


Exploring scientific legitimacy of orthorexia nervosa: a newly emerging eating disorder

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ABSTRACT

Chaki, B., Pal, S. & Bandyopadhyay, A. (2013). Exploring scientific legitimacy of orthorexia nervosa: a newly emerging eating disorder. *J. Hum. Sport Exerc.*, 8(4), pp.1045-1053. Eating disorders are a range of maladaptive eating behaviours characterized by highly restrictive and unhealthy food intake patterns that lead to a variety of psychiatric, physiological and health complications such as depression, anxiety, and personality disorders etc. Many of these psychological eating disorders such as anorexia nervosa or bulimia nervosa have been recognized as diseases by the Diagnostic and Statistical Manual of Mental Disorders (DSM IV) of the American Psychiatric Association. However, there are many newly identified eating disorders which are yet to be recognized as diseases by the American Psychiatric Association. Orthorexia nervosa (ON) is one such unrecognized psychological eating disorder in which the person becomes obsessed with eating pure, healthy and right kinds of foods to improve health. There are no standard diagnostic criteria for ON and in recent times different researchers used different questionnaires to assess the presence of orthorexic characters. Many researchers have raised questions about the validity of ON as a unique disorder and many of them preferred to describe ON as a variant of existing eating or anxiety disorders. On the other hand, many researchers believe that ON is a unique eating disorder different from other recognized eating disorders and it should be recognized as a disease in the planned fifth edition of the American Psychiatric Association's (APA) Diagnostic and Statistical Manual of Mental Disorders (DSM 5), due to be published in 2013. The review aims to highlight the present understanding about ON including its character, physiological and psychological consequences and different diagnostic features used by different researchers to evaluate ON. The review will compare ON with other recognized eating disorders, and assess the scientific validity of ON to be considered as a valid psychological eating disorder by the American Psychiatric Association's (APA). **Key words:** ORTHOREXIA NERVOSA, EATING DISORDER.

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INTRODUCTION

Consciousness about healthy diet has become the primary focus of the people belonging to the developed societies. Rapidly growing incidence of obesity largely due to sedentary lifestyle, has led to dramatic increase in diabetes, cardiovascular problem, hypertension, osteoarthritis, cancer and many other health problems. So being selective about the quality, quantity and the type of foods consumed is the key to remain fit and healthy. But there is very thin margin between selectivity about the type and quality of food consumed and developing a psychological obsession about the diet in order to remain fit. Development of such psychological fixation about the quantity or type of food often lead to disordered eating pattern and in extreme cases result in psychological eating disorders.

Eating disorders are a spectrum of serious maladaptive eating behaviours characterized by highly restrictive and unhealthy food intake patterns that not only lead to plethora of physiological and health complications but also lead to different psychiatric conditions such as depression, anxiety, and personality disorders (Martina & Cartwright, 2004). Although the causes of eating disorders remain a mystery, but contributory factors may be classified as genetic, physiological, psychological, environmental and social factors (Becker et al., 1999; Kaye et al., 2000). A significant number of eating disorder sufferers have experienced a period of being overweight, teasing regarding weight, or a sense of social isolation (Becker et al., 1999). Eating disorders are more prevalent in females (>90% cases) than the males (Keel et al., 1998). Eating disorders usually appear in adolescence and early adulthood when the individual is more prone to emotional fluctuations and influences (Martina & Cartwright, 2004). More than 86% afflict before the age of 20 years (Becker et al., 1999).

Orthorexia Nervosa (ON) is a relatively new and unrecognized psychological eating disorder in which the person becomes obsessed with eating pure, healthy and right kinds of foods to improve health. The term ON was coined by Steven Bratman in 1997 to describe those people who have developed a fixation with healthy or righteous eating (Bratman & Knight, 2000). The word ON comes from the Greek words "orthos" meaning right and correct and "orexis" meaning appetite (Catalina et al., 2005). Although ON has not been recognized as a disease by Diagnostic and Statistical Manual of Mental Disorders (DSM IV) of American psychiatric association, it may be considered as a personality or behavioural disorder that results in obsessive phobic personality traits. Whereas other recognized eating disorders, e.g., anorexia nervosa or bulimia nervosa are expressed in quantitative manner (i.e. the quantity of food consumed), ON is expressed in qualitative way (i.e. the quality of the food consumed) (Bratman & Knight, 2000).

An orthorexic person becomes extremely selective about his choice of food in the context of its purity, origin, presence of artificial ingredients or additives (if any), preservatives, etc. (Catalina et al., 2005). Orthorexics obsessively avoid foods, which may contain artificial colours, flavours, preservative agents, pesticide residues or genetically modified ingredients, unhealthy fats, foods containing too much salt or too much sugar and other components. In the course of time an orthorexic person develops his own highly specific food rules and ultimately restricts himself to a self-imposed dietary regimen. The way of preparation, kitchenware and other tools used are also part of the obsessive ritual. They are very careful, detailed and tidy persons with an exaggerated need for self care and protection (Bartrina, 2007). This obsession leads to loss of social relationships and affective dissatisfactions, which, in turn, favours obsessive concern about food. In orthorexia, the patient initially wants to improve his/her health, treat a disease or lose weight, but ultimately the diet becomes the most important part of their lives (Catalina et al., 2005). However, vegetarians cannot be considered as orthorexic because they do not exclude animal diets because of maniacal fear for their health (Bratman & Knight, 2000). Generally, orthorexia can be

considered when the eating disorder is long-term and not transitory, and when such behaviour has a significant negative impact on the quality of life of the individual (Bratman & Knight, 2000; Nymah, 2002).

The review aims to highlight the present understanding about ON including its nature, consequences and different diagnostic features used to evaluate ON, compare ON with other recognized eating disorders, and assess the scientific validity of ON to be considered as a valid psychological eating disorder.

CONSEQUENCES OF ORTHOREXIA NERVOSA

Dependence on such strict diet in orthorexia nervosa eliminates many essential nutrients from diet and it may lead to several nutritional and mineral deficiencies, which can be harmful to individuals' health and ultimately compromise with the quality of life (Bratman & Knight, 2000; Bosi et al., 2007). In extreme cases an orthorexic person may even prefer to starve rather than eating foods that they consider to be impure, unhealthy and harmful to health (Bratman & Knight, 2000; Nymah, 2002).

They often wind up with disordered thinking and psychological torment by punishing themselves with increasingly stringent dietary restrictions if they violate a personal food rule by consuming bad or wrong foods. Some individuals may feel that adhering to a perfect diet will help them to achieve a sense of personal purity or perfection. Individuals with orthorexia nervosa describe their symptoms as an overwhelming obsessive desire to feel pure, natural, and healthy that begins to override other pleasurable aspects of life (Bratman & Knight, 2000; Mathieu, 2005). The behaviour becomes restrictive to the degree that it begins to interfere with the person's quality of life. Finally what starts out as something they are controlling becomes something that controls them (Getz, 2009).

Such compulsive obsession with a particular type of food as in orthorexia nervosa not only impacts the psycho-physical health of the affected but also has significant social consequences. This distorted perception may affect their view about others and cause them to look down on anyone who does not have the same self-discipline in food habit as they do. A person suffering from orthorexia nervosa becomes socially isolated because they do not share the same eating habit as the rest of the social group does and carry their specific foods wherever they go (Bratman & Knight, 2000).

Perhaps one of the most alarming trends associated with orthorexia nervosa is that children are picking up orthorexic tendencies from their parents. Kids who watch their parents becoming obsessed with certain foods types may mimic that behavior. In many cases parents strictly limit their children's sugar intake or try to feed them only organic foods. These restrictions may instill a sense of fear in the mind of the children that certain foods are "bad" and consumption of such foods may cause harm (Getz, 2009).

DIAGNOSIS OF ORTHOREXIA NERVOSA

Valid diagnostic criteria for orthorexia nervosa is somewhat controversial since it has not been officially recognized as a disorder by Diagnostic and Statistical Manual of Mental Disorders –IV (DSM-IV) published by American Psychiatric Association's (APA). Some physicians and other health professionals say orthorexia nervosa does not require its own classification because they believe it is a form of anorexia nervosa or obsessive-compulsive disorder.

According to Bratman & Knight (2000) orthorexia nervosa can be diagnosed by the presence of following characters in the person:

- Spending more than 3 hours per day for thinking about and preparing healthy food.
- Feeling superior to those with differing eating habits.
- Following a particular self imposed dietary regimen rigidly and engaging in compensatory restriction to make up for any dietary indiscretions.
- Attaching self-esteem to adherence to the self imposed diet (feeling of self-satisfaction when complying with the self imposed dietary regimen).
- Making consumption of healthy diet the central focus of life, at the expense of other personal values, relationships, previously enjoyed activities, and sometimes, ironically, physical health.
- Making nutritional value of meal more important than the pleasure of eating it.

Thus, orthorexia nervosa is conceptualized as a mixture of behaviors and attitudes. However, the above diagnostic criteria are simply derived from experiences of Bratman. They have not been identified empirically and it has not been established that they represent a co-occurring pattern of behaviors (i.e. a syndrome).

Donini et al. (2004) followed a diagnostic criterion based on questionnaire method to assess prevalence of orthorexia nervosa. They emphasized on the choice made by the subjects regarding foods that are considered healthy (e.g. fresh, whole meal, biological produce etc.) and unhealthy (e.g. frozen and tinned food products etc.). To classify each selected food group (cereals, milk, meat, fish vegetable, fruit, fast food, snacks, biscuits, drinks and sweets) a point system was used which scored 0 for eating behavior considered healthy and 1 for non healthy. The final result was the ratio of the sum of points awarded for each single item with the maximum of points that each subjects could obtain without including the items to which they failed to obtain a response. From the distribution of obtained points, those subjects were considered as health fanatic who were classified below the 25th percentile (score < 0.57). The obsessive compulsive traits and the phobia linked to personality of the subjects was assessed based on the scale 7 of Minnesota Multiphasic Personality Inventory (MMPI) test considering a score of >65 for women and > 66 for men as modified. Body weight, BMI, were also measured to assess nutritional status of the subjects. Sensation of the subjects regarding the desire to eat was assessed using Emotional eating scale – 11 and the subjects were asked to connect their emotion with their desire to eat which was classified in 5 different levels ranging from no desire to uncontrollable urge (Donini et al., 2004).

Donini et al. (2005) conducted subsequent work to validate a questionnaire for the diagnosis of orthorexia nervosa. This new questionnaire was described as ORTO-15 questionnaire which contained 15 multiple choice questions to assess the prevalence of orthorexia. Answers of these questions that indicated orthorexia were given a score of 1, while the healthier ones had a score of 4. The sum of the scores was the final score of the test. Donni et al. proposed a cut of score of 40 for ORTO- 15 test. A score below 40 indicates that the person has orthorexic tendency. Cut-off point values can be set depending on the purpose for which the scales are used. For diagnosis purposes a high specificity is generally required whereas screening purposes require a high sensitivity (Donini et al., 2005).

PREVALENCE OF ORTHOREXIA NERVOSA

Literatures regarding orthorexia nervosa are scanty. Very few studies have been conducted worldwide to assess the prevalence of orthorexia. Donini et al. (2004) found a orthorexia nervosa prevalence rate of 6.9% among the people of Rome (Italy) belonging to different occupations. 28 out of 404 subjects examined by them showed characteristics of orthorexia nervosa. Bratman, in his famous book health food

junkies, described a very alarming rate of prevalence of orthorexia among the people of USA (Bratman & Knight, 2000) but other researchers don't agree with the conclusion of Bratman. On the contrary to the general belief, Donini et al. (2004) found a higher rate of orthorexia among the male as compared to female who are otherwise thought to be more diet conscious. Orthorexic group in their study had a lower level of education. The orthorexic subjects in their study showed a strong or uncontrollable desire to eat when feeling nervous, excited, happy or guilty. 15.8% subjects in their study had normal eating behavior but had altered Minnesota Multiphasic Personality Inventory (MMPI) indicators. 17.8% subjects had health fanatic eating problem but a normal MMPI. They found that the age of the orthorexic persons were slightly higher than the nonorthorexic ones (Donini et al., 2004).

It is often believed that professionals of nutrition and dietetics are more obsessed with specific dietary habit and show more disordered eating patterns. Korinth et al. (2009) assessed dietary restraint, disinhibition, the tendency towards orthorexia nervosa and healthy food choices in students of nutrition sciences from universities of Germany using a Three-factor Eating Questionnaire (TFEQ). 126 students belonged to the first year of their study while 96 students belonged to higher semesters. The control groups belonged to other study programmes (n = 68 and n = 46 respectively). Nutrition students showed higher levels of dietary restraint than the control group. Disinhibition and orthorexia nervosa did not differ between nutrition students and controls. In addition, the tendency of orthorexia remained stable in the control group, whereas it decreased in the nutrition students between the first/second semester and the seventh semester or higher. Healthy food choices did not differ among students in the first year. Hence Orthorexic tendencies were lower in the more advanced nutrition students. More advanced nutrition students showed healthier food choices, whereas the corresponding controls showed slightly more unhealthy food choices (Korinth et al., 2009). So the study of Korinth et al. (2009) suggest that nutrition students may have a tendency to restrict their food intake in order to control their weight, but they do not have more disturbed or disordered eating patterns like orthorexia than other students. Moreover, during the course of their studies, they adopt slightly more healthy food choices and decrease their tendency to be obsessive in their eating behavior (Bartrina, 2007).

A recent survey of dietitians in Austria found that among dietitians, a considerable portion of 12.8% showed four or more symptoms of orthorexia nervosa (Kinzl et al., 2005).

Aksoydan & Camci (2009) examined the rate of prevalence of orthorexia nervosa among the performance artists in the State Opera and Ballet and in the Bilkent University Symphony Orchestra. The study population consisted of 39 men and 55 women for a total of 94 artists with mean age of 33 years. The ORTO-15 test was used to determine the prevalence of orthorexia nervosa. Those subjects who scored below 40 in the ORTO-15 test were classified as having orthorexia nervosa. A total of 56.4% of the artists involved in the research scored below 40 in the ORTO-15 test. While the highest prevalence of orthorexia nervosa was recorded among opera singers (81.8%), it was 32.1% among ballet dancers and 36.4% among symphony orchestra musicians. The differences between the three groups were statistically significant. No difference was noted between mean ORTO-15 score by baseline characteristics as gender, age, educational level, work experience, body mass index, smoking and alcohol consumption (Aksoydan & Camci, 2009).

Fidan et al. (2010) studied occurrence of orthorexia nervosa among 878 medical student, of whom 464 (52.8%) were male and 359 (40.9%) were female. The rates of the ORTO-11 scores between 0 and 15 was 1.9%; between 16 and 30 was 57.5%, and between 31 and higher was 21.1%. There were 17 students with a score of 0 to 15. The mean score for the ORTO-11 test was 27. There were statistically significant

differences between age, sex, and smoking habit of the students. In the male students, there was a statistically significantly higher tendency for orthorexia, and there was a statistically significant difference between the age groups for tendency for orthorexia (Fidan et al., 2010).

According to Bartrina (2007) women, adolescents and those who practice sports such as bodybuilding or athletics are the groups at higher risk of orthorexia nervosa.

Segura-García et al. reported high incidence of orthorexia nervosa among the athletes (Segura-García et al., 2012).

ORTHOREXIA NERVOSA VS OTHER EATING DISORDERS

The fourth edition of the Diagnostic and Statistical Manual of Mental Disorders (DSM-IV-TR) recognizes three types of eating disorders namely anorexia nervosa, bulimia nervosa, and eating disorder not otherwise specified (EDNOS). While anorexia nervosa and bulimia nervosa are defined by specific sets of diagnostic criteria, EDNOS is heterogeneous and includes individuals who narrowly miss full criteria for anorexia and bulimia nervosa, as well as those presenting with a range of other symptom clusters, including binge eating disorder (BED) (American Psychiatric Association, 2000a).

Anorexia nervosa is characterized by a refusal to maintain a normal body weight, an intense fear of gaining weight, amenorrhea, a severely distorted body image, and a body weight that is more than 15% lower than the ideal. There are two subtypes of anorexia nervosa: restricting and binge/purge. The latter is characterized by bingeing followed by self-induced vomiting, laxative abuse, or other inappropriate weight control measures while still meeting the criteria for anorexia nervosa (American Psychiatric Association, 1994; Mehler & Krantz, 2003).

Bulimia nervosa, often called college girl disease, is the most common eating disorder, affecting 1% to 4% of the United States population and 19% to 30% of college-aged women (American Psychiatric Association, 2000b; Becker et al., 1999). It is estimated that 1.1% to 4.2% of American females will suffer from bulimia nervosa during their lifetime (American Psychiatric Association, 2000b). Bulimia nervosa generally starts as a strategy to control weight but develops into a preoccupation with eating, purging, and weight. Bulimia nervosa is characterized by binge eating, which is consuming a large amount of food/calories in a short period of time. Sometimes the binges last all day; for others, binges last 1 to 2 hours. Bingeing episodes are followed by inappropriate compensatory behaviors (purging) to prevent weight gain; these methods include self-induced vomiting; abuse of laxatives, diuretics, enemas, particular herbal remedies, diet pills, proemetics, prolonged fasting, and excessive exercise (American Psychiatric Association, 1994).

In eating disorders like anorexia nervosa and bulimia nervosa the patients show obsessions about the quantity of food intake, but in orthorexia nervosa the person develops a psychological obsession about quality of food intake. So anorexia nervosa and bulimia nervosa are expressed in quantitative terms while orthorexia nervosa is expressed in qualitative terms (Bratman & Knight, 2000).

Unlike anorexia nervosa or bulimia nervosa, orthorexia nervosa is not about the desire to become thin. The driving force seems to be a desire to eat a perfectly healthy or pure diet. For instance, organically grown vegetables and fruits may be thought of as safe foods (for both those with anorexia and orthorexia) because they are seen as healthy and low in calories. But artificial sweeteners and diet frozen meals, which usually seem acceptable to someone with anorexia, would not be seen as acceptable to someone with

orthorexic tendencies. Conversely, expeller-pressed canola oil may be acceptable to someone with orthorexia but not someone with anorexia because of the fear of weight gain due to eating fat (Getz et al., 2009).

Both anorexia and bulimia nervosa (BN) are found to be more prevalent in females (Martina & Cartwright, 2004). By contrast, orthorexia may be more prevalent in males (Aksoydan et al., 2009; Donini et al., 2004; Fidan et al., 2010). The rate of Binge-Eating Disorder (BED) may be higher in males as in orthorexia (Barlow, 2008).

ORTHOREXIA NERVOSA: IS IT A DISORDER?

There is nothing wrong in having a desire to eat healthy food. Generally people are becoming more and more selective about their choice of food these days. But when the urge to eat healthy foods becomes more of an obsession and the person restricts himself to a self imposed highly specific dietary regimen, it may be assumed that the person is showing orthorexic tendency (Getz, 2009). Generally, orthorexia can be considered when the eating disorder is long-term and not transitory, and when such behavior has a significant negative impact on the quality of life of the individual (Bratman & Knight, 2000; Nymah, 2002).

Orthorexia nervosa is not yet a clinically recognized term or disorder and the Diagnostic and Statistical Manual of Mental Disorders (DSM-IV-TR) has not included orthorexia nervosa in the list of approved eating disorder.

As orthorexia gained more and more media attention, the researchers have raised questions about the validity of orthorexia as a unique disorder and many of them preferred to describe orthorexia nervosa as a variant of existing eating or anxiety disorder (Mathieu, 2005)

However, Bratman argued that orthorexia nervosa is best categorized as a unique form of eating disorder. Bratman contends that existing eating disorders share many similarities with orthorexia but the later differs from other eating disorders in many important ways.

While justifying the similarities between existing eating disorders and orthorexia, Bratman argued that, just as in Anorexia Nervosa, the orthorexic individuals become extremely focused in controlling their eating habits which lead to an unbalanced life (Bratman & Knight, 2000). In addition, orthorexia and anorexia are believed to share the characteristics of a genetic predisposition for perfection, high anxiety levels, and a need to control the environment (Fidan et al., 2009; Mathieu, 2005).

Bratman also highlighted the main differences between orthorexia nervosa and other eating disorders like anorexia nervosa and bulimia nervosa. According to him the most prominent difference between orthorexia and other eating disorders is that individuals with orthorexia nervosa focus on food quality, while individuals with anorexia or bulimia are more concerned with food quantity (Bratman & Knight, 2000). However many other researchers have shown that psychological fixation about the quality or type of food is also common in eating disorders like anorexia nervosa and many individuals with anorexia make their specific dietary rules regarding the type of food that they will consume (Affenito et al., 2002; Kummer et al., 2008; Misra et al., 2006). So fixation about the quality or type of food may not be unique to orthorexia.

Bratman has argued that in contrast to anorexia nervosa, where the motivation is for weight loss, individuals with orthorexia nervosa are driven instead by a need to achieve a sense of personal perfection

or purity (Bratman & Knight, 2000; Mathieu, 2005). However, recent research has suggested that these motivations, especially that of reaching perfection, are also present in individuals with anorexia nervosa (Joiner et al., 1997; Lilienfeld et al., 2006; Shafran et al., 2002).

Some researchers have suggested that rather than classifying orthorexia nervosa as a unique eating disorder, it can be more appropriately considered as a risk factor for future eating disorders. According to this school of thought, if orthorexia nervosa is not appropriately addressed, this disordered eating pattern may eventually develop into a full eating disorder over the time (Mac Evilly, 2001).

CONCLUSIONS

According to many researchers the DSM–IV scheme for classifying eating disorders is a poor reflection of clinical reality. In adults it recognizes two conditions, anorexia nervosa and bulimia nervosa, yet these states are merely two presentations among many. Many new syndromes have been proposed for inclusion in the DSM-5. Orthorexia nervosa is the most familiar of these unrecognized disorders. Orthorexia nervosa seem to be a forerunner among all these unrecognized disorders to be taken up more seriously in DSM -5 as a genuine syndromes. Although Bratman [5] argues that orthorexia should be classified as a unique type of eating disorder, the present idea about orthorexia rests more on opinion and anecdotal evidence rather than on experiential findings. More research is needed not only to identify the distinctive features that differentiate orthorexia nervosa from other eating disorders but also to establish orthorexia as a unique eating disorder. Future researches on orthorexia nervosa need to concentrate on formulating valid diagnostic criteria, which do not overlap with the characteristics of other eating disorders.

REFERENCES

1. Affenito, S.G., Dohm, F.A., Crawford, P.B., Daniels, S.R.& Striegel-Moore, R.H. (2002). Macronutrient intake in anorexia nervosa: The national heart, lung, and blood institute growth and health study. *J Pediatr*, 141(5), pp.701-705.
2. Aksoydan, E.& Camci, N. (2009). Prevalence of orthorexia nervosa among Turkish performance artists. *Eat Weight Disord*, 14(1), pp.33-37.
3. American Psychiatric Association. (1994). *Diagnostic and statistical manual for mental disorders*. 4th edition (DSM IV). Washington DC: American Psychiatric Press.
4. American Psychiatric Association. (2000a). *Diagnostic and Statistical Manual of Mental Disorders, Fourth Edition, Text Revision (DSM-IV TR)*. 4th ed.; Arlington: VA.
5. American Psychiatric Association. (2000b). Work Group on Eating Disorders. Practice guidelines for the treatment of patients with eating disorders. *Am J Psychol*, 157(1Suppl), pp.1-39.
6. Barlow DH. (2008) *Clinical handbook of psychological disorders: A step-by-step treatment manual*. 4th ed.; New York, NY: Guilford Press.
7. Bartrina, J.A. (2007). Orthorexia or when a healthy diet becomes an obsession. *Arch Latinoam Nutr*, 57(4), pp.313-5.
8. Becker, A.E., Grinspoon, S.K., Klibanski, A.& Herzog D.B. (1999). Eating disorders. *N Engl J Med*, 340(14), pp.1092-8.
9. Bosi, A.T.B., Camur, D. & Güler, C. (2007). Prevalence of orthorexia nervosa in resident medical doctors in the faculty of medicine. *Appetite*, 49(3), pp.661-666.
10. Bratman, S.& Knight, D. (2000). *Health Food Junkies: Orthorexia Nervosa – Overcoming the Obsession with Healthful Eating*. New York: Broadway Books.

11. Catalina, M.L., Bote, B., García, F. & Ríos, B. (2005). Orthorexia nervosa: A new eating behavior disorder? *Actas Esp Psiquiatr*, 33(1), pp.66-8.
12. Donini, L.M., Marsili, D., Graziani, M.P., Imbriale, M. & Cannella, C. (2004). Orthorexia nervosa: a preliminary study with a proposal for diagnosis and an attempt to measure the dimension of the phenomenon. *Eat Weight Disord*, 9(2) pp.151-7.
13. Donini, L.M., Marsili, D., Graziani, M.P., Imbriale, M. & Cannella, C. (2005). Orthorexia nervosa: Validation of a diagnosis questionnaire. *Eat Weight Disord*, 10(2), pp.e28-32.
14. Fidan, T., Ertekin, V., Işıkay, S. & Kirpınar, I. (2010). Prevalence of orthorexia among medical students in Erzurum, Turkey. *Compr Psychiatry*, 51, pp.49-54.
15. Getz, L. (2009). Orthorexia: When Eating Healthy Becomes an Unhealthy Obsession. *Today's Dietitian*, 11(6), pp.40.
16. Joiner, T.E.Jr., Heatherton, T.F. & Keel, P.K. (1997). Ten year stability and predictive validity of five bulimia-related indicators. *Am J Psychiat*, 154(8), pp.1133-1138.
17. Kaye, W.H., Klump, K.L., Frank, G.K. & Strober, M. (2000). Anorexia and bulimia nervosa. *Annu Rev Med*, 51, pp.299-313.
18. Keel, P.K., Klump, K.L., Leon, G.R. & Fulkerson, J.A. (1998). Disordered eating in adolescent males from a school-based sample. *Int J Eat Disor*, 23(2), pp.125-32.
19. Kinzl, J.F., Hauer, K., Traweger, C. & Kiefer, I. (2005). Orthorexia nervosa: eine häufige Essstörung bei Diätassistentinnen? (Orthorexia nervosa: a frequent eating disorder in dieticians?) *Erna hrungs-Umschau*, 52, pp.436-439.
20. Korinth, A., Schiess, S. & Westenhofer, J. (2009). Eating behaviour and eating disorders in students of nutrition sciences. *Public Health Nutrition*, 13(1), pp.32-37.
21. Kummer, A., Dias, F.M. & Teixeira, A.L. (2008). On the concept of orthorexia nervosa. *Scand J Med Sci Spor*, 18(3), pp.395-396.
22. Lilienfeld, L.R.R., Wonderlich, S., Riso, L.P., Crosby, R. & Mitchell, J. (2006). Eating disorders and personality: A methodological and empirical review. *Clin Psychol Rev*, 26(3), pp.299-320.
23. Mac Evilly, C. (2001). The price of perfection. *Nutrition Bulletin*, 26(4), pp.275-276.
24. Martina M. & Cartwright, M.M. (2004). Eating disorder emergencies: Understanding the medical complexities of the hospitalized eating disordered patient. *Critical Care Nursing Clinics of North America*, 16(4), pp.515-530.
25. Mathieu, J. (2005). What is orthorexia? *Journal of the American Dietetic Association*, 105(10), pp.1510-1512.
26. Mehler, P.S. & Krantz, M. (2003). Anorexia nervosa medical issues. *J Womens Health (Larchmt)*, 12(4), pp.331-40.
27. Misra, M., Tsai, P., Anderson, E.J., Hubbard, J.L., Gallagher, K., Soyka, L.A. & Klibanski, A. (2006). Nutrient intake in community-dwelling adolescent girls with anorexia nervosa and in healthy adolescents. *Am J Clin Nutr*, 84(4), pp.698-706.
28. Nymah, H. (2002). A direct question: is orthorexia a correct word for a wrong concept? *Lakartdningen*, 99, pp.433-434.
29. Segura-García, C., Papaiani, M.C., Caglioti, F., Procopio, L., Nisticò, C.G., Bombardiere, L., Ammendolia, A., De Fazio, P. & Capranica, L. (2012). Orthorexia Nervosa: A frequent eating disordered behavior in athletes. *Eat Weight Disord*, 21. [Epub ahead of print]
30. Shafran, R., Cooper, Z. & Fairburn, C.G. (2002). Clinical perfectionism: A cognitive behavioural analysis. *Behav Res Ther*, 40(7), pp.773-791.