UNIVERSITY OF RAJSHAHI

DEPARTMENT OF STATISTICS

Research Project

[According to B.Sc. Syllabus]

Research On

Factors associated with the nutritional status of older male population in Kahaloo Pourosova, Bogura, Bangladesh

A Report Submitted in Partial Fulfillment of the Requirements for the degree of B.Sc. in Statistics for the year 2021

Submitted by

Examination Roll No   : 1810624122

Registration No   : 1810624122

Session   : 2017-18

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Date of Submission   : 15-Dec-2022

Dedicated to
My
Respectable
Grandmother

A Research Project On

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ABSTRACT

To evaluate the nutritional status of older population age greater than 55 years, from Kahaloo Pourosova, Bogura, Bangladesh according to the body mass index (BMI) and using anthropometric indicators.

A sample was established consisting of 70 male respondent. For assessing of growth and nutritional status by measurement of weight, height, and body mass index established association using cross tabulation and binary logistic regression analysis. The study was carried out between May, 2022 to December 2022.

A prevalence of unhealthy respondent was found in 25.7% of the sample, evidencing a higher percentage of overweight (14.3%) than of underweight (5.7%). Also found that the obesity is about 5.7%.

In this study, there was significant positive relation with age at first marriage weak positive relation with the age of starting work, and moderate positive relation with monthly family income. Using multiple linear regression analysis we find that some variable like age at first marriage, age of starting work and monthly family income has significant association with BMI.

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CHAPTER ONE

INTRODUCTION

Nutritional status is a broad word that refers to a variety of different aspects of nutritional evaluations. A nutritional evaluation is a comprehensive method of determining a person's nutritional needs. Medical, nutrition, medication histories, and physical examinations are used to determine nutritional status. The World Health Organization (WHO) recognizes the body mass index (BMI) as a reliable indication of nutritional status. BMI is an indirect indicator of nutritional status calculated using a person's weight and height. Changes in a person's nutritional status significantly impact their health. As a result, BMI can be utilized as a health indicator, and associations with certain diseases can be expected. As a result, BMI is a reliable indication of a population's nutritional state. Adolphe Quetelet (1796-1874), a Belgian statistician, devised the BMI calculation, dubbed the Quetelet Index. Obesity is measured using the BMI, which is a metric utilized all over the world. Hypertension, heart disease, diabetes mellitus, cardiovascular disease, gall bladder disease, and several types of cancer have all been linked to a BMI of over or equal to 30 kg/m^2.

BMI is a steadfast indicator of body obesity. BMI does not assess body fat straight, but prepare has shown that BMI correlates to direct measures of body fat. BMI can be considered an alternative for direct measures of body fat. Additionally, BMI is an inexpensive and easy-to-perform method of screening for weight categories that may go in front to health problems. For children and olders, BMI is age and sex specific and is often referred to as BMI for age.

An examination, anthropometric measurements, and laboratory results are all part of the process. Due to their unique role in the population, it is important to investigate the relationship between the BMI of older male population and important factors such as age, number of family members, family income, number of siblings, age of starting work, age at first marriage in order to ensure that corrective action can be done. The goal of this study is to investigate the association between BMI and a variety of socio-demographic characteristics.

1.1 Background

The nutritional status is seldom defined in general, but is considered to be important throughout life span, especially in times of diseases and disabilities. We previously proposed a theoretical model of the nutritional status from a functional perspective, however without proposing a definition of the nutritional status. The model comprises four domains that might affect the nutritional and functional status in a bidirectional way. These four domains are: Food and nutrition; Health and somatic disorders; Physical function and capacity; and Cognitive, affective, and sensory function. This study contributes to the existing literature and knowledge by empirically analysing patterns and relationships of possible nutritional status indicators within and between the four domains. Several studies on the relationship between undernutrition, wasting, stunting and assessment of nutritional status of elderly and its correlates have been published and all of them have reported significant associations between nutritional status indicators. The relationship between nutrition, health and financial achievement of old age population in less developed countries has been of interest to many researchers due to the frequent observation that many old people did not get proper treatment and those who get, did not well aware about their health.

A lot of focus has been given to the rural population as poverty setting. However, urban slums display more serious poverty conditions which manifest in poor stunting rates, yet this has been ignored in the realm of scientific writing. This study explored the socio-demographic factors in relation to nutritional status indices mainly stunting, wasting and underweight.

This is not a new work but as a new researcher I am try to interpret the analysis in different way and the theme of my project is, "Factors associated with the nutritional status of the older male population in Kahaloo Pourosova, Bogura, Bangladesh."

1.2 Statement of the Problem

Now a day's in old age people overweight, underweight, and obesity is significantly increasing in low- and middle-income countries, particularly in urban populations. (Wang & Lob stein, 2006) Bangladesh is also a developing and lower middle-income country with changing economy and rapidly growing population, in where the general prosperity of the society is reflected by the nutritional status of the elderly population besides lot more factors.

1.3 Objectives of the Research

Research is a scientific method of answering a research question, solving a research problem, or developing new knowledge by collecting, organizing, and analyzing data in a systematic and orderly manner, with the ultimate purpose of making research findings helpful in decision-making. It is a method of searching for information in a systematic manner. Every study has its own set of aims and goals. The goal of our research is to see if there are any long-term trends in the socioeconomic and demographic factors on BMI of old age population (age greater than 55).

1.4 Scope of the Study

This study is mainly designed for B.Sc. honors project that is why I kept it in a limited form, of course there is scope to extend this work in a greater extent. I had considered only a few old people in my residential place, in Bogura districts as my study area. If I could collect data from whole area of the Pourosova, I think my project paper would be fulfilled and would get a nearly report about this topic. Since the population size of my study is very small it would be better if I could increase the population size. So, there is a greater opportunity to extend this study in a wider field in our country.

1.5 Importance of the Study

To form a civilized nation humanity and care to older population is a must. It is the key point for developing a country. So, for proper caring system we have to know how many factors lying behind this. After the analysis we can know which factors plays important role. Here, we also get information that, how nutritional status effects on the health of old age people. By analyzing we can find out the weak point and then we can take necessary steps for improving our system.

1.6 Limitation of the Study

It is not possible in the part of researcher to deal with all the aspects of a problem within limited time and resource constrain. It is difficult to maintain all process of research for some environmental, social, economic, physical, educational problem. Research is a long-term process. But we do not get sufficient time to do it properly.

Another cause is that there are no sufficient secondary materials for maintain research process properly. Some of the important problems given below:

1. I could not increase the sample because of time and money constant.
2. The research respondent had shown the tendency of hiding correct answer of some aspects such as family income, education level and age of starting work.
3. Non sampling error may arise for this.
4. Lack of knowledge.
5. Lack of awareness about the research of the respondent.

CHAPTER TWO

RESEARCH METHODOLOGY

2.1 Introduction

Research methodology is a way to systematically solve the research problem and it is regarded as a science of studying how research is done scientifically. The term 'research' refers to the systematic method consisting of enunciating the problem, formulating a hypothesis, collecting the fact or data, analyzing the data and reaching certain conclusion either in a form of solutions towards the concerned problem or in certain generalizations for some theoretical formulation. It is most important part for every researcher to understand not only the research methodology but also consider the logic behind the methods that is needed for research study and to explain the research work. In any research work data is an essential element that plays an important role in entire research work. Data source, quality and methodology are the important part for obtaining accurate findings and lastly comment on those findings for any research. Regarding the above importance, this chapter provides a brief description of data sources, selection of project title, study area, population and sample, sampling design, questionnaire preparation, data collection and processing, computer application in research, conceptual framework, methodology and limitation of present study. Therefore, BMI can be used as an indicator for health status and association with some family type, residence, occupation etc. can be expected. Height means the measurement of someone or something from head to foot or from base to top. Weight means a body's relative mass or the quantity of matter contained by it, giving rise to a downward force; the heaviness of a person or thing

2.2 Target Area and Target Population

In this study our target was Kahaloo Pourosova in Bogura district, a place in northern part of Bangladesh. Data was collected from three selected wards from this pourosova. It is a semi-urban region. All the people living in this area aged greater than 55 were considered as the target population. Data are collected from the selected unit and in presence of enumerators.

2.3 Study Design and Sampling Unit

The sample for project was a Simple random sampling selected in two stages from the pourosova ward sampling frame.

Stratification was achieved by age. Samples were selected independently in each stratum, by a two stages of selection. Implicit stratification and proportional allocation should have been achieved at each of the ward by sorting the sampling frame according to birth year and by using a probability proportional to size selection at the second stage of sampling.

In stratified sampling, The allocation of the sample to different strata is done by the consideration proportional allocation.

The procedure of allocation is very easy for its simplicity. When no other information except N_i ,the total no of unit in the ith stratum is available, the allocation of given sample of size n to different strata is done in proportion to their size, i.e in the ith stratum,

$$n_i = \frac{nN_i}{N} \ (or \ f_i = f)$$

This means that the sampling fraction is same in the entire stratum.

In the first stage 3 ward were selected among 8 wards. Our estimated sample size was 75, so in the second stage we select proportional sample size from each of 3 ward. Because of tight time restriction and limitation of budget ,the sample allocation was not proportional in all the area. In our selection of first stage we take account only male and born between 1930 to 1967. Every unit in sample is known as samling unit. Finaly we considered 70

samples for our study. Our selected samples are greater than 55 years and they are from Ward no -1, Ward no -2, and Ward no -5.

2.4 Data Collection Procedure

We initially considered 70 samples for our study. There were certain numbers of people in my target area. I collect the data form different wards in Kahaloo Pourosova by several groups and accumulate these data. Data were collected from selected persons using a slandered pre and post tested questioner, Our selected samples are from ages 55 years or more older and different social classes.

2.5 Data Processing and Analysis

2.5.1 Data processing

Data processing is the key factor for conducting a research and to write a report. Data processing procedure consists three parts as editing, coding, and tabulation. The entire process is done with help of a personal computer.

2.5.2 Data edititng

After collecting necessary data, at first the researcher edits those data orderly as it can be easily analyzed in computer for getting expected result of the study. Without editing it is very difficult to analyze the data properly. So, data editing is very important factor in research.

2.5.3 Data coding

The recoded data were coded in code sheets according to a comprehensive code plan. I tried my best to minimize possible bias due to coding of open question.

2.5.4 Computeraization

Edited and coded data were next processed in computer. At first I made entry of each data in worksheet and prepare for analyzing. I have to select a suitable computer program for data entry and analyze.

2.5.5 Tabulation

Tabulation is the process of summarizing raw data, and displaying same in compact from for farther analysis. It is an orderly arrangement of data in columns and rows.

2.6 Data Entry and Analysis

The analysis of data is an important part of any research project work. At first I again coding entire questionnaire according to the predetermined code plan and entry them into the computer. I have different type of table, such as frequency table, association which are needed. I have used different test statistics to test the validity of significance of our data for quick assessment, I have also made pie chart in this direction.

2.7 Measurement and Scaling

From the data, we have Age, Height, Weight as the measurement of the old age people and the corresponding scales for those measurements are year for age, metre (m) for height, kilogram (kg) for weight. The Body Mass Index (BMI) calculated by the following rule:

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

2.8 Outcome Variable

We have considered several variables as for example age, BMI, education, and so on for making my study more reliable and meaningful. We had to choose some independent and dependent variables. For the sake of making analysis associated to the association. From our questionnaire I have selected Body mass index (BMI) my dependent variable of the study and it is derived from kg/m^2

2.9 Independent Variable

In my research the independent variables are age, age at first marriage, residence, family type, educational status, occupation, family type, number of household members, family income and so on.

2.10 Statistical Analysis

Frequency distribution of all variables was done to find the situation of some particular variables such as BMI, age, income level etc. Descriptive statistics, frequency distribution are executed to see the nature of the data. Then correlation test and multiple linear regression were applied to observe the association of nutritional status with different variables. A value of $P<0.10$ will be considered as statistically significant in the analysis.

2.11 Software

In this study, I have used SPSS software to analyze the data in version 20. SPSS is the acronym of Statistical Package for the Social Science. Microsoft Excel version 2013 have been used for graphical representation.

CHAPTER THREE

RESULTS AND DISCUSSION

In previous chapters, the background of the study and the method of data collection and computerization are discussed. Generally, it is important to know the characteristic or nature of the data before performing any statistical analysis. In order to know the nature and characteristics of the data, descriptive distribution, frequency distribution and graphical representation could be very useful.

3.1 Descriptive Analysis

Descriptive statistics used to calculate means and standard deviations of respondent's age, height, weight and BMI of old age person presented in the current section. A total sample of 70 elderly population was analyzed in this study. The age of subjects varied from 55 to 90 years.

Table 3.1.1 Descriptive distribution of all scale data including age, number of family members, family income, height, weight and BMI.

Descriptive Statistics					
Variable	N	Minimum	Maximum	Mean	Std. Deviation
Age of Respondent	70	55	85	64.89	7.664
Number of Siblings	70	1	13	5.06	2.559
Age of first marriage	70	15	42	21.16	5.064
Age of starting work	70	8	35	17.29	4.450
Number of family members	70	1	18	5.06	3.234
Monthly family income	70	4000	80000	18000.00	15411.270
Body Mass Index	70	16.5089	40.3551	23.292765	3.8670479

With a mean age of 64.89 years their average first marriage 21.16 ranging from 15 to 42 years, their number of household members 3.23 ranging from 1 to 18, their average age of starting work is 4.45 ranging from 8 to 35 that's look like correlated with the age of first marriage, their average weight is 62.53 kg ranging from 29.10 to 84.90 kg, and average height is 1.64m with the standard deviation 0.07. By height and weight we calculated the BMI which varied from 16.51 to 40.36 kg/m^2 with a mean of 23.29 kg/m^2 (Table 3.1.1).

3.2 Frequency Distribution

Now, I would like to present frequency distribution and relevant graphs to have a quick look of my quantitave data. To give a clearer understanding of the BMI results obtained from our data, we converted it to categorical data and performed frequency analysis.

Table 3.2.1: Frequency distribution of BMI categories of male old age people (age greater than 55) in Kahaloo Pourosova, Bogura, Bangladesh.

Body Mass Index	Frequency	Percent	Valid Percent	Cumulative Percent
Underweight	4	5.7	5.7	5.7
Healthy Weight	52	74.3	74.3	80.0
Overweight	10	14.3	14.3	94.3
Obesity	4	5.7	5.7	100.0

Table 3.2.1 shows the frequency distiribution of body mass index level among old age pople (aged greater than 55) in Kahaloo Pourosova, Bogura, Bangladesh. It was observed that 74.3% are in healthy status whereas 5.7% are underweight and obesity equal.
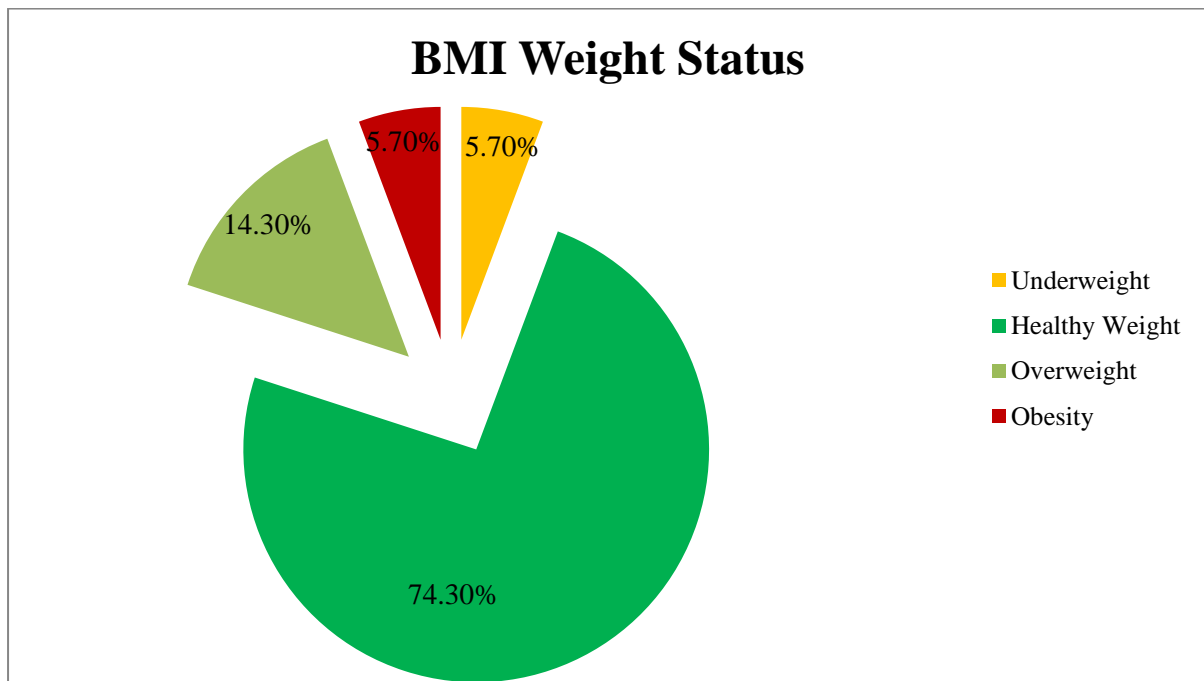
Fig3.2.1: Pie Chart of BMI

Figure3.2.2: Frequency bar diagram of older population educational status at Kahaloo Pourosova, Bogura, Bangladesh.
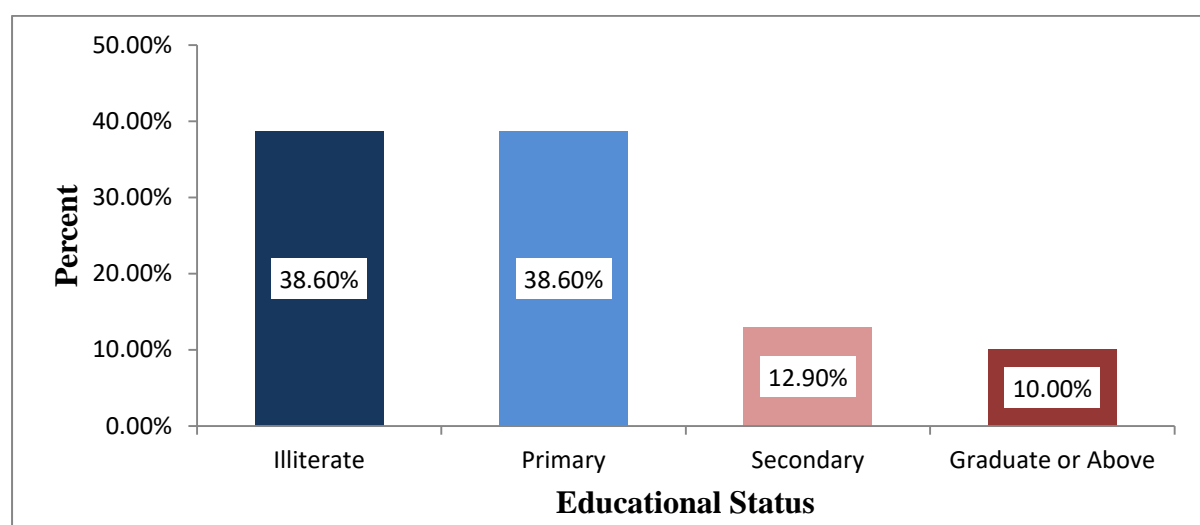
Fig3.2.2: Bar Diagram of Educational Status

The above bar diagram implies that the percentage of illiterate and primary level education obtained by 38.57% individually whereas only 12.86% completed their secondary and 10% are graduated or above degree obtainer (Figure 3.2.2).

Figure3.2.3: Frequency distribution of older population profession status at Kahaloo Pourosova, Bogura, Bangladesh.
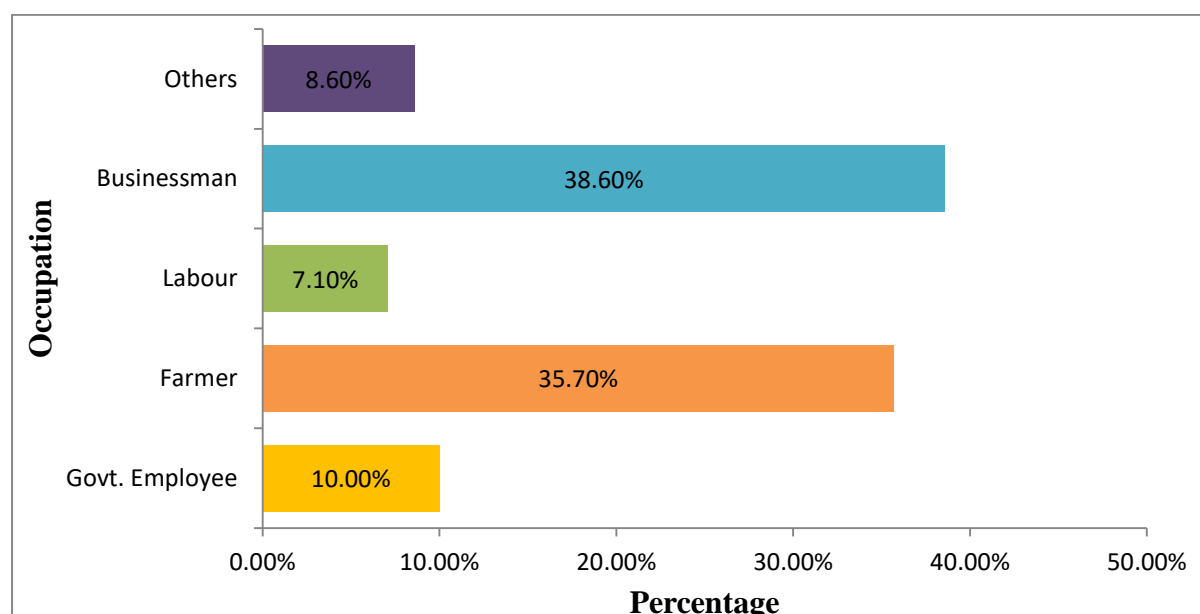
Fig3.2.3: Gantt Chart of Occupation Status

The above gantt chart shows the occupation status of the respondent. It was observed that most of them are businessman which is 38.60% and the lowest 7.10% is labour. The others 8.57% implies nongovernmental employers (Figure 3.2.3).

Table 3.2.4: Frequency distribution of excercise categories of male old age people (age greater than 55) in Kahaloo Pourosova, Bogura, Bangladesh.

Exercise Type	Frequency	Percent	Valid Percent	Cumulative Percent
None	42	60.0	60.0	60.0
Walking	25	35.7	35.7	95.7
Running	3	4.3	4.3	100.0

Table 3.2.4 shows the frequency distiribution of exercise status among old age pople (aged greater than 55) in Kahaloo Pourosova, Bogura, Bangladesh. It was observed that 60% are not exercise regularly whereas 35.7% are doing regular morning walk.

Some other Graphical representation is given below at a glance:

Fig3.2.5: Bar diagram of Family Type
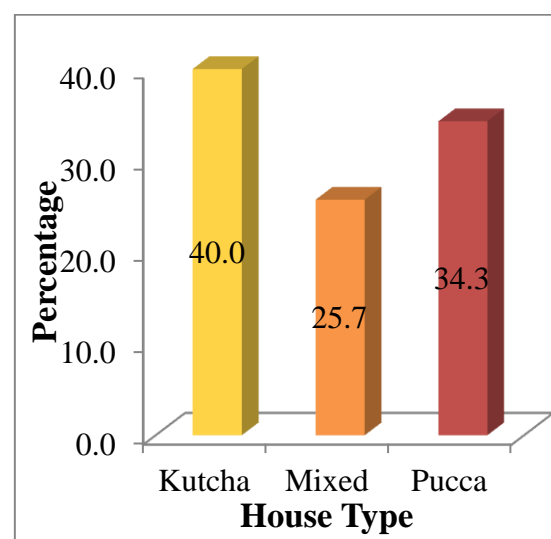
Fig3.2.6: 3D Bar diagram of House

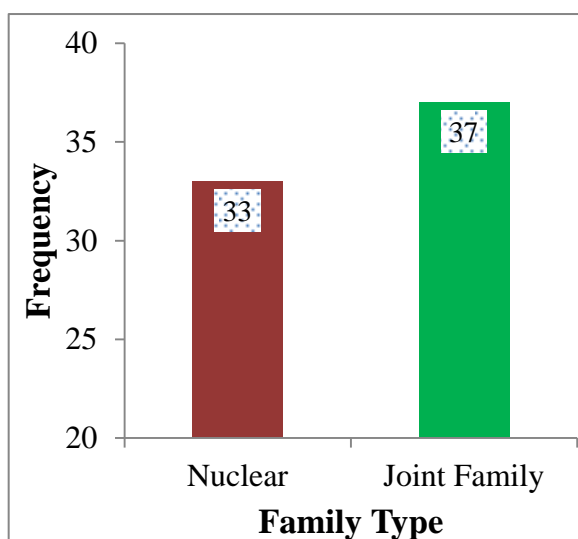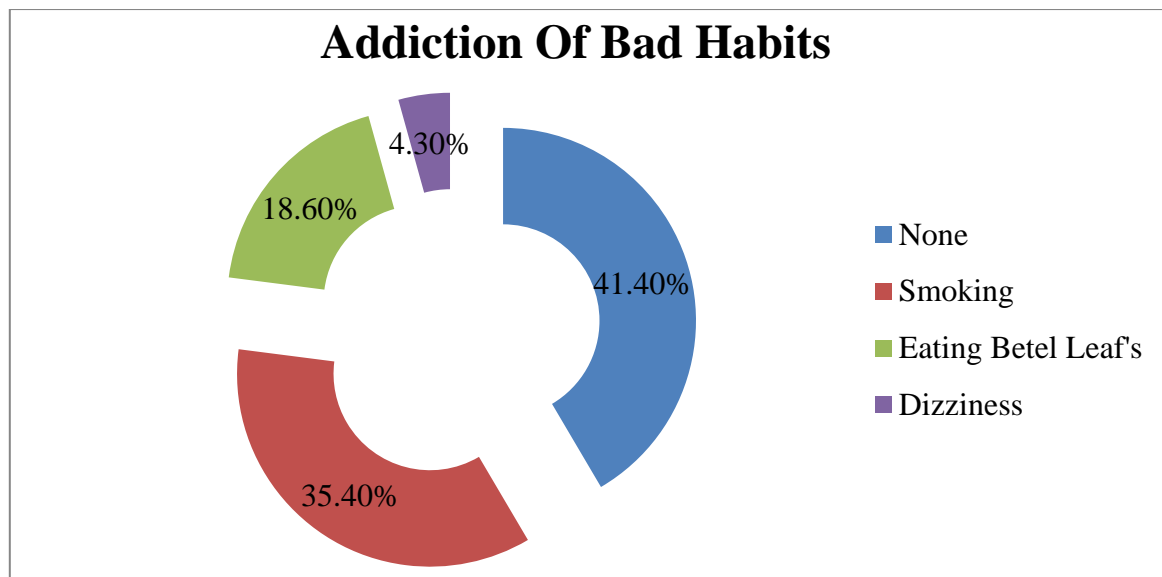**Fig3.2.7: Doughnut Chart of Bad Habits**

3.3 Correlation Analysis

Correlation analysis is a statistical technique which aims to establish whether a pair of variables is related. In any case, without a doubt, one of the key outputs in correlation analysis is a correlational coefficient that indicates the strength of the relationship between two variables.

The Pearson product moment correlation coefficient can be described as a way to measure the strength of a linear relationship between two variables—which can be used to find out if there is strong association between one variable versus another.

3.3.1 Relationship between BMI and some demographic, socioeconomic factors

The correlation coefficient is only applicable for scaled data. So here we will only consider the quantitative demographic and socioeconomic factors like age, number of siblings, age of first marriage, age of starting work, number of family members and total family income. We will check the linear relationship between BMI and those factors using Pearson Correlation technique.

The Pearson correlation coefficient coefficient (r) is calculated using the following expression:

$$r_{xy} = \frac{Cov(x,y)}{\sqrt{V(x) * V(y)}}$$

Table 3.3.1: Pearson correlation coefficient between BMI and some continuous variables

Variables	Pearson Correlation	Sig.(2-tailed)
Age at first marriage	0.302	0.011
Respondent age	-0.107	0.380
Numbers of siblings	-0.020	0.872
Age of starting work	0.225	0.061
Number of family members	0.087	0.475
Monthly family income	0.438	<0.001

From table 3.3.1 Pearson correlation coefficients demonstrated that the linear relationship between BMI and age of the respondent is negative ($r = -0.107$) and was insignificant. The relationship between BMI and the number of siblings was negative ($r = -0.020$) and it was also isignificant (p>0.05). Positive relationship (r = 0.302) was found between BMI and age at first marriage of male older population which was statistically significant (p<0.10). Positive relationship (r = 0.225) was found between BMI and age of starting work which was statistically significant(p<0.10). Number of household members did not show significant ($p = 0.475$) status and relationship between BMI and number of household was positive($r = 0.087$). Finally, a positive moderate ($r = 0.438$) relationship was found between BMI and monthly family income and it was significant (p<0.001) .

3.4 Regression Analysis

To predict the BMI, multiple regression analysis was utilized to examine the relationship between BMI and socioeconomic, demographic and behavioural factors. BMI was used as the

dependent variable. The multiple regression model is a powerful statistical tool for finding the relationship between dependent (continuous) and independent variables. The multiple regression models is written as:

$$Y_{ij} = \beta_{0j} + \beta_1 X_{1ij} + \beta_2 X_{2ij} + \cdots + \beta_k X_{kij} + e_{ij}; i = 1, 2, \ldots, n$$

Where, β_0 and $\beta_1, \beta_2, \ldots, \beta_k$ are fixed regression coefficients; In multiple regression analysis, an important assumption is that the explanatory variables are independent of each other; that is, there is no significant correlation between the explanatory variables used to estimate the ordinary least squares (OLS) relationship. However, in some applications of regression, the explanatory variables are related to each other.

3.4.1 Effects of socioeconomic and demographic factors on BMI of male older population in Kahaloo Pourosova

Multiple linear regression model was selected in this study for the continuous outcome data which is body mass index (BMI) level and since there is only three significant correlation in scale data those are age at first marriage, age of starting work and monthly family income. So consider these three as the respondent variable and let's build the regression model.

Based on these analysis, the intercept of the multiple linear regression analysis exhibited a significant result ($ß_0$=17.966; p<0.001). The coefficient of age at first marriage was positive ($ß_1$=0.168; p<0.05), men who got marriage later had higher BMI than their counterparts. Also the coefficient of age of starting work was positive ($ß_1$=0.028; p<0.10), men who started work later had higher BMI than their counterparts. A puny association was observed between BMI and monthly family income ($ß_2$=0.0001; p<0.001), this result indicated that a family having transcendental income had the person higher BMI than her counterpart (Table 3.4.1).

Therefore we may write the model as follows:

$$BMI = 17.966 + 0.168X_1 + 0.028X_2 + 0.0001X_3 + \in$$

Where,

$$X_1 = \text{Age at first marriage}$$

$$X_2 = \text{Age of starting work}$$

$$X_3 = \text{Monthly family income}$$

Table 3.4.1: Effects of socioeconomic and demographic factors on BMI using linear regression

<table>
<tr><th colspan="5">Coefficients Table</th></tr>
<tr><td rowspan="2">Variable</td><td colspan="2">Unstandardized Coefficients</td><td rowspan="2">t</td><td rowspan="2">Sig.</td></tr>
<tr><td>Beta</td><td>Std. Error</td></tr>
<tr><td>Intercept</td><td>17.966</td><td>1.775</td><td>10.120</td><td>0.000</td></tr>
<tr><td>Age at first marriage</td><td>0.168</td><td>0.083</td><td>2.019</td><td>0.048</td></tr>
<tr><td>Age of starting work</td><td>0.028</td><td>0.111</td><td>0.256</td><td>0.071</td></tr>
<tr><td>Monthly family income</td><td>0.0001</td><td>0.000</td><td>3.590</td><td>0.001</td></tr>
</table>

Table 3.4.2 Coefficient of determination (R Square).

			Model Summary	
Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	0.488[a]	0.238	0.215	3.4255827

R-square 0.238 implies the total 23.8% variation for the dependent variable could be explained by the independent variables age at first marriage, age of starting work and monthly family income (Table 3.4.2).

Table 3.4.3 ANOVA table

<table>
<tr><th colspan="7">ANOVA[a]</th></tr>
<tr><td>Model</td><td>Object</td><td>Sum of Squares</td><td>df</td><td>Mean Square</td><td>F</td><td>Sig.</td></tr>
<tr><td rowspan="3">1</td><td>Regression</td><td>246.390</td><td>3</td><td>82.130</td><td>6.901</td><td>0.000[b]</td></tr>
<tr><td>Residual</td><td>785.440</td><td>66</td><td>11.901</td><td></td><td></td></tr>
<tr><td>Total</td><td>1031.830</td><td>69</td><td></td><td></td><td></td></tr>
<tr><td colspan="7">a. Dependent Variable: Body Mass Index</td></tr>
<tr><td colspan="7">b. Predictors: (Constant), Monthly family income, Age of first marriage, Age of starting work</td></tr>
</table>

In the ANOVA table, the obtained P-value is less than the significance level, so the null hypothesis gets automatically rejected and concluded that all the means are not equal to the given population (Table 3.4.3).

CHAPTER FOUR

SUMMARY AND RECOMMENDATION

4.1 Summary

The effect of socioeconomic and demographic determinants on BMI among the old age population in Kahaloo Pourosova was examined in this chapter. The sample group came from semi-urban regions of the northern part of Bangladesh, the study allowed us to provide a more comprehensive analysis of the target population. Previous research in Bangladesh (Shafique et al., 2007; Khan & Kraemer, 2009) looked at the link between BMI and age, mortality, level of education, wealth index, and other social variables, but they employed considerably smaller data sets that were not typical of the country. Hossain et al., 2012 investigated the association between BMI and certain socio-demographic parameters, but they did not eliminate the cluster effect. In addition, the current study may be the first to look at other relevant facts, such as the relationship between BMI and monthly family income, house type, major disease, and bad habits etc.

According to this study, A total sample of 70 old age male members were analyzed in this study. The age of subjects varied from 55 or more years with mean age 64.89 ± 7.66 years, their average first marriage 21.16 ± 5.06 ranging from 15 to 42, number of household members average 3.23 ranging from 1 to 18, their average age of starting work is 4.45 ranging from 8 to 35 that's look like correlated with the age of first marriage, their average weight is 62.53 KG ranging from 29.10 to 84.90 KG, and average height is 1.64m with the standard deviation 0.07.,The BMI varied from 4 to $1 kg/m^2$ with a mean of $23.29 \pm 3.87 kg/m^2$.

BMI rises with education level and occupation, income index, and age at first marriage, according to the study. BMI, on the other hand, decreases when the age is increased, family increased, presence of major disease, addicted with bad habits. The current study's conclusions are also in partial agreement with those of another Bangladeshi investigation (Shafique et al., 2007). They looked at data from the Nutritional Surveillance Project (NSP) from 2000 to 2004 and found that age, education, wealth index, housing, and locality all had an impact on the BMI of elderly aged greater than 65. Furthermore, another study found that Bangladeshi women's BMI was linked to their age, smoking

status, and educational level (Pierce et al., 2010) in urban areas had a higher BMI. More than 35% of the respondent in this study were disadvantaged economically, and 32% were illiterate and lacked knowledge about basic health practices. They may be unable to achieve their caloric needs due to a lack of resources. The found positive relationship between BMI and amount of education suggests that education can play an essential role in enhancing women's knowledge of general health and balanced eating. The bulk of the women in the survey lived in rural areas. More than 61 percent of rural women in the current study did not have access to adequate health care, and more than 80 percent gave birth at home without the assistance of a doctor. As a result, both the mother and the new born infant are at a higher risk of birth problems.

A multiple linear regression was performed to ascertain the effects of family income, age of first marriage, weight of respondent, height of respondent, age of starting work on the likelihood that participants have significant nutritional status. The multiple linear regression model was statistically significant, F test = 6.901; p < 0.001. The model explained 23.8% (R Square) of the variance of BMI and correctly classified 71.0% of cases. Addicted with the bad habits were 4.361 times more likely to exhibit unhealthy condition than the non addicted person. Increasing first marrital age was associated with an increased likelihood of exhibiting unhealthy condition. Finally we found that there is a significant association between nutritional status and age at first marriage, age of starting work and monthly family income.

As a result, people living in rural areas continue to experience serious health issues. The percentage of underweight old age people was higher in joint family than in neuclear family, but the percentage of fat older person was the opposite. Poor economic conditions, illiteracy, early marriage, early birth, and insufficient medical facilities are the main explanations of the observed drop in BMI of this old age population in Bangladesh, according to the current study. Reduced protein in the diet, increasing psychological and physiological stress, and worsening socioeconomic conditions of older population are all plausible causes of the BMI drop. Some wealthy adult person are now very mindful of their body weight and aim to maintain a slender figure without exercising or changing their diet

As a result, they are unaware of the long-term health risks associated with being unhealthy.

4.2 Recommendation

The target of no increase in person's overweight and underweight may appear modest because it implies acceptance of the existing high-level lack of nutrition. However, the drivers of persons overweight and underweight — over consumption of an unhealthy diet, low physical activity, bad habits, and presence of major disease like diabetes, heart failure etc — continue to expand worldwide and will continue to increase the risk of old age persons overweight and underweight. This research confirmed the existence of a significant risk in the elderly aged population evaluated. Therefore, preventive programs need to be developed to promote healthy lifestyles, such as nutritional education for old people and promote low physical activity to avoid sedentary lifestyle which caused the major disease.

Designing a food guide and planning nutritional menus, can be helpful in promoting healthy eating habits in the population. However, the effectiveness of these guidelines in preventing overweight, underweight and malnutrition should be the subject of further studies.

At last to explain the variation in BMI among this people of old age, the answer is likely multifactorial and consists of a combination of many factors.

Therefore, more research is needed to explain better about this topic.

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