

## AN EPIDEMIC IN THE PANDEMIC: THE MOST DIFFICULT CHALLENGE FOR YOUNG ADOLESCENTS

Maria Rosaria Juli<sup>1</sup>, Giada Juli<sup>2</sup> & Rebecca Juli<sup>3</sup>

*Department of Psychology, University Magna Graecia, Catanzaro, Italy*

*<sup>2</sup>"Psychiatric Studies Center" (Cen.Stu.Psi.), Provaglio d'Iseo, Italy*

*<sup>3</sup>Mental Health Department, Azienda Sanitaria Provinciale di Catanzaro, Catanzaro, Italy*

### SUMMARY

*The pandemic due to COVID-19 has had a huge psychological impact on individuals all over the world, in particular the international literature is noting an increase in pathologies among children and adolescents (Pappa et al. 2020, Keles et al. 2020, Pigaiani et al. 2020, Solmi et al. 2021). Adolescence is a time when individuals observe physical changes in their bodies, experience new interests and desires, and find themselves with greater freedom, independence and responsibility; although variably defined, adolescence is generally believed to begin with the onset of puberty and end with assuming social roles as adults (Dahl 2004, Spear 2000). Among the changes that the adolescent has to face are: accepting one's body, acquiring a social role, female or male, establishing new relationships with peers of both sexes, achieving emotional independence from parents and other adults, acquiring social behavior responsible, learn a system of values and an ethical conscience as a guide to one's behavior, develop intellectual skills and prepare for a profession, achieve independence (Juli 2020). All this is not always easy and, many times young people find themselves facing a tortuous path that can give rise to the onset of some mental pathologies; if we then take into account the pandemic period we are experiencing, all this can get complicated. The data released by the Ministry of Health (2021) in the first months of the year, highlight that in Italy today there are about three million young people suffering from Eating Disorders (ED) with early onset before the age of 13 and the number tends to constantly increase. In 1990 Gordon spoke of Eating Disorders as a real social epidemic both in prevalence and incidence and if the preliminary studies conducted during the last year in which we lived the pandemic experience, confirm the increase of about 30% , in the years to come we will find an entire population of young adolescents with dietary difficulties (Santini et al. 2020).*

**Key words:** *adolescents - consequences lockdown - eating disorders – anorexia – bulimia - binge eating disorders - mental disorder*

\* \* \* \* \*

### INTRODUCTION

The COVID-19 pandemic has significantly changed our habits, making us rediscover a different dimension of everyday life and forcing us, in a very short time, to readjust our lifestyle. According to the European regional office of the World Health Organization (2021) the mental health of European adolescents is deteriorating. This is revealed by the results of a survey conducted on over 220,000 boys and girls, between the ages of 11 and 15; in about one third of the countries, there is an increase in adolescents anxious for school-related reasons, an increase in vulnerabilities and new threats due to excessive use of the internet (Keles et al. 2020, Rodgers et al. 2020, Solmi et al. 2021). Psychopathological aspects include risky sexual behaviors (at the age of 15, 24% of boys and 14% of girls report having had sexual intercourse), smoking and more often alcohol abuse (20% of 15-year-olds has already been drunk at least 2 times), a 30% increase in pathological eating habits and a lowering of the age of onset under the age of 15; moreover, adolescents play less and less sports and are increasingly overweight, 1 in 5 adolescents (Pigaiani et al. 2020; Guessoum et al. 2020). Despite the ambiguities of definition, it is well known that important transitions occur during this period, including a variety of characteristic behavioral

changes observed between species. There is an increase in social behavior (Csikszentmihalyi et al. 1977), novelty and sensation seeking (Adriani et al. 1998, Stansfield & Kirstein 2006, Stansfield et al. 2004), tendencies to take risks (Spear 2000, Steinberg 2008), emotional instability (Steinberg 2005) and impulsivity (Adriani & Laviola 2003, Chambers et al. 2003) Peer relationships become dominant and there are greater inclinations to seek out fun and exciting experiences (Nelson et al. 2005). The increased search for novelty and sensation can be developmentally adaptive, as these behaviors could improve the adolescent's chances of being independent (Spear 2000). In addition to the additional risks of normal adolescent development, it is also the time when symptoms of a variety of mental illnesses often arise, including mood disorders, eating disorders, and psychotic disorders such as schizophrenia (Paus et al. 2008, Pine 2002, Sisk & Zehr 2005, Volkmar 1996). During adolescent change, there is a wide range of neurobiological modifications, a cascade of hormonal signals occurs that mark the onset of puberty (Sisk & Zehr 2005), an increase in cognitive abilities and motivational changes (Doremus-Fitzwater et al. 2009, Luna et al. 2004). Understanding precisely how the brain develops during adolescence and relating these changes to both normal behavioral trends and pathological conditions

is critically important to public health, but we must cope with the fact that the duration of adolescence is not fixed, and has been lengthening and, while the period is related to many processes of biological development, it is partially defined according to psychosocial and behavioral criteria. The World Health Organization defines adolescence as the period of the individual's life in which the beginning coincides with the appearance of the first signs of pubertal maturation and whose term goes beyond the end of the development of the body, also represents the social transition of the child to that of the adult varies in duration, quality and meaning within different civilizations and social groups (WHO 2018). Several studies agree that adolescents are a vulnerable group and are experiencing a difficult transition in the transition to adulthood (Swick et al. 2002, Larsen & Luna 2018, Sturman & Moghaddam 2011). With these premises, we understand well how the COVID-19 pandemic has had multiple consequences on the lives of adolescents: chronic and acute stress, concern for their families, unexpected deaths, sudden interruption of school and confinement at home, increased access time to the internet and social media, interruption from social relationships. Extensive studies agree that in times of pandemics there is an increased risk of Post-Traumatic Stress Disorder (PTSD) and depression (Douglas et al. 2009). Two studies in China involving 2,091 and 285 adult individuals in the weeks following the COVID-19 outbreak in Wuhan reported a prevalence of PTSD of 4.6% and 7%, respectively, most commonly associated with female gender and poor sleep quality (Liu et al. 2020, Sun et al. 2020). Post-Traumatic Stress Disorders, depression and anxiety are potential catastrophic impacts on adolescent mental health (Kar & Bastia 2006, Yule et al. 2000, Bolton et al. 2000, Kar 2019), yes estimates that girls are twice as likely to suffer from post-traumatic stress disorder (Garza & Jovanovic 2017, Fan et al. 2015). We are not yet aware of the damage that the pandemic will cause, but past history gives us indications on the increase in suicide rates (Brent 1995, Chan et al. 2006), on the increase in intra-family and sexual violence (UNFPA, 2020), on the consequences of Internet addiction with excessive or poorly controlled worries, impulses or behaviors regarding computer use (Shaw & Black 2008). Samantha Brooks and colleagues at King's College London revisiting 24 studies on the psychological impact of quarantine found negative psychological effects including symptoms of post-traumatic stress, confusion and anger. The stressors included a longer quarantine, fears of infection, frustration, boredom, inadequate information, financial loss and stigma. According to the review, children and adolescents appear to be particularly at risk for PTSD (Dalle Grave 2020). Furthermore, media use, including social media, is associated with an increased risk of eating

disorder, particularly through exposure to content related to dietary and ideal culture, as well as food advertising (Boswell & Kober 2016, Levine & Murnen 2009, Rodgers & Melioli 2016).

Social distancing has favored the increase in the use of social media as a means of communication, which can therefore increase the risk of disordered eating. Moreover, during the pandemic, a lot of news is devoted to the increase in the number of infections and deaths, to health and safety issues around the world and to the economic and social impact, as confirmed by previous studies (Rodgers et al. 2012), exposure to such news may contribute to increasing concern about the physical appearance, which as is known, involve a risk factor for the onset of eating disorders (Cuzzolaro 2014). In the emergency situation from Covid-19 among factors closely related to Eating Disorders, extreme concern for the weight and shape of the body is increasing, due to the increase in activities via webcam, such as distance learning and depression that in situations crisis can be present in a pathological way in the individual (Salari et al. 2020) and negative mood that in difficult situations can lead to a reduced evaluation of one's physical pleasantness (Bessenoff 2006). Eating Disorders, represent a group of extremely complex conditions, characterized in subjects suffering from them by abnormalities in eating patterns, excessive concern for physical fitness and altered perception of body image (Dalle Grave 2011, Fairburn & Harrison 2003, Rosen - American Academy of Pediatrics 2010, Sigel 2008), precisely for this reason, they are considered a psychiatric pathology with complex pathogenesis, defined by various individual and relational psychological factors, family but also socio-cultural (Onnis 2014, Treasure et al. 2003).

## AN EPIDEMIC IN THE PANDEMIC

Eating disorders are not bizarre lifestyle choices, they are relevant mental disorders which can induce those who suffer from them to either consume extremely limited amounts of food or, vice versa, binge eat uncontrollably or abstain from eating for prolonged periods of time. Early diagnosis and multidisciplinary treatment are the only paths to undertake which can prevent the diffusion and growth of eating pathologies. An ED diagnosis is a remarkably relevant occurrence that disturbs (messes up) not only the personal functioning of the patients but of the entire family group.

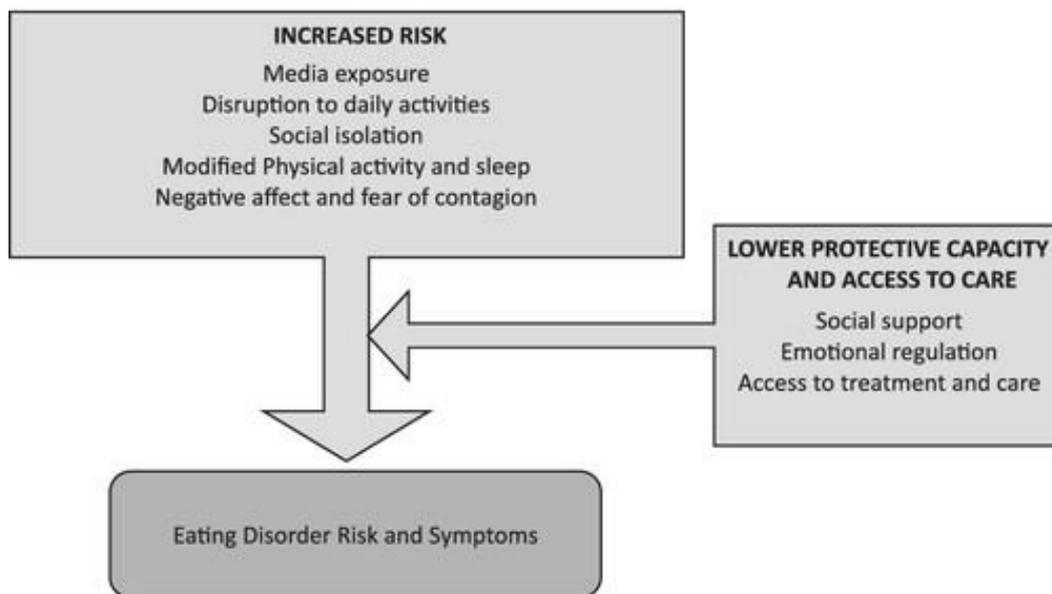
According to the studies that have been recently published by the Ministry of Health (2021) approximately 3 million of Italia's young population suffers from Nutrition and Eating Disorders (DNA), among those 95.9% are female and 4.1% male. The incidence of nervous anorexia amounts to at least 8 new cases for 100.000 persons per year for females and between 0.02 and 1.4 new cases for males. That of Nervous Bulimia

amounts at the very least to 12 new cases for 100.000 persons in a year for females and around 0.8 new cases for 100.000 persons for males. If not identified in time and treated accordingly eating disorders can become chronic and, in the worst case scenario, lead to death. Both obese and underweight individuals affected by an eating disorder run a higher risk of developing medical complications originated by malnourishment. Eating disorders originate from various concatenated biological, psychological and social factors upon which operate other triggering factors such as particularly stressing situations; the lockdown has favored, specifically in teenagers, the establishment of a number of triggering factors among which: social isolation, the uncertainty of academic prospects, the devices and regulations of protection which has caused a forced isolation between peers, the fear of infection often linked to a sense of powerlessness. The cited circumstances and factors lead to an increase of eating restrictions or, on the contrary, to frequent sessions of uncontrolled eating. This results in a major focus on body image giving space to a more prominent consideration of the body, consequently of food and exercise, and the rising of dysfunctional habits both in excess and deficit. The impact that the Covid-19 pandemic has had on individuals suffering from eating disorders is yet to be determined with precision, however many studies have already registered an increase of 30% of cases. The data collected by a Survey and made public by the Ministry of Health show how in the first half of 2020 230.458 new cases have been revealed, while during the same period of the last year the new cases were 163.547. Those are simply temporary numbers given that the covid-19 emergency has yet to come to an end. Moreover the male subjects that have reached for emergency care have quadrupled during this lapse of time. Eating Disorders, particularly Anorexia; Nervous Bulimia and Binge Eating, are a matter of public concern given their progressive diffusion, the premature beginning among young people and the multifactorial and complex etiology. It is incredibly important to identify them and intervene promptly because, if not properly treated, the chances of irreversible damaging of internal organs becomes higher and, in the most severe cases, lead to death. During the covid-19 pandemic an increase of eating and nutrition disorders diagnosis has been registered, with a consequent decrease of age range (13-16 years old) and a prevailing increment of Nervous Anorexia diagnosis. While the data are at the moment partial, they are nonetheless alarming. As a matter of fact ED patients are considered really fragile because of the connected psychiatric and metabolic anomalies (Todisco et al. 2020). Such elevated vulnerability renders them more susceptible to stress (Todisco et al. 2020). As reported by Termorshuizen

and colleagues in a study conducted in the United States and Oland, during the pandemic the restrictions among ed patients have increased, there has been an increase of binge eating and nervous bulimia episodes (Termorshuizen et al. 2020). Similar statistics have been registered by Phillipou and colleagues (Phillipou et al. 2020). The phenomenon of ED can be viewed like an epidemic inside the pandemic whose eating habits are a manifestation of an internal sense of discomfort, where the individual has lost the capacity of responding to the stimuli of hunger and fullness in a natural way and doesn't follow the signals of the body becoming a prisoner of their own mind. Eating or avoiding food acquires a new significance which goes beyond simple nourishment, it becomes a way of expressing internal suffering (Fusi et al. 2020). The relationship with food from 13 to 16 is of fundamental importance not only for physical development but also as a defining element of personal identity and psychosocial autonomy (Jul 2017).

## CONCLUSIONS

Contemporary psychological literature has tried to pinpoint the post traumatic consequences of the pandemic among young teenagers, however the post pandemic psychological impact, especially on teenagers and children, can have lasting and dangerous effects. The enhancement of confusion, anger, depression, anxiety, eating disorders, consume of cannabinoids and attempted suicide, the excessive use of social media, alteration of the wake-sleep rhythm appear to be strictly connected with the beginning of adolescent's mental pathology, who are undergoing an increase of insecurity and lowering of protection factors, limited social support, low emotional regulation. Such consequences suggest a necessity to promptly identify the effects that the pandemic, a phenomenon that has overthrown the lifestyle of many, has inflicted on the mental health. If we look at psychological disorders in general it is possible to prove that pandemics are always associated with the worsening of both general and specific disorders. It appears that the tendency of expressing one's issues or of communicating with others through the body or somatic behaviors, which is typical to teenagers, is responsible for a series of disorders centered around the body, whose biological needs (sleep, nourishment) are utilized in order to express discomfort (Juli 2018). Eating disorders have a traumatic background and the pandemic certainly is a traumatic event for the young individuals that have found themselves isolated from friends in a situation of distress and family tension caused by the lockdown. As shown by figure 1, by Rodgers and colleagues, the beginning of an ED is favored by triggering factors that the pandemic has inevitably adopted to fight the global emergency.



**Figure 1.** Summary of the pathways through which the COVID-19 pandemic may increase eating disorder risk and symptoms (Rodgers et al. 2020)

In regard to this, it has been registered, in the patients already affected by ED a worsening of their condition followed by an alarming increase in ER visits caused by extreme psychological trouble, not by chance eating disorders have been described by Russel “pathoplastic”, that is to say they are variable disorders, adaptable and flexible accordingly with historical circumstances. Putting focus on eating disorders is significant during the historical period we are living for various reasons: the risk of relapse or worsening of the eating pathology, the higher risk of COVID-19 infection among those who suffer from eating disorders, the possibility of the beginning of an eating disorder ex novo or addiction tendencies, the inadequate offers of psychological and psychiatric treatments during the covid emergency. This is why on one hand it is necessary to plan an innovative way of distributing treatments and of integrating standard procedures that prevent both the eating disorders and the fear of infection and isolation, organize and implement a specific protocol for treating a patient diagnosed with ED who have tested positive for COVID-19. In order to diffuse well being and a sense of security among teenagers it is advised to promote reassurances, accurate information and stress reducing actions. The World Health Organization has published recommendations oriented to teenagers in order to help them cope with the stressful situation: identify the normal emotional reactions, being an active participant of dialog and social exchange, maintain a lifestyle and relationships that are healthy, avoid smoking, alcohol and other drugs, reaching out to health operators for help when necessary, obtain information from an accurate source, limit the exposure to social media, develop coping strategies to deal with emotions (WHO 2020).

**Acknowledgements:** None.

**Conflict of interest:** None to declare.

**Contribution of individual authors:**

Maria Rosaria Juli: conceptualization, visualization, writing – original draft, writing – review and editing, supervision.

Giada Jul & Rebecca Juli: conceptualization, visualization, writing – original draft, writing – review and editing.

**References**

1. Adriani W, Chiarotti F, Laviola G: Elevated novelty seeking and peculiar d-amphetamine sensitization in peri-adolescent mice compared with adult mice. *Behavioral neuroscience* 1998; 112:1152–1166
2. Adriani W, Granstrem O, Macri S, Izykenova G, Dambinova S, Laviola G: Behavioral and neurochemical vulnerability during adolescence in mice: studies with nicotine. *Neuropsychopharmacology* 2004; 29:869–878
3. Bessenoff GR: Can the media affect us? Social comparison, self-discrepancy, and the thin ideal. *Psychol Women Q* 2006; 30:239–251
4. Bolton D, O’Ryan D, Udwin O, Boyle S, Yule W: The long-term psychological effects of a disaster experienced in adolescence: II: General psychopathology. *Journal of Child Psychology and Psychiatry, and Allied Disciplines* 2000; 41:513–523
5. Boswell RG & Kober H: Food cue reactivity and craving predict eating and weight gain: A meta-analytic review. *Obesity Reviews* 2016; 17:159–177
6. Brent DA: Risk factors for adolescent suicide and suicidal behavior: mental and substance abuse disorders, family environmental factors, and life stress. *Suicide & Life-Threatening Behavior*, 1995

7. Brooks SK, Webster RK, Smith LE, Woodland L, Wessely S, Greenberg N & Rubin GJ: The psychological impact of quarantine and how to reduce it: rapid review of the evidence. *The Lancet*, 2020
8. Cardinali E, Fusi M: *Le emozioni nel piatto. Affrontare la fame emotiva, scegliere il cibo del buonumore*. Terra Nuova edizioni, 2021
9. Chambers RA, Taylor JR, Potenza MN: Developmental neurocircuitry of motivation in adolescence: a critical period of addiction vulnerability. *The American journal of psychiatry* 2003; 160:1041–1052
10. Chan SMS, Chiu FKH, Lam CWL, Leung PYV, Conwell Y: Elderly suicide and the 2003 SARS epidemic in Hong Kong. *International Journal of Geriatric Psychiatry* 2006; 21:113–118
11. Csikszentmihalyi M, Larson R, Prescott S: The ecology of adolescent activity and experience. *Journal of Youth and Adolescence* 1977; 6:281–294
12. Cuzzolaro M: *Anoressie e bulimie*. Bologna, il Mulino, 2014
13. Dahl RE: Adolescent brain development: a period of vulnerabilities and opportunities. Keynote address. *Annals of the New York Academy of Sciences* 2004; 1021:1–22
14. Dalle Grave R: Eating disorders: progress and challenges. *European Journal of Internal Medicine* 2011; 22:153-160
15. Dalle Grave R: Coronavirus Disease 2019 and Eating Disorders- What do people with eating disorders have to address during the pandemic? *Psychology Today*, Posted Mar 21th, 2020
16. Doremus-Fitzwater TL, Varlinskaya EI, Spear LP; Motivational systems in adolescence: Possible implications for age differences in substance abuse and other risk-taking behaviors. *Brain and cognition*, 2009
17. Douglas PK, Douglas DB, Harrigan DC, Douglas KM: Preparing for pandemic influenza and its aftermath: mental health issues considered. *International Journal of Emergency Mental Health*, 2009
18. Fairburn CG, Harrison PJ: Eating disorders. *Lancet* 2003; 361:407-416
19. Fan F, Long K, Zhou Y, Zheng Y, Liu X: Longitudinal trajectories of post-traumatic stress disorder symptoms among adolescents after the Wenchuan earthquake in China. *Psychological Medicine* 2015; 45:2885–2896
20. Garza K, Jovanovic T: Impact of Gender on Child and Adolescent PTSD. *Current Psychiatry Reports* 2017; 19:87
21. Gordon RA: *Anoressia e Bulimia: anatomia di una epidemia sociale*. Trad. It. Raffaello Cortina Editore, Milano, 1990
22. Guessoum SB, Lachal J, Radjack R, Carretier E, Minassian S, Benoit L, Moro MR: Adolescent psychiatric disorders during the COVID-19 pandemic and lockdown. *Psychiatry Res*, 2020
23. Haddad C, Zakhour M, Bou Kheir M, Haddad R, Al Hachach M, Sacre H, Salameh P: Associazione tra comportamento alimentare e fattori di stress da quarantena / confinamento durante l'epidemia di coronavirus 2019. *Journal of Eating Disorders* 2020; 8
24. Holmes EA, O'Connor RC, Perry VH, Tracey I, Wessely S, Arseneault L, Bullmore E: Multidisciplinary research priorities for the COVID-19 pandemic: A call for action for mental health science. *The Lancet Psychiatry*, 2020
25. Juli MR: Perception of body Image in Early adolescence. An investigation in secondary schools. *Psychiatr Danub* 2017; 29(Suppl. 3):245-482
26. Juli MR: The suffering body: manipulation and discomfort in Eating Disorders. *Psichiatria Danub* 2018; 30(Suppl. 7):521-526
27. Juli MR: Body identity search: the suspend body. *Psichiatria Danub* 2020; 32(Suppl. 1):83-87
28. Kar N: Depression in Youth Exposed to Disasters, Terrorism and Political Violence. *Current Psychiatry Reports* 2019; 21:73
29. Kar N, Bastia BK: Post-traumatic stress disorder, depression and generalised anxiety disorder in adolescents after a natural disaster: a study of comorbidity. *Clinical Practice and Epidemiology in Mental Health: CP & EMH* 2006; 2:17
30. Keles B, McCrae N, Grealish A: A systematic review: the influence of social media on depression, anxiety and psychological distress in adolescents. *International Journal of Adolescence and Youth* 2020; 25:79–93
31. Levine MP & Murnen SK: Everybody knows that mass media are/are not [pick one] a cause of eating disorders”: A critical review of evidence for a causal link between media, negative body image, and disordered eating in females. *Journal of Social and Clinical Psychology* 2009; 28:9–42
32. Liu N, Zhang F, Wei C, Jia Y, Shang Z, Sun L, Wu L, Sun Z, Zhou Y, Wang Y, Liu W: Prevalence and predictors of PTSS during COVID-19 outbreak in China hardest-hit areas: Gender differences matter. *Psychiatry Research*, 2020
33. Luna B, Garver KE, Urban TA, Lazar NA, Sweeney JA: Maturation of cognitive processes from late childhood to adulthood. *Child development* 2004; 75:1357–1372
34. Nelson EE, Leibenluft E, McClure EB, Pine DS. The social re-orientation of adolescence: a neuroscience perspective on the process and its relation to psychopathology. *Psychological medicine*, 2005
35. Onnis L: *Il tempo sospeso, Anoressia e Bulimia tra individuo, famiglia e società*. Franco Angeli, Sec Ediz, 2014
36. *Organizzazione mondiale della sanità: Affrontare lo stress durante l'epidemia di 2019-nCoV*. 2020
37. Pappa S, Ntella V, Giannakas T, Giannakoulis VG, Papoutsis E, Katsaounou P: Prevalence of depression, anxiety, and insomnia among healthcare workers during the COVID-19 pandemic: a systematic review and meta-analysis. *Brain, Behavior, and Immunity*, 2020
38. Paus T, Keshavan M, Giedd JN: Why do many psychiatric disorders emerge during adolescence? *Nature reviews* 2008; 9:947–957
39. Phillipou A, Meyer D, Neill E, Tan EJ, Toh WL, Van Rheenen TE & Rossell SL: Eating and exercise behaviors in eating disorders and the general population during the COVID-19 pandemic in Australia: Initial results from the COLLATE project. *International Journal of Eating Disorders*, 2020
40. Pigaiani Y, Zoccante L, Zocca A, Arzenton A, Menegolli M, Fadel S, Ruggeri M, Colizzi M: Adolescent Lifestyle Behaviors, Coping Strategies and Subjective Wellbeing during the COVID-19 Pandemic: An Online Student Survey. *Healthcare (Basel)*, 2020
41. Pine DS: Brain development and the onset of mood disorders. *Semin Clin Neuropsychiatry*, 2002
42. Rodgers RF, Melioli T: The relationship between body image concerns, eating disorders and internet use, part I: A review of empirical support. *Adolescent Research Review* 2016; 1:95–119

43. Rodgers RF, Franko DL, Brunet A, Herbert CF & Bui E: *Disordered eating following exposure to television and internet coverage of the March 2011 Japan earthquake. International Journal of Eating Disorders* 2012; 45:845-849
44. Rosen DS: *American Academy of Pediatrics Committee on Adolescence. Clinical report - Identification and management of eating disorders in children and adolescents. Pediatrics* 2010; 126:1240-1253
45. Salari N, Hosseini-Far A, Jalali R, Vaisi-Raygani A, Rasoulpoor S, Mohammadi M, Rasoulpoor S, Khaledi-Paveh B: *Prevalence of stress, anxiety, depression among the general population during the COVID-19 pandemic: a systematic review and meta-analysis, Globalization and Health*, 2020
46. Shaw M, Black DW: *Dipendenza da Internet: definizione, valutazione, epidemiologia e gestione clinica. Farmaci del SNC* 2008; 22:353-365
47. Santini ZI, Jose PE, Cornwell EY, Koyanagi A, Nielsen L, Hinrichsen C, et al.: *Social disconnectedness, perceived isolation, and symptoms of depression and anxiety among older Americans (NSHAP): A longitudinal mediation analysis. The Lancet Public Health* 2020; 5:62-70
48. Sigel E: *Eating Disorders. Adolescent Medicine: state of the art Review* 2008; 19:547-72
49. Sisk CL, Zehr JL: *Pubertal hormones organize the adolescent brain and behavior. Frontiers in neuroendocrinology* 2005; 26:163-174
50. Solmi F, Downs JL, Dasha & Nicholls: *Covid-19 and eating disorders in young people. The Lancet Child e Adolescent Health*, 2021
51. Spear LP: *The adolescent brain and age-related behavioral manifestations. Neuroscience and biobehavioral reviews* 2000; 24:417-463
52. Stansfield KH, Kirstein CL: *Effects of novelty on behavior in the adolescent and adult rat. Developmental psychobiology* 2006; 48:10-15
53. Stansfield KH, Philpot RM, Kirstein CL: *An animal model of sensation seeking; the adolescent rat. Annals of the New York Academy of Sciences*, 2004
54. Steinberg L: *Cognitive and affective development in adolescence. Trends in cognitive sciences* 2005; 9:69-74
55. Steinberg L, Albert D, Cauffman E, Banich M, Graham S, Woolard J: *Age differences in sensation seeking and impulsivity as indexed by behavior and self-report: evidence for a dual systems model. Developmental psychology* 2008; 44:1764-1778
56. Sturman DA, Moghaddam B: *Reduced Neuronal Inhibition and Coordination of Adolescent Prefrontal Cortex during Motivated Behavior. J Neurosci* 2010; 31:1471-1478
57. Sun L, Sun Z, Wu L, Zhu Z, Zhang F, Shang Z, Jia Y, Gu J, Zhou Y, Wang Y, Liu N, Liu W: *Prevalence and Risk Factors of Acute Posttraumatic Stress Symptoms during the COVID-19 Outbreak in Wuhan, China. medRxiv*, 2020
58. Swick SD, Jellinek MS, Dechant E, Jellinek MS, Belluck J: *Children of victims of September 11th: a perspective on the emotional and developmental challenges they face and how to help meet them. Journal of Developmental and Behavioral Pediatrics: JDBP* 2002; 23:378-384
59. Termorshuizen JD, Watson HJ, Thornton LM et al.: *Early impact of COVID-19 on individuals with self-reported eating disorders: A survey of ~1,000 individuals in the United States and the Netherlands, International Journal of Eating Disorders*, 2020
60. Todisco P, Donini LM: *Disturbi alimentari e obesità (ED&O) nella tempesta COVID-19. Disturbo del peso alimentare*, 2020
61. Treasure J, Schmidt U, Van Furth E: *Handbook of eating disorders. John Wiley & Sons. EDS*, 2003
62. UNFPA: *COVID-19: A Gender Lens*, 2020
63. Volkmar FR: *Childhood and adolescent psychosis: a review of the past 10 years. Journal the American Academy of Child and Adolescent Psychiatry* 1996; 35:843-851
64. Yule W, Bolton D, Udwin O, Boyle S, O'Ryan D, Nurrish J: *The long-term psychological effects of a disaster experienced in adolescence: I: The incidence and course of PTSD. Journal of Child Psychology and Psychiatry, and Allied Disciplines* 2000; 41:503-11
65. World Health Organization: *Maternal, newborn, child and adolescent health. Retrieved*, 2018
66. World Health Organization: *June 4. Coronavirus disease (COVID-19) Situation Report – 136*, 2020
67. World Health Organization: *Coping with stress during the 2019-nCoV outbreak*, 2020

Correspondence:

Maria Rosaria Juli, MA, PhD  
Department of Psychology, University Magna Graecia  
Viale Europa, 88 100 Catanzaro, Italy  
E-mail: dottmariarosaria.juli@gmail.com