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## Abstract

College students are in that phase of transition where they get independence in many dimensions including choosing their lifestyle, diet and food. Now a days in spite of more inclination towards fast food, junk foods they are very much conscious about their look, physique and fitness. But after the incidence of pandemic COVID-19 immunity is now the major factor and alarming topic of discussion among youngsters too. They are aware of functional foods, antioxidants, wellness designed food, immunity boosting foods etc. Different nutrients like Zinc, Magnesium, Proteins, B vitamins, essential fatty acids play important role in body defensive mechanism; their presence in different types of foods is now creating curiosity among college girls. In rural areas girls are not that much aware about immunity-based foods but their food habits make them unknowingly that much strong enough so that they can face the immunological challenges. If it will be focused on food security, preserving nutrients for body immunity is also a major factor. Now days the environmental condition, life style, adulteration, malpractices in food sectors compel to think about strong immune - booster foods to combat such situation. So in this review article different studies are recapitulated to assess the knowledge level of college going girls on dietary awareness and defensive or immunity enhancing foods.

**Keywords:** functional foods, antioxidants, wellness designed food, immunity boosting foods

## 1. Introduction

Now a days it is a major concern that factors like workload, stress, home sickness, peer group pressure, imbalanced life style and food habits leads to disturbed eating habits of students. Skipping breakfast significantly found among young generation Verma K., Gupta A. and Verma S. (2018) [9]. Many college going students have common unhealthy eating patterns such as meal skipping, eating away from home, snacking and fast-food consumption. In present India there is a drastic change is been observed in the dietary patterns of college students. They adopt unhealthy eating habits mainly because of reduced affordability and accessibility of healthy diet on the premises and the presence of an abundance of surrounding fast-food outlets (Yadav H., 2015) [10]. So, these detrimental habits picked up during this age generally persist in adult life leading to chronic diseases later in life.

Immunity of the body is the result of wise eating habits and physical fitness. It also contributes in cognitive abilities such as problem solving, memorizing, alertness and information processing (Afina S., 2018) [2]. But faulty eating habits lead to many degenerative disease conditions among young girls in future.

Where as in the wake of modern facilities and technologies, the young generation is usually knowledgeable about health issues and health benefitting habits. So gradually some of the youngsters becoming conscious about their fitness, health and dietary pattern. They are wondering about new advanced concepts of food, Nutrition and different types of diets. Among them recently the terms like Super foods, Functional foods also acquiring special position.

Research conducted by Carrillo *et al.* (2013), students are included in the category of young consumers (aged 15-34 years) consumed functional food more than middle-aged consumers. Rezai *et al.*, (2012) suggested that young consumers were more open to new things and showed more positive attitude than the middle- aged consumers.

Modern approaches such as television, internet, movies, videogames websites and smart phone application are playing one of the crucial roles in the life of the adolescents (Sultana A., 2015).

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They use these in daily life activities. Advertisements, an attractive effective method of marketing products also attracting this age group.

**2. Objectives:** To review the articles on:

- 1 Dietary pattern based on weekly food group intake in college students.
- 2 Dietary pattern based on regular homely and outside foods intake of students.
- 3 Knowledge and attitude of college students towards immunity boosting foods.
- 4 Following labels by young consumers while purchasing food products.
- 5 Effect of mass media on dietary pattern of college girls.

### 3. Review of Literatures

#### 3.1 Dietary pattern based on weekly food group intake

Emerald *et al.* (2019) conducted a study in Father Muller College of nursing, Mangalore. Two hundred students of 18-19 years were selected by Simple random sampling technique; objective was to assess the eating habits. Information was collected by self-reporting checklist based on their eating habits. Results revealed that all of them consumed mixed diet. About 68% of the students were consuming three meals and 2 snacks regularly. Most of the students consumed starch, fruits, vegetables, dairy products, meat, fish, poultry, fat items and sweets only once or twice a day. Few students consuming vitamins and minerals that is only 1.5%. 3% takes other dietary supplements, and only 1% consumed meal replacement products.

A study was performed by Dayana Al., Reshma M., Dhanalekshmy T.G. (2019) [5] among adolescent girls in the different age groups of 14- 15, 16- 17 and 18-20 years studying in the urban schools and colleges in Thiruvananthapuram City during 2018-19 to understand the food pattern and the nutritional knowledge among them and to know about the trend existing in an urban area.

A self-administered questionnaire was drafted in English used to collect the information on their initial demographics, dietary pattern and nutritional knowledge. Two hundred sixteen school going children and 175 college students were randomly studied. The data collected was statistically analyzed using NCSS version 19.0.1 to draw conclusions. 90% of the study group consumed fast food. 75% of adolescents consumed instantly made food items at home 1-2 time/wk. All the age groups consumed fish at least 1-2 time/week. 50.48% of the 14- 15 age group had 2 servings of fruit/day whereas 50.45% of 16- 17 age and 48.57% of 18-20 age had only < 1 serving of fruits Day in their diet. 40% of the study group had 2 servings of vegetables daily in their diet and were consuming green leafy vegetables infrequently. An average of 58% of the adolescents consumed soft drinks 1-2 time/wk. 63% of adolescents used coconut oil for cooking and 34% used sunflower oil. An average of 49% of the participants consumed food 3 times/day. 87% of the adolescents preferred home cooked meal. Only 5% was aware about the importance of daily intake of 5 servings of vegetables as per the dietary guidelines. About 66% were not aware about the type of body shape that had risk of cardiovascular disease. Even though this survey has limitation, the sample may be a representative of the population as far as age and area is concerned. Adolescents in general do not follow proper diet chart which point to the need of continuous intervention even in the secondary and tertiary education to ensure healthy habits.

A Cross-sectional study was carried out by Yadav *et al.* (2015) [10] on 400 college going adolescents (17-19 years) of S.G. Balekundri Institute of Technology College, in urban area of Belagavi. Two hundred boys and 200 girls were selected randomly for the study by simple random sampling method.

Objective was to assess the dietary pattern among college going adolescents. Pre-designed and pre-tested questionnaire was used to assess diet (consumption pattern), frequency of meals, type of meal, vegetables and fruits consumption, daily water intake, consumption of fast food, etc. Mean calorie consumption among girls was  $1360 \pm 380$  Kcal. Majority students had their regular meals and breakfast (72% and 80.8% respectively). Fruit intake was by 46.8% students, which was consumed less than three times per week, 58% had fried food twice or more per week and 40.5% consumed less than 2 liters of water a day.

Undergraduate students of 1,189 in number in the University of Turku, southwestern Finland were selected for the study by Ansari w., Suominen S., Samara A. (2015) [3]. They completed an online self-administered questionnaire by reporting their eating habits. It contained the data regarding total 12 food groups, with their number of daily servings of fruits/ vegetables they consume and its importance. WHO guidelines were followed. Chi-square statistic was used the differences in dietary guidelines adherence between males and females, the associations between the gradients of importance of healthy eating and the self-reported eating habits. The observation was high levels of dietary adherence (> 70%) for most of the 'unhealthy food' items (cake/cookies, snacks, fast food/canned food, and lemonade/soft drinks), and moderate adherence for most of the healthy food' items (> 50%) (dairy/dairy products, fruit/vegetables serv-ings/day, fresh fruit, salads/raw vegetables and cereal/cereal products). Women had better adherence for meat/sausage products, fast food/canned food and for most healthy food' items ( $p < 0.001$ ), whereas men had better adherence for sweets (difference = 12.8%,  $p < 0.001$ ), lemonade/soft drinks (difference = 16.7%,  $p < 0.001$ ) and fish/seafood (difference = 6.6%,  $p = 0.040$ ). Most students considered importance of eating healthy (78.8%).

#### 3.2 Dietary pattern based on regular homely and outside foods intake

Assessing the eating habits of two hundred students (18-19 years) who were selected by Simple random sampling technique, the Information were collected by self-reporting checklist based on their eating habits. By conducting the study in Father Muller College of nursing, Mangalore Emerald *et al.* (2019) revealed that all of them consumed mixed diet. Students were irregular in their meal intake with preference in eating outside. About 68% of the students were consuming three meals and 2 snacks regularly.

The 66% of the students ate outside on a monthly basis, and 2% ate on a daily basis, 27.5% ate on a weekly basis, and 4% of the students go less than once a month or never ate outside. Another study was carried out by Abraham (2018) in Christian college in the mid-western United States. A sum of 121 students of 18-25 years of age were selected. This was a quantitative, cross-sectional study. The students were knowledgeable about outside foods like consuming fast food, soda, and processed food are unhealthy and they contain additives. A significant number of consumptions of processed food such as chips, cookies, and cereal based was observed on convenience.

Students living at home consumed more frequently raw and cooked vegetables, fish, meat and poultry, fresh fruit, eggs, bread/cereals and Students living away from home consumed more often packaged/ready food, beer and spirits, milk and chips. This was found out through a cross sectional study conducted by Lupi *et al.* (2015) to assess dietary habits of university students, who were living at and away from home. Two hundred and fifty-eight undergraduate students attending University of Ferrara were selected. The majority of students living alone reported a modification of dietary habits since leaving family. Furthermore, they perceived to have a weight condition different from normal in a greater extent than students living with family.

### 3.3 Knowledge and attitude towards Immune - boosting foods

Dayana Al., Reshma M., Dhanalekshmy T.G. (2019) [5] studied on adolescent girls in the different age groups of 14-15, 16-17 and 18-20 years studying in the urban schools and colleges in Thiruvananthapuram City during 2018-19 and found the food pattern and the nutritional knowledge among college girls with the trend existing in an urban area.

Two hundred sixteen school going children and 175 college students were randomly studied. The data collected was statistically analyzed using NCSS version 19.0.1 to draw conclusions. All the age groups consumed fish at least 1-2 times/week. 50.48% of the 14-15 age group had 2 servings of fruit/day whereas 50.45% of 16-17 age and 48.57% of 18-20 age had only < 1 serving of fruits/day in their diet. 40% of the study group had 2 servings of vegetables daily in their diet and were consuming green leafy vegetables infrequently. Only 5% was aware about the importance of daily intake of 5 servings of vegetables as per the dietary guidelines.

Based on the study by Afina S., Retnaningsih (2018) [2] the research with objectives to analyze the influence of 204 undergraduate student's knowledge and attitude toward functional foods. A cross-sectional study designed at Bogor Agricultural University. The data were collected by self-administered questionnaires. The result showed average of functional food consumption frequency was 47 times a month and was 7 kinds. Pearson correlation test showed that student's allowance, attitudes, and frequency of functional foods consumption were significantly correlated and positive.

A Study by Verma K., Gupta A. and Verma S. (2018) [9] was conducted to assess the consumption pattern among college going girls. Total 30 girls of age groups of 18-25 years were selected from Shuats, Allahbad. The questionnaire included General Profile Survey, Dietary intake (24 hours dietary recall method), Anthropometric measurement, Clinical sign and symptoms. Results explained the percentage of college going girls regarding awareness of functional foods was 60 percent. Fifty-three-point three percent believed that functional foods have health benefits beyond their basic nutrition. Forty percent were known that functional foods are very much essential for the prevention and treatment of disease. 33.33 percent were known about functional foods with probiotic benefits. Seventy percent did not know about functional foods which were easily available in their location. Some common functional foods such as tomato, garlic, etc. were consumed in high amount by college girls than some other functional foods like oats, barley, and beet root in daily diets.

By Ansari w., Suominen S., Samara A. (2015) [3] the study was based on 1,189 undergraduate students of the University of Turku in southwestern Finland. The questionnaire contained the data regarding total 12 food groups, with their

number of daily servings of fruits/vegetables they consume and its importance. WHO guidelines were followed. The observation was high levels of dietary adherence (> 70%) for most of the 'unhealthy food' items (cake/cookies, snacks, fast food/canned food, and lemonade/soft drinks), and moderate adherence for most of the 'healthy food' items (> 50%) (dairy/dairy products, fruit/vegetables servings/day, fresh fruit, salads/raw vegetables and cereal/cereal products). Women had better adherence for meat/sausage products, fast food/canned food and for most 'healthy food' items ( $p < 0.001$ ), whereas men had better adherence for sweets (difference = 12.8%,  $p < 0.001$ ), lemonade/soft drinks (difference = 16.7%,  $p < 0.001$ ) and fish/seafood (difference = 6.6%,  $p = 0.040$ ). Most students considered importance of eating healthy (78.8%<sup>c</sup>).

### 3.4 Following labels while purchasing food products

The study carried out by Kessler A. (2016) data were gathered by using an online 24-question survey, Monkey. A 14,334 number of students of 18 years age in East Tennessee State University (ETSU) attended the survey. Questions were related to their health and food purchasing behaviors, as well as the perceptions of front-of-package (FOP) nutrition labels. The survey included demographic characteristics with Objective to get information on participant's awareness about the presence of FOP nutrition labeling systems and symbols and its influence on purchasing the product. Result was explained by IBM Statistical Package for Social Sciences (SPSS). It was noted no significant differences among groups regarding the perceived accuracy, truthfulness or effect on cost that FOP nutrition labeling systems and symbols have on products displaying them. They more frequently paid attention on making nutritious and healthy food purchases ( $P = 0.002$ ); more strongly agreed that FOP nutrition labeling systems and symbols were useful tools ( $P < 0.001$ ); more strongly agreed that such labels were easy to understand and use ( $P < 0.001$ ); more strongly agreed that they were accurate ( $P < 0.001$ ); and finally, more strongly agreed that they were truthful ( $P < 0.001$ ).

### 3.5 Effect of mass media on dietary pattern

Abraham (2018) conducted a study among 121 students of 18-25 years of age in Christian college in the mid-western United States. This was a quantitative, cross-sectional study. The students were informational about fast foods and processed foods and their unhealthy aspects. It was found that Smartphone, vending machine uses were in least preference.

To assess of the impact of modern approaches on eating behavior of adolescent girls and to compare their nutritional status with RDA as recommended by I.C.M.R., 2010, a sample of 100 girls, collected by purposive random sampling technique by Atiqua S. and Savita A. (2015) [1]. Sample group belonged to 18-25 years of age which were chosen from four academic institutions of Lucknow city. A self-designed and pretested questionnaire was used to assess the impact of modern approaches on their eating behavior. BMI and 24-hour dietary recall method was used to assess their nutritional status. The result showed that 79% girls used modern approaches on daily basis. Their preference for fast and Junk food was highly influenced by advertisements. Average energy intake of adolescent girl was less than RDA, but good quality of protein, iron, calcium & Vit A intakes were significantly less than the RDA. Milk was not taken by girls in adequate amount. Dinner time was found to be deviated from regular supper time. It was also found that they skipped

their meals. Seventy nine percent of adolescent purchase fast food products influenced by modern approaches. Television plays a major role to buy. Maximum 59% of adolescent girls were influenced by TV and only 2% were influenced by video games.

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#### 4. Result and Discussion

From the above studies it's been found that college students are really in some zone of chaos ness in terms of healthy, functional, immunity boosted foods and also at risk of unhealthy junks but still as young consumer they are somehow aware of healthy food, food labels and are also media followers. So proper guidelines and nutrition education programs can enhance and refine their knowledge, behavior and attitude towards wellness and defensive food consumption.

#### 5. Conclusion

In present scenario many chronic and lifestyle diseases pave path to increased morbidity and mortality rate. Young generation is also caught in this circle. So, our near future, the college students should be harnessed in terms of healthy dietary pattern and specifically should make themselves ready and defensive for any health or physical challenges like the present biological disaster Covid 19.

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