

**VEGETABLES CONSUMPTION BEHAVIOR OF RURAL FARM
FAMILIES**

A THESIS

By

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A Thesis (Course No. AERD-6104) Submitted to the Agrotechnology Discipline in Partial
Fulfillment of the Requirements for the Degree of Master of Science

**AGROTECHNOLOGY DISCIPLINE
LIFE SCIENCE SCHOOL
KHULNA UNIVERSITY
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MARCH, 2022

**KHULNA UNIVERSITY
LIFE SCIENCE SCHOOL**

AGROTECHNOLOGY DISCIPLINE

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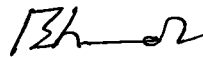
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ABSTRACT

Vegetables are important for human nutrition in terms of bioactive nutrient molecules such as dietary fiber, vitamins (C, A, B1, B6, B9, E) and minerals, and non-nutritive photochemical (phenolic compounds, flavonoids, bioactive peptides, etc.). The main objectives of this study were to determine the vegetables consumption behavior of the rural farm families and explore its relationship with the selected characteristics of the farmers. Data were collected from 80 respondents of two villages of Rupshaupazila under Khulna district, by using a structured personal interview schedule during April-May, 2021 through due to face to face method. Appropriate scales were developed in order to measure the concerned variables. Karl Pearson Product Moment Correlation Coefficient (r) and Spearman's Ranked Correlation Coefficient (p) was used to test the relationship between the selected characteristics and vegetables consumption behavior (VCB). The average vegetables consumption rate by the respondents of the rural farm families was 203.18g/day/person. Most (55 percent) of the respondents showed low consumption rate of the vegetables, while (38.8percent) and (6.3 percent) of the respondents consumed above standard (>235) and standard (235) amount of vegetables respectively. Overlay, highest proportion (38.7 percent) of the respondents showed medium vegetables consumption behavior (knowledge, attitude, intake/consumption) whereas one third 33.8 percent and 27.5 percent of them showed high and low vegetables consumption behavior respectively. Among the 13 selected characteristics of respondent's education, family size, innovativeness, extension media contact, organizational participation, knowledge, attitude and food intake was positively correlated with vegetables consumption behavior. On the other hand, respondent's age, farming experience, farm size, family income, training showed a negative significant relationship with vegetables consumption behavior. However, the vegetables consumption behavior of the respondents was satisfactory.

Keywords: Vegetables consumption behavior, rural farm families

ACKNOWLEDGEMENTS

The author would like to express with utmost humble gratitude and endless praises to Almighty Allah, who enabled the author to complete the study and writing up the thesis successfully.

The author have much pleasure to express her heartfelt respect, deep sense of gratitude, immense indebtedness and deep appreciation to honorable teacher and supervisor Dr. Mohammad Bashir Ahmed, Professor, Agrotechnology Discipline, Khulna University, Khulna, for his kind help for preparation of the thesis including worthy guidance, valuable suggestions, constructive criticism, encouragement and continuous supervision throughout the study work and preparation of the thesis.

The author also expresses heartiest gratefulness and thanks to thesis co-supervisor Md. RejaulIslam, Professor, Agrotechnology Discipline, Khulna University, Khulna, for his special cooperation.

The author explicitsher heartiest thankfulness and indebtedness to all the respondents of the study area who co-operated the author by giving valuable information during collection of data.

The author likes to express her boundless gratitude to her parents and other members of her family whose sacrifices, inspiration, and continuous blessings opened the gate and paved the way for higher studies.

Special thanks are extended to the authority of Khulna University Central Library, Seminar Library of Agrotechnology Discipline, Khulna University, Khulna, from where the author found valuable information to complete the study.

March 2022

The Author

CONTENTS

CHAPTER	TITLE	PAGE NO.
	ABSTRACT	i
	ACKNOWLEDGEMENT	ii
	CONTENTS	iii-vii
	LIST OF TABLES	viii-ix
	LIST OF FIGURES	x
I	INTRODUCTION	1-10
	1.1 Background of the Study	1
	1.2 Statements of the Problem	4
	1.3 Specific objectives of the Study	5
	1.4 limitation of the Study	6
	1.5 scope of the Study	6
	1.6 Justification of the Study	7
	1.7 Assumption of the Study	8
	1.8 Definition of the Key Terms	8
II	REVIEW OF LITERATURE	11-21
	2.1 Concept of vegetables consumption	11
	2.2 Review of literature on general context of vegetables consumption	12
	2.3 Studies regarding relationship between selected characteristics of the respondents and their vegetables consumption behavior	16-20
	2.3.1 Age and vegetables consumption behavior	16
	2.3.2 Farm size and vegetables consumption behavior	17
	2.3.3 Education and vegetables consumption behavior	17
	2.3.4 Family size and vegetables consumption behavior	18



	2.3.5 Family income and vegetables consumption behavior	18
	2.3.6 Media contact and vegetables consumption behavior	19
	2.3.7 Attitude and nutritional knowledge and vegetables consumption behavior	19
	2.4 conceptual Framework of the study	21
III	METHODOLOGY	23-39
	3.1 Design of the study	23
	3.2 Locale of the Study	23
	3.3 Population and Sampling	26
	3.4 Instrument for Data Collection	26
	3.5 Collection of Data	26
	3.6 Selection and measurement of variable	27
	3.6.1 Selection of variables	27
	3.6.2 Measurement of Variables	28
	3.6.2.1 Measurement of Independent variables	28-34
	3.6.2.1.1 Age	28
	3.6.2.1.2 Farming experience	29
	3.6.2.1.3 Level of education	29
	3.6.2.1.4 Family size	30
	3.6.2.1.5 Farm size	31
	3.6.2.1.6 Income of the respondents	32
	3.6.2.1.7 Training exposure	32
	3.6.2.1.8 Innovativeness	32

	3.6.2.1.9 Extension media contact	33
	3.6.2.1.10 Organizational participation	34
	3.6.2.2 Measurement of Dependent Variable	35-38
	3.6.2.2.1 The knowledge level of the respondents about the nutritional aspect of vegetables consumption behavior	35
	3.6.2.2.2 Attitude of the respondents towards vegetables consumption behavior	36
	3.6.2.2.3 Vegetables intake (consumption) of the respondents of the rural farm families	36
	3.6.2.3 Measurement of vegetables consumption behavior depends on the respondents (dependent variable)	38
	3.7 Compilation of data	39
	3.8 statistical Analysis	39
IV	RESULTS AND DISCUSSION	40-51
	4.1 Selected characteristics of the respondents	40
	4.1.1 Age	40
	4.1.2 Farming experience	41
	4.1.3 Level of education	42
	4.1.4 Family size	43
	4.1.5 Farm size	43
	4.1.6 Total annual income	44
	4.1.7 Training exposure	45
	4.1.8 Innovativeness	45
	4.1.9 Extension media contact	47

4.1.10 Organizational participation	48
4.2 Vegetables consumption behavior	49
4.2.1 Knowledge	49
4.2.2 Attitude	50
4.2.3 Vegetables consumption (intake) by the rural farm families	51
4.3 Relationships between the Selected Characteristics (independent variables) of the respondents and Their Vegetable Consumption behavior (dependent Variable)	52-62
4.3.1 Age and the vegetable consumption behavior by the rural farm families	53
4.3.2 Farming Experience and the vegetable consumption behavior by the rural farm families	54
4.3.3 Level of Education and the vegetable consumption behavior by the rural farm families	55
4.3.4 Family Size and the vegetable consumption behavior by the rural farm families	55
4.3.5 Farm size and the vegetable consumption behavior by the rural farm families	56
4.3.6 Annual Income and the vegetable consumption behavior by the rural farm families	57
4.3.7 Training and the vegetable consumption behavior by the rural farm families	58

	4.3.8Innovativeness and the vegetable consumption behavior by the rural farm families	58
	4.3.9 Extension media Contact and the vegetable consumption behavior by the rural farm families	59
	4.3.10 Organizational Participation and the vegetable consumption behavior by the rural farm families	60
	4.3.11 knowledge and the vegetable consumption behavior by the rural farm families	60
	4.3.12 Attitude and the vegetable consumption behavior by the rural farm families	61
	4.3.13 Vegetables intake and the vegetable consumption behavior by the rural farm families	62
	4.4 vegetables consumption behavior of the rural farm families	
V	SUMMARY, CONCLUSIONS AND RECOMMENDATIONS	64-68
	5. 1 Summery	64
	5.2 Selected characteristics of the respondents	64
	5.3 Relationships between the Selected Characteristics (independent variables) of the respondents and Their Vegetable Consumption behavior (dependent Variable)	66
	5.4 vegetables consumption behavior of the rural farm families	66
	5.5 Conclusion	66
	5.6 Recommendations	67-68
	5.6.1 Recommendations for policy implication	67
	5.6.2 Recommendations for further study	68
	REFERENCES	69-76
	APPENDIX A	80

4.2	Distribution of the respondents according to their farming experience score	41
4.3	Distribution of respondents according to their education	42
4.4	Distribution of respondents according to their family size	43
4.5	Distribution of respondents according to farm size	43
4.6	Distribution of respondents according to their annual income	44
4.7	Distribution of respondents according to Training	45
4.8	Distribution of respondents according to their innovativeness	46
4.9	Distribution of respondents according to their extension media contacts	47
4.10	Distribution of the respondents according to their organizational participation	48
4.11	Distribution of respondents according to Knowledge	49
4.12	Distribution of respondents according to their Attitude towards the vegetables consumption (intake)	50
4.13	Distribution of the respondents according to their vegetables consumption (intake)	51
4.14	Categories of the respondents based on their vegetables consumption behavior	52
4.15	Relationship between the selected characteristics of the respondents and their vegetables consumption behavior	63

LIST OF FIGURES

FIGURE NO.	TITLE	PAGE NO.
Figure2.1	Conceptual framework of the study	22
Figure 3.1	A map of Khulna district	24
Figure 3.2	A map of Rupsha upazila showing the study union	25

CHAPTER I

INTERODUCTION

1.1 Background of the study

Vegetables are plants grown for their vegetative parts, such as leaves or stems. However, some "vegetables" are actually flower parts, and many fruits are referred to as vegetables as well. Vegetable is a culinary term which may be applied to any part of an herbaceous plant that humans eat whole or in part is a vegetable, except for culinary fruit, grains, nuts, herbs, and spices. Mushrooms are also commonly considered as vegetables, though of course these are not true plants. An alternative definition of the term is applied somewhat arbitrarily, often by culinary and cultural tradition. It may exclude foods derived from some plants that are fruits, flowers, nuts, and cereal grains, but include savoury fruits such as tomatoes and courgettes, flowers such as broccoli, and seeds such as pulses. Vegetables have been part of the human diet from time immemorial. Some are staple foods but most are accessory foodstuffs, adding variety to meals with their unique flavors and at the same time, adding nutrients necessary for health. Some vegetables are perennials but most are annuals and biennials, usually harvested within a year of sowing or planting (Sinha, Nirmal, et al. 2010).

Vegetables are important for human nutrition in terms of bioactive nutrient molecules such as dietary fiber, vitamins (C, A, B1, B6, B9, E) and minerals, and non-nutritive phytochemicals (phenolic compounds, flavonoids, bioactive peptides, etc.). These nutrient and non-nutrient molecules reduce the risk of chronic diseases such as cardiovascular diseases, diabetes, certain cancers, and obesity (Kays, 2011). However, our day-to-day experience of living in the existing society finds that, vegetables are merely considered as a rich source of nutrients among the common people. The traditional outlook of our society is that, only the fishes, eggs, milk and meats contain the essential nutrients for proper functioning of the human body. Thus, many of us usually ignore adequate consumption of vegetables. Moreover, the richer section of the society also considers that the vegetable consumption would not demonstrate their richness. The rural farm families are also a vital part of the society. Their thinking, somewhat, also resembles the traditional thinking of the common people of the society in Bangladesh. Vegetables make up a major portion of the diet of human in many parts of the world. Broccoli or any of the cruciferous

It's no secret that vegetables are a vital part of a healthy diet. The U.S. Department of Agriculture (USDA) and other health-focused organizations recommend that people include lots of vegetables in their diets. An individual's ideal daily intake of produce depends on factors such as age, sex, and activity level. The consumed foods should have nutritional quality, and should be balanced that permits growth and maintains proper body functions. It is generally believed by the nutritionists and health professionals that the health benefit of vegetables should not be linked to only one compound or one type of vegetable, but rather a balanced diet that includes more than one type of vegetable is likely to provide better protection. All the vegetables may offer protection to humans against chronic diseases (Thomas 2008).

Depending on age and sex federal guidelines recommend that adults eat at least 1½ to 2 cups per day of fruit and 2 to 3 cups per day of vegetables as part of a healthy eating pattern. Teenage girls should eat at least two and a half cups of vegetables every day. Teenage boys should eat at least three cups of vegetables daily. Women 51 and older should dial back to around two cups of vegetables per day; men of the same age should get around two and a half cups (Bere E, Klepp, 2004).

Generally the rural people of Bangladesh do not eat enough food and vegetables according to their bodily or dietary need but their consumption behavior of vegetables is not assessed. The rural farm families in Bangladesh suffer from many malnutrition problems and chronic diseases, as they do not concern about vegetables intake. So it is important to identify the vegetable consumption behavior of rural farm families to remove malnutrition problem and to protect human against different diseases through strategic plan.

Considering the above facts, the researcher felt a thrust to conduct a study with a hope to identify the behavior on vegetable consumption by the rural farm families of Khulna District.

1.2 Statement of the problem

In view of the overall discussion, an attempt was made to undertake a piece of research entitled “Vegetables consumption behavior of rural farm families”. In Bangladesh 80% people live in the rural area and their occupation is agriculture. The population density is 1014 persons per kilometer square. The life style in Bangladesh is characterized by one of the lowest per capita income in the world with consequential effect of low per capita energy as well as vegetables consumption. We know that when farmers remain in well condition then the food production will increase. But this is a matter of great sorrow that they can hardly make both ends to meet. Ensuring food as well as vegetable consumption and agricultural development in Bangladesh are almost similar. It is important to know vegetable consumption behavior of farm families for ensuring their health security, who produce food to feed the whole nation. Due to low intake of vegetables rural people suffer from different problems, such as malnutrition problem, cancer, heart disease, stroke, diabetes, anemia, gastric ulcer and other diseases. A high vegetables diet can erase these problems and give the rural people a healthy life.

It is necessary to have a clear understanding that the vegetables consumption level is different from family to family according to the family member's age, gender, health, activity and genetic and biochemical characteristics of the individual. The main purpose of the study was to determine the vegetables consumption behavior of the rural farm families and to identify the how much vegetables consumed by the rural farm families in a month. The study aimed at providing information regarding the following queries:

- What is the use rent status of vegetables consumption the farm families?
- What is the vegetables consumption behavior of the rural farm families?
- What is the relationship between existing characteristics of the farm families and vegetables consumption status?

1.3 specific Objectives:

The present study has been carried out to fulfill the following specific objectives:

- i. To determine the vegetables consumption behavior of the rural farm families,
- ii. To analyze the selected characteristic of the rural farm families of Khulna division.

The selected characters are

- Age,
- Farming experience,
- Education,
- Family size,
- Farm size,
- Family income,
- Training,
- Innovativeness,
- Extension contact,
- Organizational participation,
- Knowledge,
- Attitude,
- Vegetables intake.

- iii. To explore relationship between the selected characteristics of the rural farm families and their vegetables consumption behavior (VCB).

1.4 Limitation of the study

This study is a student research work and hence, there is a limitation of time and resources.

Therefore, the findings of the study cannot be generalized to other areas and other population of vegetables consumption behavior as a whole.

Considering the time, money and other necessary resources available to the researcher and make the research manageable and meaningful from the practical point of view, it become necessary to impose certain limitations as mentioned below:

- The study was confined to two selected villages i.e. Rajapur and Dayara under Rupsha upazila of Khulna district.
- There were many characteristics of the farm families but only thirteen characteristics of them were selected for the study.
- There were many farm families in the study area, but only 80 respondents were considered for this study.
- The researcher depended on the information furnished by the respondents while interviewing.

1.5 Scope of the study

The present study was designed to have an understanding the behavior of the vegetables consumption by the rural farm families and to explore its relationship with their selected characteristics.

Particularly, the finding of the study will be applicable to the two villages (Rajapur and Dayara) of Rupsha Upazilla under Khulna district. Nevertheless, the findings may also be applicable to other areas of Bangladesh where socio-cultural, economical and the psychological condition do not differ much than those of the study area. The findings of the study will be helpful to the extension workers and planners for preparation of plans for increasing the vegetables consumption behavior among the rural farm families. At last, it is assumed that the recommendation of the study will be helpful to open a new window for the researcher to do more study and solve the problem related to vegetables consumption behavior. We know that Bangladesh is an over populated country. The food shortage and the malnutrition have become

general problems in our country, so this study would also be helpful to the rural people to lead a healthy life and to remove the malnutrition problems in the rural area of Bangladesh.

1.6 Justification of the study

Bangladesh is an agro-based country. About 88.45 percent of the people are living in rural areas and the rural farm families of our country are the center point of our agriculture. The rural farm families produce different vegetables and cereal crops, but they are not aware of vegetables consumption, for this reason they suffer from different nutritional problems along with different diseases like cancer, heart disease, stroke, diabetes, anemia, gastric ulcer. Proper nutritional knowledge and attitude towards the vegetable consumption behavior is responsible for taking low intake of vegetables in a daily diet requirement. In other side, vegetable consumption increase health immunity and reduce human cardio vascular diseases. In 1996. The world's heads of state meeting in Rome committed their countries to eradicate malnutrition problems and reduce the number of under nourished people by 50 percent by the year 2015 (FAO, 2000). We had enough food as well as vegetables but, there was no scope to study vegetables consumption behavior in the rural area of Bangladesh. There is a little work or research in our country side widely.

The Researcher seems that the findings of the research about the vegetables consumption behavior of the rural farm families is helpful to the policy maker in our country to make appropriate policy and give the security for the consumption of vegetables to the people. This study will be helpful to find out the malnutrition problem and the importance for taking vegetables to get rid of different chronic diseases. This finding will open a new window for the researcher to do more study and solve the problem related vegetables consumption. The government and non-government organization, farmers, researcher, extension worker might be benefited from this study.

1.7 Assumption of the Study

An assumption is the supposition that an apparent fact or principle is true in the light of available evidence (Goode, 1945). The researcher had following assumptions while undertaking this study:

- The respondents selected for the study were competent enough to answer the queries made by the researcher.
- The respondents included in the sample were capable of furnishing proper responses to the questions included in the interview schedule.
- The views and opinions provided by the farm families included in the sample were the representative views and opinions of all farm families of the study area.
- The data collected by the researcher from the respondents were free from biases.
- The items, questions and scales used for measuring the variables were reasonably adequate to reflect the respondents' real views and opinions.
- The data for the study were valid and reliable.
- The findings of the study were expected to be useful for planning and implementation of various extension programs for improving vegetables consumption status of the country.

1.8 Definition of Related Terms

The terms which have been frequently used throughout the research work are defined and interpreted below:

Farm family: A family farm is generally understood to be a farm owned and/or operated by a family; it is sometimes considered to be an estate passed down by inheritance. Family farm businesses can take many forms, from smallholding farms to larger farms operated under intensive farming practices.

Respondent: Respondent referred to the farm family members beneficiaries who were exposed to vegetable consumption behavior and were included to the sample.

Vegetable: The term vegetable, in this study, referred to the edible parts of plants (root, stem, leaf, fruit etc.) which are eaten as cooked food or green salad.

Vegetables consumption: Vegetable consumption is a predictor for improved health outcomes, such as reduced obesity and likelihood of food-related non communicable diseases. Effective vegetables consumption depends in large measure on knowledge within the household of



vegetables cooking and processing techniques, basic principles of nutrition, proper childcare and illness management.

Age: Age of a respondent is defined as the span of his life and was operationally measured by the number of years from his birth to the time of interview.

Farming experience: It means the experience which one gains from farming activities directly. Farming experience of farmers was measured in years which he gained from involvement in farming activities.

Family Size: Family size was defined as the number of individual in the family including family head and other dependent members who lived and ate together.

Education: Education referred to the development of desirable knowledge, skill and attitude in the individual through reading, writing, and other related activities. It is measured in terms of schooling of individual respondent.

Farm size: Farm size referred to the cultivated area either owned by the farmer or obtained from other on barga system, the area being estimated in terms of full benefit and half benefit to the farmer respectively. The self-cultivated owned land and cultivated area taken as lease or mortgage from others was recognized as full benefit.

Annual family income: The term annual income refers to the total earning of the respondent and their family members from agriculture, livestock, fisheries and other accessible sources (business, service, daily labor etc.) during a year. It was expressed in Taka.

Training exposure: It was used to refer to the completion of an activity by the farmer which was offered by the government, semi-govt. or non-government organization to improve the knowledge & skills of farmers for better performing an agricultural job.

Innovativeness: Innovativeness is the degree to which an individual or other unit of adoption is relatively earlier in adopting new ideas than other members of a social system (Rogers, 1983).

Extension Media Contact The term extension media contact refers to an individual access to or contact to the communication media and sources or any extension teaching methods being used for dispersion of new technologies among rural women.

Knowledge about nutrients of the vegetables: Nutrition knowledge, broadly defined, refers to knowledge of concepts and processes related to nutrition and health including knowledge of diet and health, diet and disease, foods as well as vegetables representing major sources of nutrients, and dietary guidelines and recommendations (Axelson, Brinberg, 1992). Family knowledge about the nutrients of the vegetables by asking questions to the members who are present at the time of interviewing.

Attitude towards the vegetable consumption: An attitude can be a positive or negative evaluation of respondents. Attitude towards the vegetable consumption behavior were measured by asking different questions related to the vegetables.

CHAPTER II

REVIEW OF LITERATURE

This Chapter contains the pertinent literatures relevant to the vegetable consumption behavior of the rural families. Very few researches, especially regarding the vegetables consumption behavior have been carried out in different countries of the world. Besides, it was a preliminary investigation in this regard. Flowerer, pertinent literatures from related articles and websites have so far been documented in this Chapter. The aim of this chapter is to show the reader that the author have read and a good grasps of the main published work concerning a particular topics or question in that field.

Therefore, the findings of such studies related to the vegetables consumption behavior of the rural farm families and other partial studies have been reviewed in this chapter. This chapter is divided into two sections; the first section deals with past research findings relating to the vegetables consumption behavior and the second section deals with past research findings relating to the relationships of vegetables consumption behavior of the rural farm families with their selected characteristics. However, the reviews are presented in following sections.

2.1 Concept of vegetable consumption

Low fruit and vegetables consumption is a complex, multidimensional phenomenon which varies through a continuum of successive stages as the condition becomes more severe. Each stage consists of characteristic conditions and experiences of fruit and vegetables insufficiency to fully meet the basic needs of family members and of the behavioral responses of family members to these condition.

Definitions on fruit and vegetables consumption or security, provided by different Authors, have a common emphasis. The most commonly accepted definition of the fruit and vegetables security was given by Reutlinger (1987). He defined fruit and vegetables security as access by all people at all time to enough fruit and vegetables needed for an active and healthy life. Its essential elements are the availability of food and the ability to acquire it.

2.2 Review of literature on general context of vegetables consumption

According to USAID (2008), there is a fruits and vegetables consumption or security when all people at all times have sufficient physical and economical access to safe and nutritious food to meet their dietary needs including food performances, in order to live a healthy and active life.

Fairbrainer *et al* (1997) found that Family vegetable consumption or utilization was a complex sustainable development issue, linked to health through malnutrition, but also to sustainable economic development, environment and trade.

Sharma (1992) points out that a family leads a healthy life when it is both physical and economical access to adequate nutritional foods for all its members and when it is not at undue risk of losing such access.

According to FAO (2000), Family food security is a year round access to adequate supply of nutritious and safe food to meet the nutritional needs of all family members.

According to WHO (2002), at national level fruits and vegetables consumption means the availability in the country of sufficient stocks of fruits and vegetables to meet domestic demand until such time as stocks can be replenished from harvests or imports.

At household level, it means that all members including, women and children, have access to fruits and vegetables as they need, either from their own production from market or from government's transfer mechanism. However even when national fruits and vegetables consumption is achieved individuals and groups in the country can still go malnutrition problem do not have the means to access fruits and vegetables.

According to IRRI (2006), only a small proportion of total cropped areas of Bangladesh are vegetables production. Most of the agricultural production in Bangladesh is strenuous in rice, occupying about 75 percent of total cropped areas, whereas only 7 percent of the total cropped land is used for horticultural crops, including root and tuber crops.

Islam and Bari, (2009) found that the area under vegetable cultivation accounted for only 2.56 percent of the total cropped areas of Bangladesh. They also pointed that from this small proportion of the cultivable land area, Bangladesh produced about 1.76 lac metric tons of vegetables annually, of which about 65 percent were produced in winter and the rest in summer. Therefore, production was not well distributed throughout the year and produce for domestic use

was relatively scarce in the off-season, so the people of Bangladesh suffered from malnutrition problem.

Jahan, K. & Hossain, M. (1998) was found that in Bangladesh 75% of urban and 92% of rural populations consumed less than five services a day. While gender was not found to be a significant factor, housewives appeared to be more at risk of a lower intake of fruits and vegetables. So, People with higher income, higher education, and who were older less likely to have problems with a low intake of fruits and vegetables.

FAO (2003) was reported that a high vegetables diet had been associated with lower risk diseases. Low vegetables intake, unbalance diet had been associated with about 31% of ischemic heart diseases and 11% of stroke worldwide. Overall, it was estimated that up to 2.7 million lives could be saved every year with a sufficient increase in vegetable consumption.

Wandel, M. (1995) said that around 2.8% of deaths were attributable to low fruit and vegetable consumption, and these deaths were mainly from gastrointestinal cancer, coronary heart disease, and stroke.

Karim and Mahboob (1986) conducted a study on the regular vegetables consumption benefit. They found that regular, adequate consumption of fruits and vegetables improved survival and conferred protection against chronic diseases, when consumed in adequate amounts on a regular basis.

Webb et al (2002) stated that physical availability of fruits and vegetables underscored the significance of production in order to supply enough fruits and vegetables for all people at all times. He also stated that available production of food was noted by generic indicators such as area cultivated, crop yield, crop diversity, number of cropping seasons and access to and use of inputs. There were several factors that mediate the process of attaining food availability, food access and food utilization is an attempt to achieve.

Gopalan (2000) indicated that a comprehensive nutrients based approach towards achieving family nutrition security (including micro-nutrient adequacy) is in effect, a 'people's movement'. The corner stones of this movement were self-help, self-reliance, effective mobilization and optimal utilization of locally available fruits and vegetables resources.

Frankenberger (1992) mentioned that worsening lack of fruits and vegetables consumption came to be viewed as an evolving process in which the victims were not passive to its effects. Social anthropologists observed that vulnerable populations exhibited a sequence of responses to

economic stress, giving recognition to the importance of behavioral responses and coping mechanisms in fruits and vegetables crises.

Fisseha (1987) stated that the growing dependence of rural people on off-farm employment suggests that the potential for linking tree products with off-farm employment and income creation probably also. Small rural processing enterprise based on wood and other tree and forest products are one of the largest sources of off-farm rural employment.

Jones and Parikh (1998) found that in Bangladesh, short- and long-term wage effects are different and policy, in promoting the growth of agriculture, should mitigate against short-run food insecurity amongst the landless poor and marginal farmers who are generally the poorest section of society.

Hamilton et al (1997) stated that the range of nutritional food insecurity and hunger cannot be captured by any single indicator. Instead, a household's or family level of food insecurity or hunger must be determined by obtaining information on a variety of specific conditions, experiences and behaviors that serve as indicators of the varying degrees of severity of the condition. Responses to individual items in this supplement are not, taken alone or in themselves, meaningful measures of

food insufficiency, food insecurity or hunger and should not be used in such a manner.

Maxwell and Frankenberger (1992) concluded that the household livelihood and healthy food consumption or security allows for a broader and more comprehensive understanding of the relationships among the political economy of poverty, malnutrition and the dynamic and complex strategies that the poor use to negotiate survival. Food is understood to be only one of the priorities that people pursue. People are constantly required to balance food procurement against the satisfaction of other basic material and non-material needs.

Maxwell and Smith (1992) indicated that the focus on vegetables and nutritional security as they were currently conceived needed to be broadened. It was found that nutrient security is one subset of objectives of poor households. Healthy food is only one of a whole range of factors that determines why the poor take decisions and spread risk and how they finely balance competing interests in order to subsist in the short and longer term.

Maxwell and Smith (1995) stated that not all households or families are equal in their ability to cope with stress and repeated shocks. Poor people balance competing needs for asset preservation, income generation and present and future healthy food supplies in complex ways.

Chambers (1989) found that the risk of livelihood failure determines the level of vulnerability of rural farm families to income, food, health and nutritional insecurity. Therefore, livelihoods are secure when families have secure ownership of or access to, resources and income earning activities, including reserves and assets, to offset risks, ease shocks and meet contingencies.

Dev. (1998) provided that more evidence from India and suggests that 12 percent increases in agricultural productivity led to 125 percent increases average incomes of the landless. Agricultural development also generates new and better-paid jobs off-farm for the poor through linkages between agriculture and the wider rural economy. The combination of extra jobs within and outside farming can have strong effects on rural labor markets, pushing tip wages and improving the ability of the poor to buy nutrients rich foods.

Mewan (1992) defined family's livelihood consumption as adequate and sustainable access to income and resources to meet basic needs (including adequate access to food, potable water, health facilities, educational opportunities, housing, time for community participation and social integration).

DFID (2004) stated that the contribution of rural farm families' production to fruits and vegetables consumption is based on two assumptions. First, it is assumed that an increase in agricultural production would increase the physical availability of fruits and vegetables from own household production as well as increase physical availability of fruits and vegetables in markets at affordable prices for the poor. Secondly, increased agricultural production would provide jobs and increase families' income to enhance economic access to vegetables and fruits.

Sen (1981) found on food entitlement had a considerable influence on this change in thinking, representing a paradigm shift in the way that famines were conceptualized. Households derive food entitlements from their own production, income, gathering of wild foods, community support (claims), assets, migration.etc. Thus a number of socio-economic variables have an influence on a household's access to food.

Stringer (2001) mentioned that the cultural and social association of cash crops and large livestock to men's control while subsistence food crops and small livestock as being in women's domain illustrates how food consumption as a gendered concept.

2.3 Studies regarding relationship between selected characteristics of the respondents and their vegetables consumption behavior

Literature dealing with the relationships of characteristics of the respondents and their vegetables consumption behavior in this section.

2.3.1 Age and vegetables consumption behavior

Pathak and Sasmal (1992) observed that there was a positive and significant relationship between the age of the respondents and their vegetables consumption behavior.

Dzadey (2009) said that age appeared to be a determining factor for vegetables consumption behavior. He showed negative relationship between the age and vegetables consumption behavior. Specially, the young and middle aged people were less likely to eat vegetables.

Lien et al. (2001) found that differences between various age groups concerning the consumption of these two food groups with consumption decreasing with the age.

Johansson et al. (1998) observed that women were more likely to consume vegetables than men.

Roos et al. (1998) found that woman's food behavior was more accordance with dietary guidelines than that of the men. Because of the significant influence of age and gender on the consumption of vegetables, there is the need to further investigate their effect to better evaluate the inclusion of these factors in intervention program.

Neumark-Sztainer et al. (1996) examined the relationship between family connectedness and the consumption of fruits and vegetables and found that two factors were significantly related. The age of the respondents was not significantly related to the vegetables and fruits consumption.

Preya et al (2019) found that the negative relationship between the age and the vegetables consumption behavior of the Khulna university students.

Nair (1963) found in his study age as one of the factors that influenced the healthy food consumption pattern. He also said that healthy food intake pattern decreasing with increasing ages.

Redimar (1990) said that the respondents have been noted to be aged between 18 to 25 years and at this age since parental supervision was less so they were more likely to develop food patterns that had the potential to influence their future.

2.3.2 Farm Size and vegetables Consumption behavior

Haile et al. (2005) found in their study that farm size was positively and significantly related to the probability of a household being sufficient food and nutrient for consumption.

Shiferaw, et al.(2003) observed in their study that the farm size of the food secure households was significantly larger than the low food consumption or food insecure households.

VijayalaxmiKhed and Saravanakumarb et al. (2018) observed that, monthly consumption of major rice based food items was higher for large farm households than the vegetables and fruit consumption.

Mahzabin (2011) observed in her study that there was a positive and significant relationship with farm size and household food security status.

Islam (1993) in his study found that farm size had a significant positive effect on rice based food intake. He also said that farmers were likely to produce rice than the fruits and vegetables.

Hossain (1981) findings of the study showed that the farm size had a significant relationship with rice cultivation than the horticultural crops cultivation (such as fruits and vegetables).

2.3.3 Education and vegetables Consumption behavior

Nigussic (2008) found that educational status of the household family was important to affect how money spend efficiently. Sufficient amount of income was a precondition to attain food consumption but not an end by itself when it was supported by education there would be better management of the available income and efficient utilization, which in turn paved the way to have food consumption.

Haile et al. (2005) in their study revealed that education was found to have a positive relationship with families' healthy food consumption. They found that educated family was more secured consumption pattern of healthy food than uneducated family.

Diez Roux (1999) said that children who received high academic support from parents tended to consume more vegetables than who did not have much academic support from parents.

Bere and kleep (2004) pointed that the relationship between personal factors and environmental factors (such as parental support) was significant relationship to behavior. Environmental and personal factors have been found to impact the consumption of vegetables.

Hasan (2006) stated that the education made the largest contribution of wealth accumulation and primary education had an effect on malnutrition problem.

In the socio graphic determinants of low fruits and vegetables consumption among Bangladeshi adults, it is stated that older adults and poorer and the less educated people are more prone to in adequate intake of vegetables consumption.

2.3.4 Family size and vegetables Consumption behavior

Haile et al. (2005) found in their study that household members or family size had a significant relationship with the probability of vegetables consumption.

Maharjan and Khatri-Clthetri (2006) conducted a study on the fruits consumption and family members relation. He found that family members influenced the behavior of the healthy diet intake.

Paddy (2003) said that the majority of the women and about half of the men were responsible for food preparation. Both men and women of a family indicated the food preparer's responsibilities included making a variety of nutritious, well-balanced meals that the others members liked.

2.3.5 Family income and vegetables Consumption behavior

Jacob (2009) found that low-income household is more likely to suffer healthy food shortages than a wealthier household.

Babatunde et al, (2007) found that the higher annual family income, the higher is the probability that the household would food for consumption.

Mahzabin (2011) found that there is a positive relationship between Annual family income and household food and energy security (consumption basis) status.

Dzadey (2009) said that the level of vegetables consumption depend on one's family affluence and the child's family was more affluent, then the higher level of vegetables consumption happened in that family atmosphere. The relationship between family affluence and vegetables

may be determined by the availability of vegetables, which could be an important factors of vegetables consumption.

(Diez- Roux et al, 1997) said that People living in higher-income neighborhoods generally had higher energy-adjusted intakes of vegetables than those living in lower-income neighborhoods and this pattern were still presented after adjustment for individual-level income.

Findings about social beliefs and behavioral practices regarding fruit and vegetable consumption in relation to socioeconomic status revealed that people with lower income were more likely to believe in food beliefs and behavioral practices prejudiced against higher levels of fruit and vegetable consumption.

2.3.6 Media contact and vegetables Consumption behavior

Freisling H,et al (2009) showed that the negative impact of TV and radio commercials on Fruit and vegetables consumption. That advertisements covered in newspapers and magazines showed no effect on Fruit and vegetables consumption and may be explained by the less frequent and probably less persuasive exposure to these media.

Kate Eshleman (2001) conducted a study on the social media and healthy food consumption. The findings of the study suggested that not only exposure to healthy food images on social media, but those that were also heavily endorsed with 'likes,' may nudge people to choose to eat more healthy foods, in place of less nutritious food,”

2.3.7 Attitude and nutritional knowledge and vegetables Consumption behavior

Hailer. A. O. (1968) consumers in the developing countries became more concerned about the nutrition, health, and quality of food they eat. Therefore, organic products (fruits, vegetables) became very popular.

Moirra Gundu (2009), the main findings of this study support the view that women play an active role in food production but their potential is limited by inadequate levels of literacy that affect the way they access and utilize resources for sustainable agriculture and household food consumption among other factors. This may be generalized to the situation of female farmers in Zimbabwe. He found about 70% of the people have favorable attitude toward vegetables fruit consumption.

Brug et al (2004) said that attitude was related to whether a person holds positive or negative outlook about fruit and vegetable intake; social influence referred to the conditions and supports in the surroundings in favor of or opposed to this particular eating behavior; and self-efficacy implied the ability of a person to perform the desired behavior.

The world Health Organization (2004) recommends a daily intake of at least 400g of fruits and vegetables, excluding potatoes. If one maintain a healthy diet which includes fruits and vegetables that help ones to prevent immediate health problems, such as iron deficiency, anemia, obesity, eating disorder and dental problems. It may also prevent long-term health problems, such as coronary heart disease, cancer, stroke and hypertension.

Block et al (1992) says that vegetables contain lots of vitamin and minerals that serve as important sources of nutrients. Diets rich in them are central in the prevention or reduction of the risk of several diseases including cardiovascular diseases and cancer.

Williams et al (1995) point out that people need adequate vitamins and minerals to develop both physically and mentally. These needs include calcium and vitamin D from dietary products, protein from meat products for building muscles, vitamin c from fruits for strong immune system and vitamin Bangladesh is small country. For a healthy nervous system and good digestion and blood production.

Preya et al (2019), found that most (82.5%) of the students had higher knowledge regarding nutrients of vegetables.

Johansson et al. (1990) found that unhealthy lifestyles were less interested in eating fruits and vegetables and participants with higher incomes and higher levels of education were more likely to agree with the statements that they were more afraid of pesticides use in vegetables.

2.4 The Conceptual Framework of the Study

The conceptual framework of Rosenberg and Hoveland (1960) was kept in mind while framing the structural arrangement for the dependent and independent variables. The present study tried to focus two concepts: first, respondents selected characteristics; and the second, vegetables consumption behavior. Vegetables consumption behavior may be influenced and affected through interacting of many characteristics in ones surroundings. It is difficult to deal with all characteristics in a single study.

Related literature, discussion with the experts and research fellows in the relevant field and available resources at hand helped the researcher in selecting twelve variables which include age, farming experience, level of education, family size, farm size, annual income of respondents, training exposure, innovativeness, extension media contact, organizational participation, knowledge, attitude and food intake towards the vegetables consumption behavior of the rural farm families. The conceptual model of the study has been presented below:

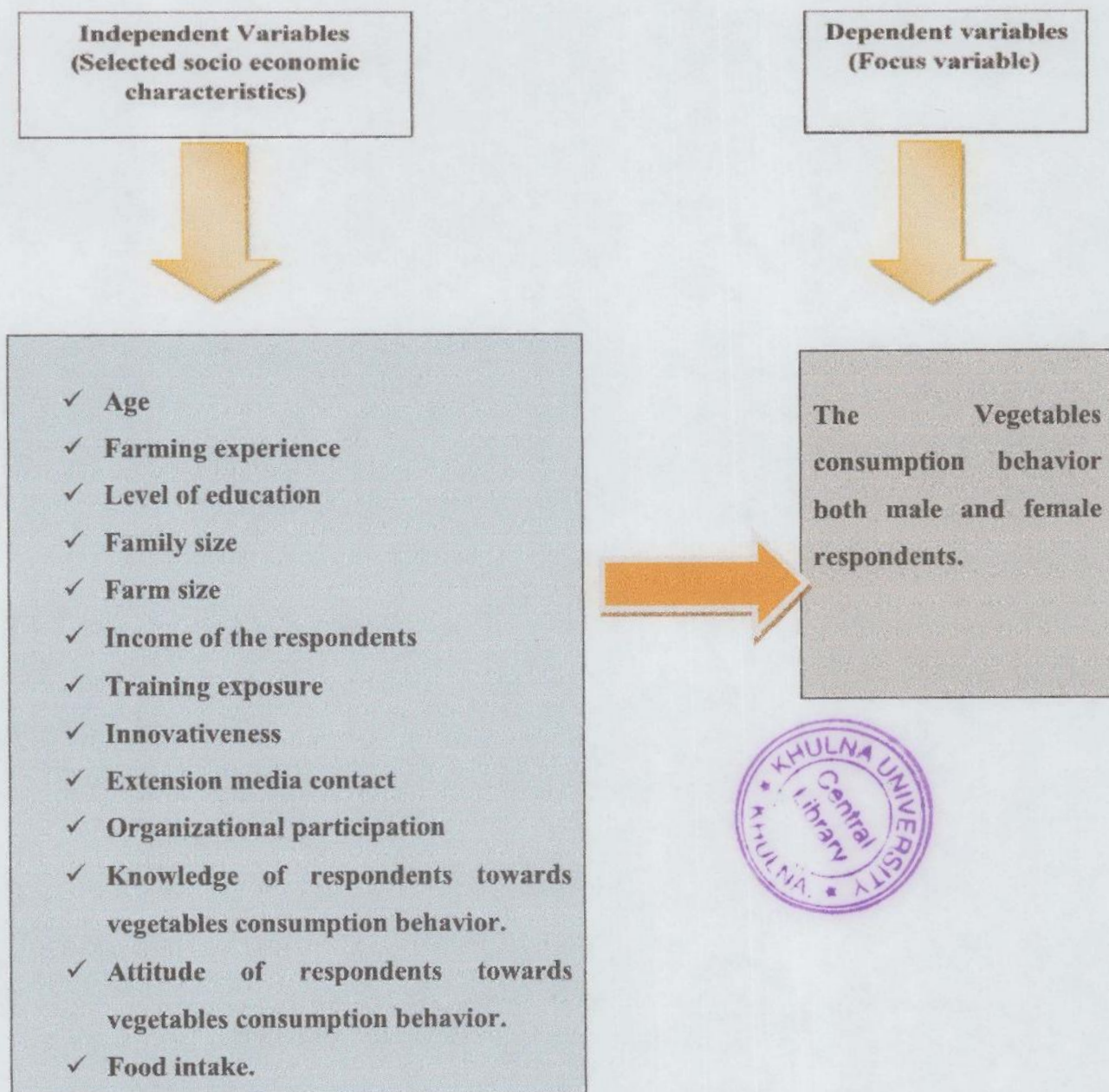


Fig. 2.4: Conceptual framework of the study

CHAPTER III

METHODOLOGY

Methods and procedures used in conducting research need very careful consideration. Methodology should be such that enables the researcher to collect valid information and to analyze the same properly to arrive at correct decisions. The methods and procedures followed in conducting this research are being described below:

3.1 Design of the Study

The study was conducted was carried out by following descriptive and diagnostic research design, Kothari (2004). It was designed to study the vegetables consumption behavior of the rural farm families.

3.2 Locale of the Study

The study was conducted at two villages (Rajapur and Dayara) of Rupsha Upazila under Khulna district. The study area is situated 6 km away from Khulna District. The area of Rupsha Upazila is 120.15 sq km. As the census of 2012, Population Total 167604; male 86176, female 81428. Map of district Khulna showing Rupsha upazila presented in Figure 3.1 and map of Rupsha upazila showing under study area is presented in Figure 3.2.

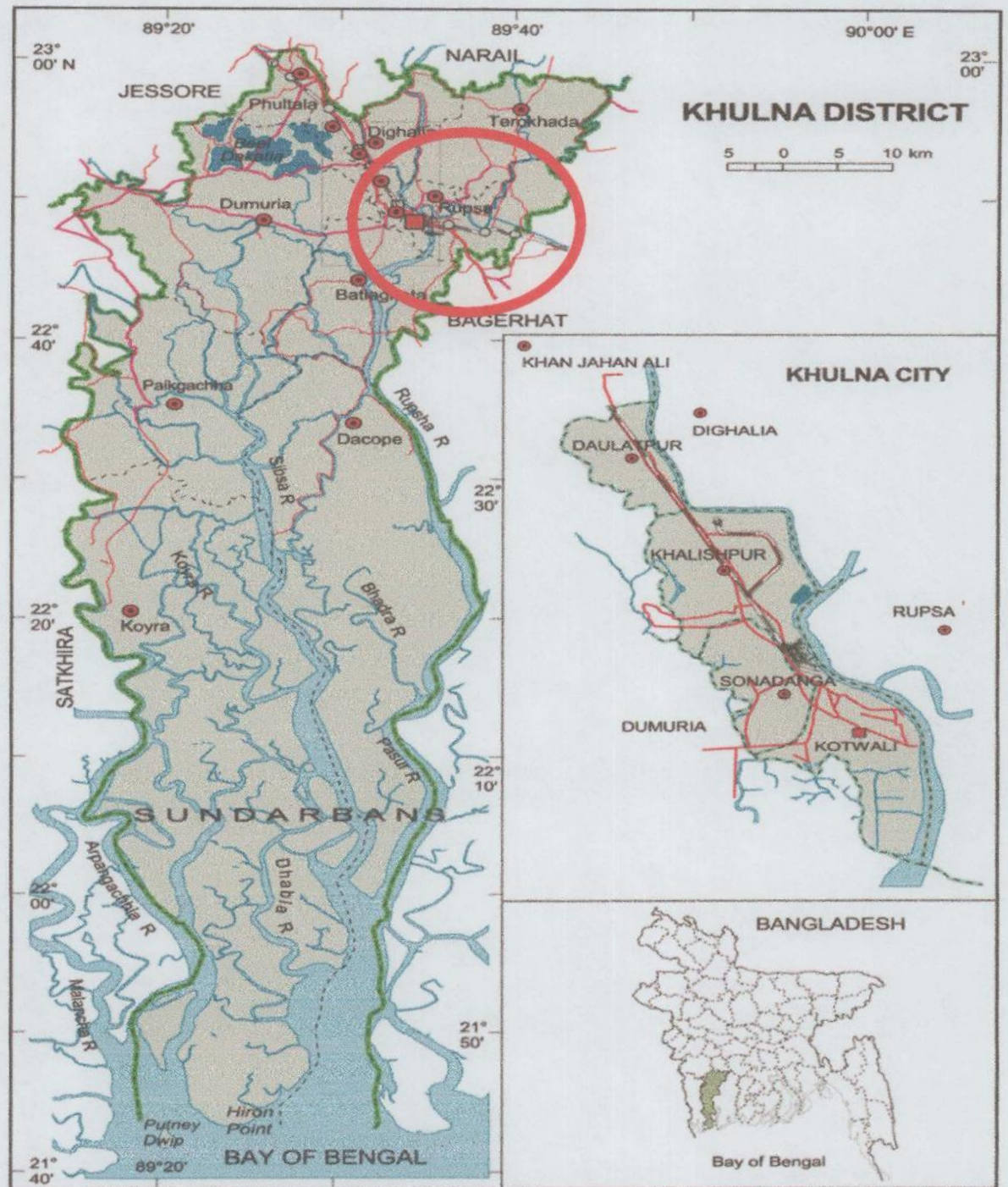


Figure 3.1 A map of Khulna district

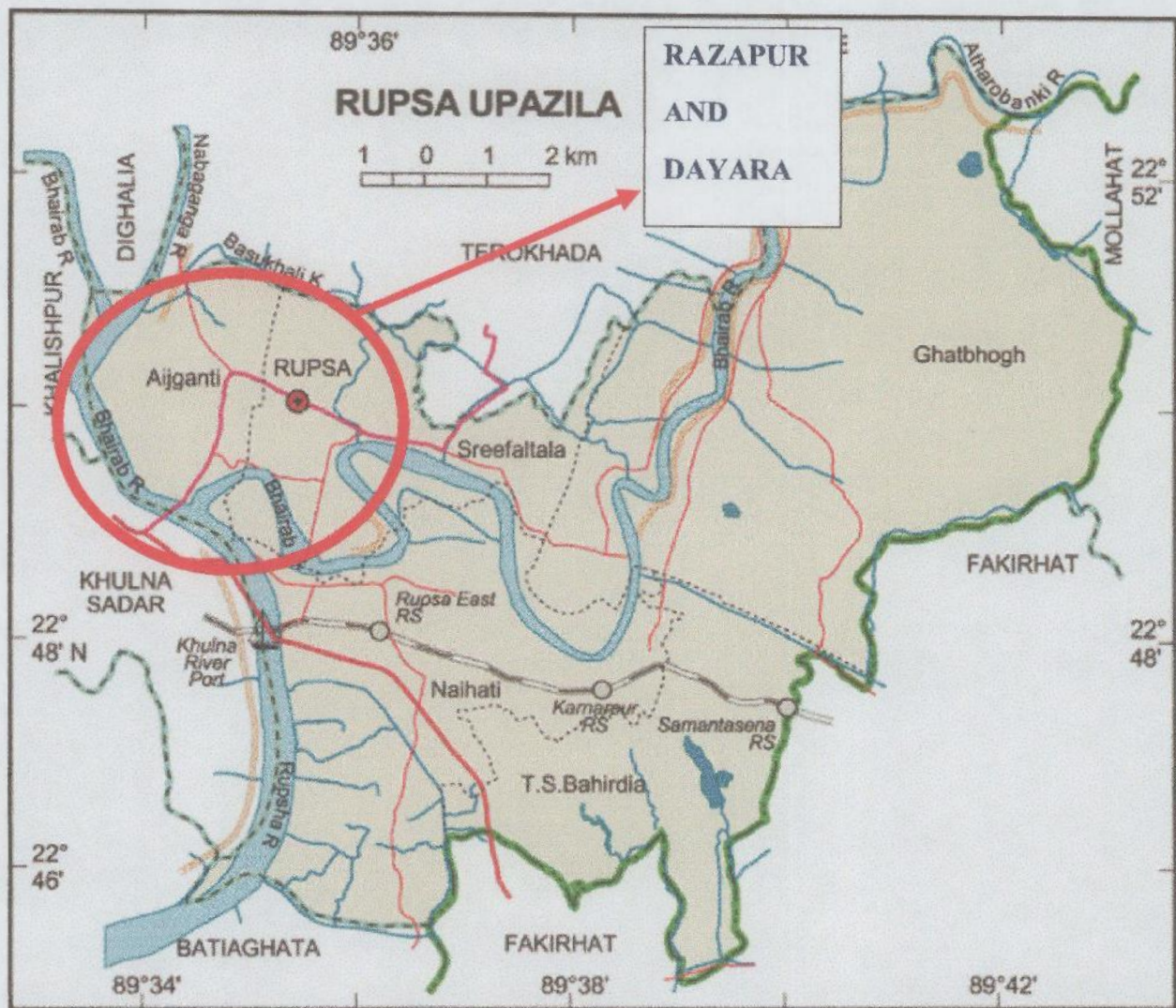


Figure 3.2 A map of RupshaUpazila showing the study unions

3.3 Population and sampling

The household heads with male and female respondents of the study area were selected as population of the study. A number of 80 households were selected as sample fully accidental random sampling method (Kothari, 2004) for two villages (40 from each of the villages).

3.4 Instrument for Data Collection

In order to collect relevant information from the respondents, an interview schedule was used. The schedule was carefully designed keeping the objectives of the study in view. The schedule contained both open and closed questions. Most easy, simple direct questions and different scales were used to obtain the information. Direct questions were also used to obtain information like age, level of education, farm size, and family income, training and organizational participation etc. Different scales were developed and used to measure nutritional knowledge, attitude and practice/consumption ($\text{g}^{-1}\text{day}^{-1}\text{person}^{-1}$) of vegetables etc. The questions were arranged systematically and presented clearly so that the respondents could understand to furnish information in a consistent and systematic manner. Before finalization of interview schedule, it was pretested. Necessary correlations and modification were made based on pretest results. An English version of the interview schedule is enclosed in Appendix A.

3.5 Collection of Data

Data were collected personally by the researcher herself through face to face interview. To familiarize with the study area and for getting local support, the researcher took help from the local leaders. The researcher made all possible efforts to explain the purpose of the study to the respondents of the rural farm families. Data were collected during the period of 1st April, 2021 to 25th may, 2021.

3.6 Selection and Measurement of variables

A variable is any characteristic, which can assume varying or different values in successive individual cases (Ezekiel and Fox, 1959). A well-organized piece of research usually contains at least two important elements, viz. an independent variable and a dependent variable. An independent variable is that variable which is manipulated by the researcher in his attempt to ascertain its relationships to an observed phenomenon. A dependent variable is that variable which appears, disappears or varies as the researcher introduces, removes or varies the independent variables (Townsend, 1953). In a scientific research the selection and measurement of variables constitutes a significant task. In this connection, the researcher reviewed literature to widen her understanding about the nature and scope of the variables relevant to this piece of research.

3.6.1 Selection of variables

Reviewing related studies, the researcher considered 13 - characteristics of farmers as independent variables. The selected characteristics (independent variables) are:

- a) Age,
- b) Farming experience,
- c) Level of education,
- d) Family size,
- e) Farm size,
- f) Income of the respondents,
- g) Training exposure,
- h) Innovativeness,
- i) Organizational participation,
- j) Knowledge of respondents towards vegetables consumption behavior,
- k) Attitude of respondents towards vegetables consumption behavior,
- l) Vegetables intake.

On the other hand, the Vegetables consumption behavior was related dependent variables. Vegetables consumption behavior was determined based on the knowledge, attitude and practice (quantity of vegetables of a farm family consumed every day}. For this purpose data was

collected from the members of the farm family either female or male head. The average amount was calculated from the amount of the seven days.

3.6.2 Measurement of Variables

3.6.2.1 Measurement of Independent Variables

In this study selected thirteen (13) personal, economic, social and psychological characteristics of the rural farm families were considered as independent variables. Procedure for measuring independent variables mentioned under section 3.3.1 has been discussed.

3.6.2.1.1 Age

Age of the respondent refers to the period of time from her birth to the time of interview. It was measured in terms of actual years on the basis of her response to question no. 1 of the interview schedule (Appendix A). Based on age, the respondents were classified into different categories as shown in Table 3.1.

Table 3.1 Categories of the respondents according to their age

Categories	Score (Years)
Young aged	≤ 35
Meddle aged	35-50
Old aged	> 50

3.6.2.1.2 Farming experience

Farming experience of a respondent was measured on the basis of years he/she involved in farming. For example, if a respondent involved in one year her experience score is 1 (question no. 2 of the interview schedule, Appendix A). Based on the Farming experience scores, the respondents were grouped into following categories as shown in Table 3.2

Table 3.2 Categories of the respondents based on farming experience

Categories	Score (Years of experience)
Low experience	1-15
Medium experience	16-30
High experience	>30

3.6.2.1.3 Level of Education

The level of education of a respondent was measured by the number of years of schooling. A score of 1 was assigned for each year of schooling completed. For example, if a respondent completed study of class five his education score was assigned as 5. The educational status of a respondent who could illiterate was assigned a score 0 if a respondent could not read and write. Besides, a score of one (01) was also assigned for these who can sign their name only (question no.3 of the interview schedule, Appendix A). Based on level of education score, the respondents were grouped into different categories as presented in Table 3.3.

Table 3.3 Categories of respondents according to their level of education

Categories	Score (Years of schooling)
Illiterate	0
Primary	1-5
Secondary	6-10
Higher secondary	11-12
Above Higher secondary	13-16

3.6.2.1.4 Family Size

The family size of a respondent was measured by the total number of his family members including himself, his family, children and other dependents who were eating and staying together. This variable has been shown in the question no. 4 of the interview schedule(Appendix A). Based on family size, the respondents were classified into different categories as shown in Table 3.4.

Table 3.4 Categories of respondents according to family size

Categories	No of family members
Small size family	1 - 4
Medium size family	5 -6
Large size family	>7

3.6.2.1.5 Farm Size

Farm size was measured as the size of his farm on which farmers continued his farming operations during the period of study. It included the area of homestead, land cultivation under his or her family cultivation, land given to others on lease.

The area was measured in terms of hectare. The farm size of a respondent was measured by using the following formula:

Farm size = $A+B+1/2(C+D) +E+F+G+H$ Where,

- A. Homestead area
- B. Own land under own cultivation
- C. Own land under others cultivation
- D. Others land under own cultivation
- E. Leased in
- F. Leased out
- G. Pond/Ditches
- H. Others

Actual size of the farm was considered as the score of the farm size. For example, if a respondent had 0.05 ha of land then his score was 0.05. The data were first recorded in local unit and then converted to hectare (question no.5 of the interview schedule) (Appendix A). Based on farm size, the respondents were classified into five categories as shown in Table 3.5.

Table 3.5 Categories of respondents according to farm size

Categories	Score (ha)
Landless farmers	<0.02
Marginal farmers	0.02 -0.20
Small farmers	0.21- 1.0
Medium farmers	1.01-3.0
Large farmers	>3.00

3.6.2.1.6. Income of the Respondents

Annual income is operationally defined as the total income of the respondents from farming and other sources for a period of one year including the income of this family members. The response was obtained by asking the respondent the income he received during this preceding year. Then the responses were categorized. The scoring procedure is represented in table 3.6.

Table 3.6 Annual income-wise distributions of respondents

Categories	Annual Income
Low income	≤ 150000
Medium income	151000 -300000
High income	>300000

3.6.2.1.7 Training exposure

Farmers training score was determined by the number of training received by him/ her. For example, if a respondent received one training; his/ her training score was '1' irrespective of its duration. This variable has been shown in the question no. 11 of the interview schedule (Appendix A). Based on training score the respondents were classified into following categories as shown in Table 3.7

Table 3.7 Categories of respondents according to their training exposure

Categories	Score
No training	0
Low training	1
Medium training	2
High training	≥ 2

3.6.2.1.8 Innovativeness

Innovativeness is operationally defined as the degree to which the respondent is relatively earlier in adopting new ideas. The respondents were asked as to when they would like to adopt an improved practice in farming (question no.8 of the interview schedule, Appendix A). The measurement of innovativeness was as follows:

Table 3.8 Categories of the respondents based on Innovation

Categories	Score
Laggard	1 ($X + 2Sd$)
Late majority	2 ($<X + 1Sd$ to $X + 2Sd$)
Early majority	3 ($X + 1Sd$)
Early adaptor	4 ($>X - 1Sd$)
Innovators	5 ($>X - 2Sd$)

3.6.2.1.9 Extension Media Contact

It refers to the extent of exposure to different agricultural information during the last year. The procedure followed by Ranuji (2006) in order to assess the extent of exposure of the respondents in extension activities with slight modification, the different activities were listed and they were asked to indicate their extent exposure as regularly, sometimes, rarely and not at all. The scores assigned as 3, 2, 1 and 0, respectively was determined by adding all this score against the 12-selected information status. The extension media score could range between 0-36 whereas 0 indicate no contact and 36 indicate high contact. The respondents were classified in to three groups (low, medium, high) based on extent of exposure in the particular extension activity by considering frequency and percentage (question no.9 of the interview schedule, Appendix A). Based on extension media contact score of the respondents were classified into different categories as shown in Table 3.9.

Table 3.9 Categories of respondents according to their extension media contact

Categories	Score
Low extension media contacts	1-12
Medium extension media contacts	13-24
High extension media contacts	>24

3.6.2.1.10 Organizational participation

Organizational participation of a respondents was measured on the basis of the number of organizations involved considering the nature of participation. For example, if a respondent involved in an organization his/her organizational participation score is accordingly as no involvement (0), general member (1), executive member (2) and executive officer (4) with duration. This organizational participation was calculated by adding all the scores against organizations he/she participated considering his/her participation (question no.10 of the interview schedule, Appendix A). Based on organizational participation scores, the respondents were grouped into following categories as shown in Table 3.10.

Table 3.10 Categories of the respondents based on organizational participation

Categories	Score
No Participation	0
Low participation	1
Medium participation	2
High participation	>2

3.6.2.2 Measurement of Dependent Variable

Vegetables consumption behavior was the dependent for the present variables. Vegetables consumption behavior was determined based on the knowledge, attitude and practice (quantity of vegetables of a farm family consumed every day).

3.6.2.2.1 The Knowledge level of the respondents about the nutritional aspect of vegetables consumption

To test the nutritional knowledge of the respondents a number of 14 questions were included in the interview schedule (Appendix A) and a score of 2 was assigned to each of the questions. Full marks were given to appropriate answer and partial score was given for partially correct answer whereas 0 score was given to wrong or no answer. Knowledge score could range from 0 to 28 where 0 indicated no knowledge while 28 indicated high knowledge (question no. 11 of the interview schedule, Appendix A). Based on Knowledge score, the respondents were grouped into three categories as shown in Table 3.11.

3.6.2.2.2 Attitude of the respondents towards the vegetable consumption

To determine the attitude of respondents about vegetables consumption a number of 20 statements were included in the interview schedule under item 12 (Appendix A). Each of the respondents was assigned to express his/her opinion about the 20 statements as either strongly agreed, agreed, undecided, disagreed and strongly disagreed. And a score of 5, 3, 2 and 1 were assigned against the daily scale respectively. The attitude scale of the respondents was determined/calculated by adding all the scores against the 20 statements. The attitudes of a respondent could range from 20 to 100 where 20 indicate highly unfavorable attitude 100 indicate very highly favorable attitudes (question no. 12 of the interview schedule, Appendix A). Based on attitudes score, the respondents were grouped into three categories in Table 3.11.

3.6.2.2.3 Vegetables intake (consumption) of the respondents of the rural farm families

A separate sheet regarding the intake (consumption) of the vegetables was supplied to each of the respondents. The respondents were requested to mention the amount of vegetables taken by their family members in a month (4weeks). The average amount of vegetables taken by a person per day was determined (question no. 13 of the interview schedule, Appendix A).

Based on the vegetables intake score, the respondents were singed into different categories following Lambert (2003) classification method as shown in Table 3.11

Table no. 3.11 Categorizes of the respondent's based on knowledge, attitude and Practice/consumption:

Aspect	Categories	Score
Knowledge	Low knowledge	0 upto 10
	Medium knowledge	16-20
	High knowledge	>20
Attitude	very unfavorable attitude	Up to 20
	Unfavorable attitude	21-40
	Neutral attitude	41-60
	Favorable attitude	61-80
	Highly favorable attitude	81-100
Practice/ vegetables intake(consumption) (g/day/person) Lambert(2003)	Low consumption of vegetables	<235
	Medium consumption of vegetables	235
	High consumption of vegetables	>235

3.6.2.3 Measurement of vegetables consumption behavior depends on the respondents (Dependent variable)

The vegetables consumption behavior (VCB) of respondent was determined based on the combined effect of Knowledge, Attitude and vegetables intake (consumption) of the respondents. The respondent's vegetables consumption behavior (VCB) score was determined by following Ahmed and Ali (1993). For this purpose, the respondent was assigned a score either 1 (if the obtained score of a respondents is below the mean score in a particular aspect) or 2 (if the obtained score of a respondents is above the mean score in a particular aspect). In this way, a respondent assumed combined score vegetables consumption behavior (VCB) ranging from 3(1+1+1) to 6 (2+2+2). The possible obtained scored were 3(1+1+1), 4 ((1+1+2), 4 (1+2+1), 4 (2+1+1), 5 (1+2+2), 5 (2+2+1), 5 (2+1+2) and 6 (2+2+2). Based on obtaining combined score, the respondents were grouped into 3 categories as shown in Table 3.12

Table no. 3.12 Categories of the respondents based on their vegetables consumption behavior

categories	Score
Low consumption behavior	3
Medium consumption behavior	4-5
High consumption behavior	6

The characteristics of the groups/ categories of the respondents based VCB (vegetables consumption behavior) was:

Low consumption Behavior:

Low knowledge+ low favorable attitude+ low consumption (1+1+1=3)

Medium consumption Behavior:

Low knowledge+ low favorable attitude+ high consumption (1+1+2=4)

Low knowledge+ high favorable attitude+ low consumption (1+2+1=4)

High knowledge+ less favorable attitude+ low consumption (2+1+1=4)

Low knowledge+ high favorable attitude+ high consumption (1+2+2=5)

High knowledge+ high favorable attitude+ low consumption (2+2+1=5)

High consumption Behavior:

High knowledge+ high favorable attitude+ high consumption (2+2+2=6)

3.7 Compilation of Data

After completion of field survey all the data of the interview schedule were compiled. Local units were converted into standard unit. Appropriate coding and scoring technique were followed to convert the qualitative data into quantitative forms. The responses of the individual respondent contained in the interview schedules were transferred to a master sheet for entering the data in the computer. As soon as the data entered into the computer, it was then analyzed in accordance with the objectives of the study.

3.8 Statistical Analysis

Statistical measure such as number, percentage, minimum-maximum, rank order etc. Mean and standard deviation were used in describing the independent and dependent variables of the study. Collected data was coded, complied, tabulated and analyzed according to the purpose of the study. To explore the relationship between any two variables person's product moments correlation "r", spearman rank order correlation (rho) was employed. For analysis of data statistical package for social science (SPSS) version 20 was used.



CHAPTER IV

RESULTS AND DISCUSSION

Data were collected from the respondents (rural farm families) and were carefully accomplished, coded, computed, tabulated and analyzed in accordance with the objectives of the study. After completion of those processes this chapter was written carefully. The findings of the study and logical interpretations of the results have been presented in this chapter. This chapter is divided into three sections. The first section deals with the independent variables (selected characteristics of the rural farm families) have been discussed and in the second section, the dependent variable (vegetables consumption behavior) of the study have been discussed. In the third section, the relationships between the selected characteristics of the rural farm families and their vegetables consumption.

4.1 Selected Characteristics of the respondents

Thirteen characteristics of the rural farm families were selected to find out their relationship with the vegetables consumption behavior. The selected characteristics included age, level of education, family size, farm size, income of the respondents, farming experience, innovativeness, extension media contact, organizational participation, training, knowledge and attitude of the respondents, towards the vegetables consumption behavior. These characteristics of the respondents are described in this section.

4.1.1 Age

The age of the respondents ranged from 24 to 70 years, with a mean of 43.31 years and the standard deviation of 13.18. The distribution of the respondents according to their age categories is shown in Table 4.1.

Table 4.1 Distribution of respondents according to their age

Categories	Scores (Years)	Respondents(N=80)		Range		Mean	SD
		Number	Percentage	Min	Max		
Young	≤35	26	32.5				
Middle aged	36-50	31	38.8	20	75	43.31	13.18
Old aged	>50	23	28.7				
Total		80	100				

Data presented in Table 4.1 indicated that highest proportion (38.8 percent) of the respondents fell in the middle-aged category compared to young aged (32.5percent) and old aged (28.7percent). It was also found that middle aged respondents were not more interested in vegetable consumption.

The old people are more conscious about vegetables consumption than the young and middle aged people so, they have positive attitude towards the vegetables intake. This finding is similar with Dzadey (2009), Neumark- Sztainer et al. (1996). But dissimilar with Redimar (1990), he found more percentage of young people than the old and middle aged people.

4.1.2 Farming experience

The score related to farming experience of the respondents ranged from 6.00- 45 years with a mean of 18.01 years and standard deviation of 9.99. The distribution of the respondents according to their farming experience categories is shown in Table 4.2.

Table 4.2 Distribution of the respondents according to their farming experience score is presented in.

Categories	Scores	Respondents (N=80)		Range		Mean	SD
		Number	Percentage	Min	Max		
Low	1-15	39	48.8				
Medium	16-30	34	42.5	3	45	18.01	9.99
High	>30	7	8.7				
Total		80	100				

Data presented in Table 4.2 indicate that the highest proportion (48.8 percent) of the respondents had low experience followed by medium experience (42.5 percent) and high experience (8.7 percent) in farming activities. The findings of the study indicate that the majority (91.3 percent) of the respondents possessed either low to medium farming experience. This finding suggested that, it was very much clear that most of them had fewer to medium farming experience.

4.1.3 Level of Education

The level of education score of the respondents ranged from 0-16, with a mean of 8.17 and standard deviation of 4.13. The distribution of the respondents according to their level of education categories is shown in Table 4.3.

Table 4.3 Distribution of respondents according to their education

Categories	Score (Years of schooling)	Respondents (N=80)		Range		Mean	SD
		Number	Percentage	Min	Max		
Illiterate	0	3	3.8				
Primary	1-5	20	25				
Secondary	6-10	39	48.8	0	16	8.17	4.13
Higher secondary	11-12	8	10.0				
Above Higher secondary	≥13	10	12.4				
Total		80	100				

From Table 4.2 the data determine that about (48.8 percent) of the respondents belonged to the secondary level of education category while (25 percent), (10.0 percent), (12.4 percent) of the respondents belonged to primary level, above higher secondary, secondary level categories respectively. Only a few (3.8 percent) of them were illiterate. The literacy rate of the study area (96.2 percent) was higher than that of the rational literacy (75 percent) (BBS, 2021)

Education develops mental and psychological ability of average person to understand the necessity of the vegetables consumption. The findings also indicate that most of (80 percent) the respondents belong to primary level to secondary level of education.

4.1.4 Family Size

Family size is ranged from 3-10, with a mean of 6.21 and standard deviation of 4.06. The distribution of the respondents according to their family size is shown in Table 4.4.

4.4 Distribution of respondents according to their family size

Categories	Scores (Number)	Respondents (N=80)		Range		Mean	SD
		Number	Percentage	Min	Max		
Small size family	1-4	17	21.3				
Medium size family	5-6	25	31.3	3	10	6.21	1.06
Large size family	≥ 7	38	47.4				
Total		80	100				

Data Table 4.4 demonstrate that higher proportion (47.4 percent) of the respondents belonged to the large size family whereas (31.3 percent) and (21.3 percent) of the respondents belonged to medium and small size family respectively. The average family size of the study area (6.21 percent) is higher than that of national average (21.2 percent; BBS 2021).

4.1.5 Farm Size

The observed farm size scores of the respondents varied from 0.02 hectare to 3.32 hectares. The average farm size was 0.621 hectares and the standard deviation was .45177. The distribution of the respondents according to their farm size categories is shown in Table 4.5

Table 4.5 Distribution of respondents according to farm size

Categories	Score (ha)	Respondents (N=80)		Range		Mean	SD
		Number	Percentage	Min	Max		
Landless	<0.02	1	1.3				
Marginal	0.02-0.20	10	12.5				
Small	0.21-1.00	62	77.5	0.01	3.12	0.621	.45177
Medium	1.01-3.00	6	7.4				
Large	>3.00	1	1.3				
Total		80	100				

The findings revealed that above three-fourth (77.5 percent) of the respondents possessed small farm size while (12.5 percent) and (7.4 percent) having marginal and medium farm respectively and similar percent (1.3) of them were under large farm and were landless. Based on the observed information, it was very much clear that most of them had fewer to medium amounts of land holdings. Average lands of the study area (0.45 ha) is higher/larger than that of the national average (0.28 ha; BBS 2021)

This finding is similar with VijayalaxmiKhed and Saravanakumarb et al. (2018) and Islam (1993).but dissimilar with Haile *et al.*,(2005), he found (about 38 percent) of the respondents of his study area had large farm.

4.1.6 Total Annual Income

Annual income of the respondents ranged from 50000 BDT to 370000 BDT with a mean of 157930 BDT and standard deviation 66195. The distribution of the respondents according to their annual income categories is shown in Table 4.6

Table 4.6 Distribution of respondents according to their annual income

Categories	Scores (‘000 BDT)	Respondents (N=80)		Range		Mean	SD
		Number	Percentage	Min	Max		
Low income	≤ 150	40	50				
Medium income	151-300	38	47.5	50	350	157.93	66.195
High income	>300	2	2.5				
Total		80	100				

Data suggested in Table 4.6 that the half of the respondent's (50 percent) belonged to low income category whereas (47.5 percent) belonged to medium income and (2.5 percent) of the respondents belonged to high income (>300000 BDT) category. As a result, the most (95.5 percent) of the respondents in the study area were low to medium income earners. This might be due to the fact that the respondents in the study area were not only engaged in agriculture but also earn from other sources, such as service, business etc. the rural people of Bangladesh cannot eat adequate amount of vegetables and fruits because of low income and large family size.

This finding is similar with Jacob (2009), Babatunde et al, (2007) and Mahzabin (2011). They also found more low income respondents than the high and medium income respondents in their finding respectively.

4.1.7 Training exposure

The observed training exposure score of the respondents ranged from 0 to 3 with mean of 1.06 and standard deviation of 0.87. The distribution of the respondents according to organizational participation categories is presented in Table 4.7.

Table 4.7 Distribution of respondents according to Training

Categories	Scores	Respondents (N=80)		Range		Mean	SD
		Number	Percentage	Min	Max		
No	0	24	30.0				
Low	1	31	38.7				
Medium	2	21	26.3	0	3	1.06	.87
High	≥ 3	4	5.00				
Total		80	100				

Data contained in Table 4.7 indicate that highest proportion (38.7 percent) of the respondents had low training whereas (30.0 percent) of respondents belonged to the no training and (26.30 percent) had medium training. On the other hand, (5 percent) of the respondents had high training exposure. According to DAE (1999), training have a positive effect with increasing the knowledge of the respondents.

4.1.8 Innovativeness

The score ranged for innovativeness was 1-5 with the mean of the respondents. The distribution of the respondents according to their farming experience categories is shown in Table 4.8.

Table 4.8 Distribution of respondents according to their innovativeness

Innovativeness	Frequency	Percent
Laggard	5	6.3
Late majority	10	12.4
Early majority	26	32.5
Early adaptor	34	42.5
Innovators	5	6.3
Total	80	100.0

The results presented in Table 4.8 depict that highest proportion of (42.5 percent) and about one-third (32.5 percent) of the respondents belonged to early adopter and early majority categories respectively while similar proportion (6.3 percent) of them were innovators and laggard. About one-eighth (12.4 percent) were late majority. The farmers of the study area are more innovators than that of Rogers (1983). He stated that (2.5 percent) and (13.5 percent) were innovators and early adopter where as in this study innovators and early adopter were (6.3 percent) and (42.4 percent) respectively which is 3 times (16.0 percent and 48.7 percent) more than that of Rogers (1983) study.

The laggard respondents opined that they received agricultural information from their peer groups, while the others used interpersonal, group and mass media sources of information for getting agricultural information. The innovativeness also refers to proneness of an individual to understand the health benefit from the vegetables consumption.

4.1.9 Extension Media Contact

The observed extension contacts scores of the respondents ranged from 3-29 having an average of 19.97 with a standard deviation of 7.04. The distribution of respondents according to their extension media contact categories is shown in Table 4.9.

Table 4.9 Distribution of respondents according to their extension media contacts

Categories	Scores	Respondents (N=80)		Range		Mean	SD
		Number	Percentage	Min	Max		
Low	1-12	16	20.0				
Medium	13-24	39	48.7	7	36	19.97	7.04
High	>24	25	31.3				
Total		80	100				

The results presented in Table 4.8 depict about half/highest proportion (48.7 percent) of the respondents belonged to medium extension contact category to (20.0 percent) and (31.3 percent) on belonged to low and high extension contact categories respectively. Thus, it can be concluded that most (80.00 percent) of the respondents were getting help from the extension workers or they were aware of the services provided by different extension agencies.

This finding is similar with Kate Eshleman (2001). He also found that extension media contact (television, internet) had an effect on healthy life style.

4.1.10 Organizational participation

The observed organizational participation score of the respondents ranged from 0 to 4 with a mean of 1.11 and standard deviation of 1.56. The distribution of the respondents according to organizational participation categories is presented in Table 4.10.

Table 4.10 Distribution of the respondents according to their organizational participation

Categories	Scores	Respondents(N=80)		Range		Mean	SD
		Number	Percentage	Min	Max		
No	0	42	52.5				
Low	1	18	22.5				
Medium	2	6	7.5	0	5.00	1.11	1.56
High	>2	14	17.5				
Total		80	100				

Data contained in Table 4.10 revealed that more than majority (52.5 percent) of the respondents belonged to no organizational participation and on the other hand, (22.5 percent), (17.5 percent) and (7.5 percent) of the respondents belonged to low, high and medium organizational participation respectively. Being busy with their daily activities or other works, it obviously that they don't have enough time to participate in different organization. Organizational participation was very much important for self-actualization as well as to together knowledge.

4.2 vegetables consumption behavior

The vegetables consumption behavior of the respondents was determined by combining the uses regard knowledge, attitude and intake/consumption of vegetables which are described in the methodology chapter.

4.2.1 Knowledge

Knowledge score of the respondents ranged from 5 to 28 with a mean of 16.9 and standard deviation of 6.38. The distribution of respondents according to their knowledge categories is shown in Table 4.11

Table 4.11 Distribution of respondents according to Knowledge

Categories	Scores	Respondents (N=80)		Range		Mean	SD
		Number	Percentage	Min	Max		
Low	1-10	18	22.5				
Medium	11-20	48	60.0	5	28	16.9	6.38
High	>21	14	17.5				
Total		80	100				

Data show that majority of three-fifth (60.0 percent) of the respondents had medium nutritional knowledge about vegetables and 22.5 percent and (17.5 percent) had high nutritional knowledge respectively about vegetables because they spent their most of the time to perform the different categories of crop and vegetables cultivation. Consequently they have some knowledge about nutritional status of the vegetables consumption. The respondents of the present study has disagreement with the finding of Preya et al (2019), they found that most (82.5%) of the students had higher knowledge regarding nutrients of vegetables.

4.2.2 Attitude of respondents towards the vegetables consumption (intake)

The attitude score of the respondents ranged from 34 to 95 with a mean of 63.31 and standard deviation of 21.92. The distribution of respondents (respondents) according to their attitude is shown in Table 4.12.

Table 4.12 Distribution of respondents according to their Attitude towards the vegetables consumption (intake)

Categories	Scores	Respondents (N=80)		Range		Mean	SD
		Number	Percentage	Min	Max		
Very Unfavorable Attitude	1-20	0	0				
Unfavorable Attitude	21-40	18	22.5				
Neutral Attitude	41-60	23	28.7	27	97	63.31	21.92
Favorable Attitude	61-80	15	18.8				
Highly Favorable Attitude	81-100	24	30				
Total		80	100				

The data contained in the Table. 4.12 indicate that highest proportion (30 percent) of the respondents had highly favorable attitude towards the vegetables consumption followed by neutral attitude (28.7 percent) and favorable attitude ((18.8 percent). However a good percentage of the respondents showed unfavorable attitude towards vegetable consumption. None of the respondents had very unfavorable attitude towards the vegetables consumption. Brug et al (2004) and Moira Gundu (2009) also found most of the respondents had highly favorable attitude towards vegetables and fruit consumption.

4.2.3 Vegetables consumption (intake) by the rural farm families

The vegetables consumption intake of the respondents ranged from 112.71 to 250.63 g/day/person with mean 203.18 and stander deviation of 44.32 respectively. According to the vegetables consumption behavior the respondents were distributed into 3 categories as shown in table 4.13

Table 4.13 Distribution of the respondents according to their vegetables consumption (intake)

Categories	Scores	Respondents (N=80)		Range		Mean	SD
		Number	Percentage	Min	Max		
Low consumption	<235	44	55				
Recommended consumption	235	5	6.3	112.7	272.57	203.18	44.32
High consumption	>235	31	38.7				
Total		80	100				

Data presented in Table 4.13 showed that majority (55 percent) of the respondents consumed lower amount of vegetables. On the other hand, about (6.3 percent) and (38.7 percent) of the respondents had consumed recommended and higher the more recommended amount of vegetables. Now a day's people consumed more amount of animal protein than the vegetables. It has been estimated that per head consumption of vegetables in Bangladesh is about 26.5, 25.5 and 26 kg per year, which is much lower than that our neighboring countries (like India, Thailand, china, japan; BBS, 2018). Such a low rate of vegetable consumption in Bangladesh is particularly due to the traditional rice-based food habit of the people and high price of vegetables in the country and low production rate of the vegetables. Preya et al (2019) found that the students of Khulna University of Bangladesh consumed on an average and about 128.25 g vegetables per day per student which is lower than that of the finding of the present study.

4.3 vegetables consumption behavior of the rural farm families

The vegetables consumption behavior of the respondents was determined by considering the score of the respondents on knowledge, attitude and intake (consumption) of vegetables. The vegetables consumption behavior score of the respondents ranged from 3-6 with mean 4.59 and Standard deviation of 1.21 respectively. The distribution of the respondents according to their vegetables consumption behavior categories is shown in Table 4.14

4.14 Categories of the respondents based on their vegetables consumption behavior

Categories	Scores	Respondents (N=80)		Range		Mean	SD
		Number	Percent age	Min	Max		
Low consumption behavior	3	22	27.5	3	6	4.59	1.218
Medium consumption behavior	4-5	31	38.7				
High consumption behavior	6	27	33.8				
Total		80	100				

Data presented in the Table 4.15 indicate that highest proportion (38.7 percent) of the respondents showed medium vegetables consumption behavior where (33.8 percent) and (27.5 percent) of them showed high and low vegetables consumption behavior.

4.4 Relationships between the Selected Characteristics (independent variables) of the respondents and Their Vegetable Consumption behavior (dependent Variable)

In this chapter the relationships between the selected characteristics of the respondents (independent variables) and their vegetable consumption behavior (dependent/ focus variable) are presented. The selected thirteen characteristics include age, farming experience, education, family size, farm size, family income, training, innovativeness, extension contact, Organizational participation, knowledge, attitude and food intake.

Person's Product Moment Co-efficient of Correlation (r) and Spearman's Ranked Correlation Coefficient (ρ) have been used to test the hypothesis concerning the relationship between two variables. Five percent and one percent level of probability were used as the basis for rejection and acceptance of a hypothesis. The tabulated value of ' r ' and " ρ " were calculated at $(80-2) = 78$ degrees of freedom. The summary of the results of the co-efficient of correlation indicating the relationships between the selected characteristics of the respondents and their vegetables consumption behavior shown in Table 4.15

Table 4.15 Relationship between the selected characteristics of the respondents and their vegetables consumption behavior

Characteristics(Independent variables)	Dependent variable	Correlation coefficient	
		Pearson (r)	Spearman(ρ)
1. Age	Vegetables consumption behavior	-0.141^{NS}	-0.110^{NS}
2. Farming experience		0.038^{NS}	0.028^{NS}
3. Education		0.654^{**}	0.681^{**}
4. Family Size		0.279[*]	0.303^{**}
5. Farm size		-0.008^{NS}	0.076^{NS}
6. Family income		0.135^{NS}	0.171^{NS}
7. Training		-0.011^{NS}	0.025^{NS}
8. Innovativeness		0.220[*]	0.241[*]
9. Extension media contact		0.683^{**}	0.683^{**}
10. Organizational participation		0.382^{**}	0.305^{**}
11. Knowledge		0.788^{**}	0.771^{**}
12. Attitude		0.833^{**}	0.775^{**}
13. vegetables intake		0.569^{**}	0.642^{**}

NS= Non-significant **. Correlation is significant at the 0.01 level (2-tailed) * Correlation is significant at the 0.05 level (2-tailed)

4.4.1 Age and the vegetable consumption behavior by the rural farm families

The null hypothesis (H_0) stated in this regard was "There is no relationship between level of age of the respondents and their vegetables consumption behavior." The computed value of the coefficient of correlation between level of age the respondents and their vegetables consumption behavior was found to be $r = -0.141^{NS}$ and $\rho = -0.110^{NS}$ as shown at table 4.3. The following observations were made regarding the relationship between two variables based on the variables on the correlation values.

- a) The relationship showed a negative trend.
- b) A negligible relationship was found to exist between the two variables
- c) The computed value of $r = -0.141^{NS}$ and $p = -0.110^{NS}$ were found to be smaller than the tabulated value $r = \pm 0.219$ and $p = \pm 0.223$ with 78 degrees of freedom at 0.05 level of probability.

Thus, the null hypothesis was accepted, it can be said that ages of the respondents' and their vegetables consumption behavior have no relationship with each other. This study is similar with Dzadey (2009) and Preya et al (2019). They also found insignificant relationship between the age of the respondents and their vegetables consumption behavior.

4.4.2 Farming Experience and the vegetable consumption behavior by the rural farm families

The null hypothesis (H_0) stated in this regard was "There is no relationship between farming experience of the respondents and their vegetables consumption behavior." The computed value of the co-efficient of correlation between farming experience of the respondents and their vegetables consumption behavior was found to be $r = 0.038^{NS}$ and $p = 0.028^{NS}$ as shown at table 4.3. The following observations were made regarding the relationship between two variables based on the variables on the correlation values

- a) The relationship showed a negative trend.
- b) A negligible relationship was found to exist between the two variables
- c) The computed value of $r = 0.038^{NS}$ and $p = 0.028^{NS}$ were found to be smaller than the tabulated value $r = \pm 0.219$ and $p = \pm 0.223$ with 78 degrees of freedom at 0.05 level of probability.

Thus, the null hypothesis was accepted, it can be said that farming experience of the respondents' and their vegetables consumption behavior have no relationship with each other.

4.4.3 Level of Education and the vegetable consumption behavior by the rural farm families

The null hypothesis (H_0) stated in this regard was “There is no relationship between level of education of the farmers and their vegetables consumption behavior.” The computed value of the co-efficient of correlation between level of education of the respondents and their vegetables consumption behavior was found to $r = 0.654^{**}$ and $p = 0.681^{**}$ as shown at table 4.16. The following observations were made regarding the relationship between two variables based on the variables on the correlation values.

- a) The relationship showed a positive trend.
- b) A highly relationship was found to exist between the two variables
- c) The computed value of $r = 0.654^{**}$ and $p = 0.681^{**}$ were found to be higher than the tabulated value $r = \pm 0.287$ and $p = \pm 0.291$ with 78 degrees of freedom at 0.01 level of probability.

Thus, the null hypothesis was rejected, it can be said that level of education of the respondents' and their vegetables consumption behavior have significant relationship with each other. Education of the respondents showed positive relationship with vegetables consumption behavior. This finding is similar with Haile *et al.* (2005) and Diez Roux (1999). They also found education had a significant relationship with vegetable consumption behavior.

4.4.4 Family Size and the vegetable consumption behavior by the rural farm families

The Hypothesis stated in this regard was “There is no relationship between family size of respondents and their vegetables consumption behavior.” The computed value of the co-efficient of correlation between family size of the respondents and their vegetables consumption behavior was found to be $r = 0.279^*$ and $p = 0.303^{**}$ as shown at table 4.3. The following observations were made regarding the relationship between two variables based on the variables on the correlation values.

- a) The relationship showed a positive trend.
- b) A highly relationship was found to exist between the two variables.

- c) The computed value of $r = 0.279^*$ and $p = 0.303^{**}$ were found to be larger than the tabulated value $r = \pm 0.219$ and $p = \pm 0.223$ with 78 degrees of freedom at 0.05 level and 0.01 level of probability.

Based on the findings, the null hypothesis was rejected and it can be said that family size of the respondents' and their vegetables consumption behavior were dependent on each other. This means the increase of the family size of the respondents, the vegetables consumption behavior is increased, if they are health conscious. Haile et al. (2005) and Maharjan and Khatri-Clthetri (2006) were also found similar result. They found that family members influenced the vegetable consumption.

4.4.5 Farm size and the vegetable consumption behavior by the rural farm families

The null hypothesis (H_0) stated in this regard was "There is no relationship between level of farm size of the respondents and their vegetables consumption behavior." The computed value of the co-efficient of correlation between level of farm size of the respondents and their vegetables consumption behavior was found to be $r = -0.008^{NS}$ and $p = 0.076^{NS}$ as shown at table 4.3. The following observations were made regarding the relationship between two variables based on the variables on the correlation values.

- a) The relationship showed a negative trend.
- b) A negligible relationship was found to exist between the two variables
- c) The computed value of $r = -0.008^{NS}$ and $p = 0.076^{NS}$ were found to be smaller than the tabulated value $r = \pm 0.219$ and $p = \pm 0.223$ with 78 degrees of freedom at 0.05 level of probability

Thus, the null hypothesis was accepted, it can be said that farm size of the respondents and their vegetables consumption behavior has no relationship with each other. VijayalaxmiKhed and Saravanakumarb et al. (2018) also found similar result. They found famers who had large farm were more interested in rice base cultivation and also taken less amount of vegetables in their daily diet.

4.4.6 Annual Income and the vegetable consumption behavior by the rural farm families

The null hypothesis (H_0) stated in this regard was "There is no relationship between annual income of the respondents and their vegetables consumption behavior." The computed value of the co-efficient of correlation between annual income of the respondents and their vegetables consumption behavior was found to be $r = 0.135^{NS}$ and $p = 0.171^{NS}$ as shown at table 4.3. The following observations were made regarding the relationship between two variables based on the variables on the correlation values.

- a) The relationship showed a negative trend.
- b) A negligible relationship was found to exist between the two variables
- d) The computed value of $r = 0.135^{NS}$ and $p = 0.171^{NS}$ were found to be smaller than the tabulated value $r = \pm 0.219$ and $p = \pm 0.223$ with 78 degrees of freedom at 0.05 level of probability

Thus, the null hypothesis was accepted, so it can be said that annual income of the respondents and their vegetables consumption behavior was negatively correlate with each other. This means that annual income of the respondents and their vegetables consumption behavior is not related with each other. So the variables were independent of each other. This finding is dissimilar with Jacob (2009), Babatunde et al, (2007). They found that higher income families consumed more amount of fruits and vegetables than the lower income families.



4.4.7 Training and the vegetable consumption behavior by the rural farm families

The null hypothesis (H_0) stated in this regard was "There is no relationship between training of the respondents and their vegetables consumption behavior." The computed value of the co-efficient of correlation between training of the respondents and their vegetables consumption behavior was found to be $r = -0.011^{NS}$ and $\rho = 0.025^{NS}$ as shown at table 4.3. The following observations were made regarding the relationship between two variables based on the variables on the correlation values.

- a) The relationship showed a negative trend.
- b) A negligible relationship was found to exist between the two variables
- c) The computed value of $r = -0.011^{NS}$ and $\rho = 0.025^{NS}$ was found to be smaller than the tabulated value $r = \pm 0.219$ and $\rho = \pm 0.223$ with 78 degrees of freedom at 0.05 level of probability. Hence, the null hypothesis was accepted and it can be said that training of the respondents and their vegetables consumption behavior was negatively correlate with each other.

4.4.8 Innovativeness and the vegetable consumption behavior by the rural farm families

The null hypothesis (H_0) stated in this regard was "There is no relationship between the innovativeness of the respondents and their vegetables consumption behavior." The computed value of the co-efficient of correlation between the innovativeness of the respondents and their vegetables consumption behavior was found to be $r = 0.220^{**}$ and $\rho = 0.214^*$ as shown at table 4.3. The following observations were made regarding the relationship between two variables based on the variables on the correlation values.

- a) The relationship showed a positive trend.
- b) A high relationship was found to exist between the two variables
- c) The computed value of $r = 0.220^{**}$ and $\rho = 0.214^*$ was found to be larger than the tabulated value $r = \pm 0.219$ and $\rho = \pm 0.223$ with 78 degrees of freedom at 0.05 level of and 0.01 level of probability.

Thus, the null hypothesis was rejected which express that existing relationship between the concerned variables indicated that positive correlation with each other where with the increase of innovativeness the vegetables consumption behavior increase.

4.4.9 Extension media Contact and the vegetable consumption behavior by the rural farm families

The null hypothesis (H_0) stated in this regard was "There is no relationship between the media contact of the respondents and their vegetables consumption behavior." The computed value of the co-efficient of correlation between the media contact of the respondents and their vegetables consumption behavior was found to be $r = 0.683^{**}$ and $p = 0.683^{**}$ shown at table 4.3. The following observations were made regarding the relationship between two variables based on the variables on the correlation values.

- a) The relationship showed a positive trend.
- b) A highly relationship was found to exist between the two variables
- c) The computed value of $r = 0.683^{**}$ and $p = 0.683^{**}$ was found to be larger than the tabulated value $r = \pm 0.287$ and $p = \pm 0.291$ with 78 degrees of freedom at 0.01 level of probability

Hence, the null hypothesis was rejected and it can be said that the media contact of the respondents and their vegetables consumption behavior was positively correlate with each other.

Kate Eshleman (2001) also found similar result.

4.4.10 Organizational Participation and the vegetable consumption behavior by the rural farm families

The null hypothesis (H_0) stated in this regard was "There is no relationship between the media contact of the respondents and their vegetables consumption behavior." The computed value of the co-efficient of correlation between the media contact of the respondents and their vegetables consumption behavior was found to be $r = 0.382^{**}$ and $p = 0.305^{**}$ as shown at table 4.3. The following observations were made regarding the relationship between two variables based on the variables on the correlation values.

- a) The relationship showed a positive trend.
- b) A highly relationship was found to exist between the two variables
- c) The computed value of $r = 0.382^{**}$ and $p = 0.305^{**}$ was found to be larger than the tabulated value $r = \pm 0.287$ and $p = \pm 0.291$ with 78 degrees of freedom at 0.01 level of probability.

Hence, the null hypothesis was rejected and it can be said that the organizational participation of the respondents and their vegetables consumption behavior was significantly correlate with each other. So, the vegetables consumption behavior depend on the organizational participation.

4.4.11 knowledge and the vegetable consumption behavior by the rural farm families

The null hypothesis (H_0) stated in this regard was "There is no relationship between the knowledge of the respondents and their vegetables consumption behavior." The computed value of the co-efficient of correlation between the knowledge of the respondents and their vegetables consumption behavior was found to be $r = 0.788^{**}$ and $p = 0.771^{**}$ as shown at table 4.3. The following observations were made regarding the relationship between two variables based on the variables on the correlation values.

- a) The relationship showed a positive trend.
- b) A highly relationship was found to exist between the two variables

- c) The computed value of $r = 0.788^{**}$ and $p = 0.771^{**}$ was found to be higher than the tabulated value $r = \pm 0.287$ and $p = \pm 0.291$ with 78 degrees of freedom at 0.01 level of probability.

Hence, the null hypothesis was rejected and it can be said that the knowledge of the respondents and their vegetables consumption behavior was positively correlate with each other. So, the vegetables consumption behavior depend on the knowledge of the respondents. Preya et al (2019) also found the similar result, they found a significant relationship of the students and knowledge regarding nutrients of vegetables.

4.4.12 Attitude and the vegetable consumption behavior by the rural farm families

The null hypothesis (H_0) stated in this regard was "There is no relationship between the attitude of the respondents and their vegetables consumption behavior." The computed value of the coefficient of correlation between the knowledge of the respondents and their vegetables consumption behavior was found to be $r = 0.833^{**}$ and $p = 0.775^{**}$ as shown at table 4.3. The following observations were made regarding the relationship between two variables based on the variables on the correlation values.

- d) The relationship showed a positive trend.
- e) A highly relationship was found to exist between the two variables
- f) The computed value of $r = 0.833^{**}$ and $p = 0.775^{**}$ was found to be larger than the tabulated value $r = \pm 0.287$ and $p = \pm 0.291$ with 78 degrees of freedom at 0.01 level of probability.

Hence, the null hypothesis was rejected and it can be said that the attitude of the respondents and their vegetables consumption behavior was positively correlate with each other. So, the vegetables consumption behavior depend on the attitude of the respondents.

4.4.13 Vegetables intake and the vegetable consumption behavior by the rural farm families

The null hypothesis (H_0) stated in this regard was "There is no relationship between the vegetables intake of the respondents and their vegetables consumption behavior." The computed value of the co-efficient of correlation between the food intake of the respondents and their vegetables consumption behavior was found to be $r = 0.569^{**}$ and $p = 0.642^{**}$ as shown at table 4.3. The following observations were made regarding the relationship between two variables based on the variables on the correlation values.

- a) The relationship showed a positive trend.
- b) A highly relationship was found to exist between the two variables
- c) The computed value of $r = 0.569^{**}$ and $p = 0.642^{**}$ was found to be larger than the tabulated value $r = \pm 0.287$ and $p = \pm 0.291$ with 78 degrees of freedom at 0.01 level of probability.

Hence, the null hypothesis was rejected and it can be said that the vegetables intake of the respondents and their vegetables consumption behavior was positively correlate with each other. So, the vegetables consumption behavior depend on the vegetables intake of the respondents.

CHAPTER V

SUMMARY OF FINDINGS, CONCLUSIONS AND RECOMMENDATIONS

This chapter presents the summary of findings, conclusions and recommendations of the study.

5.1 Summary

We know that Bangladesh is rural dominated agrarian country of the South Asia and is an overpopulated country. So the food shortages and malnutrition have become general problems in our country. Vegetables are considered as an indispensable part of the daily diet of human. Vegetables are full of essential vitamins, minerals, fiber and antioxidants that provide many important health benefits to our body, but it contributes a very little portion of our total food intake because of shortage of supply and health unawareness. Present study was undertaken to identify vegetables consumption behavior of the rural farm families of two villages (Rajapur and Deyara) of Rupshaupazila under Khulna district. Data were collected from 80 respondents through an interview schedule during April-May, 2021. A summary of the major findings is given in the subsequent section.

5.2 Selected Characteristics of the respondents

Highest proportion (38.8 percent) of the respondents fell in the middle-aged category compared to young aged (32.5percent) and old aged (28.7percent).

The highest proportion (48.8 percent) of the respondents had low experience followed by medium experience (42.5 percent) and high experience (8.7 percent) in farming activities.

Majority (48.8 percent) of the respondents belong to the secondary level of education category while (25 percent), (10.0 percent), (12.4 percent) of the respondents belong to primary level, above higher secondary, secondary level categories respectively. Only a few (3.8 percent) of them were illiterate

The higher proportion (47.4 percent) of the respondents belong to the large size family whereas (31.3 percent) and (21.3 percent) of the respondents belonged to medium and small size family respectively.

Above three-fourth (77.5 percent) of the respondents possessed small farm size while 12.5 percent and 7.4 percent having marginal and medium farm respectively and similar percent (1.3) of them were under large farm and were landless.

The half of the respondent's (50 percent) belonged to low income category whereas (47.5 percent) belonged to medium income and (2.5 percent) of the respondents belonged to high income (>300000 BDT) category.

The highest proportion (38.7 percent) of the respondents had low training whereas (30.0 percent) of respondents belonged to the no training and (26.30 percent) had medium training. On the other hand, 5 percent of the respondents had high training exposure.

The highest proportion of (42.5 percent) and about one-third (32.5 percent) of the respondents belonged to early adopter and early majority categories respectively while similar proportion (6.3 percent) of them were innovators and laggard. About one-eighth (12.4 percent) were late majority.

About half/highest proportion (48.7 percent) of the respondents belonged to medium extension contact category to (20.0 percent) and (31.3 percent) on belong to low and high extension contact categories respectively.

Majority (52.5 percent) of the respondents belonged to no organizational participation and on the other hand, (22.5 percent), (17.5 percent) and (7.5 percent) of the respondents belonged to low, high and medium organizational participation respectively.

Majority of three-fifth (60.0 percent) of the respondents had medium nutritional knowledge about vegetables and 22.5 percent and (17.5 percent) had high nutritional knowledge respectively about vegetables.

Most (30 percent) of the respondents had highly favorable attitude towards the vegetables consumption where (28.7 percent) of the respondents had neutral attitude followed by (18.8 percent) of the respondents had favorable attitude respectively.

Majority (55 percent) of the respondents consumed lower amount of vegetables. On the other hand, about (6.3 percent) and (38.7 percent) of the respondents had consumed recommended and higher the more recommended amount of vegetables.

5.3 Relationships between the Selected Characteristics (independent variables) of the respondents and Their Vegetable Consumption behavior (dependent Variable)

The study revealed that out of the 13 selected characteristics of respondent's 8 characterizes of the respondents had significant relationship with their vegetables consumption behavior whereas education, family size, innovativeness, extension media contact, organizational participation, knowledge, attitude and vegetables intake was positively correlated with vegetables consumption behavior. On the other hand, respondent's age, farming experience, farm size, family income and training had non- significant relationship with vegetables consumption behavior.

5.4 vegetables consumption behavior of the rural farm families

That highest proportion (38.7 percent) of the respondents showed medium vegetables consumption behavior where (33.8 percent) and (27.5 percent) of them showed high and low vegetables consumption behavior.

5.5 Conclusion

"A conclusion present the statements based on major findings of the study and these statements mostly confirm to the objectives of the research in the shortest form. It presents the direct answers of the research objectives, or it relates to the hypothesis" (Labon and Schefter, 1990).

Considering the objectives of the study and the above guidelines for writing a conclusion of a research report, the specific conclusion of the present study may be drawn as follows:

- I. The average vegetables consumption rate by the respondents was 203.28 g/day/person was not satisfactory. However, low amount (55 percent) of vegetables consumed by the respondents which was lower than the standard level (235g/day/person).
- II. Highest proportion (38.7 percent) of the respondents showed highest amount of vegetables consumption behavior whereas (33.8 percent) and (27.5 percent) showed high and low consumption behavior. It can be said that special awareness must be needed to erase malnutrition problems in the rural area.

- III. Among 13 characteristics of the respondent's education, family size, innovativeness, extension media contact, organizational participation, knowledge, attitude and vegetables intake (consumption) had positive significant relationship with the vegetables consumption behavior. Whereas respondent's age, farming experience, farm size, family income, training showed a negative significant relationship with vegetables consumption behavior.

5.6 Recommendation

Recommendations have been divided into two sub sections, viz. recommendation for policy implication and recommendation for the further study. Based on the findings and conclusion of the study the following recommendation for policy implications are presented below:

5.6.1 Recommendations for policy implication

- i. As the people (specially the rural people) are not aware of vegetables intake specially the young aged people, for increasing the awareness level among the all ages people special action should be taken by Government, NGOs and DAE (Department of Agricultural Extension). For this reason, poster/ sticker, television programs and agricultural programs seemed to have great impact to increase the knowledge about vegetable consumption.
- ii. For increasing vegetables cultivation in the rural area special steps such as (giving farmers special lands only for vegetables cultivation, show them the profit from vegetables cultivation) should be taken by the Government, DAE (Department of Agricultural Extension) and NGOs.
- iii. As the income of the rural people is low, so different job opportunities must be needed for increasing their income level. If they can earn more, they can consume more amount of vegetables.
- iv. The unsatisfied dietary needs of the family members should be fulfilled in order to have healthy manpower. Government should take initiatives to achieve the families' healthy food consumption status in this regard.
- v. Government and non-government organizations should improve training facilities according to need of farmers for increasing their knowledge. Management skill and operational ability for cultivating more fruits and vegetables in achieving healthy food consumption.

5.6.2 Recommendations for further study

The researcher conducted a small piece of study which could not make available all information for the proper understanding of the vegetables consumption behavior of rural farm families.

Therefore, the following recommendations could be made for further research works:

- The present study was conducted in two villages (Rajapur and Deyara) of Rupsha upazila of Khulna district. Similar studies may be conducted in other parts of the country to generalize the findings.
- The study was undertaken to explore the relationships of thirteen selected characteristics of the farm families and their vegetables consumption behavior. Therefore, it could be recommended that further studies should be conducted with other experimental and predicted variables.
- The present study was exclusively confined to vegetables consumption behavior. Further studies should be conducted to determine various aspects of food consumption of the farm families.

CHAPTER VI

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APPENDIX
AGROTECHNOLOGY DISCIPLINE
KHULNA UNIVERSITY, KHULNA

An interview schedule for a research study entitled
Vegetables consumption behavior of the rural farm families

(Please answer the following questions and put tick (✓) mark wherever apply)

Respondent No:

Date: / / 2021

A. Personal Information

Name of the respondent:			
Father /Husband name:			
Village:	Union:	Upazilla:	District:
Contact No. (must provide):			

1. Age: Years

2. Farming experience: Years

3. Educational Qualification: Please put tick mark (✓) against the correct response

a) Can't read and write

b) Can sign only

c) Passed Class/PEC/JSC/SSC/HSC/Bachelor/Master Degree

4. Family size:

Name of the Family Member	Relationship with the Respondent	Age	Education	Occupation	Remark(s)
1.	Self				
2.					
3.					
4.					
5.					
6.					
7.					
8.					

5. Farm size:

Type/Ownership of Land	Area		Remark
	Local Unit	Hectare	
A) Homestead area			
B) Own land under own cultivation			
C) Own land under others cultivation			
D) Others land under own cultivation			
E) Leased in			
F) Leased out			
G) Pond/Ditches			
H) Others			
Total = A+B+1/2(C+D)+E-F+G+H			

6. Annual family income:

Please mention you and your family member annual income from different sources:

A. Income from agricultural sectors

How much money did you receive from the following agricultural sectors in the preceding year?

Sl. No.	Income sources	Sources	Total production (Local unit)	Price/Unit (Taka)	Total price (Taka)
1.	Agriculture	Crops			
		Vegetables			
		Fruits			
2.	Livestock rearing	Cattle			
		Goat			
		Poultry			
		Others (specify)			
3.	Fisheries				
4.	Social forestry				
5.	Homestead gardening				
4.	Others (specify)				
	Total				

B. Income from non-agricultural sectors

How much money did you receive from the following non-agricultural sectors in the preceding year?

Sl. No.	Income sources	Total value (Taka)
1.	Service	
2.	Business	
3.	Day labor	
	Total	

Total income = A+B (BDT) = ... Taka

7. Training:

Have you received any training?

A) Yes

B) No

If yes, please mention the name of the training with duration you have received from different organization

No.	Title of Training	Duration	Organization	Venue of Training

8. Innovativeness

Kindly furnish your innovativeness by putting (✓) against the following with which you are agree

Sl. No.	Statement	Tick mark
01.	As soon as it come to my knowledge, I have adopted the innovation	
02.	Having seen the success of others, I have adopted the innovation	
03.	I adopt technology to see my peers who have already adopt technology	
04.	I adopt technology by the pressure of my peers group	
05.	I prefer to wait before adoption of innovation	

9. Extension contact (✓)

Please mention your contact with the following media with frequency of contact.

Sl. No.	Communication media	Frequency of contact			
		Regularly (3)	Occasionally (2)	Rarely (1)	Not at all (0)
A.	Personal media contact				
1.	Sub Assistant Agricultural Officer (SAAO)				
2.	Agricultural Extension Officer (AEO)				
3.	Upazilla Agricultural Officer (UAO)				
4.	Other extension Officers (Livestock, Fisheries)				
5.	NGO workers				
B.	Group media contact				
1.	Village meeting				
2.	Result demonstration				
3.	Farmers field day				
C.	Mass media contact				
1.	Television				
2.	Radio				
3.	Internet/Web media				
4.	Printed Materials				

T= Time(s), W= Weekly, F= Fort nightly, M= Monthly, S= Seasonally, HF= Half Yearly, Y= Yearly

10. Organizational participation:

A) Are you involve in any organization? Yes (✓) / No (✓)

B) If yes, then the answer the following question:

Sl.	Name of the organization (non- political)	Extent of involvement				Duration (year)
		No involvement (0)	General member (1)	Executive Member (2)	Executive Officer (3)	
1.						
2.						
3.						
4.						
5.						

11. The nutritional knowledge level of respondent about the vegetables:

Sl.	Question	Mark assign (2)	Obtain Mark
1.	Please tell two names of very nutritious vegetables		
2.	Please tell two names of summer vegetables		
3.	Name two green leafy vegetables		
4.	Please tell two names of winter vegetables		
5.	Name two vegetables which are grown year round		
6.	How much vegetables should be consumed per day?		
7.	Name two vitamins which we need to consume every day		
8.	Name two vegetables which are enriched in vitamin C		
9.	Please tell two names of vegetables which contain fibers		
10.	Please tell which vegetables are washed before cutting		
11.	Please tell if you think steaming vegetables are the best way of retaining flavor, color and vital nutrients		
12.	Please tell me if you know overcooking vegetables destroy nutrients and results in poor texture, appearance, and taste.		
13.	Please tell me do you know When vegetables are cut we should use a sharp blade and cut in the largest pieces for getting more nutrients		
14.	please tell me if you know two vegetables which are suitable for raw eating than cooking for getting more nutrients		

13. Attitude of respondents toward vegetables consumption behavior:

Sl. No.	Statement	SA (5)	A (4)	UD (3)	DA (2)	SDA (1)
1.	Vegetables are rich source of human nutritious					
2.	Vegetables are a great source of various vitamins and essential minerals					
3.	Vegetables get us to enjoy a variety of flavors and textures					
4.	Vegetables contain lots of fibers					
5.	Vegetables contain low-calorie and low-fat					
6.	Vegetables protect human body against cancer and other diseases					
7.	Vegetables help to maintain sound health					
8.	Vegetables are low in sodium and cholesterol					
9.	Vegetables provide complex carbohydrates					
10.	Vegetables are cheap and easy to get					
11.	Vegetables play an important role in eye health					
12.	Vegetables improve our digestive health					
13.	Vegetables control blood pressure and manage diabetes					
14.	Vegetables play important role specially for children development and pregnant women health					
15.	Vegetables are better than red meat for health					
16.	Vegetables are source of iron					
17.	Vegetables can cure constipation					
18.	For brain development and increasing memorizing capability vegetables are needed					
19.	Vegetables merely have side effects					
20.	Vegetables could also be a substitute for animal protein supply					

14. Vegetables consumption:

Please mention about the vegetables consumed by you in the last month

First week

Day	Name of the vegetables consumed	Amount of vegetables consumed	Time		
			Breakfast	Lunch	Dinner
Sat					
Sun					
Mon					
Tues					
Wed					
Thus					
Fri					

Second week

Day	Name of the vegetables consumed	Amount of vegetables consumed	Time		
			Breakfast	Lunch	Dinner
Sat					
Sun					
Mon					
Tues					
Wed					
Thus					
Fri					

Third week

Day	Name of the vegetables consumed	Amount of vegetables consumed	Time		
			Breakfast	Lunch	Dinner
Sat					
Sun					
Mon					
Tues					
Wed					
Thus					
Fri					