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Assessing the Effect of Stress on the Consumption of Various Food Groups by Adolescent Girls at Banaras Hindu University

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ABSTRACT

The phenomenon of stress is a complex one, and each individual has their own level of stress tolerance. A series of coordinated responses are induced by the presence of stressors, which are often referred to as 'stress responses' which are composed of a series of reactions in the body including alterations in behaviour, autonomic function, secretion of multiple hormones and various physiological Changes in the body. A good way to cope with stress is to eat foods that contain nutrients that reduce and fight stress.The study was designed to find out the level of stress among adolescent girls and to examine the relationship between the level of stress and the food consumption pattern of female students (17-19 years).A total of 317 adolescent girls (17-19 years) were selected from Banaras Hindu University (Women's College, Faculty of Arts, Faculty of Social Science and Faculty of Science), Varanasi. A questionnaire was developed to elicit information regarding the demographic profile, dietary pattern including food patterns, food habits, frequency of food intake and 24-hour dietary recall. The stress scale by M. Singh has been used to assess stress levels among adolescent girls.59.9 % of the respondents were found very low levels of stress and 0.9 % of the respondents were found severe levels of stress. The intake of other vegetables and the level of stress were found a significant association ($P<0.001$). The intake of roots & tubers and stress level were found a significant association ($P<0.05$).These results showed a clear difference in food selection patterns between stressed and non-stressed female students with stress being a more significant predictor of unhealthy food selection.

Keywords - Food consumption pattern, Roots & Tubers, Other Vegetables

INTRODUCTION

The term “Adolescence” comes from the Latin word “adolescere” which means “to grow” or “to maturity”[1]. So the essence of the word adolescence is growth and it is in the sense that adolescence represents a period of intensive growth and change in nearly all aspects of child’s physical, mental, emotional and social life. Adolescence is probably the most challenging and complicated period of life to describe, study or experience. According to A.T. Jersild, “Adolescence is a period during which boys and girls move from childhood to adulthood mentally, emotionally, socially and physically.” [1] Stanley Hall said, “It is a period of stress and strain, storm and strife” [1]. Piaget expressed adolescence is the age when the individual becomes integrated into the society of adults, the age when the child no longer feels that he is below the level of his elders but equal , at least in rights[1]. This integration into adult society has many affective aspects, more or less linked to puberty[1]. It also includes very profound intellectual changes. At this stage of development, the intellectual transformations typical of adolescence allow him to integrate into adult social relationships. This is actually the most characteristic trait of this stage.

It is a fact of life that we are constantly under stress in the modern world. The experiences an individual has during his or her childhood profoundly influence his or her emotional and physical well-being later in life. Early trauma and stress induce predictable patterns of brain development, traits, and behaviors as a result of childhood adversities. In adolescence, a period of transition between childhood and adulthood, stress and strain are common.

In a person's life, the adolescent years are the most stressful. As adolescents experience puberty, they meet changing expectations from others, and they cope with feelings they may not have experienced before. Adolescence is a stressful time in today's society due to modernization and westernization.

Stress Response- This process involves a series of hormones, the brain, and the autonomic nervous system, which controls involuntary functions such as breathing, blood pressure, and heart rate.

Relationships are complicated, but worth understanding.

As people respond to threats, the thalamus, located in the brain, receives and processes sensory information.

In an instant, our thalamus alerts the brain's fear center, the amygdale, and other emotional centers, which then send signals to the motor cortex. This signals muscles to tense and tighten, bracing themselves for trouble, as the message travels down nerve pathways.

There is also a signal coming from the hypothalamus, a portion of the brain situated above the brainstem. A chemical messenger is sent via the blood stream to the adrenal glands, located above the kidneys, in response to the warning. The adrenal glands relay the message to the nearby pituitary gland. Cannon isolated the first stress hormone, epinephrine, commonly known as adrenaline, in response to stress.

There is also another stress hormone produced by the adrenal glands, called nor epinephrine, or nor adrenaline. There was also another discovery that other researchers made about the stress hormone cortisol. A stressful situation will result in the release of all three hormones, which will cause a broad range of physiological responses in the body when they are released.

At the same time, the hypothalamus fires up the automatic nervous system in response to the stimulus. In the body, this network of nerves relays the warning all the way down to the spinal cord and from there to the nerves throughout the body. The body releases epinephrine and nor epinephrine when nerve endings in organs, blood vessels, skin, and sweat glands are stimulated.

This combination of hormones primes our bodies to react to an imminent threat as a result of this tandem surge of hormones. As a result of an immediate physical threat, such as a prowling wild animal or an armed enemy, the body either prepares to stand its ground and fight or flee.

As our body takes in more oxygen to fuel our muscles, our breath quickens as the body takes in more oxygen to make our muscles stronger. In a similar manner, glucose and fat, which provide us with energy, are released from

our storage sites into our bloodstream. Our senses are sharpened, such as sight and hearing, and we remain more alert as a result.

When people are faced with such a situation, their hearts beat rapidly at two to three times the normal rate, and their blood pressure also increases. There are certain blood vessels in our bodies that constrict in order to direct blood flow away from the skin and other organs and towards our muscles and brain, which helps direct blood away from our skin and other organs and towards them.

The blood cells called platelets become stickier, which makes it easier for clots to form in order to minimize bleeding from potential injuries that may occur. In order to combat infections from anticipated wounds, the immune system begins to get more active. As the body prepares to take action, our muscles, even tiny, hair-raising muscles beneath our skin, tighten up, preparing to spring into action. It was decided that in order to concentrate energy in the right places, body systems which were not necessary for the immediate emergency were suppressed. There is a slowdown in the functioning of the stomach and intestines. The level of sexual arousal decreases. There is a slowing down of the process of repairing and growing body tissues.

The Positive Side of Short-Term Stress

It is important to remember that not all stress is bad. It has been observed that a stress response can be extraordinarily beneficial in times of physical danger or when it's imperative to accomplish a critical task in a short period of time, as many people have discovered. People are able to perform Herculean feats thanks to the surge in epinephrine (adrenaline) in their systems. Countless examples of such deeds are found in the deeds of first responders who act swiftly to help others during hazardous weather events or terrorist-related incidents that occur all over the world.

As overwhelming as these situations can be, the stress response can be appropriate and essential in such circumstances, as well as assist in rising to many challenges. These challenges may be external forces, such as a fire or an earthquake, or internal threats, such as the circulatory system teetering on the brink of a deadly collapse.

The Downside of Chronic Stress

It is intuitively understandable why the classic stress response occurs. It enables you to rise to occasions that reward heightened awareness and abilities. When we hear a tree limb crack above us while sheltering from a storm, the surge of epinephrine helps us sprint away from its path far more quickly than we would normally. This was the perfect way to release the stress hormones circulating in our bodies.

The reality, however, is that obvious dangers are not the only scenarios that can elicit the stress response in us. Any situation that we see as a hassle or as a threat to our well-being may trigger it, too, especially if we assess the situation too quickly and decide that we do not have the resources to handle it. The trouble begins there, and that's when things go awry.

It is very difficult for the human body to differentiate between a life-threatening event and the stresses of day-to-day living. The anger and anxiety created by less momentous sources of stress, such as computer malfunctions and traffic jams, tend not to find a quick physical release and are likely to build up as the day progresses.

Our body's stress response can be described as maladaptive or unhealthy when the body repeatedly experiences the stress response, or if arousal after experiencing a terrible trauma is never fully switched off after the event. In this situation, the stress response kicks in sooner or more frequently than normal, increasing the burden our bodies must handle. There are a number of serious health problems that can result from this condition. When it comes to coronary artery disease, high blood pressure is a very important risk factor. As an example, high blood pressure is one of the factors that contribute to this.

Dietary habits play a significant role in health, morbidity, and mortality for a wide variety of conditions. Thus, patterns of food consumption and their implications for mental health have received some attention in research.[2] A

number of observational and experimental studies have examined the effects of carbohydrate intake on mood. [3] [4] [5] Several studies have examined the association between stress and food selection, with partly inconsistent results. [6] [7] [8] [9] [10] [11] [12] It has been hypothesized that carbohydrate consumption can relieve depression. [13] This has been considered to be a contributing factor to the development of obesity. [14] [15] The association, however, has also been observed in the opposite direction, with poor food choices being associated with stress and depressive symptoms. [16] Studies on the effects of stress on food choice show that people experiencing periods of stress reported eating foods they normally avoided and eating them as a means of coping. [17] A lack of a healthy diet was associated with depression/stress being reported for 10 or more days during the past month for both males and females in the United States.[18] There is evidence that stress increases food consumption in some individuals, as well as causes them to shift their food choices from low fat foods to higher fat foods. [17] A coping strategy for stressful situations has been theorized to be eating[19], however, a study of college students found that stress or depression were associated with frequency of eating various food groups. [16] The University of the United Arab Emirates reported that 65% of students reported high stress levels and 50% reported poor diets. [20] In order to understand students' patterns of food consumption, it is imperative to understand their eating patterns. When poor nutritional habits are associated with stress and/or depression symptoms, programs that address mental health may also lead to healthier eating habits, and vice versa.

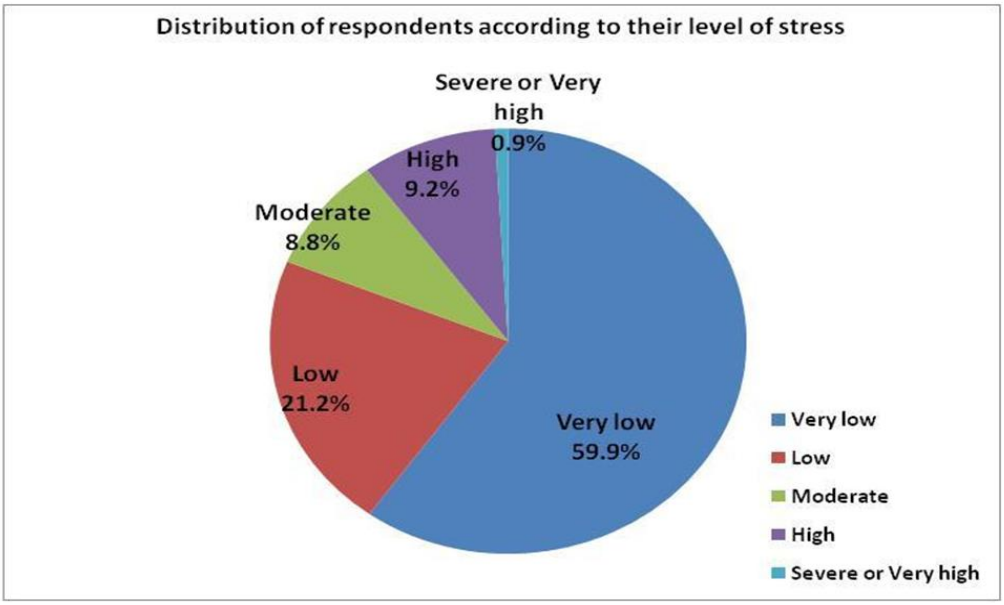
Objectives of the Study- To find out the level of stress among adolescent college going girls (17-19 Years) and **to examine the relationship between level of stress and food consumption pattern of female students (17-19 years).**

Study Materials and Methods – This cross sectional study was conducted at Banaras Hindu University (Women's College, Faculty of Arts, Faculty of Social Science, Faculty of Science), Varanasi. Among the 1510 (Population) of adolescents girls, 317 respondents were selected.

A questionnaire was developed to elicit information regarding demographic profile, dietary pattern including food pattern, food habits, frequency of food intake and 24 hours dietary recall. A stress scale by M. Singh (2002) was used to assess the level of perceived stress of selected adolescent girls. Using SPSS, suitable statistical tools were selected to analyze the observed data.

Table No. 1: Distribution of respondents according to their level of stress

Level of stress	No.	Percentage(Per cent)
Very low	190	59.9
Low	67	21.2
Moderate	28	8.8
High	29	9.2
Severe or Very high	03	0.9
Total	**317**	**100.0**



Most respondents (59.9% (190) found that they were under very low levels of stress, 21.2% (67) reported that they were under very low levels of stress, 9.2% (29) reported high levels of stress, and 0.9% (03) reported several or very high levels of stress.

Table No. 2 - Association between stress and food consumption pattern of pulses & legumes

Food Consumption Pattern of Pulses & Legumes	Level of Stress							
	Low		Moderate		High		Total	
	No.	Percentage	No.	Percentage	No.	Percentage	No.	Percentage
Daily	232	82.0	21	7.4	30	10.6	283	100.0
Weekly	24	72.7	07	21.2	02	6.1	33	100.0
Occasionally	01	100.0	01	-	-	-	-	100.0
Total	257	81.1	28	8.8	32	10.1	317	100.0
χ^2 =7.51, df=4, P >0.05								

According to the majority, 82.0 % of respondents with low levels of stress consumed more pulses & legumes on a daily basis, while only 6.1 % of respondents with high levels of stress consumed pulses & legumes weekly. There was no significant difference between the intake of pulses & legumes and the level of stress (P>0.05).

Table No. 3 - Association between stress and food consumption pattern of green leafy vegetables

Food Consumption Pattern of Green Leafy Vegetables	Level of Stress							
	Low		Moderate		High		Total	
	No.	Percentage	No.	Percentage	No.	Percentage	No.	Percentage

Daily	171	81.8	19	9.1	19	9.1	209	100.0
Weekly	83	81.4	07	6.9	12	11.8	102	100.0
Occasionally	03	50.0	02	33.3	01	16.7	06	100.0
χ^2=6.02, df=4, P >0.05								

A majority (81.8 %) of respondents with low levels of stress consumed a greater number of green leafy vegetables on a daily basis, while a minority (6.9 %) consumed green leafy vegetables on a weekly basis. There was no significant difference between the intake of green leafy vegetables and the level of stress (P>0.05). According to **Mikolajczyk et al**, **(2009),** less frequent consumption of vegetables was associated with perceived stress. This association appears to be a result of the behavioural consequences of higher depressive symptoms and is consistent with the correlation between depressive symptoms and perceived stress. According to **Pareek et al, (2020),** vegetables were consumed at a significantly low level. This study was similar to the present study.

Table No. 4 - Association between stress and food consumption pattern of other vegetables

Food Consumption Pattern of Other Vegetables	Level of Stress							
	Low		Moderate		High		Total	
	No.	Percentage	No.	Percentage	No.	Percentage	No.	Percentage
Daily	173	80.8	15	7.0	26	12.2	214	100.0
Weekly	78	85.7	08	8.8	05	5.5	91	100.0
Occasionally	06	50.0	05	41.7	01	8.3	12	100.0
χ^2=19.97, df=4, P <0.001								

The majority (85.7 %) of respondents with a low level of stress consumed more other vegetables on a weekly basis, whereas only 5.5% of respondents with a high level of stress consumed other vegetables. There was a significant difference between the intake of other vegetables and the level of stress (P0.001).

Table No. 5- Association between stress and food consumption pattern of roots & tubers

Food Consumption Pattern of Roots & Tubers	Level of Stress							
	Low		Moderate		High		Total	
	No.	Percentage	No.	Percentage	No.	Percentage	No.	Percentage
Daily	61	83.6	05	6.8	07	9.6	73	100.0
Weekly	100	86.2	07	6.0	09	7.8	116	100.0
Occasionally	77	76.2	09	8.9	15	14.9	101	100.0
Rarely	19	70.4	07	25.9	01	3.7	27	100.0
χ^2=15.39, df=6, P <0.05								

In general, 86.2 per cent of respondents with low levels of stress consumed more roots and tubers each week. There were only 6.0% of respondents who consumed roots and tubers on a weekly basis among the minority of respondents who had moderate levels of stress. There was a significant correlation between the intake of roots and tubers and the level of stress (P 0.05).

Table No. 6- Association between stress and food consumption pattern of fruits

Food Consumption Pattern of Fruits	Level of Stress							
	Low		Moderate		High		Total	
	No.	Percentage	No.	Percentage	No.	Percentage	No.	Percentage
Daily	126	82.9	09	5.9	17	11.2	152	100.0
Weekly	104	78.8	15	11.4	13	9.8	132	100.0
Occasionally	27	81.8	04	12.1	02	6.1	33	100.0
χ^2=3.69, df=4, P >0.05								

In general, 82.9 % of respondents who reported low levels of stress consumed more fruits on a daily basis. Only 5.9 per cent of respondents with moderate levels of stress consumed fruits on a daily basis. A significant difference was not found between the intake of fruits and the level of stress of the respondents (P>0.05). In a study conducted by **Mikolajczyk et al, (2009),** less frequent consumption of fruits was associated with perceived stress. In their study, **Pareek et al, (2020)** found a significantly low intake of fruits. These studies were similar to the present study.

Conclusion- Everyone deals with stress at some point in their lives, some more than others. There are many factors that cause stress to the human body, the surroundings, and day-to-day living. The food that a person consumes as part of their daily lifestyle can assist a person in overcoming or reducing stress' effects on the body. If unhealthy eating habits are not addressed, they will only lead to increased levels of stress, followed by further problems in the future. A well-balanced nutritional diet is one of the most important components of good health. The importance of a well-balanced diet when under stress cannot be overstated. A well-balanced diet and stress busting foods will help us combat stress effects on adolescents' bodies. Stress management may be assisted by modifying the diet and changing the frequency of diet intake. Eating properly is very important. There must be a large amount of complex carbohydrates in the diet. Foods of plant origin should be preferred in general. It may be beneficial to reduce and modify the amount of fat in the diet. It is recommended to consume a diet high in monounsaturated fats and omega-3 fatty acids. Cortisol concentrations and its binding globulin can change as a result of these modifications. Furthermore, plant foods are rich in phytochemicals and trace elements, which have many health benefits. Consuming green or yellow vegetables every day may also reduce the incidence of some stress syndromes (e.g., irritation and sleeplessness). At some point in an adolescent's life, stress will occur, and most likely several times. In spite of the fact that stress is sometimes unavoidable, it is always a matter of choice. Either one can allow the body to suffer the effects of stress, or one can take action to prevent them. Every individual should be aware that healthy eating and stress management play a significant role in keeping the body and mind healthy.

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