HEALTH SCIENCES

Eating Disorder Risks Associated with Time Spent Using Social Media at an AMREC Population in the Coal Mining Region of Santa Catarina

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Abstract: Comparing one's appearance to other people's and believing in an ideal body shape can negatively impact an individual. The probability of developing ED in individuals with high body dissatisfaction is higher than in the general population, leading to long-term emotional and metabolic damage. Populational studies on the prevalence of ED in Brazil are scarce in the literature. The research was carried out through the Google Forms website and evaluated risk of eating disorders through the Eating Attitude Test, degree of body dissatisfaction in the sample through the Body Shape Questionnaire and the Internet Addiction Test was used to evaluate time spent on the internet. The results showed that 84.5% of the sample were female and 62.3% of the individuals had eutrophic by the Body Mass Index. About 40.2% of the population studied had abnormal attitudes towards food, indicating a possible risk of developing ED, and 62.5% of the sample did not show body dissatisfaction. Regarding internet use, 10.8% had problematic internet use. The presence of risky eating attitudes was more prevalent in participants dissatisfied with their bodies. In addition, participants with problematic internet use had a higher risk for EDs.

Key words: Body dissatisfaction, eating disorders, internet, social media.

INTRODUCTION

Eating disorders (ED) are grave psychosomatic conditions, characterized by excessive behaviors about weight control and abnormal (restrictive or compulsive) attitudes towards food. Uncommon attitudes toward weight, body shape, and eating habits play a fundamental role in their origin and symptom constancy (Treasure et al. 2014).

The main consequences of ED occur due to alterations in the volume of food consumption or by dysfunctional absorption of nutrients, significantly affecting the physical health or the psychosocial functioning of the individual (American Psychiatric Association 2014). Eating Disorders' side effects can include amenorrhea, hyperactivity, bradycardia, and vomiting. Furthermore, some psychological disorders can unfold in the long run such as anxiety, depression, phobias, compulsion, excessive preoccupation, and eccentric attitudes toward food (N Galvão & MAF Carvalho, unpublished data).

The prevalence of these disorders is seen more in industrialized and developed countries. The incidence is estimated to be between 0.5% and 1% for anorexia nervosa. Meanwhile, it is estimated a prevalence between 3 and 5% of the female adolescent and young adult population

with Bulimia in developed countries. In general, it can be observed an increase in the incidence (new cases) of these disorders throughout the years, having almost doubled the number of cases in the last two decades, arriving 70 million people4. However, it cannot be discarded the idea that the wide disclosure of the subject has been facilitating the diagnosis of ED. Also, it is important to highlight that the numbers can be underestimated since many individuals only decide to seek professional help when they conditions becomes dangerous/risky/hazardous, which makes it harder to estimate the number of cases (Lee et al. 2001, Kessler & Poll 2018).

The etiology of these alterations is multifactorial, its main risk factors are genetics, psychological and sociocultural. The way the individual behaves towards the body and food, and the intensity of how the symptoms manifest themselves can vary according to gender identity, sexual orientation, ethnicity, and age (Kendler et al. 1997, American Dietetic Association 2006). First-degree parents of patients with anorexia nervosa (AN) and bulimia nervosa (BN) are more tolerant of developing the disorder, as family history is the greatest predisposing risk (Prisco et al. 2013).

The prevalence of these pathologies varies from 0.5% to 4.2% from that of the world population. Most of the cases are observed in females, representing around 90% of the cases; the age range with a higher risk of developing ED is from 18 to 30 years old (Miranda et al. 2012, Dumith et al. 2012).

Corporal dissatisfaction leads to a comparison of appearances and the internalization of an ideal slimness model, usually considering the standard model imposed by society. Then, the individual who believes that he/she does not fit in the standard model ends up adopting behaviors to find him/herself in that ideal, like restrictive diets, plastic surgeries, and excessive physical activity, among other things (Halliwell et al. 2011).

Comparing one's appearance to other people's and believing in an ideal body shape can negatively impact an individual. Nowadays, the beauty standard established by society corresponds to a thin body for women and a muscular one for men (Halliwell et al. 2011). The probability of developing ED in individuals with high body dissatisfaction is higher than in the general population, leading to long-term emotional and metabolic damage (Tiggemann & McGill 2004).

Social media has the power to influence its users and are backed by increasing investment of industry and technology to propagate health techniques and well-being tips (Sampasa-Kanyinga & Lewis 2015). Besides the crescent wave of publications on health, comparing oneself is the main mechanism by which social media negatively affects the individual's image, especially body satisfaction (Holland & Tiggemann 2016).

The frequency of social media use is expressed by the time spent using social media, which is related to mental health problems in children and adolescents (Magalhães & Mendonça 2005). Moreover, the same study shows that spending over 2 hours using social media can cause higher psychological damage, reduce self-evaluation capacity, and increase suicidal thoughts (Bighetti 2003, Magalhães & Mendonça 2005)

The use of social media is closely related to body image and also the way we create a relationship with food. These outside influences can become pathological, thereby shaping how we think and act. The broad relationship between social media use, body image and eating disorders operates through a number of mechanisms. Social media use would be

associated with body image concerns, eating disorders or disordered eating outcomes, and mental health issues through mediating pathways of social comparison, internalization of the thin/fit ideal, and self-objectification (Conti et al. 2009, Fortes et al. 2016, Dane & Bhatia 2023).

Populational studies on the prevalence of ED in Brazil are scarce in the literature. The objective of this study is to assess the AMREC population sample and to identify the possible association between ED, anxiety and depressive symptoms, and time spent using social media.

MATERIALS AND METHODS

This was an observational analytical and transversal study to evaluate the risk of eating disorders and the time spent on social media in an AMREC population. The study began with the writing of a project for analysis by the Comite de Etica em Pesquisa (CEP), and after its approval (4.805.596), started with inviting people through social media and email addresses.

The research was carried out virtually, with the application of the questionnaires using *Google* Forms, contacted through in social media advertisement. The participants could choose where they filled out the form, with the only requirement being they must have resided in one of the AMREC cities (Cocal do Sul, Criciuma, Forquilhinha, Icara, Lauro Muller, Morro da Fumaca, Nova Veneza, Orleans, Sideropolis, Treviso and Urussanga). These cities have around 110.000 habitants in the age range of 15 to 30 years old. The population of the study was formed by AMREC residents that accepted to participate in the research with ages between 18 and 30 years old, males and females.

The minimum sample size was calculated using the formula which z (1.96) refers to bilateral standard normal statistics coupled with α (0,05);

P1 (4.2%) is the prevalence of general eating disorders in individuals aging 15 to 29 years old9,10; ε (0.05) is the maximum sample error allowed; N (110.403) is the estimated sample population9, 10 and n refers to the minimum size of the minimum sample to be researched, which resulted in 62 individuals with risk to develop eating disorders.

The questionnaire used to assess the risk of developing ED was the Eating Attitude Test-26 (EAT-26). The EAT-26 indicates the presence of abnormal eating patterns and shows a severity index of patients' typical preoccupations regarding eating disorders, particularly the intention to lose weight and fear of gaining weight and was validated in the Portuguese language.

The final score is the sum of each answer. The result varies from 0 to 78 points, and the higher the score the higher the chance to develop ED. A score above 20 points is considered indicative of risky eating behaviors for ED.

To evaluate the participants' body preoccupation and dissatisfaction, it was utilized the Body Shape Questionnaire (BSQ) validated for Brazilians in 2018 by Conti and collaborators[21]. Classification of BSQ results is divided into four levels of body dissatisfaction. A score below 110 indicates no dissatisfaction; between 111 and 138 indicates mild dissatisfaction; between 139 and 167, moderate dissatisfaction, and a score equal to or above 168 indicates severe body dissatisfaction.

The Internet Addiction Test (IAT) questionnaire measured the time spent using the internet, which evaluates internet use as being pathologic or problematic. The questionnaire contains 20 items, from 1 (rarely) to 5 (always). The final score varies from 20 to 100 and if a score is larger than 69, then that participant has a problematic use of the internet.

The data were analyzed in a descriptive form. Data collected was analyzed with the help of the software IBM *Statistical Package for the Social Sciences* (SPSS) version 21.0. Quantitative variables were expressed using the mean and standard deviation because they follow a normal distribution pattern.

The statistical tests were run with a significance level α = 0,05, therefore with a 95% confidence level. The distribution of the data regarding normality was evaluated through the application of Shapiro-Wilk (n < 50) and Kolmogorov-Smirnov's (n ≥ 50) tests. Levene's test was used to investigate the quantitative variables' variability between categories of the qualitative variables.

The comparison of the questionnaires' mean between the categories of polytomous qualitative variables of the patient's profile was performed by applying the Kruskal-Wallis H test followed by Dunn's test when statistical significance was observed. Spearman's rank correlation was used to correlate quantitative variables.

RESULTS

The study was run between October and December 2021. The initial sample was composed of 245 individuals, of which 50 were excluded: 30 individuals were over the research's age limit (30 years) and 20 individuals did not live in an AMREC city.

The results presented in Table I refer to the characterization of the 195 research participants' profiles. It was observed that the participants' mean age was 22.7 years, 84.5% were females, 93.8% were white (participants auto declared themselves following the Brazilian Institute of Geography and Statistics (IBGE), and 62.3% had a BMI in the normal range.

Table I. Socio-economic status of individuals residing at AMREC. Criciuma, Santa Catarina (2021).

	Mean ±SD, n(%)
	n = 195
Age (years)	22.70 ± 2.63
Sex	
Female	165 (84.5)
Race	
White	183 (93,8)
Brown	8 (4,1)
Black	4 (2,1)
BMI	
Underweight	15 (7,7)
Eutrophic	122 (62,3)
Overweight	42 (21,6)
Obese (Class I)	11 (5,6)
Obese (Class II)	2 (1,0)
Obese (Class III)	3 (1,5)

Source: Research data, 2022.

Table II. Risk of developing eating disorders and body dissatisfaction level of individuals residing at AMREC. Criciuma, Santa Catarina (2021).

	n = 195	p-value
Risk of developing ED	27.17 ±7.88	
No risk	117 (59.8)	
At risk	78 (40.2)	1.1915[†]
Body dissatisfaction level	100.14±39.17	
None	122 (62.5)	
Mild	33 (17)	
Moderate	28 (14.3)	0.005[†]
Severe	12 (6.2)	

[†]**Result obtained after Chi-Square test; Source: Research data, 2022.**

The results shown in Table II refer to the risk of developing ED and body dissatisfaction degree. It was observed that 40.2% of the

participants had a risk of developing ED, and 6.2% had severe body dissatisfaction. The Chi-Square Test results showed that most of the populational sample did not have the risk to develop ED (p=1,1915), and did not have any level of body dissatisfaction (p=0.005).

The mean score of the EAT-26 questionnaire was 27,17±7.88, in other words, with a high risk to develop ED, since a score above 21 points the interpretation of this initial trial indicates a behavioral risk of developing ED. Besides, the mean score for the level of body dissatisfaction, assessed through the questionnaire BSQ, was 100±39.17. This score shows the lack of any body dissatisfaction level.

Table III refers to the participants' internet use. The results show that 10.8% had problematic internet use. That verifies the mean score of 39,2±13,9 for no problematic use. Besides, approximately 21% of the sample showed problematic internet use. P values (p=<0.001) show that there was a statistically significant difference between the groups, reiterating that in this sample most participants did not have internet problematic use.

Table IV shows the results for the relationship between internet use and the risk of developing ED. They show that 71.4% of individuals with problematic internet use have a risk of developing ED (p=0.003).

Results are shown in Table V for the relationship between participants' body dissatisfaction and the risk of developing ED. Results pointed out that the higher the body dissatisfaction level is, the higher the risk of developing ED. Also, the results show that 100% of the patients with severe body dissatisfaction levels are at risk of developing ED (p<0.001).

Using the Kruskal-Wallis H test when matching the results of the body dissatisfaction test (BSQ) with the mean scores of the tracking tests for the risk of developing an eating disorder (EAT) and internet problematic use (IAT), we obtained the results shown in Table VI.

Results showed that the mean score of the group with no body dissatisfaction (n=122) in the EAT questionnaire is significantly lower than those who showed some level of body dissatisfaction (p=<0.001).

When the relationship of the BSQ with problematic internet use was evaluated, it was verified that there was no difference between the groups with none, mild, and severe body dissatisfaction, represented by the letter "a", and the groups with mild, moderate, and severe body dissatisfaction, represented by the letter "b".

However, there was a significant difference between no (n=122) and moderate (n=28) body dissatisfaction, where the mean score of the IAT test was larger in the group with moderate

Table III. Internet use of individuals residing at AMREC. Criciuma, Santa Catarina (2021).

	n (%)	p-value
	n = 195	
Internet use	39.2±13.9	
Normal	174 (89.2)	<0.001[†]
Problematic	21 (10.8)	

[†]**Result obtained after Chi-Square test; Source: Research data, 2022.**

Table IV. Internet use and risk for developing ED of individuals residing at AMREC. Criciuma, Santa Catarina (2021).

	Internet use, n (%)		
	Normal use	Problematic use	p-value
	n = 174	n = 21	
No risk of developing ED	111 (63,5)	6 (28,6)	0,003[†]
At risk of developing ED	63 (36,4)	15 (71,4)[b]	

[†]**Result obtained after Chi-Square test; [b] Statistically significant value after residual analysis. Source: Research data, 2022.**

dissatisfaction (41,89±15,68) when compared to no body dissatisfaction level (34.95±12.82) (p=<0.005). Spearman's correlation of the variables EAT and IAT is also described in Table VI. The results shown are represented by the correlation of the final means. There was no significant relationship found between the tests.

DISCUSSION

In the present study, the prevalent sex of the sample was female (84.5%), which is equivalent to the literature found (Walcott et al. 2003, Fortes et al. 2015). It is already known that females are at greater risk for the development of EDs, as they show greater concern with body image and have an eating behavior with more rules, limitations between right and wrong, and restrictive practices, in addition to food social pressure (Oliveira & Hutz 2010). Thus, this factor would also explain the greater adherence to female participation.

Most of the sample was white (93.3%), which also reinforces the data already presented in previous literature about EDs being more prevalent in white people (Grilo et al. 2005). Despite this, it is known that EDs affect different social classes and different cultural regions. Besides, throughout history, reports of ED were associated with the white race and belonging to a high socioeconomic class (Kelly et al. 2005).

Expressions of concern about body image differ in audiences with different ethnic-racial roots. It has been shown that black women report that to be dissatisfied with their appearance, they need to be very overweight. Corroborating this finding, another study reported that black women had a higher level of body satisfaction when compared to white women (Rogers & Petrie 2010).

It is also discussed the difficulty of identifying risk symptoms for the development of ED in screening instruments that were developed based on Euro-American standards and the concern of health professionals in approaching this group (Lee et al. 2001).

More than half of the studied sample (62.3%) had the BMI classification in Eutrophic. The BMI results agree with several Brazilian studies that used the same assessment instruments that we used to assess body dissatisfaction and the risk of developing an eating disorder.

Marthendal evaluated the relationship between nutritional status and ED (using the EAT-26) in students (children and adolescents) at a private school in Blumenau (Santa Catarina) (Marthendal et al. 2014). The presence of risk for the development of ED was present in 10% of the 130 adolescents evaluated (all female), and it was found that most were eutrophic, according to BMI for age (76.9%) (Silva et al. 2018).

Concern about body image, weight, and the search for an ideal body standard can lead to inappropriate eating behavior and some degree of body dissatisfaction. This is what our results showed, in which 40.2% of the sample was at

Table V. Body dissatisfaction and risk of ED in marked individuals of AMREC in the year 2021.

	Body dissatisfaction level, n (%)				
	None	**Mild**	**Moderate**	**Severe**	**p-value**
	n = 119	n = 34	n = 30	n = 12	
No risk of developing ED	98 (82,3)	13 (39,3)	5 (16,6)	0 (0,0)	<0,001[†]
At risk of developing ED	21 (17,6)	21 (60,6)	25 (83,3)[b]	12 (100,0)[b]	

[†]**Result obtained after Chi-Square test;** [b] **Statistically significant value after residual analysis. Source: Research data, 2022.**

risk for developing ED, according to the EAT-26 (score ≥ 20 points). This prevalence is above those estimated in similar studies (Alpaslan et al. 2015, de Oliveira et al. 2017, Zarychta et al. 2018).

Regarding the degree of body dissatisfaction, the present study found that 40% of the participants showed some degree of annoyance, adding the scores for mild, moderate, and severe dissatisfaction, a result equal to or below other studies that used the BSQ assessment instrument (Zhu et al. 2020).

The work by Fortes sought to build an etiological model of risk behaviors for eating disorders in Brazilian female adolescents. The study was carried out from 2012 to 2014 in the cities of Juiz de Fora (Minas Gerais), Ribeirão Preto (São Paulo), Recife (Pernambuco), and Rio de Janeiro with more than 1358 female adolescents aged between 12 and 15 years. To assess risk behaviors for ED, the EAT-26 was used, and in this expressive sample, it was seen that 26% of adolescents showed risk behavior for ED. In addition, the findings indicated that body dissatisfaction (BSQ) mediated the relationship between media pressures, BMI, and the risk of developing ED (EAT-26) (p=0.001) (Fortes et al. 2016).

Another study, when evaluating the relationship between body image dissatisfaction, attitudes towards ED, and nutritional status in female university students in the health area, found results like ours concerning mean age (22.65 years) and BMI (69.8% in Eutrophy). The BSQ showed that 51.1% of female university students had some degree of body dissatisfaction, and the prevalence of attitudes indicative of ED was 21.8%. There was a statistically significant association between BMI and BSQ (p< 0.001); BMI

Table VI. Association of BSQ with EAT and IAT of individuals residing at AMREC. Criciúma, Santa Catarina (2021). Criciúma, Santa Catarina (2021).

	n	EAT (Mean ± SD)	p-value
BSQ			
No dissatisfaction	122	16,14 ± 7,76[a]	< 0,001[†]
Mild dissatisfaction	33	25,18 ± 8,42[b]	
Moderate dissatisfaction	28	31,89 ± 7,95[b]	
Severe body dissatisfaction	12	35,75 ± 7,40[b]	
	n	IAT (Mean ± SD)	p-value
BSQ			
No dissatisfaction	122	34,95 ± 12,82[a]	0,005[†]
Mild dissatisfaction	33	35,15 ± 12,42[a,b]	
Moderate dissatisfaction	28	41,89 ± 15,68[b]	
Severe body dissatisfaction	12	44,83 ± 14,70[a,b]	
	n	r_s	p-value
EAT x IAT	195	0,164	0,022

[†]**Results obtained after Kruskal-Wallis H test;** [a,b] **Different letters represent statistically significant differences; r_s = Spearman's Rank correlation coefficient. Source: Research data, 2021.**

and EAT-26 (p<0.005); BSQ and EAT-26 (p<0.001) (Zhu et al. 2020).

Silva obtained a sample of 238 adolescents and young people and sought to assess the risk of ED (EAT-26) and body image (Silhouette Matching Task). The results showed that most of the sample was eutrophic, both female and male (66.2% and 75.6%, respectively) (Silva et al. 2018). The abnormal eating pattern, with risk for ED, was present in 23% of the female sample and 13.2% of the male sample. Regarding body image, 62.2% of the girls were dissatisfied and wanted to lose weight, while 48.9% of the boys were dissatisfied, but with a desire to gain weight. In this work, eating behavior and BMI were not associated, differing from other studies (Zarychta et al. 2018).

When comparing the results of the EAT-26 and IAT-21 instruments, the current study found a statistically significant association between the variables (p = 0.003), demonstrating a greater risk behavior for developing ED in participants with problematic internet use. Similar results were found in studies with young adults, in which greater internet use was associated with greater concern with food and eating (Walcott et al. 2003).

Alpaslan and co-workers, when evaluating a sample of 584 adolescents through the EAT-26 and IAT, identified 15.2% of the participants at risk of developing ED, and 10.1% of the participants had problematic use of the internet. A significant positive correlation was found between the IAT and EAT-26 scores (p < 0.01) (de Oliveira et al. 2017, Alpaslan et al. 2015).

In addition, the media creates a scenario in which weight loss is directly linked to emotional and social well-being. In search of this validation, the individual seeks thinness at any cost, which becomes a responsible factor for the development of ED (Zhu et al. 2020).

The expected sample was 62 individuals at risk of developing EDs, and the results showed that 78 people were at risk. As much as the p-value was not significant between the group at risk or not, here, the fact that the groups were almost homogeneous is reinforced, making this analysis impossible in terms of statistical significance.

CONCLUSION

Through this study, it can be concluded that there is an association between internet use, the risk of developing ED, and body dissatisfaction among participants of the study.

The presence of risky attitudes regarding food was more prevalent in the participants dissatisfied with their bodies. Besides, participants with problematic internet use had more risk of developing ED.

It is worth noting that this is the first study in the southern region of Santa Catarina to screen eating disorders, becoming a pioneer in its development.

Still, it must be emphasized the importance of further studies on the prevalence of eating disorders, especially related to the use of the internet, which would improve the elucidation about the way that social media influence society about eating behavior and their bodies.

It is suggested that within future perspectives, these results are presented to local health agencies since the results presented (especially with the risk of developing EDs) are much higher than the world average.

Study restrictions were mainly related to the time of data collection during the COVID-19 pandemic, which may have influenced our results.

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