Physical and Psychological Effects of Nasogastric Tube (NGT) Use in Adolescents with Anorexia Nervosa

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Article

Physical and Psychological Effects of Nasogastric Tube (NGT) Use in Adolescents with Anorexia Nervosa

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Abstract

Background: Anorexia nervosa (AN) may require nasogastric tube (NGT) feeding when oral intake is insufficient. Evidence on psychological impact and prognostic correlates of NGT use in adolescents affected with AN is limited. **Methods:** fifty-seven adolescent inpatients (96.5% female; age range 12–18 years; mean age 15.0± 1.51 years) affected with AN admitted in a child psychiatry ward and treated with NGT renutrition in addition to oral nutrition were included in the study. A 21-item VAS questionnaire was administered at intake (T0), after NGT introduction (T1), after one week of NGT use (T2) and after NGT dismissal (T3) to assess physical and psychological effects. Participants were also assessed with psychometric measures including personality (TCI), eating psychopathology (EDI-2), general psychopathology (BDI-II, SCL-90-R, TAS), and family functioning (FAD). The measures were compared between each timepoint with paired t-tests and ANOVA for repeated measures. Pearson correlations were performed between the VAS scores and psychometric measures. **Results:** From admission to discharge, weight increased by +3.2 kg and BMI by +1.2 kg/m². Items 1, 3, 4, 6, 15, 18, 20 of the VAS questionnaire items showed significant improvement over time. TCI personality traits, EDI-2 eating and BDI, SCL-90 and TAS general psychopathology, and FAD family functioning were related to NGT perception by the AN adolescents. **Conclusions:** NGT was helpful in the weight progression during inpatients treatment. It was generally well tolerated, with progressive improvement in psychological and physical discomfort during treatment. The meaningful associations with specific psychometric features suggest the possibility to tailor the NGT use based on adolescent characteristics. Multidisciplinary care and tailored psychoeducation may enhance acceptance.

Keywords: anorexia nervosa; nasogastric tube feeding; adolescents; tolerability; psychometrics; therapeutic alliance

1. Introduction

Anorexia nervosa (AN) is defined in the Diagnostic and Statistical Manual of Mental Disorders, Fifth Edition (DSM-5) as a psychiatric illness characterized by excessive caloric restriction, an intense fear of gaining weight and a distorted body image. The estimated worldwide lifetime prevalence rate is 0.2%, and 0.9% in Western populations, with a peak incidence in females aged 15 to 19 years [2]. However, most cases of eating disorders go undetected by the healthcare system limiting the epidemiological understanding of this condition [3]. Its etiology is multifactorial, involving psychological, physiological and sociocultural factors, in a complex interaction between genetics and environment [4]. AN significantly affects cognitive, emotional and social functioning and leads to severe medical complications across multiple systems, including cardiovascular, gastrointestinal, endocrine and cerebral [5]. Without adequate treatment, anorexia nervosa can be fatal. The

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standardized mortality ratio is 5.9 (95% CI 4.2–8.3), representing a risk approximately six times higher than that of the general population [6].

AN treatment requires a multidisciplinary approach (physicians, dietitians, psychologists, etc.) and the development of coordinated care plans [7]. The first step in the therapeutic path is weight restoration, which is essential for medical stabilization and reversal of long-term complications [8]. The literature recommends oral nutrition as the first-line treatment, with the introduction of nasogastric tube feeding if dietary goals are not achieved [9]. The Medical Emergencies in Eating Disorders (MEED) guidelines support the use of NG tube feeding only as a second-line option, specifying clinical/biochemical instability and life-threatening weight loss (Body Mass Index or BMI < 13) as criteria [10]. Studies show that enteral nutrition via nasogastric tube ensures rapid restoration of nutrition and reduces immediate health risks [11]. However, although recognized as an essential step for medical stabilization and the reversal of long-term complications, NGT remains a controversial procedure [12]. Its invasive nature may exacerbate body image psychopathology and potentially undermine the therapeutic alliance between patient and psychiatrist [13]. Enteral feeding may also intersect with personality traits commonly observed in AN patients, such as perfectionism, rigidity, and a high need for control [14]. These traits can influence how patients perceive and respond to treatment, which may be experienced as invasive or coercive [15]. In the event of rapid health deterioration and severe psychopathological impairments, treatment may be carried out against the patient's will [16]. The impact of such coercion can be highly traumatic for patients and parents, potentially leading to conflict, misunderstandings and negative emotions [17]. NGT is often experienced as an unpleasant physical sensation and as an external control over individual freedom, but also as a necessary and useful intervention for survival, as well as a symbol of illness, forcing patients to confront the severity of their condition and prompting awareness [18].

The literature remains scarce on the psychological effects of this treatment and on the impact of enteral feeding on the therapeutic alliance. Overall, the available evidence is limited: the number of patients studied is small, no validated tools have been adopted to assess the effects of NG feeding, no reports have considered medium- and long-term psychological consequences, and little attention has been paid to psychiatric comorbidity or personality traits [19]. Moreover, studies on the effects of NG tube feeding have been conducted predominantly in adults or late adolescents, while data on treatment perception in pediatric populations are extremely limited.

This study aims to evaluate the tolerability and prognostic aspects of nasogastric tube feeding in the treatment of adolescent patients with anorexia nervosa. Based on the data available to us and previous literature on the subject, we expect to confirm the usefulness of nasogastric tube feeding in AN patients and to observe good overall tolerability. The primary objective of the study is to assess the psychological and physical impact of nasogastric tube feeding in a sample of adolescent patients with anorexia nervosa admitted to the Regina Margherita Children's Hospital in Turin (OIRM). The secondary objective is to evaluate any significant correlation between the impact of nasogastric tube feeding and the clinical or psychometric characteristics of the patients.

2. Materials and Methods

2.1. Participants

This observational study is based on data collected from patients consecutively admitted to the Regina Margherita Children's Hospital (OIRM) in Turin. Data collection took place between March 2022, and July 2024. Inclusion criteria: full diagnosis AN assessed by an expert psychiatrist through the Structured Clinical Interview for DSM-5 [20]; age > 12 and <18 years; written informed consent/ethical approval. No gender restrictions. Exclusion criteria: intellectual disability or pervasive developmental disorder, any neurodevelopmental disorder, acute psychosis or and bipolar disorder, or any other inability to understand/complete psychometric tests for clinical/language/cultural reasons.

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For each participant, the following clinical data were collected: age, admission/discharge weight (kg), admission/discharge BMI, length of hospital stay (days and months), and psychiatric comorbidities. These data are presented in Table 1 (Clinical and Demographic Data of the Sample). The study adhered to the Declaration of Helsinki and was approved by the hospital Ethics Committee.

Table 1. Demographic characteristics of the sample.

Variable	N (%)
Sample size (n)	57
Gender – Female	55 (96.5%)
Gender – Male	2 (3.5%)
	M±SD
Mean age at admission (years)	15.0 ± 1.51
Symptoms onset (years)	13.1 ± 1.57

2.2. Intervention

A 21-item 1–10 VAS questionnaire (Appendix A) was developed and approved by the Ethics Committee. Items 1–15 addressed psychological aspects related to NGT; items 16–21 addressed physical aspects (discomfort, distress, pain). Patients completed the questionnaire autonomously. Administration points: before insertion (T0), after insertion (T1), after the first week of treatment (T2), after dismissal (T3).

2.3. Measures

Psychometric instruments:

2.3.1. Temperament and Character Inventory (TCI) [21]

The TCI is a self-administered questionnaire with 240 true/false items that assess personality dimensions. According to Cloninger's psycho-biological model, personality is divided into four temperamental dimensions (Novelty Seeking, Harm Avoidance, Reward Dependence, and Persistence), which are genetically determined and relatively stable over time, and three character dimensions (Self-Directedness, Cooperativeness, Self-Transcendence), which evolve with age and maturation processes and are influenced by environmental and sociocultural factors.

2.3.2. Eating Disorder Inventory-II (EDI-II) [22,23]

The EDI-II is a self-report questionnaire with 91 items assessing traits critical for understanding eating disorders. It measures 11 scales Drive for Thinness (DT), Bulimia (BU), Body Dissatisfaction (BD), Ineffectiveness (IN), Perfectionism (PF), Interpersonal Distrust (ID), Interoceptive Awareness (IA), Maturity Fears (MF), Asceticism (ASC), Impulse regulation (IR) and Social Insecurity (SI).

2.3.3. Beck Depression Inventory – II (BDI-II) [24]

The BDI-II is a self-report instrument that assesses depression severity in adolescents and adults with psychiatric diagnoses. It includes 21 items and provides a total score plus two subscale scores (somatic-affective and cognitive).

2.3.4. Symptom Checklist-90-R (SCL-90-R) [25]

SCL-90-R is a self-report questionnaire that evaluates a wide spectrum of psychological problems and psychopathological symptoms, capturing both internalizing (depression, somatization, anxiety) and externalizing (aggression, hostility, impulsivity) dimensions in psychiatric, general medicine, and non-clinical populations.

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2.3.5. Toronto Alexithymia Scale (TAS-20) [28,29]

TAS-20 a clinical questionnaire assessing alexithymia, a personality trait characterized by reduced or absent ability to differentiate, recognize, or express emotional experiences and bodily sensations.

2.3.6. Attachment Style Questionnaire (ASQ) [26,27]

ASQ is a self-report questionnaire designed to measure five dimensions of adult attachment, consisting of 40 items.

2.3.7. Parental Bonding Instrument (PBI) [30,31]

PBI is a self-report measure assessing the quality of past attachment relationships based on recall of parental bonding during the first 16 years of life. It consists of 25 items describing two scales: Care (12 items) and Overprotection/Control (13 items), considered key parental behavior dimensions.

2.3.8. Narcissistic Personality Inventory-40 (NPI-40) [32,33]

Explores narcissism through 40 item pairs, asking subjects to choose the alternative that best describes them.

2.3.9. Family Assessment Device (FAD) [34]

FAD is a self-report instrument consisting of 60 multiple-choice items on a 4-point Likert scale, designed to reliably assess family functioning.

2.4. Data Analysis

Mean scores (average responses of 57 participants) of clinical data, VAS questionnaire responses for each question at each timepoint, and psychometric measures were compared between timepoints using paired t-tests (T0–T1, T1–T2, T2–T3, T0–T3), and ANOVA across time (T0→T3).

Pearson correlations were performed between the scores of VAS questionnaire items and clinical/psychometric measures at T0, and across their pairwise time differences (deltas).

Bonferroni correction set significance to $p < 0.01$ to reduce Type-I error. Statistical analysis was conducted using the Statistical Package for Social Sciences (SPSS 27.0).

3. Results

3.1. Characteristics of the Study Sample

The study sample consisted of 57 inpatients (55 females) with DSM-5 AN. Tables 1–3 summarize demographic, clinical, diagnostic, and comorbidity characteristics.

Table 2. Clinical characteristics of the sample.

Variable	Admission (T0) M ± SD	SNG removal (T3) M ± SD	ΔT0-T3 M ± SD	p
Weight (kg)	37.9 ± 7.04	41.1 ± 5.85	+3.2 ± 2.46	.000
BMI (kg/m²)	14.7 ± 2.33	15.9 ± 1.58	+1.2 ± 1.09	.000
Length of stay (days)	—	61.1 ± 26.25	—	—

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Table 3. Primary diagnosis at symptoms onset and psychiatric comorbidity.

Diagnosis	N (%)
Anorexia Nervosa – restricting type	42 (73.7)
Anorexia Nervosa – binge-purging type	3 (5.2)
Anorexia Nervosa – purging type	12 (21.0)
Comorbid diagnosis	
Major Depressive Disorder	34 (59.6)
Generalized Anxiety Disorder	18 (31.6)
Obsessive–Compulsive Disorder	17 (29.8)
Self-harming / Parasuicidal behaviors	13 (22.8)
Panic Disorder	11 (19.3)
Specific Learning Disorder	3 (5.2)
Bipolar Disorder	4 (7.0)
Schizophrenia	2 (3.5)

3.2. VAS Questionnaire Evolution

Table 4 reports significant comparisons between timepoints with $p \leq 0.01$.

Table 4. T-test and ANOVA comparison between timepoints.

T-TEST ANALYSIS						
Question	Period	N	M1 ± SD	M2 ± SD	t	p
1. Do you think NGT is necessary in your situation?	T1–T2	30	6.21 ± 3.38	4.94 ± 3.18	2.798	0.009
3. Do you feel discouraged and sad about using NGT?	T0–T1	25	7.33 ± 2.66	5.91 ± 3.26	3.395	0.002
	T0–T3	18	7.33 ± 2.66	4.50 ± 3.03	3.937	0.001
4. Do you think the NGT is a medical imposition?	T2–T3	18	6.73 ± 3.16	5.61 ± 3.33	2.786	0.009
6. Do you think the tube interferes with your daily activities?	T0–T1	25	5.33 ± 2.83	4.27 ± 3.00	3.547	0.002
15. Do you feel better now compared to when you started NG feeding?	T1–T2	30	4.47 ± 2.84	6.00 ± 2.84	−3.167	0.003
20. Do you feel any discomfort or sore throat due to the feeding tube?	T1–T2	30	6.27 ± 3.14	5.15 ± 3.30	3.462	0.002
ANOVA ANALYSIS						
Question	*Period*	*N*	*M1 ± SD*	*M2 ± SD*	*F*	*p*
3. Do you feel discouraged and sad about using NGT?	T0–T3	18	7.33 ± 2.66	4.50 ± 3.03	6.939	0.001
15. Do you feel better now compared to when you started NG feeding?	T0–T3	18	4.17 ± 2.40	6.33 ± 2.81	6.031	0.001

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18. Do you experience coughing and gagging?	T0–T3	18	3.33 ± 2.70	1.72 ± 1.56	4.714	0.006

Note: M1 = mean of the first timepoint; M2 = mean of the second timepoint. Timepoints: T0 = Before insertion; T1 = after NGT insertion; T2 = after a week of treatment; T3 = After removal.

Question 1 "Do you think the NGT is necessary in your situation?", showed a significant decrease between T1 and T2 ($p < 0.009$).

Question 3 "Do you feel discouraged and sad about using NGT?" showed significant decrease between T0 and T1 ($p < 0.002$) and between T0 and T3 ($p < 0.001$), confirming a significant overall time effect with the ANOVA ($p < 0.001$).

Question 4 "Do you think the NGT is a medical imposition?", showed a significant decrease between T2 and T3 ($p < 0.009$).

Question 6 "Do you think the tube interferes with your daily activities?" showed a significant decrease between T0 and T1 ($p < 0.002$).

Question 15 "Do you feel better now compared to when you started NG feeding?", showed a significant increase between T1 and T2 ($p < 0.003$), confirming a significant overall time effect with the ANOVA ($p < 0.001$).

Question 18 "Do you experience coughing and gagging?" showed a significant decrease across T0–T3 confirming a significant overall time effect with the ANOVA ($p < 0.006$).

Question 20 "Do you feel any discomfort or sore throat due to the feeding tube?" showed a significant decrease between T1 and T2 ($p < 0.002$).

3.3. Clinical and Psychometric Correlations of VAS Questions at T0

Pearson correlations between questionnaire items and clinical/psychometric variables at T0 are summarized in Table 5.

Table 5. Correlations between NGT-related questions and psychometric characteristics (T0).

Question	*Psychometric features*	*r*	*p*
1. Do you think NGT is necessary in your situation?	Novelty Seeking (TCI)	−0.614	0.001
3. Do you feel discouraged and sad about using NGT?	Cooperativeness (TCI)	−0.543	0.006
	Bulimia (EDI-2)	−0.525	0.008
4. Do you think the NGT is a medical imposition?	Bulimia (EDI-2)	−0.565	0.004
5. Are you comfortable using NGT?	Persistence (TCI)	−0.549	0.005
9. Do you think the NGT helps you understand the value of your nutrition?	Difficulty describing feelings (TAS)	−0.543	0.006
12. Do you feel regret at the idea of removing the tube?	Impulsiveness (EDI-2)	0.641	0.001
	Cognitive depression (BDI-II)	0.559	0.005
	Somatic depression (BDI-II)	0.593	0.002
	Total (BDI-II)	0.579	0.003
13. Do you feel anxious about removing NGT?	Harm Avoidance (TCI)	0.521	0.009
	Inadequacy (EDI-2)	0.526	0.008
	Asceticism (EDI-2)	0.622	0.001
	Anxiety (SCL-90)	0.612	0.001
	SCL-90 Total	0.513	0.010
	Cognitive depression (BDI-II)	0.644	0.001
	Somatic depression (BDI-II)	0.689	<0.001
	Total (BDI-II)	0.664	<0.001
15. Do you feel better now compared to when you started NG feeding?	Novelty Seeking (TCI)	0.661	<0.001
21. Do you feel nausea/disgust due to NGT?	Problem Solving (FAD)	0.547	0.006

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Note: TCI = Temperament and Character Inventory; NPI-40 = Narcissistic Personality Inventory-40; EDI-2 = Eating Disorder Inventory-2; BDI-II = Beck Depression Inventory – II; FAD = Family Assessment Device; SCL-90 = Symptom Checklist-90; ASQ = Attachment Style Questionnaire; TAS-20 = Toronto Alexithymia Scale 20.

The item "Do you think the NGT is necessary in your situation?" (Question 1) correlated negatively with Novelty Seeking ($p < 0.001$).

The item "Do you feel discouraged and sad about using NGT?" (Question 3) correlated negatively with Cooperativeness ($p < 0.006$) and with EDI-2 Bulimia ($p < 0.008$).

For "Do you think the NGT is a medical imposition?" (Question 4), a negative correlation was observed with EDI-2 Bulimia ($p < 0.004$).

The item "Are you comfortable using NGT?" (Question 5) correlated negatively with TCI Persistence ($p < 0.005$).

For "Do you think the NGT helps you understand the value of your nutrition?" (Question 9), a negative correlation emerged with TAS Difficulty Describing Feelings ($p < 0.006$).

The item "Do you feel regret at the idea of removing the tube?" (Question 12) showed positive correlations with EDI-2 Impulsiveness ($p < 0.001$) and with the Cognitive, Somatic, and Total BDI-II scores ($p < 0.005$).

For "Do you feel anxious about removing NGT?" (Question 13), significant positive correlations were identified with Harm Avoidance ($p < 0.009$), EDI-2 Inadequacy ($p < 0.008$), EDI-2 Asceticism ($p < 0.001$), SCL-90 Anxiety and Total ($p < 0.010$), and with all BDI-II subscores ($p < 0.001$).

The item "Do you feel better now compared to when you started NG feeding?" (Question 15) correlated positively with Novelty Seeking ($p < 0.001$).

Finally, "Do you feel nausea/disgust due to NGT?" (Question 21) correlated positively with the Problem Solving dimension of the FAD ($p < 0.006$).

Table 6. Significant correlations between question changes and psychometrics.

Question	Δ Period	N	Characteristic	r	p
1. Do you think NGT is necessary in your situation?	T1–T2	33	Age of symptom onset	−0.456	0.008
2. Would you like to avoid NG feeding?	T0–T3	11	Bulimia (EDI-2)	0.805	0.003
3. Do you feel discouraged and sad about using NGT?	T0–T1	16	Vanity (NPI-40)	0.649	0.007
4. Do you think the NGT is a medical imposition?	T2–T3	21	Somatizations (SCL-90)	0.572	0.007
			Interpersonal Sensitivity (SCL-90)	0.602	0.004
			Anxiety (SCL-90)	0.627	0.002
			Phobic Anxiety (SCL-90)	0.618	0.003
			Total (SCL-90)	0.602	0.004
			Somatic depression (BDI-II)	0.589	0.005
6. Do you think the NGT is hindering your daily activities?	T0–T3	18	BMI at discharge	0.608	0.007
			Impulsiveness (EDI-2)	−0.742	0.009
21. Do you feel nausea/disgust due to NGT?	T0–T1	16	Preoccupation with relationships (ASQ)	0.790	<0.001
			Superiority (NPI-40)	0.732	0.001
	T2–T3	30	BMI at discharge	0.491	0.006
		20	Roles (FAD)	−0.567	0.009

Note: TCI = Temperament and Character Inventory; NPI-40 = Narcissistic Personality Inventory-40; EDI-2 = Eating Disorder Inventory-2; BDI-II = Beck Depression Inventory – II; FAD = Family Assessment Device; SCL-90 = Symptom Checklist-90; ASQ = Attachment Style Questionnaire; TAS-20 = Toronto Alexithymia Scale 20.

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Analyses of score variations between consecutive or cumulative time intervals revealed several significant associations with clinical and psychological measures.

Changes in Question 1 "Do you think the NGT is necessary in your situation?" from T1 to T2 correlated negatively with age of symptom onset ($p < 0.008$).

Variations Question 2 "Would you like to avoid NG feeding?" from T0 to T3 showed a strong positive association with EDI-2 Bulimia ($p < 0.003$).

For Question 3 "Do you feel discouraged and sad about using NGT?", change from T0 to T1 correlated positively with NPI-40 Vanity ($p < 0.007$).

Variations in Question 4 "Do you think the NGT is a medical imposition?" during T2–T3 correlated positively with SCL-90 Somatization, Interpersonal Sensitivity, Anxiety, Phobic Anxiety, and Total scores ($p < 0.007$), as well as with the BDI-II Somatic scale ($p < 0.005$).

Changes in Question 6 "Do you think the NGT is hindering your daily activities?" from T0 to T3 were positively associated with BMI at discharge ($p < 0.007$) and negatively associated with EDI-2 Impulsiveness ($p < 0.009$).

For Question 21 "Do you feel nausea/disgust due to NGT?", strong positive correlations in T0–T1 were found with ASQ Concern About Social Relations ($p < 0.001$) and NPI-40 Superiority ($p < 0.001$). In the T2–T3 interval, the same item correlated positively with BMI at discharge ($p < 0.006$) and negatively with the Roles dimension of the FAD ($p < 0.009$).

4. Discussion

NGT is often a necessary tool in the treatment of patients with anorexia nervosa who refuse to eat the amount of food prescribed in the dietary plan for a prolonged period and present physical conditions that cannot tolerate further food deprivation [35]. The usefulness of NGT use has been confirmed by the present study. As concerns physical effects of NGT use the most evident is the significant weight gain achieved through the combined action of enteral and natural nutrition, which confirms literature findings [11].

Nevertheless the aim of this study was to investigate also the physical side effects and the psychological effect of NGT in adolescents with anorexia nervosa, since the positioning of NGT is often considered a controversial issue in the treatment of this disorder [12]. At the beginning, tube feeding can be a major source of anguish for patients, whose greatest fear is rapid weight gain beyond their control in addition to the fear of pain during positioning and physical distress during its use. It may also represent a major source of concern and stress for parents (and even therapeutic staff) who can be disgusted by the esthetical appearance of the tube and by the fear of discomfort for their children [13,36,37]. Even though literature gives poor comparison terms, the evidence emerging from the present investigation is encouraging revealing a significant improvement in the psychological perception of tube use during treatment.

4.1. Acceptance and Psychological Adaptation to NGT

The proposal to introduce NGT is often met with dissent from patients and concern from families and staff [13,36,37] possibly because of prejudices on normal activities of the adolescents (e.g. studying, playing and relating to peers). The early reduction of their discouragement/sadness and of their perceived NGT interference with daily activities just after NGT positioning support this interpretation and suggest that adolescents perceived the treatment before its application worse than after use, possibly because of their own prejudices and/or of those of family and staff .

Moreover some improvements are experienced also across treatment (T1-T2). Patients reported a progressive reduction in discomfort and progressive increase in wellbeing consequent to the positioning of the NGT. This may happen possibly because of the positive effects of renutrition on physical strength but also on mental functioning (including the relative-deresponsabilization on weight gain and food choice) combined with the reduction of fears and discomfort due to the adolescent's negative prejudices. It also represents as a consequence of the process of adaptation to NGT of AN adolescents to a medical disposition, which in a first instance may be perceived as an

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imposition, according to literature which evidence that in general AN patients tolerated NGT both physically and psychologically [38].

4.2. Perceived Medical Imposition and Therapeutic Alliance

The late (T2-T3) reduction of AN adolescent's negative perception of the NGT as a medical imposition has relevant implications. Prior literature describes NGT as an external control that may threaten autonomy, and on occasion restraints have been used for insertion against a patient's will [18,37,39]. Adolescents of our sample do not contrast with this picture, nevertheless they demonstrate that the reduction of negative prejudices, the improvement in physical and psychological wellbeing, led them to understand that NGT was not an imposition by clinicians, but a help which was given to them to improve their treatment. This improved the perception of the alliance with medical staff which is in itself a goal for the treatment of this disorder [9,40]. Moreover, the fact that along with subjective wellbeing improvement and weight restoring adolescents reduce the perception of the sense of necessity of the NGT suggests that after the first initial negative prejudices and perception of coercion they perceive the NGT with a more realistic attitude, nearer to that of medical staff, neither refusing and opposing to it, nor becoming excessively dependent. In fact, despite their adaptation, patients continued to express a constant desire to avoid using the NGT (Q2), with no significant decrease during treatment. For this reason the clear, upfront communication and consistent psychological support given by the staff may mitigate coercion perceptions and strengthen alliance since the beginning of the NGT treatment. Emphasizing collateral benefits (e.g., reduced binge-purging in patients on tube therapy) may help transform fear into trust [11,12,15,19].

4.3. Physical Discomfort and Symptom Management

In addition to the clear benefits on weight gain, our study evidences that also physical distress caused by the NGT positioning improves during the NGT use. In fact some physical symptoms (e.g., coughing/gagging; sore throat) decreased significantly even if they did not fully resolve. This evidence implies that the improvement of NGT perception evidenced by AN adolescents do not derive from a complete absence of discomfort but form a balancing between the perceived benefits and the unavoidable discomforts, as necessary for any medical treatment. On the other hand it underscores the importance, along all the treatment, of optimizing volumes, rates, and caloric targets to reduce nausea, vomiting, dumping, and refeeding risks [36].

4.6. Correlation of NGT Perception and Evolution with Baseline Clinical Features

The perception of the necessity of the NGT use (Q1) varies depending on the age at which patients first developed symptoms of the illness. Patients with earlier onset appear to have more difficulty recognizing the tube as necessary. Nevertheless it is also evident a progression of their perception during treatment which is greater for those with lower age of onset. This may indicate a lesser insight in the severity of the disease in younger patients but suggests that in particular on these adolescents there is a need for targeted psychoeducational interventions to help them understand the importance of the artificial renutrition to help the progression of the treatment and to avoid the chronic evolution of the disorder [3,5].

The greater is the BMI at discharge the greater is the improvement of the sense of nausea and of the undermining of daily activities. This may suggest that on one hand physical symptoms like nausea and the obstacle to daily activities may impair the nutritional benefits of NGT, and this underscores that the constant attention in reducing negative physical symptoms related to artificial renutrition may be crucial to improve NGT results [36]. On the other hand it is also possible that the progressive success of the renutrition may help to overcome some negative perceptions of the NGT and facilitate the reactivation of adolescents' activities.

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4.7. Correlation of NGT Perception and Evolution with Baseline Personality Features

Personality characteristics of individuals with anorexia nervosa can influence how patients perceive and respond to treatments [41]. In particular they may represent relevant factors influencing the perception and the acceptance of the NGT use. A higher NS, which implies a less rational approach to care [21], may impair the awareness of the need of the NGT use, but, on the other hand, it increases the sense of improvement due to its application suggesting greater psychoeducational efforts before its positioning may be balanced by greater final satisfaction after its use [15,19]. HA, a trait which is strictly related to feelings of anxiety and depression [21], may increase the fears associated with the suspension of NGT treatment deserving specific reassurance by the staff [19]. The higher is the persistence, a personality trait which impairs the adaptation to changes [21], the greatest is the perceived discomfort associated with the NGT use, while a greater cooperativeness reduces the negative perception of the NGT as a medical imposition, stressing the need to overcome possible resistances of the patients with greater efforts on therapeutic alliance [9,40].

Finally, also some narcissistic personality traits (vanity and superiority) are related to the changes in some negative perceptions of the NGT [32,33]. The greater is the vanity the greater is the initial improvement in the discouragement created by the NGT, possibly because the negative perception of the NGT as impairing the physical aspect is rapidly overcome after its positioning. On the other hand, the greater is the sense of superiority the greater is the reduction of the sense of nausea after NGT use.

4.8. Correlation of NGT Perception and Evolution with Baseline Psychopathology Features

Psychiatric comorbidities such as anxiety disorders and mood disorders may affect subjective responses to stressors related to nasogastric tube feeding [42,43]. In our study specific psychopathology traits can significantly influence the quality of patients' experience with the nasogastric tube. Patients with bulimic traits showed a less discouraged attitude at the beginning of tube treatment, experiencing at a lesser degree the NGT as a medical coercion. The greater the bulimia trait the greater is the progressive improvement of the NGT refusal. This is consistent with some literature reports which suggest that the use of NGT may be welcomed by patients with bingeing-purging symptoms [11,12,15,19]. The need for control [15] which characterizes these patients may make them perceive the NGT as substantial help in controlling their symptoms.

According to literature [42,43] both somatic and cognitive depression, and anxious features, associated with a greater general psychopathology, sense of inadequacy, and greater asceticism are related to a poorer tolerance of the end phase of treatment. The AN adolescents affected with these features may perceive themselves as more fragile and less prepared to afford medical requests, they have more difficulty managing change, and may perceive greater fear of loss [42]. On the other hand, the greatest is the initial psychopathology, the greatest is the improvement of the negative perception of NGT as a medical imposition, suggesting that psychopathology may have a role in hindering the therapeutic alliance itself. These results highlight the importance of identifying patients with the most severe anxiety and depression traits in order to provide appropriate treatment (possibly also pharmacological) and of favouring a strong therapeutic relationship by transparent communication, involving patients in decision-making processes, and providing constant emotional and psychological support [40,44]. Moreover it is also necessary to prepare them for the end of treatment through proper information and psychoeducation [9,19].

4.9. Correlation of NGT Perception and Evolution with Baseline Family Features

The relationship with the perception of nausea and family difficulties in problem solving and roles definition emphasize that the psychological effect of the nasogastric tube in patients with anorexia nervosa cannot be understood solely through a medical approach. Rather, it is profoundly influenced by individual psychological characteristics and family dynamics. Especially in the course of AN the illness of one member can involve the entire family, becoming a collective illness [45]. The

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family context can amplify or mitigate NGT negative perceptions. A reduced ability of the family towards problem solving, eventually coupled with overprotective or dysfunctional attitudes, may make the acceptance of the NGT more complex with greater risks of negative somatic symptoms [19]. Literature suggests that, in particular with AN adolescents, a treatment approach involving the patient's entire family has proven more effective than other psychotherapeutic treatments based on physical recovery markers, satisfaction with services and therapies received [44]. It is thus needed a multidisciplinary approach that integrates medical treatment with psychological and family support, to improve both acceptance and effectiveness of the nasogastric tube in patients with anorexia nervosa [45,46–48].

4.7. Study Limitations and Future Directions

Limitations include modest sample size, female predominance, lack of control group, self-report bias, potential test–retest learning effects, and Hawthorne effects. Larger, controlled, longitudinal studies with validated instruments specific to NGT perceptions and long-term follow-up are needed to confirm and give the correct interpretation to our results.

5. Conclusions

NGT in adolescent AN was associated with meaningful weight/BMI restoration and a general trajectory of improved psychological and physical tolerability across treatment. Significant correlations were also found between improvements in body mass index and quality of life and the therapeutic alliance at hospital discharge [49]. Perceptions of necessity, coercion, and discomfort were modulated by personality, symptom burden, and family functioning. Tailored psychoeducation, alliance-focused communication, and family involvement may optimize acceptance and clinical outcomes.Some researchers have focused on evaluating motivation to change in relation to the therapeutic alliance.

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Informed Consent Statement: Written informed consent was obtained from all subjects involved in the study.

Data Availability Statement: Raw data of the study are available upon reasonable request to the corresponding author.

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