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**BULIMIA NERVOSA**  
PSYCHOLOGICAL OR PHYSIOLOGICAL DISEASE

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## Chapter 1 - Introduction

‘It was six men of Indostan. To learning much inclined,  
Who went to see the Elephant. (Though all of them were blind),  
That each by observation Might satisfy his mind.

The *First* approached the Elephant, And happening to fall  
Against his broad and sturdy side, At once began to bawl:  
“God bless me! — but the Elephant. Is very like a wall!”

The *Second*, feeling of the tusk, Cried: “Ho! — what have we here  
So very round and smooth and sharp? To me ‘t is mighty clear  
This wonder of an Elephant. Is very like a spear!”

The *Third* approached the animal, And happening to take  
The squirming trunk within his hands, Thus boldly up and spake:  
“I see,” quoth he, “the Elephant, Is very like a snake!”

The *Fourth* reached out his eager hand, And felt about the knee.  
“What most this wondrous beast is like, Is mighty plain,” quoth he;  
“‘T is clear enough the Elephant, Is very like a tree!”

The *Fifth*, who chanced to touch the ear, Said: “E’en the blindest man  
Can tell what this resembles most; Deny the fact who can,  
This marvel of an Elephant, Is very like a fan!”

The *Sixth* no sooner had begun, About the beast to grope,  
Than, seizing on the swinging tail, That fell within his scope,  
“I see,” quoth he, “the Elephant, Is very like a rope!”

And so these men of Indostan, Disputed loud and long,  
Each in his own opinion, Exceeding stiff and strong,  
Though each was partly in the right, And all were in the wrong.

(Johan Godfery Saxe)

This is the story of the six blind men and the elephant. In this story, while each man tells what he feels and what he perceives, all of them cannot see what it actually is. Every man believes what he sees is the absolute truth, while this represents relative truth. The knowledge they have and that which they consider to be true is therefore found to be untrue in reality. In other words, all the knowledge and the truths that one obtains are relative (Cheng, 2010).

This same principle can also be applied to describing and discovering diseases and disorders, for some patients doctors consider that person to have a psychological disease while the other describes it as a physical disease. In a sense, they both have a different part of the human body which they are investigating and thereby constitute their knowledge and obtain their truth, while it concerns the same 'elephant'.

But can this principle also apply to eating disorders? Eating disorders are serious conditions that can have a major impact on the life of the person with the disorder and everyone involved. These disorders are described as psychological disorders, but is this accurate, is it not a physical disorder, where psychological factors are involved. Does the main cause always have a psychological component? Anorexia Nervosa literally means "lack of appetite due to psychological cause," and Bulimia Nervosa literally means "being hungry like a cow due to a psychological cause" (Parnassia groep, 2021; Medisch Spectrum Twente, 2021). However, are these names correct and is the eating behavior altered by a psychological cause, or is something different at the forefront in the development of the eating disorders. Within Bulimia Nervosa, many causes, consequences, and therapies are important in the development of eating behavior, therefore the statement is that Bulimia Nervosa is not a mental illness.

## Chapter 2 – Bulimia Nervosa

### *Males and females*

About 1.1 to 4.2 percent of women will develop BN in their lifetime (National Institute of Mental Health, 1994). Bulimia is more commonly a women's disease rather than a men's; it is approximately ten times more common in females compared to males (Spitzer, et al., 1992). The lifetime prevalence varies between men and women as well, in women, it is roughly 1.5% and in men, it is about 0.5% (Smink, et al., 2012). A distinction can be made between heterosexual and homosexual men, with approximately 14% of homosexual men suffering from Bulimia Nervosa and 42% of the males diagnosed with Bulimia Nervosa are either homosexual or bisexual (Carlat, et al., 1997).

### *Age*

The riskiest age group in terms of developing bulimia nervosa is between 15 and 25 years old, with the average age of onset being around 18 and 19 years (Volpe, et al., 2016). However, it should be taken into account that an eating disorder often remains throughout life, patients do not recover entirely or are for a considerable time in the disease. This indicates that the disease may have started at a young age, but can often live on up to elderly age. Nevertheless, an eating disorder may also develop later in life (Cosford & Arnold, 1992). It appears that about 10 percent of men and women with an eating disorder who are older than 50 have Bulimia Nervosa (Lapid, et al., 2010).

### *Countries*

A difference in the location in which the person lives is present as well; for example, in industrialized countries, the likelihood of developing Bulimia Nervosa is higher (Jacobi, et al., 2004). There is increased lifetime prevalence in Latinos compared to African American populations (Marques, et al., 2011). It has been shown as well in South Africa that black women are more likely to suffer from an eating disorder compared to white women. A notable difference is that women from Curaçao and the Antilles, who were specifically white and highly educated, had a higher risk of developing an eating disorder (Hoek & Hoeken, 2003). Moreover, Hispanic people have a higher chance of developing BN when compared to non-Hispanic people (Becker, et al., 2003). However, not only does the country have an influence, but the location in the country can have a major influence as well. It appears that BN is more prevalent in the big city rather than it being common in rural areas (Son, et al., 2009).

### *History*

How widespread BN is has fluctuated over the years as well. During the eighties and the early nineties, the number of patients with Bulimia Nervosa increased, but has remained the same or declined minimally in the years since. What is noticeable is that the age at which BN begins has declined. The symptoms appear earlier in both males and females (Smink, et al., 2012).

### *Mortality rates*

Regrettably, people die of BN, this may be caused by their failure to get or want treatment or the inadequacy of the treatment (National Institute of Mental Health, 2018). Besides this, psychological problems may lead them to end their life by choice. However medical complications commonly cause the person to die as well. The number of people who die from Bulimia Nervosa is around 4% (Crow, et al., 2009).

## Chapter 3 – Bulimia Nervosa as eating disorder

### *Eating disorder*

According to the dictionary, an eating disorder is "any of various disorders, like anorexia nervosa or bulimia, characterized by severe disturbance in eating habits (Dictionary, sd). Such an eating disorder is a mental illness in which eating behavior is altered. There is mainly a focus on weight, eating and body image within these disorders (Hoek & Elburg, 2014).

DSM helps diagnose various mental disorders, DSM stands for Diagnostic and Statistical Manual of Mental Disorders (DSM). For Bulimia Nervosa, this criteria is as follows.

- A. Recurrent episodes of binge eating, as characterized by both:
  - a. Eating, within any 2-hour period, an amount of food that is definitively larger than what most individuals would eat in a similar period of time under similar circumstances.
  - b. A feeling that one cannot stop eating or control what or how much one is eating.
- B. Recurrent inappropriate compensatory behaviors in order to prevent weight gain such as self-induced vomiting; misuse of laxatives, diuretics, or other medications; fasting or excessive exercise.
- C. The binge eating and inappropriate compensatory behaviors occur, on average, at least once a week for 3 months.
- D. Self-evaluation is unjustifiably influenced by body shape and weight.
- E. The disturbance does not occur exclusively during episodes of anorexia nervosa (Anon., 2013).

### *Binge eating*

The most striking characteristic of the dieting behavior of people with BN is binge eating. A binge episode is where a large amount of food is eaten within a short period and a loss of control occurs in the individual (Hoek, et al., 2017). The number of calories eaten during such a moment is often above 1,000 calories but may even reach 10,000 kcal. The food that is consumed at these times is often sugary and rich in fat, such as ice cream and cake. But also foods such as salads and potatoes, or salty snacks can be part of a binge eating period. Daily, patients have on a moderate scale 4 episodes, but the variability between patients is large. Consequently, the minimum level of BN is based on the amount of binge eating episodes, where there are 4 different scales. In the mildest form, the average is 1 to 3 binge-eating episodes, compared to over 14 episodes in the most severe form (Hoek, et al., 2017). The binge-eating episodes primarily take place in the afternoon and evening (Hetherington, et al., 1995). Other than eating a lot at one time, there are additional factors that can play a role in the eating behavior of people with BN, for example, eating a specific food only, avoiding eating with other people around them or they may even save food for the next binge eating moment of that day (Monte Nido, 2021).

### *Lose weight*

Within Bulimia Nervosa the other major issue is trying not to gain more weight than is preferred, however, this does not necessarily mean that patients will always be underweight. Therefore, BN is less visible from the outside, certainly when compared to Anorexia Nervosa (Hoek, et al., 2017). For this they engage in multiple activities, this could include exercising extensively, using diuretics and laxatives or taking medications that will increase the metabolism of the person and could enable them to burn more calories as well (Monte Nido, 2021). Moreover, another important aspect is to vomit the food, nevertheless, not every person vomits the same amount and frequency. Likewise, not every vomiting moment needs to be combined with a severe binge. Consequently, the number of vomiting moments is

higher than the number of binge eating episodes and the vomiting of meals is more frequent than non-vomiting (Hetherington, et al., 1995).

The number of calories a person with BN eats varies considerably from person to person, however, on average it is approximately around 9000 kcal per day (Hetherington, et al., 1995). To provide some perspective, a woman needs about 2000 kcal and a man needs about 2500 kcal per day (Voedingscentrum, 2021). The food that patients with BN ingest is often higher in fat but lower in protein compared to food that is consumed during a normal meal (Hetherington, et al., 1995). The drinking behavior of BN is also altered, on average patients drink 3.2 L of liquid. To give a perspective, an adult needs 1.5 to 2 L of water per day (Voedingscentrum, 2021). Patients mainly drink carbonated beverages, but instead of the classic beverages, they drink the diet versions (Hetherington, et al., 1995).

## Chapter 4 – Potential causes

The underlying cause of BN is not clearly understood; numerous different factors may predispose to the development of BN (Mahoney, 2021). Most of the patients believe that they are falling short of the expectations of others, but also may be unable to comply with their expectations (Bendfeldt-Zachrisson, 1992). There are various groups in which BN can be categorized, here a focus is on the source or trigger of the development of BN, the main categories in which the causation of BN are divided are; biological factors; developmental factors; psychological factors; and sociocultural factors (Mahoney, 2021). In addition, several subgroups are important to the development of BN, these are explained under the corresponding main groups. It is important to get a clear picture of these categories as well, they arise differently and therefore may require different treatment or they may be prevented in different ways (Hall, et al., 1992). In this chapter, these different groups are explained.

### *Biological factors*

Here, the biological factors are the aspects that you cannot do anything about, like your genes or family members. No specific genes have yet been found, but there is a higher chance to develop bulimia nervosa when a family member has suffered from the disease as well. In addition, neurotransmitters that are present when someone is depressed can also lead to the development of bulimia nervosa (Mahoney, 2021).

### *Developmental Factors*

Furthermore, there are developmental factors. Abuse, trauma, divorce are factors that can lead to low self-esteem, which can result in the development of BN. There are two subgroups of BN which belong within this group (Mahoney, 2021).

The first is Overt Bulimia, this group often has a sudden onset of bulimia. There is a dramatic change in their behavior, this is seen in regards to school results, but in addition, they are regurgitating a lot of food. The children in this group feel that their parents are not concerned with them, many of these families recently had a divorce or have moved away. According to the study, these children are less depressed but do experience more anxiety compared to the control group. So briefly, this form is seen as a way to attract attention from the family (Hall, et al., 1992).

Sexual Evocative Bulimia is another type that is considered among the developmental factors. This type is also called the fatal attraction syndrome. Whereby the eating disorder is triggered by a past sexual abuse event. Here, the patients see themselves as hopeless victims. These patients are seen as insecure and anxious individuals who often have superficial relationships with others (Hall, et al., 1992).

### *Psychological factors*

Within the psychological factors, depression, anxiety and borderline behavior are considered. In this group, a psychological illness is often the underlying cause of the eating disorder and therefore needs to be managed. There are also two subgroups within this group, Obsessive-Ritualistic Bulimia and Masochistic Bulimia (Mahoney, 2021).

Obsessive-Ritualistic bulimia is characterized by the development of elaborate compulsive rituals. The rituals can take place on all actions around eating when preparing the food or any other situation involving food or eating (Herpertz-Dahlmann, 2009). These different rituals can be fulfilled by the patients by vomiting. Some rituals are so specific that they sometimes have to be performed during binge eating, although this can also occur during vomiting or both acts. These patients are commonly emotionally unstable, through the obsessive behavior they want to have control over the anxiety they are experiencing (Hall, et al., 1992).

Masochistic Bulimia focuses on the patient's desire to eat which causes pain or discomfort to the patient in which the patient cannot control themselves. Examples include nuts and raw broccoli. Furthermore, they choose food that is not easy to vomit, causing them pain. They prefer food that has passed its date, or they make sure that it is no longer suitable by exposing it to the sun. The patients do not dare to show their fears and feel a need to hurt themselves which leads to BN (Hall, et al., 1992).

### *Sociocultural factors*

These include the influence of media, as well as the influence of the people who surround you. The hype of diets has a big impact on the development of eating disorders, but the pictures on social media have great influence as well in which we constantly compare ourselves to other people and other bodies (Mahoney, 2021).

## Chapter 5 – Underlying mechanisms

A variety of mechanisms that occur in the human body may be affected when a person is diagnosed with Bulimia Nervosa. However, whether this is a consequence or causation of the disease is not always determined. Nevertheless, many different aspects of the disease can be associated with the body. These various areas and in what way they interact with the disease will be explained in this chapter.

### *Hormonal level*

There are several different types of hormones of importance within BN that may be modified within the pathology. The first group of hormones are the sexual and reproductive hormones. It appears that among women who have a normal menstrual cycle, decreased estradiol and increased progesterone levels have been measured when the binge eating frequency is elevated (Shiller, et al., 2007). Furthermore, it has been found that those patients with BN have a more elevated level of testosterone, by having an increased testosterone level, people may become more hungry and prefer to consume foods that are high in calories and fats (Paddock, 2007).

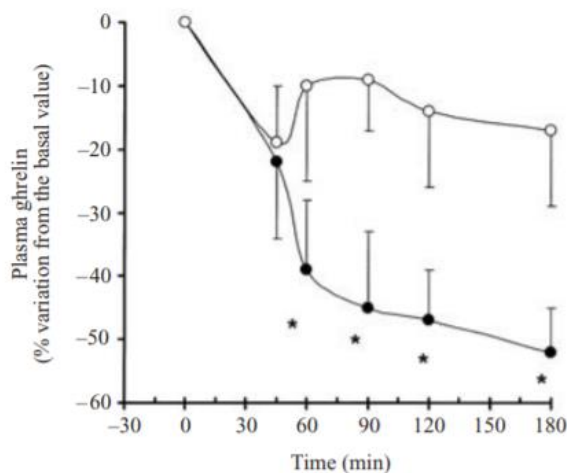
Furthermore, there are hunger signals, which are hormones that help regulate the hunger craving and therefore indicate whether to eat more or if the body has had enough. A hormone that is important in this respect is cholecystikinin (CCK), which provides a feeling of satiety. It turns out in people with BN, the level of CCK is reduced. The lowered CCK level results in patients feeling less full and can therefore continue to eat more easily (Hannon-Engel, 2011). Moreover, the hormone ghrelin is an important hormone in the regulation of eating behavior, whereby the feeling of hunger and thus the food intake is increased. In figure 1 the plasma level of Ghrelin is shown, where BN patients are compared to non BN patients. Ghrelin appears to have a less significant influence in patients with BN, where the reduction is considerably less and consequently the person can proceed to eat (Monteleone, et al., 2003).



Likewise, there is the hormone leptin, which provides an elevation of satiety and thereby decreases food intake. In figure 2 a comparison between baseline serum leptin concentrations are made. In which there as a reduced leptin concentration in both BN groups. Besides a correlation has been established between the level of leptin and the frequency of binge eating, whereby a lowered leptin level causes an increased frequency of binge eating (Jimerson, et al., 2000).

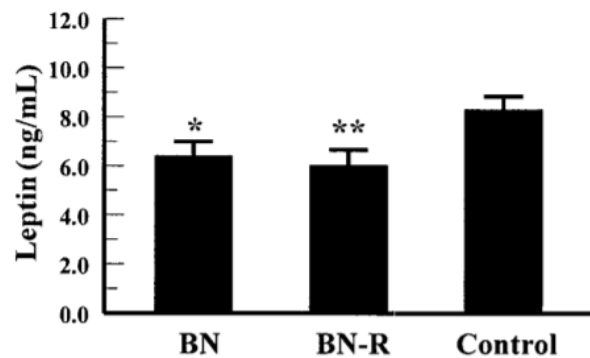
**Fig. 1**

*The percental changes in the plasma level of ghrelin in BN patients (white dots) and non BN patients (black dots) (Monteleone, et al., 2003).*



**Fig. 2**

*The baseline serum leptin concentrations in BN patients, BN patients which are recovered and non BN patients (Jimerson, et al., 2000).*



#### *Neuronal level*

Individuals diagnosed with BN were reported to have reduced activation of the front striatal brain (PFC). The PFC contributes to producing the stop signal to the basal ganglia, which then controls the output of behavior. In addition, there also appears to be a negative correlation between PFC and BMI, with increased BMI contributing to a reduction in PFC activation as well. This decreased activation could contribute to the severity of binge eating symptoms (Skunde, et al., 2016).

#### *Behavioral level*

Beyond the observable eating behaviors that may change within BN, some behaviors are unconsciously enhanced or attenuated in people with BN. Patients with BN have increased impulsivity when it comes to attention, but a decreased motor impulsivity. Moreover, their depression level is elevated and they have higher DEBQ scores, which can be used to determine what eating behaviors they show (Skunde, et al., 2016).

## Chapter 6 – Animal models

Through the use of animal models, researchers can investigate diseases more effectively. Animals and humans have anatomical and physiological similarities, which may help in the development of new therapies and subsequently apply those to humans (Barré-Sinoussi & Montagutelli, 2015). Eating disorders are complex diseases, therefore while animal models in other diseases can explain the underlying causes, animal models within eating disorders are more frequently for insights into the disease. Nonetheless, animal models may not be used optimally as a result (Kim, 2012). However, the animal models that may be used will be described in this chapter.

### *Food restriction model*

Food restriction is an aspect within BN that could be examined in animals. Whenever animals experience a food restriction, it leads them to start eating more after these restrictions occur to them even if they are already full. This is similar to a binge-eating episode. However, no immediate conclusion can be drawn here to bulimia nervosa, because when an animal eats more, it can be considered a binge-eating moment but the binge-eating can be caused by various factors (Kim, 2012). Nevertheless, other studies and the animal model have demonstrated that food restriction and dieting can increase the risk of developing binge-eating behavior. This could be explained by an impairment of opiate receptors, which normally help control food intake (Hagan & Moss, 1991).

### *Palatable food model*

Using this model can illustrate self-control and relapse within BN. Thereby focusing in this animal model on access to palatable food. When this food is taken away for a while, there is an increase in the intake of the food by the animals after the access to the food has been restored. Through a disallowance of palatable food, behaviors in which binge eating is a feature may develop. Not only is the total intake increased, but the anxiety level is elevated as well. For humans, a higher anxiety level may cause BN to develop (Stolerman, 2010).

### *Stress model*

Stress can cause an alteration in eating behavior. Research shows that animals that are forced to eat under stress have an increased intake of calories (Hagan, et al., 2002). In addition, stress can cause animals to become depressed and show anxiety, thereby developing unequal serotonin levels. Furthermore, animals are more prone to develop binge eating behavior after a period of fasting/eating when they are experiencing stress. The model, therefore, describes the possibility of binge eating when there is a combination of stress and fast/feeding, nevertheless it describes the absence of self-control, which is considered an important aspect in BN (Kim, 2012). Also, this gives an insight that is comparable to addiction, demonstrating that the behavior involving binge eating can be related to substance use whereby the animal models in that area may help in understanding those behaviors in a better way (Stolerman, 2010).

### *Sham-feeding model*

In animals, no model focuses on deliberate vomiting. A model that approaches this best is sham eating. This involves liquid food being excreted through a gastric fistula before it enters the digestive system. Animals that are capable of performing this binge eating behavior will consume more food. Moreover, this behavior causes the animal to eat more rapidly as well (Stolerman, 2010). While comparing this model to vomiting in humans, it is important to consider that the animals were manipulated and did not perform this behavior of their own volition. Nevertheless, it can demonstrate understanding and represent the negative feedback system (Kim, 2012).

## Chapter 7 – Treatments

Several treatments can be implemented once a person is diagnosed with Bulimia Nervosa. Three psychotherapies can be used to treat Bulimia Nervosa, furthermore, medications and education may help fight Bulimia Nervosa. Each of these treatments will be discussed in this chapter.

### *Cognitive-behavioral therapy*

This treatment focuses on the eating habits of the patients, considering not only what is unhealthy in terms of food, but also what the standards and values of the patients are. Through therapy, they aim to change those into healthy habits (Mayo Clinic Staff, 2018). There are three stages throughout this

therapy that a patient progresses on. First, the patient is made aware of BN and what it includes. What behaviors are associated with the behavior and what aspects that the patient demonstrates in the behavior contribute to BN? Next, the patient is taught to modify the behavior. Here the patient is taught to have no dietary restrictions and do not have behaviors that are focused on food, weight, or body shape. In the final phase, there is a focus on maintaining good behavior. The patient learns how to keep good behavior and avoid relapse (Agras, et al., 2000).

#### *Family-based treatment*

With this type of treatment, the focus is on the family. It involves the parents in supporting the child in the improvement of their eating habits, hence it is about the solution and not the underlying cause of BN (Grange, et al., 2007). In addition, the family is provided with help on how to live with the challenges that bulimia creates for the child and the family as a whole (Mayo Clinic Staff, 2018). This form of treatment consists of 3 phases. During the first stage, a focus is placed on helping the children by the parents, restoring the parents' autonomy over the children. During the second phase, the main focus is on returning control of eating to the adult, including a normal eating pattern and a varied eating style. In the final phase, an effort is made to establish a proper family structure for the normal development of the child (Grange, et al., 2007).

#### *Interpersonal psychotherapy*

Under this form of treatment, the patient is being helped in the maintenance of relationships with their friends and family. They are taught how to properly communicate and how to effectively solve problems while ensuring that their eating behavior remains normal (Mayo Clinic Staff, 2018). Likewise, this form of treatment has three phases. In the first stage, there is a focus on analyzing the interpersonal context of the person in whom BN has developed. In the next phase, the problems that are present within this context can be considered, and in the last phase, how these problems can be solved and addressed. This form is therefore focused on the people around the patient and not on the eating behavior of the patient (Agras, et al., 2000).

#### *Medication*

A variety of medications may be used throughout the treatment of BN. As BN is sometimes associated with depression, antidepressants may be used to decrease the symptoms of BN. Although this is done in combination with psychotherapy to achieve the strongest effect (Mayo Clinic Staff, 2018). The 6 most commonly used medications are Prozac (fluoxetine), Topamax (topiramate), Effexor (venlafaxine) (Drugs.com, 2021). Prozac, also known as the antidepressant fluoxetine, might provide short-term help, however, it can even prevent people from relapsing into their eating behaviors that fall under BN. Prozac can be helpful in treatment against BN, where serotonin levels are restored. The effect of Prozac does not have a different effect on the relapses when people who are depressed or not depressed are compared (Mathis, 2002). Topomax contains the active ingredient topiramate. Topiramate causes over-stimulated nerves to relax again and in this way could help on both binge eating and breakouts (KNMP, 2013). Also widely used is Effexor, with the active ingredient venlafaxine. Venlafaxine is an anti-depressant and provides a better mood and gives an anxiety reduction. By reducing these factors, can have a positive effect on the fight against bulimia nervosa (NVvP, 2013).

Since differences in the levels of hormones can contribute to excessive binge eating, hormonal therapies can be beneficial. These involve reducing the testosterone levels and normalizing the estrogen and progesterone levels likewise. This can affect eating behavior and therefore reduces the chance of binge eating. Evidence shows that patients on hormonal therapy in which estrogen is the primary ingredient will consume significantly less and have a reduced tendency to reach for foods high in sugars and fats (Paddock, 2007).

### *Nutrition education*

To provide patients knowledge of what is considered healthy and what is considered unhealthy, the focus is also on nutrition education. This involves teaching the patients ways to acquire healthy eating habits and the prevention of binge eating. Overcoming binge eating is an important aspect of the process (Mayo Clinic Staff, 2018).

### *Hospitalization*

In some cases, the patient is admitted to the hospital during treatment. Hospitalization can ensure that the medical and mental health specialists work together to provide the best possible care for the patient. In the hospital, it can also be decided that a person has to be tube-fed to get well and to monitor more closely whether the person is eating healthy or unhealthy. Hospitalization can be of short or long-term duration. Patients usually have to stay until they have strengthened sufficiently, after which they can go home again. Alternatively, people may be transferred from the hospital to a residential treatment facility, or they may have to come back for a few days. Their conditions are well established, although their condition is not yet sufficiently strong for them to manage everything on their own (Cowden, 2020).

## Chapter 8 – Various views on Bulimia nervosa

Based on the different issues and aspects that have been mentioned, these can be assigned to a perspective. The views are the physiological perspective and the psychological perspective. Those perspectives must be compared to examine ‘all hands to the elephant’.

### *Biological perspective*

Within the biological perspective, several aspects come into consideration. However, there must be a noticeable difference between this and the psychological points to provide a good comparison. Following the dictionary, biology is: 'the science of life or living matter in all its forms and phenomena, especially with reference to origin, growth, reproduction, structure, and behavior.' (Dictionary, 2021).

From the potential causes, the biological factors are consistent with the biological perspective. Discussed within these factors are the genetic influences within Bulimia Nervosa and how family-based the disease would be. For both, the chances of developing the disease are higher if it is already within your family.

When considering the underlying mechanisms, three came to mind. Two of these fit within the biological perspective, which are the hormones and the neuronal area. For the first, it appeared that abnormalities in hormones could lead to an increased likelihood of developing binge-eating. The hormones could be the sexual hormones but also the satiety hormones were commonly altered. Furthermore, when looking at brain function, it appeared that patients with BN may have an abnormality in brain activity. This deviation could cause a decrease in self-control, causing the person to continue eating.

Next, several animal models were discussed. Several aspects appear that do not fit easily into either the biological perspective or the psychological perspective. If a distinction should be made, food restriction and sham feeding belong to the biological perspective. The animal model that could provide information around food restriction could be caused by a fault in an opiate receptor, which causes the food intake to go up. In addition, sham feeding is based on a biological point where animals can excrete fluid from their bodies. This principle is not quite the same as vomiting in humans, although it does demonstrate some of the same processes in the body.

To finish, the various treatments were discussed. Only one of these is aimed at the biological factors of BN, the medication. Most of the medication focuses on depression, which is considered a psychological disease. Nevertheless, the focus is also on biological aspects, such as the hormones and the overactivity of neurons. By using a medication, various aspects can be brought back to normal levels which can lead to recovery from BN.

### *Psychological perspective*

According to the dictionary, psychology is "the science of the mind or of mental states and processes" (Dictionary, 2021). Where biology is about the processes in the body, psychology is more concerned with the mental state and behavior of the person.

Within the causes of BN that have been addressed, developmental, psychological and socio-cultural factors are all covered within the psychological perspective. Developmental factors are included within this perspective due to the focus on the mental state and a change in behavior, when a trigger event takes place. Through this particular event, the children might experience change and adapt their behavior. The psychological factors include the underlying problems, including anxiety and OCD which might lead to the development of BN. Along which socio-cultural factors focus on the media, and how it can influence the behavior and mental state of patients who have BN.

Within the mechanisms, the relationship is different, wherein in one area there are only influences that fall within the psychological perspective. These are behavioral mechanisms, which focus on changes in behavior and, for example, the development of depression in patients with BN. Similarly, their eating behavior is altered and they will be influenced to eat because of more external factors.

Some animal models focus on the psychological aspects of BN. First, the animal model of palatable food, which can cause anxiety and stress in animals and therefore affect their eating behavior. Another animal model that focuses on stress, belongs to the psychological factors. As the animals experience stress, their eating behavior is altered and this can have a major impact on, for example, the development of eating disorders.

The majority of the treatments that are applied are oriented towards psychological factors. For example, within cognitive behavioral therapy, a focus is set on a change in behavior and which factors influence this behavior positively or negatively. Furthermore, family-based therapy does fit well within that aspect, focusing on living with the eating disorder and how relationships within the family might work best. Furthermore, interpersonal psychology has a distinct place within the psychological factors as well. This focuses on the person's contact with friends and family and how to adjust behavior in a manner that is most healthy for everyone. Within medications, some also focus on modifying behavior through antidepressants, restoring neurotransmitter levels and improving the person's behavior again.

## Chapter 9 – Conclusion

However, is Bulimia Nervosa rightly treated as a psychological disorder or should it be approached as a physiological disease in the future? I am convinced, that Bulimia Nervosa belongs to both and should be considered as a collective term for various eating disorders. There are many different causes and mechanisms that are being addressed in both a psychological and physiological manner. These different aspects that can cause Bulimia Nervosa all to have different effects on how they modify behavior and eating habits and in my opinion should also be regulated in various ways. Some forms of Bulimia Nervosa have a clear psychological cause that can be helped well with therapies, but in patients in whom Bulimia Nervosa has developed and has elevated hormone levels, it can be solved through a completely

different therapy. In the future, therefore, there should be more focus on the cause of the disease rather than what is the consequence of the disease. Whereby the cause can be addressed. Bulimia Nervosa is an umbrella for changes in eating behavior, but not everyone with Bulimia Nervosa has the same cause and therapy and therefore will not have the same disease. The elephant at the beginning is not one elephant, but it is a whole zoo together.

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