

# Assessment of Nutritional Status & Health Condition Among Vegetarian and Non-vegetarian Adult at Tangail Sadar Upazila in Tangail District

Farhana Akther, Mst Khodeza Akter, Babu Kanta Sen, Mizanur Rahman, Mesbah Uddin Talukder

Department of Food Technology and Nutritional Science, Mawlana Bhashani Science and Technology University, Tangail, Bangladesh

## Email address:

mesbah\_du06@yahoo.com (M. U. Talukder)

## To cite this article:

Farhana Akther, Mst Khodeza Akter, Babu Kanta Sen, Mizanur Rahman, Mesbah Uddin Talukder. Assessment of Nutritional Status & Health Condition Among Vegetarian and Non-vegetarian Adult at Tangail Sadar Upazila in Tangail District. *International Journal of Nutrition and Food Sciences*. Vol. 5, No. 4, 2016, pp. 241-245. doi: 10.11648/j.ijnfs.20160504.12

Received: May 4, 2016; Accepted: May 26, 2016; Published: June 7, 2016

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**Abstract:** A cross sectional comparative study was carried out to compare the nutritional status between the vegetarian and non-vegetarian individuals. The study was conducted among 100 respondents (50 vegetarian and 50 non-vegetarian) at Tangail sadar upazilla in Tangail district to assess their nutritional status by collecting anthropometric and socio-demographic data, dietary intake pattern as well as hygienic and clinical information. Among the respondents all the vegetarian were Hindu and majority of the non-vegetarian were Muslim (70%). The study found that nutritional status of 72% vegetarian and 62% non-vegetarian were normal. According to this study 4% vegetarian and 12% non-vegetarian respondents were underweight and 26% non-vegetarian and 24% vegetarian respondents were overweight respectively. Mean heights of vegetarian respondents was 161.62cm and mean weight 59.78 kg whereas mean height and weight of the non-vegetarian respondents were 158.62cm and 57.14 kg respectively. The study observed the food habits of the respondents. Vegetarian respondents consumed more leafy and non-leafy vegetables, pulses, and dairy based products avoiding egg, meat, and fish. Besides 64% non-vegetarian consumed fish and 24% consumed egg daily and 64% consumed meat weekly. The study findings strengthen the notion that the nutritional status of the vegetarian respondents are better than non-vegetarian due to their health consciousness and food intake pattern.

**Keywords:** Nutritional Status, Vegetarian, Non-vegetarian, Bmi, Tangail

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## 1. Introduction

During the past decades, knowledge has emerged on the effect of vegetarian diet on nutritional status [1]. There is evidence that well-planned vegetarian diet provides numerous health benefits and is appropriate for all stages of life cycle [2]. Considering health hazards of consumption of protein rich diet deriving from animal sources, proportion of vegetarian or people consuming vegetable-based diet is increasing globally [3], [4], [5], [6]. Global health economy is recently experiencing high burden of chronic diseases as cardiovascular diseases, cardiovascular disease as well as endocrine disorders like diabetic mellitus with sufferings from malignancy [7], [8], [9], [10]. This situation has led the concept of vegetarianism to become much popular not only in developed countries but also in developing one [11], [12],

[13]. On the other hand, vegetarians are often deficient in different macro as well as micronutrients especially vitamin B12 and the sufficiency mainly found in animal food sources [14]. Chronic deficiency often manifests with clinical syndrome and need appropriate medication or replacement through properly planned diet or vitamin supplements. In most of the cases, inadequate knowledge about the food sources of such essential micronutrient as well as the availability of the particular food items might be the underlying causes. Like other developing countries, Bangladesh is now burdened with pretty high rate of chronic diseases among the general population [15], [16]. As a result, vegetarian diet is now becoming familiar and considered as healthy diet as appropriate medication. A very recent study revealed favorable lipoprotein status among rural Bangladeshi vegetarians indicating the importance of

consumption of vegetable-based diet [17].

Vegetarianism is the dietary practice of people abstaining from some or all-animal products [18], [19]. The term vegetarian is often used to include people who eat all types of vegetarian diets, which, in reality can be highly variable. Today vegetarians are divided into several different subgroups based on their dietary intake, and the most common types of vegetarians are shown in Table [18], [19], [20]. Semi-vegetarians are also sometimes called demi vegetarians, pescovegetarian and near-vegetarians, and some studies also include people in this subgroup who eat poultry or with rare and infrequent meat intake [18], [19]. Defining a person as a vegetarian, even though the person actually eats some animal products such as fish, poultry or pork, may be controversial, since they are not vegetarians in the strict sense of the word, rather non-red-meat eaters. Other types of vegetarians are fruitarians who eat only those parts of the plant that are cast off or dropped from the plant and that do not involve any destruction of the plant itself [18], [19].

Vegetarian diets, given their restricted nature, are different from omnivore, non-vegetarian diets in many ways. They tend to have higher proportions of whole grains, nuts, fruits and vegetables, and as a result have higher dietary amounts of fiber, antioxidants, vitamins C and E, potassium, and magnesium. They are also generally lower in calories, saturated fats, cholesterol, long-chain n-2 (omega-3) fatty acids, eicosapentaenoic acid (EPA), docosahexaenoic acid (DHA), iron, zinc and vitamin B-12. Meats and meat products are a rich source of these nutrients.

Vegetarian diets that restrict dairy or egg consumption are also lower in vitamin B<sub>2</sub>, Vit D, and calcium [21]. This lack of calcium may put vegans, who do not take supplement, are at risk for bone fractures; A comparative study of vegetarians and omnivores showed no difference in risk for bone fractures between omnivores and ovo-lacto vegetarians, but vegans had a 30% higher risk [22]. In fact lacto- and ovo-lacto vegetarians may consume more calcium in their diets than non-vegetarians.

A review of vegetarian diets based on ten studies found that vegetarians had lower intake than omnivores for only a few nutrients: vitamins B<sub>12</sub> and C, calcium and zinc [23]. Overall conclusions were that vegetarian diets can be nutritionally adequate. Any nutritional deficits can be addressed by taking supplements, eating fortified foods, or preparing and combining foods to enhance absorption of vitamins and minerals. Hence the present study was conducted with a objective to compare the nutritional status of vegetarian and non-vegetarian individuals to provide information related to importance of vegetarian diet.

## 2. Methods and Materials

### 2.1. Study Population

The study was conducted among selected vegetarian and non-vegetarian respondents aged 20 to 40 years in Tangail region.

### 2.2. Study Location

The study was conducted at Sabalia, Battola, Kagmari area to collect data from randomly selected vegetarian and non-vegetarian respondents.

### 2.3. Sample Size and Study Design

This study was a comparative cross-sectional study. After fulfilling the selection criteria for inclusion in the study, the respondents were selected randomly. 50 vegetarian & 50 non-vegetarian respondents were interviewed.

### 2.4. Questionnaire Design

A structured questionnaire was developed to obtain the relevant information regarding the general information, socio-economic information, nutritional knowledge and individual information. Anthropometric measurement of the adult person and food frequency information sheet were also included in the questionnaire.

The purpose of the pre-test was to test the content, wording, and expression, the topical sequence of questions and duration of the interview and the reliability of some items. After pre-test, the questionnaires which were related for quantitative data collection were improved and reformed to ensure content coverage, the reliability and validity of the study. The anthropometric data were collected based on standard methods.

### 2.5. Data Verification

Questionnaires were checked each day after interviewing and gain these were carefully checked after completion of all data collection and coded before entering into the computer. To minimize the errors after entering the data set into the computer, these are checked and resolved by correction.

### 2.6. Data Analysis

All the statistical analysis and all other data processing were done by using SPSS 17.0 windows program. For tabular, charts and graphical representation Microsoft word and Microsoft excel were used.

## 3. Results

*Table 1. Distribution of the respondents by socio-demographic features.*

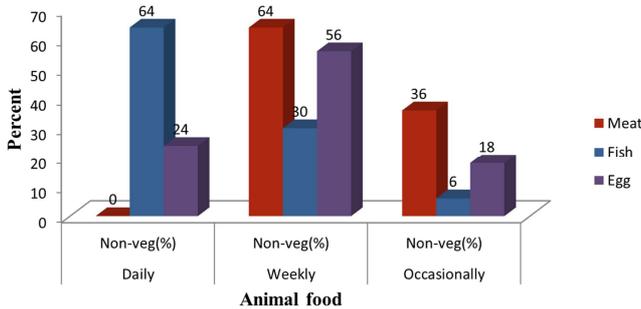
Variables	Vegetarian (n=50)		Non vegetarian (n=50)	
	Frequency	%	Frequency	%
Religion				
Muslim	0	0	35	70
Hindu	50	100	15	30
Education				
Illiterate	0	0	1	2
Primary	9	18	10	20
Secondary	13	26	16	32
Higher secondary	8	16	8	16
Graduate	20	40	15	30

Table-1 represents the demographic information of the respondents. Among the respondents all the vegetarian were Hindu and majority of the non-vegetarian were Muslim (70%) and the rest were Hindu (30%). Among the vegetarian no one was illiterate. It was found that 40% of the vegetarian completed the graduation whereas 30% non-vegetarian completed the graduation.

**Table 2.** Information about vegetarian respondent

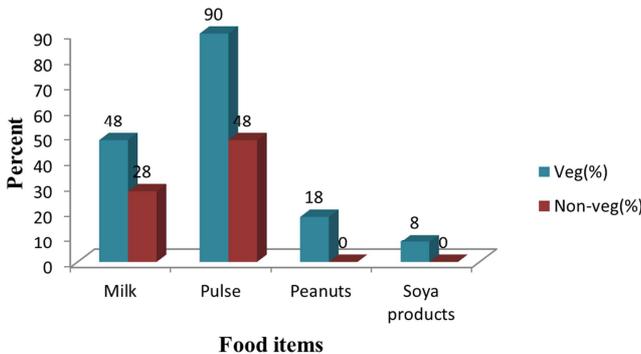
Variables	Vegetarian (n=50)	
	Frequency	(%)
Time passed as a vegetarian		
1-10 years	32	64
11-20 years	13	26
21-30 years	5	10
Cause of vegetarian		
Health	5	10
Religion	41	82
Family up-bringing	4	8

Table-2 shows that various information about vegetarian respondents. Among them 64% respondent have been vegetarian for 1-10 years old, 26% respondent 11-20 years and 10% respondent 21-30 years old. There are various causes of become a vegetarian. Among them, 10% for health issues, 82% for religion and 8% for family up-bringing.



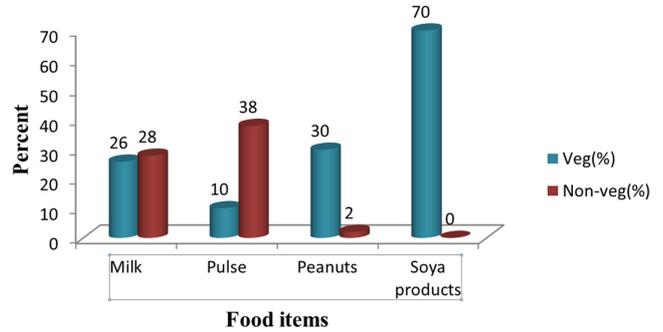
**Figure 1.** Consumption of protein rich food by non-vegetarian respondents.

Figure-1 shows that 64% & 24% non-vegetarian respondents consume fish & egg daily whereas 30% & 56% respondents consume weekly respectively. On the other hand, 64% respondents consume meat weekly & 36% consume occasionally.



**Figure 2.** Daily Consumption of protein based food among vegetarian and non-vegetarian respondents.

Figure-2 shows that 48% vegetarian used to consume milk daily whereas 28% of non-vegetarian consume milk. Among vegetarian 90% respondents consume pulse daily in compare with 38% non-vegetarian. Besides 18% & 8% vegetarian used to consume peanuts and soya-products daily.



**Figure 3.** Comparison of weekly consumption of protein based food between vegetarian and non-vegetarian respondents.

Figure-3 shows that 26% vegetarian consume milk daily whereas non-vegetarian consumes 28%. Among vegetarian 10% respondents consume pulse daily while non-vegetarian consumes 38%. Besides 30% & 70% vegetarian consumes peanuts and soya-products daily.

**Table 3.** Comparison of anthropometric measures between vegetarian and non-vegetarian respondents.

Measures	Vegetarian mean ± SD	Non-vegetarian mean ± SD
Height (cm)	161.62 ± 7.68	158.62 ± 9.20
Weight (kg)	59.78 ± 8.61	57.14 ± 11.08

Table 3 shows that vegetarian respondents have a mean height of 161.62 cm and 59.78 kg mean weight whereas non-vegetarian respondents have 158.62 cm mean height and 57.14 kg mean weight.

**Table 4.** Distribution of the respondents' nutritional status by using Body Mass Index (BMI) as an indicator.

Respondent type	Vegetarian (n=50)		Non-vegetarian (n=50)	
	Frequency	%	Frequency	%
Underweight	2	4	6	12
Normal	36	72	31	62
Overweight	12	24	13	26

Table-4 represents that nutritional status of the vegetarian are better than non-vegetarian respondents. Among the non-vegetarian 12% respondents are underweight whereas only 4% vegetarian are underweight. It also shows that majority (72%) of the vegetarian respondents have normal health condition in compare with 62% non-vegetarian respondents. Both group have nearly same percentage of overweight cases.

**Table 5.** Disease condition of the respondents.

Disease condition	Vegetarian (n=50)		Non-vegetarian (n=50)	
	Frequency	%	Frequency	%
Sick within last 15 days	13	26	27	54
Yes No	37	74	23	46
Type of disease	Vegetarian (n=13)		Non-vegetarian (n=27)	
Diarrhea	0	0	2	4
Dysentery	1	2	1	2
Fever	3	6	5	10
Cold	7	14	12	24
Others	2	4	7	14

Table-5 indicates that majority (74%) of the vegetarian respondents were free from any kind of sickness during last 15 days while only (26%) suffering from some sort of illness during that period. Whereas (54%) of the non-vegetarian respondents were suffering from some sort of illness during last 15 days and only (46%) were free from any kind of sickness during that period.

#### 4. Discussion

This study was conducted to compare the nutritional status between vegetarian and non-vegetarian respondents at Tangail sadar upazila in Tangail district. The study reveals the pattern of the socio demographic characteristic of the respondents and the type of food consumed by them. Anthropometric measurements of the respondents were done by collecting data on age, height, weight to assess nutritional status of the respondents.

This study represents that all the vegetarian respondents were Hindus and among non-vegetarian 70% were Muslims and rest (30%) were Hindus. In this study, both groups of respondents were well educated. Educational levels of vegetarian respondents were 40% graduate and 26% secondary while non-vegetarian 30%, 32% respectively.

In this study the nutritional status of the respondent is measured by using BMI as an indicator. It is observed that majority of the vegetarian (72%) and non-vegetarians (62%) were well nourished. The study also showed that 24% vegetarian and 26% non-vegetarian of the respondents were overweight and only 4% vegetarian and 12% non-vegetarian of the respondents were underweight. It is observed that respondents nutritional status greatly influenced by dietary intake pattern. Though all of the respondents take rice daily but egg, milk, fish, meat are not consumed by the vegetarian. It also observed that 64%, 24%, 28% non vegetarian respondents consume fish, egg, milk daily and 30%, 56%, 28% respondents take 1-3 days per week respectively. Although vegetarian avoid animal protein rich food, their nutritional status is better than non-vegetarian which can be due to intake of milk (48%), pulses (90%) daily and 26%, 10% take 1-3 days per week respectively. Study demonstrated that 30%, 70%, 38% vegetarian respondents respectively take peanuts, soya-products and ghee 1-3 days per week.

From the clinical information we found that there are some nutrient deficiency disorder due to low consumption of

vitamin and mineral rich fruits and vegetable.

Nutritional status depends not only on food intake, but also on the body's ability to utilize these nutrients, which may be influenced by other health factors. In this study 26% vegetarian of the respondents were sufferings from some sort of illness during last 15 days while it was 54% among non-vegetarian respondents. A healthy plant-based diet requires planning and discipline.

#### 5. Conclusion

The study was undertaken to assess the nutritional status of the vegetarian as well as non-vegetarian. The study reveals that, the overall nutritional status of the vegetarian is better than non-vegetarian, which is expressed through BMI.

Though socioeconomic situation of the studied sample were same, according to our anthropometric analysis, the prevalence of underweight among non-vegetarian were higher than that of vegetarian adults. There may be several socio-economic and hygienic factors associated with this phenomenon. Further studies needed to find out the effects of vegetarian diet and non-vegetarian diet on human health.

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