Eating Disorders: An Overview of Indian Research

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ABSTRACT

There has been sporadic research on eating disorders in India, with no published attempt to collate and summarize the literature landscape. Hence, the present narrative review aims to summarize Indian work related to eating disorders, discern current trends, and highlight gaps in research that will provide directions for future work in the area. Electronic search using the MEDLINE, Google Scholar, and PsycINFO databases was done to identify relevant peer-reviewed English language articles, in October 2018, using combinations of the following medical subject headings or free text terms: “eating disorders,” “anorexia nervosa,” “bulimia,” “treatment,” “epidemiology,” “co-morbidity,” “management,” “medications,” “behavioral intervention,” and “psychosocial intervention.” The data extracted from studies included details such as author names, year, from which of the states in India the work originated, type of intervention (for interventional studies), comparator (if any), and major outcomes. There is increasing research focused on eating disorders from India over the last decade, but it continues to be an under-researched area as evidenced by the relative paucity of original research. The cultural differences between east and west have contributed to variations in the presentation as well as challenges in the diagnosis. Hence, there is a need for the development of culturally sensitive instruments for diagnosis, as well as generating locally relevant epidemiological data about eating disorders from community and hospital settings.

Key words: Anorexia nervosa, bulimia nervosa, eating disorder, India

The earliest description of an eating disorder (ED)-like syndrome appears in a treatise by Morton (1694), under the section “Nervous Consumption,” where the author talks about two adolescents who presented with loss of appetite, extreme fasting, weight loss, and their treatment and outcome.[1] Historical reports point to the existence of ED even in the 17th century, referred to as “holy anorexia.” However, one of the first scientific reports of this condition, in the late 19th century, was by William Gull who is credited with coining the term anorexia nervosa (AN).[2] In India, the occurrence of ED was not reported until the late 20th century.[3] Perhaps, media-related glorification of “size zero” body type and culturally sanctioned drive for thinness, body shaming, and dissatisfaction have contributed to the recent upsurge of ED cases.[4-6] Traditionally,
these parameters have been less of a concern in India than other countries.\(^4\) Yet, another reason for the recent increase in the incidence of ED such as bulimia nervosa (BN) and binge eating disorder (BED) is more easy access to media outlets promoting unhealthy body types and higher socioeconomic status of people.\(^7,8\)

Notwithstanding its increasing prevalence rates, ED continues to be an area that is under-reported and under-researched. There are several reasons why ED must be given increasing focus in health care research and policy planning in today’s scenario. AN, a prototype ED, has the highest mortality rate among mental health disorders.\(^9,10\) The economic and social impact of ED was estimated to be upwards of $15 billion (INR 1057.8 billion) in 2012, which is comparable to the productivity impact of anxiety and depression, estimated at $17.9 billion (INR 1262.3 billion) in 2010.\(^9\) Though, relatively rare in the general population, the individual impact of ED can be quite debilitating and long-term treatments are often expensive. ED have high rates of psychiatric and medical co-morbidity.\(^9,12\)

Though there has been sporadic research on ED in India, there has been no attempt to collate and summarize the literature landscape. We undertook the present narrative review with the objectives of summarizing Indian work related to ED, discern current trends, and highlight gaps in research that will provide directions for future work in the area. These would potentially answer key questions on the clinical presentation and trajectories of ED in our setting.

**METHODOLOGY**

**Search strategy and study selection**

Electronic search using the MEDLINE, Google Scholar, and PsycINFO to identify relevant peer-reviewed English language articles was carried out to include articles between April 1967 to October 2018. We used random combinations of the following medical subject headings or free text terms: “eating disorders,” “anorexia nervosa,” “bulimia,” “treatment,” “epidemiology,” “co-morbidity,” “management,” “medications,” “behavioral intervention,” and “psychosocial intervention.”

This being a narrative review and because research on ED in India is relatively sparse, we included all types of research reports, including case reports, to gain a true picture of the research landscape. The initial search yielded 84 articles. From the initial search, 39 articles were relevant and therefore selected for inclusion in the review. The full text of these articles was retrieved electronically. Additionally, the reference section of all articles was manually screened to identify potentially relevant articles. We only selected articles describing research from India. There was no restriction on the date of publication. Citation indexing services and gray literature such as conference proceedings were not included in the present review.

**Data extraction**

The data extracted from studies included details such as author names, year, from which of the states in India the work originated, type of intervention (for interventional studies), comparator (if any), and major outcomes.

**RESULTS**

A major part of the literature on ED from India is derived from case reports and case series (\(n = 24\)). In comparison, there are 15 original studies summarized in Table 1.

The earliest reports of ED date back to 1966. The case was of AN in a 42-year-old female with episodes of compulsive fasting for 2 years. The patient was treated with 100 mg chlorpromazine, 100 ml of 25% glucose with vitamin C 500 mg intravenously, 10 injections of liver extract 2 ml intramuscularly biweekly, and 9 sessions of electroconvulsive treatment. After 46 days of intensive pharmacotherapy and supportive psychotherapy, she showed improvement and was kept in close follow up.\(^3\) Following this, there has been increasing reports of ED cases in the last two decades. Majority of the cases were of AN, especially restrictive subtype. The typical profile of cases described from India is of adolescent females,\(^26-31\) belonging to Hindu religion,\(^29,31,32\) and coming from an upper- or middle-socioeconomic background.\(^26-29,31,33\) In contrast, there are only four cases of male AN reported.\(^27,34\) There is a single case report of AN described in a pair of monozygotic twins too.\(^35\)

Cases of AN have been described in Indian adolescents belonging to Sikh religions, living in the United Kingdom.\(^34\) The symptoms of AN were found to flare up after being teased by peers about weight which was followed by concerns about weight gain, in the majority of cases.\(^27,29\) There is also a case of AN which had atypical features such as denial of fears of weight gain.\(^36\) One report of disordered eating described a young female, in whom “not eating” was conceptualized as a resistance to the patriarchal system and this highlights the role of Indian sociocultural factors for developing an ED.\(^37\)

Bradycardia, hypotension, anemia, and dyselectrolytemia have been reported at the time of presentation to a psychiatrist.\(^27,28,38\) Wernicke–Korsakoff syndrome
Table 1: Summary of original studies on eating disorders in India

| Authors | Subjects | Study settings | Sampling type | Assessment tools | Methodology | Major findings |
|---------|----------|----------------|---------------|-----------------|-------------|---------------|
| King and Bhugra, 1989 | 574 school girls aged between 14-23 years | Two schools and two colleges | Quota sampling | Hindi version of EAT-26 | Abnormal eating attitude and behavior was assessed by a score of more than 20 on EAT-26 | About 29% (n=167) had disordered eating or probable eating disorder |
| Srinivasan et al., 1995 Chennai | Medical students | Medical college | Convenient sampling | EAT-40, BITE, DSM-III criteria | Two step procedure | None of the subjects had syndromal eating disorder diagnosis on clinical evaluation. About 14.8% subjects (n=31) could be diagnosed with syndrome of EDS, subsyndromal eating disorder |
| Srinivasan et al., 1998 Chennai | Medical students | Medical college | Convenient sampling | SQ-EDS, SQ-20 | Step 1: 15 item SQ-EDS was made based on the study by Srinivasan et al., 1995 on 210 subjects. Step 2: The questionnaire was validated in another set of 146 students against 20-item SQ-20 | Among 210 subjects assessed individually, no criterion-based diagnosis of AN or BN could be made. About 14.8% of subjects identified as having EDS which did not fit into any of the standard diagnostic criteria for major eating disorders. In Step 2, none of the subjects could be diagnosed with AN, BN, or partial syndrome of AN or BS |
| Manmnen et al., 2007 Vellore | Medical charts of 3274 patients attending child and adolescent psychiatry unit | Hospital child guidance clinic | Consecutive sampling | ICD-10 | Retrospective chart review of patient records of consecutive children and adolescents availing Child and Adolescent Psychiatry Unit services from 2000-2005. The case records diagnosed with eating disorder (F: M=2:1.5) and AN (F: M=5:1) was predominantly seen in females. The mean age was around 11.2 (4.3) years. After chart review, 41 cases were identified. About 1.25% had an eating disorder. 85.4% (35 cases) had psychogenic vomiting. 14.6% (6 cases) had AN psychogenic vomiting (F: M=2:1.5) and AN (F: M=5:1) was predominantly seen in females. | About 11% of subjects were diagnosed with EDS |
| Kurpad et al., 2010 Bengaluru | n=73 outpatients of psychosis (schizophrenia/psychosis Nos) | Hospital | Purposive sampling | Eating behavior questionnaire DSM-IV | Eating behavior questionnaire as well as DSM-IV criteria were used for diagnosing. BED in patients of psychosis | None of the patients had BED |
| Balhara et al., 2012 New Delhi | n=97 female nursing students | Government nursing college affiliated with tertiary care hospital | Quota sampling | EAT-26, BSQ | Disordered eating attitude and behavior was assessed by a score of more than 20 on EAT-26. BSQ was used to assess attitude regarding body shape | About 4% (n=3) had disordered eating or probable eating disorder. A significant correlation was obtained between EAT-26 and BSQ |
| Chellappa and Karunanidhi, 2013 Chennai | n=200 undergraduate female students | Five premier colleges affiliated to the University of Madras | Convenience sampling | EAT-26, State Trait Anxiety Inventory BDI | Abnormal eating attitudes were assessed by EAT-26. Anxiety and depression were assessed by the State Trait Anxiety Inventory and BDI, respectively | 30% of students had abnormal eating attitudes. Participants in the abnormal eating attitude category had exhibited higher scores on depression and anxiety when compared to those with normal eating attitudes. About 42.7% (n=50) had suspected eating disorders. They had a significantly higher prevalence of periomylolysis, dental caries, and tooth sensitivity |
| Jugale et al., 2014 Bengaluru | n=117 females aged between 20-25 years | Five professional college hostels | Convenience sampling | SCOFF | A score of 2 or more on the SCOFF questionnaire was used for diagnosing disordered eating. Score more than 2 on SCOFF signifies suspected eating disorder. Dental hygiene was assessed by dental professional |

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was the presenting symptom for a 39-year-old female who had AN from adolescence.\[39\] Surreptitious use of metformin, with episodes of hypoglycemia, was the presenting symptom in another case of AN in a 21-year-old female.\[33\] Though the nature of psychiatric co-morbidity has not been described, psychiatric co-morbidity was noted in all the cases of a case series.\[32\] Obsessive traits of symmetry and order,\[32\] obsessive compulsive disorder (OCD),\[40\] and major depressive disorder have been reported as co-morbidities.\[33\] Menstrual abnormalities and poorly developed secondary sexual characteristics have been noted in the majority of cases.\[26-28,32,41\] There have been only five cases of BN reported till date.\[42-46\] Two of the cases were females: one was a 22-year-old medical student, with the onset of symptoms around 13 years of age, with binging and purging with isabgol husk and consumption of orlistat.\[34,43\] The other three cases were atypical, with an absence of concerns for body weight or body image, along with an absence of concurrent use of diuretics or laxatives in a 37-year-old male,\[46\] 15-year-old female,\[43\] and a 24-year-old female.\[42\]

### Table 1: Contd...

| Authors               | Subjects | Study settings            | Sampling type    | Assessment tools   | Methodology                                                                 | Major findings                                                                 |
|-----------------------|----------|---------------------------|------------------|--------------------|----------------------------------------------------------------------------|--------------------------------------------------------------------------------|
| Upadhyay et al., 2014 | n=120 females aged between 13-17 years, 314 outpatients, 30 inpatients | School, Tertiary care rural medical college | Convenience sampling, Convenience sampling | EAT-26, BSQ | Disordered eating attitude and behavior was assessed by a score of 20 or more on EAT-26; Disordered eating attitude and behavior was assessed by a score of 20 or more on EAT-26; BSQ was used to assess attitude regarding body shape. | Nearly 26.6% (n=32) had disordered eating; About 16.9% (n=29) had disordered eating. A significant correlation was obtained between EAT-26 and BSQ. |
| Ramaiyah, 2015        | n=172 medical students | Private mental health clinics in India and Australia | Convenience sampling | QOL EDs, DSM-IV | The diagnostic profiles and the quality of life was assessed by the QOL EDs questionnaire; Eating disorder was diagnosed as per the DSM-IV. | No significant difference was noted in global ED-QOL score. Indians compared to Australian patients had: Higher beliefs that they overeat more frequently; Similar frequency of restriction of food, vomiting, use of laxatives; Lesser frequency of beliefs of fears of loss of control over intake of food and having preoccupations with the body or food intake. |
| Lal et al., 2015      | n=550 students | Pre-university colleges | Convenience sampling | EAT-26 | The tendency to develop an eating disorder was assessed by a score of more than 20 on EAT-26. | Nearly 31.09% (n=171) had affinity to develop eating disorder. |
| Singh et al., 2016    | n=134 medical students | Tertiary care medical college and hospital | Convenience sampling | EAT-26, SCOFF | EAT-26 and SCOFF questionnaire was used to assess disordered eating attitude and behavior. Disordered eating was determined by a cut-off of 20 and 2 on EAT-26 and SCOFF, respectively. | 29.2% and 17.2% of students had disordered eating behavior as per EAT-26 and SCOFF, respectively. |
| Gupta et al., 2017    | n=250 medical students | Government Medical College | Convenience sampling | Hindi version of EAT-26 BSQ | Hindi version of 26 item EAT-26 BSQ was used to assess disordered eating attitudes and body shape attitude. | Females scored significantly greater on dieting subscale of EAT-26 and BSQ. BSQ was found to be a significant predictor of eating disorder. |
| Vijayalakshmi et al., 2017 | n=241 medical students, n=213 nursing students | Medical college | Convenience sampling | EAT-26, SCOFF, Patient health questionnaire | SCOFF questionnaire was used to assess disordered eating behaviors; Score more than 2 signifies suspected eating disorder. | Males (45.4%) scored higher on the cut-off for SCOFF questionnaire compared to female (31.1%). Males (16.5%) scored higher on the cut-off for EAT-26 compared to female (8.7%). |

AN – Anorexia nervosa; BDI – Beck’s Depression Inventory; BID – Binge eating disorder; BITE – Bulimia investigatory test; BSQ – Body shape questionnaire; BN – Bulimia nervosa; DSM-IV – Diagnostic and Statistical Manual of Mental Disorders Version IV; DSM-III – Diagnostic and Statistical Manual of Mental Disorders Version III; EAT – Eating attitudes test; EDS – Eating distress syndrome; ICD-10 – International Classification of Diseases; QOL EDs – Quality-of-life for eating disorders questionnaire; SCOFF – Sick, Control, One-stone (14 lbs/6.5 kg), Fat, Food; SRQ – Self-report questionnaire; SQ-EDS – Screening questionnaire for eating distress syndrome
Majority of cases were managed in the in-patient setting. In AN, high-calorie high-protein diet has been advised, with careful monitoring for re-feeding syndrome. In the 1960s, chlorpromazine and modified insulin therapy were the treatment options used. Ciproheptadine in combination with chlorpromazine, combination of ciproheptadine and olanzapine, mirtazapine, risperidone, trazodone, citalopram, and fluoxetine at 20 mg/day have been used for treatment of AN. Combinations of olanzapine and fluvoxamine or olanzapine and fluoxetine have been used in cases of AN with obsessive traits and OCD, respectively. Sertraline and fluoxetine at low dose of 20 mg/day have as well as at 80 mg/day has been described in the management of BN, with good response.

The non-pharmacological therapy of ED included family therapy, cognitive behavioral therapy (CBT), supportive psychotherapy, contingency management, hypnotherapy, and play therapy. High-frequency repetitive transcranial magnetic stimulation (rTMS) over the left dorsolateral prefrontal cortex was given as augmentation strategy in a 23-year-old female who earlier had only a partial response to antidepressants as well as atypical antipsychotics and CBT. rTMS was found to improve attitude toward body weight and body shape, with an improvement of weight.

DISCUSSION

This review attempted to summarize the Indian research on ED. The literature is largely comprised of case reports, as noted in the previous reviews However, there has been an increase in the number of published original research articles over the last 5–6 years. There are no studies available which determined the prevalence of ED from the community setting. There is a single hospital-based retrospective review, which reported a prevalence of 1.25% for ED. Of them, almost 85% had psychogenic vomiting and about 15% had AN. This is in contrast to the international literature, wherein the frequency of occurrence of BN and BED is more common than that of AN. A meta-analysis of 15 studies from various settings reported that the estimated lifetime prevalence of any ED was 1.01%, and those of AN, BN, and BED were 0.21%, 0.81%, and 2.22%, respectively. BED had the highest point prevalence of ED, followed by BN and AN, among young females across China, Japan, Africa, and Latin America. In comparison, in the Indian setting, there are no cases reported of BED, and only five cases have been reported of BN. Further, the two-step assessment (initial screening by self-rated questionnaire, followed by assessment by semi-structured or diagnostic interview) is the standard procedure followed globally. However, there is a single study using the two-step procedure and found no cases. Majority of the Indian studies used only the screening, self-rated assessment. The frequency of disordered eating/probable ED ranged from 4 to 45.4%. It is possible that subsyndromal ED cases may not be captured by a self-rated assessment. Two studies reported the prevalence of eating distress syndrome (EDS) to be 11% and 14.8%. EDS refers to subsyndromal forms of AN or BN, with patients having distressing and conflicting thoughts about body shape and eating habits. EDS is characterized by strict dieting, and binging in a few cases, with no significant weight loss or behaviors such as resorting to severe measures of weight loss such as diet pills, starvation, purging, or vomiting. However, there has been practically no Indian research on EDS in the last 20 years.

There are several methodological issues in Indian studies which need to be addressed. Firstly, many of the studies have employed convenient sampling on medical and nursing students. This may lead to selection bias and such samples may not be truly representative of the population at large. However, this practice of studying medical students is popular worldwide. The rationale given to support this being the “stressful” nature of medical training, which could be a risk factor for ED. But this may also imply that the prevalence rates obtained in these studies may be an inflated figure.

Secondly, in the measurement of the frequency of disordered eating, it was found to be higher as per the Sick, Control, One-stone, Fat, Food questionnaire (SCOFF) compared to the Eating Attitudes Test-26 item (EAT-26) questionnaire. The frequency with SCOFF ranged from 17.2% in women to 43.4% in men, and the frequency with EAT-26 ranged from 4% to 31%. There are limitations in the translation and implementation of the questionnaires in a setting like India that has such linguistic diversity. Though the EAT-26 questionnaire has been translated into Hindi, the cut-off score for the Hindi version has not been defined. Also, the rationale for using the same cut-off of the English version in the Kannada version is not clear.
to cultural differences between the western and Indian settings, there is a definite need for the development of culturally sensitive scales for screening ED.

Culture bears a strong influence on the presentation of ED in India. One unique point noted in the Indian presentations of ED is relative lack of concern for body fat/shape. This has been termed as “Non-fat phobic” variant of AN.[50] This has been described in Hong Kong as well. In this form, food restriction is attributed to somatic complaints such as abdominal bloating, pain, and lack of appetite, rather than concern for body fat. Similar atypical features have been noted in cases of BN too from India. Also, the concept of EDS is in accordance with this concept.[30,37] Further, food restriction is culturally sanctioned in Indian culture when one is unwell, for “cleansing the bowel.”[34] However, several recent studies show an association between perception of body shape and higher scores on EAT-26.[18,22,24] This could be explained by the ongoing rapid societal transitions in India and the increasing influence of western ideals.

At least 50% of patients with an ED are known to have a psychiatric co-morbidity, with depression being the most common.[38,39] In contrast, a few cases had syndromal co-morbidity.[27,40] The principles of management of ED adopted in India is similar to the west. Most reports of AN and BN describe using a combination of pharmacotherapy and psychotherapy. Selective serotonin reuptake inhibitors (SSRIs), second-generation antipsychotics, and cyproheptadine have been found to be effective for AN.[60] Patients with BN were treated with 20–80 mg/day of fluoxetine in the case reports.[12,24] In contrast, globally, a higher dose of SSRIs, especially fluoxetine, has been found to be effective in cases of BN.[61] Psychotherapeutic approaches used in the Indian setting, such as family-based therapy and CBT, therapy match global practices.[62]

To conclude, there is increasing research focus on ED from India over the last two decades. Lower prevalence of ED could be the reason for the relative paucity of studies. But, with the increasing importance of westernization of society, ED merit renewed focus. The cultural differences between east and west have contributed to variations in presentation as well as challenges in diagnosis. Hence, there is a need for the development of culturally sensitive instruments for diagnosis as well as generating locally relevant epidemiological data about ED from the community and hospital settings.

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There are no conflicts of interest.

REFERENCES
1. Pearce JMS. Richard Morton: Origins of anorexia nervosa. Eur Neurol 2004;52:191-2.
2. Gull WW. Anorexia nervosa (Apepsia Hysterica, Anorexia Hysterica). Obes Res 1997;5:498-502.
3. Jha BK, Awadhia NF. Anorexia nervosa: Review of the syndrome with a case report. Indian J Psychiatry 1967;9:172-80.
4. Lal M, Abraham S, Parikh S, Chhibber K. A comparison of eating disorder patients in India and Australia. Indian J Psychiatry 2015;57:37-42.
5. Padhy SK, Khatana S, Sankar S. Media and mental illness: Relevance to India. J Postgrad Med 2014;60:163-70.
6. Singh Mannat M, Parekar SS, Bhumika T. Body image, eating disorders and role of media among Indian adolescents. J Indian Assoc Child Adolesc Ment Health 2016;12:9-35.
7. Chugh R, Puri S. Affluent adolescent girls of Delhi: Eating and weight concerns. Br J Nutr 2001;86:535-42.
8. Mishra SK, Mukhopadhyay S. Eating and weight concerns among Sikimese adolescent girls and their biocultural correlates: An exploratory study. Public Health Nutr 2011;14:853-9.
9. Le LK, Hay P, Mihalopoulos, C. A systematic review of cost-effectiveness studies of prevention and treatment for eating disorders. Aust NZ J Psychiatry 2016;50:225-38.
10. Arcelus J, Mitchell AJ, Wales J, Nielsen S. Mortality rates in patients with anorexia nervosa and other eating disorders. A meta-analysis of 36 studies. Arch Gen Psychiatry 2011;68:724-31.
11. Paxton S, Hay P, Touyz SW, Forbes D, Madden S, Girosi F, et al. Paying the Price: The Economic and Social Impact of Eating Disorders in Australia. Butterfly Foundation; 2012.
12. Braun D, Sunday S, Halmi K. Psychiatric comorbidity in patients with eating disorders. Aust NZ J Psychiatry 2016;50:225-38.
13. King M, Bhugra D. Eating disorders: Lessons from a cross-cultural study. Psychol Med 1989;19:955-8.
14. Srinivasan TN, Suresh TR, Jayaram V, Fernandez MP. Eating disorders in India: Study of eating distress syndrome and development of a screening questionnaire. Int J Soc Psychiatry 1998;44:189-98.
15. Mammen P, Russell S, Russell PS. Prevalence of eating disorders and psychiatric comorbidity among children and adolescents. Indian Pediatr 2007;44:357-9.
16. Kurpad, SS, George SA, Kamineni K. Binge eating and other eating behaviors among patients on treatment for psychoses in India. Eat Weight Disord 2010;15:136-43.
17. Balhara YPS, Mathur S, Kataria DK. Body shape and eating attitudes among female nursing students in India. East Asian Arch Psychiatry 2012;22:70-4.
18. Chellappa AR, Karunanidhi, S. Eating attitudes and its psychological correlates among female college students. Glob J Human Soc Sci Arts Humanit 2013;13:32-9.
19. Jugale PV, Prahalla M, Murthy AK, Rangath S. Oral manifestations of suspected eating disorders among women of 20-25 years in Bangalore City, India. J Health Popul Nutr 2014;32:46-50.
20. Upadhyay A, Misra R, Parchwani D, Maheria P. Prevalence and risk factors for eating disorders in Indian adolescent females. Nat J Physiol Pharmacy Pharmacol 2014;4:153-7.

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22. Ramaiah RR. Eating disorders among medical students of a rural teaching hospital: A crosssectional study. Int J Community Med Public Health 2015;2:225-8.

23. Shashank KJ, Gowda P, Chethan TK. A crosssectional study to assess the eating disorder among female medical students in a rural medical college of Karnataka State. Natl J Community Med 2016;7:524-7.

24. Gupta N, Bhargava R, Chavan BS, Sharan P. Eating attitudes and body shape concerns among medical students in Chandigarh. Indian J Soc Psychiatry 2017;33:219-24.

25. Vijayalakshmi P, Thimmaiah R, Reddy SSN, B V K, Gandhi S, Scene ASR. Gender differences in body mass index, body weight perception, weight satisfaction, disordered eating and weight control strategies among Indian Medical and Nursing Undergraduates. Investeg Educ Enferm 2017;35:276-84.

26. Banerjee P, Malhotra S, Kaur U, Chadda R, Deothar SD. Anorexia nervosa in a patient with systemic lupus erythematosus. Rheumatol Int 1987;7:177-9.

27. Basker MM, Mathai S, Korula S, Mammen PM. Eating disorders among adolescents in a tertiary care centre in India. Indian J Pediatr 2013;80:211-4.

28. Misquitta NF. Anorexia nervosa: A Caribbean syndrome rare in Asia. Med J Armed Forces India 2001;57:62-3.

29. Mendhekar DN, Arora K, Lohia D, Aggarwal A, Jhio RC. Anorexia nervosa: An Indian perspective. Natl Med J India 2009;22:181-2.

30. Malhotra S, Malhotra N, Pradhan B. Anorexia nervosa in Indian adolescents: A report of two cases. J Indian Assoc Child Adolesc Ment Health 2014;10:230-7.

31. Das A, Elwadhi D, Gupta M. Secondary eating disorder: A reality? Case report of post-brain injury sequelae. Indian J Psychol Med 2019;37:205-8.

32. Vijayengia D, Sharma DK, Agarwal S, Sushilk CS. Anorexia Nervosa-restricted type with obsessive traits in a pre-pubertal female: A case report. Indian J Psychiatry 2012;54:392-3.

33. Sharma MP, Kar SK. Suggestive metformin abuse in anorexia nervosa presenting as periodic hypoglycaemia. Aust N Z J Psychiatry 2015;49:651-2.

34. Bhardrath BR. Anorexia nervosa in adolescents of Asian extraction. Br J Psychiatry 1990;156:565-68.

35. Neki JS, Mohan D, Sood RK. Anorexia nervosa in a monosygotic twin pair. J Indian Med Assoc 1977;68:98-100.

36. Khandelwal SK, Saxena S. Anorexia nervosa in adolescents of Asian extraction: Comment. Brit J Psychiatry 1990;157:784.

37. Ahlin, T. What keeps Maya from eating? A case study of disordered eating from North India. Transcult Psychiatry 2018;55:551-71.

38. Choudhary P, Roy P, Kumar Kar S. Improvement of weight and attitude towards eating behaviour with high frequency rTMS augmentation in anorexia nervosa. Asian J Psychiatry 2017;28:160.

39. Mushaq R, Shoib S, Shah T, Bhat M, Singh R, Mushaq S. Unusual presentation of uncommon disease: Anorexia nervosa presenting as wernicke-korsakoff syndrome-a case report from southeast Asia. Case Rep Psychiatry 2014:4602136.

40. Pani A, Santra G, Biswas KD. Anorexia nervosa with obsessive-compulsive disorder. J Assoc Physicians India 2015;63:82-3.

41. Srinivasa P, Chandrashekar M, Harish N, Gowda MR, Durgogi S. Case report on anorexia nervosa. Indian J Psychiat Med 2015;37:226-8.

42. Mendhekar DN, Gupta D, Jhio RC, Baweja A. Atypical bulimia nervosa: A case report. Indian J Psychiatry 2002;44:79-81.

43. Mendhekar DN, Mehta R, Srivastav PK. Bulimia nervosa. Indian J Pediatr 2004;71:861-2.

44. Mandal P, Arumuganathan S, Sagar R, Srivastava P. A classical case of bulimia nervosa from India. Indian J Psychol Med 2013;35:309-10.

45. Deb KS, Gupta M, Varshney M. Orlisat abuse in a case of bulimia nervosa: The changing Indian society. Gen. Hosp. Psychiatry 2014;36:549.e3-4.

46. Makial M, Mahjinder U. Atypical bulimia nervosa in a male patient of rural north-east India. J Health Spec 2014;2:34-6.

47. Dang A, Garg O, Rataboli FV. Zolpidem induced nocturnal sleep-related eating disorder (NSRED) in a male patient. Int J Eat Disord 2009;42:385-6.

48. Khashigir T, Kar P, Kulpati DD. Carcinoma oesophagus in a young girl masquerading as anorexia nervosa. J Assoc Physicians India 1988;36:679.

49. Roy PK. Efficacy of combined cognitive-behavior therapy and hypnotherapy in anorexia nervosa: A case study. Int J Clin Exp Hyn 2014;62:224-30.

50. Sharan P, Sundar AS. Eating disorders in women. Indian J Psychiatry 2015;57(Suppl 2):S286-95.

51. Kandelwal SK, Sharan P, Saxena S. Eating disorders: An Indian perspective. Int J Soc Psychiatry 1995;41:132-146.

52. Qian J, Hu Q, Wan Y, Li T, Wu M, Ren Z, et al. Prevalence of eating disorders in the general population: A systematic review. Shanghai Arch Psychiatry 2013;25:212-23.

53. Hoek HW. Review of the worldwide epidemiology of eating disorders. Curr Opin Psychiatry 2016;29:336-39.

54. Chang W-W, Nie M, Kang Y-W, He LP, Jin YL, Yao YS. Subclinical eating disorders in female medical students in Anhui, China: A cross-sectional study. Nutr Hosp 2015;31:1771-7.

55. Memon AA, Adil SE-E-R., Sidiq EU, Naem SS, Ali SA, Mehmood K. Eating disorders in medical students of Karachi, Pakistan-a cross-sectional study. BMC Res Notes 2012;5:84.

56. Alberton VC, Dal-Bó MJ, Piovezan AP, Silva RMD. Abnormal eating behaviors among medical students at a university in southern Santa Catarina, Brazil. Rev Bras Educ Med 2013;37:15-20.

57. Pike KM, Dunne PE. The rise of eating disorders in Asia: A review. J Eat Disord 2015;3:33.

58. Becker CB, Plasencia M, Kilpela LS, Briggs M, Stewart T. Changing the course of comorbid eating disorders and depression: What is the role of public health interventions in targeting shared risk factors? J Eat Disord 2014;2:15.

59. Hudson JI, Hiripi E, Pope HG, Jr, Kessler RC. The prevalence and correlates of eating disorders in the National Comorbidity Survey Replication. Biol Psychiatry 2007;61:348-58.

60. Flament MF, Bissada H, Spettigue W. Evidence-based phar macotherapy of eating disorders. Int J Neuropsychopharmacol 2012;15:189-207.

61. Milano W, De Rosa M, Milano L, Riccio A, Sanseverino B, Capasso A. The pharmacological options in the treatment of eating disorders. ISRN Pharmacol 2013:352865.