Nutritional Practice and Body Mass Index: A Quantitative Investigation among College Students of Kerala

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Abstract: Along with nutritional knowledge, the nutritional practice has a vital role in ensuring a healthy body reflected in individuals' body mass index. The present paper is an attempt to quantitatively assess the association of nutritional practice with body mass index. The researcher collected required data from undergraduate college students of Kerala using the Nutritional Practice Questionnaire. The Chi-Square test was used to assess the association between nutritional practice and body mass index. The findings were elaborately discussed with the help of extensive literature.

Key words: Nutritional practice, body mass index, Nutritional Practice Questionnaire

Introduction:

Knowledge about nutrients needed for a healthy body and the appropriate practice for consuming them is very relevant considering the growing inequality in health status among people and the decreasing accessibility towards health care facilities for the economically and the socially weak throughout the world (Food and Agricultural Organistion, 1992). As nutrition is the primary fuel for energizing the body, ensuring the required minimum quantity of them to all individuals is the right move to guarantee public health. Nutritional practices refer to all those deliberate and incidental food habits that an individual pursues to earn nutrition and energy to keep a long healthy life. As one of the most populous countries globally, developing adequate policies and infrastructure for continuous dissemination of related information and provision of nutritional food is becoming a progressive function of the state of India in the 21st century. As body mass index is based on sufficient consumption of nutrition, understanding the relationship between nutritional practices and body mass index, which is the universally used tool to calculate and compare the relative weight of an individual based on weight and height, among the youth population in India will help us to identify the missing links in our public health system.

Background of the study:

In developing countries like India, both awareness of and actual consumption of nutrition are influenced by the socio-economic conditions of the society (Sobal, 1991). As neither universal qualitative education nor a nutrient-rich food distribution system exists in these countries, underweight and malnutrition are occurring side by side here. Nutrient deficient food intake affects the health of people in these societies largely. Lack of knowledge on nutrients is the primary reason for poor nutritional practices (Ball, 2011). Educational institutions can address this issue effectively (Carpenter, 1996). The socio-economic conditions, along with poor nutritional knowledge, influence the nutritional practice of people. The fast-food habits and

sedentary lifestyle leads to growing lifestyle diseases. The irony is that such lifestyle diseases are started to affect poor and rural people too. It will affect the productivity of the people in addition to additional medical expenses. Hence the long term developmental potential of the country also is affected.

Statement of the Problem:

In contrast to the general Indian scenario, the state of Kerala ensured universal primary education to the younger population since the last decades of the 20th century. The state had developed a network of minimum health care facilities in villages too. The presence of a public distribution system and various health campaigns provided publicly accessible information on required nutrition intake and body fat levels. As the most privileged community, college students are expected to have excellent nutritional practice and body mass index exposure. The recent paper attempts to look into the level of awareness on nutritional practice and its association with body mass index among undergraduate college students of Kerala.

Objectives and Research Questions:

The paper tries to analyze the association between nutritional practices and body mass index among the graduate students of Kerala irrespective of gender, discipline, age and type of colleges. The research questions are

1. To find out the level of nutritional practices of college students of Kerala.
2. To find out the categories of body mass index of college students of Kerala.
3. To find out the nature of the association between nutritional practices and body mass index.

It is hypothesized that there will be a significant association between nutritional practice and the body mass index of college students in Kerala.

Literature review:

The changes in nutritional practices had attracted the scholar's attention for a long time. All these studies traced the association of nutritional practice with other variables. There were studies on the impact of nutritional intake in the health of later life (Chatterjee, Biswas, & Adhikary, 2014; Ferreira, 2013; Fuhr & Barclay, 1998. Similarly, there were studies on the importance of nutritionally rich food intake on obesity, folic acid formulation, cardiovascular fitness etc. (Wright, Borrud, McDowell, Wang, Radimer, & Johnson, 2007), fatigue (Ozdogan & Ozcelik, 2011). The relationship between nutritional knowledge and practices were studied by many scholars (Kinyua, 2013; Heaney, O'Connor, Michael, Gifford, & Naughton, 2011; Sharma, Gernand, & Day, 2008; Paugh, 2005;Lee, Templeton, & Wang, 1996). Scholars had studied the association of parents feeding habits of childhood with the individual's relationship with food (Branen & Fletcher, 1999), the influence of nutritional counselling on nutritional practices on adolescent girls (Suma, 2012), the relationship between nutritional practices and body mass index (Utter, Scragg, Mhurchu, & Schaaf, 2007) physical activity and body mass index (Sulemana, Smolensky, & Lai, 2006) and on obesity in relation to body mass index (Erickson, Wright, & Friedmann, 2000; Thakur & D'Amico, 1999).

Methodology:

To address the research questions, the researcher collected data from 2723 college students of age ranging from 17 to 27 years, with an average age of 19.1 years. Considering the objectives, the random sampling method is used to collect data. The samples represent all kinds of colleges in Kerala, irrespective of their stream and management. Among the respondents, 1235 were male, and 1488 were female. Using the Nutritional Practice Questionnaire (Paugh, 2005), data were collected about nutritional practices, and body mass index was calculated to know the weight categories of samples. This helps to understand the nutritional nature of the samples by calculating the frequency of a particular meal by the subjects. The questionnaire examines the frequency of taking food from each part of the food pyramid, including proteins

and other minerals. The reliability of the Nutritional Practice Questionnaire is 0.661. There are 18 questions in the well-accepted questionnaire, and the scores range from 18 to 72. The final scores were categorized into poor (below 55%), fair (55% to 69%), good (70% to 84%) and excellent (above 85%). Body mass index was calculated with a person's weight in kilograms divided by the square of height in meters. Overweight and a high body mass index indicates the obesity of an individual. To know the nature of the data, descriptive statistical tools like mean and standard deviation are used. To test the hypothesis, Chi-Square is used in which the level of significance is set at 0.05 level.

Analysis and Findings:

From the collected data, by using simple arithmetic techniques, the researcher identified the extend of nutritional practices among respondents and their respective weight categories.

Table -1: Categorization on Nutritional Practices & Body Mass Index of College Students in Kerala

Nutritional Practices			Body Mass Index		
Category	**N**	**Percent**	**Category**	**N**	**Percent**
Poor	256	9.4	Under weight (below 18.5)	693	25
Fair	1928	70.8	Normal (18.5 to 24.9)	1804	66
Good	523	19.2	Over weight (25.0 to 29.9)	176	7
Excellent	16	0.6	Obese (30.0 and above)	50	2
Total	2723	100.0	Total	2723	100

Source: calculated figures.

The above table reflects the minimum understanding of college students on nutritional practices. Around 70% of them have a fair and 20% of them have a good exposure to nutritional practice, which means only 10% of them have a poor understanding about the same. On the other side, almost two-thirds have average weight. Even though 25% have underweight, very few have overweight or obese. The following table shows the nature of data using mean and standard deviation.

Table -2: Descriptive Statistic of Nutritional Knowledge Score and Body Mass Index

Parameter	N	Mean	SD
NPQ Score	**2723**	**46.26**	**5.436**
BMI	**2723**	**20.1**	**3.419**

Source: calculated figures

The mean score of the Nutritional Practice Questionnaire is 46.26, which is 64% of the maximum attainable 72 marks. This mean score shows that the samples are better aware of the nutritional practices. In addition, the standard deviation from the mean is 5.43 only. Thus the samples are exposing the bright picture of nutritional practice understanding in the State of Kerala. Similarly, the mean and standard deviation of body mass index are 20.1 and 3.419, respectively. To test the hypothesis, Chi-square test is used, and the table is given below

Table -3: Chi-Square Test of Nutritional Practice and Body Mass Index

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	36.198[a]	6	.000
Likelihood Ratio	35.694	6	.000
Linear-by-Linear Association	4.246	1	.039
N of Valid Cases	2723		

Source: calculated figures

Table-3 shows the chi-square test of nutritional practice and body mass index of Kerala college students for verifying the independence of the two variables. Since the *p*-value indicated in the third column was less than 0.05 for three tests, it can be concluded that the variables were not independent. The *p*-value was less than 0.05, which means that there exists a relationship between the testing variables.

Table – 4: Cross Tabulation of Nutritional Practice and Body Mass Index

			Body Mass Index				Total
			Under Weight	Normal	Over Weight	Obese	
Nutritional Practice Score out of 72 (Binned)	Poor	Count	82	217	37	14	350
		Expected Count	89.1	231.9	22.6	6.4	350.0
		Residual	-7.1	-14.9	14.4	7.6	
	Fair	Count	495	1195	110	34	1834
		Expected Count	466.8	1215.0	118.5	33.7	1834.0
		Residual	28.2	-20.0	-8.5	.3	
	Good and Excellent	Count	116	392	29	2	539
		Expected Count	137.2	357.1	34.8	9.9	539.0
		Residual	-21.2	34.9	-5.8	-7.9	
Total		Count	693	1804	176	50	2723
		Expected Count	693.0	1804.0	176.0	50.0	2723.0

Source: calculated figures

In Table- 4, the data shows the residual values were high in top right columns (NP-poor: BMI- high and obese), and that it is also high in the bottom second left column (NP-Good & Excellent: BMI- Normal), which means there exists a negative relationship between these two variables. The results indicated that the students with Good and Excellent NP had optimum body mass index score.

Discussion of Hypothesis:

The result shows that the younger generation of Kerala is only moderately performing in nutritional practices. Considering the comparatively better purchasing power of people and the provision of the universal public distribution system, the state is expected to have a better nutritional practice among people. Hence it can be due to deliberate nutritional or food choices of people. The widespread availability of cheap fast food and packet food, along with alcohol, may compel people to skip nutrition-rich food. Poor

nutritional diet may lead to underweight due to malnutrition or to obesity due to high consumption of carbohydrates and fat (Caballero, 2007).

Apart from specific individual choices, the changing patterns of agriculture and market culture are vital in influencing nutritional practices. Along with the growth of service sectors and increased inflow of foreign remittances, cash crops replaced food crops largely in agricultural land. Simultaneously, flower gardens took the place of vegetable gardens too. This made a situation of depending on other states for vegetables, fruits and other food items. Hence the easy availability of conventional nutrient-rich food items became challenging to access, particularly in urban regions (Forster & Escudero, 2014). When people's dependency on the market increased, the later tried to provide more packed and fast food items for immediate consumption. This adversely affected the ordinary food culture to an extent too. All of them led to poor nutritional practices too. It is important to note that the quantity of food does not refer to the quality of nutritional intake. Similarly, an obese person can be malnutritioned too.

On the other side, backwardness and socio-economic conditions can also affect nutritional practices adversely (Beydoun & Wang, 2008). The backwardness among fishing and tribal communities can unfavourably affect their nutritional practices. Similar is the case of those semi-skilled and unskilled labourers who are increasingly migrating from other parts of the country. Contrary to these communities, an economically strong middle class is also formed in the state and the existing class of permanent workers. The new middle class was the product of market reforms since the 1990s. Their urban centred living style had the practice of consuming junk food and beverages, leading to obesity or overweight.

However, compared to the levels of nutritional practices, the students perform better in body mass index. Those having good and excellent nutritional practice have optimum body mass index score from the earlier statistical analysis. But even those with poor and fair nutritional practice too have a better body mass index in general here. It can be mainly because of their age-related vigour. In the teenage years, all individuals are generally more physically active. Their involvement in sports, dance, gymnasium and other physical activities will be high. Similarly, the high metabolism in the body can keep the body mass index at an optimum level. The consequences of bad nutritional practices can affect individuals only later. Overweight and obesity among teenagers reflect a highly sedentary lifestyle or can be a genetic disorder.

Based on these discussions, the hypothesis stated that there would be a significant association between nutritional practice and the body mass index of college students in Kerala is partially accepted. Those college students who have good and excellent nutritional practices have the most suitable body mass index, whereas those with fair and poor nutritional practices have the worst body mass index.

Conclusion:

The famous Kerala model of development, based on universal primary education and health care facilities, also ensured the provision of the minimum amount of nutrients to the masses through the public distribution system. It helped the state to break several developmental obstacles and assisted in building a skilled workforce. Hence, it proved that a developing state could actively play a vital role in creating a healthy bodied society by successfully addressing socio-economic backwardness. But the increasing gap among economic communities in the present days due to changing concerns of state policies and society in large shows signs of deterioration in body mass index among the younger generation. This is reflected in the present study. The paper urges for urgent intervention from the state and community to the issues of nutritional knowledge, practices and physical activities of the younger generations in Kerala.

Bibliography

Ball, L. (2011). Nutrition Care in General Practice: Are We Waiting for Patients to Ask? *Australian Family Physician, 40* (7), 463.

Beydoun, M. A., & Wang, Y. (2008). How Do Socio-Economic Status, Perceived Economic Barriers and Nutritional Benefits Affect Quality of Dietary Intake Among US Adults. *European Journal of Clinical Nutrition volume, 62*, 303–313.

Branen, L., & Fletcher, J. (1999). Comaprison of College Students' Current Eating Habits and Recollections of Their Childhood Food Practices. *Journal of Nutrition Education, 31* (6), 304-310.

Caballero, B. (2007). The Global Epidemic of Obesity: An Overview. *Epidemiologic Reviews, 29*, 1–5.

Carpenter, J. (1996). *Nutrition Education in Public Elementary and Secondary Schools.* National Center for Education Statistics.

Chatterjee, S., Biswas, J., & Adhikary, S. (2014). A Study on the Relationship between Nutrition Status and Physical Fitness of School Boys. *Journal of Sports and Physical Education, 1* (5), 46-50.

Erickson, P., Wright, H., & Friedmann, J. (2000). Association between Body Mass Index and Health Related Quality of Life in Older Adults. *Quality of Life Research, 9* (3), 329.

Ferreira, F. (2013). Relationship between Physical Fitness and Nutritional Status in a Portuguese Sample of School Adolescents. *Journal of Obesity & Weight Loss Therapy, 3* (5), 1-6.

Food and Agricultural Organistion. (1992). *Major Issues for Nutrition Strategies.* Rome: Food and Agricultural Organistion.

Forster, T., & Escudero, A. G. (2014). *City Regions as Landscapes for People, Food and Nature.* Washington DC: EcoAgriculture Partners.

Fuhr, J., & Barclay, K. (1998). The Importance of Appropriate Nutrition and Nutrition Education. *Young Children, 53* (1), 74-80.

Heaney, S., O'Connor, H., Michael, S., Gifford, J., & Naughton, G. (2011). Nutrition Knowledge in Athletes: A Systematic Review. *International Journal of Sport Nutrition and Exercise Metabolism, 21* (3), 248-261.

Kinyua, L. (2013). *Association of Nutrition Knowledge and attitude with Dietary Practices and Nutritional Status of Female Undergraduate Students Attending University Colleges within Nairobi Metropolis.* Nairobi : University of Nairobi.

Lee, C., Templeton, S., & Wang, C. (1996). The Impact of Nutritional Knowledge on the Quantity and Quality of Diet Among the Southern Rural Elderly. *Journal of the American Dietetic Association, 96* (9).

Ozdogan, Y., & Ozcelik, A. (2011). Evaluation of the Nutrition Knowledge of Sports Department Students of Universities. *Journal of International Society of Sports Nutrition, 8* (11).

Paugh, S. (2005). *Dietary Habits and Nutritional Knowledge of College Athletes.* California: University of Pennsylvania.

Sharma, S., Gernand, A., & Day, R. (2008). NNutrition Knowledge Predicts Eating Behaviour of All Food Groups Except Fruits and Vegetables Among Adults in the Paso del Norte Region: Que Sabrosa Vida. *Journal of Nutrition Education and Behavious, 40* (6), 361-368.

Sobal, J., & Stunkard, A. (1989). Socio-Economic Status And Obesity: A Review Of The Literature. *Psychology Bulletin, 106*, 260–275.

Sulemana, H., Smolensky, M., & Lai, D. (2006). Relationship between Physical Activity and Body Mass Index in AdolescentS. *Medicine and Science in Sports and Exercise, 38* (6), 1182-1186.

Suma, N. (2012). *Nutritional Status and Nutrition Cognition of Adolescent Girls in the Coastal Areas of Thiruvananthapuram.* Thrissur: Kerala Agriculture University.

Thakur, N., & D'Amico, F. (1999). Relationship of Nutrition Knowledge and Obesity in Adolescence. *Family Medicine, 31* (2), 122-127.

Utter, J., Scragg, R., Mhurchu, C., & Schaaf, D. (2007). At-home Breakfast Consumption Among New Zealand Children: Associations with Body Mass Index and Related Nutrition Behaviours. *Journal of American Dieti Association, 107* (4), 570-576.

Wright, J., Borrud, L., McDowell, M., Wang, C., Radimer, K., & Johnson, C. (2007). Nutrition Assessment in the National Health and Nutrition Examination Survey1999-2002. *Journal of the American Dietetic Association, 107* (5), 822-829.