



Anorexia nervosa and familial risk factors: a systematic review of the literature

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Accepted: 24 July 2022 / Published online: 25 August 2022
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Abstract

Anorexia Nervosa (AN) is a psychological disorder involving body manipulation, self-inflicted hunger, and fear of gaining weight. We performed an overview of the existing literature in the field of AN, highlighting the main intrafamilial risk factors for anorexia. We searched the PubMed database by using keywords such as “anorexia” and “risk factors” and “family”. After appropriate selection, 16 scientific articles were identified. The main intrafamilial risk factors for AN identified include: increased family food intake, higher parental demands, emotional reactivity, sexual family taboos, low familial involvement, family discord, negative family history for Eating Disorders (ED), family history of psychiatric disorders, alcohol and drug abuse, having a sibling with AN, relational trauma. Some other risk factors identified relate to the mother: lack of maternal caresses, dysfunctional interaction during feeding (for IA), attachment insecurity, dependence. Further studies are needed, to identify better personalized intervention strategies for patients suffering from AN.

Highlights:

- This systematic review aims at identifying the main intrafamilial risk factors for anorexia nervosa, including maternal ones.
- Intrafamilial risk factors identified mostly regard family environment and relational issues, as well as family history of psychiatric diseases.
- Family risk factors identified may interact with genetic, environmental, and personal risk factors.
- These findings may help develop tailored diagnostic procedures and therapeutic interventions.

Keywords Anorexia nervosa · Family · Risk factors · Eating disorders · Environment

Level of evidence: V

Introduction

Eating behavior encompasses all responses associated with the act of eating and is influenced by social conditions,

individual perception, previous experiences, and nutritional status. Additional influencing factors include mass media and idealization of thinness. Anorexia nervosa (AN) is a psychological disorder concerning body manipulation, including fear of becoming fat and self-inflicted hunger. This disorder is interpreted as a response to the social context and a woman’s rejection of fat to deny mature sexuality (Gonçalves et al., 2013; Korb, 1994) and it was once supposed to have “hysterical” causes (Valente, 2016). The current definition of AN provided by the DSM-5 describes it as “a restriction of energy intake relative to requirements such as to lead to a significantly low body weight [...]; intense fear of gaining weight or becoming fat, or persistence in behaviors that interfere with weight gain [...]; alteration in

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the way weight or body shape are experienced [...]” (Cuzolaro, 2014). The lifetime prevalence of AN is estimated being of 1.4% (0.1–3.6%) in women and 0.2% (0–0.3%) in men (Galmiche et al., 2019). The lifetime prevalence rates of anorexia nervosa might be up to 4% among females and 0.3% among males (Van Eeden et al., 2021). AN finds its roots in biological, psychological, social, and familial risk factors.

More precisely, heritable risk factors for AN can be found in 48–74% of cases (Baker et al., 2017): for example, it has a higher prevalence in female relatives of individuals with AN (Bulik et al., 2019). The presence of genetic correlations between AN and metabolic and anthropometric traits may explain why people with AN achieve very low BMIs and may even maintain and relapse to low body weight despite clinical improvement (Bulik et al., 2019). On the other hand, psychological risk factors include excessive concerns about weight and figure, low self-esteem, and depression; while social risk factors are related to peer diet, peer criticism, and poor social support (Haynos et al., 2016). As far as family is concerned, it has been observed that anorexic girls’ families are often characterized by poor communication with one another, overprotection, conflicts, and hostility (Emanuelli et al., 2003; Horesh et al., 2015; Sim et al., 2009).

Overall, the puzzle of AN risk factors is still obscure and needs deeper investigations as far as some predisposing aspects are concerned, such as intrafamilial risk factors, which have been extensively analyzed but not properly clarified for clinical applications. Because of the multifactorial etiology of AN, intrafamilial risk factors identification can help to establish preventive interventions in at-risk individuals, and to provide tailored treatments from the earliest stages of the disorder. Our main hypothesis is that intrafamilial as well as maternal risk factors play an essential role in the development of the disease.

Therefore, the main objective of this work is to provide a scientific review of the existing literature about familial relational risk factors involved in the development of AN, with the aim of improving: prevention, establishment of an early diagnosis, and development of a tailored treatment.

Methodology

On February the 16th, 2022, a first research was conducted on PubMed with the title/abstract filter, using the terms “anorexia AND risk factors AND family” in the search bar. For eligibility, we included only randomized controlled studies and case-control studies focused on the issue, as well as case-control studies with at least 50 participants. We excluded reviews, single case studies, case reports, other types of articles and other studies that did not focus on the

main topic. The system provided 76 articles, of which 24 were ignored for low relevance. Hence, 52 were assessed for eligibility, from which 26 articles were excluded for not respecting the inclusion criteria, and 12 were excluded for not analyzing the research subject specifically. To the remaining 14 articles, 2 were added from citation search.

In the PRISMA diagram below (Fig. 1), the articles identified for the review (76) are reported schematically: screened (76), assessed for eligibility (52) and included (16).

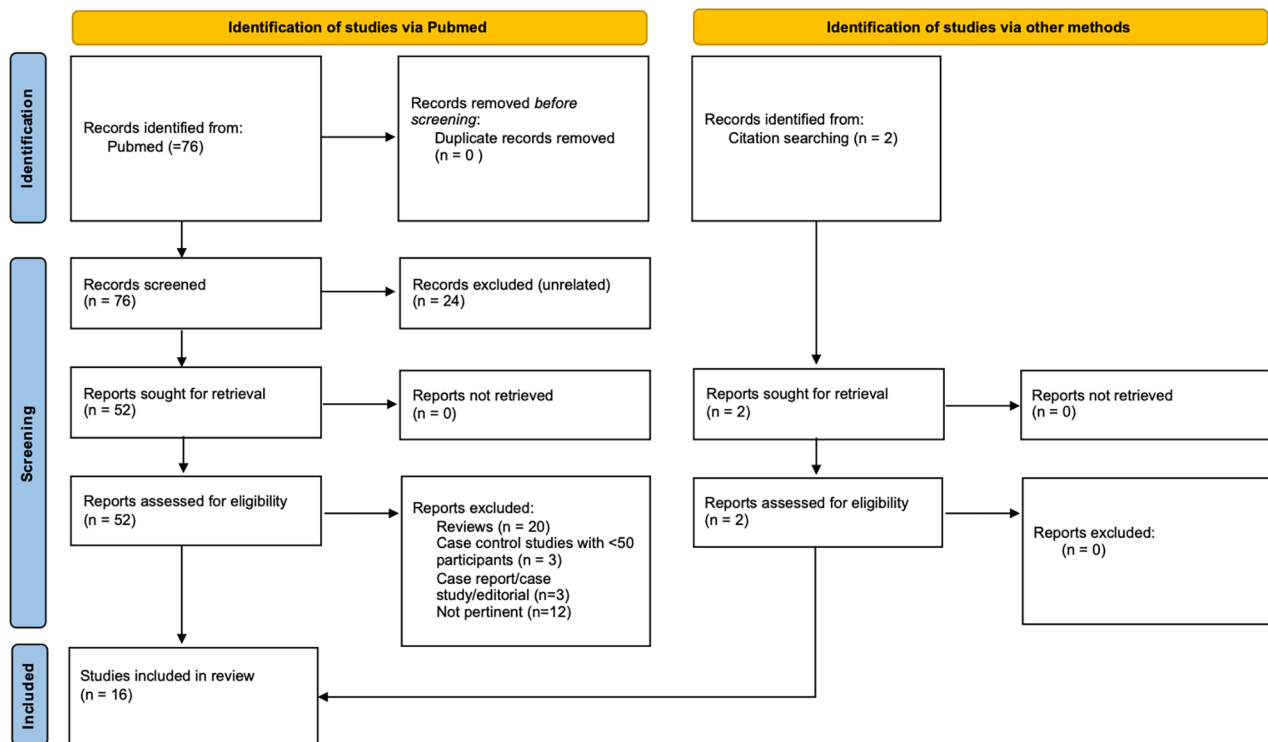
Results

The main results of the studies analyzed are summarized in Table 1.

Discussion

Despite anorexia having been usually considered an expression of age-specific conflicts intensified by constrictive cultural ideas and certain kinds of familial constellations (Bemporad et al., 1988), having our review included studies from 1990 to 2021 and conducted across many countries (i.e. US, Japan, Poland, UK, etc.) we can hypothesize that such a condition just evolves with culture and time, still maintaining certain background issues that we are aiming to emphasize in order to recognize certain red flags.

Eating disorders mark deficits in the ability to be nourished and to symbolize embodied experience. Psychoanalytic theories suggest that mothers who are insufficiently developed leave the child either austere avoiding intrusion or struggling to digest maternal provisions without becoming lost in them. (Charles, 2021). Infantile Anorexia (IA) has been defined as a child’s refusal of food for more than 1 month, between 6 months and 3 years of age; acute and/or chronic malnutrition; parental concern about the child’s eating; mother-child conflict, talk, and distraction during mealtime (Chatoor et al., 1998). Maternal risk factors for (IA) we have identified across the review can confirm this widely accepted theory, specifically lack of maternal caresses (Mangweth et al., 2005), dysfunctional interaction during feeding in IA (Ammaniti et al., 2010), and attachment insecurity (Chatoor et al., 2000). Regarding maternal history of psychiatric diseases, it has been noted that maternal depression has an influence on the development of conflicts during mother-child interaction in younger children, while maternal psychoticism predicts mother-child conflict during feeding in older children (Ammaniti et al., 2010). This means that depressed mothers engage in less positive interactions with their infants while breastfeeding, with difficulties in empathically recognizing their infant’s affective



From: Page MJ, McKenzie JE, Bossuyt PM, Boutron I, Hoffmann TC, Mulrow CD, et al. The PRISMA 2020 statement: an updated guideline for reporting systematic reviews. *BMJ* 2021;372:n71. doi: 10.1136/bmj.n71. For more information, visit: <http://www.prisma-statement.org/>

Fig. 1 PRISMA diagram of the study

states at mealtimes (Ammaniti, Ambuzzi et al., 2004; Feldman et al., 2004).

In addition to the relational risk factors, maternal diet seems to play a role in the development of AN (Haynos et al., 2016). This mechanism seems to find its roots early during childhood, since the infant's weight appears to be inversely related to the mother's degree of concern about her body shape (Ammaniti, Lucarelli et al., 2004). The "modelling theory of AN" (Pike & Rodin, 1991) argues that adolescent girls begin the diet by mimicking their dieting mothers. It seems that family concerns about weight and appearance are directly linked to the development of low satisfaction with one's body, and therefore directly or indirectly related to eating problems (Leung et al., 1996).

Maternal risk factors are synthesized in Table 2.

Enlarging our highlight from the mother to the whole family nucleus, the onset and maintenance of AN seems to be closely related to familial risk factors, and knowing them is crucial to identify the best therapeutic approach in order to target the unhealthy family environment as well as the needs of the patient. In addition, being aware of the familiar background may help in strengthening the hypothesis of genetic correlates within Eating Disorders (ED). Intrafamilial risk factors for the development of ED seem to have a greater impact when they occur early in adolescence (Field

et al., 2008), but most of them are chronic in time and one can suppose they can be found in a family at any time during the life of the patient.

The major intrafamilial risk factors identified in this review are summarized in the following Table 3.

Increased food intake in the family (Hilbert et al., 2014) seems to play a role in the development of ED. This seems counterintuitive, but the discrepancy between one's family food intake and peer and media influences on body ideals may contribute to triggering a subtle mechanism by which diet represents a way to affirm oneself in front of the family and reestablish social acceptance.

Perfectionism (Hilbert et al., 2014; Pike et al., 2008, 2021) is widely recognized as a familiar risk factor across many studies, and it can be assimilated to higher parental demands (Pike et al., 2008). It surely contributes to creating a tense family environment in which the development of oneself is more difficult, therefore inhibiting progressive differentiation of self from other (Charles, 2021). Perfectionism itself will become a personal risk factor for the outcome and severity of disease (Longo, Aloï et al., 2021) in a way that could be mimicking the family environment.

In general, unhealthy family functioning is predictive of adolescence problems (Lyke & Matsen, 2013). General family malfunction is predictive for AD onset during

Table 1 Summary table of the studies included in the systematic review

Authors	Title	Year and type	Sample	Results
Hilbert, A., Pike, K. M., Goldschmidt, (A) B., Wilfley, D. E., Fairburn, C. G., Dohm, F. A., Walsh, (B) T., & Striegel Weissman, R.	“Risk factors across the eating disorders”.	2014, original research	297 women with an E.D. and 323 without a psychiatric diagnosis	- Presence of overweight parents does not differ between groups - Risk factors: perfectionism, increased food intake in the family
Lyke, J., & Mat-sen, J.	“Family functioning and risk factors for disordered eating”.	2013, original research	91 graduated women between 18 and 25 years old	Emotional reactivity and family functioning predict risk factors for the development of ED Unhealthy family functioning causes adolescence problems.
Longo, P., Marzola, E., DeBacco, C., Demarchi, M., & Abbate-Daga, G.	“Young Patients with Anorexia Nervosa: The Contribution of Post-Traumatic Stress Disorder and Traumatic Events”.	2020, original research	64 female patients < 25 y.o. affected by AN, followed at the Center for ED in Turin	- Most frequent risk factors: relational trauma and positive family history for psychiatric disorders - Increased body symptoms severity in patients with PTSD - Infantile trauma caused more depression
Haynos, A. F., Watts, A. W., Loth, K. A., Pearson, C. M., & Neumark-Stzainer, D.	“Factors Predicting an Escalation of Restrictive Eating during Adolescence”.	2016, original research	Time 1: 4.746 students between 11–18 y.o. Time 2 (after 5 years): 2.516 students.	-Depressive symptoms, low self-esteem, body image misconception and social issues -Low familial involvement and maternal diet are risk factors for increased severity of restrictive eating habits.
Lilenfeld, L.R., Kaye, W.H., Greeno, C.G., Merikangas, K.R., Plotnicov, K., Pollice, C., Rao, R., Strober, M., Bulik, C.M., & Nagy, L.	“A controlled family study of anorexia nervosa and bulimia nervosa”.	1998, original research	26 women affected by AN 47 women affected by BN 44 female controls	--Relatives of patients with AN and BN are at risk for: ED, OCD, anxiety, substance abuse. -Familial aggregation of depression and OCD is independent from AN or BN.
Ackard, D.M., Richter, S., Egan, A., & Crone-meyer, C.	“Poor outcome and death among youth, young adults, and midlife adults with eating disorders: An investigation of risk factors by age at assessment”.	2014, original research	219 females > 12 y.o.	-Advanced age, alcohol and drug abuse, endocrine problems and negative family history for ED were predictive for poor outcome.
Lyon, M., Chatoor, I., Atkins, D., Silber, T., Mosimann, J., & Gray, J.	“Testing the hypothesis of the multidimensional model of anorexia nervosa in adolescents”.	1997, case-control	-43 adolescents with anorexia nervosa and 85 controls -43 parents of anorexics and 85 parents of controls	Confirmed risk factors: family history of depression, feelings of ineffectiveness, and poor interceptive awareness. In addition, alcohol and drug abuse or dependence figured prominently in the family history of patients with anorexia nervosa.
Steinhausen, H.C., Jakobsen, H., Helenius, D., Munk-Jørgensen, P., & Strober, M.	“A Nation-Wide Study of the Family Aggregation and Risk Factors in Anorexia Nervosa over Three Generations”.	2015, comparative study	2.370 kids and adolescents with AN born between 1951 and 1996 -7035 controls without any psychiatric diagnosis before 18 y.o.	AN occurred significantly more often in case than in control families. AN Risk factors included having a sibling with AN, affective disorders in family members, and co-morbid affective, anxiety, obsessive-compulsive, personality, or substance use disorders. Furthermore, female sex, and ascending year of birth were significantly associated with having AN. Urbanization was not related to the family load of AN and case-relatives did not develop AN earlier than control relatives.

Table 1 (continued)

Authors	Title	Year and type	Sample	Results
Patton, G.C., Johnson -Sabine, E., Wood, K., Mann, A.H., & Wakeling, A.	“Abnormal eating attitudes in London schoolgirls—a prospective epidemiological study: outcome at twelve month follow-up”.	1990, epidemiological study	A total of 1010 female students from secondary school in London were screened, with subsequent selection and final follow up in 222 girls	The relative risk of dieters becoming cases was eight times that of non-dieters. Many factors conventionally associated with eating disorder were associated more with attempting weight control than caseness. These included pre-morbid personality, pre-morbid obesity and family weight pathology. Other factors, including social class, career choice and psychosexual development, had no association either with attempting weight control or caseness.
Mangweth, B., Hausmann, A., Danzl, C., Walch, T., Rupp, C.I., Biebl, W., Hudson, J.I., & Pope, H.G. Jr.	“Childhood body-focused behaviors and social behaviors as risk factors of eating disorders”.	2005, original research	50 female inpatients with eating disorders (anorexia or bulimia nervosa), 50 female inpatients with polysubstance dependence, and 50 nonpatient female control subjects	Many body-focused measures, such as feeding problems, auto-aggressive behavior, lack of maternal caresses, and family taboos regarding nudity and sexuality, characterized eating-disordered patients as opposed to both comparison groups, as did several social behaviors, such as adjustment problems at school and lack of close friends. However, nail-biting, insecure parental bonding, and childhood physical and sexual abuse were equally elevated in both psychiatric groups.
Ammaniti, M., Lucarelli, L., Cimino, S., D’Olimpio, F., & Chatoor, I.	“Maternal Psychopathology and Child Risk Factors in Infantile Anorexia”.	2010, original research	371 mother-child pairs (children aged 6–36 months), of which 187 pairs of mothers and normally developing children (ND-group), and 184 mothers and IA children.	The IA-group showed higher scores in symptomatic characteristics both of the mother and of the child, and dysfunctional interactions during feeding as compared with the ND-group.
Pike, K.M., Hilbert, A., Wilfley, D.E., Fairburn, C.G., Dohm, F.A., Walsh, B.T., & Striegel-Moore, R.	“Toward an understanding of risk factors for anorexia nervosa: a case-control study”.	2008, case-control	50 women who met DSM-IV criteria for AN were compared to those with non-eating disorder DSM-IV psychiatric disorders (n = 50) and those with no psychiatric disorder (n = 50)	Women with AN specifically reported greater severity and significantly higher rates of negative affectivity, perfectionism and family discord, and higher parental demands than women with other psychiatric disorders. The role of weight and shape concerns was most salient in the year preceding onset of AN.
Machado, B.C., Gonçalves, S.F., Martins, C., Hoek, H.W., & Machado, P.P.	“Risk factors and antecedent life events in the development of anorexia nervosa: a Portuguese case-control study”.	2014, case control	86 women with AN and 68 controls with other psychiatric diagnoses	Women with AN reported significantly higher rates of perfectionism, negative attitudes toward parents’ shape and weight, significant concern about feeling fat and a family history of AN or bulimia nervosa. Critical comments about weight, shape or eating was the most notable event in the year preceding AN onset.
Pike, K.M., So, M., Hilbert, A., Maekawa, H., Shimanouchi, T., Wilfley, D., Dohm, F.A., Fairburn, C.G., & Weissman, R.S.	“Risk factors for anorexia nervosa and bulimia nervosa in Japan and compared to a U.S. sample”.	2021, case control	In Japan: 96 women with a current DSM-IV AN or BN primary diagnosis (AN, n = 60; BN, n = 36) and 57 women with no current psychiatric diagnosis (NC group). In the United States: 137 women with a current DSM-IV AN or BN primary diagnosis (AN-U.S., n = 71; BN-U.S., n = 66)	Perfectionism and negative affectivity, family relationship issues, and, to a lesser degree, parental psychopathology predicted the emergence of AN and BN in Japan. Physical and sexual abuse and family eating and weight concerns were not significant risk factors in Japan. Compared to their respective diagnostic U.S. groups, the Japanese AN group reported higher levels of individual mental health factors and lower levels of family dieting and family overweight

Table 1 (continued)

Authors	Title	Year and type	Sample	Results
Chatoor, I., Gani-ban, J., Hirsch, R., Borman-Spurrell, E., & Mrazek, D.A.	“Maternal characteristics and toddler temperament in infantile anorexia”.	2000, original research	Three groups of toddlers (aged 12–37 months): toddlers with infantile anorexia (n = 34), picky eaters (n = 34), and healthy eaters (n = 34). Mothers completed questionnaires that assessed their own eating attitudes, marital satisfaction, and their toddlers’ temperament.	Temperament ratings differentiated between infantile anorexics and healthy eaters ($p < .0001$), with infantile anorexics receiving higher difficulty, irregularity, negativity, dependence, and unstoppable ratings. Mothers of anorexics showed greater attachment insecurity than mothers of healthy eaters ($p < .05$), but they demonstrated neither overt eating pathology nor less marital satisfaction than the other groups. 39% of variance in feeding conflict was explained by toddlers’ diagnoses, temperament ratings, and maternal characteristics. 21% of variance in toddlers’ weights was explained by temperament ratings and feeding conflict.
Włodarczyk-Bisaga K, Dolan B.	“A two-stage epidemiological study of abnormal eating attitudes and their prospective risk factors in Polish schoolgirls”	1996, longitudinal two-stage screening study	747 schoolgirls aged 14–16 y.o. were screened, and 167 were selected for clinical interview	No cases of AN were identified in the group, but on the second stage of the follow up, but pre morbid-personality, apre-morbid obesity and family weight pathology were more associated with weight control rather than caseness. Social class, career choice and psychosexual development had no association with attempting weight control or caseness.

Table 2 Maternal risk factors for the development of Anorexia Nervosa

Maternal risk factors

- *lack of maternal caresses* (Mangweth et al., 2005)
- *dysfunctional interaction during feeding (in IA)* (Ammaniti et al., 2010)
- *attachment insecurity* (Chatoor et al., 2000)
- *dependence* (Chatoor et al., 2000; Lyon et al., 1997)
- *maternal diet* (Haynos et al., 2016)

Table 3 Main intrafamilial risk factors for AN

Intrafamilial risk factors for AN

- *Increased food intake in the family* (Hilbert et al., 2014)
- *Perfectionism* (Hilbert et al., 2014; Pike et al., 2008, 2021)
- *Higher parental demands* (Pike et al., 2008)
- *Emotional reactivity* (Lyke & Matsen, 2013)
- *Family taboos regarding nudity and sexuality* (Mangweth et al., 2005)
- *Low familial involvement* (Haynos et al., 2016)
- *Negative affectivity* (Pike et al., 2008, 2021)
- *Family discord* (Pike et al., 2008)
- *Negative family history for ED (as a predictor of poor outcome)* (Ackard et al., 2014)
- *Family history of depression* (Lyon et al., 1997)
- *Positive family history for psychiatric disorders* (Longo, Marzola et al., 2021; Pike et al., 2021)
- *Affective disorders in family members* (Steinhausen et al., 2015)
- *Alcohol and drug abuse* (Lyon et al., 1997)
- *Having a sibling with AN* (Machado et al., 2014; Steinhausen et al., 2015)
- *Relational trauma* (Longo, Marzola et al., 2021)

adolescence, and the level of affective expression of the family seems to be relate to ED risk during adolescence (Felker & Stivers, 1994), but our review has highlighted that all those features of what could be described as a “toxic”

family environment in the common sense play a role in the development of AN. Emotional reactivity (Lyke & Matsen, 2013), as well as family taboos regarding nudity and sexuality (Mangweth et al., 2005), low familial involvement (Haynos et al., 2016), negative affectivity (Pike et al., 2008, 2021), and family discord (Pike et al., 2008) may lie in the background in the lives of a future AN patient, and should be recognized as environmental risk factors in order to develop a tailored psychotherapeutic intervention that may involve the family as well as the patient, since it seems clear that the quality of family functioning influences the development (McGrane & Carr, 2002) and maintenance of EDs (North et al., 1997; Strober et al., 1997; Wewetzer et al., 1996).

As far as the presence of other disorders in family members is concerned, our review established that a familiar history of almost any psychiatric disorder (Longo, Marzola et al., 2021; Pike et al., 2021), including depression (Lyon et al., 1997), affective disorders (Steinhausen et al., 2015), alcohol and drug abuse (Lyon et al., 1997) plays a role in the development of AN. Nevertheless, having a sibling with AN increases the risk of developing AN (Machado et al., 2014; Steinhausen et al., 2015). We can hypothesize that the role of genetics in this mechanism is crucial yet still obscure, and nevertheless, talking about the presence of these diseases in members of the family nucleus, having to cope and live with the difficulties of others’ conditions is what can predispose to AN. In addition, the opposite may happen as well: there is an increased risk for relatives of patients with AN and BN to develop subclinical forms of ED, major depressive disorder, obsessive-compulsive disorder, and anxiety disorders (Lilenfeld et al., 1998). What is curious to note is that, on the one hand, having a sibling with AN predisposes to the development of AN (Felker & Stivers, 1994; Machado et al.,

2014; Steinhausen et al., 2015), probably because of shared intrafamilial risk factors, therefore underlining the importance of the aim of this review; but, on the other hand, negative family history for ED predicts poor outcome (Ackard et al., 2014), probably because of the familiar unpreparedness to cope with such a difficult condition and the discrepancy created between the healthy members and the patient, which remains alone and incapable of sharing certain issues with the others, so close yet so far from them.

Another risk factor identified is having suffered a relational trauma (Longo, Marzola et al., 2021). In general, individuals who have suffered from traumatic events (physical violence, being threatened with a weapon, sexual violence, being a victim of robbery) more frequently develop maladaptive eating behaviors (Field et al., 2008). Some evidence also suggests an increase of severe life events in the year preceding the onset of AN (Råstam & Gillberg, 1991). Children of mothers who have experienced the loss of a vital member of their family (i.e. older child or partner) in the six months prior to pregnancy have a higher risk of ED than children and infants who have not been exposed to this risk factor (Su et al., 2015). Further confirming the possible role of relational trauma as a red flag not only in the development of AN, but also in determining the severity of the disease, patients with AN and comorbid Post Traumatic Stress Disorder (PTSD) show more severe concerns about body shape and weight (Field et al., 2008). Having suffered physical and sexual abuse during childhood appears to be related to the onset of psychiatric pathologies in general, and not specifically to the onset of EDs in the young adult (Bruch, 1977; McGrane & Carr, 2002; Smith et al., 1995): therefore, this risk factor needs further investigation to confirm its specific role in the development of AN.

Strength and limits

The strength of this work lies in the comparison between different studies regarding AN showing high level of evidence and providing a complete picture of the constellation of intrafamilial risk factors of anorexia nervosa. There main limit of this study is that few articles from those included are from the very last years, while many other studies were conducted and published earlier (1990–2014), underlining the need of further investigations.

Conclusions

The main intrafamilial risk factors for AN identified from this study are: increased food intake in the family, perfectionism, higher parental demands, emotional reactivity,

family taboos regarding nudity and sexuality, low familial involvement, negative affectivity, family discord, dependence, negative family history for ED (as a predictor of poor outcome), family history of depression, positive family history for psychiatric disorders, affective disorders in family members, alcohol and drug abuse, having a sibling with AN, relational trauma. Some other risk factors identified may relate to the role of the mother during childhood especially, and are as follows: lack of maternal caresses, dysfunctional interaction during feeding (for IA), attachment insecurity, dependence, maternal diet.

Complex interactions occur between intrafamilial risk factors and other personal aspects and symptoms, including perfectionism, individual body image issues, social concerns, excessive preoccupation with weight control, stress and adjustment problems, lack of close friends, social prejudice.

In conclusion, further studies are needed to understand more clearly how intrafamilial risk factors for AN interact with other environmental, personal and genetic ones, in order to connect the dots that can lead to an improvement of diagnostic and therapeutic procedures, and to the development of tailored intervention strategies that may target multiple issues in the life of the patient, including intrafamilial mechanisms that may be identified precociously and addressed through familial therapy, for the sake of the whole family nucleus.

Acknowledgement None.

Contributions Conceptualization: ADC, SV; Data curation ADC, GP; Investigation: SV, BA, MNM, AV, GP; Methodology: ADC; MNM; Supervision: ADC, AMS; Roles/Writing - original draft: ADC, SV, BA, MNM; Writing - review & editing: ADC, MNM.

Funding Open access funding provided by Università degli Studi di Roma La Sapienza within the CRUI-CARE Agreement.

Data availability Data sharing is not applicable to this article as no datasets were generated or analyzed during the current study.

Declarations

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

Informed consent Not applicable.

Conflict of interest None.

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