ORIGINAL RESEARCH

The association between family dysfunction and admission to an acute mental health inpatient unit: a prospective study

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Objectives: With the shift from deinstitutionalization to community care in mental health services, relatives of persons with severe and enduring mental illnesses have had to take over the role as primary caregivers. Disturbed family dynamics have been observed within families with an 'ill' member. Although schizophrenia and related mental illnesses are biologically based disorders, environmental stress (including stress within family relationships) plays a major role in the onset and maintenance of symptoms. With this study, we assume that family dynamics play a central role in the course of severe psychiatric illness and hypothesized that dysfunction within family systems is a prognostic indicator of hospitalization in the course of schizophrenia/bipolar and schizoaffective disorders.

Methods: Prospective, observational cohort study evaluating family functioning of 121 patients (schizophrenia/bipolar and schizoaffective disorder) from community at baseline and followed-up over 12-month period after recruitment. Measurements included demographics, diagnosis, Family Assessment Device – General Functioning, Perceived Criticism Scale, Brief Psychiatric Rating Scale, Global Assessment of Functioning and Social Support Questionnaire-6.

Results: Significant differences found between patients admitted and not admitted during the 12-month time period for age ($p = 0.003$), Brief Psychiatric Rating Scale (BPRS; $p = 0.026$), Family Assessment Device – General Functioning (FAD-GF; $p = 0.007$) and Social Support Questionnaire total satisfaction level ($p = 0.042$) at baseline. Bivariate analysis showed that those admitted into hospital were younger with a higher BPRS score, less social satisfaction and disturbed family dynamics. FAD-GF ($p = 0.006$) and age ($p = 0.022$) were significant independent predictors for admission.

Conclusion: This provides further evidence supporting importance of promoting better family functioning through modified family dynamics, integrating and involving family into the care of such patients.

Introduction

Family is the main social group which influences a person early in their life through the development of socialization and in the shaping of his/her behavior (Pearson *et al.* 2008). Each family is represented as a system of its own and has its characteristics in relation to environment and relationship with other groups. It also has its ways of dealing with boundaries between family members regarding their communication, their roles and the quality of their emotional relationships. This identity goes beyond the individual while at the same time, it encourages individual differentiation (Reiss, 1981). Family systems theory suggests that all levels of organization are linked to each other and

changes to one of the levels have consequence to change the other. It focuses on transactions between an individual and the interpersonal environment rather than merely examining individual family members. Therefore, the family systems approach shows that there is an interplay between relationships and individuals in the whole family unit (Miklowitz, 2004; Peris and Miklowitz, 2015).

Evidence has shown that complex relationships are observed between the course of the illness and the patient's family environment. Expressed emotions (EEs) have been found to be important, predicting symptom relapse in a wide range of mental disorders, and shown to affect patients who return to families characterized by high levels of EE (Butzlaff and Hooley, 1998). It may be possible that EE is not the only factor and other psychosocial factors may have a role contributing to relapse. As EE is not a stable condition across time, it is possible that EE is increased just before

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relapse (as psychotic symptoms start to develop) (Scazufca and Kuipers, 1998). Thus, high EE may act as a confounder and not the sole cause of relapse. It is possible that family functioning, together with other social, personal and illness factors, play a role in the relapses of those mental illnesses which may eventually lead to admission.

Despite the advancement in availability of medication and treatment options, as much as 50% of patients with schizophrenia and other psychotic disorders are readmitted to the hospital after 5 years (Chen *et al.* 2018). Apart from high EE being a risk factor for relapse and admission to the hospital, a number of sociodemographic factors have also been identified that are associated with readmissions in populations with severe and enduring mental disorders (schizophrenia, bipolar and schizoaffective). Younger age and male gender were the most common factors associated with readmissions to hospitals in nearly all the studies, and across different cultures [e.g. Øiesvold *et al.* (2000) in Norway, Mahendran *et al.* (2005) in Singapore, Woo *et al.* (2006) in USA, Lin *et al.* (2010) and Hung *et al.* (2017) in Taiwan, Dey *et al.* (2016) in New Zealand and Chen *et al.* (2018) in Canada]. Variables that are reflective of social determinants such as, education level, employment and housing were also predictive of rehospitalization (Lay *et al.* 2006; Schmutte *et al.* 2010; van der Post *et al.* 2014). Similarly, unmarried status (single, divorced, separated and widowed) or living alone has been identified as a risk factor for readmission (Chen *et al.* 2017; Hung *et al.* 2017; Chen *et al.* 2018). Moreover, previous number of admissions (voluntary or involuntary) appears to be an important predictor of readmission (Callaly *et al.* 2010; Moss *et al.* 2014; Donisi *et al.* 2016; Hung *et al.* 2017). Poor support networks and challenging social environments have also been identified as risk factors for readmissions (Olfson *et al.* 1999; Donisi *et al.* 2016). However, not all studies agree about severity of illness, functional ability and medications as predictors of readmissions as some indicate an association (e.g. Hodgson *et al.* 2001; Valenstein *et al.* 2002; Callaly *et al.* 2011; Baeza *et al.* 2018), while others show no association (e.g. Boaz *et al.* 2013; O'Hagan *et al.* 2017; Zanardo *et al.* 2018; Moncrieff and Steingard 2019).

In addition, there has been research into the role of family functioning and the influences that it can have on patients not only in medical settings but also in psychiatric populations, in terms of prognostic values and outcomes of illness (Staccini *et al.* 2015). Lack of contact and support within the family have been identified as risk factors for readmissions in populations with psychotic disorders (Roick *et al.* 2004; Norman *et al.* 2005; Zanardo *et al.* 2018). Family support has also been found to be a predictor

of 90% reduction in mortality rates in people with psychosis (Revier *et al.* 2015).

Given that there is a shift from institutionalization to community mental health services, approximately 65% of relatives of persons with mental health disorders have had to take over the role as primary caregivers. This is often a long-term undertaking, either on a full-time or part-time basis when these individuals return to their families (Labrum and Solomon, 2018; Bylander, 2019). Families can have high levels of distress if they have a member who has a chronic enduring mental illness, and this can have an overall effect both psychologically and physically. The stress endured in the family can then work as a 'trigger' and may have a negative effect on the well-being of the individual with a mental disorder (Martens and Addington, 2001).

Regarding the Irish context, the closure process of large psychiatric hospitals and the process of deinstitutionalization were slow (Kelly, 2015; McInerney *et al.* 2018), while at the same time Community Mental Health Teams have been introduced as an alternative to inpatient treatment (Mental Health Commission, 2006; Vitale *et al.* 2015). Although Ireland has been characterized as an individualistic culture (according to the Hofstede model), there is still an expectation that family involvement will be strong, and perhaps family dynamics will become disturbed. Despite this, not much has been done to investigate these dynamics and their effects on readmission to hospital at an international level or at a national (Irish) level, in people with chronic and severe mental illness (like schizophrenia, bipolar and schizoaffective disorders) with few exceptions (Martyn *et al.* 2014).

Although schizophrenia and related mental illness are mainly biologically based disorders, environmental stress (including stress within family relationships) plays a major role in the onset and maintenance of symptoms. With this study, we assume that family environments play a central role as moderators of the course of severe psychiatric illness even though the direct causal role of family factors cannot be established.

Therefore, the purpose of the present study was to understand if family dysfunctions within the family system of people with chronic mental health disorders (schizophrenia, schizoaffective disorder or bipolar affective disorder) are predictive for admissions to an acute mental health inpatient unit and also to examine the effects of sociodemographic factors, individual psychopathology and the level of social support on admissions.

Thus, the following overall null hypotheses are going to be tested:

There will be no differences between those who are admitted into the acute mental health inpatient unit and those who are not within a 12-month period in terms of age, gender, family function, psychopathology, years of education, years since first diagnosis, number of previous admissions, diagnostic category, number of psychotropic medications, overall general functioning, social support and perceived criticism.

Methods

Design

Prospective, observational cohort study assessing factors related to admission measured at baseline and followed over a 12-month period after recruitment, or earlier if they were admitted to the acute mental health inpatient unit.

Participants and setting, inclusion and exclusion criteria

For this study, consecutive community dwelling participants were recruited from the outpatient clinic of Sligo Town, Adult Mental Health Services. This is a semi-rural area in the north west of Ireland. The service covers a population (catchment area) of 25 000 people aged 18 years and above. The inclusion criteria were (a) participants who are 18 years and older; (b) with a diagnosis of either schizophrenia, schizoaffective disorder or bipolar affective disorder according to the International Classification of Disease (ICD-10) and (c) able to read and understand the English language. Participants were excluded if they were unable to read or understand English.

Measurements

Sociodemographic characteristics

Sociodemographic characteristics, such as gender, age, education, status of living (alone/with other members of family at home), were collected through a structured questionnaire administered by the investigators. Further information on psychiatric diagnosis, years since first diagnosed with mental illness, number of previous mental health admissions (prior to the study period), any medical diagnosis and current medications was recorded for each patient from the medical files.

Family Assessment Device – General Functioning subscale

The General Functioning (GF) subscale is a shorter version of the Family Assessment Device (FAD; 12 items) (Byles *et al.* 1988). It has been validated as a single index for characterizing overall family functioning with high correlations ($r = 0.87$) with the other six dimensions of the FAD, and a high internal reliability of

0.84 (Kabacoff *et al.* 1990; Boterhoven de Haan *et al.* 2015; Mansfield *et al.* 2015). The scale also showed an adequate test–retest reliability (range 0.66–0.89) and stability in measuring those family functions across short time interval (Roncone *et al.* 1999; Tsamparli *et al.* 2018). It is rated on a 1–4 scale (from 'Strongly Agree' to 'Strongly Disagree') and a higher overall score indicates more family dysfunction.

Perceived Criticism Scale

Criticism which forms a part of EE is recognized as the most important element, and the Perceived Criticism Scale (PCS) measure is the simplest of all the alternative measures of EE while resembling a true EE index extremely well (Renshaw, 2008). Hooley and Teasdale (1989) devised a self-rated 10-point Likert-type scale on the following question – 'On a scale of 1-10, how critical do you feel your family are of you?'. The scale score is from 'not critical at all' (1) to 'very critical indeed' (10). PCS ratings appear to be relatively independent of current levels of psychopathology and tend to be rather stable across time and correlate reasonably well with EE as assessed by the Camberwell Family Interview (Hooley and Parker, 2006). In this scale, a higher score indicates that the patient feels more criticized by their family.

Social Support Questionnaire-6

The Social Support Questionnaire-6 (SSQ-6) consists of 6 questions derived from the original 27 questions in Social Support Questionnaire (Sarason *et al.* 1983). This is a self-rated questionnaire which assesses the person in the patients' life who provides them with help or support. There are two parts to the question. The first part is for the patient to list all the people they know excluding themselves on whom they can count on for help or support in the manner described, and the second part is for them to rate how satisfied they are with the overall support that they have. Satisfaction of support is rated on a 6-point Likert scale from 'very dissatisfied' (1) to 'very satisfied' (6). The scores for each part (1) and (2) are added separately and averaged, which provides a value for each part. The SSQ-6 has been found to correlate highly with the original SSQ-27 with internal reliabilities ranging from 0.90 to 0.93 (Sarason *et al.* 1987). A higher score indicates that the patients perceive their social support to be better (Sarason *et al.* 1983).

Brief Psychiatric Rating Scale (BPRS)

This scale is a clinician-rated scale consisting of 24 items rated over an 8-point Likert scale (0–7) with total scores ranging from 0 to 126. It has good inter-rater reliability (intraclass correlation coefficient of 0.62–0.81) that can be maintained over time. It is also sensitive and effective

to measure psychiatric symptoms (Ventura *et al.* 1993). A higher score on the Brief Psychiatric Rating Scale (BPRS) indicates greater severity of symptoms.

Global Assessment of Functioning scale

This is a clinician-rated scale with descriptors provided for each 10-point interval from 1 (being most impaired/serious problems and poorer level of functioning) to 100 (least impaired/least serious problems and better level of functioning). The Global Assessment of Functioning (GAF) scale has a high inter-rater reliability and correlates well with other measures of psychosocial function and symptom severity (Kohler *et al.* 2016). A lower GAF score indicates worse overall functioning.

Outcome

The outcome measurement in this study is the presence or absence of admission during the 12-month period of follow-up.

Procedures

Eligible participants were informed about the study on their visit to the outpatient clinics where they were asked if they would like to take part in a study focusing on family factors and functioning. They were given an information sheet describing the aims of the study and explained the time needed to complete the assessment (which included self-rated questionnaires and clinician-rated scales) which was approximately 45–60 minutes. An alert label was placed in each file to highlight that the participant has taken part in the study. Data were collected by two researchers (J.T. and C.C.). Participants who had agreed to take part had a mutually convenient appointment in the community (Day hospital) with the researchers where the scales were administered in an individual and face-to-face basis. There was no particular order given to the administered questionnaires. The BPRS and GAF were done by J.T. through all the available information. J.T. was involved in the clinical management of the vast majority of the recruited sample. A second BPRS was measured again on admission but this variable has not been used here as it was only measured in the sub-sample of those who were admitted.

Statistical analysis

All data were coded and entered into a spreadsheet. Continuous variables were reported as means + standard deviation (s.d.), while categorical variables were reported as counts and percentages. The differences between the two groups (those who were admitted and those who were not) for the examined variables were assessed using Mann–Whitney test as all variables with the exception of age and education

years were not normally distributed. Differences between categorical variables were examined by using χ^2 tests. A binary logistic regression was applied to estimate the relationship between the dependent variable (presence/absence of admission) with other variables. Cases with missing values were excluded listwise. The IBM SPSS version 24.0 for Windows software was used for the statistical analyses.

Results

Descriptive statistics

Demographics and baseline characteristics of the sample

One-hundred and thirty people were approached consecutively and from there, 121 had agreed to participate in the study. Participation rate for this study was 93%. The mean age of the 121 participants was 48.4 (s.d. = 14.1) of whom 66 (54.5%) were males. (See also Table 1 for the remaining variables.)

Bivariate statistics

Differences between the two groups (admissions and non-admissions) on baseline variables

In this analysis, a comparison of different variables (Table 2) was performed to find out if there were significant differences between those who were admitted from those who were not admitted by using the Mann–Whitney test. There were significant differences found in terms of age (Mann–Whitney = 848.50, $p = 0.003$), BPRS score (MW = 945.00, $p = 0.026$), GAF (MW = 838.50, $p = 0.005$), FAD-GF (MW = 888.00, $p = 0.007$) and SSQ total satisfaction level (MW = 983.00, $p = 0.042$). Thus, it seems from the results that those who had been admitted within a 12-month period were more likely to be younger in age, to have more active psychopathology (higher BPRS scores) and poorer overall functioning at baseline. In addition, those who were admitted had significantly worse family function (a higher FAD-GF score) and less social satisfaction in their support network.

In relation to genders, 17 out of 66 males and 12 out of 55 females were admitted. Seven persons who were living alone and 22 persons not living alone were admitted. Using the χ^2 test, between the two groups, it was found that there were no significant differences in terms of gender ($\chi^2 = 0.255$, df = 1, $p = 0.613$) or living status ($\chi^2 = 2.163$, df = 1, $p = 0.141$).

Of the three different diagnoses, 17 out of 68 patients who had schizophrenia and 4 out of 12 patients with schizoaffective disorder were admitted. For patients with bipolar disorder, 8 out of 41 were admitted during the study period. However, after cross-tabulation, and using χ^2 test, there were no statistically significant

Table 1. *Baseline characteristics of the sample*

	Frequency (%)		Mean (S.D.)	
	Admitted	Not admitted	Admitted	Not sdmitted
	29 (24%)	92 (76%)		
Age			*41.48 (14.64)*	*50.62 (13.21)*
Gender				
Male	17 (58.6)	49 (53.3)		
Female	12 (41.4)	43 (46.7)		
Family Assessment Device – General Functioning			*2.24 (0.60)*	*1.96 (0.57)*
Brief Psychiatric Rating Scale			*44.64 (16.28)*	*36.56 (10.91)*
Global Assessment of Functioning			*62.61 (14.79)*	*52.41 (17.17)*
SSQ total satisfaction			*5.04 (1.12)*	*5.41 (.87)*
SSQ number of supports			*2.16 (1.99)*	*2.20 (1.39)*
Level of PC			*5.46 (2.72)*	*4.33 (3.06)*
Status of living				
Alone	7 (24.1)	36 (39.1)		
Not alone	22 (75.9)	56 (60.9)		
Psychiatric diagnosis				
Schizophrenia	17 (58.6)	51 (55.4)		
Schizoaffective disorder	4 (13.8)	8 (8.7)		
Bipolar disorder	8 (27.6)	33 (35.9)		
Number of previous admissions			*3.79 (3.02)*	*4.75 (5.82)*
Years of education			*13.67 (3.08)*	*13.41 (3.15)*
Years since first diagnosis			*15.62 (13.13)*	*19.86 (11.30)*
Total number of psychotropic			*2.32 (1.07)*	*2.14 (1.26)*
Total number of medications			*2.72 (1.31)*	*2.65 (1.43)*

SSQ, Social Support Questionnaire.
Continuous variables are in italics.

Table 2. *Differences in baseline continuous variable between the two groups*

	Mann–Whitney	Significance (*p*-value)
Age	848.50	**0.003**
Years of education	1294.50	0.809
Years since first diagnosis	1045.00	0.079
Number of previous admissions	1264.00	0.669
Brief Psychiatric Rating Scale total	945.00	**0.026**
Global Assessment of Functioning	838.50	**0.005**
Family Assessment Device – General Functioning	888.00	**0.007**
SSQ total satisfaction	983.00	**0.042**
SSQ number of support	1179.00	0.435
Perceived criticism	799.50	0.053

SSQ, Social Support Questionnaire.
Significance highlighted in bold.

differences among the psychiatric diagnoses ($\chi^2 = 1.064$, df = 2, $p = 0.587$) between those who were admitted and those who were not. In addition, no differences were found between the two groups for the total number of the psychotropic medications and the total number of all medications (psychotropic and for medical conditions) (Mann–Whitney = 896.500, $p = 0.371$ and Mann–Whitney = 946.00, $p = 0.677$, respectively).

Binary logistic regression

Finally, a model for prediction/association between the baseline factors (age, gender, years of education, diagnosis, years since first diagnosis, number of previous admissions, total number of the psychotropic medications, total number of all medications, perceived criticism (PC), BPRS, FAD-GF, SSQ and GAF) and admission in 12-month time period was conducted using logistic regression analysis with the backward stepwise procedure. The final most parsimonious model is shown in Table 3. There was significant association for the FAD-GF ($p = 0.006$, df = 1, 95% CI: 1.252, 3.982) and for age ($p = 0.022$, df = 1, 95% CI: 0.93, 0.99). GAF was not significant ($p = 0.112$, df = 1, 95% CI: 0.96, 1.00) but was still predictive in this final model. Other independent predictors such as BPRS, age, gender, SSQ, number of previous admissions and PC were not

Table 3. *Predictors of 1-year admission: logistic regression model, with backward stepwise procedure (N = 118)*

	B	Standard error	Wald test	Degrees of freedom	p	EXP (B)	95% confidence interval
Age	−0.039	0.017	5.237	1	**0.022**	0.962	0.930, 0.994
Family Assessment Device – General Functioning	0.803	0.295	7.411	1	**0.006**	2.233	1.252, 3.982
Global Assessment of Functioning score	−0.018	0.011	2.519	1	0.112	0.982	0.960, 1.004

significant and not retained in the final model. Thus, it can be seen that the significant independent predictors for admission were younger age and poorer family functioning.

The reliability (internal consistency) of FAD-GF for this sample was Cronbach's $\alpha = 0.872$ and the Cronbach's α for the BPRS was 0.856.

Discussion

The results of this study indicate that there were significant differences between the two groups (those admitted into the acute mental health inpatient unit within 12 months and those who were not) for the following baseline characteristics: age, BPRS, GAF, FAD-GF and SSQ total satisfaction. In addition, the results also show that independent predictive factors for admission were younger age and worse family function.

The purpose of this study was to examine predictors that may influence admission for patients with chronic enduring mental illness. Findings indicate that family dysfunction is a significant predictor for admission to hospital. In this study, the rating of the FAD-GF subscale was taken from the patient's perception. This provides a better perception of the family environment especially for patients with schizophrenia, as the way they perceive the family environment predicts his/her admission to hospital (Canive *et al.* 1995). Apart from that, the patient's perception of family functioning seemed to reflect characteristics of their disorders compared to family members who perceive family functions similarly, regardless of patient diagnosis (Koyama *et al.* 2004).

The relationship of severe mental illness and in particular, schizophrenia within the family and in the social environment is a complex one. Laing and Esterson (1970) had suggested that the mental illness should not be thought as being located within the patient but within the family or within the social environment. They regarded the patient as a sensitive person who was squeezed into the 'double-bind' (Bateson *et al.* 1956) messages from his family (Laing and Esterson, 1970). Miller *et al.* (2000) described how dysfunctional transactional patterns are associated with

family impairment: some associated with problems in one particular dimension while other creating difficulties in a number of dimensions. Similarly, some may be highly adaptive for one family but dysfunctional for another (Miller *et al.* 2000). Families of patients with schizophrenia or mania did not differ substantially from non-clinical families but a patient with schizophrenia may be more sensitive to even minor family difficulties and patients with mania may be minimizing the family dysfunctions (Miller *et al.* 1986). Thus, having a family member with a psychiatric disorder regardless of the specific diagnosis appears to be a risk factor for poor family functioning (Friedmann *et al.* 1997).

From our study, however, it cannot be said completely that family dysfunction is the true 'cause' for admissions. Although the study was across the time span, it was purely observational and not experimental. A cause–effect relationship could only be concluded from experimental studies. Studies with experimental design may be difficult if not impossible to conduct in order to investigate family dynamics. In addition, the opposite relationship has also been observed. In non-clinical population (assumed healthy) where there was family dysfunction, there was at least one adult member with undetected psychopathology (Adamis *et al.* 2019). This occurs in different culture milieus, as well as in the Irish culture. In adolescents who have dropped out of school but were otherwise healthy, the same association was reported (Martyn *et al.* 2014). This, at the theoretical and clinical level, has been called 'circular causality'. Through this feedback, the family regulates the behavior of its members and achieves its stability (homeostasis).

A common assumption of all schools of family therapy is that individual and family pathologies relate through circular causality which not only promote but also maintain the presence of pathology as a structural characteristic of the family system. This pathological structure is typically represented by the notion of the 'identified patient' (I.P.) – also called the 'symptom-bearer' or 'presenting problem' (Bateson, 2000) – whose symptomatology, according to the 'systemic perspective',

is a manifestation of the family's issues and mainly expresses dysfunctional patterns of the family. The I.P. notion is closely linked to that of 'homeostasis' in the sense that the I.P.'s symptomatology assists the family's need to 'avoid change' inherent in the individual as well as the family. In that sense, there is no morbidity without co-morbidity: a relationship that, on the one hand, indicates the imperial role of the family in the falling (of one of its members) into illness or coming out of it and on the other hand, indicates that any intervention should take into account (apart from the individual) the family.

Staccini *et al.* (2015) found that in psychiatric patients, the FAD scores were significantly associated with severity of illness, psychosocial functioning, presence of comorbidities, length of recovery, recovery rates, likelihood of dropping out, suicidality and victimization by partner (Staccini *et al.* 2015). Therefore, patients with dysfunctional families may need closer monitoring regarding their compliance than patients with more functional family dynamics as this can prevent further relapses that may contribute to admissions as a proxy for relapse. This supports the findings that patients with poorer family functioning were more likely to be admitted than healthy families and provides a good awareness into the importance of screening to identify problem areas of family functioning which may differ between families and between members of the same family.

To the best of our knowledge, there has been no previous study utilizing family dysfunction as a predictor for admission. The majority of studies concerning the FAD have been based on recognizing family dysfunction mainly in affective mood disorders and suicide (Keitner *et al.* 1987; Sarmiento and Cardemil, 2009; Weinstock *et al.* 2006), eating disorder (Waller *et al.* 1990), substance use (McKay *et al.* 1993), PTSD (Evans *et al.* 2009) and obsessive compulsive disorder (Staccini *et al.* 2015). The present study adds further evidence to the literature that the administration of the GF subscale can allow further assessment of the health of families and assist in determining the association with admission. Being able to predict the possibility of admission has implications for the necessary interventions that can be provided to these patients and to their families.

In addition to examining the primary question of interest, the findings of this study provide further insight into the secondary issues – younger age, higher BPRS score, family dysfunction, lower GAF score and less social support satisfaction – that are suggestive as parameters significant for admission into an acute mental health inpatient unit.

This study shows that younger people with chronic mental disorders are more likely to be admitted into hospital. From the predictive model, it was also significant to predict 1-year admission. This is in accordance with previous studies (see 'Introduction') as well as with a recent systematic review (Zanardo *et al.* 2018) where age was a significant predictor for readmissions in the vast majority of the studies it examined. A possible explanation is that younger patients are more likely to be less mature and their illness being much more unstable. Perhaps tolerance threshold for admissions decreases particularly after an index admission. Apart from that, they are also more likely to be sensitive to their emotions and role in the family and have closer interaction due to the higher possibility of living with them.

PC was found to be not significant as a predictive factor for admission in this study despite literature which supports PC as a predictor of relapse, time to relapse and even frequency of admission (Scott *et al.* 2012). It is possible that the result was non-significant in a statistical sense but still reasonable enough to contribute in a manner which can influence a patient's outcome. This is because there may have been some biases with the PC rating such as criticality bias and biased cognitive or neural processing. Also, it may be that the family is indeed highly critical which can lead to a stressful family or home environment (Masland *et al.* 2019). These studies have also not investigated the overall family function but have focused on only one aspect of it (criticism). In dysfunctional families, criticism is perhaps only a part of the overall dysfunction in a complex family system. This is possibly the most likely explanation as to why we did not find criticism to be a significant factor, because in this study, we examined the more weighted functioning as a whole.

The results also show that lower GAF scores were a factor for admission, and although not significant in the regression analysis, it was still shown to be predictive in the model. The GAF is still the briefest form of mental health outcome assessments and is a good tool to measure overall severity in a patient's functioning (Salvi *et al.* 2005). These different outcomes may reflect the intricacy of contributing factors for admission.

In addition, this study found a significant difference in the SSQ level of satisfaction but not in the amount of support provided between those who were admitted and those who were not. However, this result should be interpreted with caution as subjective measures may be influenced by one's personality, mood or cultural upbringing (Procidano and Heller, 1983; Lakey *et al.* 1996; Russell *et al.* 1997). As to why the amount of support was not significant, the explanation could be in line with theoretical supposition of previous scholars who argued that the main dangers to one's health come from social isolation (House, 2001) and thus, even a moderately low amount of support helps to alleviate the feelings of isolation or helplessness in times of need and provide a protective effect (Shor *et al.* 2013).

The different diagnoses (schizophrenia, schizoaffective and bipolar affective disorders) in this study showed no significant differences. A likely explanation could be that these chronic disorders distribution overlaps significantly in terms of phenomenology that they fall on a spectrum (Keshavan *et al.* 2011). The only likely differences between them would be in the characteristics of affectivity, negative symptoms and level of insight (Pini *et al.* 2004). Apart from that, given the number of samples for each diagnosis in this study, it is unlikely that there would be a significant difference between those who were admitted and those who were not.

Olfson *et al.* (1999) showed that many relatives did not receive any family services, with some refusing to become involved in the treatment or care of the patient (Olfson *et al.* 1999). Recommendations to include family psychoeducation interventions are thus important as it has been widely demonstrated to be effective as a model for the prevention of hospitalization and should be included as part of a comprehensive psychosocial treatment package (Pitschel-Walz *et al.* 2001; Mayoral *et al.* 2015). These interventions have also been proven to be beneficial, by improving not only clinical symptoms but also social functioning while maintaining their efficacy for up to 6 months (Anderson *et al.* 1981; Mayoral *et al.* 2015).

Limitations and strengths of the study

As with any study, this study also has its limitations. First, evaluation of family functioning was a self-report measure, thus findings may actually reflect a perceptual bias with over- or under-reporting rather than actual deficits. In addition, the rating may be influenced by the severity of psychopathology not only for the FAD-GF but also for the other scales. However, as with all self-reported scales, the rate reflects the perception of the individual.

Another limitation is that the evaluation of family functioning was not repeated on admission, and this could help to identify and highlight the possible dimensions that are most likely dysfunctional. It is also important to note that the admission itself can be included in the definition of relapse, but it may not reflect the exacerbation of the illness. Assessing relapse may help to further the investigation of the association between family dysfunction and severity of psychopathology but this does not have any predictive value as there has been no standardized consensus on what relapse means.

Further to that, this study had only gathered a short-term follow-up data, and this might not be representative of the overall picture. With a longer follow-up period, a larger sample of data can be collected and different patterns of predictors may be identified.

Cultural differences will be another limitation for this study, as all participants were from the same country and the same culture, thus generalizability of the results to other cultures is lacking. This is not due to the exclusion criterion (language) but to the setting (semi-rural area with small cultural diversity). However, the results of this study could stimulate further studies which could include different ethnicities, races and religions as the perception of families and their functions across different cultures may differ.

Despite the limitations mentioned, the strengths of this study are, first, the use of a clear and distinct outcome which in this case was admission – with a definition of either being admitted in an acute mental health inpatient unit or not. Second, we are assessing not just the EE, but more comprehensive factors which assess the overall family functioning in relation to admission.

Conclusion

This study has provided evidence of an association between family dysfunction and admission to an acute mental health inpatient unit.

It is important to include family intervention programs as a part of the treatment package to provide a better outcome and prevent unnecessary admissions. Although everyone recognizes that family function is an important aspect for recovery, it is very surprising that not much research or evidence has been gathered regarding the role of family dysfunction and admission into the hospital. There is disproportion in research where only one aspect of family dynamics is examined, which is EE and its relation to relapse or admission. Future directions from here would require a repeat of this study to include other cultural demographics. This would provide a more generalized view and would strengthen the findings of this study.

Conflict of interest

JHPT, CC, AT, DO'N and DA have no conflicts of interest to disclose.

Ethical standards

All participants involved in the study provided written informed consent. The study was approved by the Research Ethics Committee of Sligo University Hospital. The authors assert that all procedures contributing to this work comply with the ethical standards of the relevant national and institutional committee on

human experimentation with the Helsinki Declaration of 1975, as revised in 2008.

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