# Nutrition Therapy in Diabetes mellitus: a Retrospective Study

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### Abstract

Diabetes is one of the biggest global public health problems with the estimated prevalence to increase from 425 million people in 2017 to 629 million by 2045, with linked health, social and economic costs. Type 2 diabetes is the fourth or fifth leading cause of death in most developed countries and there is growing evidence that it has reached epidemic proportions in many developing and newly industrialized countries. Since diet, physical activity and weight are modifiable factors and are also critical for slowing, or even reversing, this trend. Awareness about diabetes complications and consequent improvement in dietary knowledge, attitude and practices lead to better control of the disease. In order to improve the overall metabolism beyond calorie restriction and weight loss, it is crucial to integrate medical nutrition therapy into primary care of type 2 diabetes mellitus. This paper gives insight into need and different approaches of medical nutrition therapy (MNT) in type 2 diabetes. It outlines various approaches used till present based on studies and recommendations given. It is concluded that collaborative efforts from diabetologists, endocrinologists, and registered dieticians are required, since single approach to diabetes MNT does not exist. The diabetic diet must be nutritionally adequate for the patients' requirement and it should be tailor made for each individual patient based on age, sex, body weight and physical activity and taking into consideration, their lifestyle, socioeconomic factors, cultural background, and motivation too. Various studies concluded that evidence exists demonstrating that MNT can improve clinical outcomes while possibly decreasing the cost of managing diabetes.

Diabetes mellitus is defined as "a metabolic disorder characterized by hypergly-caemia resulting from either the deficiency in insulin secretion or the action of insulin." The poorly controlled DM can lead to damage

various organs especially the eyes, kidneys, nerves and cardiovascular system. Diabetes mellitus is a metabolic disorder characterized by the decreased ability or complete inability of the tissues to utilize carbohydrate,

accompanied by changes in the metabolism of fat, protein, water and electrolytes. Once regarded as a single disease entity, diabetes now seen as a heterogenous group of diseases, characterized by a state of chronic hyperglycemia, resulting from a diversity of etiologies, environmental and genetic acting jointly<sup>22</sup>.

Diabetes is one of the biggest global public health problems with the estimated prevalence to increase from 425 million people in 2017 to 629 million by 2045, with linked health, social and economic costs.<sup>13</sup>. Type 2 diabetes is the fourth or fifth leading cause of death in most developed countries and there is growing evidence that it has reached epidemic proportions in many developing and newly industrialized countries<sup>6</sup>. Since diet, physical activity and weight are modifiable factors and are also critical for slowing, or even reversing, this trend. Diet is a leading contributor to morbidity and mortality worldwide according to the Global Burden of Disease Study carried out in 188 countries<sup>14</sup>. Nutrition and physical activity are important parts of a healthy life for a diabetic patient. Along with other benefits, following a healthy meal plan and being active can help keep blood glucose level, blood sugar, in target range. Improvement in the elevated HbA1c level can be achieved through diet management, thus the patients could be prevented from developing the diabetes complications. Awareness about diabetes complications and consequent improvement in dietary knowledge, attitude and practices lead to better control of the disease. In the light of above, medical nutrition therapy (MNT) plays an important role to reform the course of the adverse nutritional transition<sup>8,11,16</sup>. In order to improve the overall metabolism beyond calorie

restriction and weight loss, it is crucial to integrate medical nutrition therapy into primary care of type 2 diabetes mellitus.

Approaches and Tools of Meal Planning:

\*My Plate is a tool given by USDA that can be used to guide food choices. It helps control portion size. There is no need to count calories. A 9 inch plate is used, in which half of the plate covers non starchy vegetables, meat or other protein on one-fourth of the plate and grain and other starch on the last one-fourth of plate.

\* Carbohydrate Counting involves keeping track of the amount of carbohydrates one eats and drink each day. Because carbohydrates turn into glucose in the body, they affect blood glucose level more than other foods. If insulin is taken, carb counting can help to know how much insulin to be taken.

\*The term "medical nutrition therapy" was introduced in 1994 by the American Dietetic Association<sup>3</sup> to better articulate the nutrition therapy process. It is defined as the use of specific nutrition services to treat an illness, injury, or condition and involves two phases: 1) assessment of the nutritional status of the client and 2) treatment, which includes nutrition therapy, counselling, and the use of specialized nutrition supplements<sup>3</sup>. MNT for diabetes incorporates a process that, when implemented correctly, includes: 1) an assessment of the patient's nutrition and diabetes self-management knowledge and skills; 2) identification and negotiation of individually designed nutrition goals; 3) nutrition intervention involving a careful match of both a meal-planning approach and

educational materials to the patient's needs, with flexibility in mind to have the plan be implemented by the patient; and 4) evaluation of outcomes and ongoing monitoring. These four steps are necessary to assist patients in acquiring and maintaining the knowledge, skills, attitudes, behaviours, and commitment to successfully meet the challenges of daily diabetes self-management<sup>26</sup>. Leading authorities and professional organizations have concluded that proper nutrition therapy is an important part of the foundation for the treatment of diabetes. However, appropriate nutritional intervention, implementation, and ultimate compliance with the plan remain some of the most vexing problems in diabetes management for three major reasons: First, there are some differences in the dietary structure to consider, depending on the type of diabetes and medication the PWD is taking. Second, a plethora of dietary information is available from many sources to the PWD and healthcare provider. Nutritional science is constantly evolving, so that what may be considered true today may be outdated in the near future. Nutritional intervention may vary based on the type of diabetes; however, many of the basic dietary principles are similar for all PWD, prediabetes, metabolic syndrome or who are overweight or obese. Lastly, there is not perfect agreement among professionals as to the best nutritional therapy for individuals with diabetes, and ongoing scientific debate reported in the popular press may confuse PWD and health care providers2. Franz et al. 15. completed a randomized, controlled trial in 179 individuals with type 2 diabetes, comparing the usual nutrition care consisting of only one visit with a more intensive nutrition intervention, which included at least three visits with a dietician. The results concluded that with more intensive nutrition intervention, changes in lifestyle can

lead to significant improvements in glucose control. The fasting plasma glucose level decreased by 50–100 mg/dl and the HbA<sub>1c</sub> dropped by 1–2%. The average duration of diabetes for all subjects was 4 years and the decrease in HbA<sub>1c</sub> was 0.9% (from 8.3 to 7.4%). In the subgroup of subjects with a duration of diabetes <1 year, the decrease in HbA<sub>1c</sub> was 1.9% (from 8.8 to 6.9%). By 6 weeks to 3 months, it was known if nutrition intervention had achieved target blood glucose goals; if it had not, the dietitian made recommendations for changes in medications.

\*Time Restricted Eating (TRE) It's not easy to count calories or figure out how much fat, CHO and proteins in every meal. That's why using TRE provides a new strategy for fighting obesity and metabolic diseases that affects millions of people worldwide. According to Dr. Satchin Pandan, Professor, Salk Institute and the author of Circadian Code, "Studies have shown that eating all calories within a consistent 10 hour window allows our body to rest and restore for 14 hours at night and fasting for the remaining hours in a day, protects from diseases such as type 2 diabetes. However, water is allowed during the fasting period. The science behind it is based on the concept of the circadian rhythm, which is the 24-hour cycle of living beings<sup>25</sup>. The scientists are currently conducting a clinical trial funded by the National Institute of Diabetes & Digestive & Kidney Diseases to examine the benefits of time restricted eating in a larger group of more than 100 participants with metabolic syndrome. The study includes additional measures that will help the researcher investigate changes in body composition and muscle function.

Table-1. Reviewed Eating Pattern AB Evert, 2013: Heising ETA 1993: Craig WJ 2009:

Type of eating pattern	Description Description
Mediterranean style	
redictranean style	Includes abundant plant food (fruits, vegetables, breads, other
	forms of cereals, beans, nuts and seeds); minimally processed,
	seasonally fresh and locally grown foods; fresh fruits as the
	typical daily desert and concentrated sugars or honey consumed
	only for special occasions; olive oil as the principal source of
	dietary lipid; dairy products (mainly cheese and voghurt) consumed
	in low to moderate amounts: fewer than 4 eggs/week; red meat
	consumed in low frequency and amounts, and wine consumption
W	in low to moderate amounts generally with meals.
Vegetarian and vegan	The two most common ways of defining vegetarian diets in the
	research are vegan diets (diets devoid of all flesh foods and
	animal-derived products) and vegetarian diets (diets devoid of
	all flesh foods but including egg [ovo] and/or dairy [lacto] products).
	Features of a vegetarian-eating pattern that may reduce risk of
	chronic disease include lower intakes of saturated fat and
	cholesterol and higher intakes of fruits, vegetables, whole grains,
	nuts, soy products, fibre and phytochemicals.
Low fat	Emphasizes vegetables, fruits, starches (e.g breads,/crackers,
	pasta, whole grains, starchy vegetables), lean protein, and low-
	fat dairy products. Defined as total fat intake<30% of total energy
	intake and saturated fat intake <10%
Low carbohydrate	Focuses on eating foods higher in protein (meat, poultry, fish,
	shellfish, eggs, cheese, nuts and seeds), fats (oils, butter, olives,
	avocado), and vegetables low in carbohydrates (salad green,
	cucumbers, broccoli, summer squash). The amount of carbohydrate
	allowed varies with most plans allowing fruit (e.g., berries) and
	higher carbohydrate vegetables; however, sugar-containing foods
	and grain products such as pasta, rice and bread are generally
	avoided. There is no consistent definition of "low" carbohydrate.
	In research studies, definitions have ranged from very low-
	carbohydrate diet (21-70 g/day of carbohydrates) to moderately
	low-carbohydrate diet (30 to <40% of calories from carbohydrates.
DASH	Emphasizes fruits, vegetables and low fat dairy products, including
	whole grains, poultry, fish and nuts and is reduced in saturated
	fat, red meat, sweets and sugar-containing beverages. The most
	effective DASH diet was also reduced in sodium.

Table-2. Currently available recommendations for medical nutrition therapy for the management of diabetes mellitus<sup>4,7,9,10,18,21,27</sup>

Research Society for the Study of Diabetes in India (RSSDI)	American Diabetes Association (ADA)	Indian Council of Medical Research (ICMR)
Carbohydrates  Recommended intake: 45-65% of total daily calories (minimum intake 130 gm/day)	No specified recommended intake	Recommended intake: 55- 60% of total daily calories
High fiber diet: increased intake of soluble and insoluble fibers  Preferred sources: pulses, legumes, coarse grains, sprouted grams, unprocessed fruits and vegetables	High fiber and low glycemic index diet  Preferred sources: fruits, vegetables, whole grains, legumes and dairy products (milk and yoghurt)	Intake of fiber rich foods  Preferred sources: cereals, mixed coarse grains, whole grains (e.g ragi, oats, barley, jowar), whole pulses, whole fruits, salads and soyabeans, leafy vegetables, fenugreek seeds
Substitution of polished white rice with millets and brown rice		Restricted intake of all purpose flour (maida) based products
Proteins Recommended intake: 10-	Typically 15-20% of total	Recommended intake; 10-
15% of total daily calories	energy in individuals without diabetic kidney disease  Recommended daily allowance in individuals with T2DM and compromised renal function: of 0.8 g/kg body weight/day	15% of total daily calories
Preferred sources: not mentioned	Preferred sources: not mentioned	Preferred sources: vegetable sources, low fat milk and milk products, fish and lean meat

Fats		
Recommended calorie intake: no specified ideal intake	Recommended calorie intake: no specified ideal intake	Recommended calorie intake: 20-25% total daily calories
Restricted intake of saturated fats: <10% of total daily calories	Restricted intake of saturated fats: <10% of total daily calories	Restricted intake of saturated fats: <7% total daily calories
Minimal intake of trans fats	Minimal intake of trans fats	Minimal intake of trans fats (hydrogenated vegetable fats)
Restricted intake of dietary cholesterol: <300mg/day	Restricted intake of dietary cholesterol: <300mg/day	Restricted intake of dietary cholesterol: <300mg/day
Preferred sources of MUFA/ PUFA*: moderate intake of fish/seafood, chicken without skin and red meat as a source of PUFA (particularly in patients with established cardiovascular disease)	Preferred sources of MUFA/ PUFA: fatty fish, nuts and seeds	Preferred sources of MUFA/ PUFA: groundnut, sesame, cotton seed, rice bran or safflower along with soyabean, mustard, canola etc., as a preferred choices for edible oils containing MUFA and PUFA
Not recommended: sunflower oil		
<ul> <li>Mono-unsaturated fatty acid (MUFA)</li> <li>Poly-unsaturated fatty acid (PUFA)</li> </ul>		
Sugars and sweeteners		
Reduced intake of refined sugars	Reduced intake of HFCS and sucrose	Avoidance of sugar, honey, jaggery
Moderate intake of non- nutritive artificial sweeteners	Substitute nutritive sweeteners with non-nutritive sweeteners	Restricted use of artificial sweeteners and avoidance in pregnant/lactating women with diabetes
Avoid consumption of High Fructose Corn Syrup (HFCS)	Natural fructose/free fructose from fruits (3-4% of energy intake and not >12) is permissible	Avoidance of very sweet fruits and juices

Micronutrients and other dietary recommendations  Inclusion of micronutrients (chromium, alpha-lipoic acid, magnesium and zinc) as adjunct to standard care (insufficient evidence available)	Not recommended	Not recommended
Restricted intake of dietary salt: < 5 g/day (further restriction in patients with diabetes and hypertension)  Avoidance of alcohol consumption	Restricted sodium intake: <2300 mg/day	Restricted intake of dietary salt: ≤ 6 gm/day
Cessation of tobacco use	Moderate alcohol consumption	Moderate of alcohol consumption  Cessation of any form of tobacco use

## The Three Major Components of Diet:

Carbohydrates: Normal regulation of blood glucose (post prandial and fasting) is the primary goal in the management of diabetes. Though many literatures recommend for low carbohydrate diet in diabetes. However, recently ADA in their 2019 position now state "research indicates that low carbohydrate eating plans may result in improved glycemia and have the potential to reduce anti hyperglycaemic medications for individual with type 2 diabetes." Further low carbohydrate diets are not recommended for pregnant and lactating women, those who have or are at risk for disordered eating and those with renal disease<sup>12</sup>. It is known that a high carbohydrate intake increases the requirement for insulin secretion in order to maintain glucose

homeostasis<sup>24</sup>. Post prandial glucose and insulin responses are influenced by dietary fibre also. In addition to quality and quantity, different characteristics of carbohydrates in the diet needs to be taken care of. Whole grains have higher fibre content than refined ones. Foods with higher Amylose content are recommended as compared to Amylopectin. Raw and large particles are better than cooked and homogenised particles. Large size of starch particle is better than small particle size.<sup>22</sup> Since there are considerable differences in the physiological responses to different forms of carbohydrate, the term Glycemic Index (GI) was coined in 1981. GI is a measure of the post-prandial glucose response after carbohydrate consumption. (NP Steyn, 2004) Glycemic Index determines the quality of food. Kanika Malhotra, Senior Nutritionist, Health Care at HOME (HCAH) agrees, "GI also depends on whether the food is eaten in isolation or with other foods. Consuming a food along with protein, fat or other CHO that have a lower GI effectively lowers its GI value. Other factors that might affect a food's GI include the ripeness of fruits (under-ripe fruits have a lower GI than ripe ones) and also how food is cooked. (food.ndtv.com).

Glycemic index does not take into account the effect of a typical amount of carbohydrate in a food portion on glycemia. In order to improve the reliability of predicting the glycemic response of a given diet, Salmeron et al have suggested the use of glycemic load. The glycemic load of a particular food is the product of the glycemic index of the food and the amount of carbohydrate in a serving. By summing the glycemic load contributed by individual foods, the overall glycemic load of a meal or the whole diet can be calculated<sup>22</sup>.

Strong evidence exists that consuming high levels of fructose-containing beverages may have particularly adverse effects on selective deposition of ectopic and visceral fat, lipid metabolism, blood pressure, and insulin sensitivity compared with glucose-sweetened beverages<sup>16</sup>.

Protein: Researches and literatures do not recommend high or low protein diet for diabetics. The recommendation regarding protein is similar to general population-10-2-% of total calorie. In individuals with type 2 diabetes, ingested protein appears to increase insulin response without increasing plasma glucose concentrations. But, in patients with renal insufficiency requires an individualized

approach. (Alison B. Evert) A number of studies in healthy subjects and in persons with controlled type 2 diabetes have demonstrated that glucose from ingested protein does not appear in the general circulation, and therefore protein does not increase plasma glucose concentrations. Furthermore, the peak glucose response to carbohydrate alone is similar to that of carbohydrate and protein, suggesting that protein does not slow the absorption of carbohydrate.

Total Fat: Evidence is inconclusive for an ideal amount of total fat intake for people with diabetes; therefore goals should be individualized. Fat quality appears to be far more important than quantity. The primary dietary fat goal in persons with diabetes is to limit saturated fat and dietary cholesterol intake. Saturated fat is the principal dietary determinant of plasma LDL cholesterol. Furthermore, persons with diabetes appear to be more sensitive to dietary cholesterol than the general public. In metabolic study diets, in which energy intake and weight are held constant, diets low in saturated fat and high in carbohydrate or enriched with cis-monounsaturated fatty acids (monounsaturated fat) lower plasma LDL cholesterol equivalently. Low-saturated fat (i.e., 10% of energy) high carbohydrate diets increase postprandial levels of plasma glucose, insulin, triglycerides and, in some studies, decrease plasma HDL cholesterol when compared in metabolic studies to isocaloric high monounsaturated fat diets. However, high-monounsaturated fat diets have not been shown to improve fasting plasma glucose or  $HbA_{1c}$  values. There is concern that when such high monounsaturated fat diets are eaten ad libitum outside of a controlled setting, it may result in increased energy intake and weight gain. Therefore, both the metabolic profile and the need to lose weight will determine nutrition therapy recommendations. Furthermore, ethnic or cultural preferences may play a role in determining whether saturated fat is to be replaced with carbohydrate or monounsaturated fat.

Polyunsaturated fats have not been well studied in persons with diabetes. When compared with saturated fat, polyunsaturated fats appear to lower plasma total and LDL cholesterol, but not as well as monounsaturated fats.

N-3 polyunsaturated fatty acid supplements have been shown to lower plasma triglyceride levels in persons with type 2 diabetes. Although the accompanying rise in plasma LDL cholesterol is of concern, glucose metabolism is not likely to be adversely affected with their use. N-3 supplements may be most beneficial in the treatment of severe hypertriglyceridemia. While n-3 fatty acid studies in persons with diabetes have primarily used supplements, there is evidence from the general population that foods containing n-3 fatty acids have cardioprotective effects. Two to three servings of fish per week provide dietary n-3 polyunsaturated fat and can be recommended.

Major sources of *trans* fatty acids in the diet include products made from partially hydrogenated oils such as baked products (including crackers and other snack foods), cookies, doughnuts, breads, and products like fries or chicken fried in hydrogenated shortening.

Animal sources, including dairy products, provide smaller amounts of trans fatty acids. The effect of trans fatty acids is similar to saturated fats in raising plasma LDL cholesterol. In addition, trans fatty acids lower plasma HDL cholesterol. Therefore, intake of trans fatty acids should be limited. Plant sterol and stanol esters block the intestinal absorption of dietary and biliary cholesterol. Plant sterols/stanols in amounts of <"2 g/day have been shown to lower total and LDL cholesterol. (ADA Position Statement). In order to achieve adequate glycemic control Medical Nutriton Therapy (MNT) is extremely important for diabetic and prediabetic patients.

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# काशल विकास

भारतीय परम्परा के नेपच्य में

विजय लक्ष्मी शर्मा





क विवासी प्राप्त की पुत्री तथा आवयर दियान है है। कामकार मीद्रुत ती. राजबायू की पत्नी डॉ. विवास सबसे साथ प्रदेश हैं। बहुमुखी प्रतिभावान मेधावी छात्रा रही हैं। काशी हिंदू विश्वविद्यालय है

इतिहास की स्नातक उपाधि प्राप्त करने के उपरांत इन्होंने यहीं के इतिहास विभाग से प्रयम केनी स्वितास की स्नातकोत्तर उपाधि प्राप्त करने के उपरांत विज्ञान के इतिहास जैसे अनकुए युनौतीपूर्ण विषय को अपने शोध अध्ययन का आधार बनाते हुए प्राचीन भारतीय इतिहास संस्कृति एवं पुरातत्व विभाग से प्रातः स्मरणीय प्रो. एच. सी. भारद्वाज के निर्देशन में अंतर्राष्ट्रीय परिप्रेक्ष्य में प्राचीन भारतीय विज्ञान विषय पर शोध उपाधि प्राप्त की जिसके, लिए उन्हें बी.एच.यू. एवं भारतीय इतिहास अनुसंधान परिषद, नई दिल्ली से कनिष्ठ छात्रवृत्ति भी प्राप्त हुई। उनके इस शोध ग्रंथ को भारतीय इतिहास अनुसंधान परिषद के द्वारा प्रकाशित करने हेतु आर्थिक अनुदान भी दिया गया। 'तत्पश्चात् डॉ. शर्मा ने 'भारतीय विज्ञान अकादमी', नई दिल्ली द्वारा प्राप्त वरिष्ठ छात्रवृत्ति की सहायता से "Tools, Appliances and equipments" विषय पर Post Doctorate किया। उनका यह कार्य भी पुस्तक के रूप में प्रकाशित हो चुका है। डॉ. शर्मा ने भारतीय इतिहास अनुसंधान परिषद एवं विश्वविद्यालय अनुदान आयोग नई दिल्ली की सीनियर फेलो, पोस्ट डॉक्टोरल फेलो एवं रिसर्च एसोशिएट के रूप में भी शोध किया।

वर्ष 1991 में उ.प्र. लोक सेवा आयोग इलाहाबाद के द्वारा अपनी वरिष्ठता सूची में प्रथम स्थान पाकर चयनित होकर आप राजकीय सेवा में आई एवं विभिन्न महाविद्यालयों में कार्य करते हुए आप वर्तमान में पं. क. प. त्रि. राजकीय स्नातकोत्तर महाविद्यालय चन्दौली के इतिहास विभाग में एसोशिएट प्रोफेसर के रूप में कार्य के दिश्व विभाग में 22 नवम्बर 2013 से 13 मई 2016 तक आपने यहां प्रभारी प्राचार्या का भी दायित्व वहन कि इतिहास के इतिहास में प्रथम बार ''नारी अस्मिता एवं सुरक्षा'' जैसे संवेदनशील विभाग विभाग संगोष्ठी का सफल आयोजन करवाया एवं उसके चुनिंदा शोध पत्रों को 'नारी चिंतन के विद्या आयाम' पुस्तक के रूप में सम्पादित किया। आपके अनेक शोध पत्र विभिन्न राष्ट्रीय एवं अंतर्राष्ट्रीय पत्रिकाओं में प्रकाशित हो चुके है।



# भारती प्रकाशन

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# अनुक्रम

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# Skill Development in India: **Need And Challenges**

# Dr. Garima Upadhyay\*

Skills and knowledge are the driving forces of economic growth and social development for any country. Countries with higher and better levels of skills adjust more effectively to the challenges and opportunities of world of work. As India moves progressively towards becoming a 'knowledge economy' it becomes increasingly important that the country should focus on advancement of skills and these skills have to be relevant to the emerging economic environment.

OBJECTIVES: Following are the Objectives of the study: To highlight the background and need of skill development in India.

To overview the trends in skill development in India.

To study the challenges with focus on India

To suggest measures to overcome the hurdles of attaining

METHODOLOGY: This paper is based on the secondary the target of Skilled India. data on skill development with special reference to Indian context. Data has been collected from annual reports, various books, journals and periodicals several reports on this particular topic and internet surfing for content analysis.

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# Background and Need of Skill Development in India

skill development. Still there is a long way ahead. Apart from newly formed government has taken certain initiatives regarding this public-private- partnership (PPP) model can boost up the of efforts are required to establish skill training institutes. training compared to 11 % in organized sector. Therefore a lot of unorganized workforce has received formal skill development better levels of skill is required. It has been found that only 2.5% and address more effectively to the opportunity and challenges the economic growth of the country. However, in order to adjust population means lower dependency ratio. Thus it will enhance India will have a surplus of active population. More active nations. According to a research it is predicted that by 2020, of total population. It is a source of hope to the aging developed According to 2011 census, 15-59 age group constitute 62.5%

of more jobs, but also more productive jobs. competitiveness that economies need to accelerate the creation change, enterprise development, economic diversification and circle" in which the quality and relevance of education and training for women and men fuels the innovation, investment, technological Conference (ILC), skills development can help build a "virtuous Labour Organization's (ILO) 2008 International Labour According to the conclusion adopted by the International

current discussion it is understood in broad terms to include: multiple meanings as they include wide ranging elements. In the Nevertheless, training and skills development can have

- Basic education ensures each individual the development of their potential, laying the foundation for employability;
- Initial training provides core work skills and the professional competencies that facilitate the transition underpinning knowledge, industry-based and into the world of work;
- · Lifelong learning ensures that individuals' skills and technology, and skill requirements change; competencies are maintained and improved as work

Different countries focus on different elements, as they development systems, and as they learn more about see relative strengths and weaknesses in their own skills innovations and experience in other countries.

requirement instead of present advantage; it must focus on skill development instead of present advantage; it must focus on skill development instead of present advantage. education focusing on academics; it has done in favour of formal education. As this sector is the academic in the convices/tertiary sector. As this sector is the convices/tertiary sector. advantabe, since, India's education system has been skewed education formal education focusing on academic requirement for employment generation to reap the demographic former; it must focus on skill development income. province skills province for majority of work-force. As a result, the people to this sector are either unadmand. processes, on the other hand, does not require academic skills recipient of formally educated work-force. Manufacturing in 18 vo... in 18 and make basic calculations; while the skills actually required basic that enables a person to read and understand instructions that can pay. The education required for manufacturing is very educated and yet unskilled at the task required, in case of firms empiror firms can't afford college graduates; or they are overemployed in this sector are either uneducated or unskilled as of the existing education system is required. and equipment handling, among others. Thus, a complete overhau vary from painting, welding, polishing, assembling, packaging If India wants to become a manufacturing-hub, given its

# TRENDS IN SKILL DEVELOPMENT IN INDIA

Skill Development Corporation (NSDC) was created in early Development Coordination Board (NSDCB) and the Nationa National Council on Skill Development, the National Skil with a three-tier institutional structure consisting of the PM's at the national level, a 'Coordinated Action on Skill Development' adopted skill development as a national priority over the next To create such an institutional base for skill development in India Development Missions, both at the State and National levels skill development in India, and favoured the formation of Skill 10 years. The Eleventh Five Year Plan detailed a road-map to In recognition of these needs, the Government of India has

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With current and expected economic growth, this challenge is going to only increase further, since more than 75% of new job opportunities are expected to be 'skill-based.'

Prime Minister Narendra Modi has recently launched a

Coordination Board and National Skill Development Corporation consisting of P.M.'s National Council, National Skill Development Development has coordinated Three-Tier institutional structure are also participating in imparting skills at various levels. The Government of India having conceptualized the need of Skil Various NGO's, Krishi Vigyan Kendras and other institutions skills from one generation to another, e.g. Traditional Crafts in factories etc. The informal structure includes the transfer of technical training centers (polytechnics), apprenticeship training professional education imparted through professional colleges, structure includes vocational education in schools, technical & two basic structural streams- formal & informal. The formal entrepreneurship too. In India, skill acquisition takes place through employment and ensure India's competitiveness in global market This mission is not only linked to skill but it is linked with skills, knowledge and qualifications to gain access to decent people by 2022 by empowering all individuals through improved for Skill Development and Entrepreneurship to train 500 million Development Mission and unveiling of the new National Policy manpower which included the launch of the National Skill project Skill India Campaign hopes to make India a hub of skilled

(Parminder Kaur, 2016)

Most of the formal skills-related training in the government apparatus happens through institutions such as the Industrial Training Institutes (ITIs) and the Industrial Training Centres (ITCs) and polytechnics which come under the Ministry of Labour and Employment. Many of the ITIs have now been brought under the public-private partnership (PPP) route. Informal skills-related training, including that in the traditional arts and crafts of India, is also supported through different government ministries. All states have set up Skill Development Missions. The National

Open School system also runs a number of vocational training open mes. A number of community colleges have been approved programmes. Gandhi National Open University (IGNOU) and by several states. Many companies too conduct training by several to meet the skilling requirements of their own programmes or sometimes as part of their corporate social workforce, or sometimes as part of their corporate social responsibility (CSR) initiatives, as also do nongovernmental responsibility (NGOs). Clearly, there are multiple efforts and the organisations (NGOs). Clearly, there are multiple efforts and the organisations (NGOs) are also linked to different schemes. efforts of the private sector are also linked to different schemes. efforts of trying to achieve the goals of the National Skill task of trying to achieve the goals of the National Skill pevelopment and Entrepreneurship policy of 2015 (S.Nayana Development Sanath Kumar, 2016; )

# CHALLENGES WITH FOCUS ON INDIA

Relevance of skill development: According to a survey 2% of the country's workforce is skilled which is much lower 2% of compared to the developing nations; there is dual challenge of developing skills and utilizing them in proper ways.

Quality of training and skill development: In India education and skill development sector is structured under two independent ministeries. The Ministry of Human Resource Development is associated with conventional education system, whereas industry oriented training and education is supervised by the Ministry of Labor and Employment. Additionally, a number of commissions and agencies such as AICTE, UGC are dedicated for higher education in country.

Access to training and skill development: Rural areas lack infrastructure according to the demand of the various industries. Though there is better infrastructure in urban areas as compared to rural areas but there is a gap in need and supply in terms of the expectation of the youth and the facilities that are available.

Adaptability and Acceptability to skill development: There is a need for a National Skills Qualification Framework but the real challenge is to focus on how it will be applicable in a federal

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which is generally seen as unproductive and unremunerative. force have always been neglected because of their nature of work country like India? Women as an important component of work

more practical skills. This can offer greater flexibility to students Work based and institution based learning should impart

development initiative to be successful-flexibility is the key in terms of choice of courses and career options. For skill

opportunities available to the youth. the academic skills, occupational demand as well as local development programmes should be designed keeping in mind knowledge and practice or changing technology in industry. Skill Curriculum should be designed to bridge the gap between

role in skill development? planning. The basic question is upto what extent they have played amendment Act 1992, we have entered into mode of decentralized with regard to skill development. Post 73rd Constitutional There is a need for overcoming rural and urban dichotomy

promotion of skill development and women entrepreneurship to providing financial assistance. These can be used for the status. Self Help Groups in India have been generally confined would subsequently lead to improving their social and economic Specifically, women should be targeted by explaining how education, which may lead to employability, is very important inculcating income-generating skills and activities within them women and their families on the advantages of vocational combined efforts with local NGOs and Panchayats on informing in rural areas. Therefore, in order to increase enrolments, the discouraged due to such family and social pressures, especially and family responsibilities. Women also tend to become constraining interest/participation may be social and cultural norms is especially low as compared to men. There are a few reasons Women participation in vocational education and training

> CONCLUSION: As in the becomes increasingly important to focus on economy, it becomes kills and these skills have to be economic of the skills and these skills have to be economic. advance.... the emerging economic environment. Therefore a according to the emerging way to achieve this amhining colution is the only way to achieve this amhining colution is the only way to achieve this amhining colution is the only way to achieve this amhining colution is the only way to achieve this amhining colution is the only way to achieve this amhining columns. economy, of the skills and these skills have to be relevant edvancement of the emerging economic environment. according the only way to achieve this ambitious target, holistic solution is the only way to achieve this ambitious target. As more and more India is heading towards the Knowledge As more and more increasingly important to a

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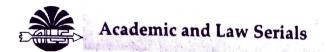
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# ATTITUDINAL PERCEPTION OF ADOLESCENT GIRLS ABOUT FOOD LABELS: ANALYTICAL STUDY OF BANARAS HINDU UNIVERSITY, VARANASI

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### Abstract

Adolescence is a period of rapid growth and development bridging childhood and adulthood. As teens become more independent, they make more of their own food choices. Nevertheless, being influenced by a multitude of factors (biological, social, physical, economic, psychosocial, attitudes, beliefs and knowledge about food) and changing of lifestyle may affect their buying and eating behavior of RTE food products. Snacking is a common feature of the diet of adolescents. Snacking can, be made part of a healthy diet especially among adolescents. This requires empowering them to seek accurate and reliable information on healthy snacks, to decide which snack is healthy and which is not. In this regard, labels on packaged snacks serve as a reliable source of nutrition-related information. These labels provide simple visual guides that enable the consumers to make healthier choices at a glance. With these background, perception of adolescent girls of Banaras Hindu University, Varanasi, about food label was studied. The study was conducted in under graduate girls' hostels of Banaras Hindu University. The hostels were randomly selected. Sample size was determined to be 384. Data was collected through self prepared Questionnaire. After deciding the topic, a general survey was conducted to know the commonly used RTE food products among the adolescent girls and on the basis of findings food items belonging to different food groups were selected for the study. The particular product was selected in such a way as to present two products from each food group like cereals, fruits, vegetables and milk and milk product. It can be concluded that frequent label reading is a good practice that needs to be inculcated in an individual since early age.

Key words: Adolescents, Food label, snacking, Ready to eat

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Exploring new taste and trends in eating and drinking is well known characteristics of adolescents. Recent environment is also promoting snacking (pre-cooked and ready-to-eat food items) because of urbanization, quest for independence, peer acceptance, self-image and mood. (Kim and Kim 2010). Also, in response to their growth spurt to fulfil their hunger gaps and nutritional demands, snacking among adolescents is higher as compared to other age groups. Market flooding with variety of snacks and adolescents targeted with marketing strategy also promote the situation. With the result, unhealthy dietary practices are adopted by them especially in context to energy consumption, ultimately resulting in obesity and other related non-communicable diseases. WHO states that the early lesions of atherosclerosis are found in obese children. (Mackay & Mensah 2004). Primordial prevention efforts should therefore be directed towards discouraging adolescents from adopting harmful dietary practices. Improving their skill towards Snacking can, to be made part of a healthy diet especially among reliable information on healthy snacks, to decide which snack is healthy and which is not. In this regard, labels on packaged snacks serve as a reliable source of nutrition-related information. These labels provide simple visual guides that enable the consumers to make healthier that is either printed on the packaging itself, or attached to a product's container (Regulations relating to the labeling and advertising of foodstuffs, 2010). Food labels perform an important communicative phase (Vander Merwe et al., 2010; Dimara & Skuras, 2005). Point-of-sale smart shopping through food labels would be one such effort to reshape them to adopt healthy choices. (Talagala and Arambepola 2016). adolescents. This requires empowering them to seek accurate and choices at a glance. (Bonsmann et. al 2010). A label is printed material function by providing consumers with information to select the most suitable product alternative during the pre-purchase decision-making communications seem to be the most effective instrument to inform consumers in terms of whatever information producers wish to provide to potential buyers. With regard to food purchasing, food labels have factor during consumer decision because most of the information that consumers require, such as branding and product ingredients, hence probably be-come the most important and most influential are printed on product labels (Kole et al., 2009) that are prominently attached to the packaging, or form an integral part of the packaging.

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Silayoi and Speece (2004) found in their study visual elements, such as graphics, colour, size and the shape of packaging, as well as informational elements, such as the product information printed on abels or packaging and technologies used, can potentially influence ikely to read are price, preparation, manipulation and preservation consumers' product decisions. Godwin, Henderson, & Thompson, (2006) concluded form their study the items that consumers are most of products. In another study items found that were read mostly are calories, fats, sugar and fiber contents.

psychosocial, attitudes, beliefs and knowledge about food) and changing of lifestyle may affect their buying and eating behavior of RTE to be high in sugar, sodium and fat, while relatively low in vitamins and minerals. Indeed, there is evidence from local studies that Adolescence is a period of rapid growth and development bridging childhood and adulthood. As teens become more independent, they make more of their own food choices. Nevertheless, being influenced by a multitude of factors (biological, social, physical, economic, food products. Snacking is a common feature of the diet of adolescents. Unfortunately, food choices made by adolescents while snacking tend adolescents are consuming too many unhealthy snacks such as chips, chocolates, sweets, and sugared fizzy drinks and are not consuming enough fruits and vegetables. In addition, fast food options such as pizzas, fried chicken, burgers, and hot dogs are gaining popularity among adolescents, possibly because of their taste, convenience and the influence of peers. During adolescence, teens spend less time with family and more time with friends. As teens become more independent, occasions occur outside the home. The average teen eats ready-to-eat food products twice a week. Fast food visits account for 31% of all food eaten away from home, and make up 83% of adolescent visits to restaurants. Fast food Restaurants and food courts are favorite eating eating away from home increases. One-third of all teen eating on special places of teens for several reasons:

- They offer a social setting with an informal, comfortable atmosphere for adolescents.
- Ready to eat foods products can be eaten outside the restaurant, fitting into the busy schedules of adolescents.
- RTE food products is fast and the limited offerings allow for quick decision-making

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up in Hyderabad and New Delhi showed that only 20 per cent of people that it takes too much time to read the label. A survey (by FSSAI) taken have a hard time locating the nutrition information. Consumers state report that the label is confusing in its terminology or language, and of interest, time, and difficulties in understanding the label. Consumers consumers cited similar reasons for not using the nutrition label are lack Among the different articles reviewed, the majority of adolescent labels, calorie content was by far the most often sought information. nutritional and ingredient information. Of those who did read food those who looked at the labels reported difficulty in deciphering the However, 49% of teenagers said they did not read labels and 51% of Forecast Magazine, 2008) reported that 70% of teenagers said it is at on their behavior which in turn, may affect their health .The Fifth purchasing habits may have an immediate as well as long-term impact least "somewhat important" to know the ingredients of a food item. Annual Food and Nutrition Survey (Food and Beverage Marketing & influencing adolescents' food purchasing decisions. Adolescents' foodas well as parental and peer influence are only some of the factors

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confectionary, cereal products, pulses, spices, jams/ jellies. When asked whether they felt that specific ingredients (e.g., sugar, salt, food were milk, biscuits, snacks and savories, beverages, oils, bakery foods, the packaged food products. The prepackaged foods that were brought from a sample at super markets went through the nutrients contents on additives and preservatives, artificial coloring and flavor) should be option. There is a need to focus not only on providing "nutrition facts" and label-reading skills. Food labeling is emerging as a major global since these young people are the future generation of the country health and nutrition status of adolescents warrants particular attention. listed on a food package, at least 69% of teenagers were unsure.) . The of each country and global initiatives to reduce added sugar, trans fats panels on foods but also on developing systems for identifying which Therefore, adolescents need to be taught appropriate food-shopping will be deemed to be important to understand the buying behaviour reading education. In this context, a study on consumer behavior is important for developing appropriate food-shopping and labelfruit, legume and other vegetable consumption. (Roodenburg et. al other saturated fats and added sodium while encouraging whole grain, foods and beverages are deemed healthy according to the food customs 2011). Knowing if and how adolescents use nutrition-label information about food labels perception of adolescent girls of Banaras Hindu University, Varanasi Keeping this in view, the study was undertaken to study the attitudinal

# Methodology

Study Area: Banaras Hindu University Under-Graduate Girls Hostel, provided an ideal setting to study the behavior among adolescent girls toward ready-to-eat food products.

Banaras Hindu University is a public central university located in girls' hostel, there are 10 under-graduate girls' hostels. Since femal over 20,000 students. BHU offers one of the best residential experience Malviya, BHU is one of the largest residential universities in Asia, wit Varanasi, Uttar Pradesh, established in 1916 by Pandit Madan Mohar are the grocery shoppers and meal planners of most of the househole one of the outer arc roads, facing large playgrounds. From the total for students staying within the campus. Many of these hostels lie improving their skills on reading labels is particularly of value. The under graduate girls provided an ideal setting to study the attitudir

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perception among adolescent girls. So the study was conducted in under graduate girls' hostels of Banaras Hindi University. The hostels were randomly selected.

Study sample: All types of required respondents who lived at girls hostel in Banaras Hindu University, between the age groups of 16-19 years (adolescent girls age according to WHO)

Sample Size: determined with the following formula:-  $n = z\alpha^2pq \div 12$ 

In which, P = proportion of adolescent girls having awareness about RTE food products.

 $q = 1-p z\alpha = 1.96 l = 5\%$  Therefore n = 384

- (a) Sampling procedure Adolescent girls were selected from five different specified hostels randomly according to the proportion allocated.
- (b) Selection of ready -to -food products. After deciding the topic, a general survey was conducted to know the commonly used RTE food products among the adolescent girls and on the basis of findings following food items belonging to different food groups were selected for the study. The particular product was selected in such a way as to present two products from each food group like cereals, fruits, vegetables and milk and milk product. The products selected for study were as follows:-
- Cereal based
- Biscuits, Bread
- Fruit based Vegetable based
- Fruit juice (packed), Jam Chips, vegetable based namkeen
- Milk and milk product Ice-creams, Lassi (packed)

Tool of study: Self prepared Questionnaire

- Data collected through self prepared Questionnaire which was divided into two sections. Section A elicited general and biographical information about respondents (age, educational and occupational status of respondents' parents, marital status, type and size of family, food habits and monthly per capita income etc.)

Section B elicited information on respondents' awareness and purchasing behavior. The questions in Section B were adopted from previous studies. The questionnaire was pre-tested with a conveniently selected sample of 20 respondents of hostel in order to

identify the problems and select the ready-to-eat food products as well as to determine the time for the completion of the questionnaire. The questionnaire was further tested during a pilot study and accordingly it was finalized i,e Feedback from both the pre-test and pilot study was used to make minor revisions in the questionnaire.

# Result and Discussion

Table 1: Distribution of Respondents according to Attention paid to label content of RTE Food Products with Reference to their Age, Family Background & Economic Status.

	Attentio	Attention paid about all the mint at	יווב לווחר	-				
Age (Verre)		,	on the label	label	a intorn	nation	ł	•
00 (20000)	Yes	s	No		Partial	ial	TOTAL	-
	No.	%	No.	%	No.	%	No.	%
16-17	16	20.5	17	21.8	45	57.7	78	130
17-18	26	16.0	36	22.1	101			0.00
18-19	10	3 6	3 8	1.77	101	62.0	163	100.0
Total	2 19	13.3	33	23.1	91	63.6	143	100.0
TOTAL	19	15.9	86	22.4	237	61.7	384	100.0
$\chi^2 = 2.01$ , df = 4, P>0.05	= <b>4</b> , P>0.0	5						
Family background	und							
Village	20	11.8	49	28.8	101	59.4	170	100 0
City	41	19.2	37	17.3	136	63.6	214	100.0
$\chi^2 = 9.15$ , df = 2, P<0.01	=2, P<0.	21						
Monthly/capita income	income							
<1670	07	9.9	18	25.4	\$	64.8	נ	1000
1670-5570	27	13.7	51	25.9	119	60.4	197	100.0
>55/1	27	23.3	17	14.7	72	62.1	116	100.0
$\chi^2 = 10.82$ , df = 4, P<0.05	f=4, P<	0.05						į
Control of the Contro								

The table 1 indicates that the distribution of subjects according to their knowledge about all the printed information on the label of Ready-to-eat food products which reflects that maximum 61.7% of adolescent girls have partial knowledge about all the printed information on the label where as 22.4% had no knowledge at all and rest 15.9% had full knowledge about printed matters on the label of Ready-to-eat food product.

Age wise distribution of adolescent reveals that a decreasing trend in proportion is obtained with increase of their age status among those had full knowledge about all printed information on label within range of maximum 20.5% to minimum 13.3% respectively. An increasing trend in proportion was observed among those adolescent girl had partial knowledge about printed information with increase of their age in range of minimum 57.7% to maximum 63.6%. Statistical x² test clearly shows that the difference in proportion about level of knowledge of adolescent girls among different age group is not significant.

It was seen that the adolescent girls of urban family background had complete knowledge (19.2%) and partial knowledge 63.6% in more proportion, than the adolescent girls of rural family background regarding details given on label of Ready-to-eat food product, and just reverse pattern was observed among those adolescent girls who had no knowledge of details given on the label. There is significant difference in proportion regarding level of knowledge about printed details on the label of Ready-to-eat food products between rural and urban family background adolescent girls.

Increasing trend in proportion of adolescent girls who had full knowledge about details of printed information on label with increase

Table 2: Distribution of Respondents According to the Attention paid to Different Printed Information on the label of RTE Food Products While Purchasing.

			*	Witeritani bara	var burn		
2	printed Information	Yes	Š	No	0	Total	al
75	I THICK THEY STATE SOLVE	Zo.	%	No.	%	No.	%
1	BJ Namo	335	87.2	49	12.8	384	100.0
1.	Brand Name		n n	S T	л	384	100.0
0	Product Name	359	93.5	C7	0.0	1	
o i	D-:	372	96.9	12	3.1	384	100.0
J.	File	278	77 4	106	27.6	384	100.0
4.	Manufacture & Expiry date	!			0	202	1000
Ċ	Weight of product	262	68.2	771	0.10		1000
7	Colour of product	57	14.8	327	85.2	384	0.00T
3 0	Colour or property	49	12.8	335	87.2	384	100.0
	1. LERET ABIT AC THURSTAN	10/	40 4	108	51 6	384	100.0
,00	Nutrients	100	F.0.	170	,		1000
9	Symbol of yeg & Non-yeg	115	29.9	269	70.1	384	0.00
5 :	Winding	165	43.0	219	57.0	384	100.0
10.	may or use	4		1	10	20/	100.0
	Raw materials (used)	159	41.4	225	9,86	200	1000
12	Address for complaint/ suggestion	127	33.1	257	66.9	384	0.001

of their family monthly per capita income in range of minimum 9.9% to maximum 23.3% respectively.

It may be concluded that no significant association exists between age and level of knowledge and significant association exist between family background and family monthly per capita income with level of knowledge of details given on the label of Ready-to-eat food products.

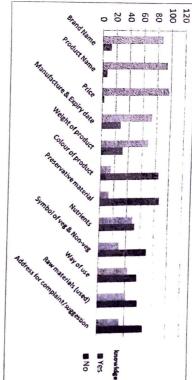


Figure 1: Printed Information on food label

and suggestion in case of poor quality of the products is found to be symbol of vegetarian & non-vegetarian and address for complaints and last date of use. 68.2% of subjects were aware about weight of also noticed that 72.4% of subjects were attentive about manufactured attention to price, product name and name of brand respectively. It was attention paid on the printed information on label of RTE food products. girls cared about brand name, name of products, price and weight of among 41.1%, 29.9% and 33.1% of subjects respectively. It was seen nutrients and ingredients as well as process of utilization of Keady in products. The results clearly shows that majority of the adolescents that 14.8% of subjects had knowledge about colour of products and The knowledge about raw material or ingredients used in products, knowledge about process of utilization of Ready-to-eat food products. product, 48.4% of subjects about nutrients and 43.0% of subjects had It reveals that majority 96.9%, 93.5% and 87.2% of total subjects paid The table 2 provides the distribution of subjects according to the product, manufacture and expiry date of product as well as type of 12.8% of subjects had knowledge about preservative materials used

to-eat food products in the present study. In the study by Ishanka & Carukshi (2016) found that more than 70% of the students paid attention Carukshi (2016) found that more than 70% of the students paid attention always' or 'most of the time' to the expiry date, price, brand name, nutritional panel and readability of the label. Godwin, Henderson & nutritional panel and readability of respondents read the label Thompson (2006) reported that majority of respondents read the label most of the time before purchasing food, with 21% stated they almost always do so. Parts of the label read most frequently were the calorie, fat, sugar and fibre content. Percentages of daily values were read less often, as were the health related statements and the list of ingredients. Approximately, half of those who consumed candy, bakery products, chips or sodas—foods known to be high in calories—stated that they did not read the calorie content.

Table 3: Age wise Distribution of Respondents According Attention paid on the Printed Information on Label of RTE Food Products

1 5 3 3				-	The state of the s	The state of the s		-		
				Age	36				Statistics	stics
Printed	17 (78)	78)	18 (163)	163)	19 (143)	143)	Total (384)	(384)	df=2	=2
Information	S.	%	No.	%	No.	%	No.	%	X2	P
Brand Name	67	85.9	142	87.1	126	88.1	335	87.2	0.24	>0.05
Product Name	71	91.0	152	93.3	136	95.1	359	93.5	1.41	>0.05
Price	76	97.4	155	95.1	141	98.6	372	96.9	3.20	>0.05
Manufacture &	56	71.8	113	69.3	109	76.2	278	72.4	1.83	>0.05
Expiry date										
Weight of product	53	67.9	114	69.9	95	66.4	262	68.2	0.44	>0.05
Colour of product	18	23.1	21	12.9	18	12.6	57	14.8	3.25	>0.05
Preservative	16	20.5	14	8.6	19	13,3	49	12.8	6.80	<0.05
Nutrients	40	51.3	71	43.6	75	52.4	186	48,4	2.73	>0.05
Symbol of veg &	28	35.9	45	27.6	42	29.4	115	29.9	1.77	>0.05
Way of use	35	44.9	65	39.9	65	45.5	165	43.0	1.12	>0.05
Raw materials	31	39.7	28	40.5	62	43.4	159	41.4	0.37	×0.05
(uscu)			i		1		100	3	201	\ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \
Address for complaint/	24	30.8	47	28.8	56	39.2	12/	33.1	3.91	2
suggestion										

The knowledge level of adolescent girls regarding different types of printed information is also categorized according to their age which presented in table 3. Statistically x<sup>2</sup> test signifies the fact that there is no

significant difference in proportion of adolescent girls among different age states regarding attention paid to different types of printed information on label of Ready-to-eat food products with the exception of the knowledge about preservative used in the product.

It may be concluded that although there is a variation in proportion of adolescent girls' knowledge regarding different type of printed information on the label of Ready-to-eat food product, among different age group but statistical the difference in variation of proportion is not significant except the knowledge about the preservative used in the product, in which 17 year of adolescent girls have significantly higher knowledge than 18 years & 19 year of age group. Washi (2012) in UAE conducted a study on awareness of food labelling among

Table 4: Distribution of Respondents According to their Satisfaction Regarding Packaging of RTE Food Products in relation to their Age, Family Background&

Economic Status

	Satis	Satisfaction regarding packaging of RTE food products	garding pack products	packagin ucts	g of RTE	pood		
Age	Yes	SS	Z Z	0	Sometimes (for specific	times ecific	Total	<u>al</u>
	No.	%	No.	%	3	0/	5	Q
16-17	32	41.0	39	50.0	87	90	76	1000
17-18	88	54.0	82	11 7	3 (		10	0.001
1010	!		8	11./	27	4.3	163	100.0
18-19	74	51.7	59	41.3	10	7.0	143	100.0
Total	194	50.2	166	43.2	24	6.2	35 12	100.0
$\chi^2 = 4.92$ , df = 4, P>0.05	df=4, F	>0.05						
Family background	ground							
Village	102	60.2	59	34.7	09	5.3	170	100.0
City	92	43.0	107	50.0	15	7.0	214	100.0
$\chi^2 = 10.99$ , df = 2, P<0.01	, df = 2,	P<0.01						
Monthly/capita income	pita inco	me						
<1670	31	43.7	33	46.5	07	9.9	71	100.0
1670-5570	114	57.9	74	37.6	09	4.6		100.0
>5571	49	42.2	59	U1	50.9	6.9		100.0
$\chi^2 = 9.99$ ,	=9.99, df=4, P<0.05	P<0.05						
								-

consumers. The study revealed the need to raise level of awareness of consumers specially on nutrition aspects of food labelling in order to assist them make healthy choices of foods. Production and expiry dates were documented by the study as necessary information preferred by

The distribution of subjects according to their choice towards satisfaction of packaging of Ready-to-eat food products according to their age, family background and economic status is presented in table 4. It depicts that maximum 50.2% of subjects opined that the packing of all Ready-to-eat food products are satisfactory, 6.2% of subjects were satisfied with the packaging of some specific products of stated Ready-to-eat food product but remaining 43.2% of subjects reported that the packaging of these products were not satisfactory.

The  $x^2$  test shows that highly significant difference is observed between urban and rural family background subjects' satisfaction regarding packaging arrangement of Ready-to-eat food products.

It may be concluded that about 57.0% of adolescent girls provided the positive opinion and remaining 43.0% negative opinion regarding packaging of Ready-to-eat food products. No significant association exist with age status and significant association exist with family background and economic status of subjects with their opinion regarding packing of Ready-to-eat food products in the present study.

Table 5: Distribution of Respondents on the basis of their Opinion about Reasons for Dissatisfaction of Different type of Packaging arrangement of RTE Food Products.

			ם	Dissatisfaction about packaging	ction a	bout pa	ackagin	00		
					Way to	v to	Material	erial		
RTE Food	Colo	Colour of	Seal of	lof	open	en `	to used in	ed in	Total	al
products	pac	packing	packing	gung	package	cage	packing	cing		
	N	%	No	%	No	%	No	%	No	%
Biscuits	95	57.2	32	19.3	37	22.3	02	1.2	166	100.0
Bread	79	47.6	54	32.5	24	14.5	09	5.4	166	100.0
Chips	83	50.0	44	26.5	36	21.7	03	1.8	166	100.0
Namkeen	81	48.8	45	27.1	38 8	22.9	02	1.2	166	100.0
Ice cream	36	21.7	44	26.5	81	48.8	05	3.0	166	100.0
Lassi	24	14.5	43	25.9	92	55.4	07	4.2	166	100.0
Fruit juice	33	19.9	56	33.7	72	43.4	05	3.0	166	100.0
Jam	43	25.9	73	44.0	47	28.3	03	1.8	166	100.0

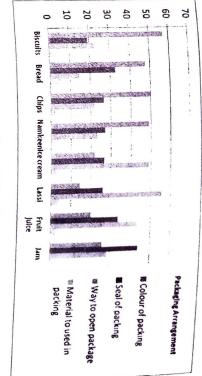


Figure 2. Food Products

was seen that maximum 48.8%, 55.4% and 43.4% of subject reported 5.4 of subjects was dissatisfied with materials used in the packing. It Bread, Chips and vegetable based namkeen respectively. Only 1.2% to subjects were not satisfied with way to open the packet of Biscuits, products. It was also seen that 22.3%, 14.5%, 21.7% and 22.9% of of respondents were dissatisfied with seal of packing of these stated based Namkeen respectively where as 19.3%, 32.5%, 26.5% and 27.1% disliked the colour of packaging of biscuits, bread, chips and vegetable who were not satisfied with packing of Ready-to-eat food products, It illustrates that majority 57.2%, 47.6%, 50.0% and 48.8% of subject packaging of Ready-to-eat food products is shown in the above table 5 The distribution of subjects about dissatisfaction of different type of that the process of opening the package of ice-cream, lassi and fruit 21.7%, 14.5% and 19.9% of subjects were not satisfied with colour of icedissatisfied from seal of packet of these products respectively. Only juice is not so good where as 26.5%, 25.9% and 33.7% of subjects were in packaging respectively. only 1.8% of subjects were dissatisfied about colour and material used followed by 28.3% about way to open packet and remaining 25.9% and maximum 44.0% of subjects were dissatisfied with seal of jam packing cream, lassi and fruit juice packing respectively. It was also noted tha

The results clearly shows that majority of adolescent girls were not satisfied with colour of Biscuits, Bread, Chips and Vegetable based Namkeen package followed by seen of packing and way to open package respectively while majority of adolescent girls are dissatisfied

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with way to open package of ice-cream, lassi, fruit juice followed by seal of packing as well as seal of packing respectively.

Table 6: Distribution of Respondents According to the Problems Faced during reading label with reference to their Age, Family Background & Economic Status

	Pr	oblem i	aced du	ring read	Problem faced during reading label		Total	=
Age (vears)	Yes		No	_	Sometimes	mes		
	No.	%	No.	%	No.	%	No.	%
16.17	14	17.9	22	28.2	42	53.8	78	100.0
17 10	20	12.3	56	34.4	87	53.4	163	100.0
17-10	3 !	20 3	2	35.0	2	44.8	143	100.0
18-19	13		0			1	707	1000
Total	63	16.4	128	33.3	193	50.3	384	100.0
$\chi^2 = 5.28$ , df = 4, P>0.05	=4, P>0.0	5						
Family background	und 29	17.1	50	29.4	91	53.5	170	100.0
City	34	15.9	78	36.4	102	47.7	214	100.0
$\chi^2 = 2.14$ , df = 2, P>0.05	= 2, P>0.0	55						
Monthly/capita income	income	21.1	15	21.1	41	57.7	71	100.0
1670-5570	31	15.7	63	32.0	103	52.3	197	100.0
>5571	17	14.7	50	43.1	49	42.2	110	100.0
$\gamma^2 = 10.28$ , df = 4, P<0.05	If = 4, P<	0.05						
,					-	-	-	-

The statistical x² test demonstrates that there is no significant difference in proportion of subjects among different age group regarding problems faced in reading and understanding the labels of Ready-to-eat food products. The x² test shows that no significant difference proportion exist between rural and urban family background of adolescent girls regarding facing problem in reading/understanding the label of Ready-to-eat food products.

It may be concluded that there is a variation in proportion of adolescent girls' perceptions regarding facing problem in reading/ understanding the label of Ready-to-eat food products. Among various age group economic status as well as between rural and urban family background, but significant difference is observed only according to family monthly per capita income group, that is higher economic states

related adolescent girls are not facing any types of problems in reading/understanding the label in more proportion while those adolescent girls were facing always and sometimes problems, the girls whose majority belong to family of below <1670 monthly per capita income. Sandria, et al. (2006) found in their study that over 2/3 of the consumer felt confident that the understand how to read labels and said using a food label was better than relying on their own knowledge.

Table 7: Distribution of Respondents According to type of Problem Faced
in Reading/Understanding

45 35 25	Total	7.	6.	<u>5</u> ,	4. 1	3.	2.	1.	SI.	
		1+2+3	2+3	+3	1+2	Use of scientific/commercial words	Very small letter/unclear print	English language (Only)	Type of problem faced	in Keaaing/Understanding
	256	47	19	04	02	98	53	33	No	ng
	100.0	18.4	7.4	1.6	0.8	ر د.ع	20.7	12.9	٩	

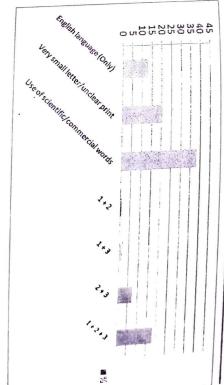


Figure 3: Type of problems

Further information about the type of problems was gathered among those subjects who reported to face always or some time in reading and understanding the label on Ready-to-eat food products, and distribution is presented in Table 7. It depicts that majority 38.3% of

subjects were facing problems about use of scientific/ commercial due to printing of very small letters as well as unclear printing. Only language on label followed by 20.7% of subjects were facing problem very small letter/ unclear printing and use of scientific commercial 18.4% were facing all three types of problems that is English language, 12.9% subjects opined about the problem of English language, whereas of subjects are facing problems of English language along with very language. It was also observed that is 02 (0.8%), 04 (1.6%) and 19 (7.4%)small letters and unclear printing and use of scientific/ commercial most focus group participants say they use label information, but they commercial words respectively. Silayoi & Speece (2004) repoted that words as well as very small letters along with use of scientific and adolescents prefer to make decisions on snacks quickly at a glance, thus would like it if simplified. Similarly, Gavaravarapu (2009) stated that reading long lists of nutrients given on labels would become rather cumbersome.

# Conclusion

Frequent label reading is a good practice that needs to be inculcated in an individual from adolescence. In reviewing the literature, it was also found that majority of studies have shown that adolescents read food labels less frequently. Since, India has the largest adolescent population (20%) in the world and these 10 to 19 years old constitute population of India's 1.2 billion population and at the same time, in the 243 million of India's 1.2 billion population and at the same time, in the current scenario, when there is shifts from homemade to prepackaged foods. In the light of above situation there is emphasized the need to foods. In the light of above situation there is emphasized the need to foods and implement programmes aimed at adolescents to improve develop and implement programmes aimed at adolescents to improve the usage of food labels on making healthy choices of the RTE food

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Ms. Mahajabi Fatma

Research Scholar Department of Home Science Vasant Kanya Mahavidyalaya Kamaccha

VARANASI- 221 010

U.P

Subject: Acceptance Letter

Madam:

This is with reference to your research article, "A Meta Analytical Study of Physiological and Nutritional Aspect of Stress in Adolescent Girls " by Mahajabi Fatma and Garima Upadhyay, sent by you on 29th May' 2018 for consideration of publication.

We are pleased to inform you that your research article is according to NAAS guidelines and has been accepted for publication. The same will be published in 14 no 3 (October-December) of 2018 in INTERNATIONAL JOURNAL OF FAMILYAND HOME SCIENCE (3 issues per year) (NAAS Rated and UGC Approved).

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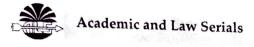
Thanking you,

Yours faithfully.

For ACADEMIC, AND LAW SERIALS

S.K Puri

Managing Editor



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# A META ANALYTICAL STUDY OF PHYSIOLOGICAL AND NUTRITIONAL ASPECT OF STRESS IN ADOLESCENT GIRLS

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### Abstract

The pressures of modern life, good education, good social image in front of others and with the demands of a job can lead to emotional imbalances, that are labeled 'stress'. Stress has many effects on the human biological systems. The central nervous systems (brain and spinal cord) play an important role in the body's stress-related machanisms. The central nervous system works closely with the body's endocrine system to regulate these mechanisms. The sympathetic nervous systems become active during a stress response, regulating many of the body's physiological functions is way that ought to make an organism more adoptive to its environment. Three principle regulatory systems in the body, serotonin systems, catecholamine systems and the hypothalamic-pituitary-adrenocortical axis adversely affect by stress.

In stress human beings turn to hyper palatable comfort foods even in the absence of hunger and lack of homeostatic need for calories. This effect worsen in obese or over weight individuals as compared to lean individuals.

Key words: Food choice, Adolescents Girls, Eating Behaviour

## Introduction

Many people consider stress is what happens to our bodies, psyche and our behavior in response to an event. The pressures of modern life, good education, good social image in front of others and with the demands of a job, can lead to emotional imbalances, that are labeled 'stress'. In many times stress is helpful in leading healthy life. We can say that the stress is spice of life and the absence of stress

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makes life monotonous and spiritless. Many times stress is helping us to realize the value of happiness and joy.

Some stress is necessary for the wellbeing and a lack of stress can be harmful. Stress is definitely responsible for some serious ailments. Severe stress can make people accident prone. Once in a life most people experience stress. Stress has been used to describe many types of negative feelings and reactions but not all stress reactions are negative. Some stress is actually necessary for survival.

The stress maximizes the use of energy which helps prepare the whole body to meet a threatening or challenging situation and the individual tends to mobilize a great deal of effort in order to deal with the event or stressor. Many of the diseases are caused by stress like headaches, insomnia, high blood pressure and cardiac diseases. Stress can lead to disease especially when the stress is prolonged intense.

**Different aspects of stress:** Stress affects all aspects of human life. It is not surprising that some of its aspects appear to be very general, possibly because they are not yet precisely understood. The effects of stress can be differentiated on the basis of-

**Cognitive aspects:** The initial physiological response of stress is automatic. It can be switched on by cognitive factors. For example when receiving sudden bad news, Cognitive symptoms of the urgent stress response involve increased attentiveness and distract ability of short and long term memory.

**Emotional aspects:** A range of emotions may be associated with stress in its early stages, including frustration, anxiety, anger, fear and irritability. If the stress be prolonged, these emotions may become confounded with others such as tension, depression and helplessness. Sudden emotional eruptions can occur even though they are quite out of character.

**Behavioral aspects:** Behavioral reactions of stress also vary greatly. Some people may tend more towards the 'fight' but others towards the 'flight' response. A third group may find it very hard to act at all. Some one more inclined to flee may avoid or escape from the difficult situation and thus miss opportunities for solving the problem.

**Causes of stress can be as followed:** Physical condition or health, life stage, life style, socio-economic status and many more but some habits really help to relieve or lower the stress like meditation, exercise,

balanced diet, control of anger. To manage stress full situations and conditions, positive attitude towards life and harmony towards sell and others helps us to cope the stress.

Biology of stress: Stress have many effects on the human biological systems. The central nervous systems [brain and spinal cord] plays an important role in the body's stress-related mechanisms. The central nervous system works closely with the body's endocrine system to regulate these mechanisms. The sympathetic nervous systems becomes active during a stress response, regulating many of the body's physiological functions is way that ought to make an organism more adoptive to its environment. Stress can be severe, acute stress or chronic low-grade stress may induce abnormalities in three principle regulatory systems in the body, serotonin systems, catecholamine systems and the hypothalamic-pituitary-adreno cortical axis. Aggressive behavior has also been associated with abnormalities in these systems. The hypothalamic-pituitary-adernal axis, a complex set of three endocrine glands that are hypothalamus, pituitary gland and adrenal glands.

These organs and their interactions made HPA (hypothalanuc pituitary-adernal) axis, a major neuro endocrine system that controls the reactions to stress and regulates many body processes, like digestion, immune system, emotions and mood, energy storage and expenditure. It is the common mechanism for interactions among hormones, glands and mid brain that mediate the general adaptation syndrome.

Anatomy of HPA Axis: The para ventricular nucleus (is a group of neurons that can be activated by physiological changes including stress) which contains neuroendocrine neurons that synthesize and secrete vasopressin (antidiuretic hormone) and corticotrophin-releasing hormone (CRH) (is a peptide hormone involved in the stress response). These facilitate to regulate the following-

The anterior lobe of the master gland or pituitary gland. CRH and Vasopressin stimulate the secretion of adrenocorticotropic hormone (ACTH). ACTH in turn acts on Adrenal cortex produces gluco corticoid hormones (cortisol in humans). Gluco corticoids in turn act back on the hypothalamus and pituitary (to suppress CRH and ACTH production) in a negative feedback cycle.

ACTH, transported by the blood to the adrenal gland, where it rapidly stimulates biosynthesis of corticosteroids such as cortisol from

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cholesterol. Cortisol is a main stress hormone and has effects on many tissues in the brain. In the brain, cortisol acts on two types of receptor-mineralo corticoid receptors and gluco corticoids is the hypothalamus, which is a major controlling center of the HPA axis.

CRH and Vasopressin act collectively to stimulate the secretion of stored ACTH form corticotrope (are basophilic cells in the anterior pituitary).

Release of CRH from the hypothalamus is influenced by many factors like stress, physical activity, illness, circadian rhythm. In healthy human beings, cortisol rises rapidly after wakening, reaching a peak within 30-45 minutes. It then gradually falls over the day, rising again in late afternoon. Cortisol levels then fall in late evening, reaching low points during the middle of the night.

Increased production of cortisol during stress results in an increase availability of glucose in order to facilitate fight or fly situation. Cortisol directly increase the availability of glucose and suppresses the highly demanding metabolic process of the immune system, resulting in further availability of glucose.

Studies on people show that the HPA axis is activated in different ways during chronic stress depending on the stressor and other factors. Stressors which are uncontrollable, alarms physical integrity or involve trauma move to have a high, flat diurnal profile of cortisol release (with lower than normal levels of cortisol in the morning and higher than normal levels in the evening) resulting in a high overall level of daily cortisol release.

**The Central Serotonin System:** Serotonin or 5-hydroxy tryptamine (5-HT) is a monoamine neurotransmitter. In biochemical aspects it is derived from tryptophan (amino acid). Serotonin is found in the gastrointestinal tract (GI Tract), blood platelets and the Central nervous system (CNS) of human. It is a contributor to feelings of happiness and well-being.

Serotonergic cell bodies move to upward projections to cortisol and limbic areas are predominantly stored in the mid brain dorsal and median raphe nuclei. Serotonin (5- HT) is unable to pass the bloodbrain barriers and has to be synthesized locally from the precursor molecule L-Tryptophan (TRP). TRP is essential amino acids which has to complete with other large neutral amino acids for transport through

the blood-brain barrier. So, TRP depletion through dietary restriction is an effective method to substantially reduce both cerebral TRP and 5-HT levels. After synthesis, 5-HT is stored into the small vesicles in the axon terminal.

Serotonin has a various kind of physiological and behavioral functions and mood regulation. Abnormal cerebral 5-HT function has been related to depression, aggression, anxiety and poor impulse control.

Normal serotonin function for control of sleep, wakefulness, feeding behavior, the control of sensory transmission, mood and a wide range of behavior. Changes in serotonin function have been related to changes in behavior. Serotonin poor function affects the abnormalities in mood and behavior. When the extracellular mono amine levels in the brain increased helps lower the several forms of stress.

Sachs D. Benjamin *et al.*, (2015), studied that brain 5-HT deficiency can increase vulnerability to psychosocial stress.

Catecholamine System: A catecholamine (mono amine) is an organic compound has a catechol and a side-chain amine. Catechol can be either a free molecule or is a substituent of larger molecule (1,2-dihydroxy benzene group).

Catecholamines are derived by the amino acid tyrosine, which is derived from dietary sources. These are water-soluble and 50% bound to plasma proteins in circulation.

Included among catecholamines are epinephrine, nor epinephrine and dopamine. Release of the hormones epinephrine and norepinephrine from the adrenal medulla of the adrenal glands is responsible for the fight-or-flight response.

Tyrosine is created from phenylalanine by hydroxylation by the enzyme (Phenylalanine hydroxylase). Tyrosine is also ingested from dietary protein. Catecholamine-secreting cells use several reactions to convert tyrosine serially to L- Dopa and then to dopamine. Based on the cell type-Dopamine may be further converted to norepinephrine or even change into epinephrine furtherely. Stress is affected by the high catecholamine levels in blood., which can be generated from psychological reactions or environmental stressors such as loud volume levels, high voltage of light or low blood sugar levels.

Catecholamines cause general physiological changes that prepare the body for physical activity (fight or flight response).

Catecholamine is secreted into urine after break down and its secretion level can be measured by the diagnosis of illness related to catecholamine in the body.

Adolescent eating habits: During adolescence nutritional demand or needs are increased because of the increased growth and changes in body composition. Increase of energy and nutrient requirements coincides with other factors that affect adolescents' food choices and nutrient intake and nutritional status. These factors areas followed by acceptance of peers, high rate of activity, too much time spent at school or work activities and preoccupation with self-image, contribute to the unhealthy eating behaviors that are common in adolescence.

In adolescence, young people gradually take the responsibility for their eating habits. Knowledge is necessary for a healthy transition of responsibilities. Unhealthy dieting behaviors in youth affect intake of nutrient, mental health and long-term health outcomes. After some times to follow this type of behavior some symptoms are shown like fatigue, anxiety and depression. During adolescent period of life, most common psychiatric problems are eating disorders among women and girls. This type of disorder leads to many eating behavior problem such as Anorexia nervosa, Bulimia nervosa, Binge eating habits and many more. Anorexia nervosa involves fear of becoming fat, under influence of shape on self-evaluation, having low body weight. Eating disorders are marked by psychosocial impairment.

Pressure for thin body shape promotes dieting. People who had body dissatisfaction may believe that this reduce social pressure to be thin.

Many adults reported that they have eaten fast food or junk foods in the past because of stress and it helps distract them from stress. Many adults said that they skipped meal during stress. Stress and diet both are related to each other. Research on everyday food intake in human subject under low and high-stress conditions has also produced inconsistent results. Stress on the work place has been associated with higher energy intake in two studies, examination stress has produced mixed results and surgical stress, probably the most extreme stressor examined, has been found to have no consistent effect. These type of

results may be associated to the nature of the stressors, could induce hypo phagic and mild stressors, hyper phagia.

Food Choice: Eating and food are the vital part of our life and its primary or basic function is to fulfill our biological needs, food plays an important role in various kind of activities in our day to day life and which are not related to only nutrition.

Our emotion, motives and attitudes are the common psychological factors effecting food choice. Food choice and emotional status is correlative to each other. Foods can conversely be chosen for boosting the current emotional state, such as calming of stressed 'nerves', lifting of mood, or food preferences can equally be a result of the current emotional state.

The determined mechanisms for stress caused changes in eating and choice of food are motivational differences, physiological and practical changes in food availability, eating opportunities and preparation of meal. So we can say that mood and stress can affect food choice.

The determinants of food choice are hunger, appetite and taste, cost income and availability, access, education, skills and time, culture family, pears and meal patterns, mood, stress and guilt, attitudes beliefs and knowledge about food.

**Emotional Eating:** Emotional eating defined as to increase our food intake in response to suppress our negative emotions. Emotional eating is a emotion-focused coping, which helps to minimize, regulate and prevent emotional stress.

In stress, hunger is changed by physically to emotionally. Physical hunger comes on more gradually to emotional. Emotional hunger is instant when a person is physically hungry he likes all types of foods including healthy and vegetable food stuff but if he stressed, like calorie-dense foods. In physical hunger conditions people enjoy their foods but in stress people do not enjoy their food even pizza, noodles etc. In physical hunger, person feel satisfied when his stomach is full but in emotional hunger state person wants more and more food without any physical needs. Emotional hunger is not the hunger of stomach. Emotional hunger leads to guilt or shame about food because the person try to manage his stress through consuming more food what he likes. Persons consumed food for psychological satisfaction rather than physiological needs.

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The effect of stress on food choice is complex. Some people eat more and some eat less than normal when they are in stress.

Yau et al. (2013), In human, individual differences in food intake response are 40% increased and 40% decrease their caloric intake when they are stressed and 20% people do not change feeding behaviors during stressful periods.

Another study shows that food choice does change under stress, with a tendency toward a relative increase in sugary, fatty [often snack type] foods.

Studies also suggest that if a person works in stress for long time, then dietary changes could result, increasing the possibility of weight gain and cardio vascular risk.

# Objective

To study the physiology of stress in adolescent girls.

# Methodology

The paper is based on secondary data. Data related to effect of stress on eating behavior of adolescent girls, is collected from various books, journals and periodicals on the particular topic and internet surfing for content analysis.

# Result

According to a number of laboratory studies shows that the variations of individual differences of the eating response in the state of stress. Stress affects the taste perception. A number of literature suggests that women consume more fat and calories under stress and they exchange their food choices from meal type foods to snack type foods. In contrast men eaters shows a reduction in food consumption under stress. In the group of emotional eaters stress increases consumption of sweet and fatty foods. In the state of stress small and high energy foods are more easily digested when gut activity is suppressed by sympathetic arousal.

In another study on chocolate consumption, three days of dark chocolate intake helps to manage or lower the level of stress. A study shows that consumption of 38gm dark chocolate per day for two weeks levels of psychological stress captured by self-reported anxiety and depression.

In stress human beings turn to hyper palatable comfort foods such as snacks, fast food and calories-dense foods even in the absence of

hunger and lack of homeostatic need for calories,this type of effect may be worse in obese or overweight individuals as compared to learn individuals.

Chronic stressors alter the brain function and it may leave traces after their relief. The hyper palatability of foods may serve as "comfort food"that acts as a form of self-medication to disappear unwanted distress.

Hippocrates was the first who suggest the healing power of food, yet it was not until the age of middle that food was considered a tool to treat the temperament and mood. Now days it is recognized that food influences our mood and that mood has a strong impact over our food choice.

sweet foods an average than did low emotional eaters in the group of emotional eaters were found to eat almost twice the weight of fatty Both consumed more weight of low fat than high fat sweet foods. High bland foods than women while this difference was more observable intake than women. The study also revealed that men eat notably more men eat remarkably more weight of food that is higher in total energy differences in food preferences among stress and control groups and notably more than women. The study also found that there were no low fat were the least liked. Men liked fatty bland and fatty salty foods foods compared to healthy foods. stressed people. Study shows in the stress people select less healthy foods than women and men did not eat more sweet foods than women for low fat than high fat bland foods. Men eat particularly more sally liked by the whole sample of study but foods that are salty and had higher than men on the emotional eating scale. Sweet foods were most Study of Oliver Georgina et al., (2000) conclude that women were

According to Habhab *et al.*,(2009) found in his study participants in higher stress condition eat larger quantities of food than those in the low-stress. Experiments reported that stress make a preference for sweet foods.

Pecina et al., (2006) show in his study the hedonic pathways in the brain related to liking for sweet tasting food items.

Macht et al., (2008) suggested consuming sweet foods in stress may help one control negative emotions by making positive affect that is conflicting wish such negative feelings.

Gibson et al., (2006) explained in his study that, high-fat, sweet food may helpreduce stress by enhanced function of the serotonergic system also found that high-fat meals be present to increase sub-fatigue and lower the alertness and attention with respect to equal high carbohydrate orlow fat meals.

Torres and Nowson (2007) showed that the desire for sweet, high-fat foods is correlated with their being viewed as more palatable or delightful.

Margo, (1985); Strober, (1984) study suggested that role of eating behavior in coping with stress have functional value. Bulimia may reduce emotional states causing from stress.

Rosen et al., (1993) suggests stress may be an outcome rather than a cause of eating disorders.

Mikolajczyk et al., (2009) researches shown that higher consumption of fruits and vegetables was correlated lower levels of depressive symptoms among females in our study and more frequent meat consumption was correlated with reduce levels of depressive symptoms in females.

# Conclusion

- Stress is correlated with emotional eating and leads to unhealthy dietary pattern.
- Stress can lead to increased or decreased eating or consumption which is based on severity of stressors.
- Stress harms our whole body including brain, nervous system, digestive system and the heart.
- Chronic stress levels are correlated with highly palatable foods which are energy dense and acute stress are correlated with reduce food intake.
- Changes in eating behaviors are more frequent in adolescent women rather than adolescent men.
- Levels of stress increased by the lack of physical activity.
- Farly adolescents have less stress than late adolescents.

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 In chronic stress our body's systems to reduce stress can leads to obesity.

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# Importance of understanding Vata Dosha and Trayopastambha in the management of diseases

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### Abstract

The human body has a unique mixture of three doshas (vata, pitta, kapha), which trigger life. These three doshas perform different functions in the body. When these defects are imbalanced, various types of physical and mental diseases are generated. Treatment of diseases is also possible on the basis of the panch mahabhoot that make up the body. According to the three stages of dosha (Sanchaya, prakop, prasar), symptoms of diseases arise. Acharya Charaka has given the following reasons for various Nanatmaja disorders - Nature, Adhyanthana, Gender, Volume, Ruja, Varna, Naam.Dosa outbreaks play an important role as they are responsible for the occurrence of diseases when consumed in large amounts. Therefore, this article describes the vata prakop nidana to overcome vataj nanatmaja disorder.

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