

Eating Disorders and the Internet: A Descriptive Cross-sectional Study Monitoring the Pro Ana Phenomenon in an Italian Sample

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ABSTRACT

Background: The Internet is a significant source of information for adolescents, affecting their life and health. The online Pro Anorexia (Pro Ana) phenomenon is a growing danger. The purpose of this study is to evaluate the presence of the Pro Ana phenomenon in an Italian sample of patients affected by Eating Disorders.

Methods: This study is a descriptive cross-sectional analysis that examines two different samples of patients affected by eating disorders at different points in time, in 2017 and 2020. This study was conducted by using a seven item anonymous questionnaire specifically developed by the authors to collect data on knowledge and visitation of websites and Social Networks Sites related to "pro-ana" and "thinspiration" content.

Results: More than 80% of the respondents in both samples use the Internet daily. From 2017 to 2020 we observed a rise of the phenomenon among the adolescents of our sample. In 2020, 76% of the patients knew of sites emphasizing a marked thinness as an ideal of beauty, 60% knew of Pro Ana sites and 22% visited them.

Conclusions: Our data confirm that in Italy too, Pro Ana is a diffused phenomenon, of which clinicians need to be consistently aware especially when treating adolescents with ED. Patients with ED mainly visit diet and nutrition sites, and it is important to acknowledge this practice in order to prevent and address ED in early adolescence. Although few subjects claim to visit Pro Ana websites, the majority is aware of these sites and therefore they are potential users. Many patients assert that they are familiar with websites promoting excessive thinness as ideal beauty, which supports the bio-psycho-social etiopathogenetic model of Anorexia Nervosa. Information sharing and prevention work are important forms of interventions for families, teachers and clinicians, who together care for adolescent patients with ED.

Keywords: Eating disorders; Pro Ana; Adolescence

PLAIN ENGLISH SUMMARY

The Internet is an important source of information for adolescents, impacting their life and health. It may have positive and negative effects: one of the aberrant byproducts of the Internet is the Pro Anorexia (Pro Ana) phenomenon.

The purpose of this cross-sectional study is to evaluate the presence of this phenomenon in an Italian sample of patients affected by Eating Disorders (ED). We examined more than 100 anonymous questionnaires and found that recent year's consultation of Pro Ana material has increased especially among adolescents (5.7% of the sample in 2017 vs 23% of the sample in 2020). These findings prompted us to modify our clinical practice with regards to the collection of medical history and the consideration of Internet use by patients admitted to our Services. Information sharing and prevention work are important forms of intervention for families,

teachers and clinicians who collaboratively and concurrently care for adolescent patients with ED.

Level of evidence

Level IV (descriptive, cross-sectional study examining case series of patients with Eating Disorders)

INTRODUCTION

The Internet is an important source of information in an adolescent's life and may have positive and negative effects: it may encourage learning and social participation but may also bolster dependency and disinformation [1]. Contents found on the Internet can give rise to serious consequences with important implications for a person's health. Among the aberrant byproducts of the Internet is the Pro Anorexia (Pro Ana) phenomenon, namely the online presence of Social Network Sites (SNS) favoring and

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praising a life philosophy exclusively focused on weight loss. This movement came to life in the U.S. in the late 1990's, reached Europe through Spain and France, and finally reached Italy in the past decade. The phenomenon is sometimes described as a religion with its commandments, its creed and the invocation of a divinity: Ana. The main contents addressed by this phenomenon include dieting, exercising, "thinspiration" and "tips and tricks" [2]. A distinctive feature is the presence of short narratives providing self-introductions, information about one's everyday life, and "tips and tricks" for weight loss, exercising and dieting [2]. In almost all cases a primary motivation to join the Pro Ana cyber-community is the search for social support [3]. In addition, subjects searching for ways to lose weight fast and continuously are drawn to Pro Ana sites because they offer advice on how to avoid eating and hide weight loss. Young women encourage each other to overcome moments of weakness, hunger and exhaustion through words or images: the concept of "thinspiration", often abbreviated as "thinspo", describes the practice of inspiring one to remain or become thin even "to the bone" ("bonespiration"). From a study conducted on the use of the Internet, in particular on the words searched to find content related to Pro Ana on the Web, it appears that the words "thinspiration" and "thinspo" are among the most used and among the most dangerous in terms of psychological effects on the Internet users [4].

The negative consequences of the exposure to Pro Ana sites have been demonstrated in almost all the studies that have been carried out on the topic. Specifically, it has been shown that exposure to Pro Ana sites, even if limited, is responsible for a clinically and statistically significant change in caloric intake, and that this effect can extend well beyond the "acute" phase of visual impact [5]. A study conducted on 90 American female students without eating disorders shows that they experienced a weekly calorie reduction of 80% after perusing Pro Ana sites, and that 44% of them would later adopt exercises or weight control strategies learned from these sites [5]. However, if viewing pro-eating disorder websites can increase eating disorder behaviors by encouraging harmful weight loss and weight control practices, it is unlikely to be the original cause of these practices since these kind of online resources attracts subjects who are already inclined to ED, and direct causality is hard to determine [6]. The more traditional Pro Ana typology represented by blogs and personal forums has recently undergone a marked transition to SNS that focus less on personal narratives but, rather, display multimedia presentations and enable information sharing. Through such platforms as Instagram, Tumblr, Facebook and Pinterest, users mainly utilize images, photos and videos to communicate, inspire or be inspired. In current clinical practice, the use of the Internet by patients with ED has not been sufficiently investigated. For this reason, we decided to conduct a descriptive cross-sectional analysis to ascertain the relevance of the Pro Ana phenomenon in two samples of patients with ED utilizing an anonymous questionnaire at two different points in times, in 2017 and 2020.

METHODS

The authors used a seven item anonymous questionnaire to collect information from the samples. The questionnaire content was developed, checked and validated by two senior consultant neuropsychiatrists (A.A., A.P.) authors of this study. In literature there are similar studies which utilized questionnaires specifically designed by researchers [7,8].

The questionnaire was administered first in February-April

2017 and later in December 2019-February 2020

(before the SARS COV 2 pandemic emergency) to patients at the Psychiatry Study and Assistance Unit for ED SPDC Maggiore Hospital and at the Regional Centre of Feeding and Eating Disorders, S. Orsola-Malpighi Hospital in Bologna.

Patients with ED were recruited consecutively in 2017 and 2020 to verify the effective knowledge and use of Pro Ana websites. The clinicians required that periphrases be deliberately used to refer to Pro Ana sites during the administration of the questionnaire to adolescents (age ≤ 18) in order to prevent any curiosity for or interest in the phenomenon itself. Each participant was informed of the scientific scope and anonymous nature of the questionnaire prior to its administration.

In 2017 patients were selected on the basis of the diagnosis of ED that was made at the time of their first visit (anorexia nervosa, bulimia nervosa, binge eating disorder and disorders with other specifications such as atypical anorexia or bulimia nervosa) and age (>10 and ≤ 40 years). In 2019-2020, the inclusion criteria related to the diagnosis were the same but the age range had changed to ≤ 18 years; exclusion criteria included initial diagnosis of another type, age <10 or >18 years. The Authors decided to focus on a younger age group (10-18 years) for two reasons: on account of the early onset of the disease as described in literature and because the developmental age had emerged as the population age more susceptible to the potential risk of the Internet [9,10]. The same questionnaire was administered to both samples; no participant had their data collected at both points in time.

Some demographic characteristics of the sample (sex, age, and schooling) were considered since related findings can give indications regarding the average age group most affected by the phenomenon. Frequency of Internet use was also investigated and the actual knowledge and diffusion of the phenomenon was considered through a series of inherent questions. The use of SNS platforms was investigated given the recent transition of Pro Ana content to multimedia sites.

Diagnostic subtype was not an important criterion in our research, since our goal was not to find correlations between diagnosis and the use of Pro Ana sites, but rather, to verify the presence of the Pro Ana phenomenon in a general clinical population affected by ED. Nevertheless, if we look at the data concerning the diagnostic subtype of our samples, the vast majority were patients with anorexia nervosa (more than 70%); fewer patients were affected by bulimia nervosa (20%) and much fewer suffered from binge eating disorder and eating disorder not otherwise specified (less than 10%).

To avoid confounding variables such as age and schooling, only patients with age ≤ 18 in the 2017 sample were considered for statistical comparison. Data were statistically examined utilizing Chi square test.

RESULTS

The questionnaires were administered with a very low refusal rate: less than 10% of patients. In 2017, the results of 55 questionnaires were examined and 35 of them (patients with age >10 and ≤ 18 years) were considered for statistical comparison. The average age of the whole sample was 19.28

years (SD 6.290) with a substantial female prevalence (93.5%) and a large prevalence of students ($p=0.002$). In 2020, the results of 50 questionnaires were examined, and all of them were considered for statistical comparison. The average age of the sample was 16.24 years (SD=1.673); females were 94%.

Data collected from the studies in 2017 and 2020 regarding patients with age >10 and ≤ 18 years are reported in Table 1. In 2017, adults (>18 years) represented the 35.3% of the sample.

Table 1: Data collected from the samples of research.

Research period (sample)	2017 (N=35)	2020 (N=50)	Test	P-Value
	Internet use		Chi-square	-
Every day	30 (85.7%)	41 (82%)	0.21	0.65
Other	5(14.2%)	9 (18%)	-	
Awareness of the existence of Pro-Eating Disorders sites			8.97	0.003
Yes	19 (54.2%)	42 (84%)		
No	16 (45.37%)	8 (16%)	-	
Knowledge/use			18.4	<0.001
Dietary sites	18 (51.4%)	29 (58%)		
Therapy-promoting sites	5 (14.2%)	10 (19%)	-	
Pro-Ana sites	2 (5.7%)	11 (23%)		
Other	10 (28.5%)	-		
Knowledge of sites/pages/forums that emphasize a marked thinness as an ideal of beauty			3.76	0.053
Yes	19 (54.2%)	38 (76%)		
No	15 (45.7%)	12(24%)	-	
Knowledge of Pro Ana websites			1.69	0.193
Yes	16 (45.7%)	30 (60%)		
No	19 (54.2%)	20 (40%)	-	
Use of Pro Ana websites			4.21	0.04
Yes	2 (5.7%)	11 (22%)	-	
No	33 (94.2%)	39 (78%)		
Way of knowledge			1.26	0.739
Personal research	14 (40%)	19 (38%)		
Friends and relatives	8 (22.8%)	8 (16%)		
Other web-sites and on-line contacts	6 (17.1%)	13 (26%)	-	
Other	7(20%)	10 (20%)		

A total of 85 questionnaires were examined for statistical comparison. A very high percentage of our patients in 2017 and 2020 used the Internet every day (85.7% vs 82%). In 2017, half of patients (54.2%) indicated that they were aware of the existence of sites related to ED. In 2020, the percentage was higher: 84% of cases claimed to be aware of the existence of sites related to ED ($p=0.003$). Regarding knowledge/use respectively, in 2017 and 2020 51.4% and 58% of cases know dietary sites, 14.2%, 19% therapy promoting sites, and 5.7% 23% pro Ana sites ($p<0.001$).

In 2017, 54.2% of patients maintained that they had knowledge of sites that promoted marked thinness as an ideal of beauty. While 45.7% of the adolescents claimed to have knowledge of the existence of Pro Ana websites, only 5.7% stated that they visited them. The predominant method of knowledge was personal research, followed by knowledge through friends and relatives, and through other sites and online contacts. In 2020, 76% admitted to know sites that emphasized a marked thinness as an ideal of beauty; 60% confirmed knowledge of Pro Ana websites;

and 22% reported that they both knew and visited them. With regard to the patients who, in 2020, declared to have knowledge of Pro Ana websites, it is important to underscore that 40% of them not only indicated that they knew Forum/Blog-based sites, but also made reference to using such social media and sharing services as Instagram, YouTube, Tumblr and Facebook. The predominant method of knowledge was still personal research, followed again by knowledge through friends and relatives, and through other sites and online contacts. As our data show, the use of Pro Ana sites has increased from 2017 to 2020 ($p=0.04$).

DISCUSSION

The Pro Ana phenomenon is developing fast and appears to be dangerous particularly with respect to the developmental age [10]. Preliminary evidence shows that the age of onset of juvenile anorexia nervosa has decreased during the last decade [9]. Steinhausen and Jensen report that in 1995 the peak age of onset was between 16 and 19 years, while in 2010 it ranged from 12 to 15 years [11]. In our Center, in 2020, during the COVID-19 emergency, we received 89 patients aged 14 years or less compared to 47 with the same age range in 2019. Moreover, the effects of on-line harmful material on this population group seem to be more severe at both clinical and psychopathological levels [9]. A systematic review of 7 studies carried out in 2010 showed an increase in caloric restriction, exercise and body dissatisfaction within disease duration and relative hospitalization in subjects with ED exposed to Pro Ana websites [12]. A linguistic analysis of 129 college students carried out 10 years later showed that Pro Ana blog users have higher rates of negative emotions and related anxiety symptoms than control blog users [13]. Likewise, a systematic review of 9 studies demonstrated an increase in body dissatisfaction and dietary restriction [14]. The same authors carried out a qualitative analysis through an online survey to explore motivations and perceptions among the participants in an online community, and confirmed the role of the community in encouraging harmful weight loss and weight control practices [6]. Young people represent the highest number of Internet and social media users, with up to 89% of 18 to 29 year olds using a social network site largely through their mobile phones. These trends underscore a greater need for further investigations into the relationship between social media use and eating disorder risk [15].

In 2009, the prevalence of viewership of Pro Ana websites was examined through the administration of a questionnaire in a sample of healthy adolescents in Belgium. This research explored whether any correlation existed between Pro Ana website visits and predictors of anorexia nervosa. It reported that 12.6% of the girls and 5.9% of the boys had visited such websites, and showed that in girls, visiting pro-anorexia websites was associated with a higher drive for thinness, worse perception of appearance and more perfectionism [7].

In current clinical practice the use of the Internet by patients with ED is not normally investigated. For this reason, we decided to conduct a cross-sectional study by anonymously surveying Italian patients affected by ED, who visited our clinical services in two different periods. In 2017, our population included both adults and adolescents, with a prevalence of the latter (64.7%) to investigate the general

presence of such phenomenon. In 2020, we decided to focus only on a younger and specific age group (10-18 years) because the developmental age appears not only the most susceptible to the appeal of technology but also the most fragile from a clinical point of view. In fact, based on the prevalence of severe ED in developmental age in Italy identified by Gigantesco et al. in 2010, the rate of severe ED cases requiring hospitalization at the age of 10-19 is 22.8% [16].

Our research confirms the data reported in literature on how Web usage is today a fundamental part of the lives of our patients by showing that more than 80% of respondents use it daily. In our adolescent sample, we also observed increased awareness of the existence of Pro-Eating Disorders sites, increased knowledge and use of dietary sites, therapy promoting sites and Pro Ana, and increased knowledge and use of specifically Pro Ana sites.

New technologies have changed the processes of personality development and consolidation, as well as the ways we relate to each other and the world. These profound changes correspond to changes in daily habits; the excessive use of virtual resources related to health also concerns the nutritional field. It is evident that patients with ED use the Web primarily to find information about food restrictions and losing weight, and for emotional support. Thus, they incur a series of health risks including those related to the Pro Ana phenomenon, which could induce or aggravate an ED in the subclinical phase [10].

Our research shows that patients with ED frequently visit food and nutrition/dietary sites (51.4% in 2017 vs 58% in 2020). This is a worrying practice if we consider how online resources are often inaccurate and provide incorrect and harmful health information. Patients who visit pro Ana sites often indicate that they visit pro-recovery websites as well: these data are important because they reflect a degree of confusion among young patients, who cannot discern the value, accuracy, harm and risks of the information they receive. For this reason, therapists should find new communication strategies to monitor their patients' use of these online resources, whether to educate them to a critical use or to prevent them from using them at all.

A minority of the surveyed subjects, albeit growing (5.7% in 2017 vs 22% in 2020) acknowledged visiting and using Pro Ana websites; this is not surprising, as secrecy and concealment are reported as cornerstones of Pro Ana philosophy. Nevertheless, it is significant how the majority of patients (45.7% in 2017 vs 60% in 2020) said to be aware of the existence of Pro Ana practices, which suggests that they could become users of these sites if they are not already.

Considering the recent evolution of the means of transmission of Pro Ana material from blogs and personal forums to multimedia SNS, it is significant that in our findings in 2020 almost one half of the sample (49%) indicated they found Pro Ana material on such social media platforms as Instagram, Tumblr, and Facebook.

Finally, our patients stated that they had knowledge of other non-Pro Ana sites, which still promoted excessive thinness as an ideal of beauty (54.2% in 2017 vs 76% in

2020). This finding may be related to the bio-psycho-social etiopathogenetic model of anorexia nervosa, which postulates bio-socio-cultural factors at the origin of the disease. This model emphasizes the idealization of current aesthetic models conveyed by omnipresent messages on and offline.

Our research presents some limitations. It is a descriptive study designed solely for the purpose of describing the distribution of certain variables in the clinical population of interest. It does not address the association between these variables; for example, it does not establish a correlation between clinical subtypes of disease and the use of Pro Ana material. This, however, may be the topic of further research.

Our study investigates the presence of the Pro Ana phenomenon in Italy, and confirms the worrying increase in the knowledge and use of Pro Ana materials among young patients at developmental age [17,18].

CONCLUSION

By comparing 85 questionnaires administered to an Italian sample, we confirmed the data reported in literature about the worrisome diffusion of the Pro Ana phenomenon among young individuals at developmental age. Our study further substantiates the prevalence of such phenomenon in a population with known ED, and shows that consultation of Pro Ana websites plays a particularly important role in our adolescent sample.

These data prompted us to modify our clinical practice, especially the collection of medical history and the consideration of Internet use by patients admitted to our Services.

With regard to the anamnesis of patients, it has been shown that investigating suicidal thoughts and behavior does not increase the risk of suicide: in the same way, we believe that clinicians can investigate the knowledge and use of Pro Ana materials without increasing the risk of their use by patients.

Our study also underscores the need of “digital training” for all the adults who deal with adolescents, and especially for those who treat mental illness. A great difference often exists between the perceptions that young people and adults have of the digital world. Parents, teachers and adult therapists may believe that they are in control of the digital world, but they do not always know it well enough, unlike adolescent patients who experience it on a daily basis and often read it with different codes. Information sharing and prevention work are very important for families, teachers and clinicians who care for adolescent patients with ED. Awareness of this virtual world is increasingly important for clinicians and educators who could advise patients and their families on reliable sources of information on health and nutrition.

More specific and more targeted studies would be desirable in the future to demonstrate the effects of this additional information on the outcome of ED and to continue developing new methods to approach patients, especially concerning the use of digital means, in order to improve their diagnostic and therapeutic paths. Given the often concealed, fluid and dynamic nature of virtual resources, future research is needed to continuously monitor their trends and developments.

Our research is particularly timely since, due to the many restrictions caused by the SARS COV 2 pandemic emergency, the

social life of young people is further and more stringently confined to the online environment. A very recent research pointed out the presence of Pro Ana and anti-Pro Ana material on TikTok, one of the social media most used by teenagers nowadays. This case report highlights a controversial instance of preventive interventions, that is, even “anti-Pro Ana” videos can have a negative impact on the young people who view them, by generating curiosity and interest in the phenomenon that they would like to discourage [18]. Taking this aspect into account is very important when designing truly targeted and effective prevention interventions.

Young patients should be helped to develop more critical thinking about the digital world, to become informed and responsible agents rather than unaware victims of it. At the same time, stronger control systems should be developed to prevent the circulation of dangerous material such as that described above. This is a collective work that requires new knowledge and new skills from all professionals in a multi-disciplinary team.

ETHICS APPROVAL

Ethical approval was not required for this study since the research involved the use of a non-sensitive and completely anonymous survey.

PATIENT CONSENT FOR PUBLICATION

Not required.

AVAILABILITY OF DATA AND MATERIAL (DATA TRANSPARENCY)

All data and material (questionnaires) are available upon reasonable request

CODE AVAILABILITY

<https://www.ibm.com/it-it/analytics/spss-statistics-software>

CONFLICTS OF INTEREST/COMPETING INTERESTS

Not applicable

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AUTHOR'S CONTRIBUTIONS

Conceptualization: AA, AP. Methodology: AA, LR. Investigation: LR, PT. Resources: EM, FM, PG, FR, VF. Data curation: LR, AP, AA. Writing-Original Draft preparation: LR, PT-Review and editing: LR, AP. Supervision: AP. Project administration: AA, AP. All authors read and approved the final manuscript.

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