

Eating disorders among fashion models: a systematic review of the literature

Simona Alexandra Zancu¹ · Violeta Enea¹

Received: 18 February 2016 / Accepted: 17 May 2016
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Abstract

Purpose In the light of recent concerns regarding the eating disorders among fashion models and professional regulations of fashion model occupation, an examination of the scientific evidence on this issue is necessary. The article reviews findings on the prevalence of eating disorders and body image concerns among professional fashion models.

Method A systematic literature search was conducted using ProQUEST, EBSCO, PsycINFO, SCOPUS, and Gale Canage electronic databases.

Results A very low number of studies conducted on fashion models and eating disorders resulted between 1980 and 2015, with seven articles included in this review. Overall, results of these studies do not indicate a higher prevalence of eating disorders among fashion models compared to non-models. Fashion models have a positive body image and generally do not report more dysfunctional eating behaviors than controls. However, fashion models are on average slightly underweight with significantly lower BMI than controls, and give higher importance to appearance and thin body shape, and thus have a higher prevalence of partial-syndrome eating disorders than controls.

Conclusion Despite public concerns, research on eating disorders among professional fashion models is extremely scarce and results cannot be generalized to all models. The existing research fails to clarify the matter of eating

disorders among fashion models and given the small number of studies, further research is needed.

Keywords Fashion models · Eating disorders · Body dissatisfaction · Body image

Introduction

Eating disorders (ED) represent a matter of concern especially in western societies and socio-cultural contexts that value the feminine ideal of thin beauty [1, 2] although they tend to be spread worldwide [3]. ED prevalence is higher in females and at young ages and has increased slightly over the past decades [4–6]. Recent studies show a significant increase in the incidence of ED among female adolescents [5, 6]. Eating disorders are influenced by many sociocultural factors such as media, friends and family systems, and peer pressure. They have a different impact on body image, eating behavior, and thin-ideal internalization depending greatly on individual factors [7–10].

Although the socio-cultural model has been tested in many studies, the research examining the impact of media on body dissatisfaction has, to date, been inconsistent as shown by several meta-analyses with contradictory results. Due to a study selection bias [11], some meta-analyses found a small to moderate effect of media exposure on body image [12, 13], whilst recent and comprehensive meta-analyses found minimal to no effect of thin ideal media exposure on body image and ED [11, 14]. Other studies also found a higher impact of peers and family influence than of media exposure [7–9, 15].

Fashion models, alongside actresses, stars and other beauty icons [16] who are seen as exponents of thin body ideal are also considered to be cultural beauty ideals. Over

✉ Violeta Enea
violeta.enea@uaic.ro

¹ Department of Psychology, Faculty of Psychology and Education Sciences, “Alexandru Ioan Cuza” University, 3 Toma Cozma Street, Iasi, Romania

the past decades the cultural beauty ideal has become increasingly thinner, as reflected by a progressive decrease in body size of beauty pageant winners, while increasing the women average weight [17]. In the socio-professional context, fashion models, like athletes [18], dancers, ballerinas and other esthetic categories in fields, that focus on physical appearance, are considered groups prone to eating behavior disturbances, from the constant preoccupation to maintain a certain body shape [19, 20].

The model occupation raises concerns about undernourishment and the prevalence of anorexia nervosa (AN). After a long period of widespread use of clinically underweight models in the fashion industry, some European countries adopted laws for conditions of access to the model occupation regarding health status excluding AN [21]. For example, France conditioned by law the access in model occupation by BMI at least 18.

Recent important progress in the fashion industry was professionalizing the model occupation regulated by the occupational standards which provides professional rules and conditions for health status, physical shape and strength required for the job demands and strains [22, 23]. Criteria for maintaining the health status include rational and balanced nutrition and regular medical checks [22]. Occupation standards are based on empirical research of professional activities, International fashion festivals and events.

No standard measures are imposed in fashion industry [24], even if fashion models are usually very tall and thin. Especially on International catwalks, models have particular body conformation, very tall and with thin body structure, starting from 1.80 m height that creates an elongated body shape with a higher height/width ratio. This is what fashion designers look for because this figure has the right proportions that highlights best their creations, especially on camera which distorts the image, increases the width and adds volume and size. Fashion show collections are created on these proportions to highlight designs and models are selected to fit this standard with no specific intention in promoting the thin ideal.

Rationale for this systematic review

To our knowledge, there has not been any systematic review conducted on the prevalence of ED among fashion models. An agreeable physical appearance is a necessary attribute in the fashion and image industry being important in accessing and advancing in these careers [25, 26]. The importance of appearance in the socio-professional context of fashion models, as in other fields that emphasize body shape, raises concerns of health specialists about body image and eating behaviors [17–19]. In the context of recent regulations in the professional field of fashion and the present concerns about the eating disorders among

fashion models, an examination of the scientific evidence is required.

Aims of the study

The study aims to review the research conducted so far on fashion models regarding eating behavior, body image, and psychological variables relevant in the socio-professional context. It will address the following questions: (1) Is the prevalence of eating disorders greater among professional fashion models than among non-models? (2) Are body dissatisfaction, body weight, and body image distortions greater concerns among professional fashion models than among non-models?

Methods

ProQUEST, EBSCO, PsycINFO, SCOPUS, and Gale Canage electronic databases were searched in September 2015. The following search strategy was used for PsycINFO and was adapted for other databases: (“eating disorder” or “anorexia nervosa” or “bulimia nervosa” or “eating attitudes” or “eating behavior” or “body image” or “body dissatisfaction” or “body weight”) and (“fashion” or “models” or “modeling” or “esthetic”). The PRISMA- P guidelines [27, 28] were followed during the search for and selection of studies. The studies were selected via a three-stage procedure. In the first stage, studies were selected based on title; in the second stage, the abstracts of the remaining studies were read and excluded; and in the final stage, the results section was read (see Fig. 1). Initial disagreements between the reviewers regarding the final selection were resolved by reaching consensus through discussion.

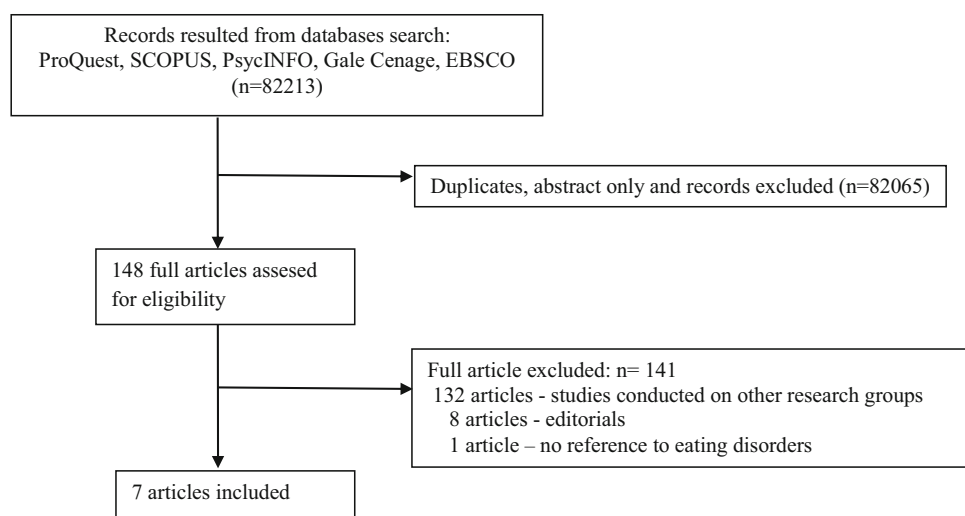
Inclusion criteria

To be included in this review, a qualitative or quantitative study had to meet all of the following inclusion criteria:

- (a) should have been published in peer-reviewed journals during or since 1980,
- (b) should have focused on fashion models as a study group,
- (c) should have reported at least one component of eating disorders, and
- (d) should have been published in English.

Exclusion criteria

Papers were excluded if they were editorials, essays, reviews, single-case studies, commentaries, books,

Fig. 1 Study selection process

unpublished dissertations, and studies conducted on other research groups (adolescents, women, students, athletes, dancers).

The selection criteria were met by seven studies.

Results

Main characteristics of the studies

Out of the seven cross-sectional studies included in this review, six studies reported the prevalence of ED among fashion models [29–34]; of these, four studies also examined the body image concerns [29, 31, 32, 34], and one study focused exclusively on body image concerns [35]. Table 1 summarizes the main characteristics of the studies included in this systematic review. There were two major themes: the prevalence of eating disorders and body image concerns.

Prevalence of eating disorders among fashion models

Six studies examined eating attitudes and the prevalence of ED among fashion models compared with control groups [29–34].

Garner and Garfinkel [30] conducted the first study on models who were considered at risk for AN due to increased pressure to maintain slender figure and identified significant differences between fashion students and the control group. The study examined symptoms of AN assessed by Eating Attitudes Test (EAT-40) [36], through the comparative analyses of five groups: fashion students, ballet students, normal controls, patients with AN, and music students controls. The results showed that symptoms

of AN were significantly higher among fashion students compared to the control group: 34 % ($n = 19$) scoring above the cut-off at eating disorder assessment questionnaire with 7 % (4 cases) identified with AN. Fashion students included in the study fell, however, on average within the limits of normal weight range (BMI $M = 18.98 \text{ kg/m}^2$). Brenner and Cunningham [29] examined eating attitudes among professional fashion models compared to control groups and also took into account gender differences. The study showed no significant differences in eating disorders between models and non-models, based on the EAT-26 [37] scores. However, significant gender differences were identified, women having higher scores than men in both model control samples. This illustrated the higher frequency of eating behavior problems among women than men, regardless of occupation.

In line with this, van Hanswijck and van Furth [33] investigated the prevalence of ED in feminine population of professional fashion models, assessed by EAT [36] and Eating Disorders Inventory- bulimia subscale questionnaires [38]. Eating Disorders Examination (EDE) interview [39] was also administered to all those models who scored above the cut-off on questionnaires. The study showed that the prevalence of eating disorders is not higher among professional fashion models and did not find any case of AN or bulimia nervosa (BN). However, despite these findings, there was no control group and the low response rate of fashion models from the study (16 %), from the size of the original targeted group, limited the researchers in generalizing any conclusion based on the results.

Another study conducted by Santonastaso et al. [32] focused on the prevalence of ED among professional fashion models from Milan of different nationalities, in comparison with a control group matched for socio-cultural and demographic variables. Results showed that the

Table 1 The characteristics of the studies included in the review

Study	Country	Objective	Design	Sample size	Measures	Results
Garner and Garfinkel [30]	Canada	To examine the symptoms of AN in population with an increased pressure to keep a thin body shape (dancers, fashion models)	Cross-sectional, between-subjects	<i>N</i> = 423 females: 1. ballet students (<i>n</i> = 183), 2. fashion students (<i>n</i> = 56), 3. patients with AN (<i>n</i> = 68), 4. normal controls - NC (<i>n</i> = 81), 5. musicians controls (<i>n</i> = 35)	EAT-40 HSCL	The dance and model groups have significantly higher mean at EAT-40 scores than NC group In modeling students group 19 subjects (34 %) had scores above the cut-off on EAT > 30 and 4 cases with AN (7 %) were identified, but 2 of these had onset prior to the modeling course
Brenner and Cunningham [29]	USA	Examining gender differences in eating attitudes, body image, and self-esteem among professional fashion models and controls	Cross-sectional, between subjects	1. Male models (<i>n</i> = 29), 2. female models (<i>n</i> = 30) control group, 3. male college students (<i>n</i> = 30) 4. female college students (<i>n</i> = 30)	EAT-26 Body-Cathexis Scale Rosenberg Self-Esteem Scale	There are significant differences between fashion models and control groups in height and deviation from average height Female models are underweight and show significant deviation from average recommended weight. All females show significant difference from males between actual and ideal weight regardless of group
Van Hanswijck de Jonge and van Furth [33]	Netherlands	To examine the prevalence of ED within the female population of professional fashion models	Cross-sectional, correlational	<i>N</i> = 50 fashion models	EAT EDI-bulimia subscale EDE	Although female fashion models were significantly underweight, no case of AN or BN was identified Prevalence of ED is not higher among professional fashion models than in general female population
Santonastaso, Mondini and Favaro [32]	Italy	Examining the prevalence of pathological eating behavior and body attitudes, and the use of alcohol and illicit drugs in a group of professional fashion models	Cross-sectional, between subjects	<i>N</i> = 63 fashion models, Matched control group: <i>n</i> = 126,	EDE EAT BAT Alcohol abuse Use of illicit drugs	On the whole, full-syndrome eating disorders are slightly more common among control group than models group, and partial-syndrome ED are significantly more frequent among fashion models Fashion models have significantly lower BMI than controls, being slightly underweight (models mean BMI = 17.7)

Table 1 continued

Study	Country	Objective	Design	Sample size	Measures	Results
Preti et al. [31]	Italy	To investigate prevalence of eating disorders among professional fashion models compared to a well-matched control group from the same socio-cultural context	Cross-sectional, between subjects	<i>N</i> = 55 fashion models, matched control group: <i>N</i> = 110, composed by friends of the fashion models included in the study, from the same socio-cultural environment	EAT- 26 BITE BAT EDE interview	Fashion models have significantly lower BMI than controls. Significantly more models have BMI < 18 than control group: 34 (54.5 %) of models, than 14 (12.7 %) of controls In the EAT, BITE, and BAT scores there are no significant differences between the two groups Partial-syndrome AN is significantly more frequent among fashion models than controls
Zoletić, and Duraković-Belko [34]	Croatia	Analyzing differences in body image perception, BMI, neurotic perfectionism, body image distortions, and ED symptoms in risk group and control	Cross-sectional, between subjects	<i>N</i> = 91 subjects: Risk group: <i>n</i> = 36 (13 ballerinas and 23 models) Control group: <i>n</i> = 55 (psychology students)	BMI BMI-SMT NPQ EDI	Groups differ significantly in BMI: all 36 models and ballerinas are underweight compared to 20 underweight and 33 normal within control group The risk group shows significantly higher body image distortion than control group at BMI-SMT, models and ballerinas self-estimated as normal (80 %) or overweight (19 %) though being underweight
Swami and Szmigielska [35]	England	Analyzing incidence of body image and related concerns among a sample of professional fashion models	Cross-sectional, between subjects	52 fashion models Matched Control group <i>N</i> = 51 women	PFRS BAS SPAS EDI-BD EDI-DT SATAQ-3 ASI	Results show that fashion models have no negative body image: there are no significant differences between groups in weight discrepancy, body appreciation, social physique anxiety, body dissatisfaction, and internalization of sociocultural standards of beauty

ED eating disorders, *EAT-40* Eating Attitude Test 40, *HSCL* Hopkins Symptom Checklist, *EAT-26* Eating Attitude Test, *EAT* Eating Attitudes Test, *EDI* Eating Disorders Inventory, *EDE* Eating Disorders Examination interview, *BMI* Body Mass Index, *EAT-26* Eating Attitudes Test-26, *BAT* Body Attitude Test, *PDFS-56* Personality Disorder Features Screener, *BITE* Bulimic Inventory Test of Edinburgh, *NPQ* Neurotic Perfectionism Questionnaire, *BMI-SMT* Body mass index-Silhouette matching test, *PFRS* Photographic Figure Rating Scale, *BAS* Body Appreciation Scale, *SPAS* Social Physique Anxiety Scale, *EDI-BD* Eating Disorder Inventory-Body Dissatisfaction subscale, *EDI-DT* Eating Disorder Inventory-Drive for Thinness subscale, *SATAQ-3* Sociocultural Attitudes Toward Appearance Questionnaire-3, *ASI* Appearance Schemas Inventory

fashion model occupation per se does not represent a risk for full-syndrome ED, because pathological eating attitudes were not significantly more frequent in models' group than in the control group. The study found no significant differences between models' and controls'

scores. In addition, full-syndrome ED was slightly more frequent among the control group, while partial-syndrome ED was significantly more frequent in models, with 20 % of models and 4 % of controls meeting the partial-syndrome criteria [32].

Preti et al. [31] investigated the prevalence of ED among professional fashion models compared to a well-matched control group from the same socio-cultural background, to identify if the model occupation associates with an increased risk for ED. Again, although significantly more models are slightly underweight having a BMI < 18 (54.5 %), there were no significant differences in eating disorders based on EAT and Bulimic Inventory Test of Edinburgh (BITE) scores, or on the base of EDE diagnostic interviews [35]. Results of EDE interviews showed significant differences between groups on partial-syndrome criteria for AN, 12.7 % of models than 3.6 % of controls, meeting the proposed criteria: underweight and one of amenorrhea/unduly influence of shape and weight on self-evaluation. There were no significant differences between groups on partial-syndrome of BN. By contrast, Zoletić and Duraković-Belko [34] found significant differences among 23 models and 13 ballerinas (the experimental group) compared to controls regarding symptoms of ED based on EDI scores [40]. The analysis of the results was not performed separately for models and ballerinas participants. Authors concluded that the risk group (models and ballerinas) showed more symptoms of BN and more body dissatisfaction.

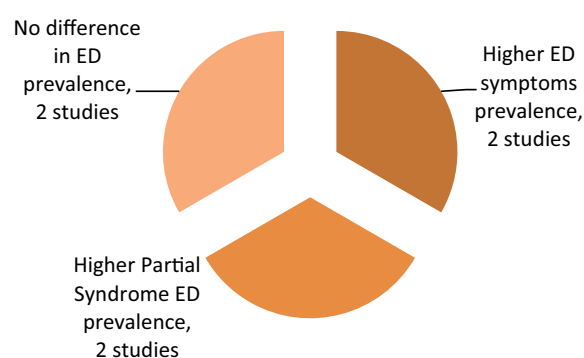
Studies arrived at different outcomes regarding the prevalence of ED symptoms between models and controls (Fig. 2). Four out of six studies showed that fashion models do not have a higher prevalence of full-syndrome ED than non-models [29, 31–33], but two of these found a higher prevalence of partial-syndrome ED [31, 32].

To sum up, most of the reviewed studies found the following: (1) Professional fashion models do not show an increased prevalence of full-syndrome ED compared with control groups. (2) Fashion models had a higher prevalence of partial-syndrome ED.

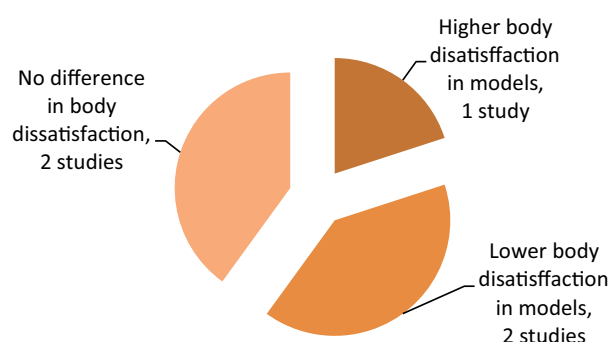
Body image and appearance concerns among fashion models

Five studies examined body image and appearance concerns among professional fashion models compared to control groups [29, 31, 32, 34, 35]. It is thought that in the fashion model occupation there is an increased socio-professional pressure to fit specific physical standards and a constant preoccupation to maintain a slender body shape.

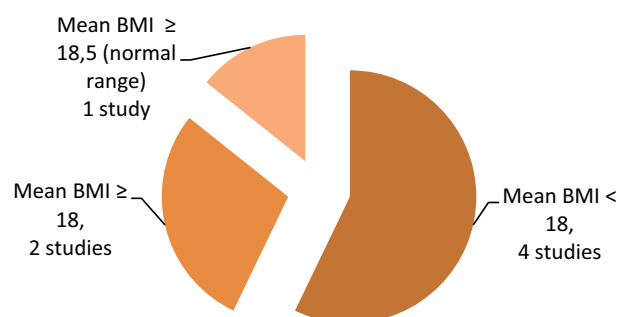
Brenner and Cunningham [29] examined self-esteem and body satisfaction of female and male models and non-models. Results showed that female models had a significantly higher body satisfaction compared to female controls that was positively associated with higher levels of self-esteem and negatively associated with dysfunctional eating attitudes. Authors concluded that higher body satisfaction and self-esteem act as protective factors against



(a) ED prevalence among fashion models in the reviewed studies



(b) Differences in Body Dissatisfaction between fashion models and controls in the reviewed studies



(c) BMI of fashion models in the reviewed studies

Fig. 2 Synthesis of research findings on eating disorders among fashion models

ED among fashion models. Female fashion models are slightly underweight with a mean BMI of 18, significantly lower than control's BMI. Female models and controls do not differ in weight, but models are significantly taller than female controls (+12 cm), which is a significant deviation from the average height. The authors concluded that models' slenderness is due to uncommon natural body constitutions, within genetic variability, and not to excessive dieting and purposeful slimming [29].

In Santonastaso et al. study [32] fashion models were also underweight with a mean BMI of 17.7, and significantly more models (54 %) than controls (12 %) had a BMI < 18. The study found significantly lower levels of body dissatisfaction in fashion models than controls, thus a higher body appreciation. The authors concluded that high levels of body satisfaction and self-esteem act as protective factors for ED despite the risk factors due to pressure for thinness.

Examining the level of body dissatisfaction as precondition of ED, Preti et al. [31] found no significant differences between fashion models and well-matched peers in body dissatisfaction measured with the Body Attitude Test. Fashion models in the study were underweight with a mean BMI of 17.9, significantly lower than the control group BMI.

Zoletić and Durakovic-Belko [34] found significantly higher body image distortions and dissatisfaction among the experimental group (fashion models and ballerinas) when compared to control group on the results from the BMI Silhouette Matching Test. 80 % of models and ballerinas rated their body shape as normal, and 20 % as overweight, all of them being underweight as shown by the BMI. The experimental group had also significantly higher scores on all EDI-3 subscales, including body dissatisfaction.

More recently, Swami and Szmigielska [35] examined body image and appearance concerns among professional fashion models through several complementary measures: weight discrepancy, body appreciation, social physique anxiety, body dissatisfaction, drive for thinness, socio-cultural influences on body image, and dysfunctional investment in appearance. They showed that fashion models do not have a negative body image. However, although fashion models are on average slightly underweight with a mean BMI of 18.17, they still have a significantly higher drive for thinness on the EDI-3 subscale and a higher level of dysfunctional investment in appearance on Appearance Schema Inventory. The authors suggested that the fact that fashion models successfully attain the cultural beauty ideal acts as a protective factor against a negative body image, even in the condition of a higher drive for thinness and higher investment in appearance.

In sum, most of the reviewed studies have shown that fashion models (1) have a significantly lower BMI than control groups, being slightly underweight; and (2) do not have a higher body dissatisfaction but a positive body image, some studies finding even a higher level of body satisfaction in models than controls.

In all studies models are on average slightly underweight with a mean BMI around 18, ranging from 16.9 to 18.9 and significantly lower than controls' mean BMI that ranges from 20 to 22.2, but the main difference comes from

height and not from weight. Models and controls have similar weights, but all models have significantly greater heights (+10 to 12 cm), with significant deviations from the average female height [29].

Discussion

Despite many concerns regarding the prevalence of ED among fashion models, the scientific research on this professional group is surprisingly scarce.

Major findings

When reviewing the selected studies, we found that all studies hypothesized an increased prevalence of ED and a negative body image among fashion models, but there were surprisingly only little differences between fashion models and non-models. As shown by most studies, ED does not occur with an increased prevalence among fashion models compared to control groups. Models pay significantly higher importance on appearance and are more focused on thin shape. A more concerning fact is that in all studies models have a significantly lower BMI than non-models, being on average slightly underweight with a BMI around 18, and still having a stronger drive for thinness. However, this does not seem to be associated more frequently with ED and dysfunctional weight control methods. Some researchers explain these findings as being due to the above average height of the models, as they have a particular body structure that allows them to naturally maintain a slim shape, without making any deliberate attempt to control their weight by keeping severe diets or using pathological eating behaviors [29]. Although having a similar weight as controls, models are significantly taller, so the main difference in BMI comes from height. In most studies, a similar prevalence of full-syndrome ED on DSM-IV [41] criteria between models and controls was found.

The concerning result is the higher prevalence of partial-syndrome ED, two studies finding significant differences in partial-syndrome AN with significantly more models meeting the criteria used in studies: underweight and undue influence of shape and weight on self-evaluation [31, 32]. Besides this, models did not report more pathological eating behaviors than controls on self-report inventories [31, 32], but in face-to-face interviews they admitted having significantly more ED symptoms [31]. The definition of partial-syndrome AN is problematic for models, since 40–50 % meets the weight criteria based on BMI [32]. The BMI depends on height, and models have a significant deviation from the average height that may produce an atypical body conformation that placed models at the extreme end of the BMI normal distribution in the female population [29].

Therefore, the low BMI of underweight models may partly be due to their body constitution and not undernourishment.

Furthermore, fashion models were expected to have greater concerns regarding body shape compared to non-models and most studies hypothesized that models would show a significantly more negative body image than controls. This hypothesis was not supported by the results. Most studies found that body dissatisfaction is not a characteristic feature of fashion models. Further, positive body image and high levels of body satisfaction are considered to be protective factors against ED. It is not clear how this works for fashion models, because their underweight does not decrease the drive for thinness [29, 35]. Over time they show increased body esteem but also increased drive for thinness, despite being underweight; this suggests they highly value a thin shape that may be rewarding and reinforcing their will to remain thin. Although the relation between body appreciation, self-esteem, and ED is well documented [42], only one study examined the self-esteem of fashion models in relation to body image and eating attitudes. As predicted, a higher body satisfaction is positively associated with self-esteem in fashion models and negatively with dysfunctional eating attitudes [29]. Since body satisfaction and self-esteem increase during fashion models' career [35], and the dysfunctional eating decreases, we may also assume they managed to control their body shape and weight by other non dysfunctional methods.

Most studies start with the assumption of increased socio-professional pressures for thin body on fashion models. Since the internalization of socio-cultural standards represents a potential risk factor for ED [43], its assessment seems relevant in the esthetic field. Only one recent study has assessed the socio-cultural pressures toward appearance among fashion models and controls and found no differences [35]. In studies, pressures for thinness were considered implicit in the fashion field because of many underweight models and their desire to maintain a slim figure. Since models give a higher importance to appearance, we may assume that having an ideal body might be a higher stake and increase the motivation for using shape and weight management behaviors. Regarding physical demands, there are no official standards imposed for fashion models, but different body shapes are more suitable for different fashion sectors [24]. For international fashion shows, very tall models are required with a height of 1.80 m because "long" bodies display the right proportions that highlight better the creations design and produce the best visual impact on catwalk and on camera. Models are expected to have a good physical shape, a healthy appearance, and enough strength for the physically challenging activity. Undernourished models would not be

able to meet the job performance criteria. Occupation standards also require a good training, nutrition, and a balanced lifestyle [22] as ways to prevent the weakness caused by undernourishment. Of late, professional fashion event organizers pay greater attention to prevention because a disgraceful appearance, health problems, the weakness of undernourished bodies, and the risks for accidents would cause a great prejudice against the image of fashion designers and producers.

Limitations and strengths of this review

This is the first systematic review which examined the relationship between model occupation and ED and its strengths are that it is comprehensive and structured. With respect to limitations of this review, these results can be clouded by the low response rates in some studies and also by a very small number of studies.

Quality assessment of the available studies included in this review revealed that there are a few rigorous studies without limitations and methodological weaknesses. First, most measures were based on self-reporting instruments which may increase the likelihood of socially desirable responses and denial of stigmatizing behaviors. For instance, Preti et al. [31] found that on self-report questionnaires, the models and non-models did not differ significantly, but in a detailed face-to-face interview, models reported significantly more symptoms of ED than non-models. Furthermore, most of the measures of ED used in the reviewed studies have not been standardized on fashion models. Second, some methodological aspects limit the validity of the findings based on results of studies: the relatively small samples, low rates of response in some studies, and low openness in the field raise questions about those who refused to participate. Third, all studies used cross-sectional designs that cannot allow causal conclusions. In the absence of longitudinal designs it cannot be determined whether the model occupation or the professional field itself influences the appearance concerns and maintenance of a thin body shape, or whether people who have already had these features are attracted towards being recruited in this field.

Some methodological aspects lead to cautious interpretation of the results. For example, two studies found higher levels of eating disorder and body image disturbances among models compared to controls [30, 34] that may be partially influenced by the group selection. Garner and Garfinkel [30] analyzed fashion students and not professional fashion models. The distinction between established professional fashion models and girls who desire this career whether they have the necessary qualities or not might have led to different outcomes. [33]. Fashion students in the study had mean height of 1.69 m, insufficient for

professional fashion models, which can lead to dysfunctional compensation methods to attain the right proportions of a tall person. In the other study with significant differences between experimental group and the control group, the latter was formed exclusively of psychology students [34].

Future research

Given the extremely low number of studies and the heterogeneity of results, additional research is needed to arrive to more consistent conclusions. Future research might examine the risk, maintenance, and resilience factors that may account for the absence, presence or severity of eating problems in this field. Although complying with specific beauty standards may be a risk factor, it cannot produce by itself ED, the scientific evidence proving this condition is multi-determined by a wide range of factors with different role and impact [30]. Future studies might focus on examining other mediators connected to fashion models activity. Physical exercise to keep in shape, active lifestyle, and healthy eating encouraged for maintaining proper physical condition and health can be examples of healthy behaviors [44]. Also, the attention, care and body appreciation, a higher bodily self-awareness, self-control, and physical discipline [44, 45] may be positive factors in the self-body relationship, frequently dysfunctional in ED [46]. Body image concerns and ED are also linked to social comparison, as upward physical comparison increases body dissatisfaction [47, 48]. Among fashion models, there may be more common downward social comparison, leading to higher body satisfaction, with a prevention role against ED [29].

Future studies may use a variety of assessment methods, in addition to self-reporting instruments, including standardized interviews, which may reduce the risk of the desirable answers, thereby increasing the validity of the results. Further, to produce sound conclusions and substantiated explanations, research should also include longitudinal studies that could overcome the limitations of cross-sectional studies that cannot identify causality.

Conclusion

Overall, research on ED among professional fashion model does not support the assumption of ED as a generalized phenomenon in models. Research results showed that full-syndrome ED prevalence was not higher among fashion models than controls, but in fashion model groups significantly higher levels of partial-syndrome AN were found. Fashion models are slightly underweight and give higher importance to thin body shape but they generally do not

report more dysfunctional eating behaviors and consider having a positive body image a protective factor. Of more concern is the fact that despite being underweight, models still have a stronger drive for thinness. This suggests that they highly value their thin appearance that may be reinforced and rewarded by the professional success and increased motivation for maintaining thin body shape. It is important that fashion industry professionals acknowledge the health risks of underweight models and address this problem by adopting proper prevention measures such as by increasing focus on health and ensuring that models slightly increase their body size.

The current findings do not clearly elucidate the matter of eating disorder among fashion models and cannot be used to derive firm conclusions. Future research is needed to consolidate the findings and to offer a more accurate image and valid explanations, necessary to enhance prevention measures that could properly address the challenges in professional fashion field. In the absence of more substantial scientific evidence, overestimation of ED among fashion models in public concerns may also be increased by the generalization of single striking cases used in anti-anorexia campaigns, and by the misinformation in the tabloid mass-media focused on sensational topics.

Acknowledgments The authors received no financial support for the research, authorship, and/or publication of this article.

Compliance with ethical standards

Conflict of interest The authors declare that they have no conflict of interest.

Ethical approval This article does not contain any studies with human participants performed by any of the authors.

Informed consent For this type of study formal consent is not required.

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