



Research Article

Risky Behaviors in Adolescent in Patients with AN Admitted to Pediatric Wards during COVID-19 Pandemic: Personality and Psychopathology Correlates

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Abstract

Background: the rising of child psychiatric epidemics during and after the COVID-19 pandemic increased the need of inpatient treatments for adolescents affected with anorexia nervosa (AN). There was also a more frequent and severe comorbid psychopathology as suicide attempts, suicidal ideation, non suicidal self-harming injuries (NSSI) and social withdrawal. Many AN subjects have been treated in pediatric wards and this has raised management and security problems. A deeper knowledge of AN adolescents inpatients with risky behaviors may help their management. **Methods:** we assessed 85 AN adolescents admitted to inpatient treatment in pediatric wards during the COVID-19 pandemics. The assessment included personality, eating and general psychopathology, attachment, and family functioning self-administered measures. We compared those who displayed risky behaviors with those who did not. Moreover, risky behaviors and psychopathology measures were correlated with treatment length and modality of discharge. **Results:** AN adolescents who committed suicide attempts displayed higher anticipatory worry, interpersonal distrust, preoccupation with relationships, difficulty in describing feelings, and worse family general functioning. Those with suicidal ideation greater BMI at intake and discharge, higher, lower maternal care, and worse family functioning. Both those with suicidal ideation and social withdrawal displayed higher phobic anxiety, paternal overprotection, tendency towards exploitation. Those with NSSI displayed higher disease for intimacy and worse depression. **Conclusions:** risky behaviors associated with AN in adolescent inpatients are characterized by specific psychopathology features. The early assessment of these characteristics at intake may help AN adolescents' allocation to prevent management risks.

Keywords: Anorexia Nervosa; Adolescence; Risk Behaviors; Inpatient Treatment; Child Psychiatry; ineffective [7].

List of Abbreviations

AN = Anorexia Nervosa;
ASQ = Attachment Style Questionnaire;
BDI = Beck Depression Inventory –II;
BMI = Body Mass Index;
CNW = Child Neuropsychiatry Ward;
EDI = Eating Disorder Inventory -2;
FAD = Family Assessment Device;
NPI = Child Neuropsychiatry;
NPI-40 = Narcissistic Personality Inventory;
NSSI = Non Suicidal Self-Injuries;
PBI = Parental Bonding Instrument;
PW = Pediatric Ward;
SCL = Symptom Checklist 90;
TAS = Toronto Alexithymia Scale-20; FAD = Family Assessment Device;
TCI = Temperament and Character Inventory.

Introduction

Anorexia nervosa (AN) is a complex mental disorder that can lead to a clinical and psychopathological condition that make hospital treatment necessary [1]. In recent decades, an increase in the rate of AN patients requiring hospitalization has been highlighted [2]. In particular, during the COVID-19 pandemic, the number of AN patients in need of hospital treatment in some cases doubled (increase of 104%) compared to previous years [3]. Some authors also underlined that a worse psychopathological expression of the AN and greater association with psychiatric comorbidities characterized the adolescents in this historical period [4].

Among the reasons that can cause hospitalization, one of the most relevant is the excessive and/or too rapid weight loss in AN [5]. This condition, without rapid and effective treatment, can severely compromise the patient's physical, psychological and social health to the point of putting his/her life at risk [6]. Therefore, the guidelines for the treatment of AN indicate the initiation of hospital treatment when the patient's physical health is seriously compromised, or if a serious psychopathological comorbidity coexists, or if less intensive treatments have proven

ineffective [7]. Psychopathological comorbidity represents a very important aspect for the clinical management of EDs. In fact, in addition to being a possible reason for hospitalization, the presence of psychopathology associated with the eating disorder represents an influencing factor on the duration of treatment [8]. Among the disorders most frequently associated with AN, major depression affects up to 64% of patients [9]. Depressive symptoms may be associated with suicide attempts in up to 27% of the AN subjects [10], while suicidal ideation and/or non suicidal self-injuries (NSSI) are present from 20% up to more than half of patients [11-14]. Social withdrawal is very common too in AN adolescents, being present in up to 90% of the patients, and it is possibly related to higher self-harm risk [15,16].

With respect to hospital placement, some evidences from the literature support how adolescents with AN should be assisted in hospital departments which are suitable for their age, such as Child Neuropsychiatry Wards (CNW) and Paediatric Wards (PW), and close to their home in order to provide adequate educational activities during longer hospitalizations [7]. However, the management of the most severe cases of AN, especially when they display critical physical conditions or when they occur in comorbidity with serious psychopathological problems, such as suicidal ideation or suicide attempts, can be difficult in PW since these may be not specialized in nutrition management in severely malnourished and/or non cooperating AN adolescents [17]. Moreover, PW may not display the requirements (e.g. patient surveillance, closed doors and windows, environmental surveillance) needed for successfully managing psychiatric comorbidity (e.g. suicidality and NSSIs), which may significantly raise the mortality and morbidity risk [18]. Therefore, after the initial hospitalization in a PW, it may be necessary to transfer AN subjects with psychiatric comorbidity to a CNW with a specialized eating disorder unit, even if it can be far from the place of residence, as it is more protective towards suicidal ideation and other psychiatric comorbidity, and/or is better equipped for the management of the eating disorder in the phase of severe malnutrition or opposition to nutrition and/or hydration [19].

Frequently the transfer of the more severe AN patients from a PW to a CNW follows the treatment failure or the manifestation of self-harm or life-threatening behaviors. When an adolescent with AN is admitted to a PW, it is thus useful to explore, along with the weight evolution, also the psychopathological indicators of suicide attempts, suicidal ideation, NSSI, social withdrawal to identify prognostic factors and functional aspects that can help clinicians to address more quickly and effectively their placement in the CNW, guaranteeing a “tailor-made” therapeutic path with respect to their psychopathological situation [20].

Many psychopathological features characterize AN adolescents. Specific personality characteristics are associated with the disorder in adolescence [21], high levels of eating psychopathology [22], high levels of deflected mood and comorbid depression [23, 24]. Moreover, AN adolescents often display alexithymia, i.e. difficulties in deciphering emotions, and elaborate on mental representations [25]. Finally, unsafe attachment styles are important psychopathological aspects in patients with AN [26-28]. A thorough assessment of these features may thus help to trace a psychopathology profile linked to risky behaviors which is detectable in the early phases of PW inpatient treatment, to help the identification of those subjects needing early transfer into the CNW.

The present study aims to explore the psychopathological features of patients with EDs admitted for an inpatient treatment to the PW of a pediatric hospital by exploring through self-administered psychometric tests their comorbidity with some significant psychopathological behaviors detected at admission: suicide attempts, suicidal ideation, NSSIs, and social withdrawal. We expect to find out personality and psychopathology features specifically correlated with comorbid psychopathological problems which could influence the progress of the hospitalization with respect to duration, BMI increase, upon discharge at home or upon the need for hospitalization in a Neuropsychiatric (NPI) Day Hospital (DH) or upon transfer to the CNW.

Methods

Sample composition

This study involved a sample of 85 adolescents hospitalized at the Regina Margherita Children's Hospital (OIRM) in Turin between June 2020 and June 2022. Patients with a diagnosis of ED according to the DSM-5-TR [1] criteria admitted to pediatric wards (general pediatrics, nephro-gastroenterological pediatrics, infectious disease pediatrics, emergency pediatrics and low-intensity surgery) not specialized in the management of psychiatric patients due to lack of beds available in the CNW during the pandemic were included.

Inclusion criteria

1. Diagnosis of AN (any subtype of AN and atypical AN) according to the DSM-5;
2. Age-range 14-17 yo;
3. Admission to a PW of the OIRM after a general assessment in the emergency department with the exclusion of physical problems other than those secondary to AN;
4. Absence of intellectual disability;
5. Sufficient knowledge of Italian language in order to fill out the self-administered tests;
6. Patient's and its parents' informed consent for participation in the study.

Exclusion criteria

Refusal or incomplete self-administration of the psychometric tests. Hospitalized patients were visited daily by pediatricians and NPI training specialists, while NPI specialists provided a consultation at least three times a week to monitor the progress of the hospitalization by interfacing with the pediatric staff to discuss any further therapeutic intervention and/or transfer to another service (e.g. CNW or NPI DH) or discharge. The AN adolescents were assisted also by the hospital's clinical nutrition team (specialists and dieticians) and by the NPI psychological team (specialized and trainee psychologists). In all the PWs involved the nursing staff were not specialized in ED care, the ward organization was standard i.e. adapted to solely physical health problems, the PWs were not closed or protected by any security measure for psychiatric patients (e.g. periodical controls of the environment to detect self-harming instruments, inspection of the personal effects of the patients, meal assistance by nurses, etc.). In addition, the presence of a parent or a delegated adult who had the responsibility of supervising the minor was necessary.

The objective of the treatment for all adolescents admitted in a PW was to improve their physical and psychopathological conditions. Possibly the restoration of weight loss in case of malnutrition was prosecuted with the resumption of oral food intake (though a nutritional plan of progressive food resumption) or via nasogastric tube in case of total interruption of caloric and/or water intake or excessive difficulties in food resumption. An overall stable improvement in psychopathological behaviors and eating habits was then pursued.

The parameters taken into consideration to detect the outcome of the hospitalization were: age and BMI at admission, BMI at discharge, BMI delta (i.e. the difference between BMI at discharge and BMI at admission), duration of hospital admission in the PW, need to transfer the adolescent to the CNW due to lack of weight improvement and/or self-inflicted/hetero-injurious behavior, or poor cooperation with renutrition, or the need to transfer to the NPI Day Hospital due to insufficient or unstable weight or behavioral recovery. The presence of a suicide attempt among the reasons for admission, and/or the presence upon admission of psychopathological comorbidities such as Suicidal Ideation, NSSI, Social Withdrawal were considered as target behaviors for the study.

During the first week of hospitalization, the patients were tested with self-administered questionnaires for the evaluation of personality traits, eating and general psychopathology, alexithymia, attachment, parenting and family functioning. The questionnaires were provided to all AN adolescents: the patients were included

in the study only if they accepted and successfully completed the self-administration of the tests.

Self-administered questionnaires

Temperament and Character Inventory (TCI) [29]

It is a tool for the dimensional assessment of personality and consists of a self-administered questionnaire of 240 items to be answered with true or false.

The test is based on Cloninger's personality model which divides it into seven dimensions, split into "temperament" (seeking novelty, harm avoidance, dependence on recognition, persistence) and "character" (self-directivity, cooperativeness, self-transcendence), each one containing several subscales.

The dimensions are:

- Novelty Seeking (NS), expresses the approach towards new signals coming from the environment
- Harm Avoidance (HA), denotes excessive worry, pessimism and shyness
- Recognition Dependence (RD), characterized by a tendency to respond to reward signals, particularly verbal signals of approval and social support
- Persistence (PS), indicates perseverance despite a feeling of fatigue or frustration
- Self-directivity (SD), ability to regulate and adapt behavior to the needs of a situation to achieve personally chosen objectives and values
- Cooperativeness (C), concerns the degree to which a person is generally conciliatory in relationships with other people, without aggressive, hostile or egocentric behavior
- Self-transcendence (ST) denotes the expansion of personal boundaries with respect to the external world.

Cronbach's alpha for Italian population = 0.72

Eating Disorder Inventory-2 (EDI-2) [30]

It is a self-assessment questionnaire used to evaluate psychopathology related to eating disorders. It evaluates the main psychopathological characteristics linked to EDs, using 91 items which are developed into eleven scales:

- Drive for thinness (MI), indicates excessive attention to weight and diet, with an intense fear of gaining weight
- Bulimia (BU), evaluates the tendency to think or engage in binge eating or purging behavior

- Body dissatisfaction (CI), evaluates discontent with one's physical appearance and body shapes

- Inadequacy (I), measures the feelings of inadequacy, insecurity, uselessness and feeling incapable of having control over one's life

- Perfectionism (P), evaluates the refusal to accept anything that deviates from perfection

- Interpersonal distrust (SI), measures the resistance towards establishing any form of close social relationship

- Enteroceptive awareness (EC), evaluates the ability to respond correctly to feelings, and to distinguish physical sensations such as hunger and satiety

- Fear of maturity (PM), evaluates a person's approach to dealing with the demands of adult life

- Asceticism (ASC), measures the tendency to enhance oneself through self-discipline, self-denial and control of one's body's needs

- Impulsivity (I), measures the ability to regulate instinctive behaviors, such as substance abuse or incorrect eating behaviors (binge eating and purging behaviors)

- Social insecurity (SI), evaluates the fear and insecurity one has towards social relationships.

Cronbach's alpha for Italian population = 0.81

The Beck Depression Inventory II (BDI-II) [31]

It is a self-administered psychometric test, useful for assessing the severity of a patient's depressive state and the typical symptoms of depression such as hopelessness, irritability and guilt, but also physical symptoms such as fatigue, weight loss and lack of sexual interest. It consists of 21 questions to be answered with a score ranging from zero to three based on the perception of the patient of the severity of his symptoms.

The BDI-II also allows us to distinguish the somatic component of depression from the cognitive component, so that it is easier to define the specific origin of mood depression.

Cronbach's alpha for the Italian version = 0.89

Symptom Checklist-90 (SCL-90) [32]

It is a tool designed to evaluate a wide range of psychopathological symptoms. It is used to measure the progress and results of the treatments the patient undergoes in a healthcare setting.

It consists of 90 items, to be answered with a score from zero to four, which constitute nine subscales of primary symptoms typically

observed in psychotic patients: Somatization, Obsessiveness-Compulsivity, Interpersonal sensitivity, Depression, Anxiety, Phobic anxiety, Hostility, Paranoid depression, Psychoticism.

Cronbach's alpha for Italian population = 0.96

The Toronto Alexithymia Scale (TAS-20) [33]

It is a self-administered questionnaire for assessing alexithymia levels. Alexithymia is a condition that involves a deficit in the ability to get in touch with one's feelings and describe them, and to distinguish emotional states from physiological perceptions. The test consists of 20 questions to which the patient can answer with a score from one to five.

The score obtained defines whether the patient is "non-alexithymic", "borderline" or "alexithymic".

Cronbach's alpha for Italian population = 0.72

The Attachment Style Questionnaire (ASQ) [34]

It is a self-assessment questionnaire intended for measuring attachment in adolescents and adults. It consists of 40 items to which an answer must be provided with a score from one (totally disagree) to six points (totally agree).

Based on theoretical expectations and analyzes of main behaviors, the 40 items were assigned to five scales describing attachment:

- Trust
- Discomfort with intimacy
- Need for approval
- Concern about relationships
- Second nature of relationships.

Cronbach's alpha for Italian population = 0.79

The Parental Bonding Instrument (PBI) [35]

It is a self-administered questionnaire that measures the parenting style of parents during the early adolescence of their sons and daughters (before the age of 16) and is used to retrospectively evaluate how the patient was raised and treated by his parents during the first 16 years of life.

Since this instrument has a cut-off score system for both the father and mother, it is suitable for children with two parents as well as those with a single parent. For both the mother and the father, it is developed on two axes: "Care", which measures warmth, empathy and emotional support, and "Overprotection", which captures the parent's overprotection, control and interference. It is made up of 50 items, 25 per parent, to which the patient must respond with a

score ranging from zero to three.

Cronbach's alpha for Italian population = 0.81

The Family Assessment Device (FAD) [36]

It is a self-administered questionnaire to assess family functioning.

It consists of 60 items developing in seven scales:

- Problem Solving, measures the ability to solve problems in order to guarantee the persistence of effective global family functioning
- Communication, indicates the methods of exchanging information limited to verbal exchange
- Roles, measures the behaviors through which individuals fulfill family functioning
- Emotional resonance, measures the family's ability to respond to a range of stimuli with feelings of appropriate quality and quantity
- Affective involvement, indicates the interest that the entire nucleus shows in the activities and interests of each member and it is essential to evaluate how much, and in what way, there is mutual interest
- Behavioral control, expresses the model that the family adopts to control behavior in physically dangerous situations, situations that express biological needs and situations that imply socialization behavior with people outside the family
- General functioning, indicates how the subject sees their family functioning overall.

Chronbach's alpha for Italian population = 0.70

The Narcissistic Personality Inventory (NPI-40) [37]

It is a self-administered questionnaire used to evaluate the patient's level of narcissism based on the behavioral criteria for the narcissistic personality according to the DSM. It consists of 40 items to which the patient responds by choosing between two options provided by the questionnaire, developing into seven scales that measure: Authority, Exhibitionism, Superiority, Interpersonal exploitation, Self-sufficiency, Vanity, Right.

Chronbach's alpha for Italian population = 0.62

Data collection

At the time of hospitalization, the neuropsychiatrist who welcomes the patient into the ward collects reported anthropometric parameters, the patient's clinical history and the reasons for hospitalization reported by the patient and parents, the eating symptoms present at admission, the patient's criticalities regarding weight gain and loss, the eating habits, and the psychopathological comorbidities.

On the first or second day after hospitalization, the nutritional consultant carries out a physical assessment with objective measurement of the anthropometric parameters (weight in kilos and height in meters, calculating the BMI and identifying the corresponding BMI-P and z-score for nutritional purposes).

Ethics

The study was approved by the Ethics Committee of AOU City of Science and Health, Turin (protocol number: CS2 366). All participants provided written informed consent to take part in the study. All the procedures were conducted according to the 1995 Declaration of Helsinki as revised in Edinburgh in 2000.

Statistical analysis

The statistical analysis was carried out using SPSS 27.0 (Statistical Package for Social Sciences 27.0) software.

The differences in clinical, personality, nutritional and general psychopathology, attachment and family functioning features were compared using t-tests for independent samples, with respect to the following dichotomous variables: suicide attempt at admission, suicidal ideation, self-harm, social withdrawal, need to be transferred to the CNW, discharge with admission to the NPI Day Hospital. The continuous clinical variables (age at admission, duration of hospitalization, BMI at admission, BMI at discharge, delta BMI) were correlated with each other and with the personality variables, eating and general psychopathology, attachment and family functioning using Pearson's correlation.

In consideration of the large number of variables taken into account but also of the explorative nature of the study, an intermediate level of correction was applied to significance level to reduce type I error, a $p < 0.01$ was considered acceptable.

Results

Description of the sample included in the study 85 adolescents responding to inclusion criteria (age range 14-17)

were included in the study: 75 were affected with full diagnosis of AN (66 restricting subtype; 7 binge-purging subtype; 2 purging subtype) (mean age: 14.85 ± 1.76 ; mean weight 15.06 ± 1.79), 10 were affected with atypical AN (mean age: 15.72 ± 1.67 ; mean weight: 21.89 ± 3.07). Since the numerosity of the non-ANR subtypes was small, in order to preserve the aims of the study, all the adolescents admitted to a PW responding to inclusion criteria, who were generically considered AN adolescents, were included in the analysis and taken into account as a whole in the statistical analysis (Table 1) Shows the clinical parameters of hospitalization for the whole AN sample.

Parameters	Inpatients
	N= 85 m ± sd
Age at admission (years)	14.92 ± 1.75
Length of stay (days)	46.33 ± 29.88
BMI at admission (kg/m^2)	15.72 ± 2.79
BMI at discharge (kg/m^2)	16.30 ± 2.07
BMI delta (kg/m^2)	0.85 ± 1.20

Table 1: Clinical parameters of the inpatient treatment; BMI = Body Mass Index.

Comparison among the psychopathological characteristics associated with AN

Suicide attempts

(Table 2) Shows the comparison between subjects who had and those who had not made suicide attempts before hospitalization.

Suicide attempts	No N=83 mn ± sd	Yes N=2 mn ± sd	t	p
Length of stay	47.08 ± 26.76	15.00 ± 1.41	10.341	.001
TCI Impulsivity (NS2)	4.30 ± 2.56	3.00 ± 0.00	3.451	.001
TCI Anticipatory Worry (HA1)	8.13 ± 2.67	10.00 ± 0.00	-4.746	.001
EDI Interpersonal Distrust	9.98 ± 5.00	17.00 ± 0.00	-9.533	.001
ASQ Preoccupation for Relationships	28.26 ± 9.00	39.5 ± 0.71	-7.922	.001
TAS Difficulty in Describing Feelings	19.30 ± 4.92	24.50 ± 0.71	-5.900	.001
FAD General Functioning	2.02 ± 0.65	2.54 ± 0.06	-4.967	.001

Table 2: T-test comparison among subjects with and without suicide attempts with respect to clinical parameters and behavioral measures; TCI = Temperament and Character Inventory; EDI = Eating Disorder Inventory -2; ASQ = Attachment Style Questionnaire; TAS = Toronto Alexithymia Scale-20; FAD = Family Assessment Device.

Duration of hospitalization appears significantly longer and impulsivity at the TCI appeared higher in the group that did not engage in suicidal behavior ($p < .001$).

The group that had performed suicide attempts showed greater anticipatory anxiety at the TCI, greater interpersonal distrust at the EDI-2, greater concern about relationships at the ASQ and difficulty describing feelings at the TAS-20, and a worse general family functioning at the FAD ($p < .001$).

Suicidal ideation

(Table 3) Displays the comparison between subjects who manifested suicidal ideation at admission and those who did not.

Suicidal Ideation	No N=67 mn ± sd	Yes N=18 mn ± sd	t	p
BMI at admission	15.06 ± 2.22	18.26 ± 3.38	-3.696	.001
BMI at discharge	15.97 ± 2.06	17.72 ± 1.44	-3.864	.001
SCL Phobic Anxiety	7.41 ± 5.66	14.55 ± 7.06	-3.470	.001
PBI Paternal Care	26.14 ± 9.94	10.45 ± 10.31	4.466	.001
PBI Paternal Overprotection	7.95 ± 6.20	19.55 ± 11.81	-4.346	.001
FAD Problem Solving	1.85 ± 0.66	2.62 ± 0.70	-3.242	.005
FAD Emotional Involvement	1.85 ± 0.54	2.58 ± 0.59	-3.872	.001

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FAD General Functioning	1.86 ± 0.56	2.65 ± 0.57	-4.062	.001
NPI-40 Exploitation	1.22 ± 1.03	2.27 ± 0.79	-3.625	.002

Table 3: T-test comparison among subjects with and without suicidal ideation with respect to clinical parameters and behavioral measures; BMI = body mass index; FAD = Family Assessment Device; SCL = Symptom Checklist 90; PBI = Parental Bonding Instrument; NPI-40 = Narcissistic Personality Inventory

Displays the comparison between subjects who manifested suicidal ideation at admission and those who did not.

The subjects who presented suicidal ideation had higher BMI at admission and at discharge, higher phobic anxiety at SCL-90, higher paternal overprotection at the PBI, higher family general problems and worse family problem solving as well as emotional involvement at the FAD, and higher tendency to Exploitation at the NPI-40 ($p < .001$).

Those who did not present suicidal ideation showed higher paternal care at the PBI ($p < .001$).

NSSIs

(Table 4a) Displays the comparison between subjects who presented NSSI at admission and those who did not.

NSSI	No N=69 mn ± sd	Yes N=16 mn ± sd	t	p
ASQ Disease for Intimacy	35.35 ± 8.47	42.64 ± 4.57	-3.720	.001
BDI Total Depression	29.54 ± 16.09	43.73 ± 8.67	-3.814	.001
BDI Somatic Depression	13.84 ± 7.70	20.64 ± 4.65	-3.597	.001

Table 4a: T-test comparison among subjects with and without NSSI with respect to clinical parameters and behavioral measures. NSSI = Non Suicidal Self-Injuries; ASQ = Attachment Style Questionnaire; BDI = Beck Depression Inventory -II

Those who presented NSSI had higher disease for intimacy at the ASQ, higher total and somatic depression at the BDI-II ($p < .001$).

Social Withdrawal

(Table 4b) Displays the comparison between subjects who presented social withdrawal at admission and those who did not.

Social Withdrawal	No N=81 mn ± sd	Yes N=4 mn ± sd	t	p
SCL Phobic Anxiety	9.31 ± 6.79	5.00 ± 0.00	4.256	.001
PBI Maternal Overprotection	10.80 ± 7.45	25.67 ± 9.29	-3.309	.002
PBI Paternal Overprotection	9.71 ± 8.51	24.00 ± 9.00	-2.810	.007
NPI-40 Exploitation	1.36 ± 1.00	3.00 ± 1.00	-2.749	.009

Table 4b: T-test comparison among subjects with and without social withdrawal with respect to clinical parameters and behavioral measures; SCL = Symptom Checklist 90; PBI = Parental Bonding Instrument; NPI-40 = Narcissistic Personality Inventory

Those who presented social withdrawal had higher phobic anxiety at the SCL-90, higher maternal and paternal overprotection at the PBI and higher tendency to Exploitation at the NPI-40 ($p < .001$).

Transfer to CNW or NPI Day Hospital

(Table 5) Displays the comparison between those who were transferred to the CNW and those who were transferred to the NPI DH and those who did not.

NPI Ward transfer	No N= 57 mn ± sd	Yes N= 28 mn ± sd	t	p
	Length of stay	35.11 ± 20.98		
NPI-40 Right	1.52 ± 1.39	2.76 ± 1.35	-3.038	.005
Day Hospital transfer	No N= 52 mn ± sd	Yes N= 33 mn ± sd	t	p
	Length of stay	40.31 ± 25.14		

Table 5: T-test comparison among subjects with and without NPI Inpatient Ward or Day Hospital transfer with respect to clinical parameters and behavioral measures; NPI = Child Neuropsychiatry; NPI-40 = Narcissistic Personality Inventory.

Those who were transferred to the CNW showed higher treatment duration ($p < .001$) and higher attitude to defend their rights at the NPI-40 ($p < .005$). Those who were transferred to the NPI DH showed higher duration of the treatment ($p < .010$).

Significant correlations between indices of hospitalization and behavioral parameters

(Table 6) displays the correlations between the clinical indices of hospitalization and the person logical and psychopathological traits of the patients.

		r	p
Age at Admission	BDI Total	.397	.005
	BDI Somatic	.412	.004
Length of stay	BMI at Admission	-.379	.001
	BMI at Discharge	-.294	.008
	BMI at Admission	-.455	.001
BMI at Admission	FAD Problem Solving	-.426	.005
	BMI at Discharge	-.857	.001
	BMI delta	-.455	.001
	Length of stay	-.379	.001
	EDI Bulimia	.588	.001
	EDI Body Dissatisfaction	.470	.001

	FAD Problem Solving	.405	.005
	FAD General Functioning	.400	.006
BMI at Discharge	BMI at Admission	.857	.001
	Length of stay	-.294	.008
	EDI Body Dissatisfaction	.401	.008

Table 6: Significant correlations of clinical parameters with clinical and behavioral measures; BMI = body mass index; EDI = Eating Disorder Inventory -2; FAD = Family Assessment Device.

The age at admission is positively related to total ($p < .005$) and somatic depression ($p < .004$) at the BDI-II. Treatment duration is negatively related to BMI at admission ($p < .001$), at discharge ($p < .008$), and to BMI delta ($p < .001$), as well as with family problem solving at the FAD ($p < .005$).

BMI at admission negatively correlates with BMI at discharge and BMI delta ($p < .001$) and positively correlates with bulimia and body dissatisfaction at the EDI-2 ($p < .001$), family problem solving ($p < .005$) and general functioning at the FAD ($p < .006$).

BMI at discharge positively correlates with BMI at admission ($p < .001$) and body dissatisfaction at the EDI-2 ($p < .008$), and negatively correlates with treatment duration ($p < .008$).

Discussion

The study compared the outcomes of hospitalization (length of stay, increase in BMI, transfer to CNW or to NPI DH), personality traits and associated psychopathology to the comorbidity with suicide attempts, suicidal ideation, NSSI and social withdrawal in AN adolescent inpatients admitted to a PW.

Psychopathologic behaviors associated features

The incidence of suicide attempts prior to hospitalization is relatively rare in our sample (2.3%) and lower than that of the general adolescent population (4.2%) evidenced by Carli in 2020 [38]. The reason is that the majority of AN adolescents who attempted suicide before hospital admission were referred with priority to the CNW because of the better protection measures guaranteed in that department. This is underlined by the shorter length of hospitalization of the two AN adolescents who were admitted to the PW but rapidly transferred to CNW. In fact during the COVID-19 period the number of AN adolescents with severe psychiatric issues had greatly risen [4] and thus even non-specialised PW were sometimes required to manage this type of patients.

This rose a significant problem since suicide is a frequent cause of death in AN adolescents [39], who therefore need specialized care. Notwithstanding their low number, AN adolescents who had previously attempted suicide displayed several distinctive features. These characteristics are potentially useful for identifying risky situations when admitting AN adolescents to a PW, particularly for those who may be reticent regarding their past actions or future intentions. As regards personality traits, patients who had attempted suicide were less impulsive and showed higher anticipatory anxiety on the TCI. Evidence of higher anticipatory anxiety in suicide committers is in accordance with the interpersonal theory of suicide which identifies concerns for the future as possible triggers for suicidality [40]. Evidence of a lower impulsivity is more difficult to interpret. In fact impulsivity has been identified as a risk factor for suicide [41].

However, a low impulsivity may characterize suicide attempters among AN female adolescents who are generally characterized by a low degree of impulsivity [42]. It is thus possible that the determinants towards suicide could be different compared to those of the male adolescent and adult population [41]. This underlines the complexity of the suicidal phenomenon and the importance of studying it in relation to different associated psychopathologies [43].

Interpersonal distrust on the EDI-2, together with the high concern for relationships on the ASQ, may play a relevant role as suicide risk factors. In fact, both are closely linked to the difficulties in social integration often evidenced in AN adolescents [15,16]. In particular, AN adolescents with interpersonal distrust may tend to minimize the value of relationships, and may be less likely to share their feelings with others [44]. Their concern for relationships may facilitate interpersonal difficulties, which may foster suicide attempts [45]. The picture outlined in our sample confirms that poor interpersonal relationships may represent a relevant risk for suicide attempts in AN adolescent population [46].

The high difficulty in describing feelings on the TAS-20 may reinforce the above mentioned difficulty of AN adolescents in finding relational support [15]. Moreover, even if not ubiquitous, alexithymia frequently characterizes AN patients and represents a negative prognostic factor for therapeutic outcomes [27]. However, the high levels of alexithymia in AN adolescent suicide attempters confirms this feature as a risk factor for suicide attempts and hence as a potential therapeutic target for their prevention [47].

The worse family functioning highlighted on the FAD represents an “exogenous” risk factor among those evidenced in this research. This evidence is in accordance with the suggestion that good relationships with adult caregivers may represent a strong resilience factor towards suicide attempts in adolescents, reducing by up to half their suicidality [48].

In line with the literature data [11-14], 25% of our AN adolescent inpatients sample reported suicidal ideation. The psychopathological profile was well differentiated compared to suicide attempters. Although this is partly attributable to the small number of suicide attempters, the evidence underlines how the two phenomena should be interpreted differently in AN adolescents [43]. This does not imply that suicidal ideation should be neglected: on the contrary, the evidence suggests the need to accurately identify the large subgroup of AN adolescents with suicidal ideation, even without prior suicide attempts, since this represents one of the greatest predictors of suicide risk [13,43].

The negative association between suicidal ideation with BMI at admission and at discharge from PW is in contrast with what emerges from literature, which is that the more underweight patients are, the more they are prone to suicidal risk [49]. The more severe condition of underweight could have motivated the hospitalization of patients even in the absence of concomitant suicidal ideation, while suicidal ideation may have led to the hospitalization of less underweight patients. Hospitalized patients with atypical AN may have suffered this selection bias.

Among the psychopathological features, an association emerges between suicidal ideation and phobic anxiety on the SCL-90. Literature supports our results, correlating phobic traits with suicidal risk [50]. The association of phobic anxiety with suicidal ideation suggests that AN adolescents are characterized by avoidant defenses not only concerning attachment dynamics [46], but also existential problems in general, thus suicidal ideation may represent an inadequate coping strategy against a painful reality [40].

According to a psychodynamic interpretation, phobic anxiety may also be associated with unconscious unresolved conflicts with parental figures [51]. In our sample these conflicts are highlighted

by the fact that AN adolescents with suicidal ideation report low paternal care and high over control alongside with worse general family functioning, in particular with family difficulties in dealing with problems and inadequate family emotional involvement. This confirms the paternal role in the psychopathological distress of daughters with AN [52,53].

In particular it links the suicidal ideation of AN adolescents to the parenting style defined “affectionless control”, which was recently evidenced as a specific risk factor also for the development of obesity [54]. Moreover, the association of family dysfunctions with suicidal ideation in AN adolescents supports the need for family counseling, which was already demonstrated a successful tool to improve the overall outcome in eating disorders [55].

The propensity for interpersonal exploitation of some AN adolescents who report suicidal ideation suggests that this expression of suffering may sometimes represent an instrument for the manipulation of interpersonal relationships in a malfunctioning family environment as an attempt to gain power within the family system [45]. In fact, recent evidence describes suicidal ideation as a very complex phenomenon with several possible meanings [56].

The combination of the evidences linking AN adolescents suicidal ideation with family troubles stresses the importance of working with family not only to treat effectively AN, but also to reduce its comorbidity with suicidal ideation as well as with possible suicide attempts [57]. On the other hand, the evidence of narcissistic manipulative attitudes as determinants of suicidal ideation in AN adolescents, along with their avoidant attachment styles, underlines how family therapeutic approach should necessarily consider also these patients’ personality and attachment features to overcome their resistances and to be successful [58].

NSSI is frequently observed in patients suffering from eating disorders [14], although it is more frequent in patients suffering from Bulimia Nervosa rather than in those suffering from Anorexia Nervosa [12]. According to literature, the incidence of NSSI (23%) in our sample confirms that the problem is not negligible, especially in the AN population undergoing hospitalization. AN participants with NSSI are more affected by depressive traits, particularly expressed at a somatic level, probably because of the tendency to somatise the inner suffering instead of mentalizing it, which is typical of AN [59].

The present study does not confirm the evidence that AN patients who experience NSSI display lower character development, in particular of cooperativeness [11]. This may be due to a selection bias related to the admission to the PW, which may have excluded the AN subjects with the most severe personality troubles. However, the fact that NSSI is associated

with greater discomfort with intimacy confirms a relational significance of it. NSSIs may represent an alternative way to express one's intimate suffering externally in subjects incapable of doing so within a helping relationship. Nevertheless, although the comorbidity with NSSI is correlated with suicidal acts [50], the prognostic meaning of the of NSSI expression in subjects with AN is uncertain. In fact, improvements in eating psychopathology are reported in those who self-harm during hospital treatment [60]. It is thus possible that the externalization of inner suffering as an alternative to somatization may sometimes represent a step for overcoming eating psychopathology.

The features associated with social withdrawal are fewer but similar to those reported for suicide ideation, supporting the evidence of a link between the two phenomena [15,16]. As discussed for suicidal ideation, phobic avoidance defenses support the avoidance of interpersonal relationships [46]. Nevertheless the strong association with the overprotective attitudes of both parents may contribute. In fact, previous evidence underlined how parental "affectionless control" produces an eight-fold increase in the development of obesity [54]. However, so far, little evidence has linked this type of parental functioning to social withdrawal, an increasingly widespread problem in Western society [61].

Finally, as for the suicidal ideation, relationship manipulation may be relevant too in those AN adolescents who express social withdrawal, which is related to narcissistic personality traits of Exploitation towards others [45].

The transfer to the CNW or the NPI DH display few associations with psychopathology or personality features, probably because they are more influenced by organizational aspects. The shorter duration of treatment in subjects transferred to both facilities derives in fact from the clinical (e.g. to provide a safer place for patients with suicidal ideation or NSSI acts), and organizational (e.g. the availability of beds in the CNW) opportunity to continue treatment in a different care setting than that of the PW. Only the presence of narcissistic traits oriented towards demanding respect for one's rights may be relevant for the definition of the transfer to the CNW in order to obtain the most intensive and specialistic level of treatment possible, with a greater valorisation of their own suffering [62].

Correlations

The age at admission is often reported as a factor influencing the length of stay, and it was evidenced that a higher age at treatment is an important risk factor for a worse treatment success [63]. Goddard and coworkers found that younger patients obtained greater benefits from hospital treatment [64]. In our study the age of hospitalization positively correlates with greater total and somatic depressive symptoms and this could suggest that the increasing

of age with an AN diagnosis may lead to greater demoralization experiences maybe fostering or being consequent to treatment failures and resistance to treatment [58].

The duration of hospitalization is one of the most important clinical indices for establishing the effectiveness of the treatment. In our study, a lower BMI at the time of admission is correlated with the need for longer hospitalization confirming the evidence of several studies [65,66]. Also the pattern of correlations between treatment duration, BMI change, and BMI at discharge confirm this evidence. As highlighted by Wales and coworkers in 2016, hospitalization would be necessary when the patient's BMI is not yet too low, because a higher BMI at the time of admission leads to a more rapid increase in weight and consequently a greater probability of a positive treatment outcome, with savings in terms of costs and inconvenience for the patient and family [67].

Family problem solving skills are expected to play a positive effect on the therapeutic course of affected members. For this reason, at least in some cases, the duration of treatment in PW is longer in relation to the family's ability to assist the patient properly thanks to its greater problem-solving skills and this permits to avoid the transfer to the CNW (where parent assistance is not necessary). Nevertheless, encouraged by clinicians due to the low amount of available beds, the more functional families could have taken on the responsibility of their daughters' outpatient treatment for longer periods of time, even when ineffective. This would have produced the admission to the PW with a lower BMI. Thus, paradoxically, greater problem solving skills and a better general family functioning may have represented a negative prognostic factor with respect to the effectiveness of hospitalization during COVID-19 pandemics [67]. This highlights how in this emergency situation the organizational aspects of the facilities and the positive characteristics of the families may have played an important role in the timing of treatments, with potentially unfavorable consequences [3,4].

The correlations between a higher BMI at admission and higher levels of bulimia and body dissatisfaction, and between a higher BMI at discharge and higher levels of body dissatisfaction were expected. They underline how bulimic functioning fosters the maintenance of a higher BMI in patients with AN, and that the higher BMI in turn fosters greater body dissatisfaction. On the other hand, these correlations suggest that when weight recovery is not linked to a psychological improvement of the discomfort with one's body, AN adolescents are exposed to a greater risk of relapse [68].

Limitations

One of the main limitations of this study is the relatively small sample size, which in some cases led to a comparison

between groups of patients with very low numbers (e.g. in the case of suicidal behaviour) reducing the power of the statistical analysis and the representativeness of the sample. For this reason, the AN patients were not differentiated in the sample according to the diagnostic subtypes (“restricting”, “purging” and “binge-purging”) and the patients with atypical AN were not considered separately. Future studies on larger samples may provide further details about the association between each diagnostic subtype and the behavioral and psychopathological traits of these patients.

Another limitation is the lack of quantification and standardized evaluation with specific scales of the psychopathological functioning associated with AN (e.g. number, severity, frequency of suicide attempts, suicidal ideation and NSSI) which was due to the retrospective nature of the study. The naturalistic and observational nature of the study resulted in a significant interference of organizational aspects on the clinical features with respect to the distribution in the wards.

Finally, the study was conducted in an exceptional historical period, dominated by the COVID-19 pandemic, and this could reduce the generalizability of the results to periods of “ordinary” hospitalization management.

Conclusions

Hospital treatment of AN adolescents can be particularly complicated if it is not conducted in specialized CNWs. In particular, suicidal or self-harmful psychopathology can make the management of patients in PWs even more complex and challenging.

The present study conducted during the COVID-19 pandemic period explores the clinical and psychopathological characteristics associated with these psychopathological behaviors and with the outcomes of hospitalization, and identifies some predictive and interpretative elements of these phenomena. The strength of the study was the systematic self-administration of a wide range of standardized instruments exploring personality, psychopathology and attachment features which were related to the suicidal behaviors of the AN adolescents.

The results of the present study may help pediatricians and child neuropsychiatrists to improve the management of this kind of inpatients in order to reduce risks and optimize treatment outcomes even in the case of unavailability of specialized therapeutic resources.

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Declarations of interest

None

Data availability

Data are available upon reasonable request, the lead authors have full access to research data.

Ethics

The Intercompany Review Board of Torino (CEI) approved this study (protocol 00007/2019) with the study protocol number 0099307.

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