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GEOGRAPHICAL EFFECTS ON FOOD CHOICE

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ABSTRACT :

In India, there is a paucity of reliable data on the nature and magnitude of the impact of biological variable on food choice. This study explores some of the determinants of food choice in rural and urban area particularly in Villupuram District in tamilnadu, south India.

Objectives*: -*This study is to analysethe geographical variation in food choice over biological variables such as height, weight, BMI (Health Risk) of the respondents in the study area.

Methodology:-*The sample is N=300 out of which 150 from each rural and urban. It is comparative study of rural and urban. The survey period is 2016. The factor analysis has been used to find out more important relevant variables from complex one. Some of the distinct factors are analyzed under biological variables.*
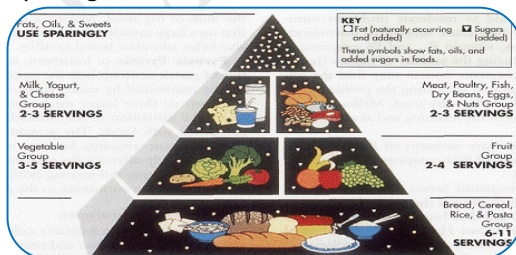
Statistical Tools: The Factor analysis, MLRM, ANOVA, Chi-square test have been used. It is direct interview method of data collection by the researcher. The Interview schedule has framed by the researcher for appropriation of data.

Results: -*This study analysed the geographical impact on food choice****.**** Further it explored the role of education and labourmigration on food choicein compared area. And shows how the respondents are in elevation of health risk due to BMI transition due to locations.*

KEYWORDS : *Food Choice, geographical region, biological variables, age, sex, occupation, education, height, weight and BMI(health risk)*

INTRODUCTION:

The problem and perspective of food choice in any region are unique to its physical, economical, biological, and social environment. Prior information regarding physical economical, biological and social environment of the people conditions helps the researcher in understanding the nature and problems of people in the study area. Keeping above in mind, this research has briefly described physical and biological, variables under geographical area chosen for the present study and the district to whichit belongs is in succeeding pages. Biologically, gender difference and age structure signifies the stages in the physiological and mental development of human beings, the maintenance of health and in increased legerity. Appropriate food choice is an essential factor in maintaining body functioning and health and influence the rate of physiologic and functional decline associated with the sex and age structure of the respondents.

METHODOLGY

In This study both primary and secondary data are used. The major tool for collecting the primary data has been framed interview schedule given in interview schedule has been prepared in Tamil language and it contains questions mostly closed and some open-set to get

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relevant information from the respondents. Detailed informal talks with some people were conducted on major issues. The Stratified random sampling has been collected. The total sample size is 300. Out of 300 samples 150 is from Vanur block and 150 is from Villupuram Town. Vanur is the representative of the rural area and Villupuram Town is the representative of the urban population in the district. The interview schedule has taken from each of the respondents by the researcher. After establishing primary rapport with the respondent, questions contained in the schedules were recorded by the researcher personally. The secondary data for the present study has been collected from different sources, such as the district statistical office, revenue department, VAO office, municipal office, etc. In addition to these published reports, survey materials have been used.

OBJECTIVES OF THE STUDY:-
This study is to analysethe geographical variation in food choice over biological variables such as height, weight, BMI (Health Risk) of the respondents in the study area.

STATISTICAL TOOLS USED
To analyse the given objectives the percentage analysis, descriptive statistics, factor analysis, chi-square analysis and the regression analysis are used. Some scoring procedure framed for dependent variables based on concerned literatures.

Variables and scoring procedures of the study:
Independent Biological Variables such as: age, height, weight, and BMI as Health risk.

Dependent variables such as: Types of food choice classified as:
Type – 1   Vegetable (T1)
Type – 2   T1 + green + pulses (T2)
Type – 3   T2+ fruits (T3)
Type – 4   T3 eggs + chicken (T4)
Type – 5   T4+mutton (T5)
Type – 6   T5+sea food and all (T6)

Gender
Many studies Paul R. Ward, et al., 2012, Martin et al 2007, Byrness et al., 1999, AdiKochavi, 2008 have concentrated on respondents sex. This study too has taken gender as one of the important variable governing the food choice. Sex-wise respondents have been classified into two categories. The scoring procedures are:

Category	Score value
Male	1
Female	2

Age
The studies like Paul Rward et al 2012, Deanna Pucciarelli et al. 2011 mm Bissonnette and Cmteato 2001 etc. considered age is one of the significant variables for food choice. This study too age wise respondents have taking role of it and have been classified into three ways and its scoring procedures are:

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Category	Score value
Up to 20 years	1
20 – 30 years	2
31 – 40 years	3
41 – 50 years	4
51 and above	5

Community

What people eat is formed and constrained by circumstances that are essentially social and cultural. Many studies clarify with regard the food choice (Devine et al., 2003, Rajula Devi, 2001, Feunekes et al, 1998). This study is also considered the respondents social status. The respondent's social status classified and scoring values are given in the following manner.

Category	Score value
OC	1
BC	2
MBC	3
SC/ST	4

Education

Studies like Kearney et al., 2000, L. Ricciuto et al., 2006, Deanna Pucciarelli 2011, France Bellisle 2005 etc considered education as a major force to determine the food choice. The study made by Ricciuto et al. 2006, Men's education has been found to be more influence on food choice than women's education. The present study has also considered education is a essential and significant factor to determine the food choice. The scoring procedure is as follows.

Category	Score value
Illiterate	1
Primary	2
Secondary	3
Higher Secondary	4
Degree and Above	5

Occupational Status

Multiple times throughout the day people are making the decision of what to eat for their next meal. This kind of decision is based on the occupational status of the people because of their food choice depends upon the work nature and income (Rajuladevi, 2001, Biener et al., 1999, Jabs & Divine, 2006). The occupational status can be classified into two broadly categories.

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Category	Score value
Formal	Top Level – 1
	Middle Level – 2
	Low Level – 3
Informal	Coolie – 1
	Business – 2
	Agriculture – 3

Expenditure (in Rs)
(Per month)

Monthly
Up to 5000 years   -   1
5001 – 10,000 years   -   2
10,001 – 15,000 years   -   3
15,001 – 2-,000 years   -   4
Above 20,000   -   5

Profile of the Villupuram District

Villupuram District lies between 11 38' 25" N and 12 20' 44" S: 78 15' 00" W and 79 42' 55" E with an area of 7194 Sq. Km.   It was carved out from the South Arcot District on 30.09.1993 and was rechristened as Villupuram District. The residual part of the erstwhile South Arcot district was named as Cuddalore District. It is surrounded on East and South by Cuddalore District. The west by Salem and Dharmapuri District on the North by Thiruvannamalai and Kanchipuram District

Villupuram District Map

District Administration

At present Villupuram district comprises of 1490 Revenue Villages, 4 Revenue Divisions, 9 Administrative Taluks, 22 Blocks, 15 Town Panchayat Unions, and 1104 Village Panchayatsand 3 Municipalities. The General geological formation of the District appears to be simple. The greater part of it is covered by the metamorphic rocks belonging to Genesis family. There are also three great groups of sedimentary rocks belonging to different geological periods. The Kalrayan Hills in the North represents a

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continuous range of hills covered with some thorny forests and vegetation. Among the hills, the most beautiful part of the district lies, round about the Gingee Hills.

Climate

The climate of Villupuram District is fairly dry and on the whole healthy. The temperature is moderate.

Population

Villupuram district has a total population of 3458873 (as per 2011 Census), of which males account for 1740819 and females account for 1718054. The Urban population according to 2011 census is 519088 and rural population is 2939785. The density of population of the district per sq. km. is 410. The people are primarily agrarian.

Sex Ratio (No of females per 1000 Males)

Year	1981	1991	2001	2011
Villupuram	972	967	984	985
State	977	974	987	995

Population Trend

According to 2011 census the district population is approximately 34.60 Lakhs as opposed to 29.60 Lakhs in 2001 census. The sex ratio works out to 985 in 2011 as against 984 in 2001.

The total population as per 2011 census in 3458873 as against the 2001 census total population of 2960373, which shows a growth rate of 16.99% over the decade.

Basic Demographic Indicators

Sl. No	Indicators	1991	2001	2011
1	Population (in"000")	2756	2960	3458
2	Density per SQ.KM	380	412	482
3	Sex Ratio (No. of females per 1000 Males)	967	984	985

Education

School education facilities are available in this district through 1777 primary schools (including nursery schools) 311 Middle schools, 150 High Schools, 100 Higher Secondary Schools. Regarding higher education Arts Colleges, engineering Colleges, Poly-Techniques, Industrial Training Institute and Teacher Training Institutes are available in this district. The Government has run hostels for boys and girls for SC, ST, MBC and Backward classes.

The Literacy rate of Villupuram District is 64.7% Compared to the State figure of 73.47% in the year 2001.

Literacy Rate

District-wise

Year	1991	2001	2011
Male	60.9	75.5	80.58
Female	35.4	52.5	63.51
Combined	48.4	64.7	72.08

State-wise

Year	1991	2001	2011
Male	73.7	82.3	86.81
Female	51.8	64.5	73.86
Combined	62.7	73.5	80.33

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While the overall literacy rate has gone up from 73.5% in 2001 to 80.33% in 2011, the male literacy rate has increased from 82.3% to 86.81% what is encouraging is that the female literacy rate has gone up from 64.5% in 2001 to 73.86% in 2011.

ANALYSIS AND INTERPRETATION:
Sex of the Respondent and Type of Food

Type of Food		Location of the Study Area					
		Rural			Urban		
		SEX					
		Male	Female	Total	Male	Female	Total
T1	A	3	0	3	2	0	2
	B	100.0%	.0%	100.0%	100.0%	.0%	100.0%
	C	3.6%	.0%	2.0%	2.3%	.0%	1.3%
T2	A	0	3	3	3	4	7
	B	.0%	100.0%	100.0%	42.9%	57.1%	100.0%
	C	.0%	4.5%	2.0%	3.5%	6.2%	4.7%
T3	A	10	19	29	23	15	38
	B	34.5%	65.5%	100.0%	60.5%	39.5%	100.0%
	C	11.9%	28.8%	19.3%	26.7%	23.4%	25.3%
T4	A	17	13	30	11	10	21
	B	56.7%	43.3%	100.0%	52.4%	47.6%	100.0%
	C	20.2%	19.7%	20.0%	12.8%	15.6%	14.0%
T5	A	43	27	70	41	35	76
	B	61.4%	38.6%	100.0%	53.9%	46.1%	100.0%
	C	51.2%	40.9%	46.7%	47.7%	54.7%	50.7%
T6	A	11	4	15	6	0	6
	B	73.3%	26.7%	100.0%	100.0%	.0%	100.0%
	C	13.1%	6.1%	10.0%	7.0%	.0%	4.0%
Total	A	84	66	150	86	64	150
	B	56.0%	44.0%	100.0%	57.3%	42.7%	100.0%
	C	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%

A – Count
B - % within sex of the respondents
C - % within food choice of the study area
Source: Primary data

This table exhibits the sex details and the food choice of the respondents in the study area. In rural area the T5 types of food choice is taken by 70 respondents which contribute 46.7% of the total respondents under the variable sex of the respondents. If we look at the both the sex groups the male group which contributes 61.4% and the female contributes 38.6% and are all in T5 types of food choice. This is also reflected in descriptive statistics which shows that the mean value 1.44 which implies that, comparing with both gender, the majority is male. Whereas in urban area, the same T5 food choice plays role and the respondents in T5 are 76 (50.7%) out of which, 53.9% are male and female contributes 46.1% and the mean value is 1.43. When we look at the both the scenario, which tells about the male are majority of the sample which distributed in both rural and urban are in this study. The standard deviation .498 and the variance .248 in rural area are somehow same as in urban area of standard deviation at .248 and the variance at.246. Which shows there is nothing variation in sex distribution in between the rural and urban area in this study.

Age of the Respondents and Type of Food

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Types of Food		Location of the Study Area											
		Rural						Urban					
		Age of the Respondents											
		Upto 20 years	21-30	31-40	41-50	51 above	Total	Upto 20 years	21-30	31-40	41-50	51 above	Total
T1	A	0	0	0	2	1	3	0	0	0	1	1	2
	B	.0%	.0%	.0%	66.7%	33.3%	100.0%	.0%	.0%	.0%	50.0%	50.0%	100.0%
	C	.0%	.0%	.0%	6.1%	5.3%	2.0%	.0%	.0%	.0%	4.8%	3.7%	1.3%
T2	A	0	1	1	1	0	3	0	0	1	6	0	7
	B	.0%	33.3%	33.3%	33.3%	.0%	100.0%	.0%	.0%	14.3%	85.7%	.0%	100.0%
	C	.0%	1.7%	3.8%	3.0%	.0%	2.0%	.0%	.0%	2.6%	28.6%	.0%	4.7%
T3	A	4	12	6	2	5	29	11	9	13	1	4	38
	B	13.8%	41.4%	20.7%	6.9%	17.2%	100.0%	28.9%	23.7%	34.2%	2.6%	10.5%	100.0%
	C	30.8%	20.3%	23.1%	6.1%	26.3%	19.3%	32.4%	31.0%	33.3%	4.8%	14.8%	25.3%
T4	A	2	16	2	6	4	30	0	4	3	1	13	21
	B	6.7%	53.3%	6.7%	20.0%	13.3%	100.0%	.0%	19.0%	14.3%	4.8%	61.9%	100.0%
	C	15.4%	27.1%	7.7%	18.2%	21.1%	20.0%	.0%	13.8%	7.7%	4.8%	48.1%	14.0%
T5	A	5	27	14	16	8	70	21	15	21	10	9	76
	B	7.1%	38.6%	20.0%	22.9%	11.4%	100.0%	27.6%	19.7%	27.6%	13.2%	11.8%	100.0%
	C	38.5%	45.8%	53.8%	48.5%	42.1%	46.7%	61.8%	51.7%	53.8%	47.6%	33.3%	50.7%
T6	A	2	3	3	6	1	15	2	1	1	2	0	6
	B	13.3%	20.0%	20.0%	40.0%	6.7%	100.0%	33.3%	16.7%	16.7%	33.3%	.0%	100.0%
	C	15.4%	5.1%	11.5%	18.2%	5.3%	10.0%	5.9%	3.4%	2.6%	9.5%	.0%	4.0%
Total	A	13	59	26	33	19	150	34	29	39	21	27	150
	B	8.7%	39.3%	17.3%	22.0%	12.7%	100.0%	22.7%	19.3%	26.0%	14.0%	18.0%	100.0%
	C	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%

A – Count   B - % within age of the respondents

C - % within food choice

Source: Primary data

This table describes the age and food choice profile of the respondents. In rural area the T5 types of food choice is taken by 70 respondents which contributes 46.7% of the total respondents to the rural area under the variable age of the respondents. If we look at the different age groups contributing to T5 types of food the maximum percentage is in 21-30 age group with 38.6%. This is also reflected in descriptive statistics which shows that the mean value (2.91) lies between this second category and the third category with the age group of 21-40. The total contributions by these age groups are totaled at 58.6%. The standard deviation and variance also shows that the age group is evenly distributed majorly on these groups of age i,e,. 21-30(38.6%), 30-40 (20%), 40-50(22.9%). This is the reason why the age group of the respondent is evenly distributed under types of food T5. On the other hand in urban area, the respondents are much more evenly distributed among all age groups except 51 and above age group. The T5 types of food choice is taken by 76 respondents in urban area which contributed 50.7% of the total respondents in the study area which is more than rural respondent. The maximum percentage is in both up to 20 years and in 31-40 years of age group

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with 27.6% respectively. The mean value is more or less equivalent to the mean value in the rural area (2.85) The standard deviation and the variance are more in urban area compare to the rural area. standard deviation at 1.39 variance at 1.95. Even though the variance is more in overall the distribution of the age respondents in the urban area, when it comes to T5 food choice the age group is not showing much variation among the different age groups.

Occupational Status of the Respondents in the Study Area

Occupational Status		Location of the Study Area		Total
		Rural	Urban	
No occupation/ Dependents	**A**	**35**	**64**	**99**
	B	35.4%	64.6%	100.0%
	C	23.3%	42.7%	33.0%
Formal sector	**A**	**41**	**45**	**86**
	B	47.7%	52.3%	100.0%
	C	27.3%	30.0%	28.7%
Informal sector	**A**	**74**	**41**	**115**
	B	64.3%	35.7%	100.0%
	C	49.3%	27.3%	38.3%
Total	**A**	**150**	**150**	**300**
	B	50.0%	50.0%	100.0%
	C	100.0%	100.0%	100.0%

A – Count
B - % within location of the respondents
C - % within occupational status of the study area
Source: Primary data

Above table reveals that 33 percent of the respondents are not having any occupation because they are dependent on their family income in which 35 percent of the respondents are living in rural area and 65 percent of the respondents are living in urban area. And 29 percent of the respondents are working in the formal sector in which 48 percent of the respondents are living in rural area and 52 percent of the respondents are living in urban area and further, 38 percent of the respondents are working in informal sector in which 64 percent of the respondents are living in rural area and 36 percent of the respondents are living in urban area.

Monthly Food Expenditure Pattern of the Respondents in the Study Area

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Monthly Food Expenditure (in Rs.)		Location of the Study Area		Total
		Rural	Urban	
Upto-5000	A	50	70	120
	B	41.7%	58.3%	100.0%
	C	46.7%	68.0%	57.1%
5001-10000	A	41	22	63
	B	65.1%	34.9%	100.0%
	C	38.3%	21.4%	30.0%
10001-15000	A	7	8	15
	B	46.7%	53.3%	100.0%
	C	6.5%	7.8%	7.1%
15001-20000	A	6	3	9
	B	66.7%	33.3%	100.0%
	C	5.6%	2.9%	4.3%
Above 20000	A	3	0	3
	B	100.0%	.0%	100.0%
	C	2.8%	.0%	1.4%
Total	A	107	103	210
	B	51.0%	49.0%	100.0%
	C	100.0%	100.0%	100.0%

A – Count

B - % within location of the respondents

C - % within monthly food expenditure of the studyarea

Source: Primary data

   This table reveals that the respondents monthly food expenditure. It shows that 57 percent of the respondents spent up to Rs. 5000 for their food in which 42 percent of the respondents are living in rural area and 58 percent of the respondents are living in urban area. 30 percent of the respondents are spent for their food in betweenRs. 5001-10,000 per month in which 65 percent are living in rural area and 35 percent of the respondents are living in urban area. And just 7 percent of the respondents spent for their food in between Rs. 10,001-15,000 per months in which 47 percent of the respondents are having in rural area and 53 percent of them living in urban area. And 5 percent of the respondents spent for their food up to Rs. 15,001-20000 in which 67 percent of the respondents are living in rural area and 33 percent of them living in urban area. It is interesting to note that nearly 60 percent of the respondents spent only uptoRs. 5000 per month for their food.

Educational Status of the Respondents and Type of Food

Types of		Location of the Study Area	
		Rural	Urban

Food		Education										
		Illiterate	Primary	Secondary	Higher Secondary	Degree & Above	Total	Illiterate	Primary	Secondary	Higher Secondary	Degree & Above	Total
T1	A	1	0	1	1	0	3	0	0	1	1	0	2
	B	33.3%	.0%	33.3%	33.3%	.0%	100.0%	.0%	.0%	50.0%	50.0%	.0%	100.0%
	C	6.2%	.0%	3.6%	3.2%	.0%	2.0%	.0%	.0%	5.9%	5.6%	.0%	1.3%
T2	A	1	1	0	1	0	3	0	7	0	0	0	7
	B	33.3%	33.3%	.0%	33.3%	.0%	100.0%	.0%	100.0%	.0%	.0%	.0%	100.0%
	C	6.2%	5.0%	.0%	3.2%	.0%	2.0%	.0%	31.8%	.0%	.0%	.0%	4.7%
T3	A	0	0	4	8	17	29	0	0	5	1	32	38
	B	.0%	.0%	13.8%	27.6%	58.6%	100.0%	.0%	.0%	13.2%	2.6%	84.2%	100.0%
	C	.0%	.0%	14.3%	25.8%	30.9%	19.3%	.0%	.0%	29.4%	5.6%	42.1%	25.3%
T4	A	6	6	6	6	6	30	10	6	0	0	5	21
	B	20.0%	20.0%	20.0%	20.0%	20.0%	100.0%	47.6%	28.6%	.0%	.0%	23.8%	100.0%
	C	37.5%	30.0%	21.4%	19.4%	10.9%	20.0%	58.8%	27.3%	.0%	.0%	6.6%	14.0%
T5	A	7	11	12	11	29	70	6	9	10	15	36	76
	B	10.0%	15.7%	17.1%	15.7%	41.4%	100.0%	7.9%	11.8%	13.2%	19.7%	47.4%	100.0%
	C	43.8%	55.0%	42.9%	35.5%	52.7%	46.7%	35.3%	40.9%	58.8%	83.3%	47.4%	50.7%
T6	A	1	2	5	4	3	15	1	0	1	1	3	6
	B	6.7%	13.3%	33.3%	26.7%	20.0%	100.0%	16.7%	.0%	16.7%	16.7%	50.0%	100.0%
	C	6.2%	10.0%	17.9%	12.9%	5.5%	10.0%	5.9%	.0%	5.9%	5.6%	3.9%	4.0%
Total	A	16	20	28	31	55	150	17	22	17	18	76	150
	B	10.7%	13.3%	18.7%	20.7%	36.7%	100.0%	11.3%	14.7%	11.3%	12.0%	50.7%	100.0%
	C	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%

A – Count   B - % within education of the respondents   C - % within food choice
Source: Primary data

This table shows the education profile of the community in the study area. In total 36.7% are in degree and above qualification in rural area whereas in urban area 50.7%. The rest of the percentage of the respondents are scattered in higher secondary, secondary, and primary including illiterate categories in both areas. This is supported by the mean value of 3.59 in rural and 3.76 in urban, the standard deviation and variance for rural is 1.376 and 1.894 likewise, the standard deviation and variance for urban is 1.478 and 2.184 which implies there is no uniformed in representation of data particularly in educational qualification of the respondents in both areas. When the food choice concern. The T5 plays the majority of the role which contributes 46.7% of the respondents in rural area and 50.7% in urban area. And it is followed by T4

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food choice in rural are and T3 food choice inurban area. Thus there is no same food choice in between both the areas.

Occupation Status of the Respondents and Type of Food

Type of Food		Location of the Study Area							
		Rural				Urban			
		Occupation							
		No Occupation	Formal	Informal	Total	No Occupation	Formal	Informal	Total
T1	A	1	1	1	3	0	1	1	2
	B	33.3%	33.3%	33.3%	100.0%	.0%	50.0%	50.0%	100.0%
	C	2.9%	2.4%	1.4%	2.0%	.0%	2.2%	2.4%	1.3%
T2	A	1	2	0	3	7	0	0	7
	B	33.3%	66.7%	.0%	100.0%	100.0%	.0%	.0%	100.0%
	C	2.9%	4.9%	.0%	2.0%	10.9%	.0%	.0%	4.7%
T3	A	6	12	11	29	11	15	12	38
	B	20.7%	41.4%	37.9%	100.0%	28.9%	39.5%	31.6%	100.0%
	C	17.1%	29.3%	14.9%	19.3%	17.2%	33.3%	29.3%	25.3%
T4	A	4	7	19	30	9	3	9	21
	B	13.3%	23.3%	63.3%	100.0%	42.9%	14.3%	42.9%	100.0%
	C	11.4%	17.1%	25.7%	20.0%	14.1%	6.7%	22.0%	14.0%
T5	A	22	17	31	70	37	24	15	76
	B	31.4%	24.3%	44.3%	100.0%	48.7%	31.6%	19.7%	100.0%
	C	62.9%	41.5%	41.9%	46.7%	57.8%	53.3%	36.6%	50.7%
T6	A	1	2	12	15	0	2	4	6
	B	6.7%	13.3%	80.0%	100.0%	.0%	33.3%	66.7%	100.0%
	C	2.9%	4.9%	16.2%	10.0%	.0%	4.4%	9.8%	4.0%
Total	A	35	41	74	150	64	45	41	150
	B	23.3%	27.3%	49.3%	100.0%	42.7%	30.0%	27.3%	100.0%
	C	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%

A – Count   B - % within occupation of the respondents   C - % within food choice
Source: Primary data

This table shows that occupational profile of the community in the study area. In total of 150 respondents in each area the 49.3% are in informal occupational category in rural area whereas in urban area 27.3%. The rest of the 27.3% and 23.3% of the respondents are scattered in formal and dependents categories in rural area and 30%, 42.7%. are in formal and dependents categories in urban area. This is supported by the mean value of 2.26 in rural and 1.85 in urban, the standard deviation and variance for rural area is .829 and .687 likewise, the standard deviation and variance for urban is .829 and .687 which implies that there is no uniformity in representation of data in particular occupational categories. Based on the mean value the informal occupation contributes more whereas, in urban the dependents contributes more. When the food choice is concerned The T5 plays the majority of the role which contributes 46.7% of the respondents in rural area and 50.7% in urban area. And it is followed by T3 and T4 food choice equally in rural area and T3 food choice is followed in urban area. Thus there is no same food choice in between both the areas. Thus, urbangets different types of alternative for T5 which is out of non-vegetarian.

Height of the Respondents and Types of Food

Types of	Location of the Study Area	
	Rural	Urban

Food		Height (Centimeter)									
		150 - 160	160 - 170	170 - 180	180 - 190	Total	150 – 160	160 - 170	170 - 180	180- 190	Total
T1	A	1	2	0	0	3	1	1	0	0	2
	B	33.3%	66.7%	.0%	.0%	100.0%	50.0%	50.0%	.0%	.0%	100.0%
	C	2.3%	3.3%	.0%	.0%	2.0%	1.4%	2.1%	.0%	.0%	1.3%
T2	A	1	2	0	0	3	7	0	0	0	7
	B	33.3%	66.7%	.0%	.0%	100.0%	100.0%	.0%	.0%	.0%	100.0%
	C	2.3%	3.3%	.0%	.0%	2.0%	9.9%	.0%	.0%	.0%	4.7%
T3	A	11	11	6	1	29	13	16	9	0	38
	B	37.9%	37.9%	20.7%	3.4%	100.0%	34.2%	42.1%	23.7%	.0%	100.0%
	C	25.0%	18.0%	16.2%	12.5%	19.3%	18.3%	33.3%	37.5%	.0%	25.3%
T4	A	9	10	10	1	30	14	3	4	0	21
	B	30.0%	33.3%	33.3%	3.3%	100.0%	66.7%	14.3%	19.0%	.0%	100.0%
	C	20.5%	16.4%	27.0%	12.5%	20.0%	19.7%	6.2%	16.7%	.0%	14.0%
T5	A	19	27	18	6	70	36	23	10	7	76
	B	27.1%	38.6%	25.7%	8.6%	100.0%	47.4%	30.3%	13.2%	9.2%	100.0%
	C	43.2%	44.3%	48.6%	75.0%	46.7%	50.7%	47.9%	41.7%	100.0%	50.7%
T6	A	3	9	3	0	15	0	5	1	0	6
	B	20.0%	60.0%	20.0%	.0%	100.0%	.0%	83.3%	16.7%	.0%	100.0%
	C	6.8%	14.8%	8.1%	.0%	10.0%	.0%	10.4%	4.2%	.0%	4.0%
Total	A	44	61	37	8	150	71	48	24	7	150
	B	29.3%	40.7%	24.7%	5.3%	100.0%	47.3%	32.0%	16.0%	4.7%	100.0%
	C	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%

A – Count   B - % within height of the respondents
C - % within food choice
Source: Primary data

This table shows the data about Height of the Respondentsand the food choice of the respondents in the study area. In the total of 150 respondents in each rural and urban area, the majority of the 40.7% of the respondents are in 160-170cm category in rural area whereas in urban area it is 32% and the 29.3% in rural and 47.3% in urban respondents are 150-160cm category. The rest of the 24.7% in rural and 16% are in urban respondents are under 170-180cm category. The very meager of 5.3% in rural and 4.7% in urban respondents are in 180-190cm category. When we compare the both rural and urban distribution of respondents, it seems that in rural majority height is 160-170cm whereas in urban it is 150-160. Thus, there is difference in both area. This difference is supported by the descriptive statistics value. In which, the mean value is 2.06 in rural and 1.78 in urban which implies that majority of respondents in rural falls in second height category 160-170cm whereas in urban, the mean value falls in first height category of 150-160cm. The standard deviation and the variance for rural area is .869 and .755 likewise, the standard deviation and variance for urban is .881 and .777 implies that there is no uniformity in distribution of data in both area. When the food choice is concerned The T5 plays the majority of the role which contributes 46.7% of the respondents in total 150 respondents In rural area the height 160-170cm comprises majority of the respondents i.e.,38.6% and in urban it is differed and the height 150-160cm has majority of the respondents i.e.,47.4%. In rural, the T5 food choice is followed by the T4 and T3 whereas in urban the same T5 food choice is followed by T3 and T4 types of choice and the rest of the categories are very meager representations.

Weight of the Respondents and Types of Food Choice

Types		Location of the Study Area

of Food		Rural				Urban			
		Weight (Kilograms)							
		40 – 60	60 - 80	80-100	Total	40 - 60	60-80	80- 100	Total
T1	A	1	2	0	3	1	1	0	2
	B	33.3%	66.7%	.0%	100.0%	50.0%	50.0%	.0%	100.0%
	C	3.8%	2.2%	.0%	2.0%	2.3%	1.1%	.0%	1.3%
T2	A	0	2	1	3	0	7	0	7
	B	.0%	66.7%	33.3%	100.0%	.0%	100.0%	.0%	100.0%
	C	.0%	2.2%	3.0%	2.0%	.0%	7.4%	.0%	4.7%
T3	A	7	16	6	29	16	18	4	38
	B	24.1%	55.2%	20.7%	100.0%	42.1%	47.4%	10.5%	100.0%
	C	26.9%	17.6%	18.2%	19.3%	36.4%	19.1%	33.3%	25.3%
T4	A	5	16	9	30	1	18	2	21
	B	16.7%	53.3%	30.0%	100.0%	4.8%	85.7%	9.5%	100.0%
	C	19.2%	17.6%	27.3%	20.0%	2.3%	19.1%	16.7%	14.0%
T5	A	10	46	14	70	25	45	6	76
	B	14.3%	65.7%	20.0%	100.0%	32.9%	59.2%	7.9%	100.0%
	C	38.5%	50.5%	42.4%	46.7%	56.8%	47.9%	50.0%	50.7%
T6	A	3	9	3	15	1	5	0	6
	B	20.0%	60.0%	20.0%	100.0%	16.7%	83.3%	.0%	100.0%
	C	11.5%	9.9%	9.1%	10.0%	2.3%	5.3%	.0%	4.0%
Total	A	26	91	33	150	44	94	12	150
	B	17.3%	60.7%	22.0%	100.0%	29.3%	62.7%	8.0%	100.0%
	C	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%

A – Count

B - % within weight of the respondents

C - % within food choice of the study Area

Source: Primary data

      This table shows the data about Weight of the Respondentsand the food choice of the respondents in the study area. In the total of 150 respondents in each rural and urban area, the majority of the 60.7% of the respondents are in 60-80kg category in rural area whereas in urban area it is more than rural i.e., 62.7%. and the next 22% in rural and 8% in urban respondents are 80-100kg category. The rest of the 17.3% in rural and 29.3% in urban respondents are under 40-60kg category. When we compare the both rural and urban distribution of respondents, it seems that both rural and urban the majority weight is 60-80kg. This is supported by the descriptive statistics value. The mean value is 2.05 in rural and 1.79 in urban, which implies that the majority of respondents in both rural and urban falls in second category of weight i.e.,60-80kg The standard deviation and the variance for rural area is .628 and .394 likewise, the standard deviation and variance for urban are is .574 and .330 which implies that there is no uniformity in distribution of data in both the area since, in rural area, the weight 80-100kg category has placed in second to 60-80 kg category whereas in urban, the weight 40-60 kg category has placed in second to 60-80kg category. It is clearly highlighted in this table. When the food choice is concerned The T5 plays the majority of the role which contributes 46.7% of the respondents in total 150 respondents in rural area, and 50.7% are in such urban area. In rural area the weight 60-80kg comprises majority of the respondents i.e., 65.7% and in urban it is 59.2%. When we compare both areas the distribution of the respondents are same. In rural, the T5 food choice is followed by the T4 and T3 whereas in urban the same T5 food choice is followed by T3 and T4 types of choice and the rest of the categories are very meager representations.

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BMI status of the Respondents and Type of Food Choice

Types of Food		Location of the Study Area									
		Rural					Urban				
		BMI									
		Under Weight	Normal Weight	Over Weight	Obesity	Total	Under Weight	Normal Weight	Over Weight	Obesity	Total
T1	A	0	2	0	1	3	0	1	1	0	2
	B	.0%	66.7%	.0%	33.3%	100.0%	.0%	50.0%	50.0%	.0%	100.0%
	C	.0%	3.7%	.0%	3.0%	2.0%	.0%	1.7%	1.8%	.0%	1.3%
T2	A	0	1	0	2	3	0	3	3	1	7
	B	.0%	33.3%	.0%	66.7%	100.0%	.0%	42.9%	42.9%	14.3%	100.0%
	C	.0%	1.9%	.0%	6.1%	2.0%	.0%	5.1%	5.4%	3.6%	4.7%
T3	A	2	9	12	6	29	5	13	15	5	38
	B	6.9%	31.0%	41.4%	20.7%	100.0%	13.2%	34.2%	39.5%	13.2%	100.0%
	C	33.3%	16.7%	21.1%	18.2%	19.3%	71.4%	22.0%	26.8%	17.9%	25.3%
T4	A	1	8	14	7	30	0	10	7	4	21
	B	3.3%	26.7%	46.7%	23.3%	100.0%	.0%	47.6%	33.3%	19.0%	100.0%
	C	16.7%	14.8%	24.6%	21.2%	20.0%	.0%	16.9%	12.5%	14.3%	14.0%
T5	A	3	28	26	13	70	2	29	29	16	76
	B	4.3%	40.0%	37.1%	18.6%	100.0%	2.6%	38.2%	38.2%	21.1%	100.0%
	C	50.0%	51.9%	45.6%	39.4%	46.7%	28.6%	49.2%	51.8%	57.1%	50.7%
T6	A	0	6	5	4	15	0	3	1	2	6
	B	.0%	40.0%	33.3%	26.7%	100.0%	.0%	50.0%	16.7%	33.3%	100.0%
	C	.0%	11.1%	8.8%	12.1%	10.0%	.0%	5.1%	1.8%	7.1%	4.0%
Total	A	6	54	57	33	150	7	59	56	28	150
	B	4.0%	36.0%	38.0%	22.0%	100.0%	4.7%	39.3%	37.3%	18.7%	100.0%
	C	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%

A – Count
B - % within body mass index of the respondents
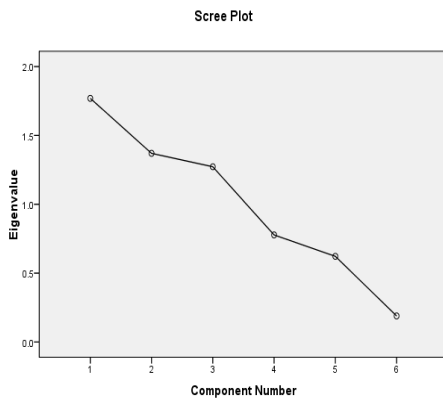C - % within food choice of the study Area
Source: Primary data

This table shows the data about the Body Mass Index and the food choice of the respondents in the study area. In the total of 150 respondents in each rural and urban area, the majority of the 38% are in overweight category in rural area whereas in urban area it is almost equal to rural i.e.,37.3%. and the 36% in rural and 39.3% in urban respondents are in normal weight category. The rest of the 22% in rural and 18.7% are in urban respondents are in obesity category. The very meager of 4% in rural and 7% in urban respondents are in underweight category. When we compare both rural and urban distribution of respondents, it seems that it almost same in both area. This is supported by the descriptive statistics value.
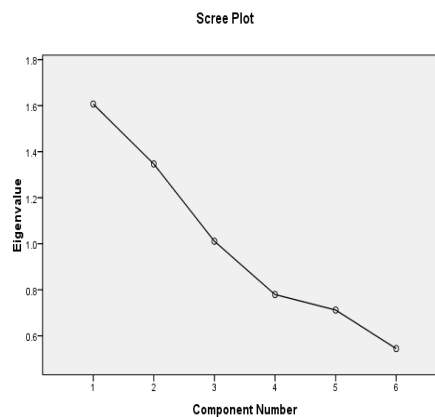
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In which, the mean value is 2.78 in rural and 2.70 in urban which implies that majority of respondents are scattered in second third categories i.e., normal weight to over weight in both areas. The standard deviation and the variance for rural area is .834 and .696 likewise, the standard deviation and variance for urban is .825 and .681 implies that there is almost uniformity in distribution of data in both area. When the food choice is concerned The T5 plays the majority of the role. Which contributes 46.7% of the respondents in total 150 of the respondents in rural area, and 50.7% are in such urban area. In which the, normal weight category comprises only 40% and in urban it has only 38.2%, and in overweight category the rural comprises 37.1% and the urban has only 38.2%. And under the obesity category the rural respondents are 18.6% whereas in urban it is almost equivalent to rural strength i.e.,21.1%. This kind distribution of data in both areas implies almost same. In rural, the T5 food choice is followed by the T4 and T3 whereas in urban the same T5 is followed by T3 and T4 types of choice and the rest of the categories are very meager representations.

Factor Analysis for Biological Variable in Rural and Urban Area

Rural

Urban

Rotated Component Matrix[a]

Particulars	Component		
	1	2	3
Palatability	.175	-.599	.330
Preference of Traditional Food	-.015	.797	.064
Height of the Respondents	-.005	.009	.948
Weight of the Respondents	.890	.024	.258
Home Made	.334	.691	.102
Extraction Method: Principal Component Analysis. Rotation Method: Varimax with Kaiser Normalization. a. Rotation converged in 5 iterations.			

Rotated Component Matrix[a]

Particulars	Component		
	1	2	3
Palatability	-.340	.132	.632
Preference of Traditional Food	.776	.019	-.059
Height of the Respondents	.127	.854	-.188
Weight of the Respondents	.056	.752	.339
Home Made	.766	.172	.043
Extraction Method: Principal Component Analysis. Rotation Method: Varimax with Kaiser Normalization. a. Rotation converged in 5 iterations.			

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Under Factor analysis, the study has selected biological variables for both rural and urban categories in the study area. The extraction method in factor analysis is used to understand the most influencing variable among the biological variable that are selected for the study. The rotated component matrix have splited the biological factors in to three factors. In rural area, the most influencing factors are weight of the respondents as the first components, preference of traditional food as the second components and the height of the respondent is selected as third component. In urban area, the most influencing factors are preference of traditional food of the respondents as the first component, the height of the respondents is selected as second component and the palatability of the respondents as the third components.

Chi-Square Test for Rural Area
Body Mass Index (BMI) for Rural Area

	Observed N	Expected N	Residual
Under weight	6	37.5	-31.5
Normal weight	54	37.5	16.5
Over weight	57	37.5	19.5
Obesity	33	37.5	-4.5
Total	150		

Chi-square Test for Rural Area

	Observed N	Expected N	Residual
Veg	3	25.0	-22.0
veg+green+pulses	3	25.0	-22.0
veg+green+pulses+fruits	29	25.0	4.0
veg+green+pulses+fruits+egg+chicken	30	25.0	5.0
veg+green+pulses+fruits+egg+chicken+mutton	70	25.0	45.0
veg+green+pulses+fruits+egg+chicken+mutton+sea&all	15	25.0	-10.0
Total	150		

Chi-square Test Statistic for Rural Area

	BMI	Types of Food
Chi-Square	44.400[a]	125.360[b]
Df	3	5
Asymp. Sig.	.000	.000

a. 0 cells (.0%) have expected frequencies less than 5. The minimum expected cell frequency is 37.5.
b. 0 cells (.0%) have expected frequencies less than 5. The minimum expected cell frequency is 25.0.

The association between BMI and Food Choice in rural area is obtained through the Chi-Square test. The test shows that at degrees of freedom at 3, the BMI is significant at 1% leveland the Food Choice with degrees of freedom at 5 is significant at 1%level. It shows that there is strong association between BMI and Food Choice .The test result shows that the Null hypothesis is that there is a association between the food choice of the respondents and its impact on health risk of the respondents of the study area is proved and the alternative hypothesis which shows that there is no association between the food choice of the respondents and health risk of the respondents is rejected with type- I error in this analysis.

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Chi-Square Test for Urban Area

Body Mass Index (BMI) for Urban Area

	Observed N	Expected N	Residual
Under weight	7	37.5	-30.5
Normal weight	59	37.5	21.5
Over weight	56	37.5	18.5
Obesity	28	37.5	-9.5
Total	150		

Chi-square Test for Urban Area

	Observed N	Expected N	Residual
Veg	2	25.0	-23.0
veg+green+pulses	7	25.0	-18.0
veg+green+pulses+fruits	38	25.0	13.0
veg+green+pulses+fruits+egg+chicken	21	25.0	-4.0
veg+green+pulses+fruits+egg+chicken+mutton	76	25.0	51.0
veg+green+pulses+fruits+egg+chicken+mutton+sea& all	6	25.0	-19.0
Total	150		

Chi-square Test Statistic for Urban Area

	BMI	Types of Food
Chi-Square	48.667[a]	160.000[b]
Df	3	5
Asymp. Sig.	.000	.000

a. 0 cells (.0%) have expected frequencies less than 5. The minimum expected cell frequency is 37.5.
b. 0 cells (.0%) have expected frequencies less than 5. The minimum expected cell frequency is 25.0.

The association between BMI and Food Choice in urban area is also obtained through the Chi-Square test. The test shows that at degrees of freedom at 3, the BMI is significant at 1% level and the Food Choice with degrees of freedom at 5 is significant at 1%level. It shows that there is strong association between BMI and Food Choice .The test result shows that the Null hypothesis is that there is a association between the food choice of the respondents and its impact on health risk of the respondents of the study area is again proved in the urban area also and the alternative hypothesis which shows that there is no association between the food choice of the respondents and health risk of the respondents is rejected with type- I error in this analysis

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DISCUSSION AND CONCLUSION

The biological factors are having two-way influence on food choice. One is based on the physical measurement that, determine the food choice, and on the other, food choice that, determine the physical measurement. In this study it ignored first one and takes the later since, there may be some of the genetic factor which might influence in physical measurements therefore it may be unable to quantify the result. In terms of individual scales, the health factor contains items related to the BMI and health risk (''Height and Weight'') and to general food choice. (e.g. ''menu or types of food '') The questionnaire which administered in this study contained several items related to food choice and health measurements has loaded as the health risk, the six types of food choice selected for the respondent's response, and in health risk, it is included as Body Mass Index (BMI) (<18.5=under weight, 18.5-24.9= normal weight, 25-29.9= overweight >30=obesity). In this study the majority of the respondents are in transition between normal weight to overweight. The food choice T5 influences much in both areas in this analysis. The respondents in urban are highly aware about the health risk therefore they control them in consumption food from T5 to T3 because the T3 choice is out of some fat and cholesterol types of food it is the vegetarian category in nature. And contains green, vegetable, pulses and fruits. Whereas in rural the respondents are not so in awareness. Thus the knowledge by the education plays significant role in selection of food choice in common.

The Chi-Square test has been used to analyze the significant of food choice on health risk in which the BMI (Body Mass Index) and different food choice are taken and it is significant at 1% level. This might be the reason of occupation and the education, and cheaply availability of food. In overall majority of the respondents are low income there by low saving, and indulging in informal occupation having the investment of Immovable investment and least movable investment. The immovable investments are naturally low liquidity in nature where in movable investment is considerably good liquidity but they are useful to them to earn income day to day. The people in rural are working in and around to their native place and will reach their home and prepare whatever they want. Whereas, in urban the respondents are away from their native have to halt in urban area to perform their profession and rarely they go their home. Hence, the data reveals 93%. This literally implies the labour migration. Thus, labour migration plays a pivotal role in selection of food choice in common.

Thus, this present study found the finding to implicate the role of physiological, individual food choice according to different social structures in geographical range. the policy makers should bevery keen in understanding the food choice of the both rural and urban areas. All of them have to address intervention to improve the food choice in future. The results shows that any intervention to improve rural and urban household's food choice would have the simultaneously allocate the priority in long-term healthiness of food selection and make them too easy and equip the people to get practical skill to make them to affordable good quality of food irrespective of region.

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