



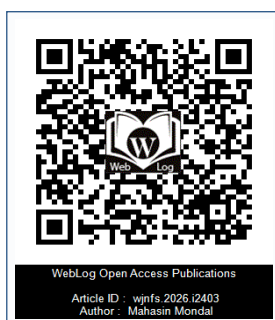
A Comparative Study on Health Status Between Lacto-Vegetarian and Non-Vegetarian Adolescent Girls

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Abstract

The objective of this study was to observed and find out the anthropometric alteration and different health related disease and symptoms between lacto-vegetarian and non-vegetarian adolescent girls due to intake of lacto-vegetarian and non-vegetarian diet. In this study a survey was conducted to compare health status between two dietary groups (lacto and non-vegetarian) in adolescent girls. The survey was carried out at Bhagwanpur-II and Contai -II & III block area, Purba Medinipur, West Bengal. A structured questionnaire was used to collect data of 30 adolescent girls, lacto-vegetarian (n=15) and non-vegetarian (n=15). Different anthropometric measurements like height, weight, Blood Pressure (BP), Pulse Pressure (PP), Pulse Rate (PR), waist and hip circumferences, body fat (from biceps, triceps by measuring skin fold thickness) were used to determine Body Mass Index (BMI), Waist Hip Ratio (WHR), BP, PP, PR and Body Fat Percentage (BFP). It was found that no significant ($p>0.05$) differences in BMI, WHR, pulse pressure, pulse rate, biceps, triceps, systolic pressure and diastolic pressure between lacto-vegetarian and non-vegetarian adolescent girls. The analysis of the study revealed, the prevalence of different health related disease and symptoms like constipation, anaemia, menstruation problems, fatigue, acidity, headache, aggressiveness, insomnia in lacto-vegetarian was 7%, 53%, 13%, 20%, 27%, 33%, 7%, 13% respectively and in non-vegetarian was 33%, 13%, 47%, 7%, 20%, 47%, 27%, 40% respectively. Lacto-vegetarian adolescent girls should be consumed good quality protein enriched food like different types of seeds and nuts, milk, soya milk, tofu etc. in high quantity and non-vegetarian girls should avoid fast food, junk food, oily food and more consumed fibre rich foods like fruits, vegetables and green leafy vegetables.

Keywords: Lacto-Vegetarian; Non-Vegetarian; Tofu; Body Mass Index; Waist Hip Ratio

Introduction

A person who does not eat or believe in eating meat, fish, poultry, eggs, seafood or any food derived from animals but mainly consumes vegetables, fruits, nuts and grains is called a lacto vegetarian. Vegetarian diets mainly consist of foods of plant origin. To meet nutritional requirements, vegetarians should include a variety of plant foods such as whole grains, legumes, nuts and seeds [1]. A person who consumes meat, fish, poultry, eggs, seafood and other animal-derived foods along with plant foods such as vegetables, fruits and grains is called a non-vegetarian [2].

Lacto vegetarians mainly consume plant-based foods such as fruits, vegetables, legumes, nuts, seeds, grains and dairy products [3]. There are several types of vegetarian diets including lacto-ovo, lacto-vegetarian, ovo-vegetarian, vegan, macrobiotic, semi-vegetarian and pesco-vegetarian, which differ based on the inclusion or exclusion of dairy products, eggs, poultry and fish [4].

Lacto vegetarian diets are associated with several health benefits, including a lower risk of obesity, diabetes, cardiovascular diseases and certain types of cancer and may also contribute to increased longevity [5]. Lacto vegetarian diets are generally lower in fat and higher in dietary fibre and include more whole grains, legumes, nuts and soy protein [6]. Vitamin B12 deficiency is common among vegetarians since it is mainly found in animal foods and may cause fatigue and weakness, though vegetarian diets can help reduce the risk of high cholesterol and heart disease. Non-vegetarian foods provide high-quality protein, vitamins and minerals such as vitamin B12 and iron that are easily absorbed by the body. However, excessive intake may increase the risk of obesity and cardiovascular diseases and an unbalanced diet may lead to digestive problems [7, 8].

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Received Date: 14 Aug 2026

Accepted Date: 22 Sep 2026

Published Date: 24 Sep 2026

Citation:

Bera P, Guchhait P, Mondal M. A
Comparative Study on Health Status
Between Lacto-Vegetarian and Non-
Vegetarian Adolescent Girls. WebLog J
Nutr Food Sci. wjnfs.2026.i2403. <https://doi.org/10.5281/zenodo.23284637>

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The main goal is to provide accurate information on the dietary patterns, health effects and nutritional status of adolescent girls following lacto vegetarian and non-vegetarian diets. It also emphasizes the importance of proper nutritional awareness and balanced food choices for maintaining good health during adolescence period, a very crucial time of life among the studied population.

The survey was conducted on lacto-vegetarian and non-vegetarian diet consumption among adolescent girls in the areas of Bhagwanpur-II, Contai-II and Contai-III Blocks of Purba Medinipur district. For this study, 30 adolescent girls were randomly selected so that the survey could be carried out properly. Half of them mainly followed a lacto vegetarian diet while other half consumed non-vegetarian foods regularly. The participants were interviewed and their ages ranged from 13 to 19 years.

Objectives

On the basis of Anthropometric Measurement both lacto-vegetarian and non-vegetarian adolescent girls the main objectives of my survey work are as follows:

To compare the health status between lacto vegetarian and non-vegetarian on the basis of Anthropometric values.

To assess any potential risks and benefits due to consumption of lacto vegetarian and non-vegetarian diet in adolescent girls.

To compare different health related symptoms and diseases percentage between lacto vegetarian and non-vegetarian adolescent girls.

The Ultimate objective is to know and identify how the health status affects adolescence girls due to intake of lacto vegetarian and non-vegetarian diet.

Materials and Methods

In order to conduct the surveys satisfactorily, it is essential to have a well-accepted methodology. The present nutritional survey is carried out in the following procedure by using appropriate methods. The material and methodology adopted for the present study.

Number of subjects: - 30

Study nature: Descriptive, Observational type of study.

Place of study: Location - Bhagwanpur and Contai

Geographical location: District- Purba Medinipur, State- West Bengal

Selection of the subject:

The total numbers of lacto vegetarian and non-vegetarian adolescent girls were 30 respectively, selected from Bhagwanpur and Contai, ages 13-19 years which obtained by interviewing them.

Methods of assessment of nutritional status:

Height and weight were measured using steel tape or anthropometric rod and Weight machine respectively. Then the BMI of woman is calculated. All measurements were taken as per guideline of World Health Organization (WHO: 1995). Mean and standard error is also calculated.

Personal history:

Back ground information about the respondents include age,

education, religions, weight, height, socioeconomic status, fathers and mothers' occupation number of total family member, member of earning member of family, dietary habit, physical exercise are asked during this survey.

Anthropometric assessment:

Anthropometry is based on the fact the physical state and gross composition of the body and when it is influenced by diet and nutrition then, we can call it Nutritional Anthropometry. Explains that measurements of the variations of the physical dimensions and gross composition of the human body at different age and degree of nutrition is nutritional anthropometry. It should be recommended that other factors, such as illness due to infection or infestation may also affects the growth and physical status of the body [9].

Anthropometric measurement such as height, weight, skin fold thickness and different circumference of different parts of the body are valuable indicators of nutritional status. Farmer of the circumference of head, chest and mid-upper arm are very important.

Weight (kg):

For weight measurement I have used human weighing machine. Subjects stand the platform of the machine with minimum clothes and exerting equal pressure on both feet. I have taken the weight reading from the scale with an accuracy of 0.5 kg.

Height (cm):

Vertical distance from the floor to the vertex (maximum bulge of the top of the head) of the body while standing in stretched erect posture, feet together and firmly placed on the ground, weight equally distributed on both feet, looking straight and ahead, palm flat against side of the thigh. A vertical measured rod or a scale fixed to a wall can be used. The height must be measured without shoes to a wall can be used. The must be measured without shoes and the subject must stand on a flat floor by the scale. His feet should be parallel with the heels, buttocks shoulders and back of the head touching the upright portion of the scale. The head should be comfortable held erect. The head piece should be either a metal bar or a wooden touch the hair and make contact with the top of the head [10].

BMI (kg/m²):

BMI is a mathematical formula which correlates with the body fat of an individual. The BMI of each individual is calculated from the formula weight in (kg) / height (m²) by putting the value of weight in kg and height in meter square [11-18] (Table 1).

Table 1: Classification of Asian adult BMI according to WHO, 2004.

BMI (kg /m ²)	Categories of nutritional status
< 16.0	Grade III thinness
16.0 - 16.99	Grade II thinness
17.0 - 18.49	Grade I thinness
18.5 - 22.99	Normal
23-24.9	Overweight
25.0-29.99	Pre-Obese
≥30.0	Obese
30.0 - 34.99	Obesity grade I (Obese)
35 - 39.99	Obesity grade II (Morbid obese)
≥40.0	Obesity grade III (Super obese)

Other way, I took help from the two nutritional index for assess is cases Physical Measurements, like –

$$\text{BMI} = (\text{Weight (kg)} / \text{Height (m}^2\text{)}) = \text{kg} / \text{m}^2$$

Classification of Asian adult BMI according to WHO, 2004.

Waist circumference (cm):

Horizontal circumference at the level of the greatest lateral indentation of trunk (*i.e.*, at the level at which the belt is worn); subject stands erect, abdomen relaxed.

Hip circumference (cm):

Horizontal circumference at the level of the hip bone (or the level of the Glutens), subject stands erect, heels together.

Waist hip ratio (cm):

Anthropometric measurement from the ratio of waist circumference and hip circumference.

Waist hip ratio = Waist circumference (cm) / Hip circumference (cm)

Blood pressure (mm-Hg) and pulse rate (bpm):

The blood pressure measurements were made of after the completion of the anthropometric measurements. Left arm blood pressure was taken with a sphygmomanometer and Stethoscope after the Participate has been seated in a released position for 5minutes. Prior to taking measurements, subjects were instructed to lie on the bed and then the left arm was placed at the inside of the body. Two former measurements were recorded and average for analysis. A 5minute relaxation period between the two measurements was maintained for all subjects, Systolic Blood Pressure (SBP) and Diastolic Blood Pressure (DBP) were recorded to the nearest mm of Hg as the appearance (Phase I) and disappearance (Phase II) of karat off sounds respectively.

Pulse pressure (mm-Hg):

Pulse pressure is the numerical difference between systolic (upper) and diastolic (lower) blood pressure readings. It is measured using a sphygmomanometer and stethoscope via auscultation or an automatic monitor, typically on the brachial artery, with a normal resting value often around 40 mmHg.

Pulse pressure (PP) = systolic blood pressure (SBP) - diastolic blood pressure (DBP)

Skinfold thickness measurement (mm):

1. Biceps (mm):

At the level of the mid-point between the acromiale (lateral edge of the acromial process, *e.g.* bony tip of shoulder) and the radiale (proximal and lateral border of the radius bone, approximately the elbow joint), on the mid-line of the anterior (front) surface of the arm (over the biceps muscle).

The arm should be relaxed with the palm of the hand facing forwards. A vertical pinch, parallel to the long axis of the arm, is made at the landmark.

2. Triceps (mm):

At the level of the mid-point between the acromiale (lateral edge of the acromial process, *e.g.* bony tip of shoulder) and the radiale

(proximal and lateral border of the radius bone, approximately the elbow joint), on the mid-line of the posterior (back) surface of the arm (over the triceps muscle).

The arm should be relaxed with the palm of the hand facing forwards. A vertical pinch, parallel to the long axis of the arm, is made at the landmark.

Statistical analysis of data:

The calculated data was analyzed by the mean value, standard deviation, Standard error and T- test with the help of computer package.

Mean:

Mean is the arithmetic average of the observed scores. The sample mean is represented by the symbol $\bar{x}$, where $\bar{x}$ represents each individual score of samples, $\sum x$ is the sum of all scores and n is the sample size or the total frequency of cases in the sample.

$$\bar{X} = \sum x / n$$

Standard deviation:

Standard Deviation (SD) is the positive square root of the mean of squared deviations of all the scores from the mean. It is an absolute measure of deviation and is expressed in the same unit as the original scores. Standard deviation of a sample is denoted by –

$$SD = \sqrt{((\sum (x - \bar{x})^2) / n)}$$

Standard error:

Standard Error (SE) of a statistic is a measure of the deviation of that statistic from the corresponding parameter and consequently serves as an index of the sampling error of that statistic. It is the standard deviation of the sampling distribution of the relevant statistics.

$$SE = SD / \sqrt{n}$$

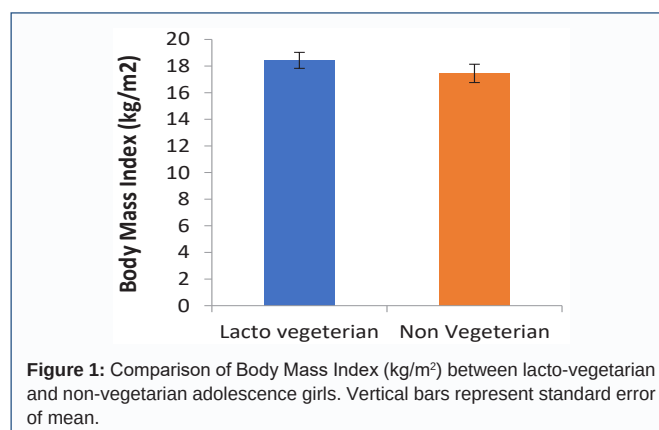
T-test:

To test the significant of the different between the means of two small samples that difference is converted to student's *t*-score which is then interpreted with the reference to the appropriate *t*- distribution. The *t*-values are computed as follows: -

$$T = (X_1 - X_2) / S * \sqrt{(n_1 n_2 / (n_1 + n_2))}$$

Result and Discussion

There was no significant ($p > 0.05$) difference on BMI (kg/m^2) of



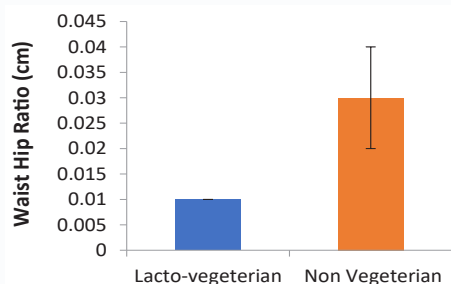


Figure 2: Comparison of Waist Hip Ratio between lacto-vegetarian and non-vegetarian adolescence girls. Vertical bars represent standard error of mean.

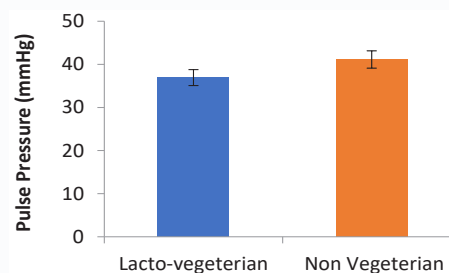


Figure 6: Comparison of Pulse Pressure (mm-Hg) between lacto-vegetarian and non-vegetarian adolescence girls. Vertical bars represent standard error of mean.

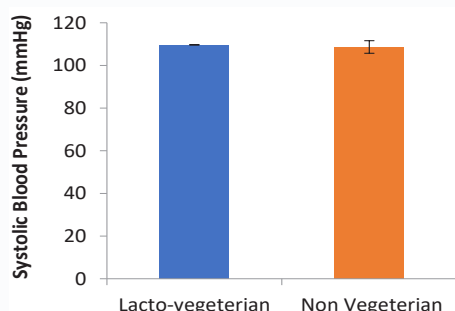


Figure 3: Comparison of Systolic Blood Pressure (mm-Hg) between lacto-vegetarian and non-vegetarian adolescence girls. Vertical bars represent standard error of mean.

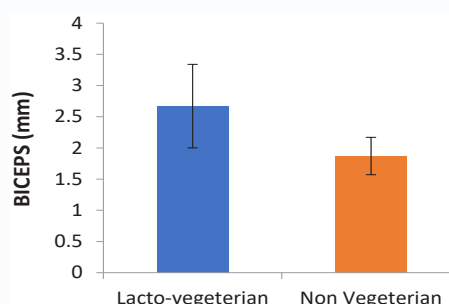


Figure 7: Comparison of Biceps (mm) between lacto-vegetarian and non-vegetarian adolescence girls. Vertical bars represent standard error of mean.

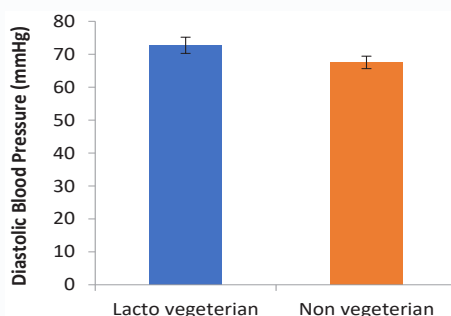


Figure 4: Comparison of Diastolic Blood Pressure (mm-Hg) between lacto-vegetarian and non-vegetarian adolescence girls. Vertical bars represent standard error of mean.

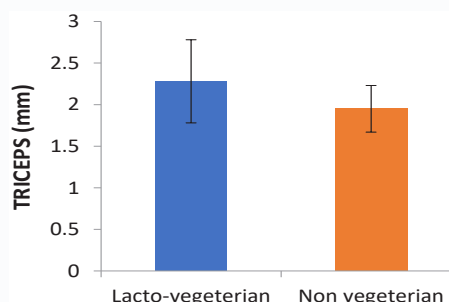


Figure 8: Comparison of Triceps (mm) between lacto-vegetarian and non-vegetarian adolescence girls. Vertical bars represent standard error of mean.

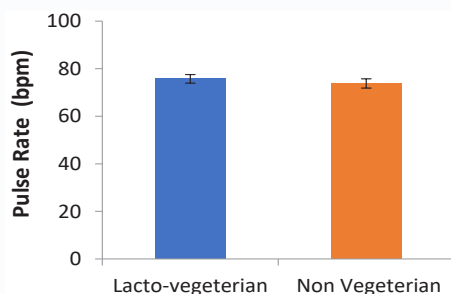


Figure 5: Comparison of Pulse rate (beats/min) between lacto-vegetarian and non-vegetarian adolescence girls. Vertical bars represent standard error of mean.

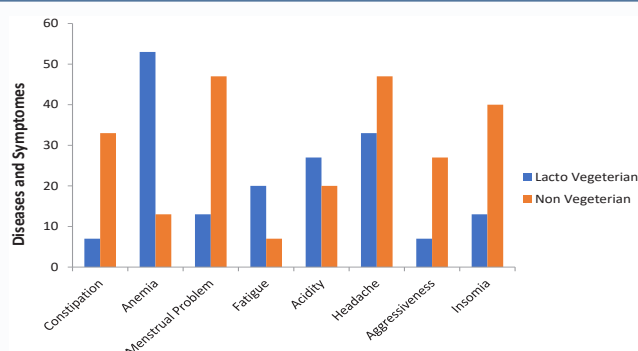


Figure 9: Comparison of diseases and symptoms between lacto-vegetarian and non-vegetarian adolescence girls. Vertical bars represent standard error of mean.

lacto-vegetarian and non-vegetarian adolescence girls (Figure 1). However, increasing BMI of lacto-vegetarian adolescence girls is most significantly. In that study we hypothesized that no significance

is BMI of lacto-vegetarian and non-vegetarian adolescence girls. There was no significant ($p>0.05$) difference on Waist Hip Ratio of lacto-vegetarian and non-vegetarian adolescence girls (Figure 2).

Table 2: Anthropometric measurement of lacto vegetarian and non-vegetarian girls.

Anthropometric indices	Lacto-Vegetarian adolescence girls (Mean ±SEM)	Non-Vegetarian adolescence girls (Mean ±SEM)	t value	Significance
BMI (kg / m ²)	18.43±0.60	17.45±0.69	0.59	Not significant
Waist Hip Ratio (cm)	66.4±2.15	70.2±2.36	0.19	Not Significant
Pulse Rate (beats/min)	75.73±1.79	73.8±1.93	0.74	Not Significant
Systolic Pressure (mm-Hg)	109.66±2.94	108.66±1.85	0.29	Not Significant
Diastolic Pressure (mmHg)	72.73±2.46	67.53±1.90	1.69	Not significant
Pulse Pressure(mm-Hg)	36.93±1.85	41.13±2	-1.56	Not significant
Bicepes (mm)	2.67±0.67	47.33±4.52	1.33	Not significant
Triceps (mm)	2.28±0.50	56.4±4.92	0.06	Not significant

Table 3: Percentage of lacto-vegetarian and non-vegetarian adolescence girls suffering from different diseases and symptoms.

Diseases and Symptoms	Lacto-vegetarian adolescence girls (%)	Non-vegetarian adolescence girls (%)
Constipation	7	33
Aneamia	53	13
Menstrual Problem	13	47
Fatigue	20	7
Acidity	27	20
Headache	33	47
Aggressiveness	7	27
Insomnia	13	40

There was no significant ($p>0.05$) difference on systolic blood pressure of lacto-vegetarian and non-vegetarian adolescence girls (Figure 3). There was no significant ($p>0.05$) difference on diastolic blood pressure of lacto-vegetarian and non-vegetarian adolescence girls (Figure 4).

There was no significant ($p>0.05$) difference on pulse rate of lacto-vegetarian and non-vegetarian adolescence girls (Figure 5). There was no significant ($p>0.05$) difference on pulse pressure of lacto-vegetarian and non-vegetarian adolescence girls (Figure 6).

There was no significant ($p>0.05$) difference on biceps of lacto-vegetarian and non-vegetarian adolescence girls (Figure 7). There was no significant ($p>0.05$) difference on triceps of lacto-vegetarian and non-vegetarian adolescence girls (Figure 8 and 9; Table 2 and 3).

Summary and Conclusion

In this study survey was on made on health status of Lacto-Vegetarian and Non-Vegetarian adolescent girls at Bhagwanpur and Contai.

Summary

1. There was no significant ($p>0.05$) difference in body mass index, waist hip ratio, pulse pressure, pulse rate, biceps, triceps, systolic pressure and diastolic pressure between lacto-vegetarian and non-vegetarian adolescent girls.
2. Lacto-vegetarian adolescent girl are suffering more in anemia, constipation, hypertension, diabetes, rashes, peptic ulcer, gastrointestinal disorder compare to non-vegetarian adolescence girls.
3. Both lacto-vegetarian and non-vegetarian adolescence girls were suffering from menstruation problem and eczema equally.

Conclusion

Lacto-vegetarian and non-vegetarian adolescence girls have different dietary patterns that influence their health and nutrition. Lacto-vegetarian girls tend to consume more fiber, antioxidants, and plant-based nutrients, which can be beneficial for digestive health and overall well-being.

However, they may face challenges in meeting their protein, iron, and vitamin B12 needs, which are essential for growth and development. Non-vegetarian girls, on the other hand, typically have higher protein and vitamin B12 intake from animal sources, which supports muscle growth and overall energy levels.

Their diet may also include higher amounts of saturated fats and cholesterol, which can contribute to long-term health risks like obesity and cardiovascular diseases. Both groups need a well-balanced diet to ensure they receive all essential nutrients.

Proper dietary planning, including the inclusion of fortified foods or supplements, if necessary, can help address potential deficiencies and promote healthy development during adolescence.

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