Nutritional Status and Dietary Profile of College Students - A Cross Sectional Study from South India

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ABSTRACT

Background: Undernutrition is most critical health challenges facing society today, not just in terms of health, but also health care expense. Several studies have revealed that college students often have bad eating habits. Students typically consume less fruits and vegetables per day and report a high intake of high-fat, high-calorie items.

Aims: The purpose of this study was to assess nutritional status and dietary habits of students studying in university.

Materials and Methods: A cross-sectional survey was conducted among a sample of post graduate students with the sample size of 57. A well-structured interview schedule was used for data collection regarding socio demographic data, nutritional status and dietary profile.

Results and Discussion: Outcome of the results indicated that majority of them were belonged to the age category of 21-25 years, stayed in hostel, had one sibling and were middle class families. Around 50.6 % of college students were within the healthy Body Mass Index range. Most students showed 'satisfactory' dietary habits. Almost more than half of the students reported consuming good amounts of fruits, vegetables, milk and nuts daily. Only 8.8 % of students were eating non-vegetarian daily.

Conclusion: Around 50% of college students, particularly females, were within the range of good nutritional status. Students' dietary habits were satisfactory. However, students' knowledge of good diet habits, and nutritional knowledge needs to be improvement. This study offers new insight for formulating policies and intervention programs among college students in the future.

KEYWORD: Adolescence, Dietary pattern, Health status, Malnutrition, Nutritional status, Nutritional Assessment, Undernutrition.

1. INTRODUCTION

Good nutrition is a crucial prerequisite for optimum health, productivity, and overall working effectiveness. Undernutrition results in stunted growth, increased morbidity rates, shorter life spans, impaired cognitive function and development, reduced learning capacity, poor academic performance, ineffective adult performance, and slower national economic growth (Anitha, 2022). One of the major global causes of morbidity and mortality in children under the age of five, contributing to 60% of deaths, is undernutrition. India has the highest rate of malnourished children and adolescents in the world, twice that of Sub-Saharan Africa, which has an adverse effect on morbidity, mortality, productivity, and economic growth (Raajeswari *et al.*, 2022). Nutritional status can be defined as a composite of an individual's health as influenced by nutrient intake and utilisation, as determined by physical, biochemical, and dietary studies. Eating habits include why and how people eat, what foods they consume, and with whom they eat, as well as how people obtain, store, use, and discard food. Under-nutrition and over-nutrition are two major components of poor nutritional status. Numerous studies have found that young individuals have a significant prevalence of malnutrition and risk factors for cardiovascular and metabolic disorders. The primary causes of these abnormalities are insufficient food intake and poor dietary habits (Bede *et al.*, 2020).

Food insecurity is defined as "limited or uncertain ability to obtain acceptable foods in acceptable ways, or restricted or uncertain availability of nutritionally adequate and safe foods." Food insecure adolescents are more likely than food-secure students to rate their own health as fair or poor, eat fewer portions of fruit and vegetables (Knol *et al.*, 2019). Students who attend college face a variety of challenges that could encourage unhealthy eating habits and weight gain. They frequently skip meals, eat less fruits and vegetables, and are exposed to unhealthy foods like fast food and high-calorie snacks. Environmental changes negatively affect the quality of diets and eating habits, which can lead to higher rates of overweight and obesity as well as metabolic risk factors in people of all ages. In addition to being less active, it was found that female students were more stressed than male students, which

had a stronger effect on their food habits. Stressed female college students were more likely to select unhealthy snacks with high sugar and fat contents and to drink more fluids than their male counterparts (Alkazemi, 2019). It is challenging to tell whether nutrition students experience less food-related issues or are more prone to develop eating disorders due to inconsistent data. Eating disorders are characterised by persistently disturbed eating behaviours that harm one's physical or emotional health by affecting food consumption or absorption. Unhealthy eating practises that may have an impact on the development of disordered eating patterns include dieting, fasting, throwing up, and improper laxative use (Yu and Tan., 2016).

India has 243 million adolescents aged 10 to 19. Nutritional status of adolescents is an essential health concern. Growth during this stage of life is fastest and aids overall development and provides adequate energy stores for pregnancy and healthy adulthood. But still, nutrition interventions in India have primarily targeted children and women of reproductive age (Joy, 2018). Few research offered information on the nutritional status of adolescents. In this regard, SWABHIMAAN establishes the foundation for understanding the situation of adolescents in three less developed Indian states (Rah *et al.,* 2017). The nutritional status of adolescent females contributes greatly to the nutritional state of the population. The state of nutrition among college students requires attention by all. Hence the present study was aimed to identify the nutritional status and dietary pattern of college students studying in Alagappa University, Karaikudi, Tamilnadu.

2. MATERIALS AND METHODS

2.1 Selection of the Area and Sample

It is a cross sectional study conducted in the campus of Alagappa university located in Karaikudi, Tamilnadu, India, during the months between December 2022 and January 2023 after getting official permission from the college authorities and also obtained written informed consent from the respondents. About 57 students (5Male and 52 Female) were recruited for the study.

2.2 Tools used for the study

A self-structured pre tested interview schedule was used for collecting general information. Anthropometric measurements such as height, weight, body mass index (BMI), waist circumference, hip circumference, waist hip ratio of the college students was recorded accurately with appropriate measuring techniques and categorized the participants nutritional status based on Gomez chart and Broca's index. Mini Nutritional Assessment Scale which consists of 18 nutrition related questions carrying 30 marks as maximum under two chapters namely screening (6 questions) and assessment (12 questions) was also administered. Based on the scores secured the students were categorised as normal nutritional status, at risk of malnutrition and malnourished.

2.3 Inclusion and Exclusion Criteria

The study included registered students of the 2022- 2023 batch of I year masters in nutrition in alagappa university who gave consent. The study excluded students who were not in good health or had a history of any chronic medical condition.

2.4 Dietary Profile

Dietary profile includes the frequency of major meals consumed in a day, where meals are eaten, snacking behaviours, meal skipping patterns, and frequency of food intake with regard to cereals, pulses and legumes, green leafy vegetables, other vegetables, fruits and non-vegetarian foods.

2.5 Study Procedure and Data Collection

Data was collected using a questionnaire designed specifically for this investigation. A component of the questionnaire was intended to gather information on socio-demographic variables and eating habits (dietary habits). The study was introduced, and the objectives were explained. The data was collected to students who agreed to participate and completed a consent form. Anthropometric data were then measured and recorded in an accurate manner. Details on the dietary profile was collected through mini nutritional assessment scale, food frequency and 24 hours recall survey.

2.6 Statistical Analysis

SPSS (16.0) version was used for statistical analysis and data were expressed in terms of number, percentage, mean and standard deviation. We analysed chi-square, independent paired 't' test for linear relationship.

3. RESULTS AND DISCUSSION

The dietary pattern and nutritional status of postgraduate students at Alagappa University, Karaikudi, Tamilnadu were assessed using self-administered questionnaires. Fifty-seven (57) undergraduate students, both male (n = 5; 8.77%) and female (n = 52; 91.22%) were participated in the study. Table 1 predicts the socio demographic profile of the college students. The mean age of the participants was 26.8 ± 8.8 for male and 24.5 ± 5.04 for female. The students were majority in the age category of 21-25 years (73.7 %) and minority in the age category of 26-30 years (12.3%). Over three-quarters of the respondents, 46 (80.7%) were staying at the hostel and 11 (19.3%) were day scholars. Over half of the respondents 34 (59.6%) had a single sibling, 18 (31.6%) had two siblings and only five (8.8%) had more than two siblings. The results of the present study is on par with the study conducted by Blaabaek *et al.*, (2019) and found that family size has a negative causal impact on students educational achievement and that effect is lesser in families with stronger social ties. Socio-economic status is the measurement of occupation, education and income of an individual (Saidu and Ali, 2019). The majority of the respondents 51 (89.5%) belonged to the middle class and six (10.5%) belonged to the upper-class family. Poor socio-economic status may influence the physical growth of the college students by choosing unhealthy and unhygienic diet (Ghosh *et al.*, 2016).

Table 1: Socio demographic profile of the students

(N=57)

Variable	Male		Female		Total	
	No	%	No	%	No	%
Age (Years)						
21 – 25	3	5.3	39	68.4	42	73.7
26 – 30	1	1.8	6	10.5	7	12.3
30 - 40	1	1.8	7	12.3	8	14.0
Place of Stay						
Hostel	5	8.8	41	71.9	46	80.7
Day Scholar	0	0	11	19.3	11	19.3
Siblings						
One	4	7.0	30	52.6	34	59.6
Two	0	0	18	31.6	18	31.6
More than two	1	1.8	4	7.0	5	8.8
Socio Economic Class						
Lower class	Nil	Nil	Nil	Nil	Nil	Nil
Middle class	4	7.0	47	82.5	51	89.5
Upper class	1	1.8	5	8.7	6	10.5

Basic nutrition screening was depicted in Table 2. About Twenty-one (36.8%) of the respondents expressed to have unexplained weight loss/gain and 43 (75.4%) had good eating habits. Over 20 (35.1%) of the respondents skipped their meals and 13 (22.8%) had sleeping troubles. Over three-quarters of the respondents 49 (86.0%) reported that they had no food allergies and 8 (14.0%) had food allergies. Only four (7.0%) of respondents were getting up in the middle of the night to eat. More than half of the respondents 37 (64.9%) had to feel tired and weak and had done exercise regularly.

Table 2: Basic Nutrition Screening

(N=57)

Nutrition Screening	Yes		No	
	No	%	No	%
Unexplained Weight Loss/Gain	21	36.8	36	63.2

Good Eating Habits	43	75.4	14	24.6
Skipping meals	20	35.1	37	64.9
Sleeping trouble	13	22.8	44	77.2
Food Allergies	8	14.0	49	86.0
Getting up in the middle of the night to eat	4	7.0	53	53.0
Feeling tired and week	20	35.1	37	64.9
Routine exercise	20	35.1	37	64.9

Results of nutritional anthropometric measurements and body mass index are shown in Table 3. Anthropometric measurements such as height (cm), weight (kg), waist circumference and hip circumference are measured by using an appropriate standard tool. The mean and SD value of the height was 172.60 ± 9.56 for males and 158.19 ± 5.40 for females. The t-test value of this category was 5.29 and a significant difference was observed at $p < 0.02$. The mean and SD value of weight was 63.4 ± 3.85 for male and 56.6 ± 11.37 for female students. The t-test value of this category is 1.32 and a significant difference was observed at $p<0.01$. Body Mass Index was calculated as based on the formula. The mean BMI of the male is 21.52 ± 2.74 and female was 22.57 ± 4.18. The mean waist circumference for male and female students were 76.20 ± 7.36 and 76.35 ± 9.50 respectively. The mean hip circumference was 89.6 ± 9.97 for male and 88.33 ± 10.9 for female students. The mean waist-hip ratio is 0.85 ± 0.08 for male and 0.87 ± 0.09 for female students respectively. There is no significant difference exists among boys and girls with regard to body mass index, waist and hip circumference and waist hip ratio.

Table 3: Assessment of nutritional anthropometry of the college students

(N=57)

Nutritional Anthropometry	Male		Female		"t"	P
	Mean	SD	Mean	SD	test	Value
Height (cm)	172.60	9.56	158.19	5.40	5.29	0.02**
Weight (kg)	63.4	3.85	56.6	11.37	1.32	0.01**
Body Mass Index	21.52	2.74	22.57	4.18	0.55	0.17
Waist Circumference (cm)	76.20	7.36	76.35	9.50	0.03	0.31
Hip Circumference (cm)	89.6	9.97	88.33	10.9	0.25	0.69
Waist Hip Ratio	0.85	0.08	0.87	0.09	0.31	0.91

** P = 0.01

Table 4 explains the categorization of nutritional status of the students based on Mini Nutritional Assessment Scale, BMI, and Broca's Index. According with the mini nutritional assessment scale scores, about 45.6 % of females and 5.3% of males, totally 50.9% of the respondents were belonged to normal nutritional status. Malnutrition category was seen among only female at the rate of 12.3 % and 36.8% of women and 3.5 % of men were at risk of undernutrition. However, this finding was not statistically significant ($p = 0.778$). Over half of the respondents 33 (57.9%) had a normal BMI, seventeen (29.8%) were overweight and Seven (12.3%) were underweight. However, this finding was not statistically significant ($p = 3.98$) between male and female. Based on the assessment through Broca's Index, 26.3% of females and 3.5% of males were at good nutritional status while 38.6% of females and 5.3% were classified as undernutrition, and 26.3% of women were at risk of overnutrition. There are no males who were at risk of overnutrition, however, the finding was also not significant ($p = 1.96$). Based on all three assessment techniques, almost 50 % of the students were at the risk of either undernutrition or overnutrition. It is reported that only 50.9 % were good nutritional status according to mini nutrition assessment scale and 57.9% good nutrition grades were observed through Gomez classification and a minimum of 29.8 % good nutrition standard was observed through Broca's Index. Pal *et al* (2017) concluded in their study that about 54% of the adolescents were undernourished which is similar to this study results. According to the WHO Report on the

Nutritional Status of college students, stunting affects 45% of girls and 20% of boys. Another well-known and widely accepted truth in practically every Indian community is that girls have a higher frequency of malnutrition (Chakravarty *et al.*, 2022).

Table 4: Classification of nutritional status of the college students (N=57)

Classification of Nutritional status of the students	Male		Female		Total		Chi-Square $\chi 2$
	No	%	No	%	No	%	
Mini Nutritional Assessment Scale							
Normal Nutritional Status	3	5.3	26	45.6	29	50.9	
At risk of undernutrition	2	3.5	19	33.3	21	36.8	0.778^{NS}
Malnourished	0	0	7	12.3	7	12.3	
Body Mass Index							
Normal Nutritional Status	5	8.8	28	49.1	33	57.9	
Undernutrition	0	0	7	12.3	7	12.3	3.98^{NS}
Overnutrition	0	0	17	29.8	17	29.8	
Broca's Index							
Normal Nutritional Status	2	3.5	15	26.3	17	29.8	
Undernutrition	3	5.3	22	38.6	25	43.9	1.96^{NS}
Overnutrition	0	0	15	26.3	15	26.3	

NS – Not Significant

Since the staple food of the Indian population was cereal-based, the proportion of cereal consumption pattern of adolescence regardless of gender was maximum. Around two-thirds of the respondents (72.2%) ate cereals daily and 22% ate once a week which is shown in Table 5. Pulses and legumes were the most common food groups that were consumed a maximum of 66.7 % daily and around 10 to 12 % were once, twice or thrice a week in the form of either sundal or sambar. The consumption pattern of green leafy vegetables was maximum as 45.6 % daily, 24.6 % once in a week and 12.3 % twice or thrice in a week. Some of the common vegetables consumed by the present study children were carrot, potato, cauliflower, lady's finger, and beans. The consumption pattern of roots and tubers was very minimum (7%) daily and maximum (47.4%) once in a week. The percentage of fruits (59.6%), nuts and seeds (50.9%), and milk and milk products (77.2%) consumption pattern were highest daily. Boucher *et al.*, (2015) investigated an intervention to increase fruit and vegetable consumption among junior college students. Eating fruits and vegetables is one of the most important healthy practices for attaining maximum physical performance. Poor nutrition was significant among children who skipped meals and consumed little fruits and vegetables (Omage and Omuemu, 2018). Nearly half of the respondents 45.6% ate meat once a week. A similar dietary diversity for food group's consumption was observed in Ghosh and Varerkar (2019) study in Maharastra and reported that milk and milk products, fruits and vegetables were conspicuously absent in their diets. The majority of students have developed the habit of healthy food consumption which is a good practice. College students appear to be characterized by their preference for food. An interesting finding was that a high percentage of students reported consuming fresh fruits on a regular basis.

Table 5: Distribution of Frequency of Food Consumption Pattern of the College Students in Percent (N=57)

Food items	Daily	Once in a week	Twice in a week	Thrice in a week	Occasionally	Rarely
Cereals	72.2	22.8	-	-	-	-
Pulses and legumes	66.7	12.8	10.5	10.5	-	-
Green leafy vegetables	45.6	24.6	12.3	12.3	1.8	3.5
Roots and tubers	7.0	47.4	19.3	17.5	3.5	5.3
Fruits	59.6	12.3	5.3	14.0	3.5	5.3
Nuts and oils seeds	50.9	10.5	10.5	12.3	5.3	10.5
Milk and milk products	77.2	5.3	3.5	3.5	3.5	7.0
Sugar and jaggery	56.1	14.0	5.3	5.3	10.5	8.8
Non-Veg Items	8.8	45.6	22.8	10.5	7.0	5.3

CONCLUSION

From the preceding discussions, it could be concluded that poor nutritional status was observed among almost 50 % of the college students particularly among girls. Poverty and lack of nutrition knowledge have been identified as a significant contributor to adolescent malnutrition. As a result, well-planned poverty reduction measures, as well as mass nutrition and health education, are required, with a special emphasis on economically and socially disadvantaged elements of society. Dietary diversity is associated to family or individual food availability and nutrient consumption from various food groups, and it is an important component of nutritional outcome.

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