

**NUTRIENT INTAKE AND NUTRITIONAL STATUS OF SELECTED  
ELDERLY PEOPLE IN DHAKA CITY**

*A Thesis*

*For the Degree of*

*Master of Philosophy in Nutrition and Food Science*

**BY**

**SONIA ISLAM**

*Registration no. 187*

*Session: 2011-2012*



**INSTITUTE OF NUTRITION AND FOOD SCIENCE**

**UNIVERSITY OF DHAKA**

**December, 2018**

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## **DECLARATION**

This is to certify that the thesis entitled “**Nutrient Intake and Nutritional Status of Selected Elderly People in Dhaka City**” by **Sonia Islam** in particular fulfillment of the requirement for the award of **Master of Philosophy in Nutrition and Food Science** has been completed under our supervision.

It is further certified that **Sonia Islam** has fulfilled all conditions laid down in the Academic Ordinance with regard to the M. Phil. course work and to the best of our knowledge the thesis contains her original research.

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## **DECLARATION**

I, hereby, humbly declare that the thesis entitled “**Nutrient Intake and Nutritional Status of Selected Elderly People in Dhaka City**” based on works carried by me. No part of it has been presented for any higher degree.

The research work was carried in 3 selected old homes in Dhaka city.

- 1. Child & Old Aged Care**, Kallaynpur, Dhaka,
- 2. Shapnalok Peace Villa**, Shamoli, Dhaka and
- 3. Probin Nibash & Hospital**, Agargaon, Dhaka.

Under the guidance of **Professor Dr. Md. Aminul Haque Bhuyan** and **Professor Dr. Md. Nizamul Hoque Bhuiyan** of Institute of Nutrition and Food Science (INFS), University of Dhaka.

---

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*Dedicated*  
*To my*  
*Grandmother*  
*“Dadu”*

## **ACKNOWLEDGEMENTS**

It is my great pleasure to express deep sense of gratitude and sincere thanks to my supervisors Professor Dr. Md. Aminul Haque Bhuyan and Professor Dr. Md. Nizamul Hoque Bhuiyan of Institute of Nutrition and Food Science (INFS), University of Dhaka for their valuable guidance, suggestion, co-operation and immense help for making this study possible.

I express my gratefulness to Director & Professor Dr. Sheikh Nazrul Islam of Institute of Nutrition and Food Science (INFS), University of Dhaka for his continued support during the conduct of the thesis.

I express my heartfelt thanks to my respected teachers Professor Dr. Md. Nazrul Islam Khan, Professor Dr. Md. Saidul Arefin and Professor Dr. ATMA Rahim for their untiring guidance throughout the writing of this thesis. I would like to specially thank Dr. Sumaiya Mamun, Assistant Professor and Associate Professor Dr. Md. Ruhul Amin (INFS) for their cooperation in the preparation of the tables as well as going through the improvements in the text of this thesis. Very special thanks to Taslima Khatun, Assistant Professor, Dept of Community Nutrition, Bangladesh University of Health Science (BUHS) to calculate nutrient intake values from the food items consumed by the respondents of the study with appropriate software.

I am always grateful to my husband Md. Sakif Hossain for his all out support and being with me in overall situation during the research period. Without him it was impossible for me to complete this task.

I am really grateful to all the authorities of 3 selected old homes in Dhaka city (Child & Old Aged Care, Shapnalok Peace Villa and Probin Nibash & Hospital), for their sincere co-operation and providing me opportunity to complete the study.

Especially I am grateful to all the elderly respondents for their co-operation during the data collection and allocating some of their valuable times without which this work would have not been possible.

## **ABSTRACT**

In Bangladesh, aging is one of the emerging problems and it has been increasing day by day with improvement of socio-economic situation. Nutritional status changes due to ageing process. The nutritional status is not only dependent on elderly person's physiological and psychological changes but also dependent on nutrients intakes as well as sanitation and hygienic practices. In Bangladesh there are few studies on elderly people, especially on old home people in Dhaka city. As such this study was undertaken to measure nutrients intakes of selected elderly based on foodstuffs weighting in 24 hour dietary recall using measuring utensils and subsequent calculations using specific software and to assess nutritional status of the elderly people from 3 selected old homes in Dhaka city.

This was a cross-sectional study which was conducted on ( $\geq 60$  years) 63 elderly people from 3 selected old homes in Dhaka city to measure their nutrients intake and assess their nutritional status. Exhausted sampling technique was applied to select the sample population and sample size,  $n=63$  [where as males were 32 (51%) & females were 31 (49%)] were taken after the exclusion and inclusion criteria of the study. Face to face interview technique with the respondents by pre-tested semi structured questionnaire was used to collect the information. BMI was calculated to assess the nutritional status of respondents according to 1998 WHO guidelines. Nutrients intake values were calculated by 24 hour dietary recall from the derived weights of consumed foodstuff of respondents according to FCT for Bangladesh. Data were analyzed by using Microsoft excel 2007 and



SPSS software program version 20. Appropriate statistical tools were used to analyze the study findings.

According to BMI, the results showed that among the entire respondents underweight were 6 (10%) persons, overweight were 24 (38%) persons and obese were 7 (11%) persons; whereas only 26 (41%) elderly persons were normal. Nutrient intakes results showed that among the entire respondents median intake of energy was 1219 Kcal/day and protein was 40 gm/day, whereas median intake of vitamin A was 184 mcg /day, vitamin B1 was 0.43 mg/day and Ca was 443 mg/day. These nutrient intake values were lower compared to percent meeting of RNI. Nutritional status of the respondents were found significantly associated with their total monthly expenditure ( $p=0.008$ ), milk intake per day ( $p=0.034$ ), personal liking of food ( $p=0.007$ ), hand washing before eating ( $p=0.001$ ) and taking bath every day ( $p=0.001$ ). Gender and Individual Dietary Diversity Score (IDDS) were not found significantly associated with nutritional status of the elderly respondents.

Nutritional status of this study has showed 59% of them were malnourished (underweight, overweight and obese), indicates similar results with Abu SG Faruque et.al study on anthropometric profile of elderly population living in urban Bangladesh having high prevalence of malnutrition among elderly population. Nutrition education and nutrition related intervention programs are essential for the elderly and their caregiver; to improve nutrients intakes to meet adequate nutrients and maintain normal nutritional status of the elderly people.

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## ACRONYMS

BDT	Bangladesh Taka
BMI	Body Mass Index
BMR	Basal Metabolic Rate
BUHS	Bangladesh University of Health Science
cm	centimeter
FAO	Food and Agriculture Organization
FCT	Food Composition Table
FANTA	Food and Nutrition Technical Assistance
Gov.t	Government
IDDS	Individual Dietary Diversity Score
INFS	Institute of Nutrition and Food Science
Kcal	Kilocalorie
kg	kilogram
ml	milliliter
MNA	Mini Nutritional Assessment
NGO	Non-Governmental Organization
NIH	National Institute of Health
NIDDM	Non-Insulin-Dependent Diabetes Mellitus
p	prevalence
QOL	Quality of Life
RNI	Recommended Nutrient Intake
SD	Standard Deviation
SPSS	Statistical Package for the Social Sciences
USA	United States of America
UNO	United Nations University
WHO	World Health Organization
mcg	microgram
%	percent

## **INTRODUCTION**

In Bangladesh, aging is one of the emerging problems and it has been increasing day by day. The number of elderly people is increasing rapidly due to improvement of social-economic conditions and good health care facilities. It is estimated that by 2050 nearly two thirds of total world population aged 60 and over will live in developing countries [1].

The number of elderly people is increasing day by day in developed countries due to the success of targeted public health interventions. In the USA there are a lot of health care services for their elderly peoples, old homes, day care centers and elderly societies for elderly people. Globally, increasing life expectancy, generating more amount of elderly population and that's creating great challenges in the world, especially health care system and support [2]. Furthermore, among all of elderly people, over half of them live in Asia.

As an Asian developing country Bangladesh has a small proportion about of 6% of elderly population but the number is about 7.2 million and this rate is increasing highly [reported by Banglapedia, retrieved (2007)]. In the Asian developing countries, particularly in Bangladesh has a traditional and religious view the elderly people is dependent on their family members [3]. The main sources of securities as well as economical supports are given by their adult child, basically by their sons [4]. But today's huge transformation of urbanization and industrialization had taken place to change socio-economic and demographic structures, also the western cultures and others related factors have broken down social and traditional values of extended family and community care system [5]. Although, in Bangladesh, most of the elderly people suffer



from basic human needs, including senile diseases, poor access of health care and medicine facilities, poor diet, poor financial support, deprivation, negligence and exclusion, limited coverage of formal social security system and inadequate benefits payments. Only the families are primary sources which provide support that's why majority of the elderly are dependent on their family members [3]. According to the other findings, elderly people enjoy healthy life with the slightest touch of hearty care and affection of family, so that they have a natural weakness to life with their family [6]. The size of successive birth cohort reduction not only signifies the diminishing availability of youngster to support the elderly but also the shrinking of their family size [7].

Nutritional status changes due to ageing process. In Bangladesh though comprehensive health policy exists for the elderly, but geriatric problems are still ignored in medical education and profession. Nationwide the only support for the older person is the provision of "Old age allowance" by the Government of Bangladesh (GOB). Several studies have been conducted both in developed and developing countries to address the overall nutritional status of elderly [8-10].

In Bangladesh there are few studies and information on elderly people, basically on old home people. Usually old homes mean institutional shelters for older peoples who have no family or family support for them, and/or who do not have the financial resources to live by themselves. Furthermore some of the elderly prefer to live in a quality old home on payment. Usually old homes provide services free but sometimes require payments too. This study lead to measure food intake, calculate nutrients intake and assess nutritional status of the elderly people from 3 selected old homes in Dhaka city.

## **RATIONALE OF THE STUDY**

In the developing country the topic of elderly people wasn't an important issue to discuss in public health sectors so long ago. In the Asian developing countries, particularly in Bangladesh 60 years and over aged elderly population live in economical insecurity, usually decline in the traditional family support. Urbanization and changing lifestyles have increased the plight of the elderly people, especially the poor elderly and the women. In the recent decade, the elderly populations appear to be increasing especially in developing country including Bangladesh [11-14].

Bangladesh has a long cultural tradition and religious view to look after the elderly in the community, basically in rural community. Also it is expected that families (mainly son), relatives and communities will take care of their own elderly, and sometimes government resources will care their wellbeing. This situation places a huge financial burden on their caregivers with a consequent lack in adequately providing for the nutritional and health needs of the aged in their care. All these increases in the cost of living affects to a great extent dietary intakes and nutritional status of not only the general population, but the often neglected elderly population. Furthermore, the vulnerability of the aged being far greater than that of the younger population shows the need for continuous monitoring of the aged with a view to identifying the extent of malnutrition among them in Bangladesh.

Several studies have documented poor nutritional status among the elderly [15-17]. As the number of elderly grows, the demand for elderly health care services and welfare measures increase as well. In Bangladesh comprehensive health policy exists for the elderly but geriatric problems are still ignored in medical education and profession. High

prevalence of morbidity is a common feature in elderly compared to the younger adults and health care expenditure is also higher in elderly. As well, inadequate sanitation facilities and lack of access of safe water also contribute to poor nutrition and health status of elderly people.

Due to lack of proper nutrition, elderly population are suffering from malnutrition. So it is very much needed to upgrade their nutritional status .The study can make some policy level suggestion so that the elderly people can be benefited in general: to draw attention of elderly people/generation in our country, to improve elderly health program of Govt. and NGO with regards to especial health care service and better treatment for elderly people in our country.

There are few researches carried on elderly nutrition sector. There is scope for improving adequacy of nutrient intake and nutritional status of the elderly people after undertaking an in depth study on them. Thus, this study was undertaken to measure nutrients intake and to assess nutritional status of the elderly people from 3 selected old homes in Dhaka city with associated factors within.

## **RESEARCH QUESTION**

**What are the nutrient intake values and nutritional status  
of selected elderly people from 3 old homes  
in Dhaka city?**

## **OBJECTIVES**

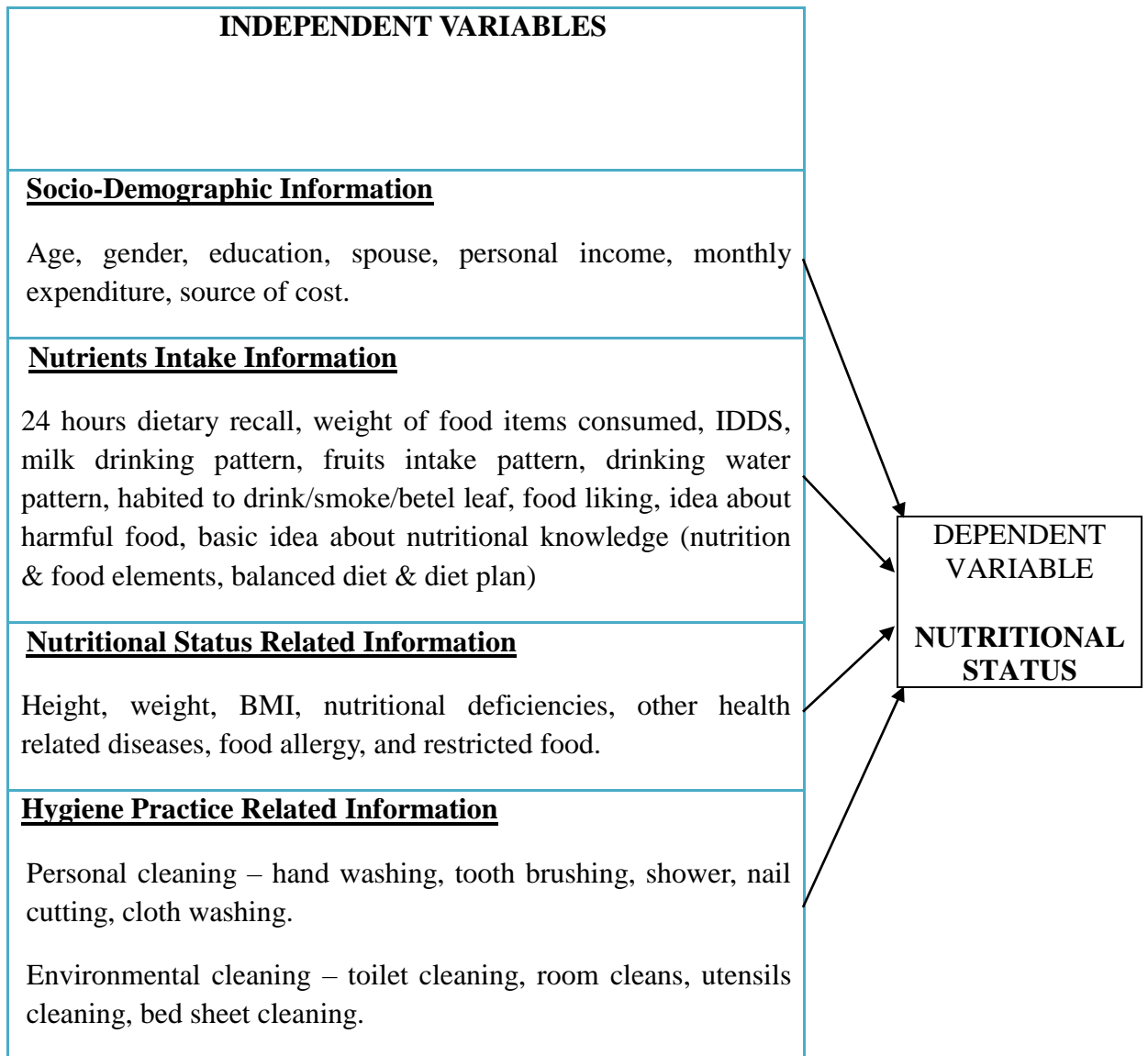
### **General Objective**

The overall objective of this study was to assess the nutrient intake and nutritional status of elderly people from 3 selected old homes in Dhaka city.

### **Specific Objectives**

1. To determine the demographic and socio-economic status of selected elderly people from 3 selected old homes in Dhaka city.
2. To measure nutrients intake (macro and micro) of selected elderly people through recording their 24 hour dietary recall with measurements of food items using standard measuring utensils from 3 selected old homes in Dhaka city.
3. To assess the nutritional status of selected elderly people through their anthropometric data (height, weight & BMI) from 3 selected old homes in Dhaka city.
4. To examine the personal hygiene and sanitation practices of selected elderly people from 3 selected old homes in Dhaka city.
5. To formulate recommendations for the elderly in Dhaka city based on study findings.

## CONCEPTUAL FRAME WORK



## **LITERATURE REVIEW**

The ageing is an ongoing physiological process and nutritional status changes due to ageing process as well as other related diseases. The definition of the age of the “elderly people” or the “old” should be explained properly. James Manney (1975) classified the ageing into four period. The first period of aging is called the stage for “reorientation”, it is the late adulthood years between 50 to 65 years. The second period of aging is called “old age” of 65 to 74 years. The third period of aging is called “old-old” ages between 75 to 84 years. The fourth and final period of aging is after the age 85 years.

According to National Institutes of Health (NIH) - funded Census Bureau, 2016 report “An Aging World: 2015” claimed that the world population will jump 17% (1.6 million) by the year 2050, which indicates that the world’s elderly populations are growing dramatically [18]. Another newly report ‘World Population Prospects: the 2017 Revision report’, said that worldwide 13 % {962 million (1.4 billion)} people are 60 and over aged today and the growing rate is about 3% per year. It is expected that between the years 2050 to 2100 the amount will be double (2.1 billion) to triple (3.1). The high percentage of 60 and over age is in Europe, which is 25% [19]. The age structure of the population has been changed in almost all countries over the world.

In China alone old persons will be living around 120 million by 2050 [20]. In Japan the number of elderly people is more than 11.65 % of total population than the other industrialized countries; so that the Japanese government has taken a national aged day to give more emphasis on health care services for the elderly people [21]. American society

has declaration of “Honor the past, imagine the future”, to give more emphasis on health care facilities and economic security for their elderly people [22].

Investigation on aging to identify the real demographic issues has been done by macro level in Bangladesh [23]. A clear indication has been found of increasing demographic aging process [24, 25]. It is widely reported that elderly people have more substantial inter- individual variability in health related to age than the younger people [26]. Elderly people vary more in health status among themselves than other age groups of peoples.

There are some demographic, socioeconomic and health related factors affecting in low-income and lower-middle-income countries life expectancy [27]. The future number of elderly indicates, how many working adults will be available to provide financial support to the elderly and to work as geriatricians, home health aides, and food services workers and so on [28].

Studies have documented that the energy and nutrients intakes of elderly people were low compared to recommended dietary allowances [29, 30]. In addition, elderly people are at nutritional risk, not only because of impaired digestion, absorption or utilization of nutrients associated with chronic disease or drug–nutrient interactions, but also due to an interaction between physiological, psychological and socioeconomic factors [30].

Dietary intake habit is influenced by elderly people’s poverty, limited education, physical disability, loneliness and mental impairment [31]. Food consumption pattern changes due to changes of aging; such as aging reduces appetite for food. Poor diet lead to weakness, these increases a feeling of isolation and abandonment.



Another study had reported that income, household composition, technology, time, education, attitude, changes in taste and smell, vision, hearing, physiologic and sociological changes and food preference, all factors are affected the food choice of elderly [32]. Dietary intake was largely independent on self assessment of chewing difficulty although among women loss of chewing efficiency was associated with preference for sweet and soft foods.

In all societies, expenditure of daily energy declines progressively throughout adult life [33]. A low calorie diet may not impair health as long as nutrient density of the diet is high and can provide adequate amount of essential nutrients. The main determinant of energy expenditure is fat free mass under sedentary conditions, which declines by about 15% between the ages of 20 to 29 and 70 to 79, and in the elderly that's contributing lower basal metabolic rate [34].

The major changes in whole body carbohydrate metabolism are associated with the increasing of age. The two hour plasma glucose level during an oral glucose tolerance test increases by an average 5.3 mg/dl per decade, whereas fasting plasma glucose increases by an average of 1 mg/dl per decade. These ages' related changes in glucose tolerance are due to diminished sensitivity of the peripheral tissues to insulin and can result in non-insulin-dependent diabetes mellitus (NIDDM). Muscle atrophy result from a gradual and selective loss of muscle fibers and the loss is more marked in those muscles involved in high-intensity "sprinting" type (type II fibers) movement, while those muscles necessary posture and most low intensity type (type I fibers) movement are preserved [35].

Fat metabolism in body and body fat content are affected during aging. Among the middle aged people fat content in the body tends to be increased, especially in women. The distribution of body fat also changes as increasing age, with marked accumulation of abdominal fat, especially in men [36]. Fat tends to be more evenly distributed between central and subcutaneous deposits and appears to be less hazardous, in aging women [37]. There is a loss of lean body mass accompanied by a gain in body fat [38]. Images obtained by magnetic resonance show a dramatic decrease in muscle size with age together with increase intramuscular and subcutaneous fat, mostly happened in women.

As age is increasing the body content of protein is decreasing. The loss of body protein is affected, particularly at skeletal muscles [39]. In elderly men and women total body protein is about 1.8 kg, which is lower than those of young adults. Loss of skeletal muscles, which in a young man make up about 45% of body weight, accounts for most of the decreases in protein reserves with advancing age [40]. Total muscle mass decreases about 50% between the ages of 20 and 90 [41], and this reduction is closely related with age to reduce in basal metabolic rate. Generalized weakness is probably due to both a decline in the number of functioning muscle, fibers and decrease in the actual strength of the contractile process itself.

As the elderly people are the largest consumers of drugs and in many cases for prolonged time drug users, as well as some may multiple drugs consumers due to some medical conditions. There are some drugs may seriously interfere with nutrient metabolism and reduce adequacy of nutrients need. Impaired nutrient absorption or metabolisms have been demonstrated for long term consumers of some drugs such as- laxatives, diuretics

and anticonvulsants should be of special concern. Relatively high alcohol consumption is mentioned among the elderly in some reports [41-42]. In the presence of toxic ethanol levels, nutrient metabolism may become impaired, particularly, some vitamins such as, Thiamin, vitamin B6 and folate; also some minerals such as Zn and Mg are at risk [43-44].

Malnutrition can be cause of related diseases; as well diseases also occurs malnutrition. In malabsorption of folic acid and vitamin B12 up to 50% of the elderly may occur atrophic gastritis [45]. Achlorhydria, which may also be associated with impaired nutrient absorption, particularly of protein bound nutrients [46-47]. Health related problems reduce consumption of nutrients. Decrease in BMR and physical activity also reduce the nutrient needs.

Among the elderly there are both primary and secondary causes of malnutrition and they often show a rapid decline of health and nutritional status [48]. An investigation related to elderly nutrition is important to obtain the information about food and drinks consumption of the elderly [64]. There have been very few studies to the validity and reliability of different dietary assessment methodologies with elderly population. It is unclear that, which the best dietary assessment method is for use of the elderly population [49].

Nutritional status of elderly persons influences by various factors and predisposes them to malnutrition, infections and chronic diseases [52]. Factors such as nutritional intake, socio-economic status, functional status, psychological conditions, oral health and

pharmacological treatment are known to decrease appetite, induce malabsorption, and diminish senses of taste and smell of elder peoples [45, 50-55].

Aging is associated with increased threshold for taste and smell; whereas smell is affected to a greater extent than the test [56]. The test buds per papilla and the number off papillae both are decreased during aging process. At first, the ability to detect sweet and salty taste is affected. Some elder people complain that all taste of foods bitter or sour is also consistent. In the elder people, improved oral hygiene can enhance taste activity significantly [57].

Physiological changes occur with atrophic gastritis more rapid emptying of liquids, but slower emptying of mixed solid-liquid diets [58, 59]. Changes in gastric secretion of acid and pepsin could result in impaired digestion and /or absorption of certain nutrients, such as- protein, folic acid, vitamin B12, calcium, copper, iron and zinc [60].

Some researchers have found that there were no differences in intestinal transit time in young versus elderly subject [61]. Structural and biochemical changes have been well-documented in aging liver. After about age 50, the ratio of body weight as well as liver weight is decreases. However, in persons, no age related changes in liver function have been reported [41].

In Bangladesh many elderly people suffer from many health problems with the advancement of age; such as diabetes, hypertension, heart diseases, cancer, liver diseases, peptic ulcer, parasitic, intestinal and gastro intestinal problem, skin diseases, osteoporosis, anemia, impaired immunity and malnutrition also other chronic diseases. It

is well recognized that with advancing age, there is a higher incidence of chronic diseases, also includes osteoporosis, low back pain and anemia [36, 62].

The nutritional status of elderly is determined by their nutrients intakes and requirements which are influenced by socio-economic constraints, family, social networks, mental intellectual activity, life style, physical activity and diseases states; but their individual health conditions are influenced by their intake and utilization of nutrients, determined from the correlation of information obtain from their physical, clinical, biochemical and dietary studies [63, 60]. In the elderly effective nutritional status is a complex function.

Body Mass Index (BMI) is listed as decreasing with increasing age. BMI is important evidence to measure nutritional status of adults and elderly. BMI is greater in women than in men, in most population. Lower BMI was found with samples of individuals of Chinese decent central and from South America, among men [63].

In the elderly, a decrease in BMI reflects a decrease in body weight, if their height is unchanged; however if height also decreases, then changes of BMI in the elderly has shown smaller [63]. The highest height decreased, differences ranged from 1.9 to 6.7 cm in men and from 2.0 to 6.0 cm in women; were found with age in all population samples from Dutch and Swedes [64].

Underweight is frequently associated with depressed immune function. The height percentage of underweight subjects were in the age group of 70 years and above found an anthropometric survey conducted an urban area of Karnataka in India. The prevalence of overweight increases with age and results in the loss of morbidity of the elderly [32].

There is evident that in developing country the elderly will be vulnerable to health related predicaments associated with very low income, inadequate food intakes and poor food patterns, under and over nutrition, chronic illness and other diseases [65]. Although, the physiological changes that negatively affect nutritional status and simply consuming enough food can become a major challenge to many elder people.

It is reported that common reasons for inadequate food intake in institutionalized elder people are quite simple, those are lack of personnel to help feed patients, inappropriate or unnecessary dietary restrictions, and unappetizing food [66]. It was also noted that, the enjoyment of food have an impact on QOL of elder people [66-68].

Worldwide it has been reported that high prevalence of malnutrition (15 - 60%) existed among hospitalized or living at home or in home care programmes elderly people [45, 46]. It is important that constant monitoring of the health status of older people in order to maintain their good nutritional status and prevent development of malnutrition. In long-term planning, efforts should be made to maintain or improve quality of life (QOL) for older people, since regular screening and management ought to improve outcomes [50], such as prolonged independence and disease prevention [47].

Severe studies reported and suggest that elderly people have to tend to have poor nutrient intakes [69, 70 and 71]. Documented by Ngatia et al. very high carbohydrate intake among the elderly in Kenya, a similar study on the elderly in Zimbabwe and India documented very low protein intakes [72, 73 and 74]. In central Uganda, the prevalence of BMI and mid upper arm circumference is reported to be 33% and 52% respectively, within the population aged 60-90 years [75].

In Mongolian elderly about 69% was well nourished, about 4.8% was malnourished and 26.2% was at risk of malnutrition [76]. In Malaysia the prevalence of malnutrition among the relatively older elderly women was more common and it's suggested that worsening nutrition with advancing age [77]. According to the MNA test, in Poland Wojszel ZB found that 12% of study sample were malnourished, where 61% were at risk of malnourishment and 27% were well nourished [78].

On the other hand, in rural Bangladesh results showed that 62% to be at risk of malnutrition and prevalence of protein energy malnutrition 26% were seen according to MNA score [79]. In Bangladesh the prevalence of malnutrition was found 26% among elderly people living in rural community of Bangladesh [80]. Another study in Bangladesh was reported the prevalence of chronic energy deficiency 63% and 72% among adults (19 years and older) in two selected rural areas in Bangladesh [81].

Others studies have found that elderly people suffer from various complicated physical diseases and day by day the number is increasing [82, 83]. Physical disabilities also hinder the capacity of some elderly people to get around to a variety of food stores. Previous study conducted that provision of community- based health education intervention might be a potential public health initiative to enhance the health status of the elderly [84].

## **METHODOLOGY**

### **Study Design:**

The study was a cross-sectional study.

### **Study Population:**

The study population was recruited from selected 3 old homes elderly population in Dhaka city.

### **Study Area:**

The study was conducted at 3 selected old homes in Dhaka city. The 1<sup>st</sup> old home was 'Child & Old Aged Care', at Kallaynpur, Dhaka, the 2<sup>nd</sup> old home was 'Shapnalok Peace Villa', at Shamoli, Dhaka and the 3<sup>rd</sup> old home was 'Probin Nibash & Hospital', at Agargaon, Dhaka.

### **Study Period:**

The study duration was from July 2017 to November 2018 preceding and time this period was utilized for questionnaire development, data collection, data entry and analysis; also preparing the presentation of the study findings and preparation for seminar presentations.



**Sampling technique and sample size:**

Exhausted sampling technique was applied to select the sample population and sample size, n=63 were taken after the exclusion and inclusion criteria of the study from selected 3 old homes in Dhaka city.

<b>OLD HOMES</b>		<b>Sample Size (n)</b>
<b>Old home 1</b>	<p>Total persons were 24</p> <p>Died (6+1) = 7 persons</p> <p>Available were 17 persons</p> <p>Seriously ill were 5 + refused to give interview 1 + aged &lt; 60 year was 1 = 7 persons were in exclusion criteria.</p> <p><b>The total respondents were, n = 10</b></p>	<b>(17- 7) = 10</b>
<b>Old home 2</b>	<p>Total persons were 15</p> <p>Died 2 persons &amp; 1 person was shifted ‘Shapnalok peace villa 2’</p> <p>Available were 12 persons.</p> <p>Seriously ill was 1 person and was in exclusion criteria.</p> <p><b>The total respondents were, n = 11</b></p>	<b>(12 – 1) = 11</b>
<b>Old home 3</b>	<p>Total persons were 45</p> <p>Seriously ill was 1 person + refused to give interview 2 persons = 3 persons were in exclusion criteria.</p> <p><b>The total respondents were, n = 42</b></p>	<b>(45 – 3) = 42</b>
<b>Total</b>	<b>Sample Size, n</b>	<b>63</b>

**Inclusion Criteria:**

Elderly people from selected 3 old homes in Dhaka city were included as participant. Respondents were selected whom age were  $\geq 60$  year's elderly people, whereas gender were both male and female. Furthermore elderly people who were willing to participate in the study and were give informed consent, during the study period.

**Exclusion Criteria:**

Elderly people from selected 3 old homes in Dhaka city whom were  $< 60$  years elderly people and whom were disagree to give interview as participant; also very sick and mentally retarded elderly people (as per available reports), during the study period.

**Data Collection Tools:**

Pre-tested semi structural questionnaires were used to collect the data from selected 3 old homes elderly respondents in Dhaka city. A manual weight machine was used for measuring weight and a height measuring scale (Stadiometer) was used for measuring height of the elderly respondents. BMI was calculated with help of a scientific calculator from weight in kilograms divided by the height in meters square.

**Data Collection Method:**

Face to face interview with the respondents (who met the inclusion criteria of the study) by pre-tested semi structure questionnaires were used to collect the information of the study. The purpose and nature of the study was explained to each participant and after getting the verbal consent, they were included in the study. A standard questionnaire was developed to obtain the relevant information regarding the socio-demographic information, anthropometry measurement; 24 hour recall dietary intake, also sanitary and hygiene practice related information. The socio-demographic such as age, gender, education, spouse, personal income, monthly expenditure, source of cost were obtained.

To collect the 24 hour dietary intake recall, respondents were asked about their food intake and approximate amount of each food they had taken previous day of data collection, using standard measuring plate, cup, spoon, glass etc. The caretakers of old homes were also asked about the respondents 24 hour dietary intake recall, to cross-check the food items and measurements to ensure the correctness of the dietary information given by the elderly respondents. Individual dietary items were categorized into individual foodstuffs on weight basis for nutrients intake analysis using appropriate software.

A manual weight machine was used for measuring weight. During measuring the weight of the each respondent was asked to bare footed and remove heavy cloth and weight was recorded in kilograms. The machine was calibrated every after 10 respondents. Height was measured by a height measuring scale (Stadiometer). For measurement of height, respondents were positioned to stand on the platform, bare footed with their hand upright,

also looking straight forward. Height was measured to the nearest 0.1 cm. Hygiene practice related information were taken on; personal cleaning such as, hand washing, tooth brushing, shower, nail cutting, cloth washing and environmental cleaning such as toilet cleaning, room cleans, utensils cleaning, bed sheet cleaning.

### **Data Entry and Analysis:**

Data were analyzed by using Microsoft excel 2007 and SPSS software program version 20. Data were coded, checked, cleaned and edited properly before analysis. Frequency distribution, sample percentages, median, percentiles, mean, standard deviation was calculated by using descriptive statistics. Appropriate statistical tools were used to analyze the study findings. For tabular, chart and graphical representation Microsoft word and SPSS were used.

Nutrients intake values were calculated by information given for 24 hour dietary recall of all the individual foodstuffs consumed daily on weight basis by the respondents. Available FCT for Bangladesh was used for this purpose.

IDDS was measured by 24 hour dietary recall of respondents according to FANTA guideline [*Indicator Guide, VERSION 2, 2006*]. BMI was calculated from weight in kilograms divided by the height in meters square & nutritional status of selected respondents was identified according to WHO guideline. [*World Health Organization. Obesity: preventing and managing the global epidemic. Geneva: WHO; 1998. (Technical Report Series, 894)*].

According to 1998 WHO classification of BMI, respondents nutritional status were categorized as; BMI <18.5 were underweight, BMI 18.5- 24.9 were normal, BMI 25-29.9 were overweight and BMI  $\geq 30$  were obese.

#### **Quality Control & Quality Assurance:**

To maintain quality control and quality assurance before data collection the questionnaire were pretested, corrected and changed (if required) for the study. During the data collection supervision were made (by the supervisors).

#### **Ethical Consideration:**

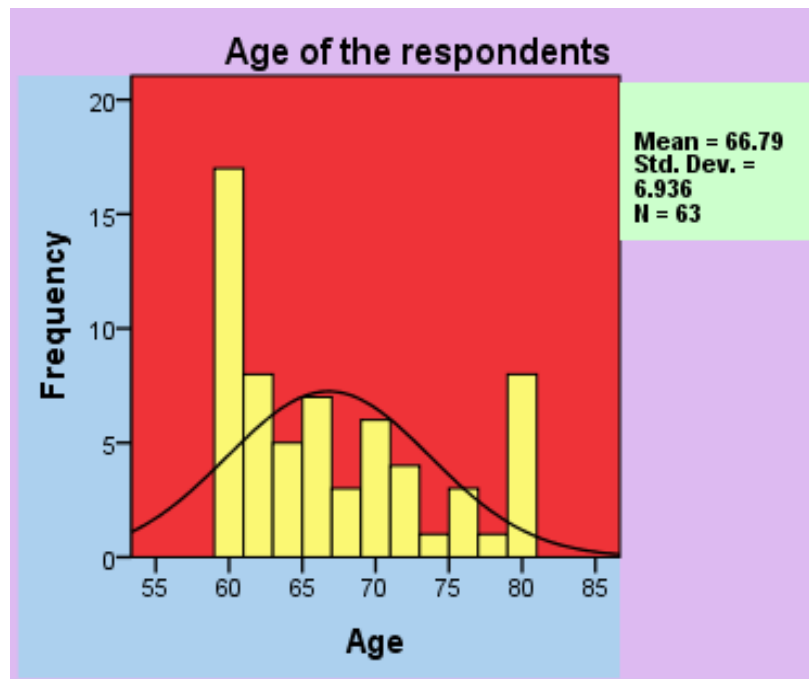
All principles of ethics were maintained to conduct this study. Administrative permission from appropriate authority was taken from each old home. Informed consent of the study respondents was taken. In all respect of the study respondents privacy and confidentiality were maintained. The study respondents had right to refuse and withdraw and restrict their data analysis from any time from the study were accepted.

## RESULTS

### Socio-Demographic Information

#### Age of the elderly respondents

Figure-1 shows that among all the respondents' minimum age was 60 years, whereas maximum age was 80 years ( $66.79 \pm 6.9$ ). The majority ages of the respondents were 60 years.



**Figure-1: Distribution of age of the elderly respondents (n=63)**

## Gender of the elderly respondents

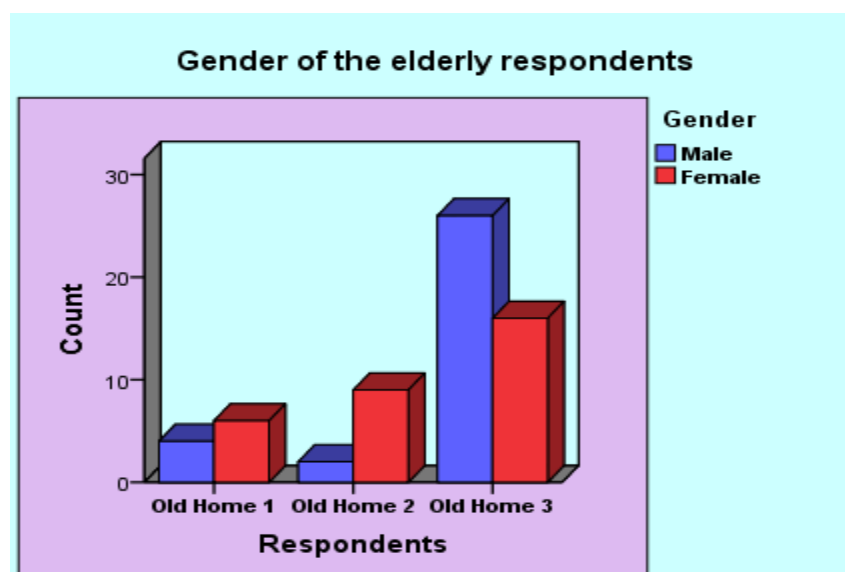
Table 1 shows that among all the elderly respondents male were 32 (51%) persons and female were 31 (49%) persons. Figure-2 shows that among the entire elderly respondents, 10 (16%), [male 4 (40%) & female 6 (60%)] persons were old home 1 respondents and 11 (17%), [male 2 (18%) & female 9 (82%)] persons were old home 2 respondents. Another 42 (67%), [male 26 (62%) & female 16 (38%)] elderly persons were old home 3 respondents.

**Table-1:**

*Frequency of gender of the elderly respondents (n=63)*

Gender	Frequency	Percent
Male	32	51
Female	31	49
Total	63	100

*Note: n=sample size*



**Figure- 2: Percent distribution of gender of the elderly respondents (n=63)**

### Educational qualification of the elderly respondents

Figure-3 shows that among all the elderly respondents illiteracy high were in old home 3 respondents and they were 12 (21%) persons. Highly educated 4 (8%) persons were old home 2 respondents. Most of the elderly respondents 15 (24%) were educated up to secondary level, whereas 3 (20%) persons were old home 1 respondents, other 3 (20%) persons were old home 2 respondents and 9 (60%) persons were old home 3 respondents.

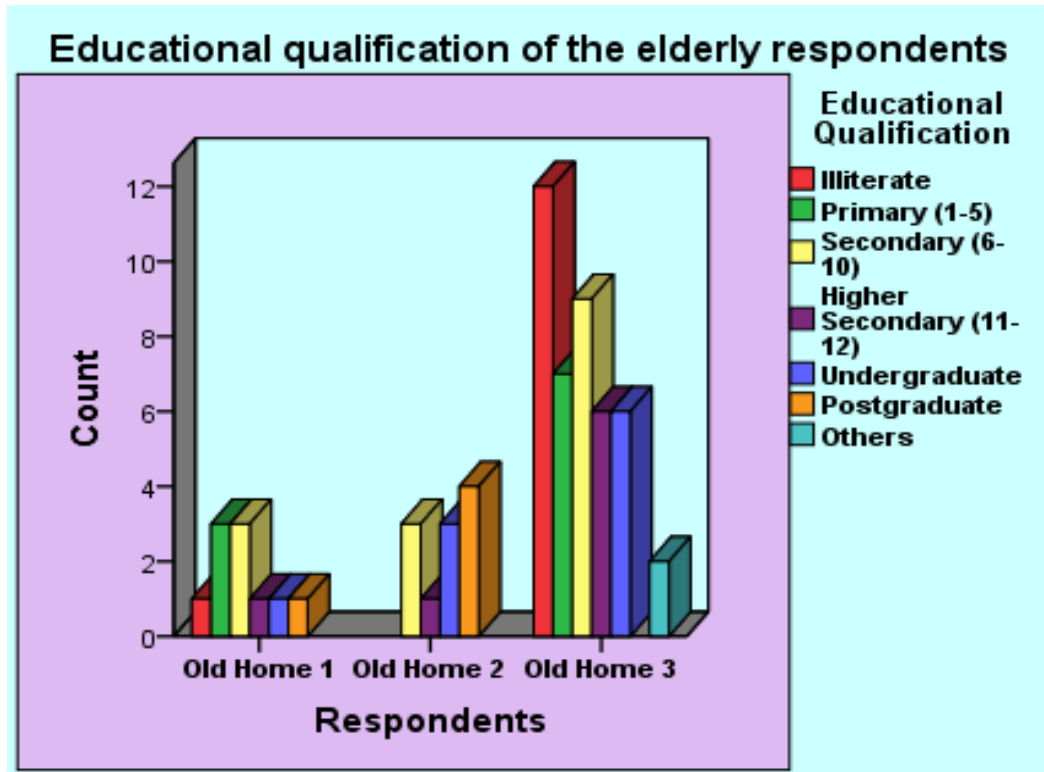


Figure- 3: Percent distribution of educational qualification of the elderly respondents (n=63)



## Spouse of the elderly respondents

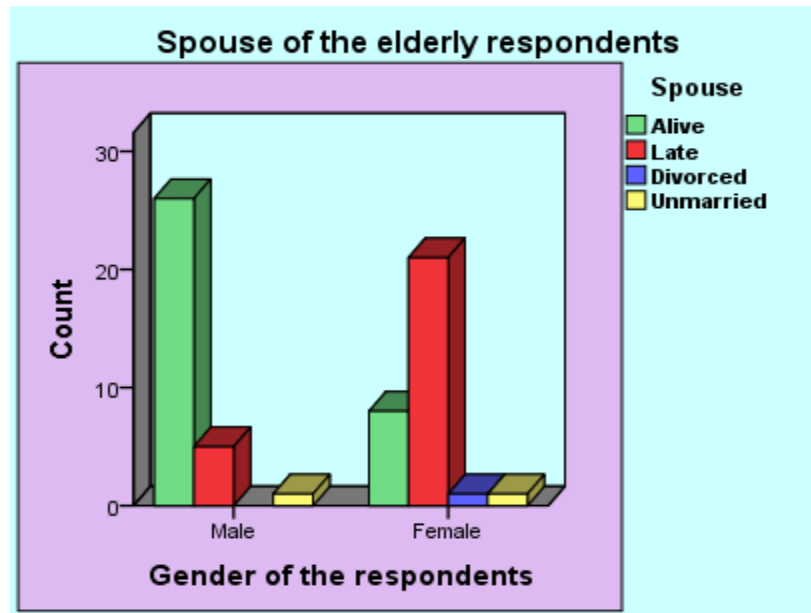
The table-2 & figure-4 are showing that among all the elderly respondents 34 (54%), [male 26 (77%) & female 8 (23%)] elderly persons spouse were alive, whereas 26 (41%), [male 5 (19%) & female 21 (81%)] elderly persons spouse had died.

**Table-2:**

*Frequency of spouse of the elderly respondents (n=63)*

Spouse	Frequency	Percent
Alive	34	54
Late	26	41
Divorced	1	2
Unmarried	2	3
Total	63	100

Note: n=sample size



**Figure- 4: Percent distribution of spouse of the elderly respondents (n=63)**

## Personal income of the respondents

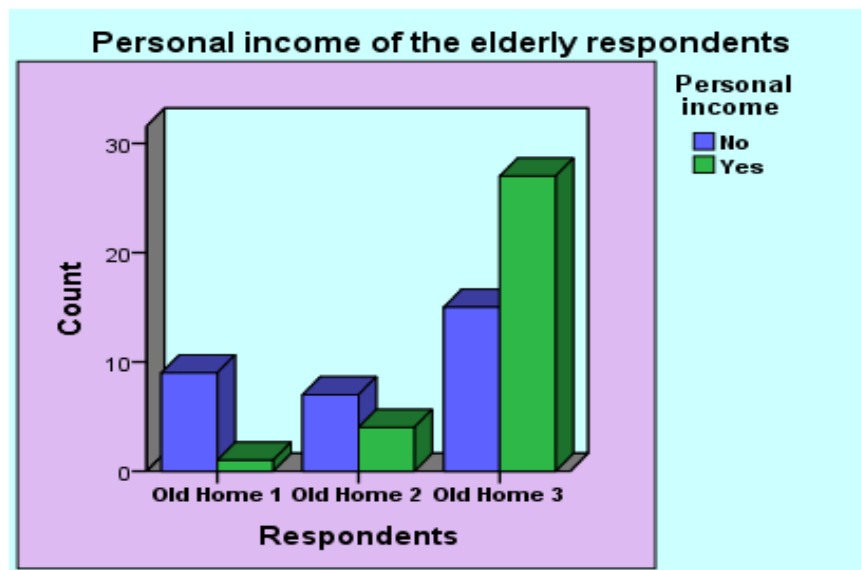
The table-3 and figure-5 are showing that among all the elderly respondents 32 (51%), [male 24 (75%) & female 8 (25%)] persons had personal income, whereas, 1 (3%) person was old home 1 respondent, other 4 (13%) persons were old home 2 respondents and 27 (84%) persons were old home 2 respondents. The figure also shows that among all the elderly respondents 31 (49%), [male 8 (25%) & female 23 (75%)] persons hadn't personal income.

**Table-3:**

*Frequency of personal income of the elderly respondents (n=63)*

Personal income	Male		Female		Total	
	n	%	n	%	n	%
No	8	25	23	74	31	49
Yes	24	75	8	26	32	51
Total	32	100	31	100	63	100

Note: n=sample size



**Figure- 5: Percent distribution of personal income of the elderly respondents (n=63)**

**Amount of money (BDT) per month (as personal income from source/sources) of the elderly respondents**

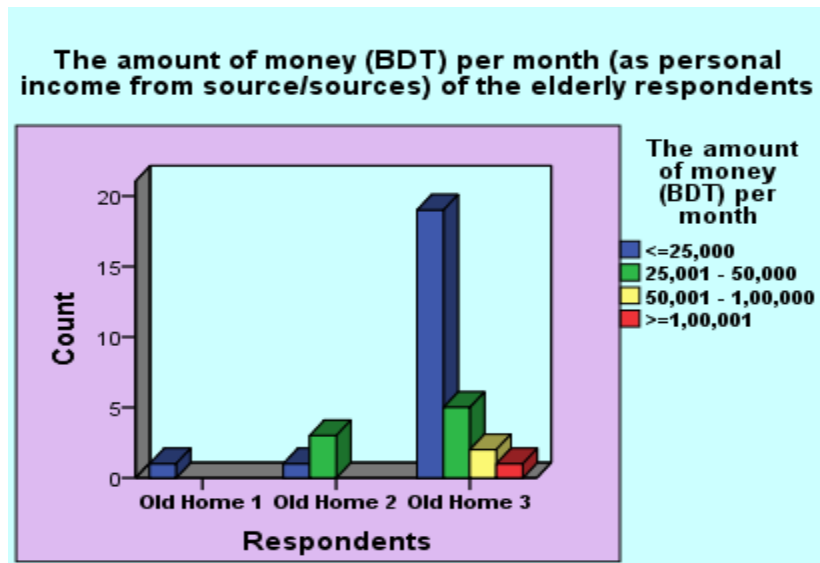
The table-4 and figure-6 are showing that among all the elderly respondents monthly amount of lowest personal income from source/sources were 21 (66%) persons and that was  $\leq 25,000$  tk per month, among them 19 (90%) persons were old home 3 respondents. Highest personal income from source/sources was only 1 (3%) person and the amount was  $\geq 1,00,001$  tk per month and that person was old home 3 respondents.

**Table- 4:**

*Frequency of amount of money (BDT) per month (as personal income from sources / sources) of the elderly respondents (n=32)*

Amount of money (BDT) per month from the respondents sources/sources	Frequency	Percent
$\leq 25,000$	21	66
25,001 - 50,000	8	25
50,001 - 1,00,000	2	6
$\geq 1,00,001$	1	3
Total	32	100

*Note:* n=sample size; BDT = Bangladesh Taka.



**Figure- 6:** *Percent distribution of amount of money (BDT) per month (as personal income from source/sources) of the elderly respondents (n=32)*

The table-5 shows that the amounts of money (BDT) from the respondents source/sources frequency high were from their land/property and their pension respectively and both were 7 (22 %) respondents' source/sources.

**Table-5:**

*Frequency of source/sources of money (BDT) per month as personal income of the elderly respondents (n=32)*

The respondents source/sources of money	Frequency	Percent
Business	4	13
Land/Property	7	22
Land + Pension	5	16
Pension	7	22
Others	9	28
Total	32	100

*Note:* n=sample size; BDT = Bangladesh Taka

**Total monthly expenditure of the elderly respondents**

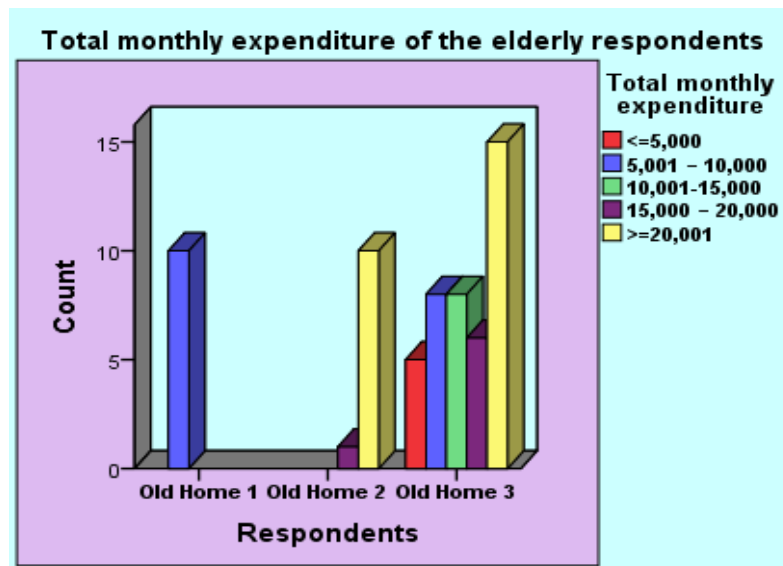
The table-6 & figure-7 are showing that among the entire respondents highest monthly expenditure were 25 (40%) persons, whereas 10 (40%) were old home 2 respondents and 15 (60%) persons were old home 3 respondents. The lowest monthly expenditure respondents were 5 (8%) persons and they were old home 1 respondents.

**Table-6:**

*Frequency of total monthly (BDT) expenditure per month of the elderly respondents (n=63)*

Total monthly expenditure (BDT)	Frequency	Percent
<=5,000	5	8
5,001 – 10,000	18	28
10,001-15,000	8	13
15,000 – 20,000	7	11
>=20,001	25	40
Total	63	100

Note: n=sample size; BDT = Bangladesh Taka



**Figure- 7: Percent distribution of monthly expenditure (BDT) of the elderly respondents (n=63)**

**Source/sources of money per month for monthly expenditure of the elderly respondents**

Table-7 shows that, the source/sources of money per month for monthly expenditure of 27 (34%) respondents were mainly spent by their own source/sources. Another 24 (30%) respondents source/sources of money were given by their sons for their monthly expenditure. Noticeable was, 13 (16%) respondents source/sources of money (BDT) per month for monthly expenditure were given by their resided old home.

**Table-7:**

*Frequency of source/sources of money (BDT) per month for monthly expenditure of the elderly respondents*

<b>Source/sources of money</b>	<b>Frequency</b>	<b>Percent</b>
Own	27	34
Spouse	9	11
Son	24	30
Daughter	6	8
Sibling	1	1
Old home	13	16

*Note:* n=sample size; BDT = Bangladesh Taka

### Dietary Intake Information

There were all together 49 varieties of foodstuffs consumed by 3 old home elderly respondents in three major meals and snack. These foodstuffs weight measurements are given in Table 8 to 11.

#### **Intake of different foodstuffs/ items of the elderly respondents**

Table-8 shows that the median intake of rice was 321.00g at the old home 1 elderly respondents. Old home 2 elderly respondents and old home 3 elderly respondents in both median rice intake was 240.00g respectively. Soybean oil median intake g/day were 20g, 40g and 35g at the old home 1 respondents, the old home elderly 2 respondents and the old home 3 elderly respondents respectively.

**Table-8:**

*Median intake of different foods (cereals, sugar, milk & milk products and oils) g/day of the elderly respondents (n=63)*

Food name in English	Food name in Bengali	Old Home 1 (n=10) Usual intake Median	Old Home 2 (n=11) Usual intake Median	Old Home 3 (n=42) Usual intake Median
Rice	Bhat	321.00	240.00	240.00
Flat bread	Atar Ruti	60.00	60.00	60.00
Flat bread (fry)	Porota	150.00	--	--
Puffed rice	Muri	10.00	--	15.00
Salt-biscuit	Nontabuiscute	10.00	--	--
Sweet-biscuit	Mistibuiscute	20.00	--	15.00
Sugar	Chini	15.00	20.00	20.00
Milk (ml)	Dudh	120.00	120.00	120.00
Curd	Doi	--	200.00	--
Soybean oil	Soyebeanteil	20.00	40.00	35.00

*Note:* n = sample size, g = gram, ml = milliliter.

Table-9 shows that median intake of chicken was only 25g and was consumed by old home 3 elderly respondents; whereas 30g of chicken was consumed by old home 2 elderly respondents and 60g of chicken was consumed by old home 3 elderly respondents. Median intake of egg was 60g, was consumed by both in old home 2 and old home 3 elderly respondents respectively, whereas egg was not consumed by old home 1 elderly respondents. In terms of fish, high median fish intake was 75g and was consumed by old home 2 elderly respondents.

**Table-9:**

*Median intake of different foods (pulses, poultry, egg and fishes) g/day of the elderly respondents (n=63)*

Food name in English	Food name in Bengali	Old Home 1	Old Home 2	Old Home 3
		(n=10)	(n=11)	(n=42)
		Usual intake	Usual intake	Usual intake
		Median	Median	Median
Bengal gram	Chola dal	42.50	20.00	30.00
Lentil	Masur dal	30.00	30.00	40.00
Green gram	Mug dal	30.00	--	--
Chicken	Murgi	25.00	30.00	60.00
Egg	Dim	--	60.00	60.00
Pangas fish	Pangash	30.00	--	30.00
Rohu fish	Rui	30.00	75.00	30.00
Katla fish	Katla	30.00	--	30.00
Boal fish	Boal	30.00	30.00	--
Tilapia/ Cuff fish	Telapia/ Koi	30.00	--	60.00
Tengra fish	Tengra	--	--	30.00
Stinging cat fish	Shing	--	--	40.00
Catfish	Pabda	--	35.00	--

*Note:* n = sample size, g = gram.



Table-10 shows that median intake of leafy vegetables was 95g, which consumed in both old home 2 and old home 3 elderly respondents respectively; whereas old home 1, leafy vegetables was not taken. Median intake of potato was 50g consumed by old home 1 elderly respondents that median intake was more comparing to others old homes. Variety types of vegetables were mainly intake by old home 3 respondents comparing to others old homes.

**Table-10:**

*Median intake of different foods (leafy vegetables, starchy roots, tubers and vegetables) g/day of the elderly respondents (n=63)*

Food name in English (g/day)	Food name in Bengali (g/day)	Old Home 1 (n=10) Usual intake Median	Old Home 2 (n=11) Usual intake Median	Old Home 3 (n=42) Usual intake Median
Red spinach	Lal shak	--	--	90.00
Gourd spinach	Lau shak	--	90.00	95.00
Spinach	Palong shak	--	95.00	95.00
Potato	Aalu	50.00	30.00	40.00
Brinjal	Begun	30.00	60.00	30.00
Pumpkin	Mistikumra	--	--	90.00
Gourd (pointed)	Potol	90.00	20.00	30.00
Bean	Sim	32.00	20.00	40.00
Carrot	Gajor	5.00	10.00	10.00
Cabbage	Badhakopi	90.00	--	90.00
Tomato	Tometo	42.00	--	10.00
Cowpea	Borboti	15.00	--	30.00
Cauliflower	Phulkopi	--	20.00	30.00
Row papaya	Kacha pape	--	--	30.00
Gourd, (teasle)	Kakrol	40.00	--	60.00
Gourd (bitter)	Korola	--	--	60.00
Gourd, (ash)	Chamkumra	20.00	20.00	50.00
Drumstick	Shojne	--	--	90.00
Ladies finger	Dherosh	--	--	60.00
Lemon	Lebu	--	10.00	15.00

Table-11 shows that median intake of variety types of fruits were mainly consumed by old home 2 elderly respondents and old home 3 elderly respondents (approximately same g of median; such as 30g, 50g). In case of old home 1 elderly respondents, no fruits were taken by any respondents.

**Table-11:**

*Median intake of different foods (fruits) g/day of the elderly respondents (n=63)*

Food name in English (g/day)	Food name in Bengali (g/day)	Old Home 1 (n=10) Usual intake Median	Old Home 2 (n=11) Usual intake Median	Old Home 3 (n=42) Usual intake Median
Coconut	Narikel	--	30.00	30.00
Banana ripe	Paka kola	--	50.00	50.00
Apple	Apple	--	30.00	30.00
Malta	Malta	--	30.00	37.00
Watermelon	Tarmuz	--	--	300.00
Wood apple ripe	Pakabel	--	30.00	--

*Note:* n = sample size, g = gram.

### Nutrients Intake Information

Nutrients intakes values were calculated as Recommended Nutrient Intake (RNI), the figures were derived from weight of all the individual foodstuffs consumed by the elderly respondents. Total respondents nutrients intake as well as individual old home respondent's nutrients intake are given in Tables 12, 13, 14 and 15.

Table-12 shows that among all selected 3 old homes elderly respondents, percent meeting of RNI for energy/day was 65.9% in male and 63.3% was in female. Percent meeting of RNI for protein was low in male (77.1%) comparing to female. In terms of vitamin A, percent meeting of RNI was quite low (27.6%) in male, comparing to female (62.1%).

**Table-12:**

*Daily Energy, Macronutrient and Micronutrient Adequacy of the elderly respondents of selected 3 old homes (n=63)*

	Usual intake			*RNI			
	Total	Male	Female	Male		Female	
	Median (25 <sup>th</sup> , 75 <sup>th</sup> percentile)	Median	Median	*RNI	Percent meeting RNI (%)	*RNI	Percent meeting RNI (%)
Energy (Kcal)	1219.4 (1043.8, 1337.8)	1285.0	1139.1	1950	65.9	1800	63.3
Carbohydrate (gm)	142.5 (125.7, 170.0)	153.2	134.8	304	50.4	281	48.0
Fat (gm)	47.8 (40.9, 53.9)	48.0	47.4	60	80.0	55	86.2
Protein (gm)	40.1 (35.1, 44.6)	40.1	40.1	52	77.1	40	100.2
Vitamin A (mcg)	184.1 (123.1, 763.1)	165.5	372.3	600	27.6	600	62.1
Vitamin B1 (mg)	.43 (.40, .48)	.44	.43	1.2	36.7	1.1	39.1
Vitamin B2 (mg)	.62 (.53, .85)	.63	.61	1.3	48.5	1.0	61
Vitamin C (mg)	37.6 (22.1, 63.1)	40.4	36.4	40	101.0	40	90.9
Ca (mg)	442.9 (302.6, 549.6)	431.3	469.3	1000	43.1	1000	46.9
Iron (mg)	8.7 (7.1, 10.2)	8.0	9.2	10	79.5	10	92.3
Zn (mg)	5.3 (4.9, 6.2)	5.5	5.3	7.0	78.9	4.9	108.0

*Note.* RNI = Recommended Nutrient Intake, (WHO/FAO/UNO=World Health Organization/ Food and Agriculture Organization/ United Nations University, 2004).

Table-13 shows that among all the elderly respondents of old home 1, percent meeting of RNI for energy/day was same (49%), among male and female respondents. Percent meeting of RNI for protein was 43.3% in male but 53.6% for female. Percent meeting of RNI for vitamin A was quite low, both in males (2.9%) and in females (1.9%).

**Table-13:**

*Daily Energy, Macronutrient and Micronutrient Adequacy at old home 1 elderly respondents (n=10)*

	Usual intake (median)			*RNI			
	Total	Male	Female	Male		Female	
	Median (25 <sup>th</sup> , 75 <sup>th</sup> percentile)	Median	Median	*RNI	Percent meeting RNI (%)	*RNI	Percent meeting RNI (%)
Energy (Kcal)	913.8 (862.1, 980.0)	956.7	886.4	1950	49.1	1800	49.2
Carbohydrate (gm)	143 (130.5, 153.9)	146.9	139.2	304	48.3	281	49.51
Fat (gm)	28.0 (24.1, 29.1)	28.3	26.5	60	47.2	55	48.2
Protein (gm)	22.3 (20.4, 26.5)	22.5	21.4	52	43.3	40	53.6
Vitamin A (mcg)	11.2 (6.3, 16.8)	17.7	11.2	600	2.9	600	1.9
Vitamin B1 (mg)	.23 (.19, .30)	.26	.20	1.2	21.7	1.1	18.2
Vitamin B2 (mg)	.29 (.23, .34)	.29	.29	1.3	22.3	1.0	29
Vitamin C (mg)	6.5 (5.7, 18.3)	12.1	5.7	40	30.3	40	14.3
Ca (mg)	163.3 (159.0, 182.2)	172.4	163.0	1000	17.2	1000	16.3
Iron (mg)	4.6 (3.9, 5.3)	4.3	4.7	10	43.4	10	47.1
Zn (mg)	3.1 (2.8, 3.3)	3.3	3.1	7.0	47.7	4.9	63.5

*Note.* RNI = Recommended Nutrient Intake, (WHO/FAO/UNO=World Health Organization/ Food and Agriculture Organization/ United Nations University, 2004).

Table-14 shows that among all the elderly respondents of old home 2, percent meeting of RNI for energy/day was 77.9% and 67.8% among male and female respectively. Percent meeting of RNI for fat and protein were quite high (median for total fat 55.3%) at old home 2 elderly respondents comparing to others old homes elderly respondents.

**Table-14:**

***Daily Energy, Macronutrient and Micronutrient Adequacy at old home 2 elderly respondents (n=11)***

	Usual intake (Median)			*RNI			
	Total	Male	Female	Male		Female	
	Median (25 <sup>th</sup> , 75 <sup>th</sup> percentile)	Median	Median	*RNI	Percent meeting RNI (%)	*RNI	Percent meeting RNI (%)
Energy (Kcal)	1238.1 (1183.8, 1437.1)	1520.0	1219.9	1950	77.9	1800	67.8
Carbohydrate (gm)	135.8 (120.9, 158.1)	175.7	134.6	304	57.8	281	47.9
Fat (gm)	55.3 (53.8, 65.9)	66.1	55.1	60	110.2	55	100.2
Protein (gm)	44.9 (41.9, 46.8)	46.9	44.6	52	90.1	40	111.5
Vitamin A (mcg)	372.3 (173.7, 407.8)	173.4	372.3	600	28.9	600	62.1
Vitamin B1 (mg)	.47 (.44, .48)	.47	.46	1.2	39.2	1.1	41.8
Vitamin B2 (mg)	.89 (.83, .97)	.87	.95	1.3	66.9	1.0	95
Vitamin C (mg)	30.6 (15.4, 57.0)	15.3	32.6	40	38.2	40	81.5
Ca (mg)	533.8 (469.3, 552.9)	530.9	546.3	1000	53.1	1000	54.6
Iron (mg)	8.72 (7.6, 9.5)	8.1	9.1	10	81.3	10	90.8
Zn (mg)	5.3 (4.97, 6.27)	6.5	5.3	7.0	92.9	4.9	108.0

*Note.* RNI = Recommended Nutrient Intake, (WHO/FAO/UNO=World Health Organization/ Food and Agriculture Organization/ United Nations University, 2004).

Table-15 shows that, percent meeting of RNI for vitamin A was only 30.8% in male, which was quite low comparing to female percent meeting of RNI among old homes 3 elderly respondents. In terms of percent meeting of RNI for vitamin B1 was quite low both in male and female elderly respondents at old homes 3.

**Table-15:**

*Daily Energy, Macronutrient and Micronutrient Adequacy at old home 3 elderly respondents (n=42)*

	Usual intake (Median)			*RNI			
	Total	Males	Females	Males		Females	
	Median (25 <sup>th</sup> , 75 <sup>th</sup> percentile)	Median	Median	*RNI	Percent meeting RNI (%)	*RNI	Percent meeting RNI (%)
Energy (Kcal)	1231.4 (1085.8, 1385.0)	1285.0	1179.0	1950	65.9	1800	65.5
Carbohydrate (gm)	142.8 (124.6, 174.6)	150.3	135.8	304	49.4	281	48.3
Fat (gm)	48.5 (44.5, 53.4)	48.5	47.9	60	80.8	55	87.2
Protein (gm)	40.5 (37.6, 44.0)	40.5	40.5	52	77.9	40	101.2
Vitamin A (mcg)	327.7 (164.5, 879.4)	184.6	762.7	600	30.8	600	127.1
Vitamin B1 (mg)	.45 (.41, .52)	.45	.44	1.2	37.5	1.1	40
Vitamin B2 (mg)	.62 (.56, .77)	.63	.59	1.3	48.5	1.0	59
Vitamin C (mg)	50.0 (29.1, 66.4)	54.1	50.0	40	135.3	40	125.0
Ca (mg)	452.0 (409.6, 590.8)	434.8	471.8	1000	43.5	1000	47.2
Iron (mg)	9.3 (7.7, 11.0)	8.6	10.0	10	85.8	10	100.2
Zn (mg)	5.6 (5.2, 6.2)	5.6	5.7	7.0	80.3	4.9	116.3

*Note.* RNI = Recommended Nutrient Intake, (WHO/FAO/UNO=World Health Organization/ Food and Agriculture Organization/ United Nations University, 2004).

### **Food groups intake pattern of the elderly respondents**

The table-16 shows that among all the elderly respondents' lowest intakes of food group was milk & milk products, was consumed by 22 (35%) elderly persons and also was fruits group, which was consumed by 23 (37%) elderly persons.

**Table-16:**

*Frequency of food groups intake (according to FANTA guidelines) of the elderly respondents (n=63)*

<b>Food groups</b>	<b>Frequency</b>	<b>Percent</b>
Cereals	63	100
Roots and tubers	45	71
Vegetables	59	94
Fruits	23	37
Meat & poultry	26	41
Eggs	25	40
Fish & seafood	45	71
Pulses, legumes & nuts	53	84
Milk & milk products	22	35

*Note:* FANTA = Food and Nutrition Technical Assistance (2006).

### **Percent distribution of IDDS score of the elderly respondents**

The table-17 and figure-8 are showing that among all the elderly respondents lowest dietary diversity score had 2 (3%) persons were old home 3 respondents. Medium dietary diversity score had 32 (51%) persons and among them 9 (28%) were old home 1 respondents and 23 (72%) were old home 3 respondents. Among all the respondents high dietary diversity had 29 (46%) persons and among them 1 (3%) person were old home 1

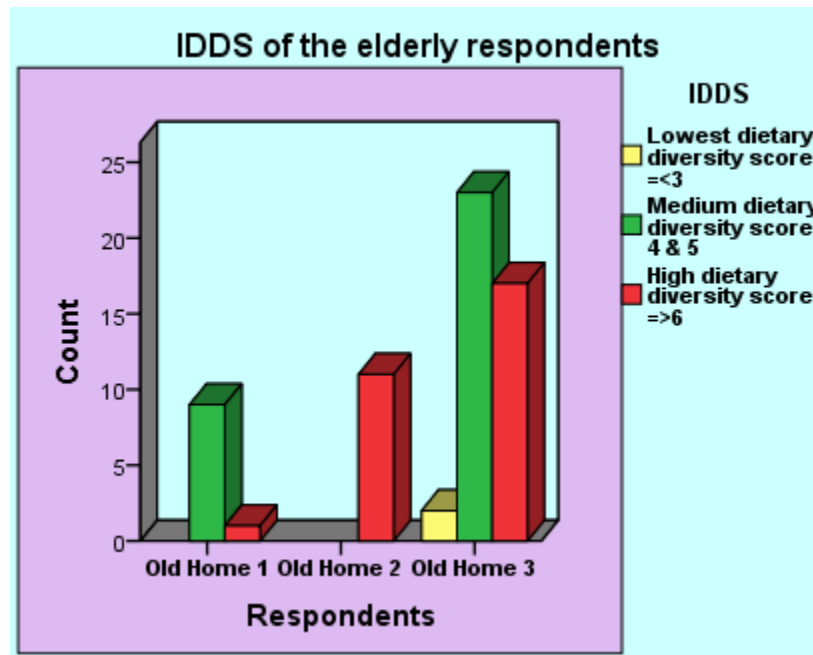
respondents, other 11 (38%) persons were old home 2 elderly respondents and 17 (59%) persons were old home 3 elderly respondents.

**Table –17:**

*Frequency of IDDS of the elderly respondents (n=63)*

<b>IDDS</b>	<b>Frequency</b>	<b>Percent</b>
Lowest dietary diversity score =<3	2	3
Medium dietary diversity score 4 & 5	32	51
High dietary diversity score =>6	29	46
Total	63	100

*Note:* IDDS = Individual Dietary Diversity Score; n = sample size



**Figure 8:** *Percent distribution of IDDS of the elderly respondents (n=63)*



### Frequency of respondents drinking milk pattern

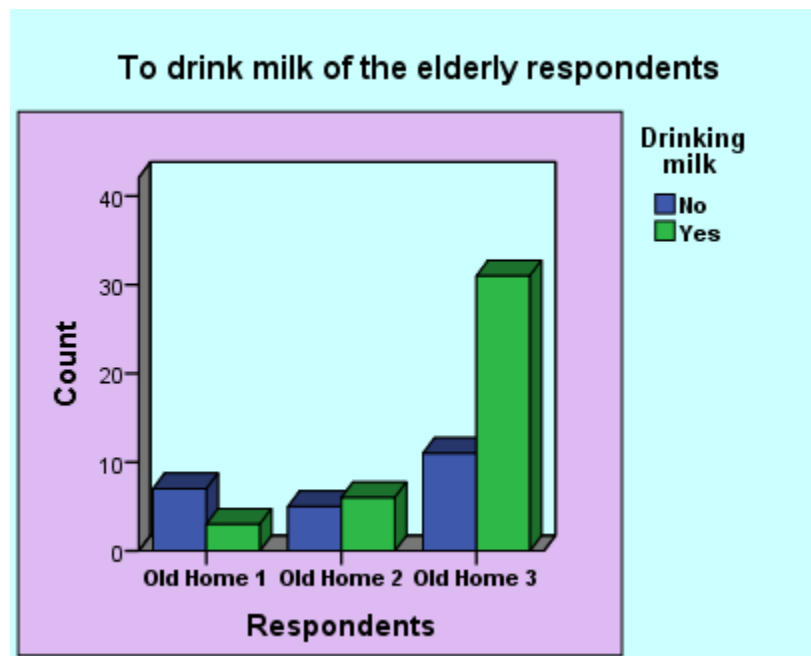
The table-18 and figure-9 are showing that among the entire elderly respondents habituated to drink milk by 40 (63%) elderly persons.

**Table-18:**

*Frequency of drinking milk of the elderly respondents (n=63)*

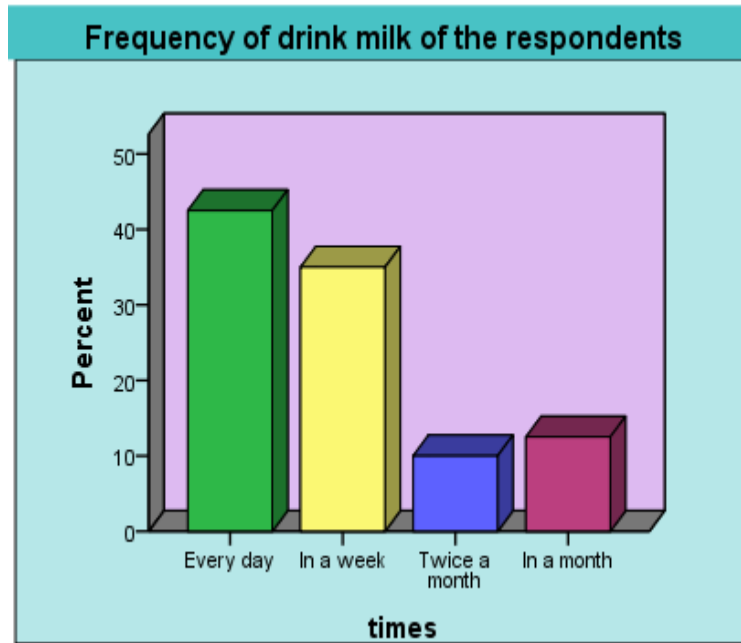
Drinking milk	Frequency	Percent
No	23	37
Yes	40	63
Total	63	100

Note: n = sample size



**Figure 9:** *Percent distribution of drinking milk of the elderly respondents (n=63)*

Figure-10 shows that, among the respondents whom used to drink milk, everyday were consumed by 17 (43%) elderly respondents and 5 (12%) elderly respondents were used to drink milk in month.



**Figure 10: Frequency of drinking milk/times of the elderly respondents (n=40)**

Table-19 shows that 33 (83%) respondents quantity of milk were <1 glass / day and 1 glass / day used to drink milk by 7 (17%) respondents.

**Table-19:**

**Frequency of quantity drinking milk of the elderly respondents (n=40)**

Quantity of milk	Frequency	Percent
<1 glass/day	33	83
1 glass/day	7	17
Total	40	100

Note: n = sample size

## Frequency of respondent's seasonal fruits intake

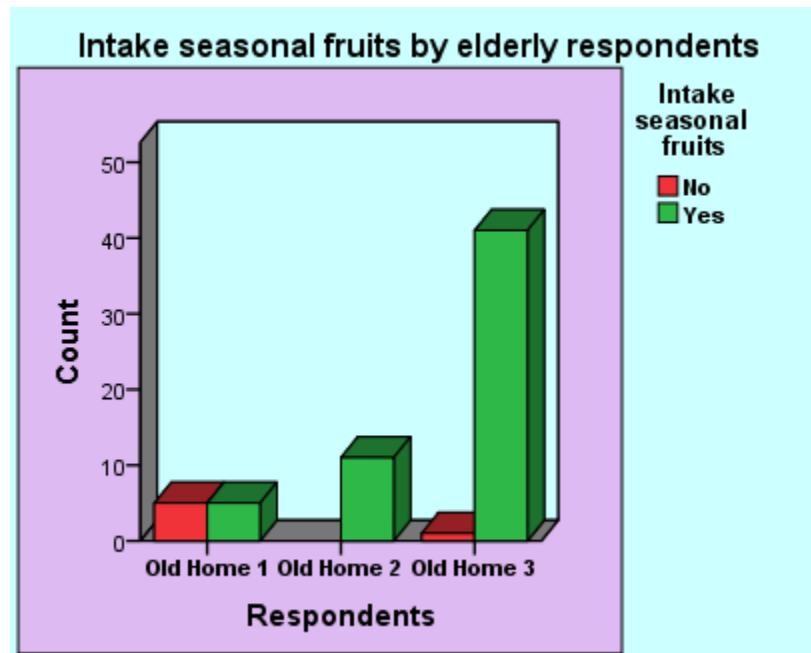
The table-20 & figure-11 are showing that among all the elderly respondents seasonal fruits were consumed by 57 (90%) persons; among them 5 (9%) persons were old home 1 respondents other 11 (19%) persons were old home 2 elderly respondents and 41 (72%) persons were taken by old home 3 elderly respondents

**Table –20:**

*Frequency of seasonal fruits intake of the elderly respondents (n=63)*

Intake seasonal fruits	Frequency	Percent
No	6	10
Yes	57	90
Total	63	100

Note: n = sample size



**Figure 11: Percent distribution of seasonal fruits intake of the elderly respondents (n=63)**

### Quantity of drinking water of the respondents

The table-21 shows that among all the elderly respondents, most of the elderly respondents were habited to drink 7 to 9 glasses of water per day and they were 26 (41%) elderly persons. Only 4 (6%) elderly persons were habited to drink high quantity > 12 glass of water per day.

**Table-21:**

*Frequency of quantity drinking water of the elderly respondents (n=63)*

The glasses /day water	Frequency	Percent
4-6	18	29
7-9	26	41
10-12	15	24
>12	4	6
Total	63	100

*Note: n = sample size*

### Taking special food during sickness of the elderly respondents

The table-22 shows that among all the elderly respondents' special types of food used to take by 52 (82%) elderly persons during their sickness, whereas 11 (18%) elderly persons were not used to take any special type of food during their sickness.

**Table-22:**

*Frequency of taking special food during sickness of the elderly respondents (n=63)*

Taking special food during sickness	Frequency	Percent
No	11	18
Yes	52	82
Total	63	100

*Note: n = sample size*

### Habituated to drink of the elderly respondents

The table-23 shows that among all the elderly respondents, 55 (87%) persons were used to drink tea, but 8 (13%) persons were not habituated to drink anything.

**Table-23:**

*Frequency of habituated to drink of the elderly respondents (n=63)*

Habituated to drink	Frequency	Percent
None	8	13
Tea	55	87
Total	63	100

*Note: n = sample size*

### Habituated to smoke of the elderly respondents

The table-24 shows that among all the respondents, 55 (87%) persons were never smoked, whereas 7 (11%) persons were habituated to smoke regularly.

**Table-24:**

*Frequency of habituated to smoke of the elderly respondents (n=63)*

Habituated to smoke	Frequency	Percent
Never	55	87
Sometimes	1	2
Regularly	7	11
Total	63	100

*Note: n = sample size*

### Habituated to betel leaf of the elderly respondents

The table-25 shows that among all the respondents, 22 (35%) persons were habituated to take betel leaf.

**Table-25:**

*Frequency of habituated to take betel leaf of the elderly respondents (n=63)*

Habituated to betel leaf	Frequency	Percent
No	41	65
Yes	22	35
Total	63	100

*Note:* n = sample size

### Idea about harmful food during old age by the elderly respondents

The table 26 shows that among all the elderly respondents, 22 (35%) persons hadn't any idea about harmful food during old age; whereas 41 (65%) persons claimed that fatty foods are harmful during old age.

**Table-26:**

*Frequency of idea about harmful food during old age by the elderly respondents (n=63)*

Idea about harmful food	Frequency	Percent
Fatty food	41	65
Do not know	22	35
Total	63	100

*Note:* n = sample size

### **Type of food liking by the elderly respondents**

The table-27 shows that among all the elderly respondents, 50 (79%) persons claimed that they like meat & fish; whereas 8 (13%) elderly persons like egg & milk and only 2 (3%) elderly persons like fruits.

**Table-27:**

*Frequency of food liking type by the elderly respondents (n=63)*

<b>Type of food liking</b>	<b>Frequency</b>	<b>Percent</b>
Meat & fish	50	79
Egg & milk	8	13
Fruits	2	3
Vegetables	3	5
Total	63	100

*Note: n = sample size*

### **Idea about nutrition and six major food elements by the elderly respondents**

The table-28 shows that among all the respondents, most of them hadn't any idea about nutrition and six major food elements and they were 40 (63%) persons; whereas 13 (21%) persons claimed that they have little bit idea about nutrition and six major food elements and only 10 (16%) persons claim that they had idea about nutrition and six major food elements.

**Table –28:**

*Frequency of idea about nutrition and six major food elements by the elderly respondents (n=63)*

<b>Idea about nutrition and six major food elements</b>	<b>Frequency</b>	<b>Percent</b>
No	40	63
Yes	10	16
little bit	13	21
Total	63	100

*Note: n = sample size*

### **Idea about balanced diet and diet plan by the elderly respondents**

The table-29 shows that among all the elderly respondents, most of them hadn't any idea about balanced diet and diet plan and they were 50 (79%) persons; whereas only 13 (21%) persons claim that they had idea about balanced diet and diet plan.

**Table –29:**

*Frequency of idea about balanced diet and diet plan by the elderly respondents (n=63)*

<b>Idea about balanced diet and diet plan</b>	<b>Frequency</b>	<b>Percent</b>
No	50	79
Yes	13	21
Total	63	100

*Note: n = sample size*



## Nutritional Status related information of the elderly respondents

### **Height, weight & BMI of the elderly respondents**

The table-30 shows that among all the elderly respondents mean of height was  $157.7 \pm 9.1$ ; whereas male mean height was  $163.6 \pm 6.8$  and female mean height was  $151.6 \pm 6.8$ . The table also shows that among the entire respondents mean of weight was  $61.5 \pm 15.6$ , whereas male weight was  $63.6 \pm 12.6$  and female weight was  $59.4 \pm 18.3$ . Among the entire respondents mean of BMI was  $24.7 \pm 5.7$ , whereas male mean of BMI was  $23.7 \pm 4.1$  and mean of BMI was  $25.7 \pm 6.9$  for female.

**Table –30:**

*Mean ( $\pm$ SD) distribution of height, weight and BMI of the elderly respondents (n=63)*

	<b>Total</b> <i>Mean <math>\pm</math> SD</i>	<b>Male</b> <i>Mean <math>\pm</math> SD</i>	<b>Female</b> <i>Mean <math>\pm</math> SD</i>
<b>Height in cm</b>	$157.7 \pm 9.1$	$163.6 \pm 6.8$	$151.6 \pm 6.8$
<b>Weight in kg</b>	$61.5 \pm 15.6$	$63.6 \pm 12.6$	$59.4 \pm 18.3$
<b>BMI</b>	$24.7 \pm 5.7$	$23.7 \pm 4.1$	$25.7 \pm 6.9$

*Note:* BMI = Body Mass Index; SD = Standard Deviation; n = sample size

### Mean ( $\pm$ SD) and median of BMI of the elderly respondents

The table-31 shows that among all the elderly respondents mean ( $\pm$ SD) and median of total BMI was low [(21.7 $\pm$ 5.8) and 22.0 respectively] at old home 1 elderly respondents comparing others old homes elderly respondents. On the other hand, among all the respondents mean ( $\pm$ SD) and median of BMI was high in male [(27.3 $\pm$ 1.7) and 27.3 respectively] at old home 2 respondents comparing all old homes and among all gender of the elderly respondents.

**Table –31:**

*Mean ( $\pm$ SD) and median of BMI according to gender of the elderly respondents (n=63)*

	(Old Home 1) BMI		(Old Home 2) BMI		(Old Home 3) BMI	
	Mean ( $\pm$ SD)	Median	Mean ( $\pm$ SD)	Median	Mean ( $\pm$ SD)	Median
<b>Males</b>	20.7 ( $\pm$ 6.0)	20.5	27.3 ( $\pm$ 1.7)	27.3	23.9 ( $\pm$ 6.1)	24.4
<b>Females</b>	22.3 ( $\pm$ 6.1)	22.0	26.7 ( $\pm$ 7.9)	26.2	26.3 ( $\pm$ 3.0)	25.0
<b>Total</b>	21.7 ( $\pm$ 5.8)	22.0	26.8 ( $\pm$ 7.1)	26.2	24.8 ( $\pm$ 5.2)	24.6

*Note:* BMI = Body Mass Index; SD = Standard Deviation; n = sample size

### Percentiles of BMI of the elderly respondents

The table-32 shows that among all the elderly respondents BMI of 5<sup>th</sup> percentile, 50<sup>th</sup> percentile and 95<sup>th</sup> percentile among males were 15.6, 24.7 and 30.0; whereas among females were 16.4, 25.2 and 43.1 respectively.

**Table –32:**

*Percentiles of BMI according to gender of the elderly respondents (n=63)*

<b>Percentiles</b>	<b>Males BMI Percentiles</b>	<b>Females BMI Percentiles</b>
<b>5<sup>th</sup></b>	15.6	16.4
<b>50<sup>th</sup></b>	24.7	25.2
<b>95<sup>th</sup></b>	30.0	43.1

*Note:* n = sample size; BMI = Body Mass Index

### **Nutritional Status of the elderly respondents**

The table-33 shows that among all the respondents 37 (59%) of the elderly respondents were malnourished [underweight 6 (10%), overweight 24 (38%) and obesity 7 (11%)], whereas 26 (41%) respondents were normal.

**Table –33:**

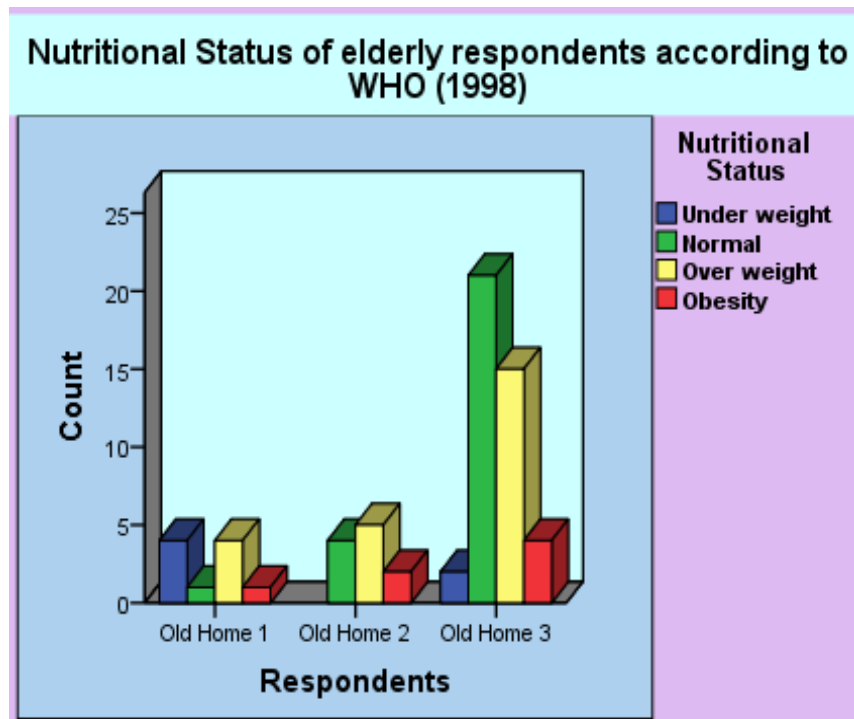
*Frequency of Nutritional Status of the elderly respondents (n=63)*

<b>Nutritional status</b>	<b>BMI</b>	<b>Frequency</b>	<b>Percent</b>
Under weight	<18.5	6	10
Normal	18.5-24.9	26	41
Over weight	25-29.0	24	38
Obesity	≥30	7	11
Total		63	100

*Note:* BMI = Body Mass Index, were identifying according to WHO (World Health Organization, 1998); n=sample size.

### Nutritional Status of the elderly respondents

The figure-12 shows that among all the respondents underweight were 6 (10%) persons, whereas 4 (67%) persons were old home 1 respondents and 2 (33%) persons were old home 3 respondents. Over weight were 24 (38%) persons, whereas 4 (17%) were old home 1 respondents, other 5 (21%) persons were old home 2 respondents and 15 (62%) persons were old home 3 respondents. Obesity were 7 (11%) persons, whereas 1 (14%) were old home 1 respondents, other 2 (29%) persons were old home 2 respondents and 4 (57%) persons were old home 3 respondents. Among all the respondent normal were 26 (41%) persons, whereas 1 (4%) were old home 1 respondents another 4 (15%) persons were old home 2 respondents and 21 (81%) persons were old home 3 respondents.



**Figure 12: Percent distribution of nutritional status of the elderly respondents (n=63)**

### Nutritional deficiency/deficiencies of elderly respondents

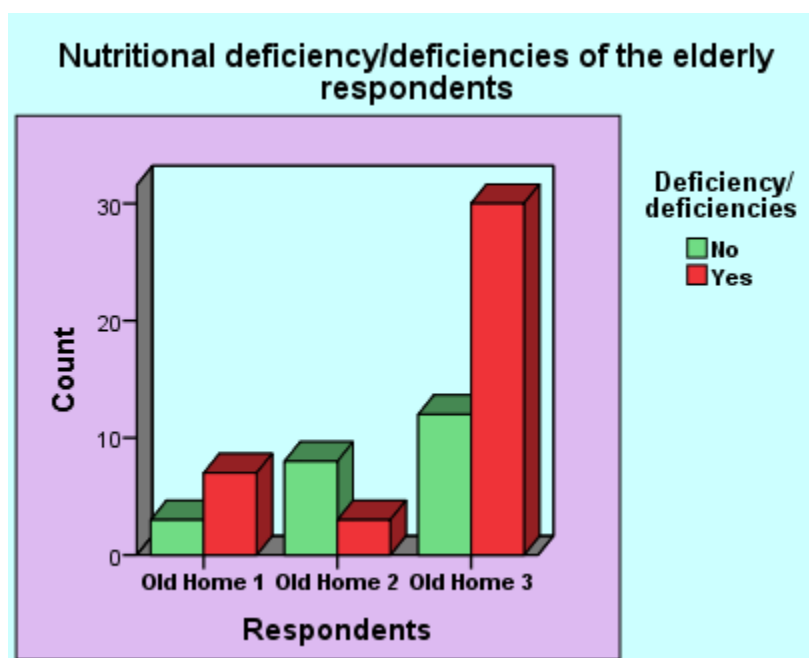
The table-34 and figure-13 are showing that among the entire elderly respondent (as per their available reports) they had claimed, nutritional deficiency had 40 (63%) persons, whereas 7 (18%) persons were lived in old home 1 respondents, 3 (7%) persons were old home 2 respondents and 30 (75%) persons were old home 3 respondents.

**Table -34:**

*Frequency of nutritional deficiency/deficiencies of the elderly respondents (n=63)*

Nutritional deficiency/deficiencies	Frequency	Percent
No	23	37
Yes	40	63
Total	63	100

Note: n=sample size



**Figure 13: Percent distribution of nutritional deficiency/deficiencies of the elderly respondents (n=63)**

### Suffered with disease/s of the elderly respondents

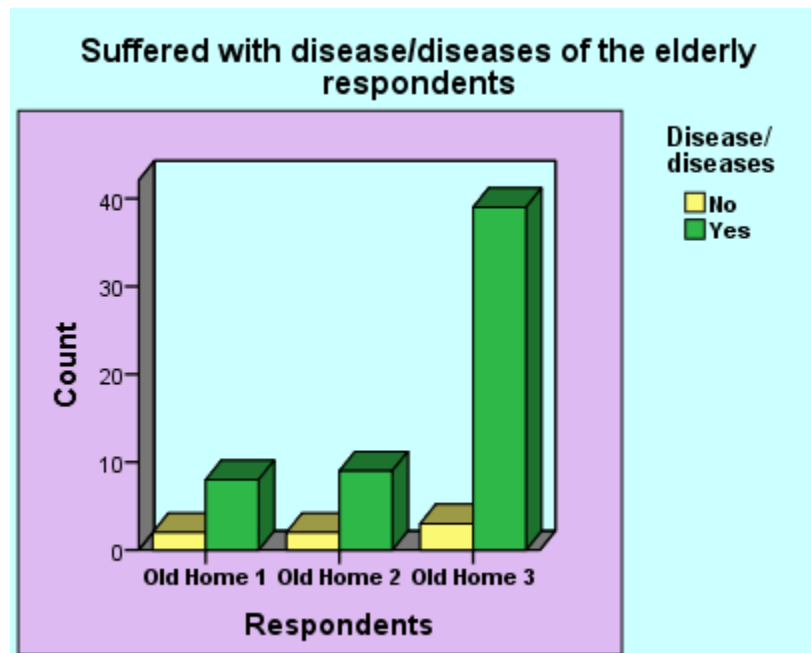
The table-35 & figure-14 are showing that among the entire elderly respondent suffered with disease/s were 56 (89%) persons, whereas 8 (14%) persons were old home 1 respondents, 9 (16%) persons were old home 2 elderly respondents and 39 (70%) persons were old home 3 elderly respondents.

**Table –35:**

*Frequency of suffered with disease/diseases of the elderly respondents (n=63)*

Diseases/diseases	Frequency	Percent
No	7	11
Yes	56	89
Total	63	100

Note: n=sample size



**Figure 14:** *Percent distribution of suffered with disease/diseases of the elderly respondents (n=63)*

The table-36 shows that among the entire elderly respondent as per available report and as respondents claimed, they suffered with diseases/diseases frequency were high 25 (50%) persons with hypertension, whereas diabetic were 16 (32%) persons and other 9 (18%) persons had heart diseases.

**Table –36**

*Frequency of suffered from type of disease/diseases of the elderly respondents (n=50)*

<b>Diseases/diseases</b>	<b>Frequency</b>	<b>Percent</b>
Diabetes	16	32
Heart diseases	9	18
Hypertension	25	50
Total	50	100

*Note: n=sample size*

### **Restricted food of the respondents**

The table-37 and table 3 (h) are showing that among all the respondents 35 (56%) persons had food restriction. Among them highly restricted food was fatty food on 16 (34%) and sweet food and others food both were restricted on 15 (32%) persons.

**Table –37:**

*Frequency of restricted food for the disease/diseases of the elderly respondents (n=63)*

<b>Food restriction</b>	<b>Frequency</b>	<b>Percent</b>
No	28	44
Yes	35	56
Total	63	100

*Note: n=sample size*

The table 38 shows that among all the elderly respondents' highly restricted foods were fatty foods and were restricted on 16 (34%) persons. On the other hand, sweet foods and others foods both were restricted on 15 (32%) persons elderly respectively.

**Table 38:**

*Frequency of restricted food types for the disease/diseases of the elderly respondents (n=47)*

<b>Restricted food</b>	<b>Frequency</b>	<b>Percent</b>
Sweet foods	15	32
Spicy foods	1	2
Fatty foods	16	34
Others	15	32
Total	47	100

*Note: n=sample size*

### **Food allergy of the elderly respondents**

The table-39 shows that among all the elderly respondent 20 (32%) persons of them had food allergy. Figure-15 shows that among allergic food, most allergic food was beef meat.

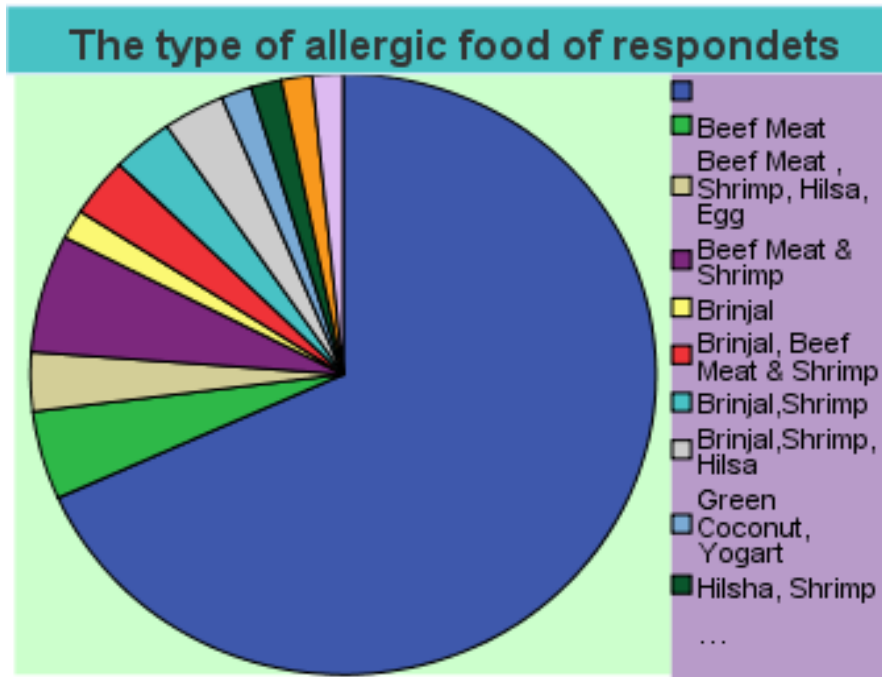
**Table –39:**

*Frequency of food allergy of the elderly respondents (n=63)*

<b>Food allergy</b>	<b>Frequency</b>	<b>Percent</b>
No	43	68
Yes	20	32
Total	63	100

*Note: n=sample size*





**Figure 15:** *Frequency of allergic food types of the elderly respondents (n=63)*

## **Personal hygiene & sanitation practices of the elderly respondents**

### **Brushing teeth of respondents**

The table 40 shows that among all the elderly respondent, most of them brushing their teeth only 1 time per day and they were 38 (60%) elderly persons.

**Table –40:**

*Frequency of brushing teeth per day of the elderly respondents (n=63)*

<b>Brushing teeth/day</b>	<b>Frequency</b>	<b>Percent</b>
2 times	25	40
1 time	38	60
Total	63	100

*Note: n=sample size*

### **Washing hand before eating of respondents**

The table-41 shows that among the entire elderly respondent, most of them wash their hand with soap sometimes before eating and they were 34 (54%) persons; whereas 8 (13%) elderly persons were not washing their hand with soap before eating.

**Table –41:**

*Frequency of hand washing with soap before eating of the elderly respondents (n=63)*

<b>Washing hand before eating</b>	<b>Frequency</b>	<b>Percent</b>
No	8	13
Yes	21	33
Sometimes	34	54
Total	63	100

*Note: n=sample size*

### **Taking bath of respondents**

The table-42 shows that among the entire elderly respondent, most of them were taking bath everyday and they were 58 (92%) persons; whereas only 5 (8%) elderly persons were not taking bath every day.

**Table –42:**

*Frequency of taking bath everyday by the elderly respondents (n=63)*

<b>Taking bath everyday</b>	<b>Frequency</b>	<b>Percent</b>
No	5	8
Yes	58	92
Total	63	100

*Note:* n=sample size

### **Taking bath with soap/week of respondents**

The table 43 shows that among the entire elderly respondent, most of them were taking bath with soap everyday and they were 24 (38%) persons; whereas 19 (30%) elderly persons were taking bath 2 times/week.

**Table –43:**

*Frequency of taking bath with soap/week by the elderly respondents (n=63)*

<b>Taking bath with soap/week</b>	<b>Frequency</b>	<b>Percent</b>
2 times	19	30
3 times	13	21
4 times	7	11
Everyday	24	38
Total	63	100

*Note:* n=sample size

### **Cutting (feet and hand) nail of respondents**

The table-44 shows that among the entire elderly respondent, 24 (38%) persons were cutting their nail per month 3 times; whereas 16 (25%) elderly persons were cutting their nail per month 4 times.

**Table –44:**

*Frequency of cutting (feet and hand) nail per month by the elderly respondents (n=63)*

<b>Cutting nail/month</b>	<b>Frequency</b>	<b>Percent</b>
2 times	23	37
3 times	24	38
4 times	16	25
Total	63	100

*Note: n=sample size*

### **Bed cover sheet cleaned of respondents**

The table-45 shows that among the entire elderly respondent, 42 (67%) persons used bed sheet were cleaned 2 times per week; whereas only 8 (13%) elderly persons used bed sheet were cleaned 2 times per week.

**Table –45:**

*Frequency of used bed cover sheet cleaned per week of the elderly respondents (n=63)*

<b>Bed cover sheet cleaned per week</b>	<b>Frequency</b>	<b>Percent</b>
2 times	42	67
3 times	8	13
4 times	13	20
Total	63	100

*Note: n=sample size*

### Room cleaned perception of respondents

The table-46 shows that among the entire elderly respondent, perception of their used room was good cleaned by 29 (46%) person's respondents, only 2 (3%) person's respondents perception was not cleaned, and excellent cleaned respectively.

**Table –46:**

*Frequency of room cleaned perception by the elderly respondents (n=63)*

Room cleaned perception	Frequency	Percent
Not clean	2	3
Moderately clean	18	29
Good clean	29	46
Satisfactory	12	19
Excellent	2	3
Total	63	100

Note: n=sample size

### Room cleaned times/week of respondents

The table 47 shows that among the entire respondent, 50 (79%) person's used room has been cleaned every day, whereas only 6 (10%) person's used room has been cleaned 2 times and 3 times in a week respectively.

**Table –47:**

*Frequency of room cleaned times per week of the elderly respondents (n=63)*

Room cleaned times/week	Frequency	Percent
2 times	6	10
3 times	6	10
4 times	1	1
Everyday	50	79
Total	63	100

Note: n=sample size

### **Toilet cleaned perception of respondents**

The table-48 shows that among the entire elderly respondent, perception of their used toilet was good cleaned by 30 (48%) person's respondents. On the other hand, perception of their used toilet was excellent cleaned by only 6 (10%) person's respondents.

**Table –48:**

*Frequency of toilet cleaned perception of the elderly respondents (n=63)*

<b>Toilet cleaned perception</b>	<b>Frequency</b>	<b>Percent</b>
Not clean	0	0
Moderately clean	14	22
Good clean	30	48
Satisfactory	13	20
Excellent	6	10
Total	63	100

*Note:* n=sample size

### **Toilet cleaned times/week of respondents**

The table-49 shows that among the entire elderly respondent, 23 (36%) person's used toilet has been cleaned every day, whereas only 11 (18%) person's used toilet has been cleaned 2 times and 3 times in a week respectively.

**Table –49:**

*Frequency of toilet cleaned times per week of the elderly respondents (n=63)*

<b>Toilet cleaned times/week</b>	<b>Frequency</b>	<b>Percent</b>
2 times	17	27
3 times	12	19
4 times	11	18
Everyday	23	36
Total	63	100

*Note:* n=sample size

### **Serving dishes cleaned perception of respondents**

The table-50 shows that among the entire elderly respondent, perception of their used serving dishes that used for their food intake was good cleaned by 42 (67%) person's respondents. On the other hand, perception of their used serving dishes that used for their food intake was excellent cleaned by only 1 (1%) person's respondents.

**Table –50:**

*Frequency of serving dishes cleaned perception of the elderly respondents (n=63)*

<b>Serving dishes cleaned perception</b>	<b>Frequency</b>	<b>Percent</b>
Not clean	0	0
Moderately clean	12	19
Good clean	42	67
Satisfactory	8	13
Excellent	1	1
Total	63	100

*Note: n=sample size*

## ASSOCIATIONS

The table-51 shows that nutritional status were associated with elderly respondent's total monthly expenditure ( $p = ***.008$ ) at the level of  $p < .05$  and their spouse ( $p = *.065$ ) at the level of  $p < .10$ .

**Table –51:**

*Association between socio-demographic characteristics and nutritional status of the elderly respondents (n=63)*

	Under weight	Normal	Over weight	Obesity	P
<b>Gender</b>					
Male	4 (67)	13 (50)	14 (58)	1 (14)	.180
Female	2 (33)	13 (50)	10 (42)	6 (86)	
<b>Educational qualification</b>					
Illiterate	3 (50)	7 (27)	2 (8)	1 (14)	.248
Primary (1-5)	0 (0)	4 (15)	6 (25)	0 (0)	
Secondary (6-10)	3 (50)	5 (19)	4 (17)	3 (43)	
Higher Secondary (11-12)	0 (0)	3 (12)	5 (21)	0 (0)	
Undergraduate	0 (0)	4 (15)	4 (17)	2 (29)	
Postgraduate	0 (0)	3 (12)	2 (8)	0 (0)	
Others	0 (0)	0 (0)	1 (4)	1 (4)	
<b>Total monthly expenditure</b>					
≤5,000	0 (0)	3 (12)	2 (8)	0 (0)	***.008
5,001 – 10,000	6 (100)	5 (19)	5 (21)	2 (29)	
10,001-15,000	0 (0)	6 (23)	1 (4)	1 (14)	
15,000 – 20,000	0 (0)	5 (19)	2 (8)	0 (0)	
≥20,001	0 (0)	7 (27)	14 (58)	4 (57)	
<b>Spouse</b>					
Alive	2 (33)	18 (69)	12 (50)	2 (29)	*.065
Late	4 (67)	8 (31)	11 (46)	3 (43)	
Divorced	0 (0)	0 (0)	0 (0)	1 (14)	
Unmarried	0 (0)	0 (0)	1 (4)	1 (14)	

Note: p = Prevalence;  $p < .05$  (&  $p < .10$ ) Pearson Chi-square test



The table-52 shows that nutritional status of the elderly respondent's were associated with their drinking milk ( $p = *.034$ ) and their type of food liking ( $p = *.007$ ) at the level of  $p < .05$ .

**Table –52:**

*Association between food consumption pattern and nutritional status of the elderly respondents (n=63)*

	Under weight (n, %)	Normal (n, %)	Over weight (n, %)	Obesity (n, %)	<b>p</b>
<b>IDDS</b>					
Lowest dietary diversity score =<3	0 (0)	0 (0)	1 (4)	1(14)	
Medium dietary diversity score 4 &5	5 (83)	12 (46)	12 (50)	3 (43)	.345
High dietary diversity score =>6	1 (17)	14 (54)	11 (46)	3 (43)	
<b>Drinking milk</b>					
No	5 (83)	8 (31)	6 (25)	4 (57)	*.034
Yes	1 (17)	18 (69)	18 (75)	3 (43)	
<b>Intake seasonal fruits</b>					
No	1 (17)	1 (4)	3 (12)	1 (14)	.624
Yes	5 (83)	25 (96)	21 (88)	6 (86)	
<b>Taking special food during sickness</b>					
No	1 (17)	5 (19)	4 (17)	1 (14)	.990
Yes	5 (83)	21 (81)	20 (83)	6 (86)	
<b>Idea about harmful food</b>					
Fatty food	4 (67)	15 (58)	16 (67)	6 (86)	.579
Do not know	2 (33)	11 (42)	8 (33)	1 (14)	
<b>Type of food liking</b>					
Meat & fish	2 (33)	19 (72)	22 (92)	7 (100)	
Egg & milk	4 (67)	3 (12)	1 (4)	0 (0)	*.007
Fruits	0 (0)	2 (8)	0 (0)	0 (0)	
Vegetables	0 (0)	2 (8)	1 (4)	0 (0)	

Note: p = Prevalence;  $p < 0.05$ , Pearson Chi-square test

IDDS = Individual Dietary Diversity Score.

The table-53 shows that nutritional status of the elderly respondent's were associated with their idea about nutrition and six major food elements ( $p = *.081$ ), diseases/s ( $p = *.081$ ), and their type of food restriction for the disease/s ( $p = *.099$ ) at the level of  $p < .10$ .

**Table –53:**

*Association between different parameters and nutritional status of the elderly respondents (n=63)*

	Under weight (n, %)	Normal (n, %)	Over weight (n, %)	Obesity (n, %)	<b>p</b>
<b>Idea about nutrition and six major food elements</b>					
No	5 (83)	20 (77)	13 (54)	2 (29)	*.081
Yes	1 (17)	2 (8)	6 (25)	1 (14)	
little bit	0 (0)	4 (15)	5 (21)	4 (57)	
<b>Idea about balanced diet and diet plan</b>					
No	5 (83)	22 (85)	18 (75)	5 (71)	.791
Yes	1 (17)	4 (15)	6 (25)	2 (29)	
<b>Nutritional deficiency/deficiencies</b>					
No	0 (0)	8 (31)	11 (46)	4 (57)	.111
Yes	6 (100)	18 (69)	13 (54)	3 (43)	
<b>Diseases/diseases</b>					
No	2 (33)	1 (4)	2 (8)	2 (29)	*.081
Yes	4 (67)	25 (96)	22 (92)	5 (71)	
<b>Food restriction</b>					
No	5 (83)	13 (50)	7 (29)	3 (43)	*.099
Yes	1 (17)	13 (50)	17 (71)	4 (57)	
<b>Food allergy</b>					
No	5 (83)	16 (62)	17 (71)	5 (71)	.735
Yes	1 (17)	10 (38)	7 (29)	2 (29)	

Note: p = Prevalence;  $p < 0.10$ , Pearson Chi-square test

The table-54 shows that nutritional status of the elderly respondent's were associated with their brushing teeth times/day ( $p = *.065$ ), washing hand with soap before eating ( $p = ***.001$ ) and taking bath every day ( $p = ***.001$ ) at the level of  $p < 0.05$ .

**Table –54:**

*Association between personal hygiene and sanitation practice with nutritional status of the elderly respondents (n=63)*

	Under weight (n, %)	Normal (n, %)	Over weight (n, %)	Obesity (n, %)	<b>P</b>
<b>Brushing teeth times/day</b>					
2 times	3 (50)	12 (46)	5 (21)	5 (71)	*.065
1 times	3 (50)	14 (54)	19 (79)	2 (29)	
<b>Washing hand with soap before eating</b>					
No	4 (66)	3 (12)	1 (4)	0 (0)	***.001
Yes	1 (17)	6 (23)	12 (50)	2 (29)	
Sometimes	1 (17)	17 (65)	11 (46)	5 (71)	
<b>Taking bath every day</b>					
No	3 (50)	0 (0)	2 (8)	5 (8)	***.001
Yes	3 (50)	26 (100)	22 (92)	58 (92)	
<b>Taking bath with soap/week</b>					
2 times	4 (66)	7 (27)	4 (17)	4 (57)	.162
3 times	1 (17)	6 (23)	6 (25)	0 (0)	
4 times	0 (0)	1 (4)	5 (21)	1 (14)	
Every day	1 (17)	12 (46)	9 (37)	2 (29)	
<b>Used clothes washed/week</b>					
2 times	0 (0)	5 (19)	4 (17)	1 (14)	.213
3 times	2 (33)	8 (31)	8 (33)	0 (0)	
4 times	2 (34)	1 (4)	2 (8)	0 (0)	
Every day	2 (33)	12 (46)	10 (42)	6 (86)	
<b>Cutting (feet &amp; hand) nail/month</b>					
2 times	4 (66)	8 (31)	9 (37)	2 (28)	.757
3 times	1 (17)	10 (38)	10 (42)	3 (43)	
4 times	1 (17)	8 (31)	5 (21)	2 (29)	

Note: p = Prevalence;  $p < 0.05$  (&  $p < 0.10$ ) Pearson Chi-square test

The table-55 shows that nutritional status of the elderly respondent's were associated with their perception about cleaned the serving dishes that used for their food intake (p = \*.090) at the level of p <0.10.

**Table –55:**

*Association between cleaning practices and perception of cleaning practices with nutritional status of the elderly respondents (n=63)*

	Under weight (n, %)	Normal (n, %)	Over weight (n, %)	Obesity (n, %)	<b>P</b>
<b>Used bed cover sheet cleaned/week</b>					
2 times	6 (100)	18 (69)	13 (54)	5 (72)	.443
3 times	0 (0)	2 (8)	5 (21)	1 (14)	
4 times	0 (0)	6 (23)	6 (25)	1 (14)	
<b>Perception about room cleaned</b>					
Not clean	0 (0)	1 (4)	1 (4)	0 (0)	.521
Moderately clean	3 (50)	8 (31)	4 (17)	3 (42)	
Good clean	2 (33)	11 (42)	14 (58)	2 (29)	
Satisfactory	0 (0)	6 (23)	4 (17)	2 (29)	
Excellent	1 (17)	0 (0)	1 (4)	0 (0)	
<b>Room cleaned times/week</b>					
2 times	0 (0)	4 (15)	2 (8)	0 (0)	.808
3 times	1 (17)	1 (4)	3 (13)	1 (14)	
4 times	0 (0)	1 (4)	0 (0)	0 (0)	
Every day	5 (83)	2 (77)	19 (79)	6 (86)	

Note: p = Prevalence; p < 0.05 (& p <0.10) Pearson Chi-square test

The table-56 shows that there were no association between nutritional statuses of the elderly respondent's with others parameters.

**Table –56:**

*Association between hygiene, sanitation and perception about hygiene & sanitation of the elderly respondents with their nutritional status of (n=63)*

	Under weight (n, %)	Normal (n, %)	Over weight (n, %)	Obesity (n, %)	<b>P</b>
<b>Perception about used toilet cleaned</b>					
Moderately clean	4 (66)	6 (23)	2 (8)	2 (29)	.197
Good clean	1 (17)	13 (50)	13 (54)	3 (43)	
Satisfactory	0 (0)	6 (23)	6 (25)	1 (14)	
Excellent	1 (17)	1 (4)	3 (15)	1 (14)	
<b>Used toilet cleaned times/week</b>					
2 times	4 (66)	5 (19)	5 (21)	3 (42)	.359
3 times	0 (0)	4 (16)	6 (25)	2 (29)	
4 times	1 (17)	6 (23)	4 (17)	0 (0)	
Every day	1 (17)	11 (42)	9 (37)	2 (29)	
<b>Perception about cleaned the serving dishes that used for their food intake</b>					
Moderately clean	3 (50)	5 (19)	2 (8)	2 (29)	*.090
Good clean	3 (50)	18 (75)	18 (75)	3 (43)	
Satisfactory	0 (0)	3 (12)	4 (17)	1 (14)	
Excellent	0 (0)	0 (0)	0 (0)	1 (14)	

Note: P = Prevalence; P < 0.05 (& P < 0.10) Pearson Chi-square test

## DISCUSSION

It is a cross sectional study which was conducted on selected elderly people ( $\geq 60$  years) from three old homes in Dhaka city. Their nutrients intakes were calculated based on measurements on weight basis using standard utensils on their 24 hour dietary recall. The assessment of their nutritional status, IDDS and others parameters were also carried out.

Applying the exhausted sampling technique, sample size,  $n = 63$  were taken after the exclusion and inclusion criteria of the study from selected all 3 old homes respondents in Dhaka city. All the respondents were asked about their socio-demographic information, their nutrient intake information, personal hygiene and sanitation information with their mental perception.

As per the specific objectives of the study, all the information obtained are put forward in tabular and figurative forms in 56 tables and 15 figures based on conceptual framework of the study. Appropriate statistical interpretations are also given.

According to gender distribution among the entire elderly respondents males were 32 (51%) persons and females were 31 (49%) persons. The entire respondents were found between ages 60 to 80 years, whereas the majority of ages were found 60 years elderly respondents, but was not found significantly associated (chi square,  $p = 0.180$ ; at the level of  $p = 0.05$ ) with nutritional status (Table-1, Figure-1 and Table-51).

Regarding the formal educational qualification most of the elderly respondents 15 (24%) persons were educated up to secondary level. Illiteracy was found high in old home 3 elderly respondents and only 4 (8%) elderly respondents were highly educated. Generally

the educated persons had their financial solvency and social relationship and they are more aware about their life and surrounding environment. Educational qualification has shown the significance role for determining the quality of life of the elderly population in earlier study. That study has shown higher mean score was observed in social relationship, environmental and overall quality of life domain and with the increase of educational level, mean scores were also significantly increasing [85]. Whereas, this study hadn't found significance association (chi square,  $p=0.248$ ) between educational qualifications and nutritional status (Figure-3 and Table-51).

Marital status of this study have shown, among the entire elderly respondents 34 (54%) persons [males 26 (77%) persons and females 8(23%) persons] spouse were alive and 26(41%) persons [males 5 (19%) and females 21 (81%) persons] spouse had died. Marital status is also an important role in the elderly population. If the elderly persons having with their life partner they can have passed the better more enjoyable life and also be able to share their mental agony [5]. The chi square p value (chi square,  $p=0.065$ ; at the level of  $p=0.10$ ) between spouse and nutritional status also indicates that there were significance different between spouse and nutritional status (Table-2, Figure-4 and Table-52).

According to personal income among all elderly respondents, 32 (51%) person's elderly respondents had their personal income. On the other hand 31 (49%) persons hadn't personal income (Table-3 and Figure-5). The entire elderly respondent's personal income ratio was about 1:1, that's represents 50% of the elderly respondent's financial capacity to purchase for their own betterment, and whereas 50% of them hadn't their own

financial capacity and they had to depend for others for their own need. Furthermore study results have also shown monthly amount of lowest personal income from source/sources were 21 (66%) persons and that was  $\leq 25,000$  tk per month. Highest personal income from source/sources has shown for only 1 (3%) person and that was  $\geq 1,00,001$  tk per month. Regarding of amounts of money (BDT) from the respondents source/sources, frequency was high from their land/property and pension of the elderly respondents (Table-4, 5 and Figure-6).

The entire elderly respondent's highest monthly expenditure was 25 (40%) persons, whereas the lowest monthly expenditure respondents were 5 (8%) persons of the elderly respondents. The monthly expenditure of the study has shown, 27 (34%) respondent's monthly expenditure was mainly spent by their own source/sources. Other 24 (30%) elderly respondent's source/sources of money were given by their sons and 13 (16%) respondents' source/sources of money (BDT) per month for monthly expenditure were given by their resided old home. This study had also found that there was significant association (chi square,  $p=0.008$ ; at the level of  $p=0.05$ ) between total monthly expenditure and nutritional status (Table-6, 7, 52 and Figure-7). This study has observed that, financial solvency or adequacy of the elderly gives them more ability to expense money for them as their need basis and give them comfort and better facilities. Similar results were also reported in previous study [5, 86].

According to different foodstuffs from 24 hour dietary recall consumed by the elderly respondents it was found that, the median intake of rice at the old home 1 respondents was 321g, whereas median rice intake was 240g, as similar both among old home 2 and



old home 3 elderly respondents respectively. With cooked foodstuffs, consumed soybean oil median intake g/day were 20g, 40g and 35g at the old home 1 respondents, the old home 2 respondents and the old home 3 respondents respectively, which indicated high soybean oil consumed at old home 2 elderly respondents compare to other old homes. As protein, median intake of chicken was consumed only 25g at old home 3 respondents and 60g consumed was indicates high median intakes of chicken at old home 3 elderly respondents. Median intake of egg was 60g in both at old home 2 and old home 3 elderly respondents; but egg was absent at old home 1 elderly respondents. In terms of median intake of fish, high consumed was 75g at old home 2 elderly respondents.

On the other hand median intake of leafy vegetables was consumed 95g by old home 2 and old home 3 elderly respondents respectively; where in case of old home 1, leafy vegetables was absent. Median intake of potato was 50g at old home 1 respondents, that median was more comparing to others old homes. Mainly various type vegetables were consumed by old home 3 elderly respondents comparing to others old homes. Most type of fruits median intake were mainly (30g, 50g) consumed by old home 2 and old home 3 elderly respondents respectively, but no fruits were consumed at old home 1 elderly respondents (Table 8, 9, 10 and 11).

Adequacy of the elderly respondents daily energy, macronutrient and micronutrient have shown that, among all the elderly respondents percent meeting of RNI energy/day was 65.9% for male and 63.3% was in female and protein percent meeting of RNI was low for male (77.1%) comparing to female. Vitamin A percent meeting of RNI was quite low (27.6%) in male, comparing to females (62.1%). According to old home 1 elderly

respondents percent meeting of RNI for energy/day were similar (49%), among both gender of the respondents, whereas protein percent meeting of RNI was low 43.3% for males compare to female 53.6%, also vitamin A were quite low among both in male (2.9%) and in female (1.9%). On the other hand, old home 2 elderly respondents percent meeting of RNI for energy/day was 77.9% and 67.8% among male and female respectively. Fat and protein were quite high at old home 2 respondents comparing to others old homes respondents. At old home 3 elderly respondents percent meeting of RNI for vitamin A was only 30.8% in male which was quite low comparing to female and vitamin B1 also was quite low among male and female elderly respondents (Table-12, 13, 14 and 15). So adequacy of nutrients intakes was low compare to percent meeting of RNI among all the elderly respondents. Various studies have conducted to assess the adequacy of nutrients in the elderly. Study in Delhi in urban slums of the elderly women revealed that mean intake of all nutrients except thiamin and total vitamin A was below the RDI. In this study have shown among all respondents' thiamin and vitamin A was below the RNI at every old home respondent. Whereas iron intake was 50 % of the RDI, and this study have found iron intake was below 50% of the RNI at old home 1 respondents [47].

Among all the elderly respondents' lowest intakes of food group were milk & milk products had taken by 22 (35%) persons and fruits group had taken by 23 (37%) persons. elderly respondents. This study had found that there was association (chi square,  $p=0.034$ ; at the level of  $p=0.05$ ) between drinking milk and nutritional status, but the study had found no association (chi square,  $p=0.624$ ) between seasonal fruits intake and nutritional status (Table-16 and 52).

IDDS in this study results have shown that medium dietary diversity score had 32 (51%) persons and high dietary diversity had 29 (46%) persons. It is clear that lowest IDDS was among old home 1 elderly respondent compare to others old home elderly respondents. This study had found no association (chi square,  $p=0.345$ ) between IDDS and nutritional status (Table-17, 52 and Figure-8).

Regarding to type of food liking of the elderly respondents, 50 (79%) persons claimed that they like meat & fish; whereas 8 (13%) persons like egg & milk and only 2 (3%) persons like fruits and there was significance association (chi square,  $p=0.007$ ; at the level of  $p=0.05$ ) between type of food liking and nutritional status (Table-27 and 52).

The study results have shown that among all the respondents, most of them hadn't any idea about nutrition and six major food elements and they were 40 (63%) persons; whereas 13 (21%) persons claimed that they have little bit idea about nutrition and six major food elements and only 10 (16%) persons claim that they had idea about nutrition and six major food elements, also there was association (chi square,  $p=0.081$ ; at the level of  $p=0.10$ ) between idea about nutrition and six major food elements and nutritional status (Table-28 and 53).

In this study results have shown that among all the elderly respondents mean of height was  $157.7 \pm 9.1$  and mean of weight was  $61.5 \pm 15.6$ , whereas mean of BMI was  $24.7 \pm 5.7$ . A study conducted by Cristina et.al. among 86 male and 106 female (non-institutionalized) and found mean height of men 164.5 cm and that of women 151.1 cm and those mean height is about to similar in this study found. Mean weight was found respectively 72.1 kg and 68.8 kg and those mean weight is different from this study found

[87]. Mean BMI was found 26.6 of men and 29.9 that of women which is higher than this study has found (Table-30). Furthermore among all the respondents mean ( $\pm$ SD) and median of total BMI was low [(21.7 $\pm$ 5.8) and 22.0 respectively] at old home 1 respondents comparing others old homes respondents, whereas, male [(27.3 $\pm$ 1.7) and 27.3 respectively] at old home 2 respondents comparing all old homes, also BMI of 5<sup>th</sup> percentile, 50<sup>th</sup> percentile and 95<sup>th</sup> percentile among males were 15.6, 24.7 and 30.0; whereas among females were 16.4, 25.2 and 43.1 respectively (Table-31 and 32).

Nutritional status of the study have shown that among all the respondents 37 (59%) of the elderly respondents were malnourished; among them, underweight 6 (10%), overweight 24 (38%) and obesity 7 (11%), whereas 26 (41%) respondents were normal. In India an anthropometric survey was conducted in urban area of Karnataka revealed that a higher percentage of normal weight elderly were between age group 60-66 years, and higher percentage of underweight elderly were between age group  $\geq$ 70 years [88]. Nutritional status of the study has showed 59% of them were malnourished (underweight, overweight and obesity), indicates similar results with another earlier study on anthropometric profile of elderly population living in urban Bangladesh having high prevalence of malnutrition among them [89].

Regarding suffered with disease/s, study have shown that among the entire respondent suffered with disease/s were 56 (89%) persons. As per available report, elderly respondents were claimed; they suffered with hypertension (50%), diabetic (32%) and heart diseases (18%). The study have found there was association (chi square,  $p=0.081$ ; at

the level of  $p=0.10$ ) between suffered with disease/s and nutritional status (Table-35, 36 and 53).

Among all the respondents' highly restricted foods were fatty foods and were restricted on 16 (34%) persons, also sweet foods and others foods both were restricted on 15 (32%) persons respectively and study have found there was association (chi square,  $p=0.099$ ; at the level of  $p=0.10$ ) between restricted foods and nutritional status (Table-39 and 53).

According to personal cleaning most of the elderly respondent's 38 (60%) persons brushing their teeth only 1 time per day. Most of the respondents wash their hand with soap sometimes, before eating and they were 34 (54%) persons and there was association (chi square,  $p=0.065$ ; at the level of  $p=0.10$ ) found between brushing teeth times/day and nutritional status, whereas also significant association were (chi square,  $p=0.001$ ; at the level of  $p=0.05$ ) between washing hand with soap before eating and nutritional status (Table 40, 41 and 54).

Regarding taking bath everyday among the entire respondent, most of elderly 58 (92%) persons were taking bath every day and were taking bath with soap everyday and they were 24 (38%) persons elderly respondents. On the other hand, there was significant association was found (chi square,  $p=0.001$ ; at the level of  $p=0.05$ ) between with taking bath everyday and nutritional status. No association was found (chi square,  $p=0.757$ ) between nail cutting/month and nutritional status in this study (Table 42, 43, 44 and 54).

According to environmental cleaning and mental perception the study results have shown that among the entire respondent, 42 (67%) persons used bed sheet were cleaned 2 times

per week and perception of their used room was good cleaned, claimed by 29 (46%) person's respondents, only 2 (3%) person's respondents perception was not cleaned, and excellent cleaned respectively. There was no association found (chi square,  $p=0.443$ ) between used bed cover cleaned/week and nutritional status, also between (chi square,  $p=0.521$ ) mental perception about room cleaning and nutritional status in the study (Table 46, 47 and 55).

According to toilet clean have shown mental perception of their used toilet was good cleaned by 30 (48%) person's respondents and 23 (36%) person's used toilet has been cleaned every day, also there were no association found (chi square,  $p=0.197$ ) between mental perception about used toilet cleaned and nutritional status, also between (chi square,  $p=0.359$ ) used toilet cleaned/week and nutritional status in the study (Table 48, 49 and 56).

among the entire elderly respondent, perception of their used serving dishes that used for their food intake was good cleaned by 42 (67%) person's respondents and there was significant association (chi square,  $p=0.001$ ; at the level of  $p=0.05$ ) were found between perception of used serving dishes cleaned and nutritional status of the elderly respondents (Table 50 and 56).

## CONCLUSION

Nutritional status of this cross sectional study has shown that, 58.7% of respondents were malnourished (underweight, over weight and obese), whereas 41.3% respondents were normal. Most of the nutrients intake values were lower compared to percent meeting of RNI when foodstuffs were measured with standard cooking utensils in 24 hour dietary recall of the elderly. The nutrients values were derived using FCT values with appropriate statistical package. The majority of IDDS score 4 & 5 indicates medium dietary diversity food intake behavior of respondents elderly people. From the socio-demographic view, elderly people were passing through financial and caring support of their family due to ongoing process of nuclear family and lack of economic solvency of our society. To ensure the financial solvency of the elderly people, proper regulations should be developed and maintained to encourage their family and caregivers to help the elderly people.

To ensure medical care services, separate ward or unit in every government and private hospital should be established for elderly people. Health professionals should be adequate trained and should operate as part of a team in all old homes of Dhaka city. Nutrition education and health related intervention programs are essential for the elderly and their caregivers.

To improve the health status of the elderly people their families, community, society, GOB and NGO have to work as a team. To know the scenario of the broader elderly population of Dhaka city as well as Bangladesh, more studies are necessary to conduct in others parts of the country with sufficient number of sample size.

## RECOMMENDATIONS

Keeping in mind the study findings to improve the nutrients intakes and nutritional status of elderly people, following recommendations are put forward. The old homes authorities of Dhaka city are expected

- To include variety of food stuffs to meet nutrients intake, achieve high IDDS score and also to include milk & milk products as well as multiple seasonal fruits intake of elderly on daily basis to ensure balanced diet.
- To ensure washing of hands with soap/cleaner before every eating of the elderly.
- To impart nutrition education frequently for the elderly and their caregivers to maintain good health nutritional status and better living of them.

Furthermore, separate ward or unit for the elderly people with adequate trained medical and nutritional professional should be established in all district level government and private hospitals to accommodate more elderly population.



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**Nutrient Intake and Nutritional Status of Selected Elderly  
People in Dhaka City**

**Informed Consent**

We are here to study on ‘**Nutrient Intake and Nutritional Status of Selected Elderly People in Dhaka City**’. As we select the old homes elders as selected elderly people for this study, so we need your cordial response and answers of the given questions for the study. Your information will be kept completely confidential. Only the researchers will know your answers and will use for the research. We will discard your name, once data has been entered and looked over.

We hope you will be willing to response to our study and we thank you very much for your participation.

Are you willing to participate?

Please confirm your willingness as participant –

0 = No	
1 = Yes	

Name of the **Respondent**

.....  
Signature

Date.....

Name of the Interviewer

.....  
Signature

Date.....

ID No

--	--	--

Name : ..... Mobile .....

Address : .....

**A. Socio-Demographic Information:**

Question	Coding categories	Code no
<b>A1.</b> Age:	. .....years	
<b>A2.</b> Sex:	1= Male 2= Female	
<b>A3.</b> Educational Qualification	0= Illiterate 1= Primary (1-5) 2= Secondary (6-10) 3= Higher Secondary (11-12) 4= Undergraduate 5= Postgraduate 9= Others.....(specify)	
<b>A5.</b> Spouse	1= Alive 2= Late 3= Divorced 4= Unmarried	
<b>A4.</b> Do you have any personal income?	0= No 1= Yes	
<b>A4a.</b> If <b>yes</b> , then, What is the amount of money (BDT) per month?	1= <=25,000 2= 25,001 - 50,000 3= 50,001 - 1,00,000 4= >=1,00,001	
<b>A4b.</b> If <b>yes</b> , then, What is/are the source/sources of money?	1= Business 2= Land/Property 3= Land + Pension 4= Pension 9= Others (specify.....)	

Question	Coding categories	Code no
<b>A5.</b> How much is your monthly expenditure staying at old home?	1= ≤5,000 2= 5,001 – 10,000 3= 10,001-15,000 4= 15,000 – 20,000 5= ≥20,001	
<b>A6.</b> What is the source of your money spent at old home?	1= Own 2= Spouse 3= Son/ Daughter 4= Siblings 5= Relatives 9= Others (specify.....)	

**B. Dietary Intake Information:**

Question	Coding categories	Code no
<b>B1.</b> Do you take any special type food during sickness?	0= No 1= Yes 3= Not provided	
<b>B2.</b> What is the (glasses) quantity of your drinking water?	1= 4-6 (glasses) 2= 7-9 (glasses) 3= 10-12 (glasses) 4= >12 (glasses)	
<b>B3.</b> What is the quality of your drinking water?	1= Row 2= Boiled 3= Filtered	
<b>B4.</b> Do you drink milk?	0= No 1= Yes	
<b>B4a.</b> If yes, then how many times	1= Every day 2= In a week 3= Twice a month 4= In a month	

Question	Coding categories	Code no
<b>B5.</b> Do you take seasonal fruits regularly?	0= No 1= Yes	
<b>B5a.</b> If yes, then number of fruits	Specify.....pieces per day	
<b>B6.</b> Do you habituated to drink?	1= None 2= Tea 3= Coffee 4= Alcoholic beverage	
<b>B6a.</b> If yes, then how many times a day?	Specify.....times per day	
<b>B7.</b> Do you smoke?	1= Never 2= Sometimes 3= Regularly (...sticks per day on average)	
<b>B8.</b> Do you habituated to take betel leaf?	1= Never 2= Sometimes 3= Regularly (.....per day on average)	
<b>B9.</b> Do you think is/are there any type of food/s harmful during old age?	0= No 1= Yes	
<b>B9a.</b> If yes, please specify the type of food	.....	
<b>B10.</b> What type of food do you like most?	1= Meat & fish 2= Egg & milk 3= Fruits 4= Vegetables	
<b>C11.</b> Do you have idea about nutrition and six major food elements?  (if the respondents can answers 2 questions, then code-1; if 1 then code-2, if both no then code-0)	0= No 1= Yes 2= little bit	
<b>C12.</b> Do you have idea about balanced diet and diet plan?	0= No 1= Yes 2= little bit	

C13. What was your menu of yesterday? (24 hour recall diet)					
Time	Menu	Food component	Serving size	Net weight (gm)	Code no
Before Breakfast	..... .....	..... .....	..... .....	..... .....	..... .....
Breakfast	..... ..... ..... ..... .....	..... ..... ..... ..... .....	..... ..... ..... ..... .....	..... ..... ..... ..... .....	..... ..... ..... ..... .....
Midmorning Snacks	..... .....	..... .....	..... .....	..... .....	..... .....
Lunch	..... ..... ..... ..... ..... ..... ..... .....	..... ..... ..... ..... ..... ..... ..... .....	..... ..... ..... ..... ..... ..... ..... .....	..... ..... ..... ..... ..... ..... ..... .....	..... ..... ..... ..... ..... ..... ..... .....
Afternoon Snacks	..... .....	..... .....	..... .....	..... .....	..... .....
Supper	..... ..... ..... ..... ..... ..... .....	..... ..... ..... ..... ..... ..... .....	..... ..... ..... ..... ..... ..... .....	..... ..... ..... ..... ..... ..... .....	..... ..... ..... ..... ..... ..... .....
Before Sleep	..... .....	..... .....	..... .....	..... .....	..... .....



**C. Nutritional Status Related Information:**

Question	Coding categories	Code no
C1. Height	. .....cm	
C2. Weight	.....kg	
C3. BMI	.....	
C4. Health Status	1= Under weight 2= Normal 3= Over weight 4= Obesity, Grade .....	
C5. Do you think you have any nutritional deficiency?  If yes, please specify	0= No 1= Yes  .....	
C6. Do you suffer from any disease?	0= No 1= Yes	
C6a. If yes, please specify	1= Diabetes 2= Heart diseases 3= Hypertension 9= Others.....(Specify)	
C7. Is there any type of food restricted for your diseases?  If yes, please specify	0= No 1= Yes  ..... .....	
C8. Do you have any food allergy?  If yes, please specify the type of allergic food	0= No 1= Yes  ..... .....	

**D. Personal Hygiene and Sanitation Practice:**

Question	Coding categories	Code no
<b>D1.</b> How many times you brush your teeth in a day?	1= 2 times 2= 1 time	
<b>D2.</b> Do you wash your hand with soap/hand wash before eating?	0= No 1= Yes 2= Sometimes	
<b>D3.</b> Do you take bath every day?  If <b>no</b> , then how many times you take your bath a week?	0= No 1= Yes  (Specify).....	
<b>D4.</b> How often you take bath with soap in a week?	1= 2 times 2= 3 times 3= 4 times 4= Every day	
<b>D7.</b> How often your used cloths have been washed in a week?	1= 2 times 2= 3 times 3= 4 times 4= Every day	
<b>D8.</b> How often do you cut your (feet & hand) nail in a month?	1= 2 times 2= 3 times 3= 4 times	
<b>D10.</b> How many times your used bed cover sheet has been cleaned in a week?	1= 1 times 2= 2 times 3= 3 times	
<b>D11.</b> How much clean the room you are living in?	1= Not clean 2= Moderately clean 3= Good clean 4= Satisfactory 5= Excellent	
<b>D12.</b> How many times your room has been cleaned in a week?	1= 2 times 2= 3 times 3= 4 times 4= Every day	

Question	Coding categories	Code no
<b>D13.</b> How much clean the toilet that is used by you?	1= Not clean 2= Moderately clean 3= Good clean 4= Satisfactory 5= Excellent	
<b>D14.</b> How many times your used toilet has been cleaned in a week?	1= 2 times 2= 3 times 3= 4 times 4= Every day	
<b>D15.</b> How much clean the serving dishes that you used for food intake?	1= Not clean 2= Moderately clean 3= Good clean 4= Satisfactory 5= Excellent	