

# Prevalence of Pica in Female University Students and Its Relationship with Anxiety, Stress, and General Health



By

**Sana Saeed**

*Dr. Muhammad Ajmal's*

**National Institute of Psychology**

*Centre of Excellence*

**Quaid-i-Azam University**

**Islamabad, Pakistan**

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**Sana Saeed**



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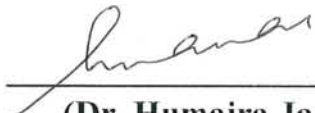
**2020**


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**Sana Saeed**

**Approved By**

  
\_\_\_\_\_  
**(Dr. Humaira Jami)**  
**Supervisor**

  
\_\_\_\_\_  
**(Dr. Uzma Masroor)**  
**External Examiner**

  
\_\_\_\_\_  
**(Prof. Dr. Anila Kamal)**  
**Director, NIP**

## CERTIFICATE

Certified that M. Sc. Research Report on " **Prevalence of Pica in Female University Students and Its Relationship with Anxiety, Stress, and General Health** " prepared by **Sana Saeed** has been approved for submission to the National Institute of Psychology, Quaid-i-Azam University, Islamabad.



Dr. Humaira Jami  
(Supervisor)

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## CONTENTS

List of tables	i
List of figures	ii
List of appendices	iii
Acknowledgments	iv
Abstract	v
<b>Chapter 1: INTRODUCTION</b>	<b>1</b>
<b>Pica</b>	<b>4</b>
Etiological Perspective	7
Nutritional theories	7
Sensory and physiologic theories	8
Neuropsychiatric theory	9
Cultural or psychosocial theory	9
Pica and Anxiety	10
Pica and Stress	12
Pica and General Health	14
Malnutrition	14
Toxicity with lead intake	15
Dental and oral health issues	15
Infections, obstructions and parasitic infestation	15
Rationale of the Study	17
<b>Chapter 2: METHOD</b>	
Objectives	19
Hypotheses	19
Conceptual and Operational Definitions	19
Research Design	20
Sample	20
Instruments	22
Procedure	23
<b>Chapter 3: RESULTS</b>	<b>24</b>
<b>Chapter 4: DISCUSSION</b>	<b>40</b>
<b>References</b>	<b>46</b>
<b>Appendices</b>	<b>56</b>

## LIST OF TABLES

Table 1	Frequencies and Percentages Along Demographic Variables (N = 253)	21
Table 2	Descriptive Statistics of the Measures (N = 253)	24
Table 3	Mean, SD, and t-values Across participants having or not having pica on study variables (N = 253)	27
Table 4	Mean, SD, and t-values Across participants having or not having pica Physical Health Issues on study variables (N = 253)	29
Table 5	Mean, SD, and t-values Across participants having or not having Mental Health Issues on study variables (N = 253)	31
Table 6	Mean, SD, and t-values Across participants having or not having Nutritional Deficiencies on study variables (N = 253)  Mean Differences Along Study Discipline on Study Variables (N = 253)	33
Table 7	Correlation Among Study Variables (N = 253)	34
Table 8	Mean Difference Along Study Discipline on Study Variables	35
Table 9	Mean Differences Along Mothers Education on Study Variables (N = 253)	37
Table 10	Mean Differences Along Province on Study Variables (N = 253)	38
Table 11	Mean Differences Along Father's Education on Study Variables (N = 253)	39

**LIST OF FIGURES**

Figure 1	Bar graph showing prevalence of different types of nonnutritive food items ( $N = 253$ )	25
Figure 2	Bar graph showing any attraction to eat nonnutritive food items ( $N = 253$ )	26
Figure 3	Bar graph showing physical health issues ( $N = 253$ )	28
Figure 4	Bar graph showing mental health issues ( $N = 253$ )	30
Figure 5	Bar graph showing nutritional deficiencies ( $N = 253$ )	32



**LIST OF APPENDICES**

Appendix A	Informed consent and Demographics	56
Appendix B	Pica Questionnaire	58
Appendix C	Somatic Symptom Adult	60
Appendix D	Perceived Stress Scale	61
Appendix E	Anxiety Adult-2	62

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## Abstract

The current study was aimed to examine the prevalence of Pica in female university students and its relationship with anxiety, stress, and general health. For this purpose, Pica Questionnaire (Stillmon, 2008), Somatic Symptom-Adult Scale (Spitzer, Williams, and Kroenke, 2002), Anxiety Adult-2 (PROMIS Health Organization, 2012), and Perceived Stress Scale (Cohens, 1983) were used. Main Study focused on testing the research hypotheses on a sample consisted of 253 female university students with an age range 18 to 30 years. Cronbach alpha Reliabilities of all measures were found to be satisfactory. The results showed that 159 female university students eat nonfood items; more prevalent were raw rice, frozen frost, and ice. They reported to have unexplainable craving that forced them to eat nonnutritive food items. Group differences showed that students having Pica had significantly more somatic symptoms than those not having Pica, hence, Hypothesis II got confirmed. Those having Pica reported more stomach ache, constipation, iron deficiency, anxiety, and stress on open-ended questions, however, independent-sample *t*-test showed nonsignificant differences on Pica scores across those having physical health problem, nutritional deficiency, and mental health problem than their counterparts. Nevertheless, they all scored high on somatic complaints, anxiety, and stress than their counterparts. Pica was found to have significant positive relationship with somatic complaints, but not with anxiety and stress hence, Hypotheses I was rejected. Age had significant positive relationship with somatic complaints and weight had significant positive relationship with somatic symptoms, anxiety, and perceived stress. Analyses were also run across study discipline, mother's education, and father's education. Findings were discussed in the light of past literature and etiological perspective. Limitations, suggestions, and implications for future research have also been discussed.

## **INTRODUCTION**

## Introduction

Eating is a necessary activity and the human body regulates appetite by different mechanisms. The factors that influence eating patterns are biological, environmental and cultural and the factors that cause eating disorders are always found to be complex (Advani, Kochhar, Chachra, & Dhawan, 2014). It is reported that eating disorders are very common in developed and developing countries where they affect approximately 2% of women and .8% of men. There are different types of eating disorders that include binge eating disorder, bulimia nervosa, Pica, and bulimia nervosa. The purpose of this research is to analyze prevalence of Pica behavior among female students studying in universities. Pica is a chronic eating disorder in which a person is prone to eating nonnutritive nonfood on consistent basis. Nonfood items consumed by patients with Pica include chalk, soil, pebbles, paper, hair, soap, ice, and paint etc. (Advani et al., 2014).

Greenberg and Schoen (2008) reported that patients suffering from Pica are found to have no control over their appetite. They have a consistent urge to eat nonfood items. Pica affected persons are also more attracted towards eating raw food like corn starch, starch flour, rice, salt, peas, and potatoes etc. According to Diagnostic and Statistical Manual of Mental Disorders (American Psychological Association [APA], 2013), Pica is now reported as a mental disorder as well. Pica can occur at any age of life. However, the most common Pica affected patients are young children and pregnant women. There are number of internal and external factors like hormonal issues, mental retardation, and phases of emotional that can cause Pica in women. It has been seen that the topic of Pica is often neglected and also it is given very less importance.

In a research study, Anthonia (2019) reported that according to global reports, it has been highlighted that about 56.8% of women practice pica. They can be young female students and pregnant women around the globe. Reports show that on getting questioned by various groups of women, they stated that they are affected by Pica due to certain cravings which they actually found to be totally unexplainable. Therefore, Pica is present significantly among a high percentage of female population around the world. Practicing of Pica among female university students and other groups of women

is a complex phenomenon. It needs to be addressed now as it is increasing day by day and is affecting the health and behavioral mantra among people (Mills, 2007).

As far as pregnant women are concerned, Pica in their cases can be a temporary phase as their body responds differently to continuously changing nutritional needs (Mortazavi, & Mohammadi, 2010). In most cases of pregnancies, cravings of consuming nonnutritive nonfoods often disappear once they are back to normal life (Horner, Lackey, Kolasa, & Warren, 1991). University female students with normal intellect suffering from Pica are characterized into two categories one is rare and other typical isolated cases. Females falling into Pica affected classifications are normally the ones who lack nutritional support, malnutrition, and often they are unable to get enough support for nutritional requirements (Mills, 2007).

Pica is different from babies' and young children's normal behavior that put things in their mouths. Those with Pica often try to eat non-food products. People with Pica can also develop a wide array of other symptoms such as broken or damaged teeth, stomach pain, stomach upset and lead intoxication. Some people have nutrient deficits with Pica. Some people with Pica, for example, may have low iron, hematocrit, or hemoglobin. Some experts think that Pica is the way the body replaces these missing nutrients for these persons (Sharma, Aly, & Kavuru, 2011).

Pica is something which is not restricted to mentally ill people only as it is present among individuals with normal intellect. In accordance to the changes made to DSM- 5 (American Psychiatric Association [APA], 2013), Pica is now identified as an eating disorder where people consume nonnutritive nonfood items on daily basis. DSM – V replaced the concept of early concept about Pica where it was taken as a disorder of early childhood or some infancy characteristic. The cases mentioned in this literature and other researches show that obsessive compulsive disorder, trichotillomania, and gastrointestinal disorders appear to be very much similar to each other as they are associated with Pica and the women discussed into had an urge to practice them as a relief from stress and self-soothing mechanism to overcome their distress and depression (Hergüner, Özyıldırım, & Tanıdır, 2008).

While the work on the Pica study has been carried out with anthropologists, geographers, pediatricians (Orozco-González, Cortés-Sanabria, Márquez-Herrera, & Núñez-Murillo, 2019) it is true that nobody knows what causes it. However, one of the

major pathophysiological explanations for Pica in at least some people is addictive behavior, as the behavior / cravings often continue after the physiological cause has been solved. This is similar to a nicotine. Even after the psychological cause has been addressed and alleviated, the conduct has been demonstrated. After the psychologic cause is treated and alleviated, conduct has been shown to continue. Therefore, if Pica was always caused by nutritional impairments, it should stop when corrected (Matson, Belva, Hattier, & Matson, 2011). Pica as an occurrence of obsessive compulsive disease. We note that dialysis patient with Pica behaviors, although this is not always expressed in irregular laboratory values, will take a large number of substances linked to the change in their metabolic function. According to Singhi, Singhi, and Adwani (1981), psychosocial factors play significant cause to pica. This stress is usually present in the form of a partial or complete non-availability of maternal care, parental neglect towards the child, mother's/ father's too little involvement with the child, frequent child beating, maternal deprivation (due to death / illness / recent pregnancy and child birth / processing mother), parental separation, a large family or joint family.

According to National Eating Disorder (2009) Eating disorders are serious conditions which potentially threaten life that affect an individual's emotional and physical health. It's not just a 'fad' or 'phase'. People do not just 'catch' an eating disorder for some time. They are real, complex and devastating, and can have severe health, productivity and relationship consequences. Eating disturbances may affect every organ system in the body, for example:

Pica anemia an iron deficiency that can cause Pica cravings

Intestinal blockages or constipation due to objects hard to digest, such as pebbles or metal.

Tears in the lining of the esophagus or intestines caused by hard or sharp objects, including paper clips or metal scraps.

Lead poisoning, which can lead to kidney damage and cognitive delays, as a result of eating paint or other lead-containing substances.

Bacteria and parasites from ingested dirt, which can cause infections, subsequently damaging the kidneys or liver.

Gastric pain and bleeding as a result of sand and soil in the digestive system.

Abnormal wear on teeth from chewing ice.

Nutritional deficiencies that may occur when Pica interferes with eating healthy food.

Pica is the craving for and consumption of non-food items, including the ingestion of earth (*geophagy*), raw starch (*amylophagy*), and ice (*pagophagy*). Pica has long been associated with pregnant women, and children and it also associated with micronutrient deficiencies, and psychosocial factors but the strength of this relationship is unclear (Zaman & Jami, 2016). We aimed to evaluate the relationship between Pica and general health in female university students. And study the relationship of Pica with anxiety, stress, and general health.

## **Pica**

The term Pica is taken from the word “magpie” which is originated from Latin. Magpie is a bird which is known for its unusual eating behaviors and patterns. This bird is fine with eating anything and often shows no preference and indiscrimination among nutritive foods and nonfoods (Duncan & Croft, 2018). The history of Pica goes back to 13<sup>th</sup> century where this disorder got referred by Greeks and Romans. Literature shows that during 16<sup>th</sup> to 20<sup>th</sup> centuries, Pica was taken as a chronic symptom leading to other disorders instead of being taken as a disorder itself (Rose, Porcerelli, & Neale, 2000). Pica according to Merriam Medical Dictionary is now defined as the eating disorder where patients found themselves habitual of consuming nonnutritive and nonfoods like chalk, paint, lead, ashes, stones, clay and glass to fulfill their persistent craving Lopez and Ortega (2004) under her research, “Pica during pregnancy. A frequently underestimated problem” also defined Pica as the consumption of nonfood substances for satisfying the appetite. The American Psychiatric Association’s Diagnostic and statistical manual of mental Disorders, Fifth Edition (DSM-5) defines pica as eating nonnutritive, nonfood substances such as raw rice, lead, pencil, clay, sand etc over a period of at least one month.

Research shows that Pica affected individuals are not prone and limited to only nonfood items consumption but they practice the substances’ subtypes too. According to “The New York Times Health Guide”, Pica affected people and groups ingest substances and their sub types which include soft stones, wool, hair, starch, animal feces, urine and ice etc. (George, Mahesh Wari, Ram, Raman, & Sathyanarayana,



2017). Pica refers to non-food foods such as paint chips or sand that people crave or eat. Pica is classified as a food disorder in most medical guides. During pregnancy, some women may develop Pica. People who eat nonnutritive food items want or consume a wide range of non-food products (Farhangi, Dehghan, & Jahangiry, 2018). Many are looking for a particular type of item. The ice chips, gravel, mud, fur, burnt and match, chalk and soap and coins are growing cravings. There is currently no way to classify this behavior, but health professionals need to try to determine the likely cause of a variety of different conditions, including mental health conditions. Among people with mental health conditions Pica sometimes grows, but not everybody with Pica has a mental illness (Horner et al., 1991).

In children and pregnant women, pica is also more common. Though, as many people might not mention it, it is difficult to estimate how many people are Pica (Moosavinejad, 2008). The actions of parents and relatives may also be concealed by children with Pica. Experts think that some groups, including autists, those with other conditions in development, pregnant women, and people from countries where dirt food is common, are at greater risk of developing pica. Pica has 18.5% of children, and 10% of children above the age of twelve. For up to 50% of children 18–36 months of age, Pica is present. 10% of people with mental disabilities can see this (Horner et al., 1991).

It is a common feature, particularly in many cultures, such as in sub-Saharan Africa and in African Americans and in western societies, in foreign-born women. The most commonly mentioned pregnancy studies have centered on the less preferred populations and include clay, starch, soap, and chalk (Horner et al., 1991). The New York Times Health Guide (2017) group Pica into subtypes based on the substances ingested. Amylophagic, unnecessary consumption of starch; corroprophagia, animal fecal consumption; geophagia, consumption of dust and crab; mycophagy, mucus; pagophagia, ice consumption; urophagia; urine consumption; trichophagy; hair or wool consumption and lithophagia; soft stone consumption.

Pica was the most common form of Pica (76%), and the prevalence of Pica amongst the studied population was 8.33%. 64% of women reported actively practicing Pica on a daily basis. The relationship between Pica and the variables analyzed was evaluated. The average age of pregnant women was  $24.7 \pm 5.6$ , and their years were

between 14 and 42. In the study, Pica was 15.5 percent among pregnant women. The majority of pregnant women used ice, dirt or both (Hackworth & Williams, 2003).

Mothers were classified according to their level of education. 26.8% of pregnant women had an analphabet and 7.9% had high school education. The lowest prevalence of Pica was for higher education participants (9.5%). The level of literacy was not correlated with pica significantly. Of the pregnant women in this study 55 percent had a monthly income of less than 1 million, and 11.1% had a monthly income of over 1.5million. The family income with pica was not substantially related. Of the total 38.2% of women had no children and 21.6% had one child. Mothers with one kid had the lowest Pica behavior (10, 7 percent), and mothers with two kids (24, 4 percent). Their primary pregnancy was 36.8% for the pregnant women and 8.9% had over 6 pregnancies. The lower Pica was associated with two (10.4%) and the highest one with three (21.3%) pregnancies. No important correlation was found between ranks of pregnancy and pica. Pica's highest prevalence of gestational age was in pregnant women who were 26.4% of their pregnancy (Hackworth & Williams, 2003).

Pica sometimes starts with its initial pregnancy in late or early adolescence in young pregnant women. Although the Pica usually ends with birth, it can last for years intermittently (Morales & Hayes-Bautista, 2000). In the last studies, pregnant women sought various non-food substances, like dirt, clay, crayfish, ice and frost with greater intakes of ice and dirt (Bautista, & O'Connell, 2000). Pica may be related to complications such as preeclampsia's, prematurity, plum intoxication, anemia of the iron deficiency, constipation, ulceration, perforations, and intestinal obstruction according to nature, amount of substances and the duration of the ingested substances (Mortazavi & Mohammadi, 2010).

A conducted research and study showed that about 262 females who are not pregnant are found anemic and out of them 45% females are affected with Pica (Blinder & Salama, 2008). Most of the females stated that Pica is practiced by them due to their cravings and they themselves are not aware of the fact of why they are doing it. Also, the percentage of female students eating ice due to their Pica disorder is reported to 87.3%. This percentage is really tragic and needs to be considered as soon as possible (Barton et al., 2010). The bidirectional effects of Pica that are found very common young university females (Sharma, Aly & Kavuru 2011).

Consumption of uncooked rice as a cause of Pica is known as ryzophagia. (Barton et al.,2010). Under his research discussed the case of two nonpregnant university female students affected with pica. The two girls discussed had ryzophagia as they were habitual of consuming raw basmati rice. One girl was reported to be from Pakistan and the other one from India. Both girls were found with oral tooth damage and also they were carrying iron deficiency with microcytic anemia. Pica is associated with iron deficiency or depletion nonpregnant adult outpatients. The results he achieved states that he took results of 230 women for analyzing pica. Out of these 230 women, 184 were white and 46 were black. The age bracket of these women was 19 – 91 years which means that university female students are assumed to be among them (Barton et al., 2010).

George et al. (2017) Pica can be taken as a form of comfort and relief for people suffering from psychosocial issues. Pica can never be always pathological as it can be considered as “culturally approved practice”. In his research, he discussed a case of a female who has completed her university degree and was suffering from Xylophagia. Xylophagia is a rare kind of Pica disorder and there is very less literature on it too. This disorder is about the consumption of cardboard paper, pencils, paper sheets and tree barks. The women in this case is discussed belonged to a family having no past history of any sort of delay in neurodevelopment or any other psychiatric illness. She came up herself with the complaint that she was consuming cardboard paper from the last 2 months when she was all alone. She stated that she would repeatedly smell anything made up of cardboard and started carrying an intense and obsessive kind of interest in them. This habit of her got aggravated and she started eating 2 to 3 A4 size sheets. She was on different medications and after some time she got better where she herself mentioned that now she is not having any sort of urge to eat cardboard papers. From this case, it was concluded that Pica is not always pathological and is culturally approved practice. Normally patients with developmental disabilities were found with this eating disorder of Pica (George et al., 2017).

### **Etiological Perspectives**

**Nutritional theories.** Many commonly cited nutritional hypotheses attributing Pica to particular mineral deficiencies such as iron and zinc. Some studies identify patients with low levels of iron and zinc whose pica activity decreases with replacement

of iron and zinc, although the empirical evidence of zinc is less compelling than that of iron. Pica may be the natural response of the body to nutritional loss or deficiency of the body in certain minerals and vitamins. By causing strange dietary cravings, the body tries to obtain these minerals. Not all people with pica, however, have a nutritional deficiency. Not all people with Pica, however, have a nutritional deficiency. It is believed that red clay, earth soil, and stone are used due to their high iron content, but clay has been shown to be iron cheater and may exacerbate the problem (Altman & Shankman, 2009).

Crosby indicated that Pica is an iron deficiency symptom. He estimated that of one kind or another, more than 50 percent of iron deficiency patients practiced Pica. Clinical studies, however, have not been able to determine whether Pica is the cause or the product of particular deficiencies (John and Duquetts). Ingested soil or clay can chelate iron or displace nutrients that lead to deficiency development (Mukhobo). Reports showing a rapid resolution of eating after iron therapy support the theory of Korman, However, the exact relationship between iron deficiency and pica remains unclear Mokhobo, Johns, and Duquette, (as cited in Altman & Shankman, 2009).

**Sensory and physiologic theories.** Many Pica patients say they enjoy the taste, texture and scent of the product they consume. Some use these things to relieve vomiting when trying to lose weight and feel a sense of fullness. People prefer non-food items that move through the body without being consumed, rather than eating food items that are absorbed into the system as calories. They will fill in this way, but they don't gain weight. Continued training may turn into Pica eating disorder, although this may not begin as a compulsion. For women who practice pica, some items have a strong sensory attraction. Edwards identified women who liked the odor, taste, or texture of clay or cornstarch. There was a connection between liking cornstarch's taste and loving its texture in the mouth. Cooksey describes an olfactory hunger syndrome that intensifies during pregnancy Knox, reported that women in Belfast experiencing increased olfactory sensitivity during pregnancy had significantly more anxieties than women who had no odor-sensitive changes. In some women during childbirth, researchers in several countries reported increased taste and odor resistance (Bhatia as cited in Chalker, 2017).

**Neuropsychiatric theory.** It is supported that certain brain lesions have been associated with irregular feeding habits in laboratory animals, and it is believed that Pica may be associated with certain patterns of human brain disease Bateson and Leroy. Pica eating disorder is often seen in those with poor neurological capacity, such as pervasive developmental disorder, autism, mental retardation, and other brain and brain abnormalities. The hypothesis suggests that people with developmental disabilities are unable to tell the difference between food items and will eat nonfood items if they are hungry and there is no food available. William and Wilkins reported in a report that Pica eating disorder existed in up to 25% of mentally retarded patients institutionalized and 60% of those with autism. Similarly, Beecroft, Bach, Tunstall, and Howard discussed the case of a woman who was suffering from chronic schizophrenia. This woman reportedly consumed large number of coins that she needed surgery (as cited in Laje et al., 2010)

**Cultural or psychosocial theory.** These theories surrounding pica have identified a relationship with family stress and social attention relationship (Edward as cited in Hermeking, 2005) found pagophagia to be associated with a smaller network of social support, hypothesizing activity as a form of stress relief. Furthermore, in that report, most pregnant women said consuming freezer frost or ice helped during stressful times that is why stress is taken as one of the related variable with pica and explore its relationship in Pakistani population. For religious reasons, some women in Mexico practiced pica. In order to obtain blessings, they ate the Virgin of Guadalupe made of sacred clay. These cultural norms encourage Pica and can become compulsive. These activities can be derived from health benefits such as clay's ability to absorb plant toxins and protect against harmful alkaloids and tannic acids. Many women claim during pregnancy that eating clay will help the baby by drying out the intestinal tract to make it safe (Ellen as cited in Hermeking, 2005).

The high rates of eating nonnutritive food item in pregnant women with anxious and depressive symptomatology are higher than those found in pregnant women without clinical complications. One suspicion is that Pica diagnosed pregnant women are more concerned, particularly with weight issues such as body image and self-esteem, becoming more vulnerable to psychiatric disorders (Dos Santos et al., 2017).

## **Pica and Anxiety**

There are number of external factors like depression, stressful events, and anxiety, etc. that are found to be associated with pica. Research show that child abuses, family problems, lack of proper attention and communication gaps make people affected by Pica (Kendall-Tackett, 2002). The American Psychological Association (APA, 2013) defines anxiety as "an emotion characterized by feelings of tension, worried thoughts and physical changes like increased blood pressure". Pica is present with patients that are apparently healthy and carry normal intellect, but they are diagnosed with any sort of mental disorder or illness. When it comes to university female students and other group of females, researches show number of Pica affected cases with their relationship with intense anxiety and depression. (Lam, Solyom, & Tompkins, 1991) under his research of "An Unusual Case of Pica" described a woman who was in severe anxiety and being induced by pica, she was found habitual of eating stones and pebbles (Lam et al., 1991).

It has been reported that university female students and teenage girls having different levels of mental disabilities were found prone to pica. Reports also show that these young university females were suffering from iron deficiency. Most of these teenage girls were found consuming ice cubes and raw rice. It was also seen that most of these university female students had very heavy menstrual bleeding which made to get affected by nutritional deficiencies and as a result they got induced with Pica (Ali, 2001). This sensory factor is very common among young females who tend to lose weight in anxiety by feeling the sense of fullness. These Pica affected patients prefer to consume nonfood items instead of eating proper food. Nonfood items pass through the digestive system without being absorbed as calories. This continued habit makes prone to pica eating disorder (Stiegler, 2005). These sensory and physiological factors found in females have its relationship with their depression and anxiety of losing weight (Imel, Laska, Jakupcak, & Simpson, 2013).

Autism patients feel themselves in depression and often show signs of anxiety. Due to the presence of developmental disabilities, these patients are unable to differentiate between foods and that is the biggest reason of having Pica (Santos, Tavares, & Gonçalves, 2010). About 25% of children with Autism are reported to be affected with Pica (Fields, 2013). Research shows that patients suffering from obsessive compulsive

disorder are affected by pica. Obsessive compulsive disorder is a type of anxiety disorder in which offensive repetitive actions are performed by the person. In this disorder, patients have recurring thoughts and they feel that they don't have control over their obsessions and behaviors. This disorder interferes with their daily life aspects and as a result they get into severe depression and anxiety with panic attacks.

Eating disorders and obsessive compulsive disorder are related to each other. As a matter of fact, the occurrence of both disorders is at higher rate and also they show similar clinical patterns. Mitra, Bastos, Bates, Pereira, and Bult-Ito, (2016). Under his research discussed a case of a 15 year old unmarried young female from Uttar Pradesh, India, who was suffering from obsessive compulsive disorder. The case was assessed on the basis that eating disorder of pica and obsessive compulsive disorder are actually similar and are linked to each other. She was repeatedly practicing pica under her obsessive compulsive disorder to take an escape from her depression and anxiety.

There are number of psychosocial theories that commented over pica's association with social attention, anxiety and family stress issues among women of different ages with normal intellect (Singhi, Singhi, & Adwani, 1981). Some female university students are reported to eat clay as they think that clay has the ability to absorb toxins of plants. According to them, eating clay protects them from toxic acids and other dangerous alkaloids. Some women also believe that eating clay during pregnancy would keep their intestinal tract all cleared up and they are going to have a clean baby (Lallanilla, 2005). Some women have stated that they practice Pica because they feel nervous and then they deliberately consume nonfood items to overcome their cravings. Addiction to Pica in some women was found where they actually felt fall in their blood pressures because of any stressful event and they are reported to practice Pica in sheer anxieties (Simpson, 1994). Therefore, after assessing the above mentioned different psychological factors, it can be concluded here that anxiety is linked with pica.

Baheretibeb, Law, and Pain (2008) discussed pica's relationship with obsessive compulsive disorder by discussing the case of 17 year old women studying at high school and is almost near her university was presented to medical outpatient department. She was suffering from depression and distress. She was complaining severe cramps and pain in her abdomen. Also, she had constipation and severe abdominal distention. It was informed that the girl was in habit of consuming mud since

her childhood. The girl reported that she had very frequent thoughts of coming to her about home's wall and she was eating it all. She described her thoughts to very intrusive and much distracting. After consuming it she used to feel relaxed and in relief. She said that she found herself really embarrassed every time and really wanted to stop it but she was unaware of how to do it. Obsessive compulsive disorder was somehow not allowing her to get an escape from this situation. In accordance to Diagnostic and Statistical Manual of Mental Disorders (DSM- IV), the girl was diagnosed with obsessive compulsive disorder. Author stated in his research that obsessive compulsive disorder provokes a person to carry an urge for practicing consumption of nonfoods repeatedly having no self-control. This is what the girl's pattern was on repeating the consumption of mud from her home's wall with no resistance over herself (Baheretibeb et al., 2008). In DSM 5 (APA, 2013) Pica is diagnosed as repetitive eating disorder not as OCD.

### **Pica and Stress**

According to Lazarus and Folkman (1984), stress does not result from an event but rather from the interaction between a person and his or her environment, focusing on a set of cognitive, affective, and coping factors. While coping is "constantly changing cognitive and behavioral efforts to manage specific external and/or internal demands that are appraised as taxing or exceeding the resources of the person". Vulnerability to a stressful event as well as an individual's interpretation and reaction to it can influence effective or ineffective coping responses. In most cases, family issues and problems make the parents to neglect their children and as a result they fall for practicing Pica to get out from regular stressful events (Mitra, Lenglos, & Timofeeva, 2015).

In context of the Roy adaptation model about pregnant women (Roy, 1991) stress is identified as internal and external stimuli affecting women. Internal stimuli include the physiological and sociocultural changes associated with pregnancy; increased trace element needs, deficient nutrition stores, the practice of pica, ethnicity, and body image changes. External stimuli include the pregnant woman's interactions with others and her life in poverty. Coping is the mediator of psychological stress and adaptation. Physiologically the body responds to stress via the neuroendocrine systems. Physiological stressors may be manifested as physiological "needs" by the system or as



changes in biologic functioning. Adaptive behaviors would seek to mediate these physiological needs or neurohormonal responses. An individual's response to stress is a combined psychophysiological response which occurs secondary to the stressor (Hanson, Anderson, Shaffer, & Thorson, 1982). A plethora of investigations have documented that an individual's perception of (Selye, 1980) defines stress as "the state manifested by a specific syndrome which consists of all the nonspecifically induced changes within a biological system." The word stressor implies a demand or imbalance within a system requiring equilibrium. Stress reactions, posit, and occur in varying degrees depending upon the system and the conditioning factors which modify the system's response that health is contingent upon the system's ability to cope or adapt to stress. The body adapts both physiologically and psychologically to stress. Psychologically, the adaptive process to a specific stressor may be manifested as anxiety (Jasmin & Trygstad). Behaviors to relieve anxiety are determined in part by the individual's ethnic group, culture, belief systems, values, and past experiences. Lazarus, Cohen, Folkman, Kanner and Schaefer identifies a stressor is more important than the stressor itself (Berry, 2016).

Both conditional factors such as heredity and nutrition and situational mediators such as environmental factors external to the individual influence the individual's response to a stressor. Further, the daily stressors of life significantly affect an individual's functioning and health status (Lazarus, & Folkman, 1984). Stress has been associated with both physical and mental illness. Yet, stress is not a single variable that can be easily measured or correlated with illness. An individual interacts with a constantly changing environment that contains a myriad both internal and external stressors and stress affects cognitive, affective, and adaptation responses. The individual's responses are determined 'by the symbolic interpretation he attaches to the stimulus (Dubos). Responses express the "individuality of the organism and determine whether it will experience health or disease in a given situation" (Dubos). Lazarus and Folkman contend that an individuals' coping is mediated by interaction between the individual and the environment. Stress is an integral part of poverty. Poverty's stressors are exacerbated by the physiological and psychosocial changes of pregnancy. Additionally, stressful life events have been associated with poor pregnancy outcomes. Pregnancy complications include low birth weight (Newton & Hunt), and prematurity (as cited in Cartwright et al., 2003).

Modifying the effects of stress during pregnancy is the individual's social support system. Social support may buffer the deleterious effects of stress or in interaction with other sociocultural variables modify the untoward effects of stress in pregnancy. However, while the variable of stress during pregnancy will not measure in this investigation, the variable of social support and its relationships with other physiological and sociocultural variables will be assessed (Cartwright et al., 2003).

### **Pica and General Health**

Pica is known for causing severe health issues and risks like malnutrition, anemia, toxicity, dental health problems and many other nutritional deficiencies. Most of young female students studying in universities get affected by Pica (Shamsah & Ahmed, 2010). Somehow, it is a very dangerous medical eating disorder.

Its seriousness goes to an extent where it aggravates different types of pathological problems and disorders. The damage which Pica causes to the human body is totally dependent upon the nature of substance eaten. Pica can cause damage to gastrointestinal tract which as a result causes obstruction, ulceration, constipation, loss of appetite, and abdominal distention (APA, 2013). Pica is a prolonged problem for healthy bodies and it really needs to be treated as soon as possible. Given below is a detailed discussion of how Pica is related with general health (Doval, Bhatia, Goyal, & Saha, 2017).

**Malnutrition.** Ekvall and Ekvall (2017) did a research on girls studying at different levels in the university are found deficient to minerals, vitamins, and nutrients like iron, phosphorus, calcium, zinc, vitamin C, vitamin D, niacin and thiamin. These are directly related to Pica and girls lacking these nutrients often fall to it. Pica affected persons are often found habitual of consuming clay. It is mainly due to the deficiency of iron that induces the craving of clay. However, it is still unclear that whether iron's deficiency in female students provokes them to eat clay or if Pica causes it. It is to be noted that Pica has the ability to stop body from absorbing iron. There is a disease known as celiac which is found among females. In this disease, damage is caused to the small intestine and as a result it causes interference with food absorption. Celiac is mainly due to iron deficiency caused by Pica (İslek, Sayar, Yilmaz, Boneval, & Artan, 2014).

**Toxicity with lead intake.** Out of many toxic compilations of pica, the most toxic substance taken by people is lead (Ali, 2001). Pica causes lead poisoning and damages the developing central nervous system of children. When it comes to adult, lead intake brings up very prominent behavioral changes. Pica affected individuals with such substances containing lead like varnishes, paints, etc., damage would be in accordance to the toxic nature of lead. Lead intake can cause lead poisoning, many neurological problems, anxiety, lethargy, coma, constant headache, cranial nerve paralysis, and incoordination. Female patients with existing cognitive disorders are likely to get affected more and they are eventually at a higher risk of consuming urban soil, varnishes, lead paints, etc.

**Dental and oral health issues.** Pica causes number of dental and oral issues which include tooth enamel erosion, dental trauma, gum diseases and oral lacerations. Pica affected patients are habitual of chewing and consuming sharp objects like nails, stones, metals, and glass, etc. Such substances cause trauma to oral dental structures. Also, the dental and oral health issues can eventually lead to mouth and gum cancer (Ali, 2001).

**Infections, obstructions and parasitic infestation.** Ekvall & Ekvall, (2017) and Woodhall and Fiore (2014), in their research work studied that Pica affected patients are habitual of consuming soil or clay to overcome their iron deficiency. There are two types of diseases that are caused due to pica's parasitic infestation and infection due to soil consumption. These diseases include Toxocariasis and Ascariasis.

The parasitic infections caused by Pica are due to the presence of cats and dogs' roundworms. Very common in United States, these infections cause severe damage to eyes, lungs, livers, and central nervous system. Pica causes chronic damages to gastrointestinal and respiratory tracts. In worst cases, surgery is necessary for overcoming the damage caused. These severe gastrointestinal obstructions are caused due to ingestion of sharp objects and hair (Woodhall & Fiore, 2014). Reports show that the practice of eating clay is very common among African and American communities. The clay or soil eating as the part of their superstitious beliefs and other social customs. This norm is very common among women and young children (Ritter, Chaudhry, Aigner, Zitterl, Stompe, 2010). Research shows that Pica is really very injurious and harmful to human's body. These Pica affected diseases are a lot common in females.

However, proper treatment and medication can lead affected person to get rid of this eating disorder (Shamsah & Ahmed, 2010).

According to literature, most of the women found affected with Pica carry adverse gastrointestinal conditions and potassium abnormalities. These adverse conditions cause problems and issues like blockage, colon ischemia, blockage, irritation, perforation and severe abdominal pains (Spaniolas, Findeis-Hosey, Monson, & Salloum, 2010). Recent statistics shows a prevalence of around 45% of Iron deficiency anemia in Pakistan (Akhtar et al., 2013). Prevalence of anemia among women between 15 - 49 years in Pakistan was 52.20 as of 2016. Its highest value over the past 26 years was 54.10 in 1990, while its lowest value was 48.90 in 2002 (Tayyar et al., 2018). So relate with Pica is a compensation to nutritional deficiency it may occur.

Chakraborty, sanyal, & Bhattacharyya., 2011 stated that it is still very controversial that if Pica is an eating disorder or if it is obsessive compulsive disorder. He has discussed this controversy on the basis of a case of Pica of adult onset with psychosexual aspects. This 27 years old female revealed that she had some very unusual and strange abdominal sensation from last 3 months. She got married 3 months back and right after marriage, she revealed her expression of sexual aversion with dyspareunia. Within a month of her wedding, she found difficulties in living with her in-laws. She revealed that during the last three months she found her mood to be really depressed. This was the time when she started consuming her nails. She stated that while eating her nails, she was enjoying the spiky and gritty texture of nails in her throat. Her mother said that she was always in denial of going back to her husband's home. During the interview, the girl expressed her positive comments regarding same sex relationship. Later on it was revealed that the patient was actually having same sex relationship with a lady of her own age from past 3 years. She also stated that she was in habit of consuming glass pieces which she never told anyone. The author of this research concluded that the factors of Pica and obsessive compulsive disorder were ruled out and her physiological, cultural, and psychodynamic determinants made her to get prone to unusual pattern of habits she showed in all this time (Fergus, Limbers, Griggs, & Kelley, 2018)

## **Rationale of the Study**

Over 2 billion people worldwide suffer from a chronic deficiency of micronutrients, a condition known as hidden hunger (World Health Organization, 2018). This hidden hunger might be pica that is why in present research prevalence of pica was explored among female university students Kunteepuram et al. (2005) stated that eating disorder of pica and obsessive compulsive disorder are actually similar and are linked to each other. Practicing pica under obsessive compulsive disorder to take an escape from depression and anxiety among females. 24<sup>th</sup> Asia Pacific Nutrition Meet and Expo was conducted in Singapore (2020). According to the present era, nutrient dispersion may be simply due to legitimate admission or low entry of some supplements, or due to lack of body to apply and utilize nutrients, or over-consumption of different types of foods. Nutritional disorders can be especially serious in any individual's age, as they interfere with development and development, and can be prone to many health problems such as infections and chronic diseases. A metabolic problem occurs when the digestion process is accelerated and enables the body to expect to remain solid from excessive or excessively basic substances. Our bodies are extremely motivated to make mistakes in metabolic action. The body must have amino acids and a large amount of protein to play the majority of its metabolic potential.

Pica affected patients generally are reluctant in telling the truth about their disorder. This might be due to their societal pressure, depression or stress that they never utter about what they were going through. As a matter of fact, in order to find out the exact treatment and assessment, clinical doctors cannot make assumptions (Gibson et al., 2010). Pica is a very mysterious disorder. Assessment and treatment of Pica is not as easy as it might seem. There are number of researchers assumed problems after analyzing different Pica cases among women.

According to literature, the worst cases of Pica affected patients with developmental disabilities can ultimately lead to the death of the person. The research studies that show that with proper behavioral treatment, Pica behavior can be decreased and controlled leading the affected person to live a healthy life with normal intellect (Williams & McAdam, 2012). University students have jam packed routine so they didn't find time to eat in cafeteria to fulfill their hunger so they prefer to eat inedible food items that are easily assessable such as paper, lead pencil, paint chips etc.

Literature suggests that gender differences also exist as it's more prevalent among females as compared to male counterparts this difference might be due to underreporting of Pica behavior in males. As university students are busy and its effect their nutrients and diet that is why they take nonfood items to compensate nutritional deficiency, feeling of hunger pangs, and dieting.

Therefore, purpose of this research is to study prevalence of Pica among university female students and its relationship with anxiety, stress and general health. This topic is taken into consideration because there is very less work done on the presence of Pica among university females or young girls. Students at this stage of their life are often found all engaged in working hard for their future career and ambitions. In this race, they are mostly caught up in stressful events like dietary health, increased depression and anxiety. They keep on looking to get relief from such phases of their busiest lives. So far no research is found on Pica in Pakistan, except one in pregnant women (Zaman & Jami, 2016). Pica further leads to severe health outcomes. Cultural prevalence of Pica (eating uncooked rice, *gachhi*, ice, etc.) is observed across female population in Pakistan.

## **METHOD**

## Method

### Objectives

The aims of current research include:

1. To explore the prevalence of pica in female university students.
2. Study relationship between pica and general health in female university students.
3. Study relationship of pica with anxiety and perceived stress in female university students.
4. Compare the general health, anxiety and stress of female university students with and without pica.
5. Explore role of demographic variables (e.g., education, age, marital status, family income, height weight, parent's education, language, native city, province, residence, nature of parent's job) in pica, anxiety, stress, and general health in female university students.

### Hypotheses

Based on literature it is assumed that:

1. Those having pica have more anxiety as compare to those who are not having pica.
2. Those having pica have more health related issues than those not having pica.

### Conceptual and Operational Definitions

**Pica.** Pica is classified as eating nonfood substances for example *gaachi*, clay, cement, raw rice etc. at least once per month (APA, 2013). Pica scale will be used to measure pica, high score mean high level of pica.

**Anxiety.** It is defined as an emotional distress of anxiety is often accompanied by specific physical symptoms associated with the state of autonomic arousal, such as sweating, dizziness, and shortness of breath, or more generalized somatic complaints such as insomnia, restlessness, and muscle aches (APA,2013). DSM-5 Level 2–Anxiety-Adult Scale will be used to measure anxiety, high score means high level of anxiety.

**General health.** It can be defined as unexplained aches and pain in different body parts, having any physical ailment at a mild or may be to a more severe level (APA, 2013). Somatic symptoms Scale will be used to measure health/ somatic complaint, high score



means poor health.

**Perceived stress.** Perceived stress is the feelings or thoughts that an individual has about how much stress they are under at a given point or given time period (Cohens, 1983). Perceived stress scale will be used to measure perceived stress, high score means more perceived stress.

### **Research Design**

Current study was a survey based correlational study. Data was cross-sectional in nature.

### **Sample**

Sample was consisted of 253 female university students from five universities of Rawalpindi and Islamabad. Age range from 18 to 30 years ( $M = 23.02$ ,  $SD = 3.57$ ) and mostly unmarried girls. Sample included students from Social Science, Natural Science, and Animal Science. Convenience sampling technique was utilized for the selection of sample. The inclusion criterion of present research is only those girls who are not pregnant, as Pica in pregnant women is considered normal (Zaman & Jami, 2016).

Table 1 summarizes the distribution of sample of university girls on the basis of discipline, residence, marital status, parent's occupation, native city. Mostly participants are day scholars enrolled in social sciences, are unmarried; most of participants belong to Lahore. Mostly mothers of the participants were middle educated and were not working (house wives). Whereas, fathers of the participants were postgraduate and government employees.

Table 1

*Frequencies and Percentages Along Demographic Variables (N = 253)*

Variables	<i>f</i>	%	Variables	<i>F</i>	%
<b>Discipline</b>			<b>Mother's Education</b>		
Social Science	150	59.3	Middle	73	28.5
Animal Science	86	34.0	Matric	67	26.5
Natural Science	17	6.7	Intermediate	30	11.9
<b>Residence</b>			Graduate	62	24.5
Hostelite	56	22.0	Post Graduate	14	5.5
Day Scholar	198	78.0	PhD	8	3.2
<b>Marital Status</b>			<b>Mother's Occupation</b>		
Married	13	5.1	Government	24	9.5
Unmarried	204	80.3	Business	8	.4
Engaged	29	11.4	Private job	3	1.2
<b>Father's Education</b>			Professional	15	5.9
Middle	9	3.5	Not Working	210	23.0
Matric	18	7.1	<b>Province</b>		
Intermediate	44	17.3	Punjab	122	48.2
Graduate	59	23.3	Sindh	31	1.55
Post Graduate	92	36.2	KPK	29	11.4
PhD	32	12.6	Gilgit	33	13.0
<b>Father's Occupation</b>			Islamabad	35	13.8
Government	115	45.3			
Business	39	15.4			
Private job	46	18.1			
Professionals	39	15.4			
Armed forces	14	5.5			

## Instruments

Following tools were used to measure variables of the study:

**Demographic sheet.** A detailed demographic sheet was designed to ask about age (in years), current study year and semester, study discipline, family income (in PKR), residence, father's education, father's occupation, mother's education, mother's occupation, native city, and marital status (see Appendix A).

**Pica Scale.** It was developed by Stillmon (2008) and is translated in four languages. There are 19 items. All the items of the scale are measured on a 7-point Likert scale (1 = *never*, 2 = *1 to 2 times per year*, 3 = *1 to 2 times per month*, 4 = *1 to 2 times per week*, 5 = *3 to 4 times per week*, 6 = *5 to 6 times per week*, 7 = *everyday*). Item 18A is explaining when pica behavior started and item 19 is explaining what they eat. Three open ended questions were added in already developed scale to measure deficiencies (Vitamin A, Vitamin D, and Iron), anxiety, and somatic symptoms. No cutoff scores were mentioned in Pica Scale (see Appendix B)

**Somatic Symptoms Questionnaire.** The original scale was developed by Spitzer, Williams, and Kroenke (2002). It is known as Patient Health Questionnaire Physical Symptoms (PHQ-15). It consists of 15 items but in present research 13 items were used after deleting two items as they were not relevant to measures. All the items of this scale are measured on a 3-point Likert scale (0 = *not bothered at all*, 1 = *bothered a little*, 2 = *bothered a lot*). The overall score ranges from 0 to 26. Higher scores indicate more severity of the present somatic symptoms. All the raw scores were summed up to obtain a total raw score for the results (see Appendix C).

**Perceived Stress Scale.** Cohen (1988) developed the scale. The scale comprised of total ten number of items. For measuring the perception of stress, it is the most widely used psychological instrument. All the items of this scale were designed to measure how unpredictable, uncontrollable, and overloaded respondents find their lives to be. A number of direct queries about current levels of experienced stress are also a part of this scale. The questions are relatively free of content specific to any sub-population group and are general in nature. The questions are used to ask about one's feelings and thoughts during the last month by asking respondents how often they felt in a certain way (see Appendix D). Scores are obtained by reversing responses (e.g., 0

= 4, 1 = 3, 2 = 2, 3 = 1 & 4 = 0) to the four positively stated items (items 4, 5, 7, & 8) and then summing across all scale items.

**DSM-5 Level 2–Anxiety-Adult Scale.** This scale was developed by a Health Organization named as PROMIS Health Organization (PHO) and also PROMIS Cooperative Group (2008-2012). It is PROMIS anxiety Short Form with total number of items as 7. These scale items are used to assess the anxiety in individuals with age of 18 and older. All the items of scale are rated on a 5-point Likert scale (1 = *never*, 2 = *rarely*, 3 = *sometimes*, 4 = *often*, and 5 = *always*). The score range is from 7 to 35. Higher scores indicate the severity of anxiety in adults. All the obtained raw scores are summed up to get a total raw score (see Appendix E).

### **Procedure**

The data were collected from 5 universities. A brief description was given to the participants about the research purpose, voluntary nature of participation, and right to quit at any time. Their written consent for participating in this research was taken. They were provided with questionnaire booklet (consisting of informed consent form see (Appendix A), demographic information sheet, and four questionnaires). Total 300 questionnaires were distributed and 253 were received for research analyses. Complete assurance was given to the participants about the confidentiality and anonymity of their identity. They were thanked for their cooperation. All the research participants were thanked for their cooperation after getting the booklet back.

## **RESULTS**

## Results

The present study was conducted to study the prevalence of pica among university students and its relationship with anxiety, stress, and general health. Data were analyzed through SPSS-22. The internal consistency of the measure was determined through Cronbach alpha reliability. Pearson Product Moment Correlation was used to determine the relationship between the study variables. Independent sample *t*-test was used to explore difference along gender and family system. ANOVA was used to explore the differences on study variables along fathers' education, mothers' education, province, and study discipline.

### Reliability and Descriptive Statistics on Measures

Cronbach alpha reliability coefficients were computed for all scales used in the present study. Various statistical analysis were applied to check the general trend in data including mean, standard deviation, actual, and potential range of scores, skewness, and kurtosis.

Table 2

*Descriptive Statistics of the Measures (N = 253)*

Scales	k	A	M	SD	Range		Skewness	Kurtosis
					Actual	Potential		
Pica	18	.82	25.66	10.18	18-126	18-177	6.57	59.83
SSA	14	.82	10.84	5.30	0-42	0-26	.28	-.17
AA2S	7	.89	20.29	5.85	7-35	7-33	-.10	-.81
PSS	10	.74	21.77	5.71	0-40	0-37	-.24	1.12

*Note.* k = No. of items; SSA = Somatic Symptoms Adult; AA2S = Anxiety Adult 2 Scale; PS = Perceived Stress Scale; Pica= Pica Questionnaire.

Table 2 shows that the reliability coefficients, of all scales are satisfactory. As per Field (2013) acceptable range of skewness and kurtosis is between -2.96 to +2.96 all measures have written acceptable range except for Pica Questionnaire. The central

theorem tells that no matter what distribution things have, the sample distribution will be normal if the sample is large enough (250 and above). Table shows that skewness and kurtosis of pica is high because pica is psychopathology as per in DSM 5 (APA, 2013) so it is not normally distributed. Results indicate that in the study all the scales are showing the values of skewness and kurtosis in acceptable range hence, parametric tests are used for analysis. The mean scores of participants on Perceived Stress Scale and Anxiety Adult-2 Scale are normally distributed and clustered at the middle of the curve. Whereas, the mean scores of participants on Pica Questionnaires and Somatic Symptoms Adult are clustered at the right of the curve which indicates that participants reported pica and somatic symptoms. Prevalence of pica is determined by current and past behavior of participants' as well as the cut off scores which is 3 based upon average score on first 18 items of Pica Scale.

### Prevalence of Pica

Figure 1 shows different types of nonnutritive food items consumed by participants to identify which type of eating nonnutritive food items are more prevalent in female university students. Girls who are involved in pica behavior for one month to daily basis are taken to be suffering from pica that was 159 (62%).

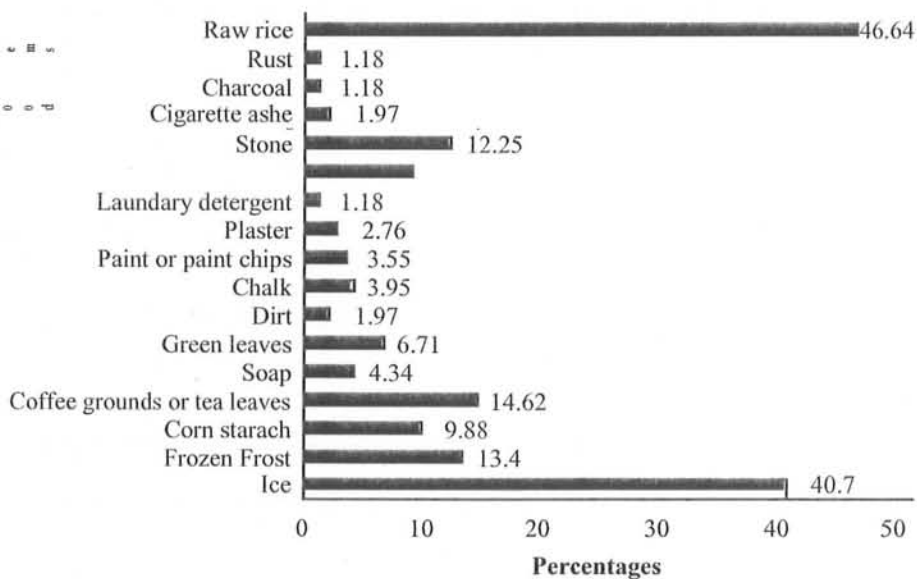


Figure 1. Prevalence of eating different types of nonnutritive food items ( $N = 253$ )

Figure 1 shows prevalence of different types of nonnutritive food items that girls eat such as ice, frozen frost, cornstarch, coffee grounds or tea leaves, soap, green leaves, dirt, chalk, paint or paint chips, plaster, laundry detergent, clay or cement, stone, cigarette ashes, charcoal, rust, raw rice. The highest percentage obtained on raw rice that is 46.64% and ice (40.7%) which indicates that consumption of raw rice and ice is more prevalent in girls whereas lowest percentage obtained on dirt that is 1.97% which indicate that consumption of dirt is less prevalent in girl (Figure 1).

**Attraction in nonnutritive food items.** Figure 2 shows responses of female university students' about which things attracted them to eat nonnutritive food items.

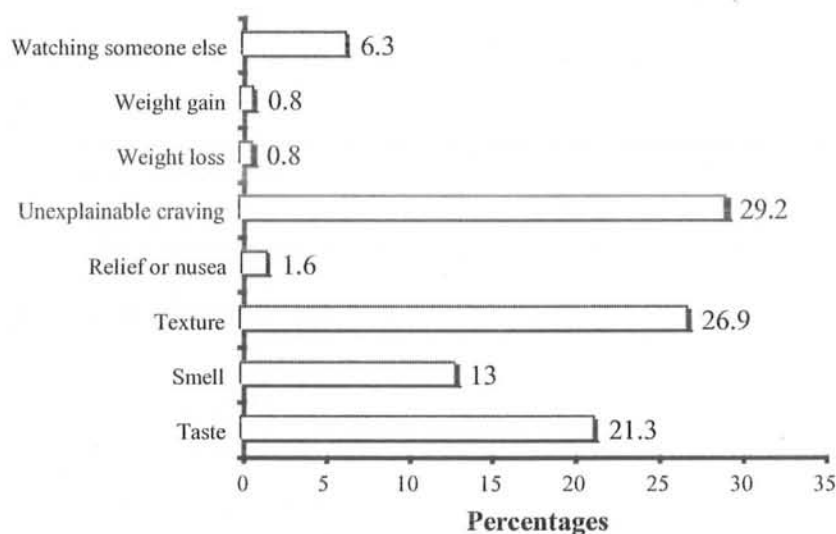


Figure 2. Any attraction in eating nonnutritive food items ( $N = 159$ ).

Figure 2 shows responses as taste, smell, texture, relief or nausea, unexplainable cravings, weight loss, weight gain, and following someone in their family and friends as motivation eating nonfood item The highest percentage obtained on unexplainable craving 29.2% which indicates that girls are not able to explain why they eat nonnutritive food items, however, have strong carving for nonfood items and lowest percentage is of weight loss or weight gain that is 0.8% which indicates that they have



concern about body weight which attracted them to eat nonnutritive food items (Figure 2).

**Group differences across having Pica or not having Pica.** Group differences were measured on study variables such as somatic symptoms, anxiety, and perceived stress. To compare female university students having pica ( $n = 159$ ) and not having pica ( $n = 94$ ), independent sample t test was performed. Purpose of this test was to explore the role of group differences on study variables (see Table 3).

Table 3

*Mean, SD, and t- values Across Participants Having or Not Having Pica on Study Variables (N = 253)*

Variables	Having pica (n = 159)		Not Having pica (n = 94)		t(251)	p	95% CI		Cohen's d
	M	SD	M	SD			LL	UL	
SS	11.79	5.45	9.24	4.65	3.82	.000	1.24	3.87	0.51
Anxiety	19.89	5.88	20.94	5.75	-1.38	.17	- 2.54	.44	-
PS	21.57	5.58	22.14	5.91	-.77	.44	- 2.03	.88	-

*Note.* CI = Confidence Interval; LL = Lower Limit; UL = Upper Limit; SS = Somatic symptoms; PS = Perceived stress.

The result in Table 3 shows significant difference on somatic symptoms across female university students having pica and not having pica. Hence, Hypothesis 2 is confirmed those having pica have health issues/complaints as compared to those not having Pica. According to results, female university students having pica report more somatic complaints and health issues as compared to those not having pica. There is nonsignificant difference on anxiety across female university students having pica and not having pica. Hence, Hypothesis 1 is rejected. Cohen's d indicates moderate effect size of group difference on somatic symptoms.

### Prevalence of Physical Health Issues

Figure 3 indicate physicals health issues as reported by participants having pica or not having pica they are suffering from.

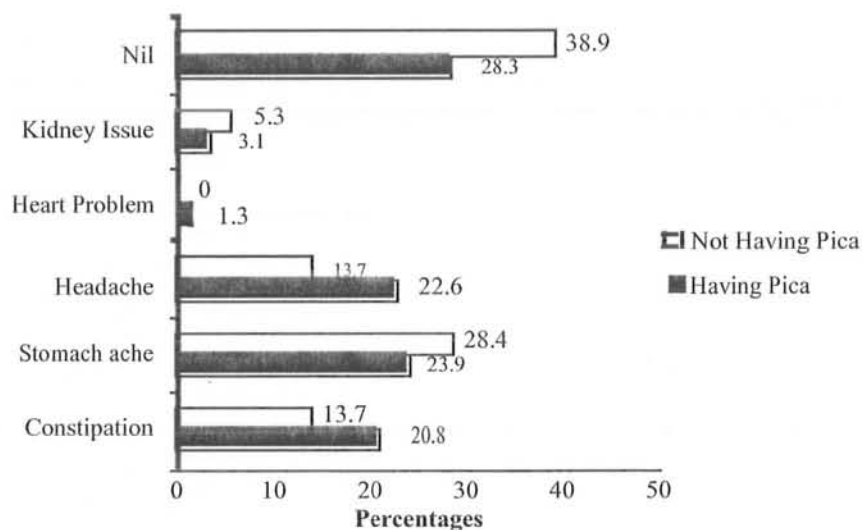


Figure 3. Prevalence of physical health issues ( $N = 253$ ).

Figure 3 shows physical health issues that is constipation, headache, stomachache, kidney problem, and heart problem among those having pica and not having pica on an open ended question in Pica scale. The highest percentage obtained on response No is 32% in those who are not involved in pica behavior. Participants' who are involved in pica behavior have more headache (22.6%), stomach ache (23.9%), and constipation (20.8%) as compared to those who are not suffering from Pica. The lowest percentage obtained on response heart problem (1.3%) which indicates that girls who are indulge in pica behavior have heart issues and none in non-Pica group have reported for having heart problem (Figure 3).

**Group Differences across physical health issues.** Group differences were measured on study variables such as somatic symptoms, anxiety, and perceived stress with physical health issues To compare female university students having physical health issues ( $n = 172$ ) and not having physical health issues ( $n = 81$ ), independent sample  $t$ -test was performed. Purpose of this test was to explore the role of group differences along physical health issues on study variables (see Table 4).

Table 4

*Mean, SD, and t- values Across Participants Having or Not Having Physical Health Issues on Study Variables (N = 253)*

Variables	Having Physical Health Issues (n = 172)		Not Having Physical Health Issues (n = 81)		t(251)	p	95% CI		Cohen's d
	M	SD	M	SD			LL	UL	
	Pica	27.4	11.8	24.2			17.7	1.70	
SS	12.3	5.05	7.83	4.50	6.74	.00	3.14	5.74	0.94
Anxiety	21.5	5.68	17.0	5.28	5.14	.00	2.37	5.33	0.82
PS	23.1	5.35	19.2	5.47	5.45	.00	2.52	5.38	0.72

*Note.* CI = Confidence Interval; LL = Lower Limit; UL = Upper Limit; SS = Somatic Symptoms; PS = Perceived stress.

Table 4 shows that female university students having physical health issues scored high on pica as compared to those students who do not have any physical health issue however, difference is nonsignificant. The students reportedly having physical issues are scored significantly higher on somatic symptoms and anxiety than those who do not have any physical health. Similarly, the students having physical issues are scored significantly higher on the perceived stress than those who do not have any physical health. Cohen's d indicates moderate effect size of group difference on somatic symptoms, anxiety, and perceived stress.

### **Prevalence of Mental Health Issues**

Figure 4 shows responses along mental health issues as reported by female university students. Different bars on the graph indicate responses on open ended question.

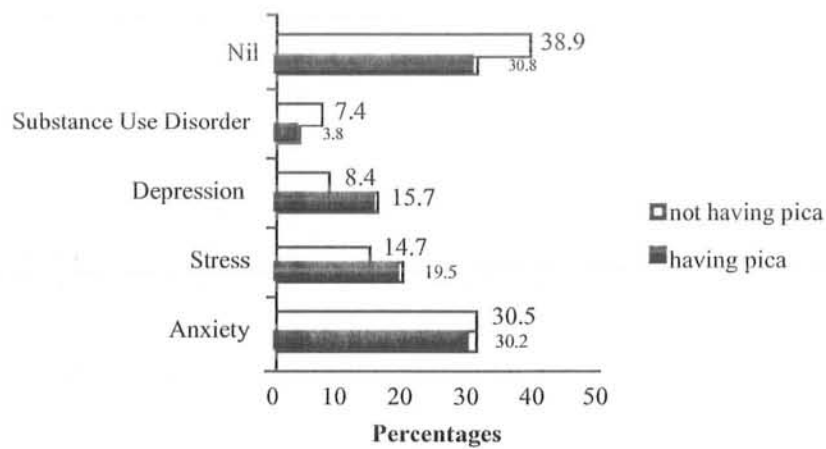


Figure 4. Prevalence of mental health issues ( $N = 253$ ).

Figure 4 shows mental health issues as reported by participants that is anxiety, stress, depression, substance use among those having pica and not having pica on an open ended question. The highest percentage obtained on response No is (38%) in those who are not involved in pica behavior. Participants who are involved in pica and are not involved in Pica behavior have almost an equal percentage of anxiety stomach ache (14.7%). Similarly, participants who have pica behavior have reported more stress (19.5%) as compared to those who have not pica. stomach ache (14.7%) (Figure 4).

**Group differences across mental health problem.** Group differences were measured on study variables such as somatic symptoms, anxiety, and perceived stress with mental health issues. To compare female university students having mental health issues ( $n = 168$ ) and not having mental health issues ( $n = 85$ ), independent sample t test was performed. Purpose of this test was to explore the role of group differences on study variables (see Table 5).

Table 5

*Mean, SD, and t-values Across Participants Having or Not Having Mental Health Issues on Study Variables (N = 253)*

Variables	Having Mental Health issues (n = 168)		Not Having Mental Health issues (n = 85)		t(251)	p	95% CI		Cohen's d
	M	SD	M	SD			LL	UL	
Pica	26.8	11.6	25.3	18.1	.806	.43	-2.18	5.20	-
SS	12.1	5.31	8.38	4.34	5.58	.00	2.41	5.03	0.77
Anxiety	21.9	5.49	17.3	5.04	6.97	.00	3.56	6.37	0.87
PS	23.3	5.29	18.9	5.32	6.23	.00	3.01	5.78	0.83

*Note.* CI = Confidence Interval; LL = Lower Limit; UL = Upper Limit; SS = Somatic symptoms; PS = Perceived stress.

Table 5 shows that female university students having mental health issues score significantly higher on the somatic symptoms than those who do not have any mental health issues. Similarly, the students having mental health issues are scored significantly higher on the anxiety and perceived stress than those who do not have any mental health issues. Cohen's d indicates moderate effect size of group difference on somatic symptoms, anxiety, and perceived stress

### **Prevalence of Nutritional Deficiencies**

Figure 5 shows prevalence of nutritional deficiencies among female university students as reported by them on the open ended question in pica scale.

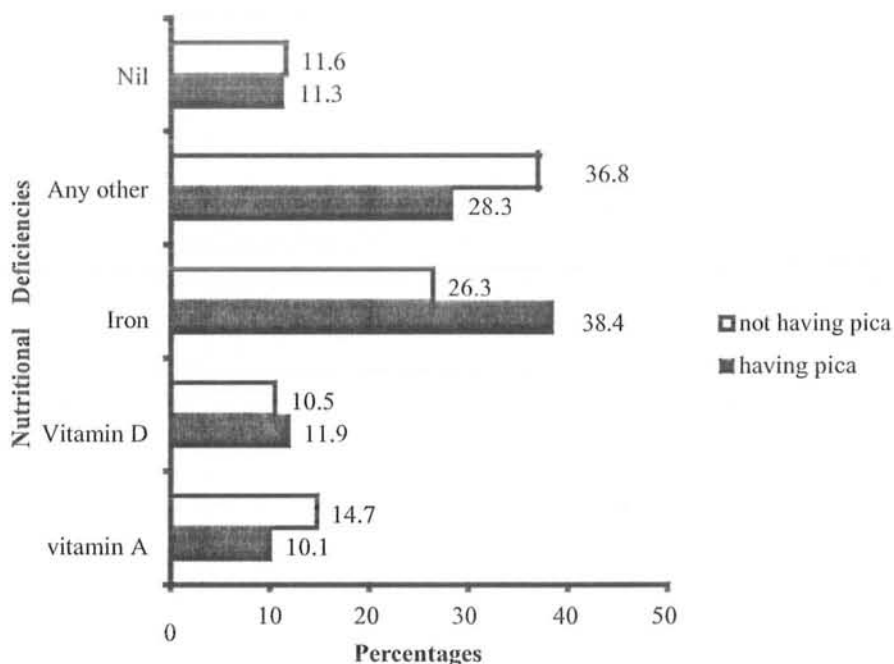


Figure 5. Prevalence of nutritional deficiencies ( $N = 253$ ).

Figure 5 shows nutritional deficiency that is vitamin A, vitamin D, and iron, any other deficiency among those having pica and not having pica on an open ended question. The highest percentage obtained on iron deficiency (38.4%) and vitamin D deficiency (11.5) in those who are involved in pica behavior. People who are not involved in Pica behavior have other deficiencies like calcium deficiency (36.8%) (Figure 5).

**Group differences across nutritional deficiencies.** Group differences were measured on study variables such as Pica, somatic symptoms, anxiety, and perceived stress along nutritional deficiency. To compare female university students having nutritional deficiency ( $n = 224$ ) and not having nutritional deficiency ( $n = 29$ ), independent sample  $t$ - test was performed (see Table 6).

Table 6

*Mean, SD, and t-values Across Participants Having or Not Having Nutritional Deficiency on Study Variables (N = 253)*

Variables	Having Nutritional Deficiency (n = 224)		Not Having Nutritional Deficiency (n = 29)		t(251)	p	95% CI		Cohen's d
	M	SD	M	SD			LL	UL	
Pica	25.9	10.8	29.2	28.9	1.70	.09	-	6.93	-
							.501		
SS	10.9	5.37	10.31	4.81	.59	.55	-	2.68	-
							1.44		
Anxiety	20.9	5.66	15.6	5.05	4.77	.00	2.37	5.34	0.98
PS	22.2	5.27	18.8	7.67	3.09	.00	2.52	5.38	0.52

*Note.* CI = Confidence Interval; LL = Lower Limit; UL = Upper Limit; SS = Somatic Symptoms; PS = Perceived stress.

Table 6 shows that female university students having nutritional deficiency score significantly high on anxiety and moderate score on perceived stress. Cohen's *d* indicates moderate effect size of group difference on anxiety, and perceived stress.

### Correlation between Variables

**Relationship between study variables.** To study the relationship among the study variables including pica, somatic symptoms, anxiety adult, and perceived stress scale, Pearson product Moment Correlation was computed.

Table 7

*Correlation Among Study Variables (N = 253)*

Variables	Pica	Somatic Symptoms	Anxiety	Perceived Stress
Pica	-	.27**	.003	.01
Somatic Symptoms		-	.47**	.45**
Anxiety			-	.52**
Perceived Stress				-

\* $p < .05$ . \*\* $p < .01$ .

Table 7 shows that Pica is significantly positively correlated with somatic symptom which indicates that with increase in pica, health issues/ complaints also increased. Relationship between anxiety and perceived stress is also significantly positively. Somatic symptoms have significant positive relationship with anxiety and perceived stress. Furthermore, Pica has non-significant relationship with anxiety and stress

### Group Differences Along Study Discipline

One Way ANOVA was conducted to compute the differences along study discipline that is social sciences, natural sciences, and animal sciences. Games-Howell post hoc analysis (used for unequal sample size) was executed.

Result in Table 8 from post hoc analysis shows significant differences on somatic symptoms that are significantly high in students of animal sciences as compared students of social sciences. However, natural sciences students have significantly more anxiety than students of social sciences. And perceived stress is significantly high in students of natural sciences as compared to students of social and animal sciences. Non-significant differences are shown in pica.



Table 8

*Mean Differences Along Study Discipline on Study Variables (N =253)*

Variables	Social Sciences (n = 150 )	Natural Sciences (n = 86)	Animal Sciences (n = 17)	F	p	i-j	D(i-j)	95% CI	
								LL	UL
	<i>M (SD)</i>	<i>M (SD)</i>	<i>M (SD)</i>						
Pica	26.69(16.25)	24.93(7.9)	30.23(18.00)	1.13	.32				
SS	11.0 (5.47)	10.00 (5.10)	13.52(3.77)	3.41	.03	3 > 1	3.53	.89	6.1
Anxiety	19.26 (5.68)	22.10 (5.96)	20.23 (4.67)	6.52	.00	2 > 1	2.79	.92	4.6
PS	21.19 (5.69)	23.34 (5.18)	19.00 (6.55)	6.18	.00	2 > 1	2.09	.38	3.81
						2 > 3	4.35	.09	8.6

*Note.* CI = Confidence Interval; LL = Lower Limit; UL = Upper Limit; SS = Somatic Symptoms; PS = Perceived Stress.

\* $p < .05$ . \*\* $p < .01$ .

**Group Differences along Participants' Mothers Education**

One Way ANOVA was conducted to compute the differences along mother's education that is middle, matric, intermediate, graduate, post graduate / PhD. Games-Howell post hoc analysis (used for unequal sample size) was executed.

Table 9

*Mean Differences Along Mothers Education on Study Variables (N = 253)*

Variables	Middle (n = 72)	Matric (n = 67)	Intermediate (n = 30)	Graduate (n = 62)	PG/PhD (n = 22)	F	i-j	D(i-j)	95% CI	
	<i>M (SD)</i>	<i>M (SD)</i>	<i>M (SD)</i>	<i>M (SD)</i>	<i>M (SD)</i>				<i>LL</i>	<i>UL</i>
Pica	27.59(20.85)	27.65(9.16)	23.33(2.98)	24.37(7.71)	27.77(20.45)	.99				
SS	12.02 (5.77)	10.65(4.80)	9.36(3.92)	10.40(5.32)	11.00 (6.35)	1.62				
Anxiety	19.80 (5.89)	21.10(5.23)	16.73(4.28)	21.25 (6.39)	21.90 (5.89)	4.29**	1>3	3.07	.15	5.99
							2>3	4.37	1.51	7.20
							4>3	4.52	1.37	7.66
							5>3	5.17	.929	9.42
PS	21.44 (5.85)	21.58(5.01)	20.06(2.69)	22.29(5.18)	24.77(9.49)	2.46*	2>3	4.32	.85	7.79

*Note.* PG/PhD = Post Graduate; CI = Confidence Interval; LL = Lower Limit; UL = Upper Limit; SS = Somatic symptoms; PS = Perceived stress.

\* $p < .05$ . \*\* $p < .01$ .

Result in Table 9 shows that there is a significant difference along anxiety as anxiety is more prevalent among those participants' having mother's education is middle, matric, graduate, and post graduate/PhD as compared to intermediate level of education. In addition to this there is a significant difference between mother education and perceived stress. Mothers with matric education have more perceived stress as compared to mother with intermediate education. No significant differences are shown in pica and somatic symptoms along with participant' mothers education.

### Group Differences Along Participants' Province

One Way ANOVA was conducted to compute the differences along provinces as reported in demographic sheet to find the cultural variation in Pica behavior. Participants belonged to Punjab, Sindh, KPK, Gilgit Baltistan, and federal region. Games- Howell post hoc analysis (used for unequal sample size) was executed.

Table 10

*Mean Differences Along Province on Study Variables (N =253)*

Variables	Punjab (n = 122)	Sindh (n = 31)	KPK (n = 29)	Gilgit (n = 33)	Federal Region (n = 35)	F
	M (SD)	M (SD)	M (SD)	M (SD)	M (SD)	
Pica	25.88(15.45)	23.67(4.88)	27.27(18.4)	29.75 (9.35)	25.04 (14.39)	.85
SS	10.46 (5.21)	12.87(5.60)	9.86 (5.24)	11.09(3.23)	10.88 (6.78)	1.55
Anxiety	20.50 (5.93)	19.29(5.36)	19.93(6.63)	20.48 (5.48)	20.68 (5.67)	.44
PS	22.10 (5.25)	22.06(4.57)	22.25(6.17)	21.66 (5.27)	21.57(7.89)	.46

Note. CI = Confidence Interval; LL = Lower Limit; UL = Upper Limit; SS = Somatic Symptoms; PS = Perceived Stress.

\* $p < .05$ . \*\* $p < .01$ .

Result in Table 10 shows that students who belong to Gilgit Baltistan consume nonfood items as compared to other provinces. Somatic symptoms are more prevalent in Sindh comparing other provinces. Anxiety have almost equal prevalence in all provinces but KPK score high on perceived stress.

### Group Differences Along Father's Education

One Way ANOVA was conducted to compute the differences along father's education that is middle, matric, intermediate, graduate, post graduate, and PhD. Games- Howell post hoc analysis (used for unequal sample size) was executed.

Table 11

*Mean Differences Along Father's Education on Study Variables (N = 253)*

Var.	Middle/Matri c (n = 26)	Intermediate (n = 43)	Graduate (n = 60)	PG (n = 92)	PhD (n = 32)	F
	M (SD)	M (SD)	M (SD)	M (SD)	M (SD)	
Pica	26.23(7.41)	28.32 (24.1)	25.38(6.90)	24.94(10.64)	29.50(18.07)	.912
SS	11.11(4.45)	12.93 (5.92)	10.43(5.32)	9.86 (5.01)	11.53 (5.26)	2.75*
Anx	21.86(5.31)	19.16(5.95)	19.45(6.17)	21.00 (5.41)	20.34 (6.40)	1.53
PS	20.87(6.15)	21.69(6.42)	21.85(3.85)	21.68 (5.34)	23.09 (7.85)	.622

Note. CI = Confidence Interval; LL = Lower Limit; UL = Upper Limit; Var. = Variables; SS = Somatic Symptoms; Anx = Anxiety; PS = Perceived Stress.

\* $p < .05$ . \*\* $p < .01$ .

Result in Table 11 shows that there is a significant difference along somatic symptoms as somatic symptoms is more prevalent among those participants' having fathers education is intermediate ( $D = 3.06$ ,  $p > .05$ ) with 95% CI [.14, 5.98] as compared to post graduate level of education

## **DISCUSSION**

## Discussion

The present study aimed at exploring the occurrence of pica among university students and its relationship with anxiety, stress and general health. The pica phenomenon has not been properly explored in Pakistan except one research was done on the pica in pregnant women by Zaman & Jami, 2016. As there is a whole lot to explore in our society, there is a research gap in the studying of the pica behavior in the female university students as well. The present study was aimed to bridge that gap by studying pica in general female sample. In addition to that the role of demographic variables including age, education, height, weight, birth order, number of siblings, and family income were also explored in relation with the study variables.

Data were collected from a sample of 253 students from different universities of Rawalpindi and Islamabad. SPSS-22 was use for the data analyses. The reliabilities of all the scales fond to be satisfactory (Field, 2013). The value of skewness and kurtosis also revealed the normality of data of all the scale except pica (Field, 2013). Pica is psychopathology and is not normally distributed, hence skewness is observed.

From the sample of 253 university girls, 159 were found as having an indulging behavior of pica through cutoff scores which is 3 (Table No. 3) this showed that most of the girl were involved in pica behaviors, the reasons behind this might be iron deficiency, vitamin A, B, and C. Every second women in Pakistan is suffering from iron deficiency (Akhtar et al., 2013). University students have jam packed routine so they may not find time to eat in cafeteria to fulfill their hunger so they prefer to eat inedible food items that are easily assessable such as paper, lead pencil, paint chips (Ogallo, 2008). Literature also suggests that people diagnosed with pica eat different nonfood items for example lead, paper and raw rice etc. (Wu, Chen, Wu, & Chen, 2014). Results in the form of graphical representation (Figure 1) showed highest percentage of pica was obtained on raw rice and ice that is 46.64% and 40.6% respectively, which indicated that the consumption of raw rice and ice was more prevalent in girls than other nonnutritive food items (Figure 1). Munir and Qadir (2010) explained in their research that women in rural areas consume raw rice in a very large amount without knowing its health consequences.

Figure 2 shows the unexplainable craving for eating nonfood items. Some researchers have also found that female with pica consume non edible items along with rice in a large quantity (Barton, Barton, & Bertoli, 2016). He discussed that a 44-year-old woman, a native of Karachi, Pakistan, presented with fatigue, dizziness, cold intolerance, hair loss, and decreased growth and thinning of nails. On investigation, she reported having pica for uncooked basmati rice, drying cement, and dirt. She often developed abdominal pain after eating large amounts of uncooked basmati rice. Physical examination also revealed moderate pallor and chipped and abraded teeth due to eating nonfood substances. Ekvall and Ekvall (2017) did a research on girls studying at different levels in the university and found out that pica is not only the cause of physical ailments but also causes nutritional deficiencies. Their sample was found deficient in minerals, vitamins, and nutrients like iron, phosphorus, calcium, zinc, vitamin C, vitamin D, niacin, and thiamin. These are directly related to Pica and girls lacking these nutrients often fall to it. Pica affected persons are often found habitual of consuming clay. It was mainly due to the deficiency of iron that induces the craving of clay. Results of the present study also showed (Figure 5, Table 6) that highest percentage obtained was iron deficiency which means that people who are involved in Pica behavior have more iron deficiency than those who are not involved in Pica behavior. So researchers in past have not only highlighted the prevalence of pica, but also its impact on both physical and mental health.

Keeping in mind the literature on pica, it was hypothesized that those having pica have more health issues than those not having pica. Adding more to this, according to National Eating Disorder (2009), different intestinal blockages or constipation are results of objects that are difficult to digest, such as pebbles or metal. Consumption of materials such as hard or sharp objects, including paper clips or metal scraps as well as paint or other lead-containing substances can cause infections, subsequently, damaging the kidneys or liver; and sand or soil consumption can cause gastric pain along with bleeding.

Results also indicated (see Figure 3, Table 4) that people who indulge in pica behavior had more health issues than those who were not involved in Pica behavior. This Hypothesis was proved by *t*-test analysis (see Table 3). . In further analysis, it was found the significant positive relationship between pica and somatic issues in female



university students. So we can say that present research finding is proved by previous research given by Ekvall and Ekvall (2017).

Hypothesis 2 stated that those having pica have more health related issues than those not having pica. Correlation was computed to find the latter relationship (see Table 7). Results reveal that there is a significant positive relationship between pica and somatic symptoms as there was a strong additive relationship of geophagy and amylophagy with lower hemoglobin (Hb) concentration and iron deficiency anemia in previous relationship. Previous literature indicated Pica to be associated with level of hemoglobin (odds ratio [OR] = 0.76, 95% confidence interval [CI] = 0.72–0.81), nausea (OR = 1.45, 95% CI = 1.20 –1.73), and abdominal pain (OR = 1.22, 95% CI = 1.01– 1.48). These striking results indicate that the nature of the relationship between pica, gastrointestinal distress, and iron deficiency anemia merits further investigation. (Young et al., 2010).

In the light of previous researches it was proposed in Hypothesis 1 that people having pica have more anxiety than those without pica. This Hypothesis was rejected in the present study. The Correlation was computed to find the relationship between pica and anxiety (see Table 7). Results reveal that there is a positive, but nonsignificant relationship between pica and anxiety. The results of the *t*-test analysis did not provide support to this Hypothesis as well. One possible explanation for this nonsignificant relationship would be that, the sample was not clinical but it was a community sample from normal population. Otherwise participants have reported that mostly they are eating nonfood because of unexplainable craving or it could be any other reason or other stressors like exams, problems in family, relationships or emotional problems because anxiety is not caused by only a single factor (Asif et al., 2013). Previous researches on pica was done on the different context and in pregnant females. Opposite results may showed the contextual and sample difference. Other reason might be the biased responses of the participant. They non clinical sample might be their resistance in sharing their issues.

Table 8 indicates significant difference on somatic symptoms that are higher in students of animal sciences as compared to social sciences. (González-Robles et al.,2018) indicated elevated scores of anxiety in animal sciences students. Students in the middle of their education careers had seen with the highest anxiety along with

depression. Not only mental health problems but also many other issues like perceived physical health, unclear expectations, difficulty fitting in, heavy workload have also been seen in the students of animal sciences (González-Robles et al., 2018).

However, natural sciences students have more anxiety than students of social sciences. And perceived stress in students of natural sciences as compared to students of social sciences because students of natural sciences have very hectic routine for example in labs they spend many hours doing experiments with chemicals so maybe this was reason they have more anxiety and stress as compared to students of social sciences (Barsky, Peekna & Borus, 2001).

Table 9 shows significant differences on anxiety in participants whose mothers having comparatively less educational degrees. Participants whose mothers having matric level education and post graduate and PhD education level were found higher in anxiety as compared participants whose mothers having intermediate education level. However nonsignificant differences are shown in somatic symptoms and perceived stress. Participants' mother's whose education is just middle and matric are anxious because they want to educate their children and struggle a lot for it so they have to achieve their goal which cause anxiety in them (Bhatia, 2017). On the other side mothers who have high level of education were more focused and expect more from their children that is why they were anxious. Some studies have found a strong association between maternal education and higher socioeconomic status. Mothers are less educated have their children more anxious (Tette et al., 2016).

For father's education significant differences on somatic symptoms has shown in participants whose father's had middle/matric, intermediate education level as compared to the participants whose father's had graduate, postgraduate, and PhD education level. It can be seen in Table 11 that participants whose father education is intermediate have more somatic symptoms than those who have high level of education. Education is strongly linked to health and to determinants of health. Those with more years of schooling tend to have better health and well-being and healthier behaviors (Birks et al., 2019).

Education is an important mechanism for enhancing the health and well-being of individuals because it reduces the need for health care, the associated costs of dependence, lost earnings and human suffering. It also helps to promote and sustain

healthy lifestyles and positive choices, supporting and nurturing human development, human relationships and personal, family and community well-being (Feinstein et al., 2006).

With many other study variables, present study also highlighted the concept of cultural pica. Culture is the characteristics and knowledge of a particular group of people, encompassing language, religion, cuisine, social habits, music and arts (D'Amen, Rahbek, Zimmermann, & Guisan, 2017). In present research findings showed nonsignificant difference between study variables and provinces that might be because the data was collected only from urban areas. However, cultural pica is reflected in the histories of many countries and remains a common practice in communities all over the world. It is explained as cultural pica because sometimes pica is embedded in fertility rituals, as with East African women, who eat soil before, during, and after pregnancy because they believe in the soil's magical potential to ensure future offspring Stiegler, (2005). Furthermore, the examination of culture based pica behavior needs to be explored briefly in Pakistani culture as the later researches are based on the western cultures only.

### **Conclusion**

The present study showed very high prevalence Pica that is they have been eating nonfood items for past one month. Hence, show that pica is highly prevalent in female population of Pakistan that needs attention and further detailed assessment. Raw rice and ice were most popular nonfood item to be consumed by participants. It was hypothesized that females having pica are more anxious and have more health related issues than that of those who were not involved in the pica behavior. The results revealed positive significant relationship between pica and somatic symptoms. However, nonsignificant relationship of anxiety and perceived stress was also found having pica.

### **Implications for Present Research**

The importance of the study is enlisted below:

1. This study is beneficial to know about prevalence of pica in female university students and plan awareness program to reduce physical health issues students are suffering from because of Pica.

2. The study is useful in implementing the findings of the present study in not just for university girls, but for the dietary practitioners help in hospitals and clinics.
3. The study is beneficial for understanding the variation of nonnutritive food items mostly girls are eating and how it is effecting their mental and physical health.
4. It also contributed to the need of promoting awareness related to health issues.

### **Limitations and Suggestions**

It is not humanly possible to conduct research without flaws and loops. The gaps of a study maintain the need for exploring phenomenon further by regarding the limitations of the current researches. Some suggestions and limitations are given which can be helpful for further research.

1. This research is inclined to be carried out in a very short period of time that limits on further aspects such as limited literature review so in future literature review can be intensified to strengthen the quality of research.
2. The sample was collected through convenient sampling and is also not large enough to be generalized so in future this research can be done with larger sample to eliminate the generalizability issue.
3. In the present study, cross sectional analysis was done. A longitudinal research can be done in future to establish a link between anxiety and Pica.
4. To refine the research, in future male sample can be taken as well to provide a comparative analysis of pica in female and males.

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## **APPENDICES**



**Appendix A****Informed Consent**

I am Sana Saeed MSc Student from National Institute of Psychology, Quaid-i-Azam University, and Islamabad. For the partial fulfilment of Master's degree, I am going to study prevalence of certain eating behaviour that is sometimes people eat certain things which are not part of our normal food and these are taken as non-food items e.g , uncooked rice, ice, soap, etc. This behaviour commonly exists in girls. Aim in current study is to explore women prevalence of eating non-food item and how it creates impact on health. For this purpose, I require your 10-15 minutes for volunteer participation, by filling out attached questionnaires in the light of your own personal experiences and attitude.

Your genuine and honest responding will help to get authentic results. Findings may help health practitioners to impart awareness among masses about prevalence of eating non-food items and its impact on health. For this purpose a booklet of questionnaires is given to you, if you feel uncomfortable in filling questionnaires, feel free to withdraw. However, I request that once you volunteer to fill the questionnaire, try not to leave any item unanswered. Your given data will be kept confidential and will be used for research purpose only. To maintain anonymity, your name is asked nowhere and only general findings across group of participants will be studied and reported.

If you want to participate in my research, then sign below. I shall be thankful to you for your active and honest participation.

Sana Saeed

National Institute of Psychology,  
Quaid-i-Azam University, Islamabad.

Signatures \_\_\_\_\_

### Demographic Sheet

1. Age (in years) \_\_\_\_\_
2. Discipline: Social Science \_\_\_\_\_ Natural Science \_\_\_\_\_ Animal Science \_\_\_\_\_
3. Education (in years) \_\_\_\_\_
4. Residence: Hostelite \_\_\_\_\_ Day scholar \_\_\_\_\_
5. Weight \_\_\_\_\_ (kg's)
6. Height \_\_\_\_\_ (inches)
7. Religion \_\_\_\_\_
8. Marital Status: Married \_\_\_\_\_, Unmarried \_\_\_\_\_, Engaged \_\_\_\_\_,  
Widow/Divorced \_\_\_\_\_, Simple \_\_\_\_\_
9. Birth order (your no. in siblings) \_\_\_\_\_
10. No. of siblings \_\_\_\_\_
11. Are your parents alive? Father Yes/No      Mother Yes/No
12. Father's education (in years) \_\_\_\_\_ 13. Occupation \_\_\_\_\_
14. Mother's education (in years) \_\_\_\_\_ 15. Occupation \_\_\_\_\_
16. Monthly income of family \_\_\_\_\_ (Rs.)
17. Language you speak at home: Urdu \_\_\_\_\_ Balochi \_\_\_\_\_ Sindhi \_\_\_\_\_  
Hindhko \_\_\_\_\_ Punjabi \_\_\_\_\_ Kashmiri \_\_\_\_\_
18. Native city \_\_\_\_\_ Province \_\_\_\_\_
19. How much you are attached
20. to your mother? not at all true \_\_\_\_\_,  
moderately true or not sure \_\_\_\_\_, definitely true \_\_\_\_\_
21. How much you are attached to your father? not at all true \_\_\_\_\_,  
moderately true or not sure \_\_\_\_\_, definitely true \_\_\_\_\_

## Appendix B

## Pica Questionnaire

Have you ever eaten any of the following? (Please indicate all that apply to you)

Sr. No.	Substance	Never	1-2 times per year	1-2 times per month	1-2 times per week	3-4 times per week	5-6 times per week	Every Day
1.	Ice.							
2.	Freezer frost.							
3.	Cornstarch, Flour or Baking Soda.							
4.	Coffee Grounds/used tea or tea leaves.							
5.	Soap.							
6.	Dirt.							
7.	Grass/Leaves.							
8.	Chalk.							
9.	Paint or Paint Chips.							
10.	Plaster.							
11.	Laundry detergent or laundry powder.							
12.	Clay/cement.							
13.	Cigarette ashes or burnt matches.							
14.	Charcoal.							
15.	Stone.							
16.	Rust (red orange coating on iron).							
17.	Raw Rice.							
18.	Any other/ specify							

18. If you have eaten any of the above substances, how long have you been doing so? (tick any)

1. Since childhood	10. 2-3 years	18. 5 months
2. over 10 years	11. 1-2 years	19. 4 months
3. 9-10 years	12. 1 year	20. 3 months
4. 8-9 years	12. 11 months	21. 2 months
5. 7-8 years	13. 10 months	22. 1 month
6. 6-7 years	14. 9 months	23. 3 week
7. 5-6 years	15. 8 months	24. 2 week
8. 4-5 years	16. 7 months	25. 1 week
9. 3-4 years	17. 6 months	26. less than 1 week

19. Is there any specific situation/condition when do you eat any of the above mentioned things \_\_\_\_\_

20. If you have eaten any of the above substances, what attracted you to eat it? (tick any)

1. Taste
2. Smell
3. Texture
4. Relief of nausea
5. Unexplainable Craving
6. Weight Loss
7. Weight Gain
8. Pregnancy
9. Watching someone else was doing it mother, sister, friend (specify)

21. Physical health issues(constipation, stomach ache, headache, heart problem,kidney problem )

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22. Mental health issues ( anxiety, stress, depression, substance use disorder)

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23. Nutritional deficiency (vitamin A, vitamin D, iron deficiency etc.)

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## Appendix C

**Somatic Symptoms Adult**

The questions below ask about these feelings in more detail and especially how often you have been bothered.

<b>Sr. no.</b>	<b>Statements</b>	<b>Not bothered at all (0)</b>	<b>Bothered a little(1)</b>	<b>Bothered a lot (2)</b>
1.	Stomach pain.			
2.	Back pain.			
3.	Pain in your arms, legs, or joints (knees, hips, etc.) .			
4.	Menstrual cramps or other problems with your periods.			
5.	Headaches.			
6.	Chest pain.			
7.	Dizziness.			
8.	Fainting spells.			
9.	Feeling your heart pound or race.			
10.	Shortness of breath.			
11.	Constipation, loose bowels, or diarrhea.			
12.	Nausea, gas, or indigestion.			
13.	Feeling tired or having low energy.			
14.	Trouble sleeping.			

## Appendix D

## Perceived Stress Scale

The questions below ask about your feelings and thoughts.

Sr. No	Statement	Never	Almost Never	Some times	Fairly Often	Very Often
1.	In the last month, how often have you been upset because of something that happened unexpectedly?					
2.	In the last month, how often you have you felt that you were unable to control important things in your life?					
3.	In the last month, how often have you felt nervous and "stressed"?					
4.	In the last month, how often have you felt confident about your ability to handle your personal problems?					
5.	In the last month, how often have you felt that things were going your way?					
6.	In the last month, how often have you found that you could not cope with all the things that you had to?					
7.	In the last month, how often have you been able to control irritations in your life?					
8.	In the last month, how often have you felt that you were on top of things?					
9.	In the last month, how often have you been angered because of things that were outside of your control?					
10.	In the last month, how often have you felt difficulties were piling up so high that you could not overcome them?					

## Appendix E

**Anxiety Adult 2**

The questions below ask about these feelings in more detail and especially how often you have been bothered by a list of symptoms during the past 7 days. Please respond to each item by marking (✓ or ×) one box per row.

Sr. No.	Statement	Never (1)	Rarely (2)	Sometimes (3)	Often (4)	Always (5)
1.	I felt fearful.					
2.	I felt anxious.					
3.	I felt worried.					
4.	I found it hard to focus on anything other than my anxiety.					
5.	I felt nervous.					
6.	I felt uneasy.					
7.	I felt tense.					