



Influence of at-risk family interactions on the course of psychiatric care in adolescence

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Received: 8 June 2023 / Accepted: 28 November 2023
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Abstract

Dysparenting, referring to inappropriate parental attitudes, is a vulnerability factor for mental disorders during adolescence and a therapeutic leverage, yet clinicians lack reliable tools to assess it in daily clinical practice. Moreover, the effect of this dysparenting on the amount of psychiatric care remains unclear. The Family and Care study aims to develop the at-risk family interactions and levers (ARFIL) scale, a comprehensive 30-item clinical scale, and to assess in a cross-sectional design, the impact of these at-risk family interactions on the care of adolescents ($n=425$) hospitalized in psychiatry and aged 13–19 years old. Factorial analysis shows that the ARFIL scale consists of three main dimensions associated with cohesion/conflicts, love/hostility, and autonomy/control with good psychometric properties. Multivariate regressions show that the ARFIL intensity score predicts the duration of hospital care, regardless of age, gender, medical severity on admission, assessed by the Global Assessment of Functioning scale, the presence of maltreatment and psychiatric diagnoses. Moreover, the ARFIL diversity score (number of items present regardless of their severity) predicts both the number and duration of hospitalizations. At-risk family interactions are a determining dimension of psychiatric adolescent care, and the ARFIL scale could constitute a valuable tool, not only for holistic evaluation and treatment, but also for prevention.

Keywords Family interactions · Adolescence · Psychiatric care · Hospitalization · ARFIL scale

Introduction

Child mental health is now recognized as a key public health concern, as it is estimated that 22–40% of adolescents aged 13–18 suffer from a mental disorder [1]. Alongside genetic and biological risk factors, the role of family in the prevention of these disorders, their severity, and in the course of their treatment has been described in a number of studies [2–7]. Some of them focus on the severe and long-lasting effects of maltreatment (abuse and neglect), on mental health [8], others focus on parenting styles. Among these, some dimensions are regularly described, like control or autonomy granting, over-involvement, inconsistency, warmth (affection, attentiveness, acceptance), family cohesion or communication level. Historically, two fundamental dimensions of parenting have been proposed by Schaefer [9]: love–hostility and control–autonomy. The first dimension refers to the parent’s ability to be accepting, supportive, and sensitive to the child’s needs. The second dimension refers to parental efforts to monitor and adjust their child’s behavior. According to Baumrind [10], it allows distinguishing four

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categories of parenting: authoritative (focus on limit setting with connection), authoritarian (focus on discipline without connection), permissive (lot of connections, low boundaries), and uninvolved (low connection and boundaries). In depressive and anxiety disorders, more inter-parental conflict, over-involvement, aversiveness, and less warmth have been described; and for depression, it also included less autonomy granting [4]. According to Pinquart, externalized and internalized disorders were predicted by harsh control, psychological control, authoritarian, and neglectful parenting (added to permissive parenting for externalized disorders) [6, 7]. Most scales focus on general parenting styles, but as studies delve deeper into the links between parenting and child psychiatric psychopathology, the need arises for more precise criteria of family interactions. Thus, significant unmeasured dimensions were revealed by other studies, such as inter-parental conflicts, premature separations or parental suicidal threats, particularly in their links with borderline pathology [11, 12].

Among the psychometric tools existing to measure parenting or family functioning according to these dimensions or these categories, most are self-administered questionnaires to be completed by the child, as the Parental Bonding Instrument (PBI) scale or the Parental Authority Questionnaire [13, 14]. Some others are to be completed by the parents as the Parental Self-Efficacy for Reducing the Risk of Adolescent Depression and Anxiety scale, the family Adaptability and Cohesion Evaluation Scale, or the Multidimensional Assessment of Parenting Scale [15–17]. But according to studies and experts in the field, the correlation between self-measured and child-reported parenting is weak. Most of the time, parents are more likely to identify difficulties arising from their children or from symptoms, and children are more likely to rate difficulties arising from their parents [18, 19]. Parents may be, for example, less aware of or inclined to report neglecting behavior or the use of psychological control strategies [16]. Measurement tools of family interactions observed by an outside observer have also been developed, as the Parenting Clinical Observation Schedule and the Iowa Family Interactions Rating Scale [20, 21]. The first one assesses three dimensions: responsive involvement, constructive discipline, and problematic discipline, in the context of a specific clinical profile (child disruptive behaviors). The second is focused on communication in parent dyad's relationship and problem solving. These types of observational measurements of parenting usually demonstrate stronger prediction of child outcomes and better reliability than self-questionnaires [22, 23]. However, these scales use complex coding system (not suitable for clinical daily use), and do not capture parenting in a way that is sufficiently useful to everyday practice [20]. This lack of feasibility and relevance in clinical practice also highlights the limits of separated research from clinical practice in this

area and calls for the development of tools that combine these different needs.

Up to now, studies have described general aspects of parental or family functioning in terms of communication, cohesion, and educative aspects. But on one hand, those parenting scales measure parent–child interactions but not parent–parent interactions (e.g., parenting conflicts regarding the child), and on the other hand, day-to-day clinical practice requires a more precise assessment of relational issues to better target therapy. For example, emotional invalidation (described in cognitive behavioral theory) or paradoxical communications (double-bind described in systemic theory) are very specific relational modalities, which can disorganize the child development if they are not accurately identified and dealt with. Considering the important role played by the family in the risk and resilience factors for mental disorders in children and adolescents, we can assume that a reliable measure of dysfunctional interactions could also be an important determinant, or even indicator, of the amount of care that will be needed for a given patient. To date, research into the predictive factors for psychiatric care and hospitalization in adolescent psychiatry has focused mainly on the clinical characteristics of the patient [24–26], family composition and history [27, 28], or abuse and neglect [26, 29, 30]. The few studies that have measured the specific links between parenting and psychiatric care described that family cohesion and support (through one or two dimensions) reduced the risk of hospitalization [31, 32]. Rice and Tan [33] described four main family factors precipitating the crisis leading to adolescent hospitalization: changes in family structure, exposure to family trauma, family conflict, and parental instability. But to our knowledge, no study has investigated the influence of the quality of parenthood on the amount of care a patient requires, while it is considered as an important healthy, politic, and economic challenge [34].

Considering both the importance of precisely assessing familial relationships in child and adolescents with mental health problems and the limitations of existing tools, we have created the at-risk family interactions and levers (ARFIL) scale. It is a hetero-evaluation by the clinician of the patient's family relational dysfunctions, whose dimensions stem from previous scales, from theoretical background, and from clinical experience of a variety of psychiatric disorders in adolescence (Annex 1). The ARFIL scale makes it possible to base the assessment both on the emotions, behaviors, and comments of the youth and the parents, but also on the observation of clinicians. Moreover, this scale meets a current need to increasingly consider patients in their environment, to precisely analyze their needs and enable better-targeted, and therefore more effective, preventive, and therapeutic actions to be put in place. It is part of the Global health movement, which emphasizes transnational health issues, determinants, and solutions to improve

health, through a synthesis of population-based prevention with individual-level clinical care [35].

The aims of this work are to present the psychometric criteria of the at-risk family interactions scale, and to test the hypothesis of the Family and Care study, that these interactions would increase the number and duration of adolescents' psychiatric hospitalizations.

Methods

Participants

The Family and Care study is a cross-sectional study exploring the family dynamics of all patients hospitalized in the psychiatric care unit for four successive years, i.e., $n = 425$ patients aged 13–19 years. Patients come from center/south of Paris and the surrounding region, which has a higher standard of living than the regional average. Patients are referred for all types of psychiatric disorders by their psychiatrists or by local hospital emergency departments. Admissions are scheduled 48 h in advance on average. There was no change in the modalities of care or observation with a usual situation. At the end of care, the clinician rated the ARFIL scale and recorded other information in the patient record. The patients were seen every other day for a medical interview and for a family interview on admission, every week and on discharge, i.e., four 1-h family interviews on average. The ARFIL scale was coded by each of the two physicians on the unit for the patients for whom he was responsible, at discharge. The two doctors in the hospitalization unit checked the consistency of their respective ratings once a month, as collective teamwork made it possible to know all the patients (very regular communication meetings between colleagues, and meetings with patients). Alongside the ARFIL scale, the sociodemographic characteristics (age, sex, socioprofessional category) of the patients were noted, as well as the maltreatment reported by the patients, the parents, and/or identified by the nursing staff (emotional, physical and sexual abuse as well as neglect), according to the European CAN hetero-evaluation scale via MDS [36]. Socioeconomic status (SES) was determined according to each parent's employment status. A dimensional index was developed as follows: (1) higher managerial/administrative/professional, (2) intermediate occupation, (3) unemployed and retired. The inclusion criterion was to be hospitalized in the department during the period studied. The only exclusion criterion was premature discharge that did not allow sufficient family assessment, i.e., discharge before 10 days of hospitalization ($n = 7$ patients). For disorders diagnosed according to the DSM 5 [37], patients completed the French version of the Mini-International Neuropsychiatric Interview (MINI) and of the Structured Interview for DSM

Personality disorders for the nine criteria of BPD [38, 39]. Parents and adolescents both provided their written informed consent and procedures were approved by the Ethics Committee CPP-Ile de France II, Paris, France (n°20130910). The consent form indicated that adolescents and families were taking part in research into psychic vulnerability factors. Ethical conditions were met by providing totally routine care and immediately anonymizing the information collected by a research file number assigned to each patient. The scale was scored on paper and then entered anonymously into a computer (Excel), along with other data from the patient's care file.

Characteristics and construction of the scale

The ARFIL scale is a hetero-evaluation tool of 30 items describing different aspects of family functioning, that were generated from dimensions highlighted in a comprehensive way in child and adolescent psychiatry: education theories, attachment theory, cognitive and behavioral, psychoanalysis, systemic and transgenerational theory. It integrates parenting and familial dimensions described in previous studies. The ARFIL scale includes the affective and behavioral dimensions constitutive of the four parenting styles of the PBI, the Parental Authority Questionnaire and the Multidimensional Assessment of Parenting Scale derived from Schaefer and Baumrind [9, 10], such as inconsistent discipline (items 1, 4, 21), permissive parenting (item 2), authoritarian parenting (item 3), over-involvement (item 5, 13), withdrawal (items 6, 7), aversiveness (items 8, 10), psychological control (item 9, 26), autonomy granting (item 12), and warmth (item 14, 16). It also includes the more systemic and general aspect of family cohesion (16, 17, 22), as it is measured in the Family Assessment Device or parental dyad interactions (items 17, 18, 19, 20) [4, 40, 41]. Moreover, it combines some dimensions referring to the family that have been especially salient over the past decades [2, 42, 43]. These constructs include trauma and transgenerational stakes, nefarious secrets (items 24), paradoxical communication (item 11), climate of fear of the outside world (item 23), and the interpersonal role to which the child may be placed (items 15, 27, 28, 29). These dimensions are rarely studied and widely implicated in the psychopathology of adolescents, whatever their symptoms and diagnoses. All these dimensions are distinct from abuse and neglect, already described in other established and validated scales [36, 44]. The items of the ARFIL scale were reviewed by experts in adolescent psychology and psychiatry, pediatrics, and child protection, who gave their opinion on the clinical content, comprehensibility, and clarity. The scale was tested on 25 family situations before implementation in the Family and Care study, and 2 items were added at the end of this pilot test ("Climate of fear, mistrust, hostility of a parent/parents towards the child", and "The child is

reminded that he/she was unwanted or is illegitimate”). The whole scale was resubmitted to the experts, and then translated and back-translated (agreement kappa score = 76.7%).

The clinician scores each of the 30 items categorically (0 = absent, 1 = present), then assesses the overall intensity of at-risk family interactions resulting from the clinical assessment of the patient, scoring from 0 (not present) to 30 (extremely invasive): this is the Intensity score. Then a Diversity score is calculated with the sum of the items present (those that were rated 1).

ARFIL scale validation

The scale validation methods included the measure of: the latent structure with a principal component analysis;

the internal consistency by calculating Cronbach’s alpha; the inter-rater reliability with the intra-class coefficient for each ARFIL score; the concurrent validity (using the Global Assessment of Functioning scale (GAF), a 100-point hypothetical continuum of mental health and functioning included in the DSM); the convergent validity (using the PBI [13]). The ARFIL scale was subjected to a principal component analysis with varimax rotation (Table 1). We retained this orthogonal rotation keeping all ARFIL items for two reasons: one, inspection of the eigenvalues (greater than one) and analysis of the scree plot led us to choose a three-component model bearing, respectively, for 15%, 11.3%, and 9.3% (sum = 35.6%) of total variance, and second, the three main components were highly interpretable clinically.

Table 1 Varimax rotated principal component analysis of the ARFIL scale (ARFIL: at-risk family interactions and levers scale)

ARFIL items (short-cut labels)	ARFIL scale component loadings			Uniqueness
	Component			
	1	2	3	
1. Educational incoherence	0.511			0.650
2. Difficulties in setting limits/boundaries	0.399			0.803
3. Excessive demands		0.392		0.748
4. Parentification	0.422			0.779
5. Overprotection			0.542	0.594
6. Lack of parental reliability	0.587	0.342		0.535
7. Emotional coldness		0.626		0.583
8. Constant criticism		0.658		0.552
9. Excessive control		0.340	0.589	0.527
10. Inducing guilt		0.615		0.572
11. Paradoxical communication			0.341	0.725
12. Difficulties with separation			0.504	0.730
13. Intrusive proximity-seeking			0.659	0.549
14. Relational instability	0.627			0.534
15. Overly intimate climate			0.344	0.854
16. Abandonment-centered atmosphere	0.505	0.489		0.503
17. Repeated conflicts within the family	0.735			0.422
18. Parenting conflicts regarding the child	0.553		0.352	0.568
19. Loyalty conflicts	0.715			0.402
20. Parents undermining each other	0.741			0.375
21. Parental unpredictability	0.644			0.542
22. Lack of support, comforting, acceptance	0.326	0.580		0.538
23. Climate of fear of the outside world			0.485	0.762
24. Traumatic familial context			0.371	0.815
25. Unwanted or illegitimate child				0.897
26. Excessive fixation on at-risk behaviors		0.463		0.751
27. Re-enactment of familial conflicts			0.515	0.683
28. Unwarranted inspection				0.879
29. Parent(s) threaten(s) with suicide	0.412			0.774
30. Climate of fear toward the child		0.543		0.675

Component 1 = cohesion/conflict; component 2 = love/hostility; component 3 = autonomy/control

Data analysis

The data analyses were performed using R software (version 4.0.2). Bivariate correlations with Student’s tests were estimated between ARFIL scale Intensity and Diversity scores and the care indicators, as described by the number of hospitalizations and the cumulative duration of those hospitalizations (Table 2). The different diagnoses were described in their prevalence and in bivariate correlation with ARFIL scores, using Student’s tests (Annex 2). Then multivariate regression models were used to estimate effects of ARFIL Intensity and Diversity scores on the number and duration of hospitalizations, with covariates including age, sex, maltreatment (emotional, physical or sexual abuse and neglect), GAF, and psychiatric diagnoses (Table 3). The two psychiatric diagnoses found to have the highest correlations with respective independent variable were schizophrenia/psychotic disorder and pervasive developmental disorder with hospitalization duration. Borderline personality disorder and bulimia nervosa had the highest correlations with hospitalization number. So, they were introduced as co-variables for each correlation, as other diagnoses were grouped and coded as a dummy variable “other diagnoses”. The individual total length of hospitalizations (in days) was estimated using OLS regressions, and the number of hospitalizations using zero-truncated Poisson models on R using GLM and VGLM procedures.

Results

Sample characteristics

Most participants were native European adolescents (95%), including 67% (283/425) of young women, with a mean age of 15.5 y.o. (sd = 1.3). Most of them belonged to families with high (201/425, 47.3%) or intermediate (159/425, 37.4%) economic status. The GAF score at entry was 33.1/100 on average (sd = 9.0, [min = 3, max = 55]). This corresponds to major impairment in several areas (e.g., school, judgment, thinking or mood) or to impairment of sense of reality or communication (e.g., speech that is at times illogical, obscure or inappropriate). The abuse scores noted were 46.1% (196/425) for emotional abuse, 21.4% (91/425) for physical abuse, 25.1% (107/425) for sexual abuse, and 70.5% (300/425) for neglect. The patients had been hospitalized on average 1.3 times (sd = 0.68, [1–7]), and the average number of days of one hospitalization was 24.1 days (18.4, [1–206]). The mean number of cumulative hospital days was 31.8 days, (26.2, [1–232]). The patients had received an average of 2.6 diagnoses (1.3, [1–8]). The diagnoses of the sample are presented in Annex 2.

Table 2 Correlation between hospitalizations indicators and ARFIL scores/GAF/age (Student tests) and means of hospitalization indicators by maltreatment/sex (Chi-square tests) (ARFIL: at-risk family interactions and levers, GAF: Global Assessment of Functioning)

	Hospitalization number		Hospitalization duration		Hospitalization num-ber: mean (sd)		Hospitalization duration: mean (sd)		p value
	Pearson correlation coef	p value	Pearson correlation coef	p value	No		Yes		
					Yes	No	Yes	No	
ARFIL intensity	0.17	< 0.001	0.24	< 0.001	Emotional abuse 1.3 (0.6)	1.4 (0.8)	28.3 (21)	36.4 (30.6)	0.002
ARFIL diversity	0.18	< 0.001	0.16	0.001	Physical abuse 1.3 (0.6)	1.5 (0.8)	29.4 (21.6)	41.8 (37.1)	0.003
ARFIL components					Sexual abuse 1.3 (0.6)	1.5 (0.8)	29.9 (22.1)	38.3 (35)	0.021
1. Cohesion/conflict	0.11	0.024	0.069	0.158	Neglect 1.3 (0.5)	1.4 (0.7)	29.1 (19.9)	33.3 (28.3)	0.084
2. Love/hostility	0.13	0.007	0.063	0.195	Men	Women	Men	Women	
3. Autonomy/control	0.071	0.145	0.016	< 0.001	Sex 1.2 (0.6)	1.4 (0.7)	29.6 (21.9)	33.3 (28)	0.140
GAF	-0.10	0.035	-0.28	< 0.001					
Age	0.01	0.910	-0.05	0.276					

Table 3 Multivariate modeling of hospitalization number and duration (ARFIL: at-risk family interactions and levers; BN: bulimia nervosa; BPD: borderline personality disorder; PDD: pervasive developmental disorders; SCZ: schizophrenia)

Covariates	Hospitalization duration (OLS regression)						Hospitalization number (zero-truncated Poisson)					
	Model 1		Model 2		Model 3		Model 4		Model 5		Model 6	
	Estimates	<i>p</i>	Estimates	<i>p</i>	Estimates	<i>p</i>	IRR	<i>p</i>	IRR	<i>p</i>	IRR	<i>p</i>
(Intercept)	27.13	0.075	32.14	0.036	32.04	0.033	0.27	0.294	0.29	0.311	0.38	0.438
Age	-0.41	0.632	-0.37	0.663	-0.29	0.732	1.00	0.961	1.02	0.809	1.02	0.794
Sex (women)	8.57	0.001	8.43	0.001	8.54	0.001	1.07	0.733	1.08	0.732	1.08	0.731
Emotional abuse	2.96	0.254	3.64	0.160	3.62	0.168	1.30	0.157	1.31	0.156	1.31	0.159
Physical abuse	3.69	0.232	4.07	0.194	5.32	0.099	1.13	0.543	1.13	0.544	1.13	0.534
Sexual abuse	5.53	0.045	6.17	0.026	6.41	0.020	1.21	0.297	1.23	0.252	1.23	0.254
Neglect	-2.50	0.359	-2.09	0.460	-0.58	0.845	0.87	0.529	0.82	0.392	0.85	0.488
GAF	-0.29	0.040	-0.37	0.008	-0.35	0.012	0.98	0.106	0.98	0.056	0.98	0.067
SCZ	22.02	<0.001	22.07	<0.001	21.77	<0.001						
PDD	17.24	<0.001	16.99	<0.001	16.51	<0.001						
Diags except SCZ/PDD	0.59	0.912	0.74	0.892	0.86	0.874						
Intensity (ARFIL)	0.42	0.011					1.03	0.040				
Diversity (ARFIL)			0.29	0.215					1.03	0.041		
1. Cohesion/conflict					0.31	0.807					1.12	0.223
2. Love/hostility					-0.48	0.710					1.10	0.289
3. Autonomy/control					2.42	0.037					1.12	0.184
BPD							1.52	0.030	1.45	0.056	1.47	0.050
BN							1.91	0.001	1.91	0.001	1.93	0.001
Diags except BPD/BN			421		421		1.40	0.629	1.35	0.667	1.39	0.642
Observations	421						422		422		422	
<i>R</i> ² / <i>R</i> ² adjusted	0.268/0.249		0.259/0.240		0.265/0.242							
AIC	3837.686		3842.818		3843.557		622.660		622.895		626.980	

Bold = *p* < 0.05

ARFIL scale validation

The validation steps of the ARFIL scale are described in Annex 3.

For the factorial analysis, the principal component analysis with varimax rotation yielded three main components. Table 1 presents the item loadings on each component. Only loadings ≥ 0.3 were considered significant. Factor 1 includes items related to the overall family group in relation to group cohesion and conflict. The more this dimension is present, the more the family lacks cohesion and is at risk of ruptures: incoherencies, unreliability, unpredictability, abandonment centered atmosphere, conflicts, etc. Factor 2 includes items related to emotional distance with the child. The more this dimension is at risk, the more the child is subjected to affective distancing and hostility, coldness, criticism, control, guilt, fear, lack of acceptance, etc. Factor 3 includes items related to physical and behavioral control of the child and proximity. The more this dimension is increased, the more the parents exert a controlling proximity on the child, overprotection, difficulties with separation, etc.

Correlations between at-risk family interactions and care indicators

The analysis of the bivariate correlations (Table 2) revealed positive correlations between the ARFIL scores for Intensity and Diversity and the amount of care described by the number of hospitalizations and the number of cumulative days in hospital. This means that high levels of at-risk family interactions are strongly associated with high levels of number and of length of hospitalizations. The factorial components of the ARFIL scale were also correlated with the level of care: the higher the level of family conflict, the greater the number of hospitalizations. The higher the level of hostility toward the child, the higher the number of hospitalizations. The greater the level of control over the child, the longer the hospital stay.

Multivariate models (OLS and zero-truncated Poisson) (Table 3) showed that a high ARFIL Intensity score was associated with a greater number of cumulative hospital days, even after controlling for age, sex, maltreatment, GAF score, and diagnoses (model 1). It was also associated with a greater number of hospitalizations (model 4). The ARFIL Diversity score was positively and significantly associated with the number of hospitalizations (model 5). The medical severity on admission (GAF score) was associated with the length of hospitalization (models 1, 2, 3). Finally, the third component of the ARFIL scale was associated with longer hospital stay (model 3).

Discussion

The scale and its components

The ARFIL scale is, to our knowledge, the first assessment tool for psychiatric clinician daily practice about family interactions in such a precise and holistic way at the same time. It provides a clinical-driven grid to help clinician assessing functional and dysfunctional familial climate. This scale combines advantages of self-reports from the child and from parents (such as consideration of feelings and experiences expressed by each member) [13–16] with those from direct observation methods (which ensure better reliability from external observer) [20, 21], while maintaining a high level of feasibility (rating time less than 10 min). Its good psychometric characteristics with strong internal consistency and good inter-rater reliability makes it also a valid and reliable tool. Concurrent validity is evidenced by correlation with the PBI, and convergent validity is supported by high correlations with severity indicators (strongly significant association between ARFIL scale score and GAF scale score). The factorial analysis of the ARFIL scale measured on 425 families revealed 3 factors: the first factor assesses overall family lack of cohesion. The second factor translates the emotional distancing from the child, in the sense of coldness, criticism, lack of acceptance, hostility. The third factor relates to a closer relational distance, physical and behavioral, rather described by the concepts of overprotection, excessive control, difficulties with separation, intrusive proximity.

Exposure to parental conflicts, which is evaluated in the first factor cohesion/conflicts, has a proven impact on the mental health of children and adolescents to the point of being described in the DSM 5 under the name Child Affected by Parental Relationship Distress. In their review, Harold and Sellers [45] studied the impact of these conflicts on the functioning of children. They suggested assessing parental conflict as part of a more general focus on parenting, which the ARFIL scale allows. Moreover, the second and third factors join the historical dimensions of love/hostility and autonomy/control of the works of Schaefer [9] and Baumrind [10]. Although the current study embodied an empirical approach, the factor structure of our scale is also congruent with Schaefer's circumplex model of parenting, in a way returning to the field's original roots, and provides a basis for extending it in new research and applications. Furthermore, we can consider a more global reading of these two factors, within the framework of the "stylistic dimension" proposed by Beavers [46]: the love/hostility factor would qualify centrifugal families tending toward hostility and to rejection toward third parties outside the family, while the autonomy/control factor would come under the centripetal

style, characterized by the tendency to withdraw within the family and to fight against attempts at separation. Finally, it should be noted that the autonomy/control factor was correlated with the length of hospitalization, which may suggest that hospitalization is experienced as precisely allowing a separation from the family, which is difficult to achieve otherwise. Considering the descriptions of these dimensions, the three factors of the ARFIL scale were called: 1. cohesion/conflicts, 2. love/hostility, 3. autonomy/control.

Dysparenting and psychiatric care

The Intensity score of the ARFIL scale was correlated with both the number of days in hospital and the number of hospitalizations in both univariate and multivariate analyses. The Diversity score, which is the sum of the observed items, was correlated with length of hospital stay in univariate and multivariate analysis. These findings suggest that dysfunctional family interactions may influence the psychological state of the adolescent, not only as a factor in the onset or severity of the disorder as previously described [2, 4], but also in the extent of subsequent psychiatric care. To date, research into the predictive factors for hospitalization in adolescent psychiatry has focused little on family interactions, or only through the spectrum of maltreatment, or family composition [24–26, 29, 30]. The few studies that have explored the specific links between parenting and hospitalization in psychiatry used the PBI, the Family Assessment Device and the Family Adaptability and Cohesion Evaluation Scale [13, 17, 40]. They suggested, for example, a link between family dysfunction—overprotection and low level of maternal care—and suicidal behavior in psychiatric inpatients [47, 48], or between family cohesion and the risk of hospitalization in patients with schizophrenia or bipolar disorders [31]. In an older work, Hauser et al. [32] described parent–child interactions with less empathy and more devaluing the child in families in which the adolescent was hospitalized in psychiatry, compared with those in which this was not the case. All together, these studies suggest that family interactions have impact on the care process, but usually focus on one family dimension (cohesion or affective support most of time) and did not consider the amount of care needed, while it is considered as an important healthy, politic, and economic challenge [34]. Rice and Tan’s study [33], which explored other family factors favoring the occurrence of hospitalizations (like trauma and family conflicts), suggested that it is important to broaden and deepen the semiology of family dysfunctions that can impact this particular moment of psychiatric care. In revealing a link between ARFIL scores and hospitalization characteristics (length and number), the results of our Family and Care study reinforce the idea that the precise conditions of the family environment will be decisive for a given patient’s care. Studies on the impact of

maltreatment and parent–child interactions on child health are often drawn from different fields and remain separated from each other. By distinguishing between risky family interactions measured by ARFIL and maltreatment, our study also brings together distinct but complementary data from these two aspects, to better discern the place of one and the other. More broadly, the multivariate analyses made it possible to measure the specificity and weight of at-risk family interactions alongside other already known risk factors of hospitalization, like maltreatment, medical severity, and psychiatric disorders. A precise description of the family’s symptoms can help identify risk factors before they lead to maltreatment, and thus assist in the prevention and treatment of these adolescents’ disorders.

It is also to be noted that the two Intensity and Diversity scores did not predict the same variables, the second being correlated with the duration of hospital care while the first was correlated with both number and length of hospitalizations. Intensity of at-risk family interactions gives an idea of the overall level of risk as assessed by the clinician, while Diversity assesses the number of interactions that accumulate independently of the intensity of each. This score indicates the number of different directions that therapeutic efforts will need to take, and as such may be more specifically linked to the duration of care during hospitalization, which will aim to address these different points. The score of Intensity would indicate a more general severity, pointing to the amount of care beyond hospitalization.

Psychiatric diagnoses and at-risk family interactions

Multivariate analyses based on data-driven methods revealed four diagnoses more particularly linked to care indicators. Schizophrenia and pervasive developmental disorders were correlated with length of hospitalization, while bulimia nervosa and BPD were related to number of hospitalizations. This result is entirely consistent with clinical observations, which show that psychotic symptoms take longer to treat in hospital, whereas bulimic or borderline symptoms require both shorter and more repeated hospitalizations. The results of this study provide further evidence that the longer hospital stay for psychotic disorders is not only due to the disease, but also to the environmental determinants themselves. In this, they continue the observations of Tan et al. [31], who revealed the impact of family cohesion in the risk of hospitalizations for schizophrenia, schizoaffective, and bipolar disorders.

Patients with BPD represent a significant proportion of our sample (30%) and our results showed that these patients are involved in frequent hospitalizations. It is usually described that patients with BPD account for 30–50% of all psychiatric inpatients in adolescence [49]. It shares frequent comorbidity and common determinants with bulimia

nervosa [50, 51]. Clinically, we observe that these patients often do not tolerate prolonged care, but are frequently re-hospitalized, for example when they attempt suicide again. Moreover, the environment of these patients is known to be marked by discontinuity and chaotic relationships (including premature separations), as well as maltreatment and emotional invalidation [2, 52–54]. In a previous study, we explored the combination of three types of adversity maltreatment, stressful life events (early separation from parents, parental suicide attempt, parental chronic disease), and parental bonding—as predictors of the number of BPD symptoms [2]. Results indicated that cumulative traumatic experiences largely characterize borderline adolescent's history; and, that all adversity experiences were likely to contribute to BPD symptoms: sexual, physical and emotional abuse, physical and emotional neglect, stressful life events (early separation from parents, parental suicide attempt, parental chronic disease), and parental bonding (low levels of maternal and paternal care, high levels of maternal and paternal control). Among them, the role of emotional abuse, parental suicide attempt, and a decrease in paternal level of care were particularly prominent. The Family and Care study builds on these findings by showing just how important role family relationships play beyond their extreme dysfunction, maltreatment. The multivariate analyses carried out in this study suggested that dysfunctional family interactions contribute to the amount of hospital care, independently of the pathology and its severity. Adverse events that are not maltreatment (such as early separations) or parenting styles play an independent role, which deserves a precise description.

Limitations and prospects

The study includes limitations, the main one being the lack of other comparators for concurrent validity than the PBI. However, this scale is one of the only self-report scales for these interactions that is validated in the language of the study. In addition, this tool has been largely used in previous studies on parenting in adolescents. Ideally, the use of observational tools such as the Parenting Clinical Observation Schedule would complement this assessment [20]. Moreover, the population studied comes from families of high socio-economic level, and it is necessary to replicate our results in other socio-economic contexts. Socio-environmental determinants impacting psychological health are often attributed to devalued environments, but our study, as well as a previous one on abuse and neglect of adolescents hospitalized in psychiatry [30], shows that maltreatment is also highly represented in families of high-income levels. A recent study even suggests that in more privileged socio-economic environments, the importance of family functioning is even more preponderant

alongside genetic factors in the development of psychiatric disorders (in adopted children) [55]. By detailing at-risk family interactions, our scale will enable future studies to measure more precisely the contribution of this socio-economic factor, as much as cultural determinants, which would play their own role and are not explored here [56]. Also, by correlating dysparenting and child health indicators, our study helps to put into perspective the normative aspect of defining parental behaviors as inappropriate. It is part of conceiving them as dysfunctional from the point of view of the child's health, in the sense of harmonious development, rather than by culturally defined norms. Another limitation of this study is the nature of the sample, which is made up of hospitalized patients. Patients in this sample, with a low GAF score (33.1/100 on average), are representative of typical adolescents hospitalized in a psychiatric department, with high severity and much comorbidity [57, 58]. This makes it a population of choice for describing the diversity of family environments but calls into question the study's external validity. The applicability of the scale will have to be assessed in other less severe and complex contexts, or in other types of settings like consultations or child protection services (where there is a need to develop measuring tools), including a time of pre-test training. Future studies could also use this scale to attempt to classify patients' environments according to their diagnoses, with the aim of better understanding their pathways. The literature on this subject is still sparse, even though the family unit is recognized as a necessary focus for clinical attention (which this study emphasizes). If the results of future studies confirm the value of the ARFIL, it could enable a better clinical assessment of a patients' family environment and of concrete treatment levers that would be in line with the currently developing trend toward global health. It would also enable predictions to be made about the amount of care required in each specific situation, and help clinicians to better identify at-risk family situations, and thus prevent acute decompensation by managing them at an earlier stage of this key period of development. Finally, it could allow to better understand the evaluation of environmental issues in terms of prevention and the cost of foreseeable care from a mental health policy perspective.

Supplementary Information The online version contains supplementary material available at <https://doi.org/10.1007/s00787-023-02330-5>.

Author contributions All authors contributed to the study conception and design. Conceptualization was performed by MR and MC. Methodology was performed by MR, JS, DC, MC. Material preparation, investigation, and data collection were performed by LB and MR. Formal analysis was performed by MR, LS, MV, BF, DC, and JS. Original draft preparation was performed by LS, MR, and reviewed by LS, JB, RR, and MC. Supervision was performed by DC. The manuscript was written by MR and LS and approved by all co-authors.

Funding This research had no funder.

Data availability The datasets presented in this study can be found in online repositories. The names of the repository and accession number(s) can be found at: <https://doi.org/10.6084/m9.figshare.24968043.v1>.

Declarations

Conflict of interest On behalf of all authors, the corresponding author states that there is no conflict of interest.

Ethical approval Procedures were approved by the Ethics Committee of Necker Hospital, Paris, France (CPP-IDFII-20130910).

Consent to participate Freely-given, informed consent to participate in the study has been obtained from participants and parents in this study.

Consent for publication Not applicable.

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