

**A STUDY ON NUTRITIONAL STATUS, LIFE STYLE AND
HEALTH PROFILE OF FOOD AND PROCESS ENGINEERING
STUDENTS OF HSTU, DINAJPUR**

**A THESIS
BY**



SOUMENDRO NATH ADHIKARY

Student No.: 1105033

Session: 2011-12

Semester: January – June, 2012

**MASTER OF SCIENCE (MS)
IN
FOOD ENGINEERING AND TECHNOLOGY**



**DEPARTMENT OF FOOD ENGINEERING AND TECHNOLOGY
HAJEE MOHAMMAD DANESH SCIENCE AND TECHNOLOGY
UNIVERSITY, DINAJPUR**

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**Submitted to the Department of Food Engineering and Technology, Hajee
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In partial fulfillment of the requirements for the degree of

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JUNE, 2012



DEDICATED TO

MY

BELOVED PARENTS

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ABSTRACT

The present study was aimed to investigate the nutritional status, life style and health profile of 80 students of Food and Process Engineering, students of Hajee Mohammad Danesh Science and Technology University, Dinajpur. Out of 80 students 52 male and 28 female students participated in the study. Considering male and female students, twenty (20) students were randomly selected from each level. The socio-economic status, nutritional status, general food habit, daily average energy expenditure, life style, general health information, nutritional knowledge, cooking and hygienic data were collected from individual students. Out of 80 students, 38 (47.5%) students' age lies between 21-22 years. Majority of the students' (80.0%) religion were Islam. About 33% students' father/family head were service holder and 20% were farmer by profession. Again 44% students' monthly family income lies between Tk. 13000 to Tk. 20000. Most of the students' families (78.8%) lived in their own house. Average monthly expenditure or amount of money taken from their family was Tk. 3971.38. Nutritional status of the students was measured by Body Mass Index (BMI) in this study. Most of the students (78.8%) were in normal range and students of level IV were more conscious of their health. The result showed that the students whose monthly expenditure was high possess good health. The daily average energy expenditure of a student was 2246.35 kcal and the daily average energy expenditure of male students was higher than that of female students. Except cereals, vegetables, potato, oil, fish, meats, pulse, egg, milk and fruits were less consumed by the students. The health status data showed that the health condition of the undergraduate students was not satisfactory. Again it was found that the undergraduate students did not have complete nutritional knowledge still then and cooking habit and hygienic status of the female students were superior to that of the male students.

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LIST OF ABBREVIATIONS

BBS	:	Bangladesh Bureau of Statistics
BMR	:	Basal Metabolic Rate
BMI	:	Body Mass Index
DU	:	Dhaka University
FAO	:	Food and Agriculture Organization
HIES	:	Household Income and Expenditure Survey
INFS	:	Institute of Nutrition and Food Science
WHO	:	World Health Organization
cm	:	Centimeter(s)
m	:	Meter(s)
lit	:	Litre(s)
dl	:	Deciliter(s)
mg	:	Milligram(s)
Kg	:	Kilogram(s)
Kcal	:	Kilo Calorie
Yrs	:	Year(s)
Tk.	:	Taka
%	:	Percent
Vs.	:	Versus
hr	:	Hour(s)
SD	:	Standard Deviation
LV	:	Leafy Vegetables
NLV	:	Non Leafy Vegetables
IU	:	International Unit
<i>et al.</i>	:	And others



CHAPTER 1

INTRODUCTION

CHAPTER I

INTRODUCTION

Background of the study

Malnutrition is highly prevalent in least developed countries. Bangladesh with its 151.41 million populations on a land of 147570 sq. km is one of the least developed countries of the world (BBS, 2011). The country faces formidable long term problems of development. This existing health status of Bangladesh is poor. Insufficient nutrition, insanitary condition including non-availability of water, inappropriate treatment facilities and inadequate availability of standard essential drugs are responsible for this condition (Ahmed, 1988). Due to assaults of malnutrition and diseases, mortality rate is high in the developing countries. This is particularly true for Bangladeshi (Habibullah, 1989).

Nutrition is defined by Bogert as the science of food as optimal health and Performance (Bogert *et al.*, 1973). In addition nutrition must be concerned with social, economic, culture and psychological implications of food and eating (Robinson, 1966). According to Bogert malnutrition is a term widely used to mean faulty or poor nutrition in all of its aspects whether from inadequate intake of nutrient or over consumption of foods (Bogert *et al.*, 1973).

Nutritional status is the physical health of a person as it results from consumption and utilization of food in the body. The nutritional status is determined by the kind and amount of nutrients supplied to the body and how completely they are used to meet body needs (Christakis, 1973).

A survey of nutritional status should show the relationship between food and nutrients ingested their uses in the body and general health. It may be good, fair or poor, depending on the body's ability to utilize these (Obert, 1978). Normal nutrition implies a sufficiency of nutrients and energy intake neither deficient nor excess, than maintenance of the highest level of good health. Good nutritional status is essential for normal reproduction, growth and its maintenance for optimum activity and working efficiency, for resistance to

infection and for achieving ability to repair bodily damage or injury. Nutritional status is affected when a person is deprived of adequate amount of essential nutrients over unexpired period of time (Robinson *et al.*, 1986).

Nutritional assessment is the process whereby the state of nutritional health of an individual or a group of individuals, is determined (Robinson *et al.*, 1986).

Nutritional status is commonly assessed by anthropometric measurement clinical examination for ascertaining nutritional deficiencies, biochemical assessment, dietary data or collection of data on the nutritional adequacy of diets consumed and radiological and biophysical deficiencies.

Malnutrition adversely affects mental development, physical development, productivity, the span of working years all of which significantly influence the economic potential of man (Alan Berg., 2008). On the other hand good nutrition and health of young women are of vital importance for efficiency, productivity and for the health of newborn (Ahmed, 1988).

A study, conducted by BIDS, showed that the mean total food intake for all ages and sex of average Bangladeshi population is 681 grams. The energy that an individual can derive from this food is 1894 kcal (BIDS, 2011).

The late adolescence period is the time where the college and University students enroll for higher studies (Al-Attar, March, 1987). Adolescence, the transition between childhood and adulthood, is a formative period of life in all societies. It is a time when patterns of behavior and relationship begin which will have lifelong effects on the individual, the family and society (Herbert, 1994).

There are three sub-stages of adolescence of a human life (Kilham, 1988). They are- (a) Early adolescence within 10-13 years age (b) Mid-adolescence within 14-16 years age (c) Late-adolescence within 17-20 years age.

The period of adolescence accompanied by its profound changes in growth rate, body composition position and marked physiological and endocrine change, in a time of life when the individual is at particular nutritional risk (Kilham, 1988).

Increased physical growth results in an increased demand for calories and other nutrients to support optimal growth (James *et al.*, 1989).

Adolescence is the period of greatest physical, biological, emotional and social activity and tension. It is accompanied by deep-seated anxiety and awareness about bodily changes (Bogert *et al.*, 1973).

Hence, adolescence is a period of life when an adequate intake of energy and other nutrients seems to be important in order to build up the full potential of an individual (Harrison *et al.*, 1985).

It is an important segment of human population of any country known as university student. They come from all parts of the country and these students belong to quite varied types of geographical and socioeconomic background (Al-Attar, April, 1987). The student community here forms a model average and adult population because they are shown from all regions of the country at any campus. Social factors exert important influence on the nutritional status of a community of people in any country in general and in the developing countries in particular (Al-Attar, May, 1987).

Late adolescent period where the college and university students enroll for higher studies provide a change for significant body growth and their understanding to adult world, particularly their relationship with family and friends. Proper diet at this stage will promote sound physical health of young men and women. A poorly nourished student will not be able to concentrate well in his studies (Herbert, 1994).

Few studies have been done to investigate the nutritional status and dietary intake among selected University students. But no information on the nutritional status, life style, health profile and food habit of the students of Hajee Mohammad Danesh Science and Technology University, Dinajpur was obtained so far.

There are several reasons why the nutritional status, health profile, life style and food intake habit of University students are of concern to the nutritionists. This is an age group characterized by frequent meal-skipping,

snacking, a preference for fast foods etc. It is also a time when the precursors of nutritionally related disease might be established (Carroline, 1991).

University students represent different segments of the society. Their nutritional status and performance will largely determine the quality and caliber of the next generation.

So, the present study was intended to understand the nutritional status, life style, health profile and general food habit of the students of Hajee Mohammad Danesh Science and Technology University, Dinajpur students on the basis of the collected information on socio-economic status, anthropometric measurements, daily energy expenditure, nutrition knowledge, cooking ability and food intake habit.

Objectives of the study

General Objective

To assess the nutritional status as well as energy expenditure, life style and health profile of Food and Process Engineering students of Hajee Mohammad Danesh Science and Technology University and to compare these findings with their socio-economic conditions.

Specific Objective

1. To identify the socio-economic status and life style of the study population.
2. To assess nutritional status by anthropometric measurements as well as per day energy expenditure level of the students.
3. To find out the relationship of nutritional status and energy expenditure level with socio-demographic and economic factors.
4. To assess the food intake habit of the students.
5. To assess the health profile and nutrition knowledge of the student.
6. To determine the hygienic status and cooking habit of the student.

Review of literature

Bangladesh is the eighth most populous country in the world, and one of the poorest. Though significant progress has been made in recent years in reducing the incidence of poverty and malnutrition, the fact remains that roughly half of its 126 million citizens live in deprivation, while roughly half of all children under 6 years show some evidence of chronic malnutrition (WB, 2003).

Since 2010, Bangladesh Bureau of Statistics (BBS) has undertaken three Household Income and Expenditure Surveys in 2000, 2005 and 2010. These surveys were conducted to investigate into the nutritional status of the rural and the urban population.

According to BBS (2000) the average per capita per day calorie intake was 2240 kcal. In the rural and urban area per capita per day calorie intake was 2263 and 2150 kcal respectively. Average per capita daily protein intake was 63 gm and in rural and urban area were 62 and 65 gm respectively.

According to BBS (2005) the average per capita per day calorie intake was 2238 kcal. In the rural and urban area per capita per day calorie intake was 2253 and 2193 kcal respectively. Average per capita daily protein intake was 63 gm and in rural and urban area were 62 and 65 gm respectively.

According to BBS (2010) the average per capita per day calorie intake was 2316 kcal. In the rural and urban area per capita per day calorie intake was 2345 and 2244 kcal respectively. Average per capita daily protein intake was 67 gm and in rural and urban area were 66 and 68 gm respectively.

BHES (2010) showed that the average per capita daily intake of calorie increased from 2238 kcal in 2005 to 2316 kcal in 2010 at national level. The caloric intake was higher 78 kcal in 2010 to 2005. On the other hand, average daily intake of protein increased from 63 gm in 2005 to 67 gm in 2010 at national level.

A major part of the world population lives of low food intake of about 2,000 kcal per person per day in the developing Countries (FAO, 1972). In Bangladesh, not low dietary intake but also ignorance about food may cause malnutrition. Majority of our populations are Illiterate. They have no

knowledge about nutritive value of food. For this reason, usually they cannot take balance diet, resulted malnutrition and ultimately attack by various nutritional deficiency diseases (ICNND, 2005).

According to CMNS (2005) the anthropometric study indicate that out of the total number of samples studied 26.8% girls and 27.7% boys have normal nutritional status . While 27.1% girls and 30.4% were underweight.

Ali *et al.*, (1994) conducted Availability of Nutrients for Adolescent girls. In that study it was revealed that 15-17 yrs girls the average weight and height were 84% and 94% of the standard weight and height respectively. Average intake of energy 15-17 yrs adolescent girls were 82% of the RDA. Intake of protein was found 13% 15-17 yrs girls. Average intake of vitamin A, Vitamin C. Vitamin B and iron were over and above the RDA.

Hossain (June, 1991) studied the nutritional status of Dhaka University male resident students. The study revealed that the male resident students of Dhaka University were under weighted according to their height and were suffering from low blood pressure. Mean calorie intake was lower than their requirement and the intake of vitamin A was extremely low. Foods available in the halls were not sufficient to maintain normal health of the students. They had to depend on foods available outside the campus. Most of them reported that they were losing their weight after they came into the halls. However, it was possible to create awareness and improve the nutritional status of the resident students through nutrition education and dietary modification as per individual requirement.

Satter (June, 1994) studied the Iodine Nutritional status among resident and non-resident students of Dhaka University. The study found that goiter prevalence (%) 36.8 with 27.35 in males and 46.0 in females. Female (46.0%) goiter was higher than in males (27.3%). In resident respondents that total goiter rate was 37.6% and in nonresident it was 32.3% the prevalence in males of both of these groups were almost similar in 27.5% in male resident and 26.5% in male nonresident respondents.

First health and nutrition survey of United States and Ten State nutrition survey stated that like other segment of population (Usha *et al.*, October, 1989), College or University students may not consume adequate diets consistently. Also that anemia was a major nutritional problem, among all age groups in United States including young adult (Narayana *et al.*, 1985).

Banerjee (May, 1987) observed that the diets consumed by students of a medical college in Assam, India were low in vitamin A, thiamine, riboflavin and iron.

Sarker and Sarker (1953) reported that the diet supplied in nurse hostel in West Bengal was deficient in calories and low in vitamins.

Wilson *et al.*, (July, 1936) studied the nutrients intake of the male hostel students in Calcutta, India. They found that per day per person nutrient intake was 2499 Kcal, total protein 51.25g. animal protein 13.65 g., total fat 51.97 g., animal fat 12.47 g. carbohydrate 440.4 g. phosphorous 900 mg. and calcium 250 mg. It was observed that 8.39% of total calorie came from protein, 19.34% from fat, and 72.26% from carbohydrate. They stated that diets analyzed in that survey were poor in total and animal protein, total and animal fat, and calcium. The diet contains too low percentage of dairy product and an excess of cereal.

Rao (May, 1966) studied that diet of a large number of students residing in hostels attached to colleges situated all over the India have been evaluated with respect to the nutritional quality. It was found that more than half the number of total diets of girls hostels and slightly less that 70% of the diets of male hostels supplied lower calories that those recommended by the Nutritional advisory committee. About 40% of both boy's and girl's diets provided even less that 2,700 kcal and 2,100 kcal, respectively. About, 75 to 80% of the diets did not need the recommended allowances for protein. The majority of diets appeared to be adequate in iron content. A large proportion of the diets (60%) supplied less that 4000 IU vitamin A. Excepting a few, diets were low in vegetable content, the majority supplied more than 50 mg of

ascorbic acid, calculated as raw basis. The majority of the diets were found to contribute excessive amounts of cereals. Many of the diets were low in protective foods, such as milk, fruits, and vegetables, and failed to provide the accepted standards for calories, proteins, calcium, vitamin A and riboflavin.

Driskell *et al.*, (January, 1979) studied the nutritional status of 150 college students of the Virginia Polytechnic Institute and State University, in 1977. They showed that the mean age, height mid body weight of the male students were 21.0 years, 179.4 cm. and 75 kg respectively. For female student's mean age, height and body were 20.5 years, 164.2 cm. and 58.4 kg respectively.

Cole and Orgungbe (May, 1987) studied the food intake of normal healthy Nigerian female resident students of the University of Ibadan, Nigeria. They found that the mean age of the students was 20.05 years, height 162.0 cm. body weight 51.28 kg. The average daily energy intake of the female students was 2019 kcal. This value was lower than that recommended by the FAO/WHO as the energy requirement for adult women engaged in light activities (2192 kcal/day), but it was higher than the FAO/WHO/UNU, recommended value of 1990 kcal/day for a housewife in an affluent society (FAO/WHO, 1973; FAO/WHO/UNU, 1985). It was lower than the recommended intake of 2226 kcal/day for rural women in developing countries²⁴. They also found that the mean energy expenditure (kcal/day) of the female subjects was 1,635 kcal (range, 1552-1720 kcal/day). The mean energy, intake and expenditure values indicated that the subjects participating in that study were not physically active.

Jakobovits *et al.* (October, 1977) studied nutrient intake of college women in Cornell University. They found that the average daily nutrients intake, calculated from 7-days food records were energy 1,930 kcal, protein 75.6 g. calcium 862 mg. iron 12.4 mg. vitamin A 6,835 (IU), thiamine 1.1 mg. riboflavin 1.6 mg. niacin 15.8 mg. and ascorbic acid 124 mg. It was shown that the energy intake met the 92% RDA and iron intake met the 69% of RDA. Except caloric and iron intake of the subjects all other nutrients met the RDA.

Jacqueline and Cowling (1972) surveyed the nutrient intake of UK University students. The average daily nutrient intake of male students were 2997 kcal energy, 89.75 g. protein, 18.0 mg iron, and 65.25 mg ascorbic acid. The average daily nutrient intake of female students were energy 2380 kcal, protein 72.0 g. iron 14.5 mg. and ascorbic acid 70.5 mg. 28% and 42.75%, respectively for male and female students calorie intake less than recommended intake. About 29% female student intake iron below the recommended intake.

A dietary and social survey was carried out by Hagger at Long Borough University to investigate the nutritional and social implications of two different types of student residences (Hagger, 1975). In that study, samples were two categories, one self catering facility other in the traditional halls of residence, food provided from the hall. The mean daily intake of nutrient of subject of halls of residence of male and female were energy (kcal) 3190 and 2571, protein (g) 103.0 and 69.0, iron (mg) 17.0 and 20.0, vitamin C (mg) 64.0, and 55.0, respectively. In self catering system, nutrient intake per day of male and female students were energy (kcal) 2857 and 2286, protein (g) 91.0 and 67.0, Iron (mg) 17.0 and vitamin C (mg) 63.0 respectively. It was found that the mean daily intake of all four groups were above the recommended intake. Most of the low nutrient intake was in self catering group, where a large number of female students had low intake of iron. These findings were similar to those of Jacqueline and Cowling study.

Hagger (1975) comments that, although self catering accommodation allowed the student a great deal of freedom in their life-style and diets. It also made it easy for them to adapt and interior diet to the students living in the traditional halls of residence.

Christine *et al.*, (1972) calculated the nutrient intake from the student's dietary records, as part of the longitudinal study of student nutritional status. The nutrient intakes of male and female students were protein (g) 83.0 and 63.0, energy (kcal), 2583 and 2097, iron (mg) 16.3 and 17.7, and ascorbic acid (mg) 49.0 and 55.6 respectively. Average nutrient intake of male students was above the recommended daily allowances. It was observed that male students generally had

higher intake of energy, protein, and iron where as females a higher intake of vitamin C.

The major cause of overweight and obesity is a positive energy balance in which energy intake exceeds energy expenditure (Cataldo *et al.*, 2003). The positive imbalance between energy intake and energy expenditure can be attributed to a number of factors including: socio-demographic and socio-economic factors (Cavalli-Soforza *et al.*, 1996), eating practices (Kruger *et al.*, 2002), nutritional knowledge (Brunt and Zhong, 2003) and decreased physical activity (Steyn *et al.*, 2003). Therefore establishing a relation between either of these factors and body weight could assist in developing strategies to control body weight or minimize health risks associated with excess body weight.

Socio-demographic factors that may contribute to overweight and obesity include gender, ethnicity, age, education level, place of residence and socio-economic (Cavalli-Soforza *et al.*, 1996). Socio-demographic factors may also contribute to inadequate physical activity, including a sedentary lifestyle which often leads to overweight and obesity (Kruger *et al.*, 2002).

The frequency of food intake or skipping of meals is also related to weight gain and obesity. Triches and Giugliani (2005) reported that not eating breakfast in the morning as well as a low frequency of milk, fruit and vegetable consumption, were practices associated with increased body weight and obesity among primary school children.

According to Dryden (2005), eating habits that contributed to weight gain in college students included eating less than five servings of fruits and vegetables per day, and in addition many did not get enough exercise.

Nutritional knowledge is believed to play an important role in promoting healthier eating practices, and consequently, maintaining appropriate body weight (Kruger *et al.*, 2002). According to Grafova (2006), people who are aware of the connection between poor nutrition and certain health conditions are more likely to follow a balanced diet and avoid excessive weight gain. This means that nutritional knowledge can be a good strategy to employ in the reduction and control of the high prevalence of obesity.

Klumbiene *et al.* (2004) found increased knowledge of dietary guidelines to be positively related to more healthy eating practices among college students. The author concluded that healthy eaters have a higher nutritional knowledge leading to good food choices which can promote reduction and maintenance of weight. However, studies conducted by Thakur and D'Amico (1999) found no significant differences between obese and non-obese people with respect to their knowledge concerning nutrition. This may mean that most people do not always practice what they know.

An inadequate level of physical activity or sedentary lifestyle is directly associated with weight gain in human beings. Physical activity accounts for 10 to 30 % of daily energy expenditure. For this reason, a person experiencing a reduction in physical activity due to a change in labour practices or forms of transportation may spend less energy. This decline in energy expenditure, if not accompanied by a reduction in energy intake may result in weight gain and potential obesity. Decreased physical activity due to increasingly sedentary nature of many forms of work, changing modes of transportation, and increasing urbanization (Klumbiene *et al.*, 2004), all contribute to positive energy expenditure which contributes to overweight and obesity.



CHAPTER 2

MATERIALS AND METHOD

CHAPTER II

MATERIALS AND METHODS

Study population

The present study was conducted amongst the students of Hajee Mohammad Danesh Science and Technology University, Dinajpur.

Study design

The students from Food and Process Engineering were randomly selected.

The students were grouped as level basis. All the respondents were from level I to level IV of Food and Process Engineering student. On the other hand respondents were both the resident and non-resident include male and female students.

Selection of students

Considering male and female students, twenty (20) students were randomly selected from each level. Finally, a total of 80 (eighty) students of both sexes from four levels (years) were selected in this study.

Study period

The study was carried out during the month of July 2012 to October 2012 among the Food and Process Engineering students of Hajee Mohammad Danesh Science and Technology University, Dinajpur.

Development of questionnaire

A standard questionnaire was developed to obtain relevant information on the student's socio-economic status, nutritional status, general food intake habit, daily average energy expenditure, life style, general health information, nutrition knowledge and cooking information. The questionnaire was pretested and corrected before finalization.

Collection of anthropometric data

i) Body Weight: A bathroom scale was used to record weight of the students. The balance was standardized every day before use. The weight was recorded on standing position in the weighing machine on bare foot and with light clothes. The arms were made to hang loosely on the body sides.

ii) Height: Height of the student was measured barefooted in standing position with a height scale.

iii) Body Mass Index (B.M.I): BMI of the subjects was calculated from the body weight in kg and height in meter square by using the following formula adopted by nutritionist (West, 1990).

$$\text{BMI} = \frac{\text{Weight of the subject in Kg}}{(\text{Height of the subject in meter})^2}$$

Collection of socio-economic data

Each student was asked about his or her socio-economic factors such as age, religion, marital status, number of family member, occupation and income of father, occupation and income of mother, occupation of the family head, monthly family income, amount of land, housing condition etc. and these were recorded in the questionnaire (Appendix).

Collection of general food habit data

The name of food items that were taken by both the male and female students during the last 2 months were recorded in questionnaire (Appendix). The food frequency data was collected by marking the various food items which the students consumed during particular period of time with a circle according to frequently intake period.

Determination of energy expenditure

The daily average energy expenditure in kcal of the students were determined by using following formula (FAO/WHO/UNU, 1985) -

Average Energy Expenditure = PAL × BMR × Time in hr

Where,

PAL = Physical Activity Level

BMR = Basal Metabolic Rate

BMR can be determine by using following formula (FAO/WHO/UNU, 1985) -

For adult male, BMR= $15.3 \times \text{weight} + 679$

For adult female, BMR= $14.7 \times \text{weight} + 496$

Collection of data on life style

Each student was asked about his or her monthly expenditure such as cost for book, assignment, enrollment, transportation, food, cloths, treatment, cell phone, internet and amount of average money taken from his/her family during student life. These data was recorded in questionnaire (Appendix).

Collection of health information data

Some general health information such as blood group, hepatitis vaccine, type of sickness, type of treatment taken, satisfaction about treatment taken etc. were asked to the students to know their health status.

Collection of nutritional knowledge data

Each student was asked to know the nutritional knowledge about balance diet, anemia, scurvy, vitamin C and iron enriched food, limit of hemoglobin and requirement of daily water intake etc. and these were recorded in questionnaire (Appendix).

Collection of cooking and hygienic data

Each student was asked to know about cooking ability, dining room in dormitory, quality of food in dining room, cleaning of utensil, use of iodized salt, salt preservation method etc. and these were recorded in questionnaire (Appendix).

Data analysis and software

The socio-economic status, nutritional status, general food habit, daily average energy expenditure, life style, general health information, nutritional knowledge, cooking and hygienic data were then edited and finalized.

Analysis of these data included mean, standard deviation, percentage etc. These were presented in both tabular and figurative form using Statistical Package for Social Science (SPSS 16.0).



CHAPTER 3

RESULTS AND DISCUSSION

CHAPTER III

RESULTS AND DISCUSSION

The study was conducted among the students of Food and Process Engineering of Hajee Mohammad Danesh Science and Technology University to assess some aspects of their nutritional and socio-economic status. A total of 80 students participated in this study. The salient findings are shown below in tabulated and figurative forms with interpretation.

Total numbers of the Food and Process Engineering students are presented in Table-01. Out of 80 students 65% were male and 35% were female.

Table 01: Distribution of the students by sex

Sex of student	No. of participant	Percentages (%)
Male	52	65.0
Female	28	35.0
Total	80	100.0

Distribution of the students of B.Sc. in Food and Process Engineering by level and age are presented in Table-02. The age of the students are classified into three groups such as- (a) 19-20 years (b) 21-22 years and (c) 23-25 years. Among them highest number of participants (38) were between 21-22 years age and lowest number of participants (19) were between 19-20 years age.

Table 02: Distribution of students by level and age

Level of student	Age group of student							
	19-20 years		21-22 years		23-25 years		Total	
	No.	(%)	No.	(%)	No.	(%)	No.	(%)
Level I	15	78.9	5	13.2	0	.0	20	25.0
Level II	4	21.1	15	39.5	1	4.3	20	25.0
Level III	0	.0	13	34.2	7	30.4	20	25.0
Level IV	0	.0	5	13.2	15	65.2	20	25.0
Total	19	100.0	38	100.0	23	100.0	80	100.0

Age group distribution of the Food and Process Engineering students is mentioned in Table-03. From the age group distribution of respondents, it was found that both male (21) and female (17) students are in highest number in 21-22 year age group.

Table-04 shows that majority of the student's religion was Islam (80.0%) and rest was Hinduism (20.0%).

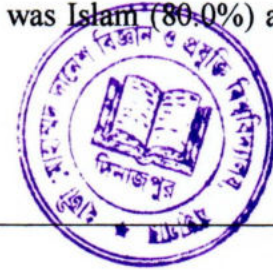


Table 03: Age distribution of the student by sex

Age group of student	Sex of student					
	Male		Female		Total	
	No.	Percentage (%)	No.	Percentage (%)	No.	Percentage (%)
19-20 years	11	21.2	8	28.6	19	23.8
21-22 years	21	40.4	17	60.7	38	47.5
23-25 years	20	38.5	3	10.7	23	28.8
Total	52	100.0	28	100.0	80	100.0

Table 04: Distribution of student by religion

Religion the of student	Sex of student					
	Male		Female		Total	
	No.	Percentage (%)	No.	Percentage (%)	No.	Percentage (%)
Islam	42	52.5	22	27.5	64	80.0
Hinduism	10	12.5	6	7.5	16	20.0
Total	52	65.0	28	35.0	80	100.0

Socio-economic status and life style of students

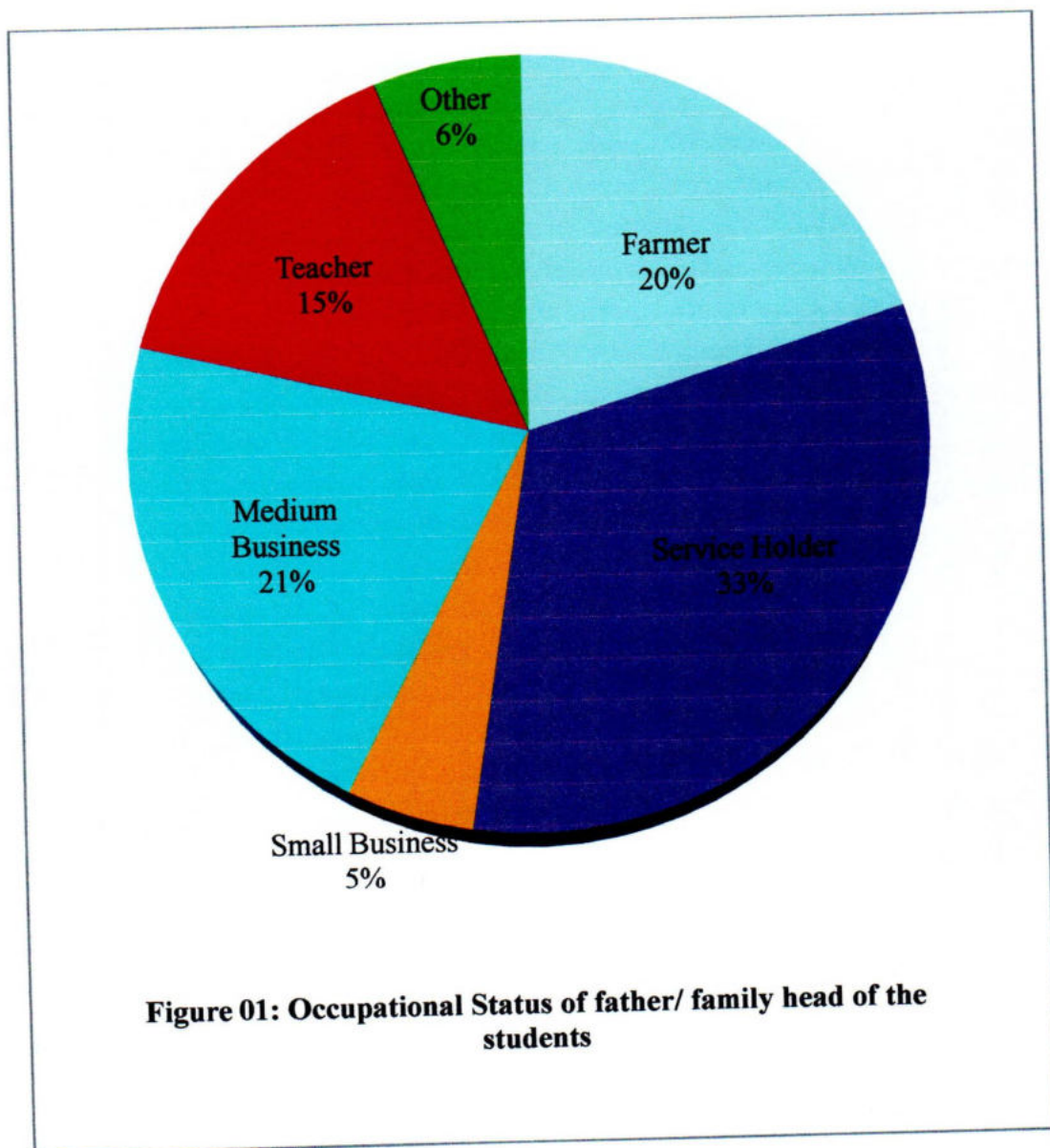
Socio-economic status and life style of the students are shown below in tabulated and graphical forms with interpretation.

Descriptive statistics of the socio-economic status of the students is presented in Table-05. It was observed that average number of family member of a student was 5.31; the maximum was 9 and the minimum was 3. The average number of brother of a student was 1.52; the maximum was 6 and minimum was 0. It was also found that the average number of sister of a student was 1.40; the maximum was 4 and minimum was 0. The average number of earning member of a student was 1.45; the maximum was 3 and minimum was 0. A student father's average total monthly income was Tk. 14825.0 and the maximum amount was Tk. 40000. It was also observed that a student mother's average total monthly income was Tk. 1362.50; the maximum was Tk. 30000 and minimum was Tk. 0. The average total monthly income of chief earning member of family of a student was Tk. 15487.50; the maximum was Tk. 40000 and minimum was Tk. 4000. It was observed that the average total monthly income of family of a student was Tk. 18737.50; the maximum was Tk. 45000 and minimum was Tk. 5000. The average amount of dwelling land of a student family was 15.66 decimal; the maximum was 120 decimal and minimum was 0 decimal. It was found that the average amount of cultivable land of a student family was 233.69 decimal; the maximum was 1200 decimal and minimum was 0 decimal. It was also found that the average amount of uncultivable land of a student family was 32.50 decimal; the maximum amount was 300 decimal and minimum amount was 0 decimal. From the above discussion it was found that most of the students came from middle income family.

Table 05: Descriptive Statistics of socio-economic status of the students

Parameter	No.	Minimum	Maximum	Mean	Std. Deviation
Number of family member	80	3	9	5.31	1.437
Number of brother	80	0	6	1.52	1.102
Number of sister	80	0	4	1.40	1.063
Number of earning member	80	1	3	1.45	.614
Father's total monthly income(Tk.)	80	0	40000	14825.0 0	8258.138
Mother's total monthly income(Tk.)	80	0	30000	1362.50	4467.162
Total monthly income of chief earning member of family (Tk.)	80	4000	40000	15487.5 0	7724.683
Total monthly income of family(Tk.)	80	5000	45000	18737.5 0	9446.376
Amount of dwelling land (Decimal)	80	0	120	15.66	23.520
Amount of cultivable land (Decimal)	80	0	1200	233.69	310.183
Amount of uncultivable land (Decimal)	80	0	300	32.50	64.026

Figure-01 shows that 33% of the student's father/family head were service holder. About 20% student's father/family heads were farmers and 15% were teacher by profession. Results show that student's guardians were at different profession categories.



Occupational status of father/family head of the students according to sex is presented in Table-06. It was found that out of 52 male students, 15 students' (28.8%) fathers/family heads were service holder, 14 students' (26.9%) fathers/family heads were farmers, 10 students' (26.9%) fathers/family heads were medium businessman and 9 students' (17.3%) fathers/family heads were teacher. It was also found that out of 28 male students, 11 students' (39.3%) fathers/family heads were service holder, 7 students' (25.0%) fathers/family heads were medium businessman, 3 students' (10.7%) fathers/family heads were teacher and 2 students' (7.1%) fathers/family heads were farmers. From the above discussion it was found that occupational status of father/family head of the female students was higher than that of the male students.

Table 06: Occupational status of father/family head of the students according to sex

Occupation of father or family head	Sex of student					
	Male		Female		Total	
	No.	%	No.	%	No.	%
Late	2	3.8	1	3.6	3	3.8
Farmer	14	26.9	2	7.1	16	20.0
Service holder	15	28.8	11	39.3	26	32.5
Industry/Construction Laboure	0	.0	1	3.6	1	1.2
Small businessman	2	3.8	1	3.6	3	3.8
Medium businessman	10	19.2	7	25.0	17	21.2
Teacher	9	17.3	3	10.7	12	15.0
Others	0	.0	2	7.1	2	2.5
Total	52	100.0	28	100.0	80	100.0

Table-07 shows about 44% student's families had monthly income from Tk. 13000 to Tk. 20000. About 50% of the female and 40% of the male student's family income lies in this income level.

Table 07: Distribution of student's total monthly income level by sex

Total family monthly income (TK)	Sex of student					
	Male		Female		Total	
	No.	Percentage (%)	No.	Percentage (%)	No.	Percentage (%)
5000-12000	17	32.7	6	21.4	23	28.8
13000-20000	21	40.4	14	50.0	35	43.8
Above 21000	14	26.9	8	28.6	22	27.5
Total	52	100.0	28	100.0	80	100.0

Average monthly income of the student's family according to sex is presented in Table-08. Average monthly income of the student's family was Tk. 18738.0. The male and female student's monthly family income were Tk. 17769.2 and Tk. 20536.0 respectively. It means that the solvency of the female student's family is more than that of the male students family because occupational status of father/family head of the female students was higher than that of the male students that shown in Table-06.

Table 08: Average monthly income of the student's family according to sex

Sex of the students	Average monthly income of the family	
	Tk.	Percentage (%)
Male	17769.2	65.0
Female	20536.0	35.0
Total	18738.0	100.0

Ownership status of house of the male and female students at their family accommodation is given in Table-09. It was found that out of 80 students 78.8% students had their own house, 15.0% students were tenant and 6.2% students were lived in other's house. It means that most of the students' families were lived in their own house.

Table 09: Distribution of students by ownership of house at their family accommodation

Type of home	Sex of student					
	Male		Female		Total	
	No.	Percentage (%)	No.	Percentage (%)	No.	Percentage (%)
Own	43	82.7	20	71.4	63	78.8
Tenant	6	11.5	6	21.4	12	15.0
Other's home	3	5.8	2	7.1	5	6.2
Total	52	100.0	28	100.0	80	100.0

Life Style of the students assessed by pattern of monthly expenditure is mentioned in Table-10. It was found that the monthly average expenditure or amount of money taken from their family was Tk. 3971.78; the maximum amount was Tk. 5800 and minimum amount was Tk. 2500 per month. Average expenditure of a student was Tk. 190.5 for buying book, Tk. 153.87 for buying pen and khata, Tk. 123.1 for making assignment, Tk. 563.94 for enrollment, Tk. 210.38 for travelling, Tk. 1634.13 for eating, Tk. 308.13 for buying cloth, Tk. 139.63 for medical purpose, Tk. 272.78 for cell phone, Tk. 184.0 for internet browsing and Tk. 211.75 for other purposes per month. Above discussion portrays that a student spends highest amount of money for eating purpose and lowest amount for making assignment.

Table 10: Descriptive statistics of monthly expenditure of the students on expenditure categories

List of expenditure	n	Minimum (Tk.)	Maximum (Tk.)	Mean (Tk.)	SE of Mean	SD
Amount of total monthly expenditure	80	2500	5800	3971.38	79.54	711.46
Spend for buying book	80	0	1000	190.50	22.61	202.19
Spend for buying pen & khata	80	20	500	153.87	11.15	99.75
Spend for making assignment	80	20	300	123.06	7.80	69.76
Spend for enrollment	80	100	800	563.94	9.66	86.36
Spend for travelling	80	0	1000	210.38	20.56	183.85
Spend for meal	80	400	3000	1634.37	60.02	536.84
Spend for cloth	80	50	800	308.13	20.43	182.71
Spend for medical purpose	80	0	1100	139.63	19.99	178.85
Spend for cell phone purpose	80	0	1500	272.38	26.74	239.14
Spend for internet browsing	80	0	700	184.00	18.59	166.26
Spend for other purposes	80	0	1000	211.75	21.96	196.45

Nutritional status of students

Nutritional status of students was measured by Body Mass Index (BMI) in this study. Nutritional status (BMI) measurements of male and female students are mentioned in Table- 11. It was found that out of 52 male students, 43 students (82.8%) were normal and 20 (71.4%) female students out of 28 were normal. Overall 78.8% students were normal, whereas 11.25% were underweight and 10.0% students were obese.

Results indicated that female students were more suffered underweight problem than male students whereas male students were more suffered in obesity problem compared to female students. Thus might be due to the fact that female students are more conscious about their body weight than that of male students.

Table 11: Nutritional status(BMI) measurements of male and female Students

Nutritional status of students (BMI)	Sex of student					
	Male		Female		Total	
	No.	(%)	No.	(%)	No.	(%)
Under weight	3	5.7	6	21.4	9	11.25
Normal	43	82.8	20	71.4	63	78.8
Obesity (Grade I)	6	11.5	2	7.1	8	10.0
Total	52	100.0	28	100.0	80	100.0

Nutritional status (BMI) of the student according to level of education is presented in Table-12. It was observed that out of 20 students, 14 students were normal in both level I and Level II. Out of 20 students, 4 and 3 students were underweight in level I and Level II respectively. It was also observed that out of 20 students, 2 and 3 students were obese in level I and Level II. Out of 20 students, 16 students were normal in level III and rest of the students was underweight and obese equally. Out of 20 students, 19 students were normal in level IV and found no obese student. Above discussion shows that student of level IV was more conscious of their health.

Table 12: Nutritional status (BMI) of the students according to level of education

Monthly expenditure (Tk.)	Nutritional status of students (BMI)							
	Under weight		Normal		Obesity (Grade I)		Total	
	No.	(%)	No.	(%)	No.	(%)	No.	(%)
2500-3500	5	6.3	18	22.5	2	2.5	25	31.2
3600-4500	5	6.2	35	43.7	4	5.0	44	55.0
4600-6000	0	.0	10	12.5	1	1.3	11	13.8
Total	10	12.5	63	78.7	7	8.8	80	100.0

Monthly expenditure of students according to nutritional status (BMI) is mentioned in Table-13. It was observed that 43.7% students were normal nutritional status with their monthly expenditure ranging from Tk. 3600-Tk. 4500. But 22.5% students whose monthly expenditure Tk. 2500-3500 are normal nutritional status. It was also observed that 12.5% students whose monthly expenditure Tk. 4600-6000 was normal nutritional status. It was significant that no underweight student found whose monthly expenditure Tk. 4600-6000. From the above discussion it was found that the students whose monthly expenditure Tk. 4600-6000 were more health conscious.

Table 13: Monthly expenditure of students according to their nutritional status (BMI)

Level of student	Nutritional status of students (BMI)							
	Under weight		Normal		Obesity (Grade I)		Total	
	No.	(%)	No.	(%)	No.	(%)	No.	(%)
Level I	4	5.0	14	17.5	2	2.5	20	25.0
Level II	3	3.7	14	17.5	3	3.7	20	25.0
Level III	2	2.5	16	20.0	2	2.5	20	25.0
Level IV	1	1.3	19	23.8	0	.0	20	25.0
Total	10	12.5	63	78.8	7	8.7	80	100.0

Energy expenditure level of students

Distribution of daily average energy expenditure of both male and female are presented in Table-14. It was found that out of 80 students, daily average energy expenditure of 37.5% students was in the range of 1901-2400 kcal. And the daily average energy expenditure of male students is higher than that of female students.

Table 14: Distribution of daily average energy expenditure by sex

Total daily energy intake (Kcal)	Sex of student					
	Male		Female		Total	
	No.	%	No.	%	No.	%
1400-1900	0	.0	18	22.5	18	22.5
1901-2400	20	25.0	10	12.5	30	37.5
2401-2600	20	25.0	0	.0	20	25.0
above 2601	12	15.0	0	.0	12	15.0
Total	52	100.0	28	100.0	80	100.0

Descriptive statistics of energy expenditure level with daily activities of students is presented in Table-15. It was observed that the daily average energy expenditure of a student was 2246.35 Kcal; the maximum was 3297.0 Kcal and the minimum was 1444.0 Kcal. It was also found that average sleeping time for students was 7.41 hours per day. Lowest amount of time for sleeping was 5.0 hours and highest amount of time was 10.0 hours per day. On an average, a student spent 1.15 hours for eating, 3.18 hours for academic study, 1.25 hours for personal study, 0.31 hours for academic study, 0.89 hours for writing, 0.43 hours for typing, 1.09 hours for walking, 0.47 hours for playing, 0.21 hours for cleaning room, 0.42 hours for washing cloth, 0.32 hours for wearing cloth, 0.59 hours for reading religious book, 0.32 hours for defecation, 0.54 hours for traveling in bus, 0.79 hours for browsing internet, 0.31 hours for taking exercise, 1.74 hours for gossiping, 0.76 hours for talking in cell phone, 0.41 hours for bathing and 1.30 hours for other activities per day. Above discussion shows that a student spends highest amount of time for sleeping and lowest for cleaning room.

Table 15: Descriptive statistics of energy expenditure level with daily activities

Daily activities	n	Min.	Max.	Mean	SE of mean	SD
Total Daily energy expenditure (Kcal)	80	1444.0	3297.0	2246.4	43.9	392.77
Amount of time for sleeping (hr)	80	5.00	10.00	7.41	.118	1.055
Amount of time for eating (hr)	80	.50	2.50	1.15	.055	.500
Amount of time academic study (hr)	80	.50	6.00	3.18	.138	1.23
Amount of time for personal study (hr)	80	.00	5.00	1.25	.096	.864
Amount of time for library study (hr)	80	.00	2.50	.31	.065	.587
Amount of time for writing (hr)	80	.17	4.00	.89	.075	.674
Amount of time for typing (hr)	80	.00	4.00	.43	.077	.690
Amount of time for walking (hr)	80	.17	3.00	1.09	.071	.635
Amount of time for playing (hr)	80	.00	3.00	.47	.077	.690
Amount of time for cleaning room (hr)	80	.00	1.00	.21	.026	.238
Amount of time for washing cloth (hr)	80	.00	1.00	.42	.029	.262
Amount of time for wearing cloth (hr)	80	.08	1.00	.32	.020	.181
Amount of time for reading religious book (hr)	80	.00	2.00	.59	.051	.458
Amount of time for defecation (hr)	80	.08	1.00	.32	.020	.180
Amount of time for traveling in bus (hr)	80	.00	2.00	.54	.047	.426
Amount of time for browsing internet (hr)	80	.00	4.00	.79	.080	.716
Amount of time for taking exercise (hr)	80	.00	1.00	.31	.037	.338
Amount of time for gossiping (hr)	80	.25	7.00	1.74	.128	1.152
Amount of time for talking in cell phone (hr)	80	.00	4.00	.76	.076	.682
Amount of time for bathing (hr)	80	.08	1.00	.41	.021	.192
Amount of time for other activities (hr)	80	.00	4.00	1.3034	.134	1.206

Relationship of BMI and energy expenditure level with socio-demographic and economic factors

The relationship between the socio-demographic factors of the students with the daily energy expenditure levels as well as nutritional status (BMI) was examined in this part. We have considered socio-economic variables such as total monthly income of the family, total monthly expenditure of the student and nutritional variables height, weight, age and other variables such as amount of time for academic study, personal study, prayer, physical exercise and total daily energy expenditure to find out relationships between nutritional status and energy expenditure level with socio-demographic and economic factors.

Table-16 showed the relationship as measured by correlation coefficient between the mentioned socio-economic variables and nutritional status by the students. It was found that nutritional status (BMI) had a significant positive correlation with weight, total daily energy expenditure and monthly expenditure of students. It means, if the weight, total daily energy expenditure and monthly expenditure of students increase then the nutritional status (BMI) of the student will be increase. On the other hand, BMI scores had a significant negative relation with amount of time for academic and personal study hour of the students. It means, if the amount of time for academic and personal study is increased then the nutritional status (BMI) of the student will decrease.

It was also observed that total daily energy expenditure had a significant positive correlation with BMI scores, height, weight, amount of time for prayer and amount of time for physical exercise. It means, if the BMI scores, height, weight, amount of time for prayer and amount of time for physical exercise of students is increased then the total daily energy expenditure of the student will increase. On the other hand, total daily energy expenditure had a significant negative relation with monthly income of family, amount of time for academic and amount of time for personal study of the students. That means if the monthly income of family, amount of time for academic and amount of time for personal study of the students is increased then the total daily energy expenditure of the student will decrease.

Table 16: Correlation analysis of BMI and energy expenditure/day of students with different causal factors

Background Characteristics	Statistics	BMI scores	Age (year)	Height (cm)	Weight (Kg)	Monthly income of family (Tk.)	Monthly expenditure of students (Tk.)	Amount of time for academic study (hr)	Amount of time for personal study (hr)	Amount of time for playing (hr)	Amount of time for physical exercise (hr)	Total daily energy expenditure (Kcal)
BMI scores	r	1	.051	.095	.751**	.055	.274*	-.050	-.022	.070	.119	.451**
	p value		.652	.404	.000	.625	.014	.662	.849	.540	.293	.000
Age (year)	r	.051	1	.117	.116	.353**	3.686**	-.107	-.215	-.033	-.165	.091
	p value	.652		.302	.307	.001	.001	.345	.056	.770	.145	.424
Height (cm)	r	.095	.117	1	.722**	-.010	.168	-.230*	-.069	.249*	.123	.714**
	p value	.404	.302		.000	.931	.136	.041	.546	.026	.277	.000
Weight (Kg)	r	.751**	.116	.722**	1	.037	.314**	-.189	-.058	.213	.164	.783**
	p value	.000	.307	.000		.744	.005	.093	.607	.058	.145	.000
Monthly income of family (Tk.)	r	.055	.353**	-.010	.037	1	.308**	.320**	-.197	.055	.068	-.118
	p value	.625	.001	.931	.744		.005	.004	.080	.628	.547	.296
Monthly expenditure of students (Tk.)	r	.274	3.686	.168	.314	.308	1	-.261	-.158	.048	.004	.143
	p value	.014	.001	.136	.005	.005		.019	.162	.674	.971	.207
Amount of time academic study (hr)	r	-.050	-.107	-.230*	-.189	.320**	-.261	1	.018	-.168	.011	-.311**
	p value	.662	.345	.041	.093	.004	.019		.874	.135	.922	.005
Amount of time for personal study (hr)	r	-.022	-.215	-.069	-.058	-.197	-.158	.018	1	-.018	.162	-.106
	p value	.849	.056	.546	.607	.080	.162	.874	.872	.872	.150	.350
Amount of time for playing (hr)	r	.070	-.033	.249*	.213	.055	.048	-.168	-.018	1	.113	.577**
	p value	.540	.770	.026	.058	.628	.674	.135	.872		.317	.000
Amount of time for physical exercise (hr)	r	.119	-.165	.123	.164	.068	.004	.011	.162	.113	1	.222*
	p value	.293	.145	.277	.145	.547	.971	.922	.150	.317		.048
Total Daily energy expenditure(Kcal)	r	.451**	.091	.714**	.783**	-.118	.143	-.311**	-.106	.577**	.222*	1
	p value	.000	.424	.000	.000	.296	.207	.005	.350	.000	.048	

Model Summary (Dependent variable: BMI scores of students)

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
Linear regression	0.783 ^a	0.613	0.603	1.55169

a. Predictors: (Constant), Total Daily energy expenditure(Kcal), Weight of student

Model Summary (Dependent variable: Energy expenditure level of students)

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	0.910 ^a	0.828	0.814	169.56062

a. Predictors: (Constant), Amount of time for taking exercise(hr), Amount of time academic study(hr), BMI score of students, Amount of time for playing(hr), Height of student(cm), Weight of student(Kg)

Food intake habit of the students

Table-17 showed that about 100% students consumed rice and oil everyday or 4-6 times per week, while 40.0% consumed atar ruti 1-3 times per month or sometimes or never generally. About 91.2% students consumed potato everyday or 4-6 times per week and 5.0% students consumed it 1-3 times or week while 96.2% students consumed sweet potato 1-3 times per month or sometimes or never generally. Small fish consumed about 21.3% student's everyday or 4-6 times per week and 15.0% students consumed it 1-3 times per week while big fish consumed 1-3 times or week by the 35.0% students and 20.0% consumed it 1-3 times per month or sometimes or never. Meat such as chicken is consumed 1-3 times or week by 26.3% students and 28.7% consumed it 1-3 times per month or sometimes or never while other meats consumed 1-3 times or week by 27.5% students and 37.5% consumed it 1-3 times per month or sometimes or never. Pulse is consumed by 45.0% student everyday or 4-6 times per week and 37.5% consumed it 1-3 times per month or sometimes or never. Leafy, non-leafy vegetables were found to consume everyday or 4-6 times per week by 45.0%, 85.0% everyday or 4-6 times per week and for 1-3 times or week by 36.3%, 0.0% students respectively. Egg, milk and fruits were consumed everyday or 4-6 times per week by 41.3%, 41.3% and 58.7% students while these were consumed 1-3 times per week by 21.2%, 21.2% and 25.0% students respectively. But Niramish is consumed at least 1-3 times per month or sometimes or never by 41.2% students.

Table 17: General habits of food frequency by the students

Food groups	Food Items	Everyday/4-6 times per week	1- 3 times per week	1-3 times per month/Sometimes/ Never	Total
Cereals	Rice	80 (100.0)	0 (.0)	0 (.0)	80 (100.0)
	Atar Ruti	31 (38.7)	17 (21.3)	32 (40.0)	80 (100.0)
	Bread/cake	13 (16.3)	24 (30.0)	43 (53.7)	80 (100.0)
	Muri/Chira	5 (6.3)	8 (10.0)	67 (83.7)	80 (100.0)
	Suji/Semai	4 (5.0)	5 (6.3)	71 (88.7)	80 (100.0)
Roots & Tubers	Potato	73 (91.2)	4 (5.0)	3 (3.8)	80 (100.0)
	Sweet potato	0 (.0)	3 (3.8)	77 (96.2)	80 (100.0)
Fats & Oil	Oil	80 (100.0)	0 (.0)	0 (.0)	80 (100.0)
	Dalda	0 (.0)	10 (12.5)	70 (87.5)	80 (100.0)
Fish	Small fish	17 (21.3)	12 (15.0)	51 (63.7)	80 (100.0)
	Big fish	36 (45.0)	28 (35.0)	16 (20.0)	80 (100.0)
	Dried fish	7 (8.7)	5 (6.3)	68 (85.0)	80 (100.0)
Meats	Chicken	36 (45.0)	21 (26.3)	23 (28.7)	80 (100.0)
	Meat (Others)	28 (35.0)	22 (27.5)	30 (37.5)	80 (100.0)
Pulse & Nuts	Pulse	36 (45.0)	14 (17.5)	30 (37.5)	80 (100.0)
	Coconut	0 (.0)	10 (12.5)	70 (87.5)	80 (100.0)
LV	Leafy vegetables	36 (45.0)	29 (36.3)	15 (18.7)	80 (100.0)
NLV	Non-leafy vegetables	68 (85.0)	12 (15.0)	0 (.0)	80 (100.0)
Others	Molasses	0 (.0)	13 (16.3)	67 (83.7)	80 (100.0)
	Egg	44 (41.3)	17 (21.2)	30 (37.5)	80 (100.0)
	Milk	33 (41.3)	17 (21.2)	30 (37.5)	80 (100.0)
	Fruits	47 (58.7)	20 (25.0)	13 (16.3)	80 (100.0)
	Niramish	33 (41.3)	14 (14.5)	33 (41.2)	80 (100.0)

N.B.: Figures in the parentheses indicate percentages.

Health profile of the students

Table-18 shows the health status of the students. It was observed that 88.8% knew their blood group while 78.3% students had not taken hepatitis-B vaccine. About 67.5% students fell in sickness within last six months and 32.5% students not fall in any sickness. It was found that 33.8% students fell in fever while only 3.8% students fell in diarrhoea. Most of the students (50.0%) took allopathic treatment while only 7.5% students took Aurbadhy treatments for sickness. About 33.0% students do not taken any treatment. About 28.8% students took treatment from university medical centre, 16.2% students took from private clinic or doctor, 13.8% students took treatment from pharmacy or quack, 6.2% students took treatment from government hospital and 5.0% students took treatment from others place. About 48.8% students told that treatment are available and 21.2% students told treatment was not available. About 45.0% students were partly satisfied and 20.0 students were completely satisfied of treatment. It was also observed that 66.2% student partly, 7.5% completely fell in physical sickness and 26.2% students not fell any physical sickness. From the above discussion it was found that the undergraduate students should more conscious to their health.

Table 18: Health information of the students

Parameter		No.	%
Blood group	Yes	71	88.8
	No	9	11.2
Vaccine taken for hepatitis-B	Yes	21	26.2
	No	59	73.8
Sickness within six month	Yes	54	67.5
	No	26	32.5
Type of sickness	No disease	24	30.0
	Fever	27	33.8
	Diarrhoea	3	3.8
	Dysentery	6	7.5
	Gastric-alser	3	3.8
	Skin diseases	4	5.0
	Others	13	16.2
Type of treatment taken	Do not taken any treatment	24	30.0
	Allopathic	40	50.0
	Homeopathy	10	12.5
	Aurbadhy	6	7.5
Type of treatment place	Do not taken any treatment	24	30.0
	Medical centre	23	28.8
	Government hospital	5	6.2
	Private clinic/ Doctor	13	16.2
	Pharmacy/Quack	11	13.8
	Others	4	5.0
Availability or quality of treatment	Do not taken any treatment	24	30.0
	Yes	39	48.8
	No	17	21.2
Satisfaction of treatment	Do not taken any treatment	24	30.0
	Partly	36	45.0
	Completely	16	20.0
	Not at all	4	5.0
Physical weakness	Partly	53	66.2
	Completely	6	7.5
	Not at all	21	26.2

Nutritional knowledge of the students

Nutritional Knowledge of the students is presented in Table-19. It was observed that 47.5% students knew about balance diet and 18.8% students did not know about it. Only 21.2% students knew the amount of carbohydrate percentage in balance diet. About 81.2% students had knowledge about anemia but 50.0% and 52.5% students knew about diseases involved in iron deficiency and Iron enriched food respectively. About 93.8% and 83.8% students knew about Vitamin C enriched food and disease due to vitamin deficiency respectively. It was also found that only 23.8% students knew about the amount of water to drink in a day. Results clearly indicate that undergraduate students did not have complete nutritional knowledge yet.

Table 19: Nutritional Knowledge of the students

Parameter		No.	%
Knowledge of balance diet	Do not know	15	18.8
	Known	38	47.5
	Partly known	27	33.8
Amount of carbohydrate in balance diet (%)	20-30%	14	17.5
	40-50%	17	21.2
	50-60%	26	32.5
	Do Not Know	23	28.8
Knowledge about anemia	Yes	65	81.2
	No	15	18.8
Diseases involved with iron deficiency	Fever	0	.0
	Anemia	40	50.0
	Weakness	12	15.0
	Do not know	28	35.0
Iron enriched food	Potato	4	5.0
	Meat/Fish	42	52.5
	Pulse	7	8.8
	Do not know	27	33.8
Probable victim of iron deficiency	Adolescent girl	53	66.2
	Little girl	5	6.2
	Girl	2	2.5
	Do not know	20	25.0
Vitamin C enriched food	Amloki	75	93.8
	Apple	2	2.5
	Mango	1	1.2
	Do not know	2	2.5
Disease due to vitamin deficiency	Scurvy	67	83.8
	Fever	2	2.5
	Pain in teeth	4	5.0
	Do not know	7	8.8
Amount of water to drink (Litre)	2 litre	19	23.8
	2-3 litre	19	23.8
	4 litre	35	43.8
	Do not know	7	8.8

Cooking habit and hygienic status of the students

Cooking information of the students is shown in Table-20. It was observed that 90.4% male and 92.9% female students were able to cook and only 9.6% male and 7.1% female students were unable to cook. Of the total students, about 91.2% students were able to cook while only 8.8% students were unable to cook. It was also observed that 17.3% male and 46.4% female students were habituated to cooking and 50.0% male and 21.4% female students were not habituated to cooking. Of the total students, only 27.5% students were habituated to cooking while 40.0% students were not habituated to cooking. About 71.2% male students and 82.1% female students answered that foods were available in their dormitory and among the total students only 18.8% students answered that foods were not available in their dormitory. It was found that 50.0% male students and 67.9% female students were partly satisfied with the quality of food and among the total students 56.2% students were partly satisfied with the quality of food.

It was found that 92.3% male students and 96.4% female students washed their hand and cooking utensils before cooking and among the total students 93.8% students washed hand and cooking utensils before cooking. It was also found that 28.8% male students and 25.0% female students cut vegetables in small pieces then washed in water and among the total students 27.5% students cut vegetables in small pieces then washed in water. About 46.2% male students and 21.4% female students washed vegetables before cutting and among the total students 37.5% students washed vegetables before cutting. About 19.2% male students and 53.6% female students washed vegetables before and after cutting and among the total students 31.2% students washed vegetables before and after cutting.

It was observed that 84.6% male and 82.1% female students were covering vegetables while cooking and only 5.8% male and 3.6% female students were not covering vegetables while cooking. About 96.2% male students and 100.0% female students were covering food after cooking and among the total students only 1.2% students were not covering food after cooking. It was also observed that 63.5% male students and 67.9% female students were using froth after cooking and among the total students only 25.0% students were not using froth after cooking.

It was found that 94.2% male students and 100.0% female students were using iodide salt and among the total students only 1.2% students were not using iodide salt. About 96.2% male students and 100.0% female students were using packet salt and among the total students only 2.5% students were using normal salt. It was also found that 84.6% male students and 100.0% female students were known the method of salt preservation while only 8.8% students were unknown.

From the above discussion it was found that cooking habit and hygienic status of the female students was superior to that of the male students.

Table 20: Cooking habit and hygienic status of the students according to sex of the students

Parameter		Sex of student					
		Male		Female		Total	
		No.	%	No.	%	No.	%
Cooking ability	Yes	47	90.4	26	92.9	73	91.2
	No	5	9.6	2	7.1	7	8.8
Cooking habit	Yes	9	17.3	13	46.4	22	27.5
	No	26	50.0	6	21.4	32	40.0
	Sometimes	17	32.7	9	32.1	26	32.5
Food available in dormitory	Do not know	0	0	5	17.9	5	6.2
	Yes	37	71.2	23	82.1	60	75.0
	No	15	28.8	0	0	15	18.8
Quality of food that available in dormitory	Do not know	0	0	5	17.9	5	6.2
	Partly	26	50.0	19	67.9	45	56.2
	Completely	1	1.9	1	3.6	2	2.5
	Not at all	25	48.1	3	10.7	28	35.0
Washing hand & utensils before cooking	Yes	48	92.3	27	96.4	75	93.8
	No	0	0	0	0	0	0
	Sometimes	4	7.7	1	3.6	5	6.2
Washing vegetables before cooking	Cutting in small pieces then washing in water	15	28.8	7	25.0	22	27.5
	Washing before cutting	24	46.2	6	21.4	30	37.5
	Follow the method 1 & 2	10	19.2	15	53.6	25	31.2
	Others	3	5.8	0	0	3	3.8
Covering vegetables while cooking	Yes	44	84.6	23	82.1	67	83.8
	No	3	5.8	1	3.6	4	5.0
	Sometimes	5	9.6	4	14.3	9	11.2
Using of froth after cooking	Through away	33	63.5	19	67.9	52	65.0
	Never through any froth	11	21.2	9	32.1	20	25.0
	To give it other	1	1.9	0	0	1	1.2
	Others	7	13.5	0	0	7	8.8
Covering food after cooking	Yes	50	96.2	28	100.0	78	97.5
	No	1	1.9	0	0	1	1.2
	Sometimes	1	1.9	0	0	1	1.2
Using of iodide salt	Yes	49	94.2	28	100.0	77	96.2
	No	2	3.8	0	0	2	2.5
	Sometimes	1	1.9	0	0	1	1.2
Type of salt using in cooking	Packet salt	50	96.2	28	100.0	78	97.5
	Normal salt	2	3.8	0	0	2	2.5
Method of salt preservation	Without covering	7	13.5	0	0	7	8.8
	With covering	44	84.6	28	100.0	72	90.0
	Pot without any cover	1	1.9	0	0	1	1.2



CHAPTER 4

SUMMARY AND CONCLUSION

CHAPTER IV

SUMMARY AND RECOMMENDATION

Summary

University student is an important segment of population of any country. They come from all parts of the country and these students belong to quite varied types of geographical and socio-economic background. The present study was undertaken to determine the nutritional status, life style, health profile and general food habit of the students of Hajee Mohammad Danesh Science and Technology University, Dinajpur. The study is demonstrated below precisely.

A total of 80 students participated in this study; of them 52 were male and 28 female students. Considering the male and female students, twenty (20) students were randomly selected from each level. The age range of the maximum students was 21-22 years. Majority of the student's (80.0%) religion was Islam and the rest Hinduism.

About 33% students' father/family head were service holder and 20% were farmer by profession. Average monthly income of the student's family was Tk. 18738.0. The male and female student's monthly family income were Tk. 17769.2 and Tk. 20536.0 respectively. The solvency of the female students' family is more than that of the male students' family because occupational status of father/family head of the female students was higher than that of the male students. Again, 44% students' monthly family income lies between Tk. 13000 to Tk. 20000. Most of the students' families (78.8%) lived in their own house. Average monthly expenditure or amount of money taken from their family was Tk. 3971.38.

Nutritional status of the students was measured by Body Mass Index (BMI) in this study. Most of the students (78.8%) were in normal range and students of level IV were more conscious of their health because out of 20 students, 19 students were normal in level IV and found no obese student.

The study showed that the students whose monthly expenditure was Tk. 4600 to 6000 possess good health. The daily average energy expenditure of a student was 2246.35 kcal and the daily average energy expenditure of male students was higher than that of female students. The study also showed that a student spends highest amount of time for sleeping (7.41 hrs) and lowest for cleaning room (0.21 hrs).

About 100% students consumed rice and oil everyday or 4-6 times per week, while 96.2% consumed sweet potato 1-3 times per month or sometimes or never. Except cereals and oil, vegetables, potato, fish, meats, pulse, egg, milk, fruits were less consumed by the students.

The health status data showed that the health condition of the undergraduate students was not satisfactory. Again it was found that the undergraduate students did not have complete nutritional knowledge still then and cooking habit and hygienic status of the female students were superior to that of the male students.

Recommendations

The present study was intended to understand the nutritional status, life style, health profile and general food habit of the food and process engineering students of Hajee Mohammad Danesh Science and Technology University, Dinajpur. The study findings make the following recommendations:

- (i) The study reveals that the nutritional status of the students is not up to the mark. So their nutritional consciousness should be increased more by eating nutritious food, practicing hygienic condition, taking regular physical exercise etc.
- (ii) The health status data shows that the health condition of the students was not satisfactory because they suffer from various sorts of illness. So, they should take more care of their health.
- (iii) The study portrays that the nutritional knowledge of the students is poor. So, they should boost their nutritional knowledge a bit.
- (iv) Cooking habit and hygienic status of the female students are superior to that of the male students. So, the male students need to practice good cooking habit and hygiene.

The study conducted in 80 students gives only an assessment of nutritional status, life style and health profile which may serve as a data bank for similar studies for future food and process engineering students from other universities too.



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APPENDIX

APPENDIX: QUESTIONNAIRE

A Study on Nutritional Status, life style and Health Profile of Food and Process Engineering Students of HSTU, Dinajpur.

Date: / /

Sample Code

1. Faculty Name:

3. Dormitory/ Hall:

2. Level:

4. Semester:

A. Identification of Student:

Name of the Student	Sex	Religion	Age	Marital Status	Anthropometry	
	(Code)	(Code)	(Year)	(Code)	Height (cm)	Weight (Kg)

Sex Code:

1. Male
2. Female

Marital Status:

1. Single
2. Double

Religion Code:

- | | | | |
|------------|----------|-------------|-----------|
| 3. Divorce | 1. Islam | 3. Buddhist | 5. Jeoin |
| 4. Widow | 2. Hindu | 4. Christan | 6. Others |

B. Socio-Economic Information:

1. How many members in your family?	<input style="width: 100%;" type="text"/>
2. How many numbers of your sister & brother?	a) Brother <input style="width: 50px;" type="text"/> & b) Sister <input style="width: 50px;" type="text"/>
3. How many earnable members in your family?	<input style="width: 100%;" type="text"/> Tk.
4. What is your father's occupation? (Use code)	<input style="width: 50px;" type="text"/>
5. What is your father's monthly income?	<input style="width: 100%;" type="text"/> Tk.
6. What is your mother's occupation? (Use code)	<input style="width: 50px;" type="text"/>
7. What is your mother's monthly income?	<input style="width: 100%;" type="text"/> Tk.
8. What is the relation with chief earnable member or your family? (Use code)	<input style="width: 50px;" type="text"/>
9. What is the monthly income of chief earnable member or your family?	<input style="width: 100%;" type="text"/> Tk.
10. What is the monthly income of your family?	<input style="width: 100%;" type="text"/> Tk.
11. Who bear your cost? (Cost bearing code)	<input style="width: 50px;" type="text"/>
12. What is the amount land of your family?	a) Dowelling land Decimal
	b) Cultivable land Decimal
	c) Uncultivable land Decimal
13. What is the type of your home? (Code: 1= Own, 2= Tenant, 3= Other's Home)	

Occupation Code:

- | | |
|------------------------------|----------------|
| 1= Farmer | 8= Doctor |
| 2= Tenant farmer | 9= Teacher |
| 3= Day laborer | 10= Unemployed |
| 4= Vendor/ Trader/ Fisherman | 11= Potter |
| 5= Businessmen | 12= Blacksmith |
| 6= Driver | 13= Other |
| 7= Housewife | |

Relation/Cost Bearing Code:

- 1= Father
- 2= Mother
- 3= Elder Brother
- 4= Relative
- 5= Charity/Missionaries
- 6= Self
- 7= Uncle

C. Information on Food Frequency of General Food Intake:

Frequency Code No.	Name of Food Item	Frequency of Food Intake*					
		1	2	3	4	5	6
1. Regular..... 1	Rice	1	2	3	4	5	6
2. 4-6 times in week..... 2	Atta/ Bhutta Ruti	1	2	3	4	5	6
3. 1-3 times in week 3	Bread/Bonruti	1	2	3	4	5	6
4. 1-3 times in month.... 3	Cake/Biscuit	1	2	3	4	5	6
5. Sometimes 4	Potato	1	2	3	4	5	6
6. Never 5	Sweet Potato	1	2	3	4	5	6
	Jaggery	1	2	3	4	5	6
	Muri/ Khoi	1	2	3	4	5	6
	Chera	1	2	3	4	5	6
	Suji/Semai	1	2	3	4	5	6
	Oil	1	2	3	4	5	6
	Dalda	1	2	3	4	5	6
	Little Fish	1	2	3	4	5	6
	Large Fish	1	2	3	4	5	6
	Dried Fish	1	2	3	4	5	6
	Beef/ Murton	1	2	3	4	5	6
	Duck/ Chicken Meat	1	2	3	4	5	6
	Lever	1	2	3	4	5	6
	Egg	1	2	3	4	5	6
	Milk	1	2	3	4	5	6
	Pulse	1	2	3	4	5	6
	Coconut/ Nut	1	2	3	4	5	6
	Leafy Vegetable	1	2	3	4	5	6
	Vegetables	1	2	3	4	5	6
	Fruits	1	2	3	4	5	6
	Niramish	1	2	3	4	5	6

*Please Mark the Figure with Circle.

D. Daily Average Energy Expenditure (Kcal):

Physical Activities	PAR value	Time (hrs)	BMR	Energy (Kcal)
1. How much time you spend in bed?				
2. How much time you spend for eating?				
3. How much time you spend for academic study?				
4. How much time you spend for personal study?				
5. How much time you spend for study in library?				
6. How much time you spend for writing?				
7. How much time you spend for typing?				
8. How much time you spend for walking?				
9. How much time you spend for playing?				
10. How much time you spend for cleaning room?				
11. How much time you spend for washing clothes?				
12. How much time you spend for dressing?				
13. How much time you spend for reading religious book?				
14. How much time you spend for urination & defaecation?				
15. How much time you spend in bus?				
16. How much time you spend for internet browsing?				
17. How much time you spend for physical exercise?				
18. How much time you spend for gossiping?				
19. How much time you spend for speak in cell phone?				
20. How much time you spend for bath?				
21. How much time you spend for other activities?				
Total :				

G. Nutrition Knowledge Information:

1. Do you Know about balance diet? (Code: 1= Partly, 2= Completely, 3= Do not Know)
2. How much carbohydrate should be in balance diet? (Code: 1= 20-30%, 2= 30-40%, 3= Do not Know)
3. Do you Know about anemia? (Code: 1= Yes, 2= No)
4. Which disease involved with iron deficiency?(Code: 1=Anemia, 2=Fever, 3=Weakness, 4=Do not Know)
5. Which is iron content food? (code: 1=Potato, 2=Meat/Fish, 3=Pulse, 4=Do not Know)
6. Who is risky with iron deficiency? (Code: 1= Adolescent girl, 2= Adult Girl, 3=Baby, 4= Do not Know)
7. What is the limit of hemoglobin in blood? (Code: 1= 12-18 gm/dl, 2=18-24 gm/dl, 3= Do not Know)
8. Which is Vitamin 'C' content food? (Code: 1=Lemon, 2=Apple, 3=Mango, 4= Do not Know)
9. Which disease involved with Vitamin 'C' deficiency?(Code: 1=Anemia, 2=Scurvy, 3=Do not Know)
10. How much water to drink in a day? (Code: 1=2 Litre, 2=3 Litre, 3=4 Litre, 4=Do not Know)

H. Information about Cooking and Hygienic Status:

1. Do you cook food in necessity? (Code: 1= Yes, 2= No)
2. Do you intake food by cooking? (Code: 1= Yes, 2= No, 3= Sometimes)
3. Have any dining-room in your dormitory? (Code: 1= Yes, 2= No)
4. Is the food of dining room safety or not? (Code: 1= Yes, 2= No)
5. Do you wash your hand & utensils before cooking? (Code: 1= Yes, 2= No, 3= Sometimes)
6. How do you wash vegetables before cooking? (Code: 1= cutting before washing, 2= Washing before cutting, 3= Follow the method 1&2)
7. Do you cook vegetable by covering it? (Code: 1= Yes, 2= No, 3= Sometimes)
8. What do you do with froth after cooking? (Code: 1= Use it, 2=Do not use)
9. Do you cover food after cooking? (Code: 1= Yes, 2= No, 3= Sometimes)
10. Do you use iodized salt? (Code: 1= Yes, 2= No, 3= Sometimes)
11. What type of salt you used during cooking? (Code: 1= Packet salt, 2= Normal salt)
12. How you preserved salt? (Code: 1= In open pot, 2=In close pot)