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Exploring the self-perceived causes of eating disorders among Chinese social media users with self-reported eating disorders

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Abstract

Background Even though robust evidence suggests the high prevalence of eating disorders (EDs) in China, EDs in China are characterized by low diagnosis rates, delayed treatment-seeking, and ineffective treatments. Given that listening to patients' perspectives and lived experiences is crucial to improving our understanding of EDs in the Chinese context, an investigation of the perceived causes of EDs in Chinese individuals with EDs represents a key step in improving the prevention and treatment of EDs in China.

Aims To explore the perceived causes of EDs based on data from a sample of Chinese social media users with self-reported EDs, with a particular focus on the Zhihu platform.

Methods We extracted and analyzed data through content analysis. Eight specific causes that could be classified into two groups were coded, including individual factors (e.g., "body image and eating") and sociocultural factors (e.g., "media and cultural ideals").

Results A total of 2079 entries regarding self-reported EDs were retained for content analysis (14.7% were anorexia nervosa, 37.6% were bulimia nervosa, and 47.7% were binge-eating disorder). More than 90% of users with self-reported EDs claimed causes belonging to individual factors, while 35–51% of users claimed sociocultural factors. "Body image and eating" (68–87%) and "psychological and emotional problems" (65–67%) were the most commonly claimed specific causes, while "traumatic life events" (13–14%), "genetics and biology" (7–13%), and "sports and health" (9–12%) were the least claimed. Chi-square independent tests showed that users with different self-reported EDs disproportionately claimed certain causes.

Conclusions Using large-scale social media data, findings provide a deeper understanding of the perceived causes of EDs in the Chinese context from individuals with self-reported EDs and highlight the variations in perceived causes across different self-reported ED types.

Keywords Eating disorders, Social media, Causes, Risk factors, Chinese, Zhihu, Content analysis

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Plain English Summary
We explored the perceived causes of eating disorders (EDs) by using big data from Chinese social media (i.e., Zhihu) users with three self-reported ED types (i.e., anorexia nervosa, bulimia nervosa, and binge-eating disorder). Results showed that more than 90% of users with self-reported EDs claimed causes belonging to individual factors, while 35–51% of users claimed sociocultural factors. Users with different types of self-reported EDs disproportionately claimed specific perceived causes of their EDs. Our findings underscore the variations in perceived causes across different self-reported ED types. The study also highlights the utility and significance of researching the etiology of EDs via big datasets in the context of the evolving digital environment.

Introduction

Eating disorders (EDs), such as anorexia nervosa (AN), bulimia nervosa (BN), and binge-eating disorder (BED), are serious mental illnesses that are related to an array of negative health consequences, including suicidality, mood disorders, impaired quality of life, and elevated mortality [1–4]. Ample research evidence suggests that EDs are highly prevalent and increasing in prevalence worldwide [5], including in China [6]. For example, a prevalence rate of 7.04% probable EDs was identified in Chinese girls and women aged 12–50 years [7].

However, EDs in China were characterized by low diagnosis rates, delayed treatment-seeking, and ineffective treatments [8]. A study based on Chinese participants who sought treatment and social support for EDs demonstrated that shame, a lack of recognition of EDs as an illness, and financial constraints were the primary reasons for not seeking treatment [9]. This study also emphasized the importance of enhancing our understanding of culturally specific manifestations of EDs [9]. Also, as argued by Jaiprahash and colleagues [10], it is important to incorporate patients' subjective perspectives in the diagnosis and treatment of EDs. To date, several qualitative studies have used interview methods to investigate the subjective perspectives of patients with EDs in China, suggesting the importance of examining the culturally specific meanings and experiences of EDs (e.g., [11–14]). However, collecting data directly from patients via interviews typically involves a very small number of participants (e.g., [11–14]), which might lead to poor generalizability of the findings to the whole ED population in China. Also, even though data collected directly from participants via interviews or surveys are valuable, it is well-acknowledged that such data suffer from social desirability bias (i.e., participants tend to provide socially acceptable responses that might differ from their true feelings [15]) [16, 17]. Therefore, using the rich data from social media could be a valuable, alternative approach to studying those with lived experiences of EDs because these data can be used to assess human behaviors and experiences in a non-intrusive way, therefore decreasing social desirability bias and increasing ecological validity [18].

Furthermore, it is vital to investigate the perceived causes of individuals with EDs because those perceptions may significantly influence clinical management by shaping motivated cognitions and behaviors which, in turn, affects overall treatment response (e.g., psychological adjustment, psychosocial adaptation, adaptive strategies) [19–23]. Illness perception refers to an organized belief system about one's illness condition and is a key determinant of direct behaviors related to illness management [21]. Different illness perceptions can contribute to different illness trajectories [20]. For example, research on chronic health conditions showed that perceptions of depression were related to patients' help-seeking behaviors [24] and perceptions of obesity were associated with one's health-related quality of life [23]. Moreover, researchers have suggested that listening to patients' perspectives and lived experiences is crucial to improving our understanding of EDs in the Chinese context [9]. Indeed, studies showed that poor mental health literacy was associated with inappropriate treatment-seeking, higher stigmatizing attitudes, and less self-recognition of ED symptoms [25, 26]. Thus, understanding the perceived causes of EDs and integrating this knowledge into educational promotion programs, interventions, and treatment are important factors related to improved ED-related health literacy for patients with EDs and their healthcare team (e.g., psychiatrists and therapists [27]) in China.

Zhihu is a popular question-and-answer (Q&A) social media platform in China, well known for its in-depth answers to specific questions. Specifically, in the context of the present study for exploring perceived causes of EDs, Zhihu's Q&A format allows users with EDs to provide detailed narratives about causes of EDs by directly answering related questions (e.g., a popular related question on Zhihu is "你们的厌食症都是怎么得的?" or How did you get anorexia nervosa?). Other popular social media platforms in China (e.g., Xiaohongshu) exist where users with EDs can also publish posts to share their experiences with EDs, but these posts might not focus on the perceived causes of their EDs. In this study, using the data from users of Zhihu, we drew upon the list of perceived causes of EDs summarized by Blodgett Salafia and colleagues [28] to explore the self-perceived causes of EDs in Chinese social media users with self-reported EDs. Specifically, Blodgett Salafia and colleagues [28] explicated two main factors—individual factors and sociocultural factors—for which eight specific subfactors were identified (e.g., traumatic life events, family problems, social problems, psychological and emotional problems, genetics and biology, media and cultural ideals, sports and health, and body image and eating; see Table 1). Given the exploratory nature of this study, we aimed to gain preliminary insights into how these perceived causes of EDs manifest in the Chinese context.

Methods

Data wrangling

The project was approved by the Institutional Review Board (Applied Psychology) of The Chinese University of Hong Kong, Shenzhen. Social media data from Zhihu were retrieved on March 29, 2023, via Zhihu's Application Programming Interface (API) using Python version 3.10. Specifically, we first adopted the ED keywords based on Sun and colleagues (2020), including "厌食症" (anorexia), "神经性厌食症" (anorexia nervosa), "贪食症" (bulimia), "神经性贪食症" (bulimia nervosa), "暴食症" (binge-eating disorder), and "进食障碍" (eating disorders). Then, an iterative search was conducted until no new questions related to EDs emerged. Afterward, we screened these data and excluded questions that did not contain any of the keywords or were unlikely to include answers where users with EDs shared their self-perceived causes of their EDs. Following that, we retrieved all answers ($N=5199$) to the relevant questions, and these data in the present study were used in subsequent manual coding.

Manual coding of posts from Chinese Zhihu users

Our fundamental framework for the content analysis was based on the coding list for the main causes and specific reasons for EDs, which were specified by Blodgett Salafia and colleagues [28]. We manually extracted relevant information by reading posts from Zhihu users, guided by the following four questions: 1) whether the user had self-reported eating disorders or not; 2) which types of the three eating disorders the user self-reported: AN, BN and/or BED; 3) what were the main causes, including individual and/or socio-cultural factors; and 4) what were the specific reasons? According to the framework [28], the specific reasons were identified as 1) traumatic life events, 2) family problems, 3) social problems, 4) psychological and emotional problems, 5) genetics and biology, 6) media and cultural ideals, 7) sports and health, and 8) body image and eating. The results of the posts were classified into none, one or multiple types of self-reported EDs, main factors of self-reported EDs, and specific reasons for self-reported EDs. Presented in Table 1 are samples of causes of self-reported EDs in each category for coders to classify each post into corresponding coding schemes. Extreme break-up events were included in the traumatic life events, based on the research team's discussion.

The research team collaborated to conduct the content analysis. Specifically, each post was coded independently by two research assistants who were college students majoring in psychology. The research assistants were trained in differentiating EDs and coding social media posts under the guidance of an expert in EDs, social media research, and content analysis. Disagreements were resolved by discussions within the research team. Cohen's Kappa, as an indicator of interrater reliability, ranged from 0.71 to 0.94, indicating an adequate to perfect agreement between the coders.

Table 1 The coding scheme of self-perceived causes of eating disorders based on Blodgett Salafia and colleagues (2015)

Categories	Illustrated examples
Individual factors	
Traumatic life events	Sexual assault, college entry, abuse, extreme break-up events
Psychological and emotional problems	Stress, depression, anxiety, need for control, perfectionism, low self-esteem
Genetics and biology	History of eating disorders in family, chemical imbalance in the brain
Sports and health	Gymnastics or dance, health or exercise class, desire to be healthy, lack of knowledge about nutrition
Body image and eating	Drive for thinness, unhappiness with appearance, feeling overweight or unattractive, distorted image, dieting, restrictive eating behaviors
Social and cultural factors	
Family problems	Comments from family, pressure from parents, need for praise, conversations about weight
Social problems	Bad romantic relationship or break-up, pressure from peers, teasing, social isolation
Media and cultural ideals	Thin ideal images and messages

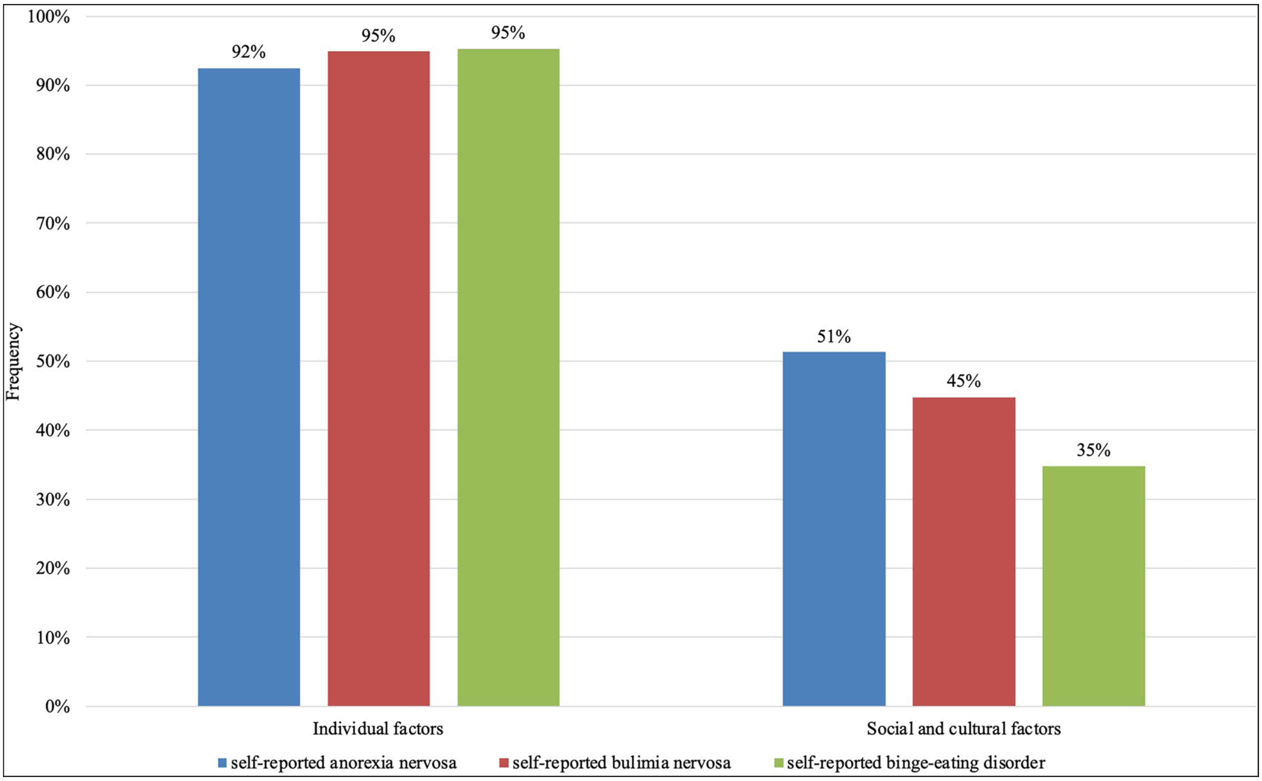

Fig. 1 Bar graph of the self-perceived main causes of self-reported eating disorder types

Data processing and cleaning

Of the 5199 initially extracted posts, after manual coding, 2098 posts/responses indicated that the users self-reported themselves as having EDs. However, 16 posts were further removed due to no detailed descriptions of their self-reported ED experiences, and three other posts were also removed because the users of the three posts indicated they had multiple types of self-reported EDs. In total, 2079 posts remained and were used in subsequent data analyses.

Data analyses

Statistical analyses were conducted via R 4.2.2. The Chi-square independence tests were used to analyze the relationships between self-reported ED types and sex, anonymity, and each self-perceived cause. Cramer's V was used to assess the effect sizes in the Chi-square independence tests, with values of 0.10 denoting small, 0.30 denoting medium, and 0.50 denoting large effects [29]. The level of statistical significance was set at $p < 0.05$.

Results

Descriptions of frequencies of self-perceived causes across eating disorder types

Overall, of the 2079 Zhihu users, 14.72% self-reported AN, 37.61% self-reported BN, and 47.67% self-reported BED. As shown in Fig. 1 regarding the two main classifications of perceived causes (i.e., individual factors and social and cultural factors), a vast majority of users with self-reported EDs claimed causes belonging to individual factors (i.e., 92%, 95%, and 95%, respectively, for AN, BN, and BED). In contrast, the "social and cultural factors" were only claimed by 51% of users with self-reported AN, 45% of users with self-reported BN, and 35% of users with self-reported BED.

Furthermore, according to Fig. 2, all three self-reported EDs showed similar patterns in the frequencies of specific causes. Specifically, as shown in Fig. 2, across all self-reported ED types, "body image and eating" (68%, 87%, and 75%, respectively, for AN, BN, and BED) and "psychological and emotional problems" (67%, 66%, and 65%, respectively, for AN, BN, and BED) were most commonly reported, followed by "social problems" (42%, 40%, and 36%), "family problems" (24%, 22%, and 20%), and "media & cultural ideals" (19%, 25%, and 19%), whereas all other three causes (i.e., "traumatic life events,"

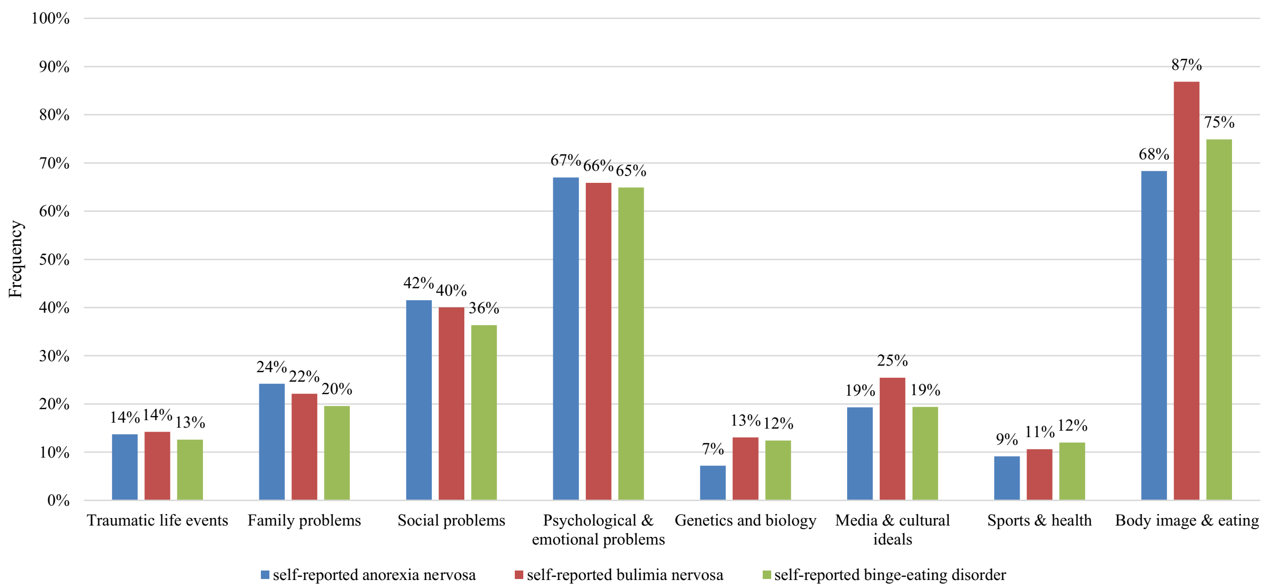

Fig. 2 Bar graph of the self-perceived specific causes of self-reported eating disorder types

"genetics and biology," and "sports and health") were claimed by less than 20% of users with self-reported EDs.

Correlates of the types of self-reported eating disorders

As shown in Table 2, the Chi-square independence tests identified several significant correlates of self-reported ED types. Specifically, being anonymous or not was significantly related to self-reported ED types (AN, BN, or BED), with $\chi^2(2, N=2079)=12.123$ ($p=0.003$; Cramer's V = 0.07, 95% CI [0.02, 0.12], a small effect), suggesting that users who self-reported BN (63%) were more likely to go for anonymity on the social platform than users who self-reported AN (57%) and self-reported BED (56%).

For the correlates of perceived reasons, the social and cultural factors had a significant relationship with self-reported ED types, $\chi^2(2, N=2079)=33.687$ ($p<0.001$; Cramer's V = 0.13, 95% CI [0.07, 0.17], a small effect), with the proportion of users who self-reported AN (51%) and self-reported BN (45%) endorsed more social and cultural factors than users who self-reported BED (35%). Furthermore, media and cultural ideals ($\chi^2(2, N=2079)=10.688$, $p=0.005$; Cramer's V = 0.07, 95%CI [0.03, 0.11], a small effect), body image and eating ($\chi^2(2, N=2079)=58.519$, $p<0.001$; Cramer's V = 0.17 (95%CI [0.12, 0.21], a small effect), and genetics and biology ($\chi^2(2, N=2079)=7.709$, $p=0.021$; Cramer's V = 0.06 (95%CI [0.03, 0.10], a small effect) were also significantly related to self-reported ED types. Specifically, the proportions of users who self-reported BN (13%) and self-reported BED (12%) claimed genetic and biological causes more than those who self-reported AN (7%). Users who self-reported BN (25%) were more likely to claim media and cultural ideals as causes than were those who self-reported AN (19%) and self-reported BED (19%). Also, users who self-reported BN (87%) were more likely to claim "body image and eating" as causes than those who self-reported BED (75%) and self-reported AN (68%).

Discussion

To our knowledge, our study was the first to explore the perceived causes of EDs via large-scale social media data from Chinese social media users with self-reported EDs. In our study, data from Zhihu were analyzed to understand self-perceived causes of EDs among users. Based on Blodgett Salafia and colleagues [28], we manually coded 2079 posts, out of an initial 5199 posts, for specific causes for subsequent statistical analysis. Results showed that "psychological and emotional problems" and "body image and eating" were the two most commonly self-perceived causes. Chi-square independence tests revealed that individuals with self-reported AN reported more causes of "social and cultural factors" than those with self-reported BN and self-reported BED. Additionally, individuals with self-reported BN were more likely to claim causes of "media and cultural ideals" and "body image and eating" than those with self-reported AN and self-reported BED. The study highlighted the importance of investigating the self-perceived etiology of different EDs and demonstrated the value of social media data in identifying perceived risk factors among Chinese users with self-reported EDs.

Table 2 Chi-square independent tests for the associations of eating disorder types with demographic characteristics and self-perceived causes

Variables	Self-reported AN ($n=306$)	Self-reported BN ($n=782$)	Self-reported BED ($n=991$)	χ^2	*df*	*p*	Cramer's V	95% CI
Sex								
Males	6 (8%)	11 (6%)	12 (4%)	1.920	2	.383	0.06	[0.01, 0.16]
Females	73 (92%)	176 (94%)	285 (96%)					
Anonymous or not								
Anonymous	173 (57%)	497 (64%)	551 (56%)	12.123	2	.002	0.08	[0.02, 0.12]
Not anonymous	133 (43%)	285 (36%)	440 (44%)					
Individual factors								
Yes	283 (92%)	742 (95%)	944 (95%)	3.667	2	.160	0.04	[0.01, 0.09]
No	23 (8%)	40 (5%)	47 (5%)					
Social and cultural factors								
Yes	157 (51%)	350 (45%)	345 (35%)	33.687	2	.000	0.13	[0.07, 0.17]
No	149 (49%)	432 (55%)	646 (65%)					
Traumatic life events								
Yes	42 (14%)	111 (14%)	125 (13%)	.982	2	.612	0.02	[0.01, 0.07]
No	264 (86%)	671 (86%)	866 (87%)					
Family problems								
Yes	74 (24%)	173 (22%)	194 (20%)	3.591	2	.166	0.04	[0.01, 0.09]
No	232 (76%)	609 (78%)	797 (80%)					
Social problems								
Yes	127 (42%)	313 (40%)	360 (36%)	3.911	2	.142	0.04	[0.01, 0.09]
No	179 (58%)	469 (60%)	631 (64%)					
Psychological and emotional problems								
Yes	205 (67%)	515 (66%)	643 (65%)	.510	2	.775	0.02	[0.01, 0.09]
No	101 (33%)	267 (34%)	348 (35%)					
Genetics and biology								
Yes	22 (7%)	102 (13%)	123 (12%)	7.709	2	.021	0.06	[0.03, 0.10]
No	284 (93%)	680 (87%)	868 (88%)					
Media and cultural ideals								
Yes	59 (19%)	199 (25%)	192 (19%)	10.688	2	.005	0.07	[0.03, 0.11]
No	247 (81%)	583 (75%)	799 (81%)					
Sports and health								
Yes	28 (9%)	83 (11%)	119 (12%)	2.198	2	.333	0.03	[0.01, 0.09]
No	278 (91%)	699 (89%)	872 (88%)					
Body image and eating								
Yes	209 (68%)	679 (87%)	742 (75%)	58.519	2	.000	0.17	[0.12, 0.21]
No	97 (32%)	103 (13%)	249 (25%)					

AN, anorexia nervosa; BN, bulimia nervosa; BED, binge-eating disorder

Frequencies of self-perceived causes of eating disorders

In the current study, individual factors (e.g., "psychological and emotional problems" and "body image and eating") were more likely to be identified as perceived causes than social and cultural factors (e.g., "social problems" and "media and cultural ideals") across all self-reported EDs. This pattern aligns with the findings of research conducted by Blodgett Salafia and colleagues [28]. The sociocultural theories of body image and disordered eating (e.g., the tripartite influence model [30]) might shed light on potential explanations. Specifically, as proposed by the tripartite influence model [30], both social and cultural factors and individual factors serve as mechanisms of disordered eating. However, these two kinds of factors differ in order, with sociocultural factors (e.g., appearance pressures from peers, family, and media) being more distal than proximal individual factors (e.g., internalizing societal appearance standards, engaging in appearance comparison, and being dissatisfied with one's own body). Similar findings have been reported in research on the attribution of obesity [31], with individual factors (e.g., less physical activity, overeating, and comfort eating) being perceived as proximal causes of obesity and family problems being perceived as distal causes. Thus, users may be more likely to claim "closely" related, proximal causes to their EDs. Also, based on Weiner's attribution theory [32], when individuals attempt to identify the causes behind their behaviors, they tend to consider the controllability of the behaviors (i.e., the extent to which the individual can influence them). Considering disordered eating behaviors are performed by individuals themselves, they may tend to perceive the behaviors as controllable, which may lead them to be more likely to attribute their EDs to internal factors (i.e., individual factors). Thus, our findings may disproportionately reflect individuals' attribution bias, and it does not mean social and cultural factors are not as important as individual factors, especially considering that recent studies showed that social and cultural factors (e.g., appearance pressures from family, peers, significant others, and media) had strong and consistent direct links with eating disorder symptomatology in both Chinese men and women [33, 34].

Our study also lends evidence to the connections between both individual and social/cultural factors and self-reported ED types. Particularly, our results showed that users with self-reported BED were more likely to report individual factors; in contrast, users with self-reported AN or self-reported BN were more likely to report social and cultural factors. Unlike self-reported AN and BN, individuals with self-reported BED typically do not engage in compensatory behaviors (e.g., dieting, purging) but instead may use binge eating as a coping mechanism for stress and emotional distress related to body image pressures. Striegel-Moore and Bulik [35] claimed that individuals with AN and BN were vulnerable to environmental factors (i.e., sociocultural pressures to attain thin ideals). Indeed, a study involving Croatian high school girls supported that those with higher body mass index (BMI) who embraced social standards of thinness were more likely to perceive social pressures to be thin, often manifested through direct and persuasive comments emphasizing the importance of dieting, which might contribute to the development of AN or BN [36]. These findings speak to the complex interplay of individual and societal factors in the development of EDs and underscore the importance of addressing both in treatment and prevention strategies.

Notably, our findings regarding the most frequently self-perceived causes (e.g., "psychological and emotional problems," "body image and eating," and "media and cultural ideals") of EDs align with those reported by empirical studies of patients with EDs in China, in which psychological distress, body image disturbances, and sociocultural changes were identified as key risk factors of EDs (e.g., [37–39]). However, although these empirical studies are valuable, the factors investigated in prior studies using clinical samples might not be comprehensive, and the generalizability of related findings might be questionable due to the small sample sizes (e.g., a few cases with EDs [39]). Thus, our study expands on prior literature in China by comprehensively investigating the self-perceived causes from a much larger and more diverse sample, findings that contribute to our understanding of the etiology of EDs and related health literacy of individuals with self-reported EDs in the Chinese context.

Frequency differences of self-perceived causes for all types of eating disorders

In our study, the causes of "psychological and emotional problems" and "body image and eating" were the two most frequently perceived causes. These findings were consistent with the well-documented literature that psychological and emotional problems (e.g., difficulties in emotion regulation and psychological distress) are core, transdiagnostic risk factors of EDs [28, 40–43]. Also, body image concerns (e.g., weight/shape dissatisfaction) and eating concerns (e.g., restrictive eating) are core risk factors and/or major manifestations of EDs [42, 44], including in Chinese adults [45]. Following the two most perceived causes are "social problems," "family problems," and "media and cultural ideals." Based on the tripartite influence model [30], sociocultural factors are important sources contributing to the development of EDs. Indeed, empirical research conducted in China consistently suggests that socially promoted body ideals (e.g., thin ideal [46]) and related pressures are important risk factors of EDs [33, 34, 47].

Relationships between self-perceived causes and types of eating disorders

In our present study, interestingly, we found a statistically significant relationship between self-reported ED types and the preference for anonymity, especially users with BN being more likely to opt for anonymity compared to those with self-reported AN and self-reported BED. One potential explanation is that, unlike individuals with AN and BED who may show significant signs of appearance changes (e.g., becoming underweight or overweight) to be observed by others, individuals with BN often have less significant appearance changes (e.g., maintaining a relatively normal weight), which makes their symptoms less likely to be detected by others [48]. Also, individuals with BN might feel ashamed of their binge eating and compensatory behaviors, especially purging or self-induced vomitting, and do these secretly [49]. Thus, it might be preferred by individuals with BN to choose anonymity as compared to those with AN and BED.

Additionally, our study found that users with self-reported BN were more likely to claim “body image and eating” causes compared to those with self-reported AN or self-reported BED. Indeed, abundant research has uncovered differences in eating and body image disturbance among AN, BN, and BED (e.g., [50, 51]). For example, Lydecker and colleagues [50] reported that patients with AN and BN exhibited higher levels of preoccupation with both shape/weight and food/eating than those with BED. Therefore, it is crucial to refine and differentiate the specific eating and body image disturbances across various EDs in the future to enhance the diagnosis of different ED types and tailor case conceptualization and treatment planning more effectively.

In addition to “body image and eating,” the frequencies of “media and cultural ideals” were also significantly different across self-reported ED types, with self-reported BN being the highest. The empirical literature has demonstrated that media use (e.g., social media use), as well as body ideals (e.g., thin ideals), are associated with body image concerns and eating disturbance among Chinese samples (e.g., [52–54]). However, to our knowledge, limited research evidence is available on how media and cultural ideals may contribute differently to developing various types of EDs. Thus, our finding of individuals with self-reported BN endorsing more perceived influence from media and cultural ideals may suggest a stronger connection between media and cultural ideals and BN compared to that between media/cultural ideals and AN/BED. Thus, media-based interventions for EDs might be more effective for Chinese individuals with BN. However, this postulation should be examined in future studies with validated samples of EDs.

Notably, the rates of self-perceived “genetics and biology” causes varied significantly across different self-reported ED types as well, with self-reported AN having a lower rate compared to self-reported BN and self-reported BED. Studies involving twins and families have provided compelling evidence regarding the heritability of various ED types and have linked specific genes and their variants to these EDs (e.g., [55–57]). For instance, genetic factors are responsible for approximately 33–84% of AN cases, 28–83% of BN cases, and 41–57% of BED cases [57]. Thus, one plausible explanation is that different from BN and BED, AN does not involve binge eating or loss of control eating, which are closely related to obesity [58]. Given that Chinese media frequently identifies genes as a risk factor for obesity [59], individuals exposed to Chinese media may be more likely to perceive BN and BED, as opposed to AN, as more influenced by genes and one’s biological profile.

Clinical implications

The findings of the present study have clinical implications. First, the perceived differences in causes across different self-reported EDs shed light on ED intervention and treatment in the Chinese context. Specifically, findings from the present study may be relevant to the early stages of clinical intervention of EDs in which patients and providers discuss, through psychoeducation, the reasons/causes of EDs. Some patients may arrive in the clinic with ideas of what causes their EDs (e.g., individual factors), as identified by this study, and others may underestimate other relevant factors (e.g., biological/genetic factors). Providers may target such gaps to enrich patients’ understanding of their EDs and support the development of a comprehensive treatment plan. Recognizing these differences may allow for more effective and personalized strategies in the treatment and prevention of different EDs.

Furthermore, given China’s large population base, this study underscored the importance of prioritizing initial screening, detection, and prediction of EDs for further prevention and intervention. The findings draw attention to developing more effective approaches to address the rising concerns of EDs in the general population and could help inform public health strategies and healthcare policies. Indeed, findings from this study also have implications for educating lay people in China, including caregivers, about EDs to increase their literacy of the numerous and complex etiological factors of EDs. This is important considering that many Chinese people suffering from EDs and their caregivers may have low literacy of EDs, including etiological factors [9].

Limitations and future research directions

This study has limitations that should be acknowledged. First, our sample was a relatively homogeneous group in terms of sex, which may impact the generalizability of our findings. Our study did not find a statistically significant relationship between sex and self-reported ED types; the lack of significance in sex differences might be attributed to missing sex information during data wrangling, which resulted in a relatively small sample size of males. However, ample research evidence has suggested that sex differences were observed in the prevalence of ED symptoms (e.g., [60, 61]). Therefore, future research should consider the sex-balanced sampling of participants, as well as additional social identities (i.e., gender identity, ethnicity, socioeconomic status, and sexual orientation [62, 63]). This expansion would enable a better understanding of the impact of sex and other demographic factors on self-perceived ED etiology, enhancing the generalizability of the results.

Second, the representativeness of our results might be restricted, as Zhihu, despite its large user base in China, may not fully represent all Chinese social media users. Moreover, due to the nature of Zhihu's user base, we recognize that it may not represent the more interactive and emotion-driven discussions found on other platforms, such as Xiaohongshu (Little Red Book), a Chinese equivalent of Instagram. Therefore, future research could broaden the scope to include other platforms, collecting comparable data from social media sites such as Xiaohongshu to validate and expand on our findings.

Finally, these data regarding perceived causes of EDs were collected *indirectly* from social media users who self-reported EDs by using content analysis of their social media posts. The perceived causes in the present study may be different from the perceived causes that are *directly* collected from patients with EDs via clinical interviews. Thus, future research should consider gathering data from social media and direct interviews with patients with EDs to examine whether and to what extent the perceived causes may differ.

Conclusion

This study offered insights into the self-perceived causes of EDs in Chinese social media users, highlighting the important roles of self-perceived causes of "psychological and emotional problems" and "body image and eating." Our findings underscored the potentially complex interplay of specific causes among individual factors and social and cultural factors in the development of EDs, with variations observed in different types of self-reported EDs. Despite its contributions, the study acknowledged limitations such as the homogeneity of the samples in terms of sex, the reliance on a single social media platform, and no validation of the findings by collecting other data directly from patients with EDs via interviews. In sum, the present study highlighted the potential utility and significance of researching the etiology of EDs via big datasets in the context of the evolving digital environment.

Abbreviations

AN	Anorexia nervosa
BED	Binge-eating disorder
BN	Bulimia nervosa
DSM-5	Diagnostic and statistical manual of mental disorders, 5th edition
EDs	Eating disorders

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Author contributions

Jinbo He: Conceptualization, Supervision, Methodology, Funding acquisition, Project administration, Writing—original draft, Writing—review & editing. Yuchen Zhang: Formal analysis, Data Curation, Writing—original draft, Writing—review & editing. Zhiyuan Liu: Investigation, Data curation, Writing—review & editing. Wesley R. Barnhart: Writing—original draft, Writing—review & editing. Shuqi Cui: Writing—review & editing. Shi'ting Chen: Writing—review & editing. Yuru Fu: Writing—review & editing. Feng Ji: Writing—review & editing. Jason M. Nagata: Writing—review & editing. Shaojing Sun: Conceptualization, Supervision, Writing—review & editing.

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Availability of data and materials

These data are available from the corresponding author upon request.

Declarations

Ethics approval and consent to participate

The ethical approval was obtained from the Institutional Review Board of the Chinese University of Hong Kong, Shenzhen (No. EF20220809001).

Informed consent

The present study used public social media data, and informed consent was not applicable.

Competing interests

The authors declare no competing interests.

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