

Moderating Role of Self-Esteem in the relationship between Orthorexia Nervosa  
and Social Appearance Anxiety among Young Women in Pakistan

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Abstract

The purpose of this study was to examine the role of social appearance anxiety and self-esteem in triggering the onset of orthorexia nervosa among young women. We intended to shed some light on the potential contributors to orthorexia nervosa within Pakistani Population by focusing on these psychological factors. In this research, 300 married and unmarried young women were taken as participants who were aged between 18 – 35 years from Wah Cantt and Islamabad. Teruel Orthorexia Nervosa (TOS), Social Appearance Anxiety Scale (SAAS), and Rosenberg Self-Esteem Scale (RSES) were applied. Descriptive Analysis, Pearson Correlation, T-test, and Mediation were calculated. The results revealed a significant positive correlation between orthorexia nervosa and healthy orthorexia nervosa, as well as between orthorexia nervosa and social appearance anxiety. There is also a non-significant difference that appears on self-esteem and social appearance anxiety scales. This proves that there are non-significant differences on orthorexia nervosa by self-esteem and social appearance anxiety i.e., there is no real effect of SAA and SE on orthorexia nervosa. Process model 4 was used to test the mediation analysis, in which results reveal that social appearance anxiety and orthorexia nervosa have direct effect ( $B = .16$ ,  $p = .00$ ) which is significant.

**Keywords:** Orthorexia Nervosa, Social Appearance Anxiety, Self-esteem, Young Women, Pakistan

Eating patterns refer to the habitual choices individuals make regarding food and drink consumption. These patterns can be influenced by various factors, including

social, demographic, and individual considerations. Importantly, these choices can have significant long-term implications for one's health. Unhealthy dietary patterns have been consistently linked to a higher risk of developing chronic diseases such as cancer, cardiovascular disease, obesity, and type 2 diabetes. Additionally, engaging in restrictive eating behaviors can contribute to the development of eating disorders, including bulimia nervosa, anorexia nervosa, binge eating disorder, and orthorexia nervosa. Eating patterns can play a significant role in a person's overall health and well-being. Certain eating patterns can lead to problems if they are not balanced or sustainable over the long term (Ćatović, 2022).

According to Roncero and Barrada (2018), orthorexia nervosa refers to obsession with perceived 'nutritious diet' and overrated dietary beliefs which then leads an individual towards psychosocial impairment or weight and nutritious deficiency. Furthermore, according to orthorexia nervosa is different from orthorexia or healthy orthorexia, which according to them refers to one's concern regarding diet, nutritional food, and healthy eating (Zickgraf, 2022). Orthorexia nervosa is denoted by a need to eat dietary food (which as per person's belief is healthy). People who suffer from orthorexia nervosa remove all those items that according to them are contaminated, unhealthy, and impure. They also tend to reduce or eliminate particular food groups like meat, dairy, food grain, cooked food, etc. while it is also necessary to keep in mind that the diet plan of such people is never medically prescribed (Roncero B. , 2018).

The prevalence of orthorexia nervosa is questioned because neither it has a psychiatric diagnosis, nor does it have standardized instrument currently. Though various research studies have suggested that the prevalence of orthorexia nervosa ranges from 6.9% to 57.6% in general population. While some of the researchers have argued that practitioners and artists might record a high prevalence of orthorexia nervosa. While others have argued that doctors, medical students, and dietitians are 55% on the risk of developing orthorexia nervosa in their entire life (Gkiouleka, 2022).

The ORTO-15 questionnaire, where lower scores indicate higher orthorexic tendencies, revealed a significant correlation between orthorexic tendencies and social appearance anxiety, as well as an obsession with being overweight. This suggests that the emergence of orthorexic tendencies is strongly linked to feelings of

social appearance anxiety and the fear of gaining weight (Matera D. K., 2015). This conclusion is consistent with the results of another research study which concluded that people with fitness goals who also represented orthorexic tendencies manifested thin people as their ideal figures which is why it was concluded by the researcher that they were experiencing social appearance anxiety along with orthorexia nervosa (Radosław, 2020).

Social appearance anxiety, characterized by the fear of being negatively evaluated by others based on physical appearance, has been identified as a precursor to eating disorders. It entails feelings of nervousness and anxiety regarding one's own physical appearance and the concern that others may judge them negatively based on their looks (Brosf, 2017).

As per the findings of previous research studies, an orthorexic person has concerns about one's body figure and weight. A study conducted by Gross and Rosen (1989), concludes that women with eating disorders more likely strive to for social acceptance and achievement while experiencing increased social anxiety and decreased self-esteem. Furthermore, individuals who think as well as negatively evaluate their body and are concerned about how others perceive their body shape leads to a decreased social pursuit (Gross, 1989). This behavior can be referred to as social appearance anxiety or otherwise commonly known as social physique anxiety. Many researchers commonly utilize the term "social physique anxiety" instead of "social appearance anxiety," as the latter is a relatively recent concept in the field. The term Physique denotes to the height, weight, and the tone of the muscle while on the other hand appearance refers to body dimension, face structure, body, and much more (Holle, 2008).

According to McGregor (2022), orthorexic behavior tends to be motivated by one's desire to develop his/her ability which in turn increases self-esteem. As per McGregor, orthorexia is better explained as preoccupation with self-development rather than preoccupation with a healthy diet. Self-esteem refers to one's own belief and confidence in one's own capabilities (McGregor, 2022).

The term self-esteem is theorized to explain an individual's one-dimensional, and relatively consistent and global individual sense of worth. As per the theory of Bratman and Knight, in individuals with orthorexia nervosa, self-esteem becomes closely tied to their adherence to strict dietary procedures. They perceive themselves

as superior to others based on their eating habits, which they consider to be the focal point of their lives. The maintenance of their prescribed diet reinforces their sense of superiority and contributes to their self-esteem. (Thomas M. Dunn, 2016). Low self-esteem has been identified as a significant factor in the development of eating disorders. A meta-analysis has shown a negative association between self-esteem and eating disorders, indicating that individuals with lower self-esteem are more susceptible to such conditions. While low self-esteem is generally considered a common precursor for eating disorders, the relationship between self-esteem and orthorexia nervosa has received limited attention from researchers. Some studies suggest there is no significant relationship between orthorexia nervosa and self-esteem, while others indicate a significant negative correlation between the two variables. Further research is needed to gain a clearer understanding of the connection between self-esteem and orthorexia nervosa. (Yilmaz, 2022).

Limited research has been conducted on the predictive role of social appearance anxiety and self-esteem in relation to orthorexia nervosa. This could be attributed to the fact that orthorexia nervosa as a phenomenon is still not fully understood and explored. Self-esteem and social appearance anxiety both as per literature correlate with aspects such as body appearance, weight, and physical appearance in terms of eating disorders (Matthews, 2012). Furthermore, an obsession with nutritious diet and proper food is correlated with social appearance issues (Brytek-Matera, 2016). However, certain researchers have reported their inability to establish a significant association between self-esteem and orthorexia nervosa. This finding has led them to believe that other factors may mediate the relationship between self-esteem and orthorexia nervosa. (Bóna, 2021).

To this date, no research paper in Pakistan has analyzed and evaluated the prevalence of orthorexia nervosa within married women nor anyone has identified the difference in the occurrence of orthorexia nervosa within married and unmarried women of Pakistan. Furthermore, till now only one paper has studied the association between orthorexia nervosa (ON), Social appearance anxiety (SAS), and Self-esteem (Songül, 2022).

Considering this, the present study is conducted with an intention to analyze the prevalence of orthorexia nervosa in young women within Pakistan and to compare the prevalence within those who are married with those who are not married. Finally,

there is a lack of research on orthorexia nervosa within Pakistani context let alone its contributing aspects. There are barely any research studies which report the onset or the likelihood of occurrence of orthorexia nervosa within the Pakistani population especially young women. Due to this, there is a very large gap in knowledge about the Pakistani trends of orthorexia nervosa. This study aimed to investigate the role of social appearance anxiety and self-esteem in triggering the onset of orthorexia nervosa among young women.

### **Orthorexia Nervosa**

The term Orthorexia Nervosa refers to an eating pattern which is expressed by the need to consume uncontaminated and fresh foods only; to an extent that the person's need turns into obsession with eating a specific kind of food. The term has been derived from the Greek words 'ortho' which refers to correct and 'orexis' which refers to appetite (Dundar, 2022).

The term was first invented by a person, namely Steven Bratman, in the year 1997 defined orthorexia nervosa as a state characterized by a pathological, monoideistic obsession with adhering to healthy eating patterns and consuming appropriate dietary foods. It is important to note that, currently, orthorexia nervosa has not received clinical recognition as an official eating disorder and is not included in the DSM-5 diagnostic manual. However, there are certain clinical aspects of orthorexia nervosa that are concurred upon as well as usually identified as the symptoms of orthorexia nervosa in the literature (Dundar M. N., 2022).

According to Strahler et al. (2018), the question which is being actively discussed is whether orthorexia nervosa should have a distinct classification in the DSM or not. Or whether orthorexia nervosa should be regarded as a distinct eating disorder or potentially viewed as a variant of obsessive-compulsive disorder (OCD). In fact, many of the researchers are of the belief that maybe orthorexia nervosa is an antecedent of or a remanent of an eating disorder. However, professionals have not been able to reach a professional agreement hence orthorexia nervosa is not yet included in DSM-5 TR because of its lack of empirical data that is needed to acquire proper diagnostic identification (Strahler, 2018).

The literature indicates that a person who has orthorexia nervosa may better be described as perfectionist (a personality trait within humans which is represented by an exceptionally high level of flawlessness, and overly critical evaluations of self

and others) nonetheless there are a very limited number of researchers who have tried to study the relationship between orthorexia nervosa and perfectionism (Matera, 2015). Orthorexic people are motivated by a need to enhance their physical wellbeing or to inhibit or heal an active ailment. Though the need to enhance one's physical well-being cannot be considered as a pathology but obsessing with a particular kind of food may ultimately lead to an eating disorder or pathology. Such people tend to devote a large portion of their time (3 or more than 3 hours per day) to first exploring, then examining, and lastly cooking the food. Individuals with orthorexia nervosa exhibit a level of food focus comparable to other eating disorders outlined in the DSM-5, such as anorexia nervosa and bulimia nervosa. However, a notable distinction lies in the primary concern of these disorders. While anorexia nervosa and bulimia nervosa revolve around the quantity of food consumed, orthorexia nervosa is characterized by an obsession with the quality of food rather than its quantity. (Scarff, 2017).

Some researchers have proposed that orthorexia nervosa may share similarities in terms of severity with anorexia nervosa and bulimia nervosa, but people may shift from a preoccupation with the amount of food to a preoccupation with the quality of it. Besides that, there is also a possibility that a nutritious diet may help to maintain a socially acceptable weight for those who are suffering from anorexia nervosa or bulimia nervosa (Gkiouleka, 2022).

Though the debate that whether orthorexia nervosa should have a distinct classification in the DSM-5 TR persists. But the physical symptoms, such as weight loss and malnutrition, the psychological symptoms, including overtiredness and emotional instability, and the social concerns, such as social isolation and diminished quality of life, associated with orthorexia nervosa align with the characteristics of a mental disorder. Despite these manifestations, it is worth noting that orthorexia nervosa has not been officially classified as a clinical disorder within the section of other eating disorders in the DSM-5 TR (Bert, 2019). A correlation has been found between reduced satisfaction with body image and heightened orthorexic tendencies. It is also suggested that body dissatisfaction may lead to a higher level of stress disorder which may further influence unusual eating attitudes within a human being (Castellano, 2021).

In literature it is debated that self-esteem and social appearance anxiety could be linked with orthorexia nervosa. Throughout their lives, women exhibit sensitivity to the nutrients they consume and are influenced by societal perceptions regarding their body image (Duran, 2022) . In a study conducted by Plichta, Jezewska-Zychowicz et al. (2018), it was found that 28.8% of women scored below the cut-off score, indicating tendencies towards orthorexia. Specifically, out of the 75.4 female students included in the study, a significant proportion exhibited indications of orthorexic tendencies. (Jezewska-Zychowicz, 2018).

Jonathan R. Scarff (2017), states that, orthorexia nervosa can be best put in a nutshell as an obsession with healthy eating in addition to restrictive behaviors. The strive to achieve perfect health through attention to diet may lead to consuming less nutrients than needed, loss of close relations, and a poor quality of life (Jonathan R. Scarff, 2017) . According to Wojtas & Drozd (2022), Bratman believed that there are two stages in the presence of ON that are, “healthy orthorexia”, in which the individual wants to eat healthy foods and is not interested in showing clinical features and “orthorexia nervosa”, in which the individual is obsessed with a healthy diet, this stage is considered as a pathology (Drozd, 2022).

According to Donini (2015), it is suggested that orthorexia nervosa should be considered as a risk factor during the early stages of developing an eating disorder rather than being classified as a distinct eating disorder itself (Donini, 2015) . Many researchers have conducted research to find out the link between marriage and eating disorders. Some have assumed that marriage might be the precursor to the alterations in eating behaviors due to family conversion, adaptation to new culture, and changing relationships. Certain researchers have posited that individuals who reside with their partners demonstrate higher range of disordered eating symptoms (Debora Bussolotti a, 2002).

Moreover, a range of comparative studies have also been conducted to find out the variance of occurrence of disordered eating in those who are married and those who are not. While many have come to the conclusion that individuals who are dissatisfied with their marriage demonstrate a wide range of disordered eating behaviors (Woodside, 2000)

Different range of Orthorexia nervosa in different studies might be due to social and demographic factors like age, gender, education level differences. In higher

educated and working group adults, the presence of Orthorexia nervosa was lesser comparatively. While the younger participants had more risk of developing Orthorexia nervosa (Dundar M. N., 2022). Individuals with orthorexia nervosa (ON) frequently encounter social isolation as a result of their dietary lifestyle. For instance, they may feel compelled to bring their own foods that align with their idealized dietary routine. In certain situations, they may choose not to eat with others due to their strict adherence to specific types of food. As a result, they may develop a sense of moral superiority regarding their food choices, leading to increased social isolation from individuals who do not comprehend the profound connection between food and these individuals' self-concept (Cena, 2019).

Bratman (2000) has proposed that due to the alleged negative physical, psychological, and social effects, orthorexia nervosa (ON) should be regarded as a distinct psychological disorder (Bratman, 2000). To support growth, maintain good health, and sustain life, humans require nourishment. Our bodies rely on a proper intake of various nutrients, tailored to our individual needs based on factors such as age, gender, and physiological state. Failing to consume a sufficient and balanced quantity of essential nutrients can lead to a range of health issues (Calder, 2020).

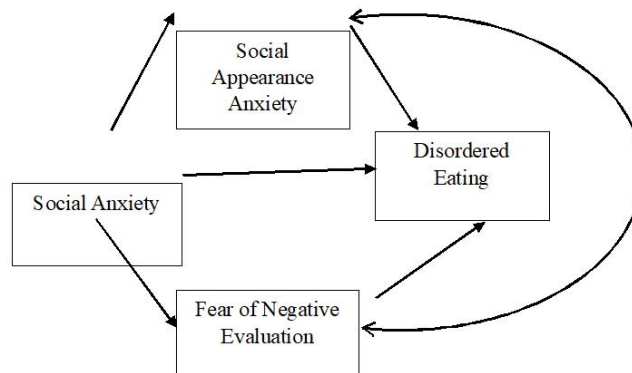
In today's society, promoting healthy nutrition is a crucial aspect when it comes to enhancing overall well-being. However, there has been a growing trend in recent years, where a rising number of individuals are displaying various forms of "highly sensitive eating behavior disorders" or "orthorexia nervosa." These individuals tend to classify foods based on their perceived healthiness and exhibit obsessive preoccupation and excessively sensitive behavior towards consuming only healthy food. It is important to note that individuals demonstrating such highly sensitive behavior regarding their nutrition intake are at risk of developing orthorexia nervosa in the future (Bağcı Bosi, 2007).

### **Social Appearance Anxiety**

Social appearance anxiety refers to the apprehension that one may be judged unfavourably based on their physical appearance, as stated by Hart et al. (2008). This type of anxiety pertains to a distinct aspect of social anxiety that cannot be attributed to negative body image, personality, depression, or affective states (Hart T. A., 2008).



Figure 01.



Social appearance anxiety refers to a form of anxiety characterized by an overwhelming fixation on one's physical appearance and a deep-seated fear of being negatively judged by others due to their appearance. It can manifest in various ways, such as feeling self-conscious about one's body shape or size, worrying excessively about one's clothing or grooming, or feeling anxious about social situations where appearance is emphasized (Hart T. A., 2008).

Social appearance anxiety can lead to avoidance of social situations or activities, low self-esteem, and negative impact on quality of life. It is particularly common among adolescents and young adults but can affect people of all ages (Karadeniz, 2022). The exact causes of social appearance anxiety are not fully understood, but it is believed to be a complex interplay of genetic, environmental, and psychological factors (Metin, 2017).

There is a strong association between self-esteem and social appearance anxiety, as both concepts relate to how an individual assesses their own value. Self-esteem refers to an individual's overall evaluation of themselves, while social appearance anxiety specifically involves an excessive concern with how one's physical appearance is perceived by others (Demirel, 2019). Individuals with social appearance anxiety are often highly concerned with their physical attractiveness, particularly as it relates to potential romantic partners, and can be sensitive to criticism and evaluation from peers (Laura Merciano, 2020). While social appearance anxiety is not a new phenomenon, the promotion of unrealistic appearance standards and appearance-based social rewards in today's digital media content can make it a

significant trigger for the development of disorders and social impairment, particularly among teenagers (Laura Merciano, 2020).

Research suggests that self-esteem is a factor in the development of anxiety disorders, particularly social anxiety. Individuals with low self-esteem may view themselves as lacking worth or importance and may have negative thoughts about their appearance and value (Nguyen, 2019).

According to research, self-esteem can contribute to the development of anxiety disorders, especially social anxiety. People who have low self-esteem may feel that they are worthless or unimportant and may have negative beliefs about their appearance and overall value (Nguyen, 2019). This fear of negative evaluation and self-doubt can cause people with low self-esteem to experience anxiety, particularly in social situations where they fear failure and rejection. Consequently, low self-esteem may contribute to the development of social anxiety. Research has found that negative self-evaluations are likely to play a role in both the emergence and persistence of social appearance anxiety, making self-esteem a risk factor for this condition (Vogel, 2008).

Moreover, Khanam and Moghal (2012) found that individuals with positive self-esteem are better equipped to withstand negative comments from others and are less vulnerable to social appearance anxiety. In this way, positive self-esteem can promote better physical and mental health as well as positive social behavior (Khanam, 2012). Based on these findings, it can be concluded that low self-esteem may increase the likelihood of experiencing social appearance anxiety, whereas high self-esteem may serve as a protective factor against it (Laura Merciano, 2020).

### **Self-Esteem**

The term self-esteem refers to the beliefs and perceptions of a person toward his or her capabilities as defined by Rosenberg (1965). It refers to the person's general evaluation of his or her value. The concept of self-esteem contains beliefs and feelings such as accomplishment, hopelessness, self-importance, and disgrace (Christina Galanou, 2014). According to Heine and Lehman's 2002 study, the field of psychology has witnessed a significant surge in attention towards self-esteem, evident by the publication of over 18,000 articles within a span of 35 years. This increased focus reflects the extensive and innovative history of research on self-esteem in psychology (Heine, 2002).

Rosenberg (1965) proposed that self-esteem encompasses an individual's positive and negative attitudes towards their own self. On the other hand, However, (Coopersmith, 1967), defined self-esteem as an ongoing self-evaluation conducted by an individual. He, furthermore, defines it as a manifestation of an individual's approval or refusal towards oneself being important and successful (Ozyesil, 2012). While according to (Guindon, 2002), self-esteem refers to how much an individual finds himself worthy. Though researchers have not agreed upon the definition of self-esteem but one thing which they have agreed upon is that it plays an essential role in an individual's life (T. K. Anurekha, 2015).

According to the social comparison theory a person tends to evaluate his/her own opinions and capabilities which is done by comparing themselves with other people (Festinger, 1954). Moreover, the comparison a person makes with people are poorer than him/her is known as a downwards comparison while the comparison a person makes with people who are rich than him/her is known as an upward comparison. He stated that downwards comparison tends to increase the self-esteem while upward comparison decreases it (Tesser, 1988).

When an individual starts to compare his/her appearance with other men or women interpreted as ideal figures within person's culture, an upward social comparison takes place, which somehow may lead a person towards feelings of body dissatisfaction followed by binge eating as well (Eric Cooley, 2001) and feelings of appearance anxiety (Taryn A Myers, 2012). Research has shown a correlation between the presence of psychiatric disorders in adolescents and diminished self-esteem. Mendelson and Eiber (2012), found that adolescents and young adults diagnosed with eating disorders displayed low levels of self-esteem (Mendelson, 2012).

### **Rationale**

Nutritional diet intake encompasses various aspects, including physiological, psychological, and sociological factors. Maintaining a balanced diet, making healthy food choices, and following a consistent dietary schedule have become essential for optimal health. In today's era, the younger generation appears to be particularly obsessed with fitness, social appearance, and food consumption. The surge of mass media and the spread of faulty beliefs have led them to follow a tough dietary routine

which is full of restrictions. By doing so, they strive to attain a socially acceptable body image within their community (Ginimole, 2022).

Several studies have established a significant correlation between poor eating patterns, behaviors, and various negative outcomes. These factors encompass reduced physical well-being, decreased self-esteem, and heightened levels of body dissatisfaction (Mizia, 2021). Numerous studies have been conducted to investigate the prevalence of orthorexia nervosa among young adults. Research conducted to analyze the symptoms of Orthorexia nervosa within 636 licensed nutritionists within US concluded that about 49% of the nutritionists were susceptible of developing orthorexia nervosa (Tremelling, 2017).

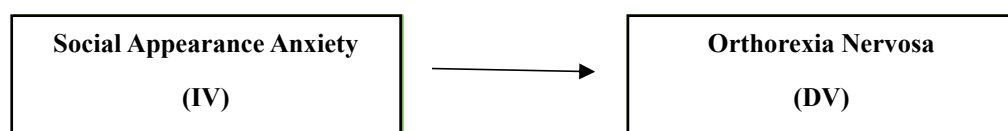
A study conducted in Malaysia revealed that 67.4% of undergraduate university students exhibited symptoms of orthorexia nervosa (Hamid, 2018) . Another study conducted in Turkey revealed that females exhibit a higher degree of selectiveness when it comes to food, compared to males (Bosi, 2007) . Insufficient research has been conducted on the topic of orthorexia nervosa within the context of Pakistan which is why the prevalence of the disorder cannot be reported in Pakistani context. Consequently, a substantial knowledge gap exists regarding the specific trends of orthorexia nervosa in Pakistan. This study aimed to investigate the role of social appearance anxiety and self-esteem in triggering the onset of orthorexia nervosa among young women. By focusing on these psychological factors, we intended to shed some light on the potential contributors to orthorexia nervosa within the Pakistani population.

### Hypothesis

1. Social appearance anxiety is positively correlated to Orthorexia Nervosa in young women.
2. Self-esteem plays a mediating role in the relationship between social appearance anxiety and orthorexia nervosa.
3. There is a difference in the occurrence of orthorexia nervosa, social appearance anxiety, and self-esteem within unmarried and married young women.

### Theoretical Framework

Figure 02.





### Participants

In this research, 300 married and unmarried young women were taken as participants who were aged between 18 to 35 years within Pakistan. Information such as the name of the participant was not collected from the participant as anonymity was the main feature of this research. The inclusion criteria were (1) to include both married and unmarried women to draw a difference and (2) to include women between the age 18-35 (3) to include only the educated women.

### Instruments

#### *Demographic Sheet*

A demographic questionnaire created by the researchers was administered to the participants of this study. The demographic questionnaire contained a total of 8 questions to assess the basic characteristics of the participants such as age, marital status, diet type, weight category, (underweight, normal weight, overweight) etc.

#### *Teruel Orthorexia Scale (TOS; Barrada and Roncero, 2018)*

This scale was created by Barrada and Roncero (2018) as two subscales to measure symptoms of orthorexia nervosa. One of the two subscales is Healthy Orthorexia which aims to inspect a person's indulgence in a healthy diet while another subscale is Orthorexia Nervosa which aims to examine the negative results of an individual's obsession with the healthy diet which may involve negative feelings such as self-punishment and interference with routine activities (Roncero B. a., 2019).

The participants of this study provided responses to a set of 17 statements using a 4-point Likert scale, ranging from 0 (completely disagree) to 3 (completely agree). All the score on items was summed to generate a score in which higher score meant higher orthorexic tendencies within the participant and vice versa.

### *Social Appearance Anxiety Scale*

Social Appearance Anxiety was measured using Social Appearance Anxiety Scale (SAAS). This scale was created by (Hart, 1999), which aims to examine the anxiety a person may have due to being negatively evaluated by others on the basis of his/her physical appearance. The scale used in this study comprises a total of 16 items. Participants responded on a 5-point Likert scale, ranging from 1 (not at all) to 5 (extremely). The first item of the scale was reverse coded. A higher score on this scale indicated increased levels of social appearance anxiety in individuals.

### *Rosenberg Self-Esteem Scale*

The Rosenberg Self-Esteem Scale, developed by Rosenberg in 1965, initially comprised 65 items divided into 12 subscales. The first 10 items of the scale were specifically designed to assess an individual's level of self-esteem (Rosenberg, 1965). Thus, in this research study, the first 10 items of the self-esteem subscale were utilized to examine the difference in self-esteem between married and unmarried women. Participants provided responses on a 4-point Likert scale, ranging from 4 (strongly agree) to 1 (strongly disagree).

### **Procedure**

In this research, participants were not required to provide identifying information such as their names. The recruitment of participants was done using purposive sampling technique. Initially, the participants were provided with information regarding the objective of the study. Subsequently, those who expressed willingness to participate were given an informed consent form and a demographic questionnaire. The completion of these questionnaires took approximately 20-25 minutes. It is important to note that participants had the freedom to withdraw from the study at any point without any obligation.

### **Ethical Consideration**

The participants of this study were not promised any sort of financial incentive to be a part of the study. The participants of this study were ensured that their information will be kept confidential, while an informed consent was obtained from each participant of this study. This study was conducted with the approval of the department of Psychology, University of Wah.

Results

Sociodemographic Characteristics of Sample

Table 1

*Detail of Sample Characteristics (N = 300)*

Demographic Variable	Frequency (f)	(%)
<b>Marital Status</b>		
Married	116	38.7
Unmarried	184	61.3
<b>Education</b>		
Bachelors	220	73.3
Masters	77	25.7
PHD	3	1.0
<b>Family System</b>		
Nuclear	154	54.7
Joint	135	45.0
<b>Weight</b>		
Underweight	64	21.3
Normal Weight	220	73.3
Overweight	16	5.3
<b>Diet</b>		
No	205	68.3
Yes	95	31.3
<b>Type of Diet</b>		
Regular Diet	235	78.3
Low Carbohydrate	62	20.7
Full Liquid	2	.7
<b>Food Supplements</b>		
No	190	63.3
Yes	110	36.7

Table 1 provides an overview of the demographic characteristics of the study's participants. The data reveals that the sample consisted of a diverse range of individuals, with unmarried women being the most common (n=184). The educational background of the participants varied, with the majority having a bachelor's degree (n=220), while fewer had a master's degree (n=77) or a PhD (n=3). Regarding family systems, the majority of participants came from a nuclear family (n=154), while a smaller proportion came from a joint family (n=135).

In terms of weight, most participants had a normal weight (n=220), while a smaller proportion were underweighted (n=64) or overweight (n=16). Additionally, the data revealed that more participants followed a diet (n=205) than those who did not (n=94). Among those who followed a diet, regular diet (n=235) was the most common, followed by low carbohydrate diet (n=62) and full liquid diet (n=2). Finally, the majority of participants did not take supplements (n=190).

### Descriptive Analysis

**Table 2**

*Mean, Standard Deviation, Range, Skewness, Kurtosis, Cronbach's alpha*

Scales	M	SD	Cronbach's $\alpha$	Range	Skewness	Kurtosis
ON	12.28	6.06	.690	0-49	1.06	6.30
HO	15.89	4.35	.654	3-27	-.48	.28
SE	27.04	4.18	.522	13-45	.53	1.29
SAA	32.97	10.51	.878	16-67	.51	.01

*Note:* ON- Orthorexia Nervosa. HO- Healthy Orthorexia. SE- Self Esteem. SAA- Social Appearance Anxiety.

In table 2 descriptive statistics for the variables under investigation are presented. The mean and standard deviation for each variable were computed. Additionally, the alpha reliabilities for the Healthy Orthorexia, Orthorexia Nervosa, Self Esteem, and Social Appearance Anxiety scales were determined. The reliability coefficient for Healthy Orthorexia was .654, indicating a moderate level of reliability. Similarly, the reliability coefficient for Orthorexia Nervosa was .690, also considered moderate. The Self Esteem scale had a reliability coefficient of .522, indicating a moderate level of



reliability. On the other hand, the Social Appearance Anxiety scale showed good reliability with a coefficient of .878.

### Relationship between Orthorexia Nervosa, Social Appearance Anxiety, and Self-esteem

**Table 3**

*Pearson Correlation of the Variables*

Variables	1	2	3	4
ON	-	.528**	-.384**	.402**
HON		-	-.135*	.114
SE			-	-.398**
SAA				-

*Note.* ON= Orthorexia Nervosa, HON= Healthy Orthorexia Nervosa, SE= Self-esteem, SAA= Social Appearance Anxiety.

Table 3 presented the relationship between Orthorexia nervosa, healthy orthorexia nervosa, social appearance anxiety, and self-esteem for the entire sample. Pearson correlation was conducted to assess the nature and strength of the associations between Orthorexia nervosa, healthy orthorexia nervosa, social appearance anxiety, and self-esteem, as well as their statistical significance.

The results revealed a significant positive correlation between orthorexia nervosa and healthy orthorexia nervosa, as well as between orthorexia nervosa and social appearance anxiety. Conversely, there was a significant negative correlation between orthorexia nervosa and self-esteem at a level of significance ( $p < 0.01$ ). Additionally, a significant negative correlation was observed between healthy orthorexia nervosa and self-esteem at a level of significance ( $p < 0.05$ ). There was a positive correlation between healthy orthorexia nervosa and social appearance anxiety. Furthermore, a significant negative correlation was found between self-esteem and social appearance anxiety at a level of significance ( $p < 0.01$ ).

**Table 4**

*Means, standard deviation and t-values of Ortho= Orthorexia nervosa, Self-esteem (SE), Social appearance anxiety (SAA) between married (n=116) and unmarried women(n=184).*

Unmarried Women (n=184)	Married Women (n=116)
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Scales	M	SD	M	SD	t	p
Ortho	10.5	5.0	14.9	6.4	6.5	.52
SE	27.8	4.0	25.7	4.0	4.4	.38
SAA	32.0	11.4	34.4	8.5	1.9	.40

*Note.* Ortho= Orthorexia nervosa, SE= Self-esteem, SAA=Social appearance anxiety, M=Mean, SD=Standard deviation.

Table 4 shows Mean, Standard deviation, t-value, and p value on Orthorexia nervosa on both comparison groups. High scores on Ortho indicate high Orthorexic tendencies. Mean values show that unmarried women (M=10.5, SD=5.0) have lower orthorexic tendencies than married women (M=14.9, SD=6.4) and there is a non-significant difference of  $p > 0.52$ . There is also a non-significant difference that appears on self-esteem and social appearance anxiety scales. This proves that there are non-significant differences on orthorexia nervosa by self-esteem and social appearance anxiety i.e., there is no real effect of SAA and SE on orthorexia nervosa.

### Mediating Role of Self-esteem

**Table 5**

*Mediating effect of Self-esteem on relationship between social appearance anxiety and orthorexia nervosa*

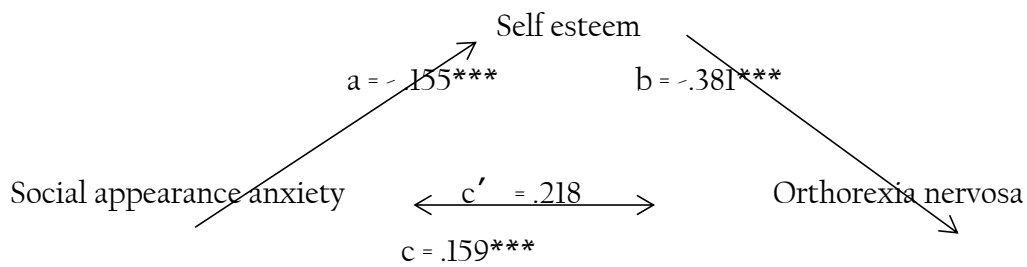
Model	S. E	B	T	P	LL	UL
Constant	2.69	32.22	6.39	.00	11.87	22.44
SE	.08	-.38	-4.91	.00	-.53	-.23
SAA	.03	-.16	5.16	.00	.10	.22
Total effect of X on Y (path ab+c)						
Direct effect of X on Y (path	.03	.16	5.16	.00	.10	.22

c)				
Indirect effect of X on Y through M (path ab)	.02	.06	.03	.09

Table 5 showed mediating role of self esteem between social appearance anxiety and orthorexia nervosa. Process model 4 was used to test the mediation analysis. Results reveal that social appearance anxiety and orthorexia nervosa have direct effect (B=.16, p=.00) which is significant.

**Figure 03**

*Graphical Representation of Mediation Effect*



### Discussion

The findings of the present study align with existing literature. Steven Bratman, in 1997, introduced the term "orthorexia nervosa" to describe individuals who exhibited an obsession with healthy eating, following rigid dietary rules that had detrimental effects on their well-being (Gramaglia, 2018). What initially starts as a genuine desire to maintain good health can evolve into an unhealthy fixation, where self-discipline transforms into self-punishment, and the pursuit of healthy eating becomes an addictive behavior. Orthorexia has been associated with various physical, psychological, and social issues (Luliana, 2015).

Numerous studies have identified several risk factors associated with the development of body dissatisfaction and eating disorders. These risk factors include internalizing societal ideals of thinness, having low self-esteem, engaging in self-criticism, and exhibiting perfectionistic tendencies. These factors play a significant role in increasing the vulnerability of individuals to body dissatisfaction and the development of disordered eating behaviors (Mantilla E. B., 2015).

The study hypothesized that social appearance anxiety is positively correlated to orthorexia nervosa in young women. Body dissatisfaction and anxiety about body shape and size can be related to high levels of stress and disorder, which may contribute to eating concerns and irregular eating habits (Kapa, 2022). The positive correlation discovered between orthorexia nervosa and social appearance anxiety suggests that young women who exhibit excessive preoccupation with their physical appearance may be more susceptible to developing orthorexia nervosa (Luliana, 2015). The second hypothesis explains that self-esteem acts as a mediator in the relationship between social appearance anxiety and orthorexia nervosa. The results confirm the hypothesis in which it is indicated that self-esteem has a mediating effect on the relationship between both variables. There are not many studies in relevance to the results, but it was found that high self-esteem prevents eating disorders (Cervera, 2003). This study is consistent with the results of the present study.

According to research conducted by (Kimberley, 2014), low levels of self-esteem are positively correlated to high social appearance anxiety (Kimberley, 2014). Thus, mediating effect of self-esteem with social appearance anxiety and orthorexia nervosa is studied which was the main contribution of the present study in the previous literature. The third hypothesis explains that there is a difference in the occurrence of orthorexia nervosa, social appearance anxiety, and self-esteem within unmarried and married young women. Results have proved this hypothesis which indicate that unmarried women have lower orthorexic tendencies than that of married women. While no studies have been conducted to support these findings, a study conducted in India has concluded that there is a high prevalence of orthorexia nervosa among Indian married women (Jain, 2021). Remarkably, this outcome is consistent with the results obtained in the present study.

### **Limitations and Suggestions**

The study of orthorexia nervosa is a relatively new concept in the field of research in Pakistan. This study aims to pave the way for further investigation by highlighting the importance of understanding this condition. By conducting additional studies, researchers can delve deeper into orthorexia nervosa and explore its relationship with other eating disorders. This will contribute to a more comprehensive understanding of the topic and promote advancements in this area of research.

The limitations of the study include that the results cannot be generalized as the sample was a small percentage of the population. The use of self-reported measures in this study presents a potential challenge, as participants may engage in socially desirable behaviors that could lead to false reporting of their self-esteem and social appearance anxiety. The cross-sectional correlational research design is also another limitation because this research design cannot establish a cause-and-effect relationship. Additionally, due to limitations of human and financial resources, most of the sample was from students in Wah Cantt which restricts its generalizability in wide population. Future researchers must try to get sample from all around Pakistan and discuss important demographic information about the participants.

### Conclusion

The findings of this study reveal a noteworthy and positive association between orthorexia nervosa and social appearance anxiety. Moreover, self-esteem plays a crucial role as a mediator in the relationship between social appearance anxiety and orthorexia nervosa.

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