Chapter-4

Results

To study the prevalence of malaria, mass blood survey was carried out in households of Study and Control Villages. For that people who were met during the survey without symptoms and all the fever cases with symptoms of malaria were tested by rapid diagnostic kits and blood smear preparations in Study and Control Village respectively.

4.1 Prevalence of Malaria among Community

The results are shown in Table 4.1 and Table 4.2. Graphical representations are illatrasted in Figure 4.1, 4.2 and Figure 4.3, 4.4 below.

Table 4.1: Age group distribution of Malaria positive cases in Study village (N=359)

Sex	Age group	Total No. (N%)
Male	<5	3.9
	5-14	5.8
	15>	5.3
	Sub Total	**15**
Female	<5	3.3
	5-14	8.4
	15>	5.6
	Sub Total	**116**
Male+Female	<5	7.2
	5-14	14.2
	15>	10.9
	Total	**32.3**

A total 32.3% people were found positive for malaria without sign and symptoms (Table 4.1) in Study Village. They are healthy but anemic. All the age groups are

affected including children. On the other hand, in the Control Villages, 0.82% positive cases with malaria symptoms have been found (Table 4.2).

Table 4.2: Age group distribution of Malaria Positive cases in Control Village (N=748)

Sex	Age group	Total No. (N%)
Male	<5	.01
	5-14	.18
	15>	.37
	Sub Total	.58
Female	<5	.01
	5-14	.12
	15>	.13
	Sub Total	.02
Male+Female	<5	.02
	5-14	.30
	15>	.50
	Total	**.82**

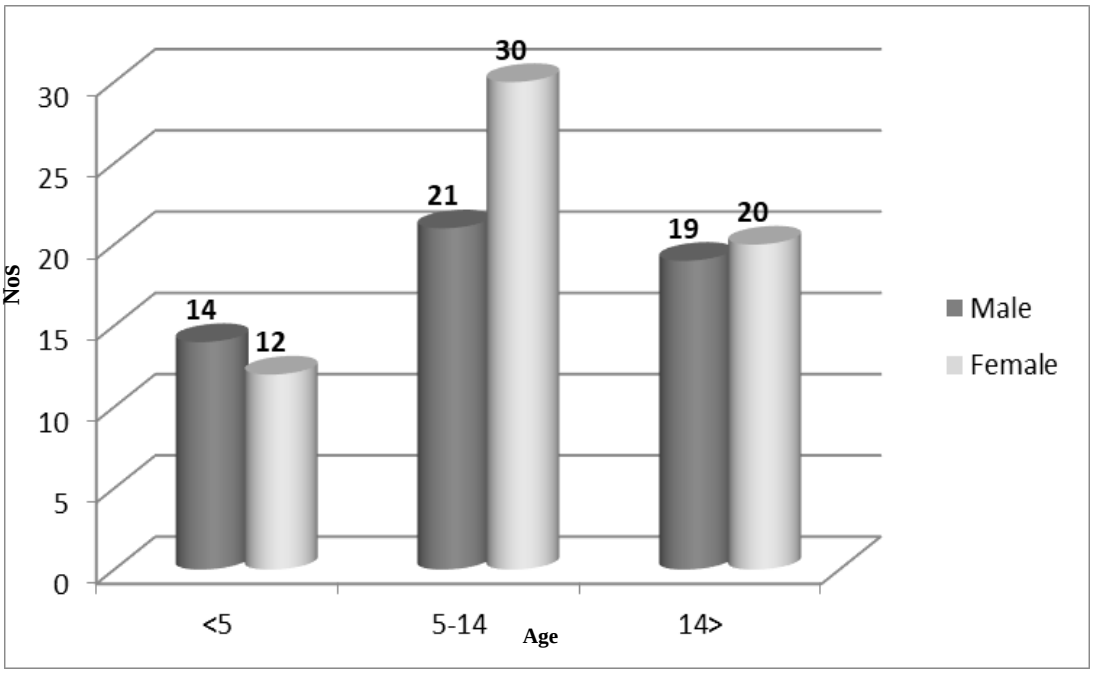


Figure 4.1: Age/Sex distribution of Malaria Positive cases of Study Village

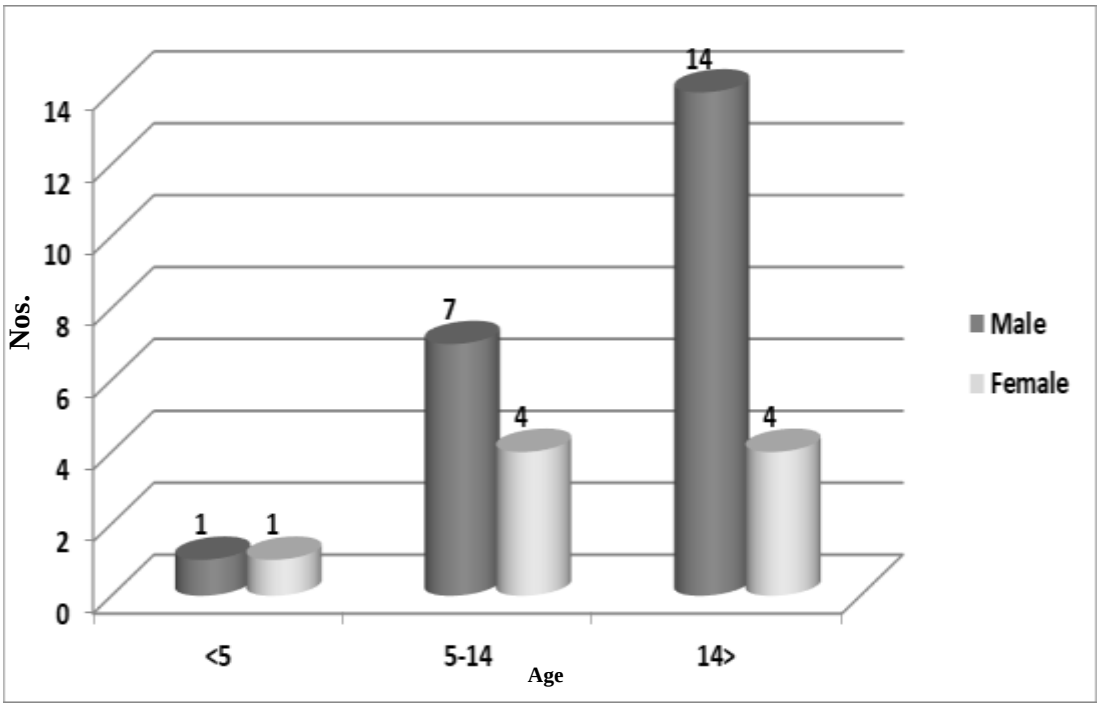


Figure 4.2: Age/Sex distribution of Positive cases of Control village

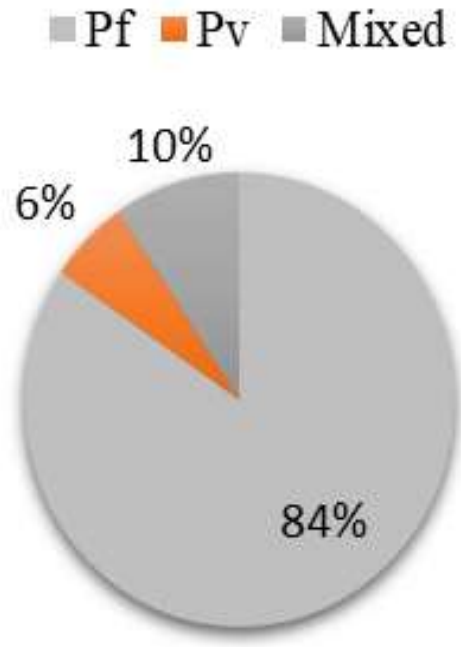


Figure 4.3: Types of Malaria Prevalence in Study Village

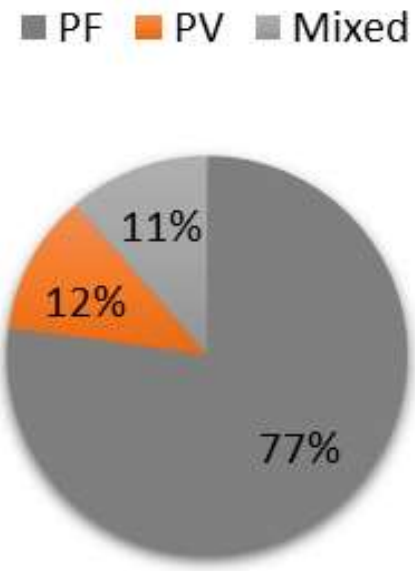


Figure 4.4: Types of Malaria Prevalence in Control Village

The highest age group affected in 5-14 years (14.2%), followed by15> years (10.9%) and 5< (7.2%) in the Study Village. In Control Village the highest case affected in 15> years (0.5%), followed by 5-14(0.3%) and <5 years (0.02%).

4.2 Socio-economic Status of the Community

Different parameters have been taken into account for Socio-economic status of the community. The aspects have been characterized and rated under following different categories.

4.2.1 Age-wise Distribution of Study and Control Village

For age wise distribution, the highest proportion (42.5%) was in the age group of 36-45 years in Study Village and 44% in 25-35 years in Control Village, followed by 30% in the youngest group of 25-35 years of age. Lowest frequency was observed in the group of 56-65 years of age in both the villages. The proportion of female is slightly higher than the male in the age groups of 46-55 years in Study and 25-35, 56-above in Control Village (Table 4.3, Figure 4.5).

Table 4.3: Age/Sex-wise distribution of Study and Control Village

Age group	Age –Sex wise distribution of the respondents					
	Study Village			Control Village		
	Male	Female	Total (%)	Male	Female	Total (%)
25-35	15	12.5	27.5	21.5	22.5	**44**
36-45	22.5	20	**42.5**	16	12.5	28.5
46- 55	10	15	25	11	10	21
56-above	2.5	2.5	**15**	**1.5**	5	6.5
Total	**100**	**100**	**200**	**100**	**100**	**200**

4.2.2 Status of Educational qualification of Study and Control Village

The highest proportion of elected members have studied up to elementary were 75.4% and 30% in Study and Control Village respectively. Least ‘0’ and 2.5% in Graduate and above in Study and Control Village. The proportion of female is

considerably higher than the male at the Primary level but lower in other categories. Education not only gives knowledge to us but also increases our social status. The Educational status of individuals of Study and Control Villages is represented in Table 4.4 and Figure 4.6.

Table 4.4: Educational qualification

Qualification	Study Village			Control Village		
	Male	**Female**	**Total (%)**	**Male**	**Female**	**Total(%)**
Elementary	37.5	42	**75.4**	10	20	30
Upto Class X	7.5	6	15	10	15	25
Matriculate	4	2	6	17.5	10	27.5
H.S.	1	0	1	10	5	15
Graduate & above	0	0	**0**	5	0	2.5
Total	**100**	**100**	**200**	**100**	**100**	**200**

4.2.3 The Occupational Pattern of the Respondents

The occupational pattern of the respondents belonging to different categories of respondents is an indicator of great importance in the present study. It shows the general economic and occupational structure of the rural areas of the study area.

Table 4.5: Occupational Patterns of the respondents

Occupation pattern	Study Village			Control Village		
	Male	**Female**	**Total (%)**	**Male**	**Female**	**Total (%)**
Cultivation	32.5	20	**65.2**	25	15	**40**
Unemployed/Students	17.5	7.5	42.5	10	15	25
Service	0	0	0	5	0	5
Retired	0	0	0	5	0	5
Business	0	0	0	5	0	5
Housewife	0	22.5	22.5	0	20	20

Persons belonging to different occupational categories have different problems, prospects, worldview, occupational prestige and social standings which influence the public issues involved under study. It was that general occupational pattern of the different categories of respondents. Only the primary occupations have been considered. Among the category of respondents, Cultivation was recorded as 65% and 40% and are found to be more common followed by students 42.5% and 25% and housewives 22.5% and 20% are in Study and Control Village respectively. 5% of each are retired, business and service in control village only (Table 4.5, Figure 4.7).

4. 2.4 ST/Non-ST Status

It has been already mentioned that the tribal areas are often interspersed with the non-ST population. Table 4.6 shows that the proportion of ST is higher than respondents in both the villages. It may be mentioned that the study was mainly confined to villages that have ST population only. However, it was observed that many villages are in fact not homogeneous and in some cases, therefore non-ST are found to represent (Figure 4.8).

Table 4.6: ST/ non-ST status of the respondents

Caste	Study Village			Control village		
	Male	Female	Total (%)	Male	Female	Total (%)
ST	50	48	98	35	35	70
Non-ST	0	2	2	15	15	30

4.2.5 Income Level

Income level shows the economic condition of the people. Here, the monthly income of the different categories of respondents has been categorized into five categories on the basis of data available.

Table (4.7) shows that the monthly income of the groups of respondents our data showed 5% in the highest income category (up to Rs 12000 and above) and 30% in the lowest income category (i.e. Rs 3000) (Figure 4.9).

Table 4.7: Income Level of the Respondents of various categories

Monthly Income range (in Rs)	Study Village			Control village		
	Male	Female	Total (%)	Male	Female	Total(%)
Up to 3000	40	17.5	**57.5**	10	20	30
3001-6000	13	12	25	15	15	30
6001-9000	7.5	7	14.5	15	10	25
9001-12000	3	0	3	5	5	10
12000 and above	0	0	**0**	5	0	5

4.2.6 Marital Status

The Marital status of Study and Control villages is shown in Table 4.8. The

Table 4.8: Marital Statuses

Marital status	Study Village			Control Village		
	Male	Female	Total (%)	Male	Female	Total (%)
Unmarried	20.5	25	**45.5**	22.5	17.5	40
Married	25.5	23	48.5	25.5	32	**57.5**
Widowed	3	2	5	0.5	1	1.5
Separated	1	0	1	1	0	1

highest proport ions (57.5%) of members are married in Control Village while 45.5% are unmarried in Study Village. The proportion of widowed is comparatively more among the men compared to women and relatively more women and relatively more women are unmarried (Figure 4.10) in the Study Village.

4.2.7 Family Type

The Family type is divided into Nuclear, Joint and Not Known categories and is depicted in Table 4.9 below.

Table 4.9: Family Type

Family Type	Study Village			Control Village		
	Male	**Female**	**Total (%)**	**Male**	**Female**	**Total (%)**
Nuclear	55	53	**54**	55	40	47.5
Joint	45	47	46	43	60	**51.5**
Not known	0	0	0	2	-	1

The highest proportion of 54% nuclear families were recorded in Study Village and highest 51.5% of members were recorded from joint families in Control Village. The proportion of women members coming from Joint families is higher than male members in both the villages. Conversely, the proportion of women members is lesser from Nuclear families compared to men in both the villages (Figure 4.11).

4.2.8 Knowledge of Malaria

This section describes the knowledge of malaria that was seen at the local level, how it varied from village and person to person and what were the sources of information. Responses relate to whether the respondents have heard of malaria or not, the signs and symptoms, the cause of transmission, preventive measures and the sources of information of malaria and availability of treatment (Table 4.10, 4.11 and Figure 4.12).

i) Heard of Malaria

All the respondents had heard of malaria in the control village whereas in study village 80% of people heard about malaria.

ii) Gender differences in knowledge of Malaria

There is a significant relationship between gender and knowledge of malaria. The gender analysis showed that 42.5% and 50% of men, 38% and 48.5% of women had heard of malaria in the Study and Control Village respectively (Table 4.10). The fact that more men had heard of malaria may be due to their higher mobility within

and outside their villages and therefore their wider interactions with people of other locations. Similarly, women's restriction on mobility may constrain the social interactions, enabling them to network with others perhaps only during market days. It is possible that men are more likely to listen to education messages.

iii) Source of Information and availability of treatment

Public health programs more widely, and disease control efforts more specifically were the sources of information that was identified for particular diseases. The public health providers provided vehicles for information dissemination for a wider audience, with targeted messages tailored to specific groups.

iv) Knowledge regarding signs and symptoms of Malaria

Appropriate health education programs were set up to raise awareness about malaria. The knowledge on signs and symptoms of malaria is important in a community. About 45% (Study Village) and 87.5% (Control Village) of the respondents in the whole sample identified the body becoming hot or fever as a sign and symptom of malaria (Table 4.10). There is a significant difference between gender and signs and symptoms of malaria. Women, nearly 15% (Study Village) and 37.5% (Control Village) reported a hot body or fever as a sign or symptom of malaria and 30% and 37.5% of men reported a hot body or fever as a sign and symptom of malaria in Study and Control Village respectively.

v) Awareness of Cause of Malaria

It is important to know what level of awareness exists in any community with regard to the causes of malaria and how these vary with different socio-economic factors, gender, and location. This, in turn, assists public health programmers to develop appropriate strategies to address both the traditional understandings of the causes of malaria with the correct biomedical understandings prevalent in the communities. There was a difference in gender and knowledge of the cause of malaria. More men 29% (in Study Village) and 45% (Control Village) than women (22.5% and 40%) attributed malaria to mosquitoes (Table 4.10).

vi) Availability of Treatment

Table 4.10 shows that male are more aware of symptoms, cause malaria, availability of treatment and preventive measures in compared to females. The analysis reveals a 1% significant difference between village and knowledge of prevention of malaria. Male has more knowledge of preventive measures than females. 97% and 22% of males knew the availability of treatment in Study and Control Village respectively.

vii) Awareness Knowledge on prevention of Malaria

29%, 46.5% men and 25% and 42.5% of women have the knowledge of prevention of malaria, those key factor in reducing malaria morbidity in study and control village respectively (Table 4.10). The people were asked about the best method of prevention. This revealed an array of responses, including avoiding certain types of foodstuffs, drinking of boiling water, cleanliness. Bed-nets, whether insecticide-treated or not, as the best preventive measure was the response of Dicholro Diphenyl Trichloro Ethane (DDT) from the whole sample. `

Table 4.10: Awareness about Malaria

Sl. No.	Awareness about Malaria	Study Village		Total (%)	Control Village		Total (%)
		Male	Female		Male	Female	
1	**Heard of Malaria**	42.5	38	80.5	50	48.5	98.5
2	**Source of information**	17.5	5	22.5	50	48.5	98.5
3	**Symptoms of Malaria**	30	15	45	42.5	37.5	87.5
4	**Cause of Malaria**	29	22.5	51.5	45	40	85
5	**Availability of treatment**	22.5	12.5	35	97	47.5	83.5
6.	**Preventive Measures**	29	25	54	46.5	42.5	89

viii. Remedial Measures

Control Village, people are well known to the preventive measures and they accept more Govt. Services, the help of health provider in comparison to control. The traditional method is not popular among them only negligible people go for it. They are concerned about cleanliness, health and hygiene. Male people are more conscious

of government activities. The measures taken by the people is shown in Table 4.11 and Figure 4.13 as follows.

Table 4.11: Measures adopted by villagers to cope with Malaria

SL. No.	Methods adopted	Study Village		Total (%)	Control Village		Total (%)
		Male	Female		Male	Female	
1	**Medicated mosquito nets**	0	0	0	50	48.5	98.5
2	**Long Lasting Bed Nets (LLIN)**	33.5	28	61.5	45	47.5	92.5
3	**Smoking**	22.5	12.5	35	42.5	37.5	80
4	**Cleanliness**	26	29	55	45	40	85
5	**Heath & hygiene**	20	19	39	48.5	47.5	96
6.	**Traditional**	34	29	63	2.5	3.5	6

D. Health Seeking Behavior during Malaria

Table 4.12: Health seeking behavior during Malaria fever cases in the family

Sl. No.	Methods	Study Village		Total (%)	Control Village		Total (%)
		Male	Female		Male	Female	
1	**Hospital/Sub center**	17.5	7.5	25	49	48.5	97.5
2	**Traditional**	32.5	42.5	75	1	1	2
3	**Self-medication**	22.5	7.5	30	10	31.5	41.5
4	**Without treatment**	30	35	65	5	7.5	12.5
5	**Heath provider**	0	0	0	35	30	65
6.	**Private fractioned**	0	0	0	15	10	25

The analysis shows that people are much aware of health delivery system available in the locality. But still few of them neglect it and they remain untreated or choose traditional medicine. So, we can observe a gap which to be rectified by available health delivery program through awareness and people's participation. Table 4.12 is shown Health behaviors of the villages (Figure 4.14).

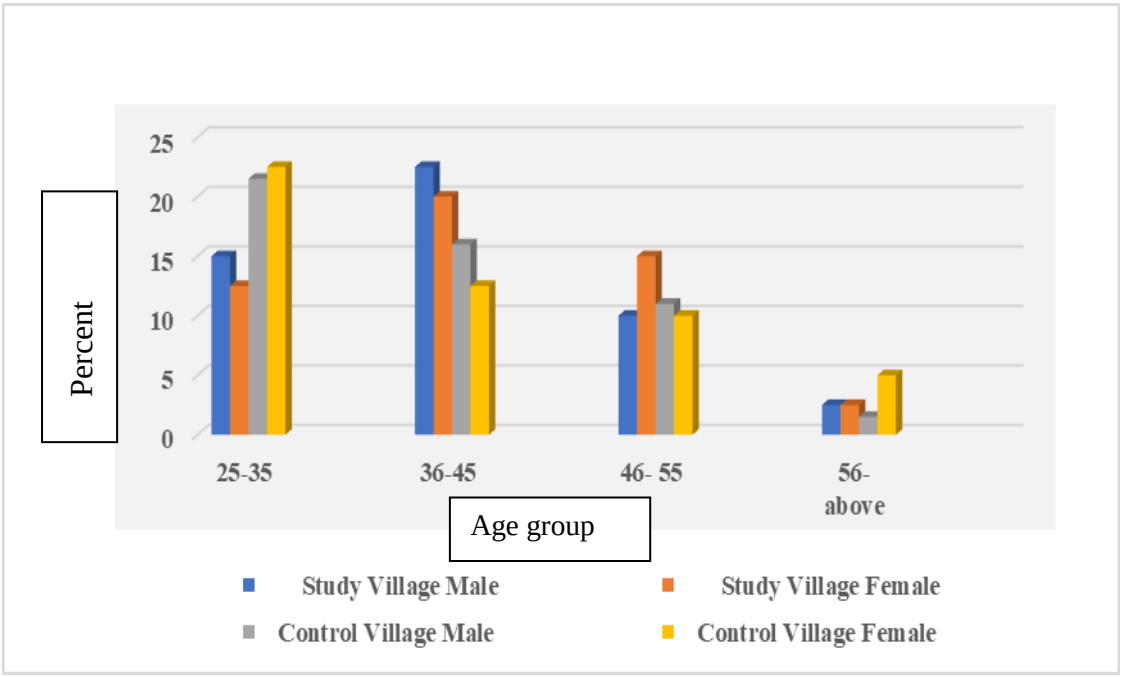


Figure 4.5: Comparison of Age distribution of respondents of Study and Control Village

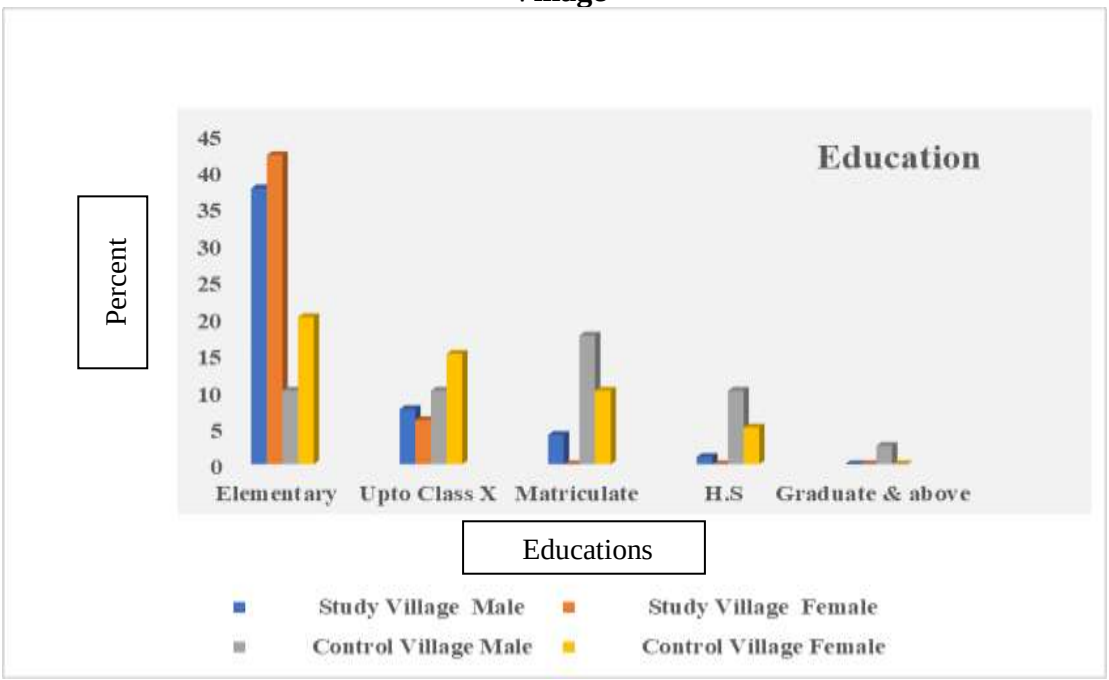


Figure 4.6: Comparison of Education of respondents of Study and Control Village

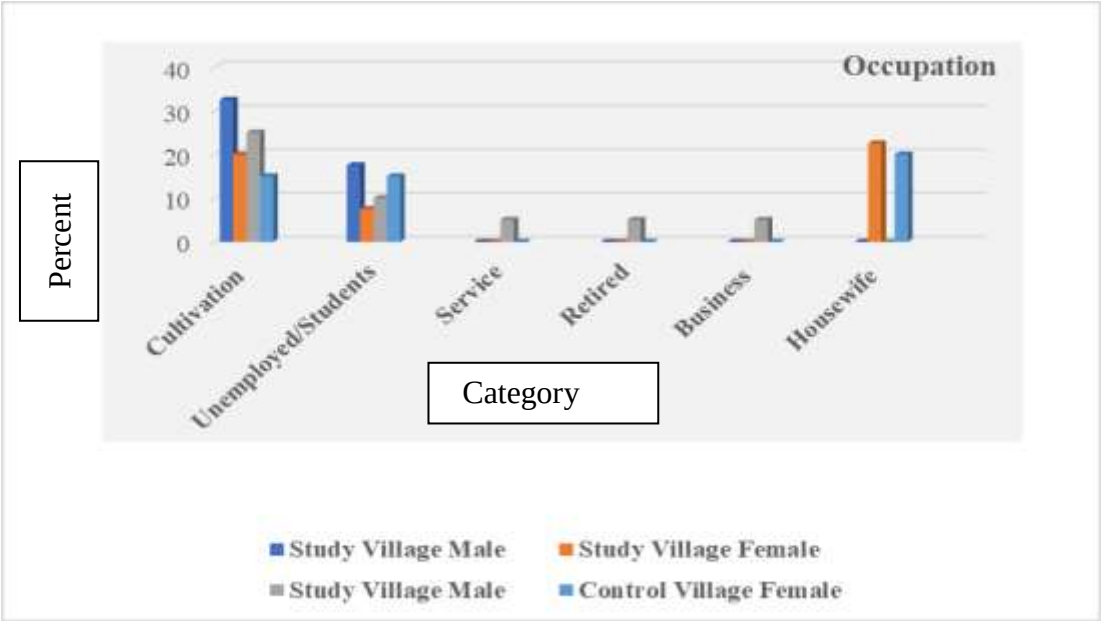


Figure 4.7: Comparison of Occupation of respondents of Study and Control Village

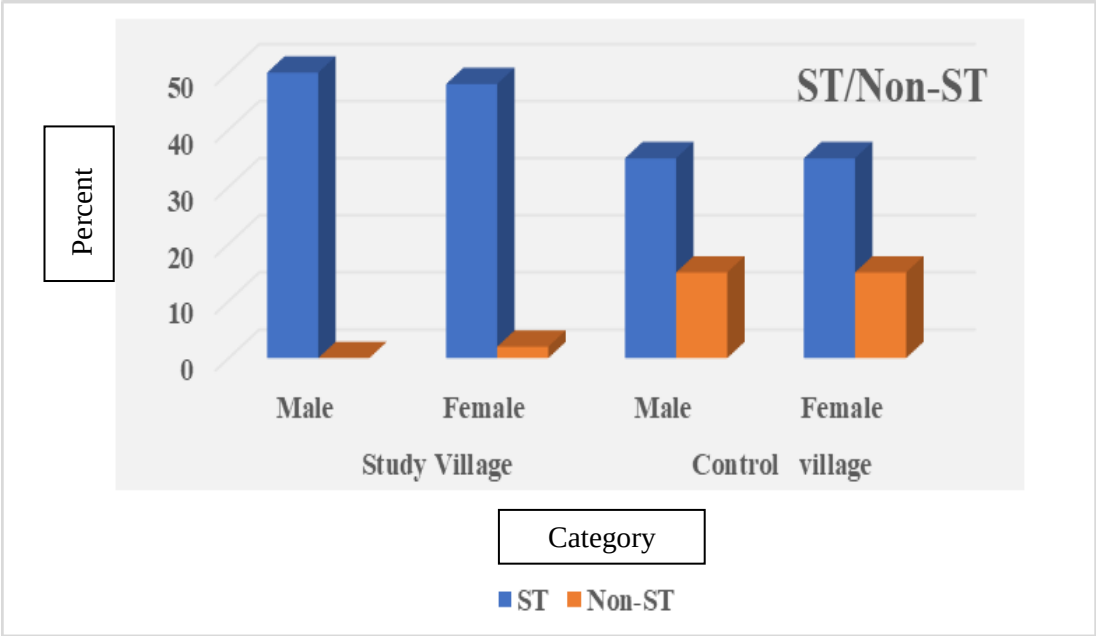


Figure 4.8: Comparison of ST/Non-ST status of respondents of Study and Control Village

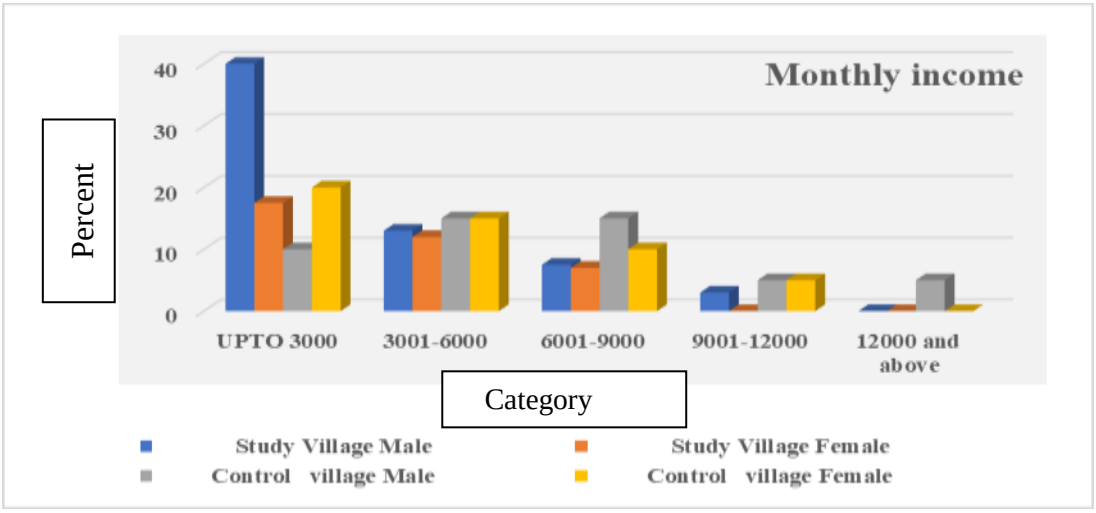


Figure 4.9: Comparison of Monthly Income status of respondents of Study and Control Village

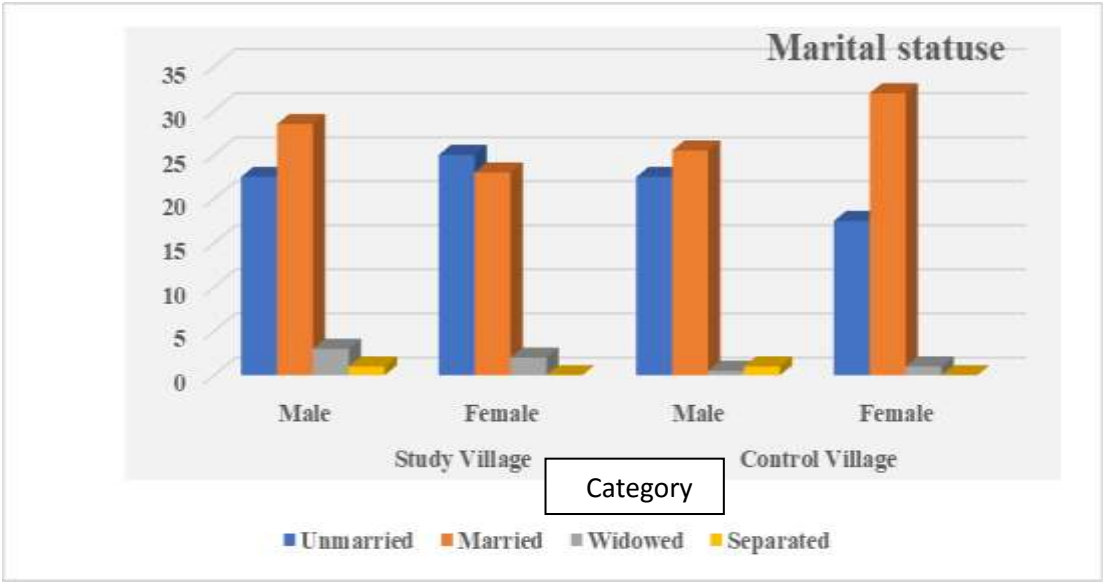


Figure 4.10: Comparison of Marital Status of respondents of Study and Control Village

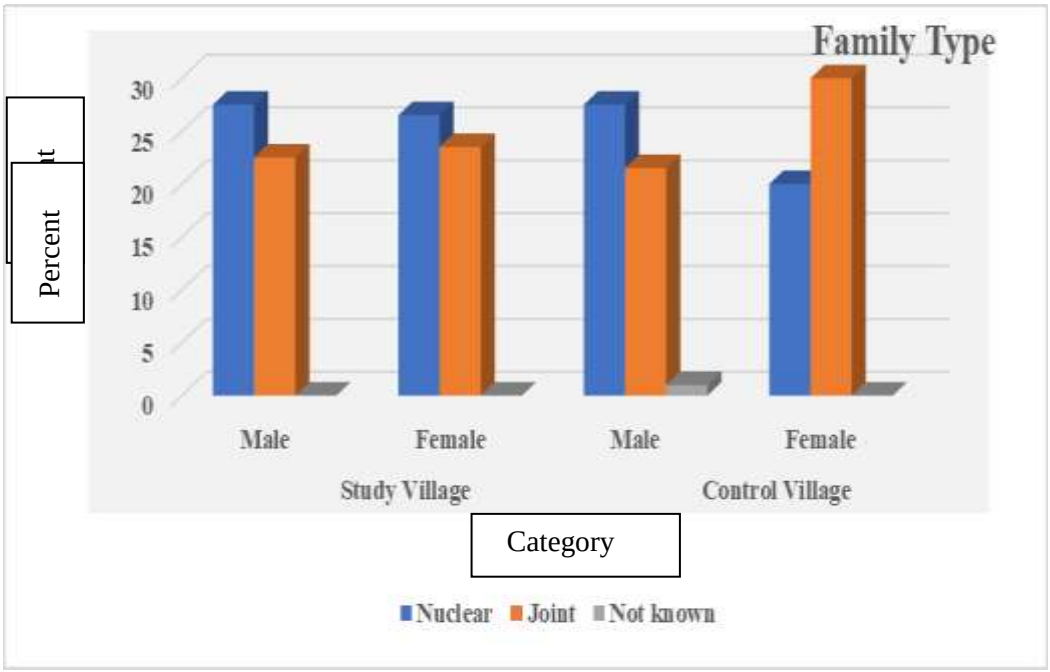


Figure 4.11: Comparison Family Type of respondents of Study and Control Village

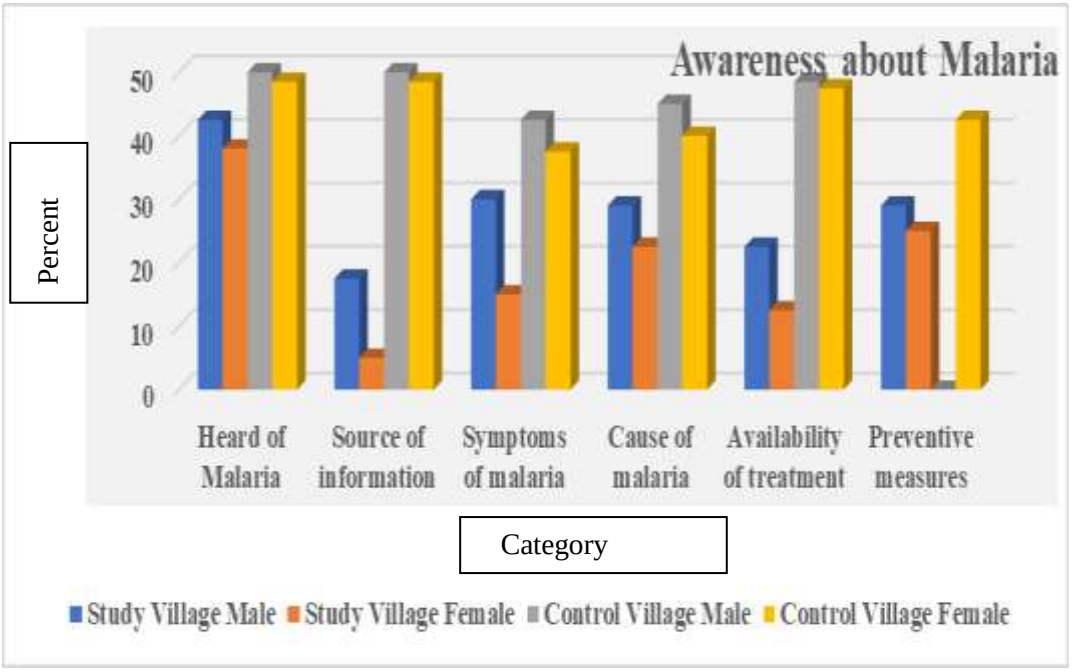


Figure 4.12: Comparison of Awareness of Malaria of respondents of Study and Control Village

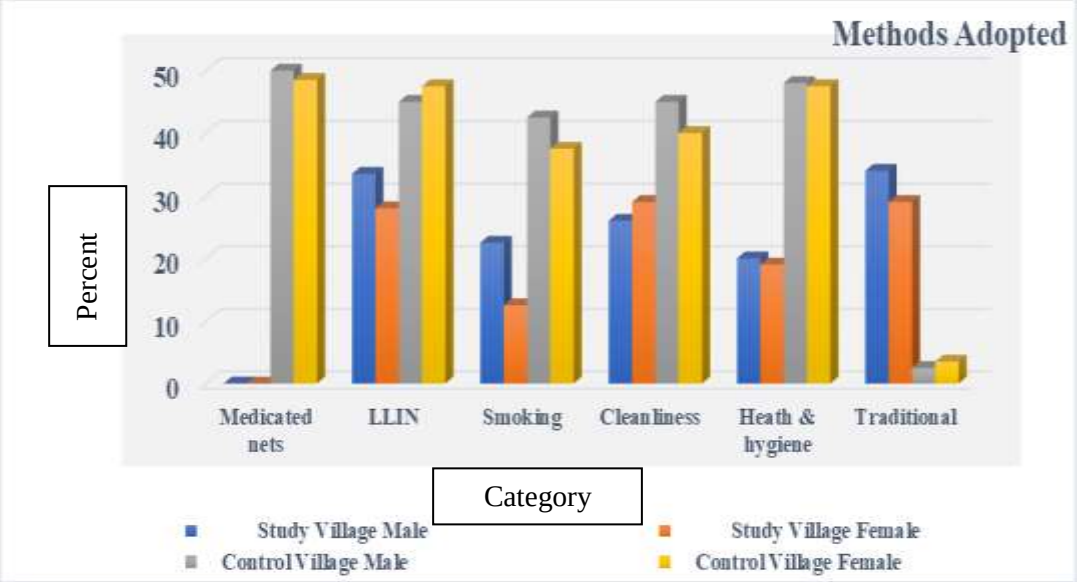


Figure 4.13: Comparison of Methods Adopted for Preventive Measures for malaria of respondents of Study and Control Village

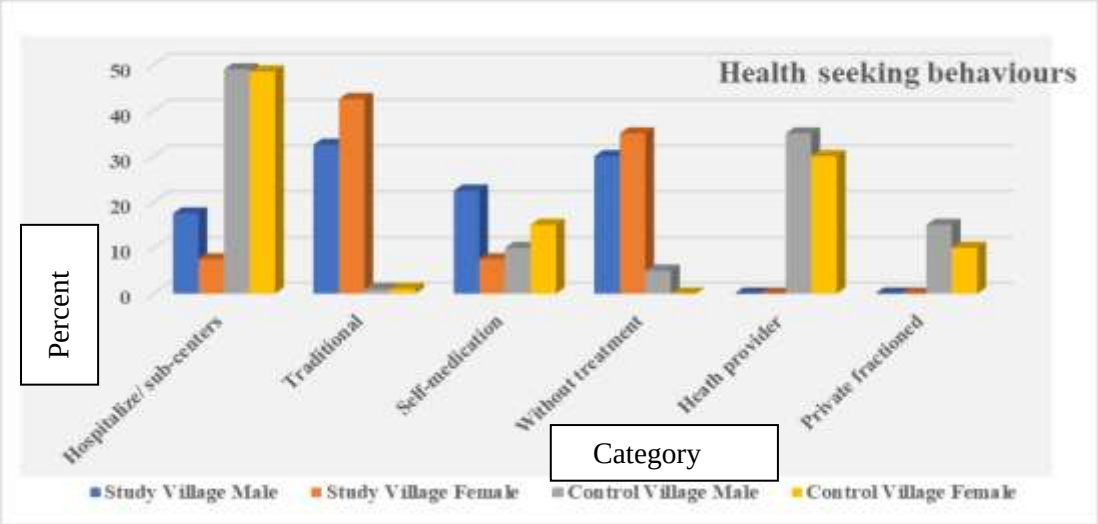


Figure 4.14: Comparison of Health Seeking Behaviour of respondents of Study and Control Village

4.3 Nutritional Evaluation of the Community

4.3.1 BMI status of the =<15 years of children

To find out the nutritional status of the children the age, the groups were categorized into three groups. In both the villages, the highest normal BMI was observed in 0-5 years, 42.1% and 57.6% in Study and Control Villages respectively. Similarly, more malnourished children were observed in study village in comparison to control village. The results are shown in Table 4.13, 4.14 and Figure 4.15, 4.16.

Table 4.13: BMI/Age wise distribution (Study Village)

Age group	> Median - 2SD to +<1 1 SD	Median < -2SD to > -3SD	< Median - 3SD	Median >+ 1SD to < + 3SD	> + 3SD
0-5	42.1	18.7	18.7	10.4	0
5-10	39.5	14.5	16.6	2.08	0
10-15	41.2	26.3	21.0	0	15.7
	Normal	**Moderate undernutrition**	**Severe undernutrition**	**Overweight**	**Obesity**

Table 4.14 BMI/Age wise Distribution (Control Village)

Age group	> Median - 2SD to +<1 1 SD	Median < -2SD to > -3SD	< Median - 3SD	Median >+ 1SD to < + 3SD	> + 3SD
0-5	57.6	3.0	16.6	16.6	6.0
5-10	45.4	27.3	9.0	4.5	9.0
10-15	50	8.3	33.3	8.3	0
	Normal	**Moderate undernutrition**	**Severe undernutrition**	**Overweight**	**Obesity**

4.3.2 BMI Criteria with Sex Distribution

Similarly, it was seen that compare to Study Village more children were found normal with BMI in Control Village and boys were healthier than girls. In moderate and severe undernutrition category, Study Village were poorer than Control Village and girls were more undernourished in both the villages (Table 4.15 and Figure 4.18).

Table 4.15: BMI Criteria with Sex Distribution

BMI criteria	Study		Total	Control		Total
	Boys	Girls		Boys	Girls	
Severe undernutrition	3	18	21	3	6	18
Moderate undernutrition	12	9	21	3	15	9
Normal	25	24	49	**31**	24	56
Overweight	3	3	6	4	7	11
Obese	3	0	3	4	2	6

4.3.3: Association of Malaria with BMI

Association of malaria with malaria not much clear and results showed both association and no association of malaria with BMI. In Study Village it was reported more numbers were normal BMI association with malaria, whereas without malaria less numbers of Normal BMI and higher numbers of malnourished children(<BMI). On the other hand, in control village, with malaria normal BMI and lesser BMI is almost equal. Whereas, without malaria more normal BMI was observed.

Table 4.16: Association of Malaria with BMI

Villages	With Malaria		without Malaria		Total
	Normal BMI	<BMI	Normal BMI	<BMI	
Study Village	53	29	6	12	100
Control Village	5	6	60	29	100

The result showed that Control Village is more normal in BMI than Study Village (56 and 49) and Study Village is more undernourished and severely undernourished than Control Village. In Study Village boys have more normal BMI, whereas in Control Village girls (Figure 4.18). Age distribution on BMI status shows 0-5 years have normal BMI in both the village. Association of malaria with malaria not much clear and results showing both association and no association of malaria with BMI (Table 4.16 and Figure 4.19).

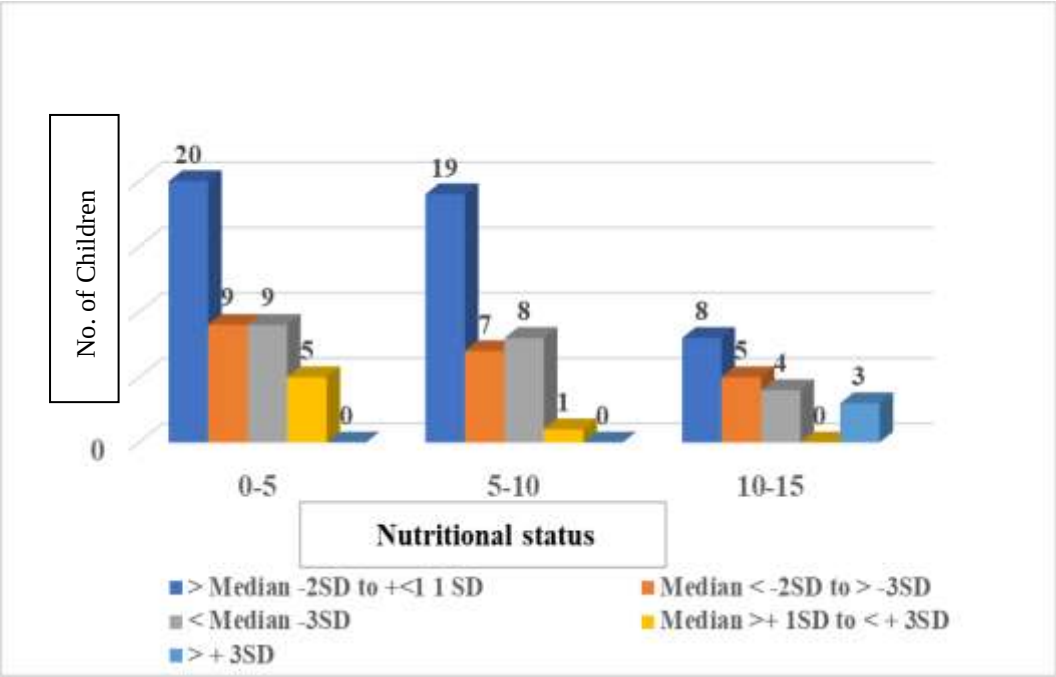


Figure 4.15: Age distribution of BMI in Study Village

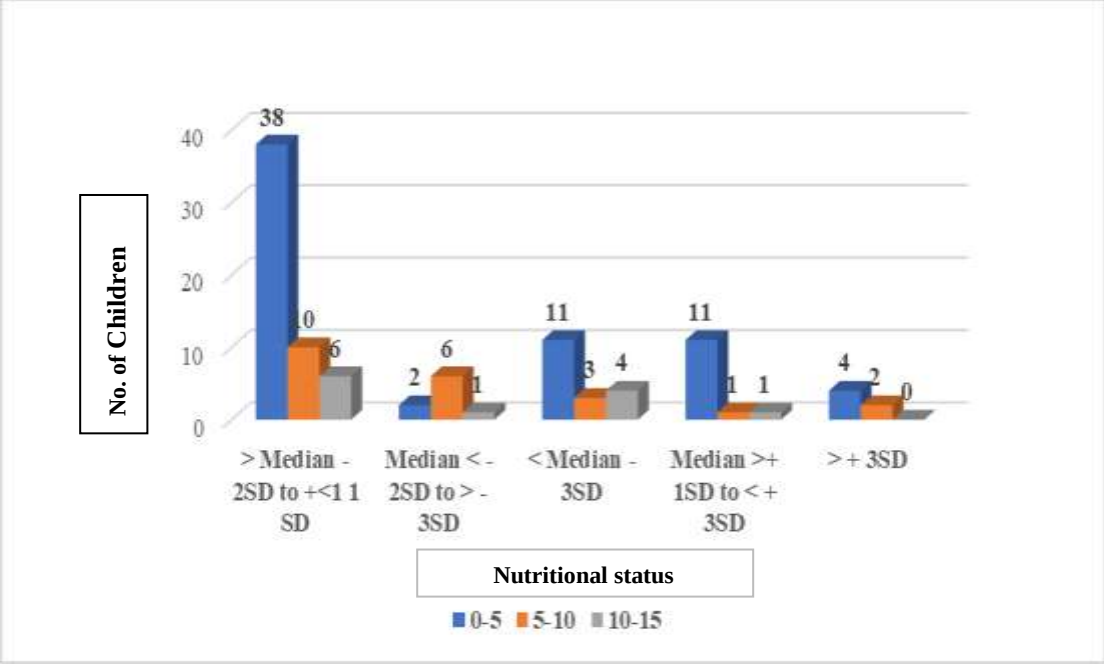


Figure 4.16: Age distribution of BMI in Control Village

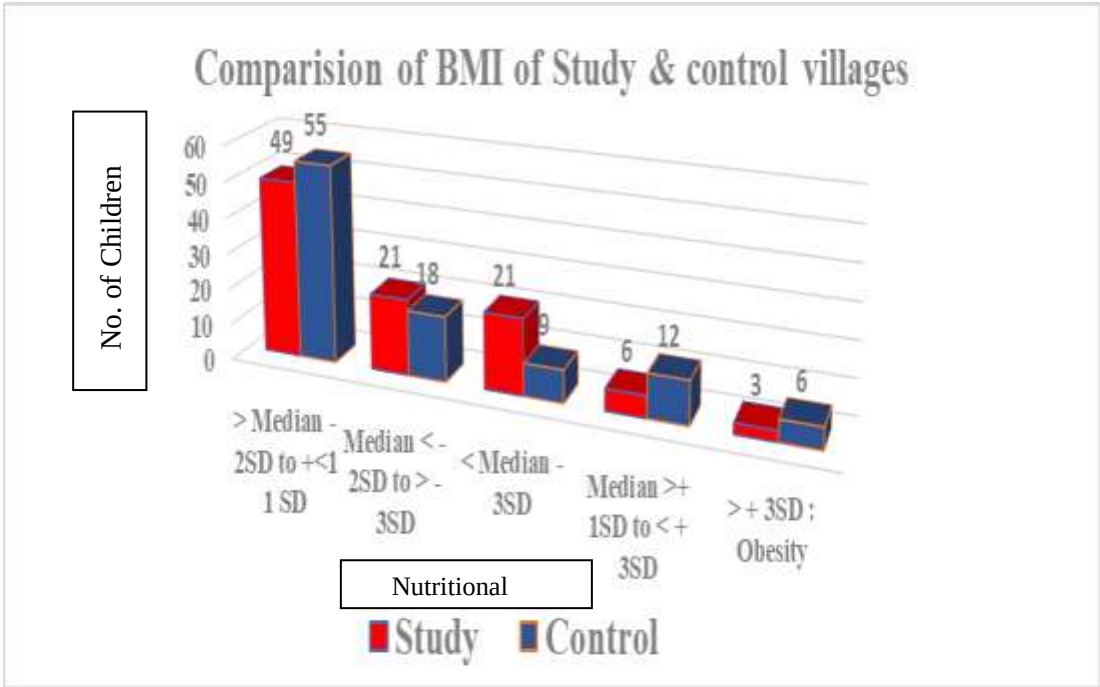


Figure 4.17: Comparision status of BMI in Study and Control Village

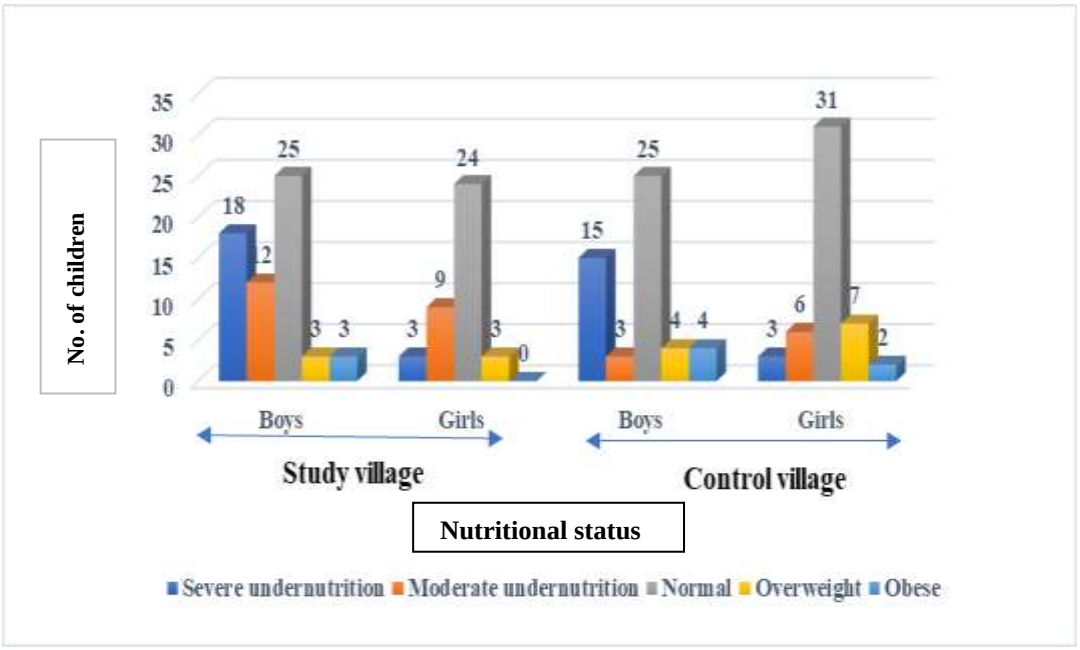


Figure 4.18: BMI criteria with Sex Distribution

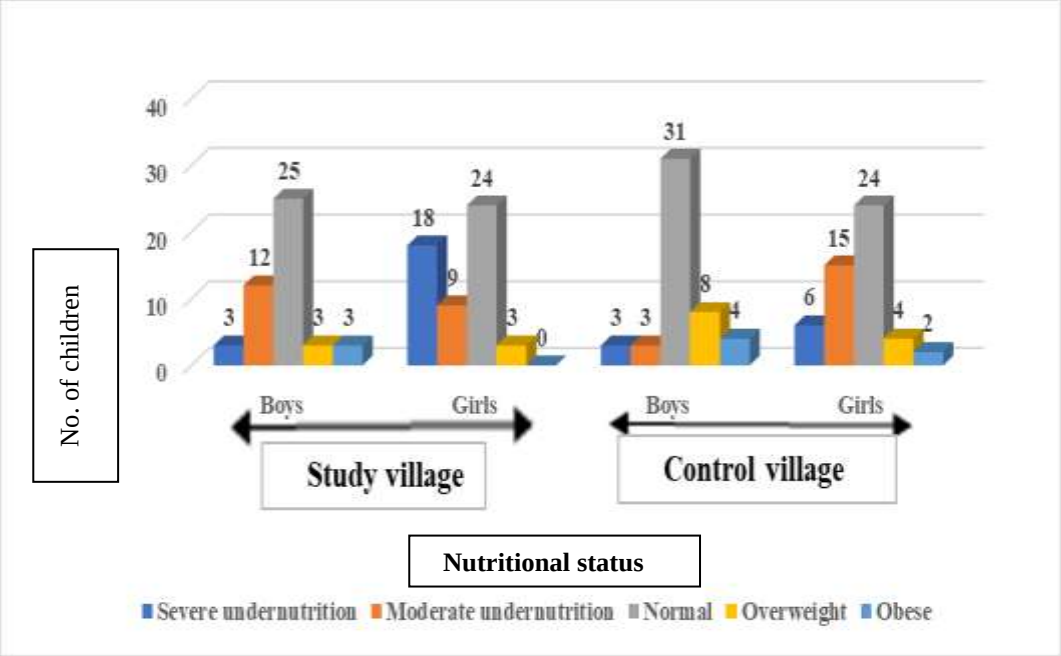


Figure 4.19: Association of Malaria with BMI

4.3.4 Study of Food Varieties and Methods of Preparation

The Study Village is habitats of Garo ethnicity groups who make a living by a combination of Assamese horticulture and fishing. The population are self-sufficient in food production and engaged in small business. Their diets appear to be traditional and composed of the resources available in their eco-system and varies according to seasonal variations.

General characteristics of their Diet

Study Village

Selections of their diet and frequency of use have a directl effect on their health and nutritional status. The group of 359 population of three small villages, inhabitants of tropical hilly forest environment and ethnographically they are not known. These group of populations makes a living in hilly low-lying forested regions and diet shared a diet based on cassava, corm, papaya flower/fruit, banana plantain, dry and fermented fish, soda-based meal, neem, and other bitter vegetables. Most frequently eaten food life cassava and other corns, fermented fish and locally

cultivated vegetables, meat, fruits. They also use variety of small fauna like frogs, snails and other insects. The staple diet is rice.

Composition of Diets

The Study Village, the villagers inhibit interiors mountainous rain forest regions nearby foothills. The detailed information of diets can be divided into raw, boil and cooked with soda and fermented fish. Cassava, plantain, fish, pork are the main source of energy booster. Fermented fish is are the most important protein source which is more common in many other tribes. Their diet is based on mainly rooted vegetables cultivated as well as wild which function as a carbohydrate source. Pumpkin, guards are also important diets which they use throughout the year. Flowers play an important part in their diet like papaya flower, banana flower, justice flower, drumstick flowers are few common and frequently used in diets. Bitter guards, neem leaves and some wild vegetable leaves are most common vegetable foods. A detailed procedure of methods of cooking are summarized in Table 3.1 and 3.2.

Control Village

In Control Village, diet described by a different pattern. The modern village dietary resources are as per seasonal variation and are usually available in the market and few are cultivated in the villages. Rice is also staple food of these villages. Most commonly used energy source in pork, chicken, and fish. They are economically better than the study village. Uncultivated food like lentils, oil, pork etc. contributes energy to diets. Cultivable vegetables like cauliflower, brinjal, jute leaves and other seasonal vegetables which are available are also frequently used. Soda and fermented and dry fish are also used in food. Wild vegetables like corms, drumsticks, Blechnum (hard fern), Justicia, *Ficus carica*, fish mint, bamboo shoot are most frequently as vegetables in the diet. All food are consumed as per their choice either traditional style or with masala powder. They also use onion, garlic, ginger, chilly in all the items. Detain compositions of frequently consumed items are summarized in Table 3.1 and 3.2. Apart from this small fauna are also included in their diet. The maximum amount

of energy arises from pork which is most frequently eaten and chicken, fish, egg are also taken. Vegetable proteins in the form of lentils, black grams, and other vegetable cereals are also consumed.

Seasonal Variations in Diet and Wild Food use

Study Village: Though it was not studied broadly, the research was carried out during 2016-2017 showed that except rice there is difference in total food supply. It is seen that cassava, corm, plantain, papaya, rooted vegetables are continuously cultivated and harvested throughout the year. Fresh and fermented fish and also consumed as it can be preserved for the whole year. The intake of wild vegetables and animals vary according to their availability (Table 3.1 in Chapter 3).

Control Village: There were fluctuations in day to day variations in intake of food due to seasonal availability of vegetables in the market. But people consumed more amount animal protein especially from pork, which is the main source of fats, and protein, followed by chicken, house sparrow and fish. Fermented fish (Hridal) also used in traditional items. As there is mix type of tribal and non-tribal populations and so their taste differs accordingly. Wild vegetables and small animal proteins like snails, crustaceans are also commonly consuming by them (Table 3.3).

4.3.5 Chemical analysis of Food Varieties Consumed by the Communities

Table 4.17, 4.18 and 4.19, 4.20 give the contents in moisture, ash, proteins, carbohydrates, fats and of dishes expressed in grams per 100 g of dry weight (% d.w) except the moisture content which is expressed in grams per 100 g of fresh weight (% f.w). The energy derived from the food varieties is reflected as Kcal per 100 gm. The results presented here are the average values for each variety. Per sample three replications were done. The results are given in the form: mean ± standard deviation.

The replicates and statistical analysis of the food varieties are illustrated in Table 4.17, 4.18 and 4.19, 4.20 of Study and Control villages accordingly below.

4.17: Nutritional content of food sample (Study Village)

Sl. No	Item	Moisture (%)			Total Ash (%)			Total Fat (%)			Total Protein (%)			Total Carbohydrate (%)			Total Energy (Kcal /100g)
		R1	R2	R3	R1	R2	R3	R1	R2	R3	R1	R2	R3	R1	R2	R3	
1	V1	92.2	91.7	92.5	2.7	2.66	2.74	0.3	0.32	0.4	1.43	1.36	1.44	3.35	3.4	3.51	22.4
2	V2	86.4	86.7	86.3	3.98	3.96	4.04	0.04	0.04	0.06	2.8	2.76	2.82	6.75	6.69	6.51	38.3
3	V3	92.4	92.4	92.4	3.17	3.24	3.2	0.07	0.06	0.07	2.11	2.14	2.06	2.24	2.23	2.22	18
4	V4	85	84.9	85.1	4.95	4.86	4.9	0.08	0.1	0.1	3.33	3.26	3.34	6.67	6.65	6.66	40.8
5	V5	75.4	75.4	75.6	5.93	5.86	5.9	1.05	0.96	1.01	5.53	5.46	5.5	12.1	12.1	12.1	79.6
6	V6	71.1	71	71.2	4.36	4.3	4.4	0.85	0.92	0.88	4.43	4.36	4.4	19.2	19.3	19.3	103
7	V7	41.5	41.8	41.7	16.3	16.3	16.4	3.61	3.54	3.56	31.4	36.7	36.9	1.41	1.42	1.43	186
8	V8	91.5	90.8	91.2	2.16	2.31	2.28	0.12	0.1	0.11	2.57	2.62	2.5	3.78	3.81	4.02	26.8
9	V9	75.6	75.7	75.7	2.26	2.34	2.28	0.17	0.2	0.14	2.31	2.32	2.5	19.5	19.5	19.5	89
10	V10	76.1	70.3	70.1	1.5	1.44	1.52	2.81	2.78	2.84	10.5	10.4	10.6	14	15	16	127
11	V11	23	22.9	23.1	1.23	1.17	1.44	0.28	0.32	0.33	1.65	1.57	1.74	73.7	73.7	73.8	305
12	V12	78.8	78.9	78.4	5.54	5.6	5.76	3.4	3.32	3.4	3.2	3.14	3.22	9	9.1	9.2	79.5
13	V13	89.1	89	89.2	1.08	1.04	1.14	0.12	0.1	0.14	2.4	2.36	2.44	7.34	7.36	7.14	39.8
14	V14	67.1	67.2	67.1	2.1	2.04	2.12	0.08	0.1	0.08	2.4	2.36	2.42	28.2	28.2	28.3	123
15	V15	85	85.4	84.9	8.1	8.14	8.06	2.4	2.32	2.36	2.1	2.16	2.12	2.43	2.38	2.12	39
16	V16	86.7	86.3	86.7	1.83	1.76	1.84	0.67	0.72	0.7	1.1	1.06	1.04	9.71	9.68	10.1	50
17	V17	85.2	85.3	85.1	1.22	1.18	1.24	0.05	0.04	0.05	1.02	1	0.96	13.4	11.8	12.4	54.6
18	V18	87.3	87.6	87.7	1.1	1.06	1.14	0.03	0.03	0.02	3.73	3.66	3.71	7.5	7.8	7.8	45.9
19	V19	89.2	89.3	89.3	1.3	1.26	1.33	0.01	0.01	0.01	3.71	3.73	3.66	5.5	5.7	5.93	37.7
20	V20	88.3	88.7	88.7	0.41	0.36	0.38	0.1	0.08	0.12	4.23	4.17	4.26	6.63	6.8	6.76	44.7
21	V21	85.5	86.1	85.3	10.3	10.4	10.4	0.56	0.44	0.6	2	1.74	2.1	1.93	1.69	1.38	18.6
22	V22	7.9	7.76	7.84	5	5.14	5.06	37	36.9	36.9	19.4	19.4	19.4	32.8	31.6	27.9	533
23	V23	87.6	87.5	87.6	0.8	0.81	0.76	0.13	0.1	0.1	4.95	4.9	4.97	6.31	6.92	6.92	47
24	V24	29.5	29.6	29.5	6	5.86	6.02	2.17	2.11	2.34	8.54	8.57	8.55	51.7	54.1	55.4	269
25	V25	83	82.9	83	0.3	0.33	0.31	0.7	0.66	0.66	6.64	6.66	6.54	8.99	9.28	10	70.2

Table 4.18: Analysis of Food Sample (Study Village)

Food item	Moisture (±SEM)	Ash (±SEM)	Protein (±SEM)	Carbohydrate ((±SEM)	Fats (±SEM)	Total Energy (±SEM)
1	92.2±0.03	2.7±0.04	1.41±0.04	3.42±0.08	0.25±0.19	22.4
2	86.49±0.22	3.99±0.04	2.79±0.03	6.65±0.12	0.25±0.19	38.25
3	92.30±0.04	3.20±0.03	2.10±0.04	2.23±0.01	0.06±0.005	17.95
4	85.02±0.08	4.90±0.04	3.31±0.04	6.66±0.11	0.09±0.01	40.78
5	75.46±0.13	5.89±0.03	5.49±0.03	19.25±0.01	1.007±0.04	79.61
6	71.11±0.09	4.35±0.05	4.39±0.03	19.25±0.01	0.88±0.03	102.52
7	41.65±0.16	16.33±0.06	35.01±.13	1.42±0.01	3.57±0.03	185.9
8	91.17±0.31	2.25±0.07	2.56±0.06	3.87±0.13	0.12±0.02	26.8
9	75.66±0.07	2.22±0.04	2.37±0.10	19.46±0.009	0.17±0.03	88.97
10	72.16±3.40	1.48±0.04	10.53±0.09	15±1	2.81±0.03	127.37
11	22.99±0.12	1.28±0.14	1.65±0.08	73.62±0.43	0.31±0.02	304.56
12	78.70±0.23	5.63±0.11	3.18±0.04	9.1±.1	3.37±0.04	79.53
13	89.09±0.06	1.08±0.05	2.4±0.04	7.28±0.07	0.12±0.02	39.8
14	67.15±0.07	2.08±0.04	2.39±0.03	28.24±0.03	0.086±0.01	123.46
15	85.09±0.23	8.10±0.04	2.12±0.03	2.31±0.46	2.36±0.04	39
16	86.57±0.20	1.81±0.04	1.06±0.03	9.82±0.21	2.79±3.64	49.98
17	85.19±0.07	1.21±0.03	0.99±0.03	12.54±0.80	0.04±0.005	54.61
18	87.53±0.25	1.09±0.04	3.7±0.03	7.7±0.17	0.02±0.005	45.87
19	89.27±0.03	1.29±0.03	3.7±0.03	5.71±0.21	0.01±0	37.73
20	88.56±0.23	0.38±0.02	4.22±0.04	6.73±0.08	0.09±0.02	44.7
21	85.65±0.39	10.38±0.03	1.94±0.18	1.5±0.16	0.53±0.08	18.57
`22	7.83±0.07	5.06±0.07	19.4±0.02	30.75±2.57	36.93±0.07	533.15
23	87.57±0.05	0.79±0.02	4.94±0.038	6.55±0.32	0.11±0.01	46.95
24	29.55±0.03	5.96±0.08	8.55±0.01	53.72±1.86	2.20±0.11	268.97
25	82.97±0.04	0.31±0.01	6.61±0.06	9.43±0.53	0.67±0.23	70.2

Table 4.19: Nutritional Content of Food Sample (Control Village)

Sl. No.	Item	Moisture (%)			Total Ash (%)			Total Fat (%)			Total Protein (%)			Total Carbohydrate (%)			Total Energy (Kcal /100g)
		R1	R2	R3	R1	R2	R3	R1	R2	R3	R1	R2	R3	R1	R2	R3	
1	V1	92.74	92.66	92.81	2.73	2.7	2.77	0.26	0.24	0.22	2.88	2.96	2.9	1.38	1.37	1.36	19.32
2	V2	80.92	80.64	81.22	2.1	2.02	2.07	5.12	5.2	5.16	3.46	33.33	3.4	8.58	8.12	8.65	93.84
3	V3	87.97	88.14	88	0.81	0.8	0.76	0.1	0.08	0.12	6.25	6.32	6.26	4.76	4.78	4.8	45.14
4	V4	42.63	41.74	42.81	0.46	0.5	0.44	0.51	0.48	0.5	1.96	2	1.96	53.98	54.8	55.15	231.02
5	V5	74.15	74.74	73.81	1.3	1.22	1.33	0.3	0.33	0.28	5.63	5.71	5.56	18.54	18.49	18.65	99.46
6	V6	46.55	47.04	46.74	0.43	0.5	0.44	0.32	0.3	0.34	1.97	2.11	2	50.38	50.41	50.41	212.56
7	V7	25.44	25.6	25.5	0.68	0.72	0.7	0.3	0.28	0.33	1.16	1.22	1.2	72.1	72.5	72.3	296.7
8	V8	36.28	36.61	36.4	1	0.96	1.1	36.41	35.84	36.54	10.75	10.64	10.81	15.38	15.61	15.69	431.51
9	V9	64.47	64.55	64.51	0.53	0.5	0.56	0.25	0.3	0.26	2.76	2.8	2.78	31.89	31.78	32.06	141.2
10	V10	70.22	70.14	70.26	1.14	1.2	1.12	0.36	0.4	0.38	2.24	2.3	2.22	25.98	26.01	26.09	116.46
11	V11	51.44	51.36	51.4	0.8	0.76	0.84	3.22	3.24	3.2	1.32	1.28	1.3	43.21	43.12	43.51	207.3
12	V12	44.36	44.21	44.27	0.76	0.74	0.81	32.81	32.76	32.78	9.74	9.14	9.2	12.8	12.78	12.85	383.7
13	V13	90.36	90.24	90.51	1..14	1.22	1.06	0.46	0.51	0.44	2.47	2.68	2.77	5.28	5.19	5.43	36.31
14	V14	60.22	60.34	60.14	1.86	1.91	1.94	15.76	15.8	15.91	14.44	14.51	14.36	7.58	7.63	7.62	230.58
15	V15	65.11	65.26	65.14	2.04	2.11	2.12	16.81	16.76	16.84	15.1	15.06	15.14	0.83	0.85	0.81	214.92
16	V16	84.8	84.34	84.71	0.61	0.66	0.57	0.7	0.64	0.74	3.46	3.61	3.55	10.64	10.71	10.24	62.58
17	V17	71.45	71.61	71.54	2.14	2.22	2.18	3.81	3.86	3.77	6.74	6.68	6.81	15.73	15.71	15.78	124.21
18	V18	93.07	92.84	92.9	1.6	1.54	1.55	0.1	0.1	0.1	4.04	4.1	4.06	1.34	1.31	1.34	22.5
19	V19	92.27	92.33	91.76	2.54	2.46	2.5	0.15	0.11	0.16	3.23	3.36	3.27	1.95	1.93	1.94	22.22
20	V20	57.72	57.68	57.8	2.1	2	2.04	16.27	16.33	16.31	16.2	16.14	16.16	7.77	7.48	8	242.38
21	V21	22.6	22.54	22.55	5.23	5.34	5.27	3.7	3.66	3.66	52.36	51.81	51.77	16.53	16.58	16.42	307
22	V22	74.01	74.14	73.96	5.55	5.6	5.56	0.53	0.6	0.56	3.1	3.06	3.14	16.73	16.71	16.75	84.36
23	V23	76.56	76.64	76.22	2.86	2.84	2.88	1.5	1.44	1.46	4.4	4.44	4.37	14.81	14.78	14.81	90
24	V24	83.62	83.66	83.56	4.76	4.8	4.84	0.31	0.28	0.28	3.16	3.12	3.2	8.11	8.16	8.12	47.86
25	V25	90.53	90.24	90.33	1.86	1.74	1.8	0.04	0.04	0.03	1.86	1.92	1.96	5.88	5.85	5.97	31.6

Table 4.20: Analysis of Food Sample (Control Village)

Food item	Moisture (±SEM)	Ash (±SEM)	Protein (±SEM)	Carbohydrate (±SEM)	Fats (±SEM)	Total Energy (Kcal /100g)
1	92.74 ±0.07	2.73 ±0.03	2.29 ±0.04	1.38 ±0.02	0.24±0.02	19.32
2	80.93 ±0.29	2.06 ±0.04	3.19 ±0.06	8.45 ±0.28	5.16±0.04	93.84
3	42.4 ±0.57	0.79 ±0.02	1.9 ±0.02	54.64 ±0.60	0.49±0.015	45.14
4	74.23 ±0.47	1.28 ±0.05	5.6 ±0.07	18.56 ±0.08	0.49±0.015	231.02
5	46.77 ±0.24	0.45 ±0.03	2.02 ±0.07	50.4 ±0.01	0.30±0.025	99.46
6	25.51 ±0.08	0.69 ±0.02	1.19 ±0.03	72.3 ±0.2	0.30±0.025	212.56
7	36.43 ±0.16	1.02 ±0.07	10.73 ±0.08	15.56 ±0.16	36.2±0.37	296.70
8	64.51 ±0.04	0.53 ±0.03	2.77 ±0.02	31.91 ±0.14	0.27±0.02	431.51
9	70.20 ±0.06	1.15 ±0.04	2.22 ±0.04	26.02 ±0.05	0.38±0.02	141.2
10	51.4 ±0.03	0.79 ±0.04	1.3 ±0.02	43.28 ±0.20	3.22±0.02	116.46
11	44.28 ±0.07	0.77 ±0.03	9.36 ±0.33	12.81 ±0.03	32.78±0.02	207.30
12	90.37 ±0.13	1.13 ±1.13	2.64 ±0.15	5.3 ±0.12	0.47±0.03	383.70
13	60.23 ±0.10	1.90 ±0.04	14.43 ±0.7	7.61 ±0.02	15.82±0.07	36.31
14	65.17 ±0.07	2.09 ±0.04	15.1 ±0.04	0.83 ±0.01	16.80±0.04	230.58
15	84.61 ±0.24	0.61 ±0.04	3.54 ±0.07	10.53 ±0.25	0.69±0.05	214.92
16	66.66 ±0.07	1.10 ±0.06	2.63 ±0.09	26.85 ±0.14	2.74±0.06	62.58
17	71.53 ±0.08	2.18 ±0.04	6.74 ±0.06	15.74 ±0.03	3.81±0.04	124.21
18	92.93 ±0.11	1.56 ±0.03	4.06 ±0.03	1.33 ±0.01	0.1±0	22.5
19	92.12 ±0.31	2.5 ±0.04	3.28 ±0.06	1.94 ±0.04	0.14±0.02	22.22
20	57.73 ±0.06	2.04 ±0.05	16.16 ±0.03	7.75 ±0.26	16.30±0.03	242.28
21	22.56 ±0.03	5.28 ±0.05	51.98 ±0.32	16.51 ±0.08	3.67±0.02	307
`22	74.03 ±0.09	5.56 ±0.02	3.1 ±0.04	16.73 ±0.01	0.56±0.03	84.36
23	76.47 ±0.22	2.85 ±0.02	4.40 ±0.03	14.8 ±0.01	1.46±0.03	90
24	83.61 ±0.05	4.8 ±0.04	0.29 ±0.01	8.13 ±0.01	0.29±0.01	47.86
25	90.36 ±0.14	1.8 ±0.06	0.03 ±0.005	5.89 ±0.06	0.03±0.005	31.6

The present study indicated that in the Study Village, villagers consumed the vegetables which were ecologically available that included plants like the families of Araceae, papaya, taro, cassava as their staple food. These green vegetables have a higher amount of moisture as well as ash and the lesser amount of carbohydrate, fat, and protein, which is supported by the literature. The study also indicates that the villagers of study area consume more amounts of moisture and ash contents and the lesser amount of protein, fats, and energy derived from the Table 4.17 and 4.18. On the other hand, in the Control Village, Table 4.19 and 4.20, people tend to modernize and eat foods which are available in the market. They consume more animal protein than vegetables. The vegetable leaves are very high in moisture which is in agreement with the range values reported for fresh vegetables and are generally the poor source of protein. They are low in carbohydrate and gross energy, but fairly high in crude fiber and ash. The low gross energy values of the leaves could have resulted from their low crude protein, lipid and carbohydrate contents.

The food varieties were collected different during the year 2016-2017. Three replicates were taken and analyzed. The results of the study village were seen that the moisture content ranged from in the food content of 7.83% (sesame) to 92.4% (Colacasia stem with fermented fish). Most of the green vegetables, banana flower, tubers, legumes, fermented fish (Hridal) and the curry prepared from these items resulted in high moisture content. The ash content ranged from 0.38% (Bean) to 16.33% (Fermented fish). In fermented fish, green chilies, ginger, pork gravy with green leaves and rice flour and more abundantly in black sesame were observed the higher amount of ash and protein. 73.74% (Rice) and Taro, 30.75% (sesame) and food items prepared by it showed the highest carbohydrate(Table 4.17).

The Control Village showed different result in compared to study village due to consuming of fatty contents in their diets. Tuber, green chilies, soda, ginger and green vegetables carry more amounts of carbohydrate and ashes. Fat content ranged from 0.04% (Colocasia stem) to 36.26% (Pork gravy with different vegetables/rice flour). Most of the higher amounts of protein contents were derived from animal

proteins of fish and pork gravy. The carbohydrate ranged from 1.33% (Black gram gravy) to 72.3% (Aijong Rice). The moisture content ranged from 22.56% (Fermented fish) to 92.93% (Black gram gravy). Ash ranged from 0.45% (mix green vegetables) to 5.56 % (ginger) and proteins ranged from 0.03% (Colocasia stem) to 51.98 % (Fermented fish).

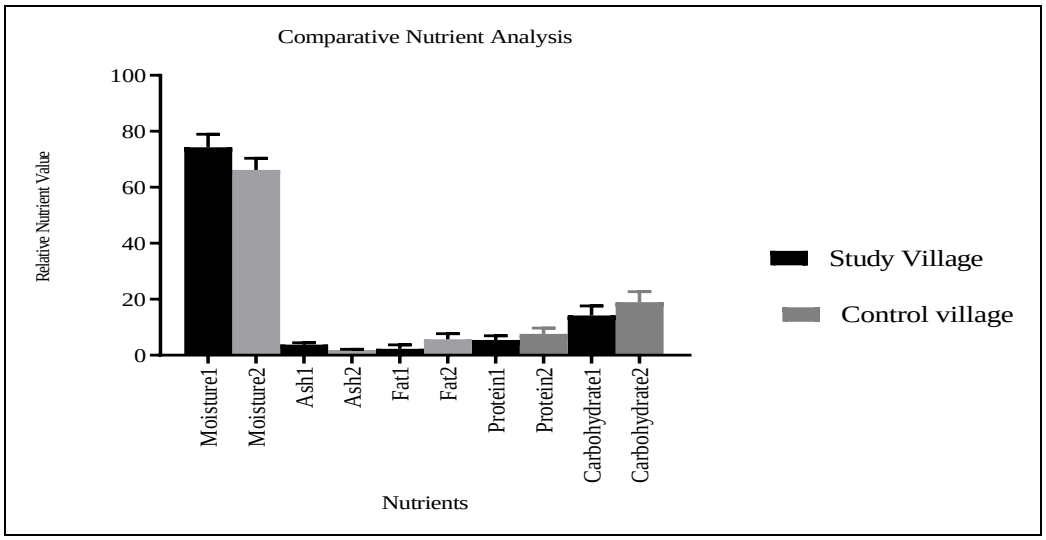


Figure 4.20: Comparative nutritional evaluation of Study and Control Villages

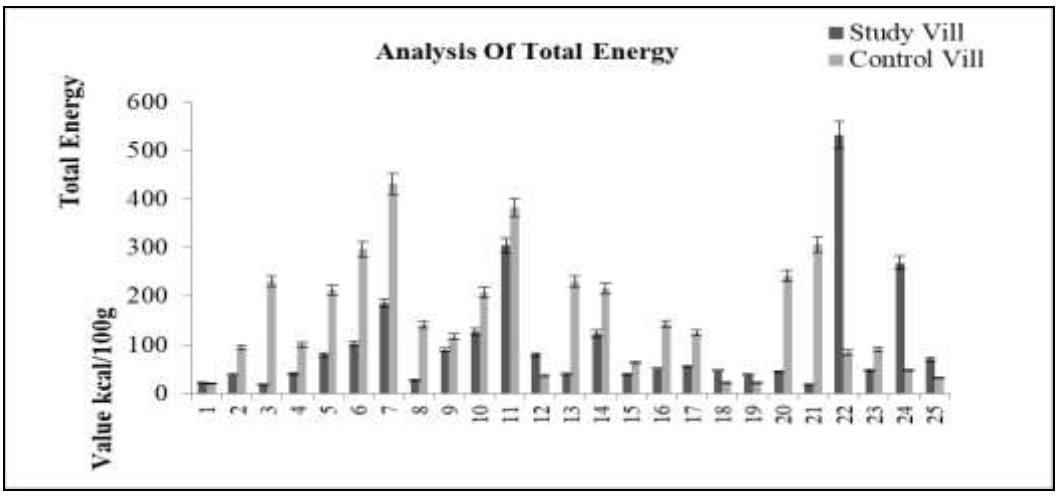


Figure 4.21: Comparative Energy generation of Study and Control Villages

The ash and moisture content are found to be significantly higher($P<0.05$) (Figure 4.20) in Study Village than Control Village and protein, fats and carbohydrate is higher in Control Village but (non-significant). Though the control village showed the higher amount of energy (Figure 4.21) derived from dishes, the amount of nutrients needed for human health to resist disease is less, due to use of higher amount of animal proteins and the lesser amount of green vegetables and derivatives.

4.3.6 Phytochemical Parameters

In this study, we found out that in the study village, the common diets included locally grown plants such as, *Carica papaya, Manihot esculentum, Aka colocasia, Musa paradisiaca* L, families of Zingiberaceae, families of Poaceae, Capsicum and the many other green vegetables like, neem, bitter guard(Table 4.21 and 4.22), drumstick, other wild vegetables.

Table 4.21: Phytochemical parameters of plant materials of Study village

Species	Common Name	Total Phenolic content (g/100g)	Total Flavonoid Content (g/100g)	Alkaloid	Tannin	Terpenoid	Carotenoid	Insoluble Ash(%)	Soluble Ash(%)	Moisture Content	Total Chlorophyll	Total Soluble Solids(Brix)	Ash Content	Reducing sugar	Water soluble extractive value(%	Alcohol soluble extractive value(%
Manihot esculantum	Cassava	0.98 ± 0.003	3.86* ± 0.001	Present	-	-	-	4.88	3.77	63.45	0	2.2	6.32	-	-	-
Alu colocasia	Colocasia	22.33 ± 0.003	2.54* ± 0.001	Present	-	-	-	-	-	6.84	0	2.2	3.44	-	12	0.8
sicum frutescen	Chilli Pepper(Sl	3.759 ± 0.003	3.306 ± 0.001	Present	-	Present	1.2	-	-	-	0.01	3.6	0.34	-	07	05
psicum annum	Chilli Pepper(L	1.988 ± 0.003	3.556* ± .00	Present	-	Present	1.88		-	-	0.08	3.9	0.65	-	08	06
Colocasia esculanta	Corn	13.33 ± 0.003	2.54 ± 0.001	Absent	-	-	-	–	-	45.55	0	2.7	4.5	-	09	06
Carica papaya	Papyaa	Present	-	-	Present	-	-	7.55	5.55	46.45	-	2.7	7.65	-	-	-
ngiber officinal	Zinger	-	Present	Present	-	-	-	0.88	5.77	34.55	-	-	14.5	-	19	12.44
momordica charan	Bitter guard	-	Present	Present	-	-	-	4.88	3.77	34.55	0.32	3.6	5.78	Present	-	-
Curcuma longa	Turmeria	-	Present	Present	-	-	-	0.88	5.77	34.55	-	-	14.5	-	19	12.44
Oryza sativa	Rice	-	Absent	Present	Present	-	-	4.11	–	3.67	-	-	7.22	Present	3.56	-
Musa acuminat	Banana Flower	5.83 ± 0.78	3.98 ± 0.153	Present	0.86	3.22	-	-	-	-	-	22.44	11.35	-	-	-

The values in the table indicate the mean values of 3 biological replicates +/-SEM. The level of significance $(0.01 \leq p \leq 0.05)$ is indicated by *, wherever applicable.

Table 4.22: Phytochemical parameters of plant materials of Control Village

Plant Material	Common Name	Total Phenolic	Total Flavonoi	Alkaloid	Tannin	Terpenoid	Caroteno id	Insoluble Ash(%)	Soluble Ash(%)	Moisture Content	Total Chloroph	Total Soluble	Ash Content	Reducing sugar	Water soluble	Alcohol soluble
Manihot esculantum	Cassava	.65 ± 0.00	.55 ± 0.00	Present	-	-	-	3.44	2.77	72.34	0	1.88	2.55	-	-	-
Alea colacasia	Colocasia	0.11 ± 0.00	.99 ± 0.00	Present	-	-	-	-	-	52.44	0	2.24	1.4	-	07	04
Capsicum frutescens L.	Chilli Pepper	754 ± 0.00	.298 ± .00	Present	-	Present	0.6	-	-		0	1.9	0.11	-	06	04
Capsicum annum L	Chilli Pepper	858 ± 0.00	.458 ± .00	Present	-	Present	1.22	-	-		0	1.9	0.11	-	06	04
Colacasia esculanta	Corm	3.33 ± 0.00	3.56± .001	Absent	-	-	-	-	-	7.54	0	1.9	1.55	-	09	05
Carica papaya	Papyaa	Present	-	-	Present	-	-	-	-	55.66	-	1.8	3.86	-	-	-
ngiber officina	Zinger	-	Present	Present	1.22	3.88	-	-	-	-	-	31.22	16.44	-	22	14.44
momordica charan	Bitter guard	-	Present	Present	-	-	-	3.55	2.88	55.66	-	1.8	3.86	-	-	-
Curcuma longa	Turmeria	-	Present	Present	-	-	-	0.43	3.65	45.66	-	-	7.55	-	16.3	16.55
Oryza sativa	Rice	-	Absent	Present	Present	-	-	3.88	–	2.88	-	-	6.22	Present	4.22	-
Musa acuminata	Banana Flower	4.03 ± 0.72	2.8 ± 0.14	Present	0.76	2.98	-	-	-	-	-	20.82	11.2	-	-	-

The values in the table indicate the mean values of 3 biological replicates +/-SEM. The level of significance $(0.01 \leq p \leq 0.05)$ is indicated by*, wherever applicable.

The qualitative and quantitative analysis (Table 24 and Table 25) showed the presence of higher number of phytochemicals in the Study Village. The presence of the phenolic content, total flavonoid content, alkaloid was observed in most of the species. Similarly, tannin was present in *Carica papaya*, *Oryza sativa*. Terpenoid and carotenoid were present in *Capsicum frutescens*, *Capsicum annum*.

The comparative analysis of phytochemicals from food diets of Study Village (Table 4.21 and 4.22) shows that flavonoids levels of diet constituents were significant at ($0.01 \leq p \leq 0.05$) compared to Control Village.

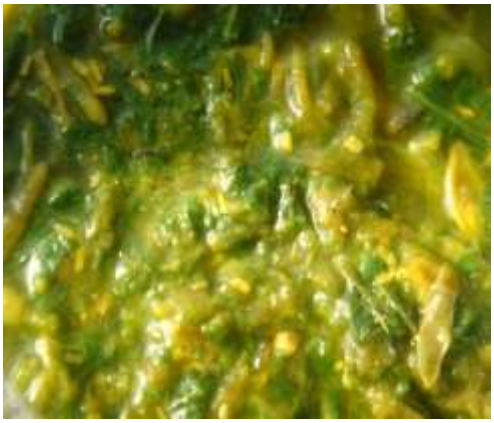


Plate 4.22.1
Papaya Flower curry

Plate 4.22.2
Colocasia and Brinjal curry

Plate 4.223
Banana flower dry salad

Plate 4.22.4
Pork with rice flour

Plate 4.22.1-4.22.4: Cooked food items of Study Village

Plate 4.22.5
Colocasia Stem curry

Plate 4.22.6
Papaya with soda curry

Plate 4.22.7
Papaya flower curry

Plate 4.22.8
Fish mint curry

Plate 4.22.9
Fermented fish

Plate 4.22.10
Papaya curry

Plate 4.22.5-4.22.10: Cooked food items of Study Village

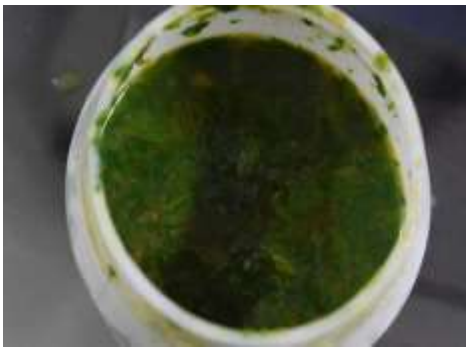


Plate 4.23.1
Green leaves curry

Plate 4.23.2
Chicken with corm

Plate 4.23.3
Drumstick curry

Plate 4.23.4
Lentil curry

Plate 4.23.5
Black gram curry

Plate 4.23.6
Fermented Fish

Plate 4.23.1-4.23.6: Cooked food items of Control Village

Plate 4.23.7
Lentil with elephant apple

Plate 4.23.8
Pork with Cauliflower curry

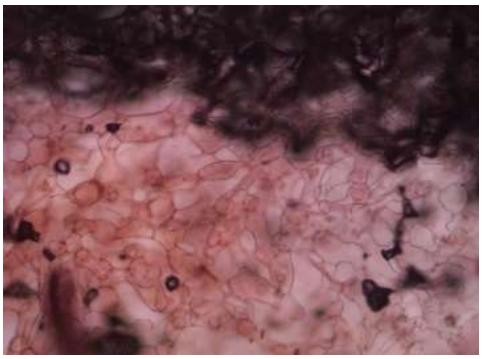
Plate 4.23.9
Pork with fern & *Ficus carica*

Plate 4.23 10
Pork with Jute leaves curry

Plate 4.23.11
Green leaves with Peas curry

Plate 4.23.12
Fish curry with Elephant apple

Plate 4.23.7-4.23.12: Cooked food items of Control Village

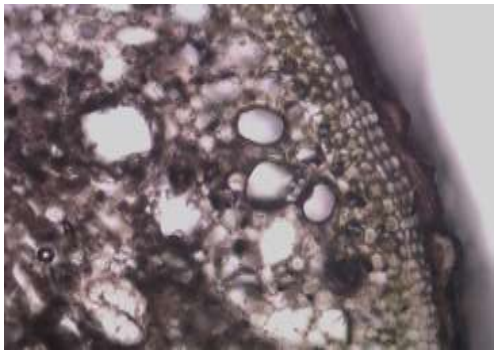


Momordica charantia

Manihot esculenta

Houttuynia cordata

Diplazium esculentum



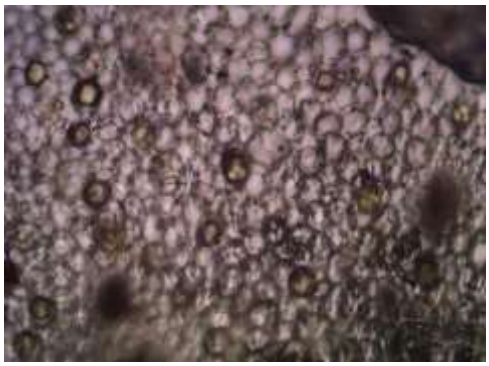
Aka colocasia

Solanum melongena

Plate 4.24: Microscopic Examinations of Food varieties of Study and Control Villages

Brassica juncea

Murraya koenigii



Zingiber officinale

Cyclosorus extensa

Plate 4.25: Microscopic Examinations of Food varieties of Study and Control Villages