Nutritional Status among Tamang Community of East Sikkim:

A Biocultural Perspective

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By

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CONTENT

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DECLARATION

I, Yogesh Sharma hereby declare that the dissertation entitled **"**Nutritional Status among Tamang Community of East Sikkim: A Bio cultural Perspective" is an original work carried out by me under the guidance of Dr. K.R Rama Mohan. The contents of dissertation did not form the basis of the award of any previous degree to me or to the best of my knowledge to anybody else, and that the dissertation has not been submitted by me for any research degree in any other university/Institute. This is submitted to the Sikkim University, for the degree of Master of Philosophy in Anthropology.

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Nutritional Status among Tamang Community of East Sikkim:

A Biocultural Perspective

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Acknowledgement

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CHAPTER - 1

INTRODUCTION

Nutritional Anthropology is a well established branch of anthropology which encompasses the disciplines of nutritional science and anthropology. This field is concerned with those anthropological phenomena which impinge upon the nutritional status of human beings. The scope of this discipline includes man's evolution, history and culture, and his adaptation to nutritional variables under various environmental conditions represents the focal materials in nutritional anthropology. According to Katona-apte (1976).Nutritional anthropology take on bicultural approach to study human beings dietary status and habits presents opportunities for studying the impact of multiple forces on nutrition and health over time and various conditions.

Nutritional anthropologists like that of other anthropologists, cover broad spectrum of theoretical perspective, utilizing a wide range of research techniques while some researchers focus on the cultural context seeking to know the meaning of food in cultural and symbolic. However, Biological anthropologists focus on the interactions of genetics variety of nutrition-relate diseases (Pertti et al, 1989).

WHO (2010), defines nutrition which is considered as the intake of food in relation to the body dietary needs. Good nutrition with a adequate, well balanced diet combined with regular physical activity in a corner stone of good health. Nutrition can lead to reduced immunity, increase susceptibility to disease impaired physical and mental development and reduced productivity.

Rao (2001) says that there is a close relationship between an availability of food resources and nutrition. Agricultural progress in the last decade has made India self-sufficient in major food grains. Yet, under nutrition continues to be major nutritional problem especially in rural population. While the midst of combating these long-standing problems of under nutrition in children and women.

The term malnutrition generally divides into under nutrition and over nutrition, but there are. Many factors which can cause malnutrition, most of which relate to poor condition of diet or severe and repeated infections, particularly in underprivileged populations. Inadequate diet and disease, in turn, are closely linked to the general standard of living, the environmental conditions, and whether a population is able to meet its basic needs such as food, housing and health care. Malnutrition is thus a health outcome as well as a risk factor for disease and exacerbated malnutrition and it can increase the risk both of morbidity and mortality. Although it is rarely the direct cause of death (except in extreme situations, such as famine), child malnutrition was associated with 54% of child deaths (10.8 million children) in developing countries. Malnutrition that is the direct cause of death is referred to as protein-energy malnutrition.

The term malnutrition refers to deficiency, excesses or imbalance in take of energy, protein and or other nutrients contrary to common usage the term malnutrition correctly include both under-nutrition that is (under weight) and over-nutrition (over weight) under nutrition is the result of food intake that is continuously insufficient to meet dietary energy requirement, poor absorption and or poor biological use of nutrients consumed.

This usually result in loss of body weight and over nutrition refers to a chronic condition where intake of good is in excess of dietary energy requirement, resulting in overweight and / or obesity WHO(2012).

1.1 FORMS OF NUTRITION

Under nutrition: Occurs when the body does not get the right amount and type of nutrients it requires to maintain health. In children, under nutrition is manifested by a child being short compared to healthy children of the same age and sex (a condition known as stunting), low weight for his or her height (known as wasting), or low weight for his or her age (known as underweight).Micronutrient deficiency is another form of under nutrition. The most common micronutrient deficiencies are iron, iodine, and vitamin A.

Over nutrition: Occurs when the body takes in more nutrients than it requires for normal growth. This leads to excess fat storage in the body and is unhealthy. Over nutrition includes overweight and obesity, which present as a person being too heavy for his or her height.

Lange (2010 a), is of opine that some causes of malnutrition for instance; household food security is seen as all people in the household having access to food at all times. The food must be safe and of high quality and the environment should be hygienic enough to use the food so that all members can lead healthy, productive lives Food security concentrates on four aspects: availability of food, stability of food supply, access to food and utilization of food globally there are about one billion people that go hungry and about

2.6 billion people that are poor. A study in Bangladesh, Nepal and Pakistan shows that the situation is worsening. Seeing as the price of staple foods is increasing and economic growth is poor, there is little evidence to show that other countries are doing better.

According to a survey done by UNICEF and the Institute for Public Health Nutrition in 2004 in Bangladesh, one in four households is food insecure and two million children are affected by malnutrition (between six months and five years). The survey was designed to assess the impact of the food price increases in Bangladesh. Data showed that 58% of households had insufficient food in the previous year. A link was found between malnutrition and food insecurity, with food insecure households showing a higher percentage of malnourished children.

Lange (2010 b) States that malnutrition rates in the developing world are still high because of the lack of access to health services Even though patients have little or no access to formal health services there is still the problem that patients do not make use of the services available, Families that have food insecurity and reliant on inadequate health services develop a reduced resistance to infections, which causes malnutrition. The health services are influenced by a loss of health staff which leads to a higher workload for those that stay behind. This has a serious effect on the quality and quantity of health services rendered. The staffs that are available at the facilities lose their skills because of a lack of supplies and equipment, lack of incentives and low morale. Shortages of staff can also lead to remote areas not being covered by health services Most of the health services in Africa are based on facility-based care. Community based programmes

operate on a smaller scale and with limited support. Poor performance of health services contributes to the high mortality rates of preventable deaths.

Lange(2010 c) says that malnutrition is worsened by a lack of nutritional information and knowledge, especially maternal nutrition education which leads to unhealthy dietary habits, poor nutrition related practices and attitudes, perceptions and socio-cultural influences All of these issues can negatively influence nutritional status. For families to be healthy with a good nutritional status, they need knowledge regarding growth, purchasing, processing, and preparation and feeding a variety of food, in the right quantities and combinations. A lack of nutritional knowledge can also lead to misconceptions about food and negative food traditions that are passed on from generation to generation. Even though nutrition knowledge is not gained in the classroom, the school education that mothers receive can help with caring for children and the household. Both female and male education can have a positive effect on the child's nutritional status.

Nutritional status of the people of a country is mainly influenced by the food they intake regularly. Taking improper amount of food results in malnutrition (that is overweight, obese or under weight) which ultimately affects physical well-being of people. Nutritional status of people is closely linked with dietary fat intake, Ahmed and Siwar (2013).

Zollo (2010) discuss good nutrition is the cornerstone for survival, health and development for current and succeeding generation in Cameroon as in many developing

countries the double burden of malnutrition is affecting the whole population's health. Its main roots are poverty and poor knowledge on food composition. For optional uses of available foods to maintain nutrition security.

The problem related to nutrition has serious public health significance impacting psychological physical development behavioral and work performance of pregnant women. Iron deficiency is by far the commonest nutritional cause of Anemia. Nutritional problems may be caused not only by deficiency of protein, calorie, iron vitamin C, but by other condition like malaria, worm infestation, adverse environmental and socio-demographic factor (Madhui and Singh 2011).

REVIEW OF LITUERATURE

Most of the studies done under the broad discipline of biological and medical anthropology. Salah Mahoup et al. (2006), discuss the effects of malnutrition on human performance, health and survival have been the subject of extensive research for several decades and studies show because of malnutrition which affects on physical growth, morbidity, mortality, cognitive development, reproduction, and physical work capacity. Malnutrition is not only affect on physical growth but it is an underlying factor in many diseases in both children and adults. this study highlights the malnutrition is mostly prevalent in developing countries, where it affects one out of every three preschool-age children.

Sumit Kar and Bidita Khanelwal (2015) have studied on the adolescent school children of east district of Sikkim and their study mainly done on urban area and they talk about how fast food and physical inactivity is risk factors for obesity and hypertension. According to their finding socioeconomic profile play a important role in the maintaining the nutritional level, in these study over weight as obesity , is positively correlated with less physical activity and higher socio economic group like upper and middle social status contributed to a higher number of obese or over weight these study also suggests that more watching television and sitting in front of computer also found among the children who are more associated over weight and obese.

Kaushik Bose and Subal Das (2011), talk about the nutritional deprivation among Indian tribes and these study mainly done on adult population this study revealed that the

nutritional status of the adult tribal's is in a critical state. To overcome this problem, there is an immediate requirement for appropriate steps to be taken to improve the nutritional status of these groups on the basis of severity of the burden they are facing .These study show more than has that like states Karnataka ,Gujarat ,Madhya Pradesh and Odisha are highly affected by adult malnutrition with more than half of the adult having a Body Mass Index less than 18.5kg/m2, so pattern of adult malnutrition show extremely poor nutritional status in these states.

Khushik Bose and Falguni Chakyraborty (2005), study the nutritional status of adult Bathudis is tribal population of keonjhar district of Orissa this study indicated that the prevalence of under nutrition among adult Bathudis was very high. According to them most importantly, immediate nutritional intervention programs are needed for implementation among this ethnic group. The economic and health burden of high rates of adult under nutrition have been well documented. The high rate of under nutrition among adult Bathudis could have severe health implications. And there is an urgent need for further studies to ascertain the relationship of this high rate of under-nutrition with morbidity and mortality among ethnic group. Similar studies should also be undertaken among other tribal populations in India since they constitute a sizeable portion of India's population.

Khongsdier and Nandita Mukherjee (2003) discuss growth and nutritional status of Khasi boys in Northeast India relating to exogamous marriages and socioeconomic classes. And this study is done on urban population of Shillong city using cross sectional data of 575

samples. And their finding indicates that significant differences exist between economic groups with respect to the growth and nutritional status of boys of Shillong and higher income group have better nutritional status as compared to the lower income group this study also found that there were no significant differences between Christian and Niam khasi boys and there is not so much genetic difference between these group because the intermarriage is allowing in these group, and conversion to Christianity is an ongoing process in Khasi society.

Bjorntorp (2001), discuss about malnutrition is a major public health and economic problem of global significance. Either the Prevalence rates of obesity or underweight are increasing in all parts of the world, both in affluent western countries as well as in poor nations. Men, women and children in different age groups are affected with the problem of over nutrition and under nutrition. Indeed, overweight, obesity and health problems associated with them are now so common that they are replacing the more traditional public health concerns such as under nutrition and infectious disease as the most significant contributors to global ill health. In 1995, the excess adult mortality attributable to over nutrition was estimated to be about 1 million, double the 0.5 million attributable to under nutrition.

Seipel (1999) says because of hunger and malnutrition which affect the millions of people around the world .and nearly 10 million deaths was found among the developing countries and his studies also shows the some of determinants of malnutrition like food insecurity, poverty, inequality etc.

According to Grima and Genebo (2002) young women and mothers face many underlying challenges to meet their nutritional needs, which include poverty, lack of education on healthy diets, infant care, and access to diverse variety of affordable nutritious foods, health care, and sanitation. Like other factors gender inequality and restrictive cultural practices also results in unequal and/or insufficient access to adequate nutrition. Several studies indicated that women with a body mass index below normal show a progressive increase in mortality rates as well as increased risk of illness. Women of the reproductive age are amongst the most vulnerable to malnutrition; their study also shows that several studies indicated that malnutrition is a serious health issue that Indian women face. It threatens their survival as well as that of their children. Some negative effects of malnutrition among women are compounded by heavy work demands, by poverty, by child bearing and rearing and by special nutritional needs of women, which in result in increased susceptibility to illness and consequently higher morbidity. Some other recent study shows that the impact of nutritional status of mother is more pervasive than the impact of other factors on birth weight. The dietary intake of rural pregnant women was lower than the recommended level.

Rao (2001), this study talks that increasing urbanization is associated with the decrease of physical activity and change in food habits in the population. Where especially in less developed nations urban population have higher rates of obesity than the rural population. Urbanization causes people to move away from their traditional way of living and is associated with a wide range of factors which mostly affect diet and physical activity levels, which include a shift to sedentary occupations, the availability of motor vehicles

for transport and sophisticated tools that make work easier in all areas of activity. Which in result, less energy is spent and the imbalance in terms of consumption is greater and obesity is increase.

Pena and Bacallao (2000), talk about urbanization has also effects on physical activity levels. In Asian cities, bicycles are rapidly being replaced by motor bikes and cars with nearly 10,000 cars being added to the automobile fleet every month in Delhi. Meanwhile, the rural populations are mainly engaged in agricultural occupations involving manual labor and a fairly high level of physical activity.

Bjorntorp (2001), in many cases, family dietary patterns can be partially attributed to genetic and hereditary factors. Dietary patterns become established in children from about age 1-2 onwards and to a great extent persist throughout life. The diets of younger children tend to be more similar to that of their parents than the diets of older children. It is thus important to try to ensure that children's diets are as varied as possible from an early age. A diet comprising many different nutrients as well as a many different flavours, textures, and colours will not only ensure adequate nutrition and development but will also encourage acquisition of the capacity to make appropriate choices between food items. Such "diet training" is particularly critical for children at the pre-school stage because this is the period during which the child learns to exercise control over his or her impulses and environment. Adolescence is a time when food habit are finalized, laying the foundation for adult nutritional status.

Juan (2006) says nutritional problems among American women are reflected in high rates of overweight and obesity as well as eating disorder which can lead to underweight. An adequate family diet is good for the child's health and provides a solid foundation for the future, when the child will gradually come to spend more time away from home, at school and elsewhere.

Ulijaszek and Lofink (2008), this Study shows that the cultural variations of appropriate and preferable body image also may contribute to obesity. In some societies, they belief that larger body size has traditionally been seen as attractive and indicative of attributes such as health, fertility, beauty, wealth and power. In a cross cultural comparison of appropriate body size in different traditional societies found that the vast majority favored plumpness as being attractive. In Africa, Central and North America, Japan many societies practice or have practiced ritual of fattening to promote the marriage fertility and embodied the social status.

Department of health and human services (2008) this study deals regular physical activity reduces risk and provides therapeutic benefits for people with heart attack, colon cancer, diabetes, and high blood pressure and may reduce their risk for stroke. It also helps to control weight; contributes to healthy bones, muscles, and joints reduces falls among older adults; helps to relieve the pain of arthritis; reduces symptoms of anxiety and depression; and is associated with fewer hospitalizations, physician visits, and medications. Moreover, physical activity need not be strenuous to be beneficial. For example, adults of all ages benefit from moderate-intensity physical activity, such as 30

minutes of brisk walking most days of the week. Despite the proven benefits of physical activity, more than 50% of U.S. adults do not get enough physical activity to provide health benefits; 25% are not active at all in their leisure time. Activity decreases with age, and sufficient activity is less common among women than men and among those with lower incomes and less education. About two-thirds of young people in grades 9–12 are not engaged in recommended levels of physical activity. Daily participation in high school physical education classes dropped from 42% in 1991 to 33% in 2005.

Hartini (2004), this study conducted in purworejo district in central java study show that before the crisis, energy, vitamin A, calcium and iron intake of the women were inadequate. The food pattern of the pregnant Indonesian women was predominately plant-based food. The women consumed inadequate food already before the crisis. Rice was the most important food item. When the price of rice increased, the consumption of rice increased and the consumption of expensive foods such as meat, milk decreased. During the crisis, rice remained an important supplier of energy, protein and carbohydrates. Rural poor women with access to rice fields had a higher rice intake than other sub-groups throughout the crisis. Compared to non-rice staple foods, rice was regarded superior for several reasons: The women had been accustomed to rice since they were born, the taste of rice was better than that non-rice staple foods, rice is essential for survival and to make pregnant women stronger during delivery, cooking methods for rice was easier, rice was easier to combine with common side dishes. For all women, the intake of animal food was low initially and decreased further. Nuts and pulses were an important supplier of calcium and iron and vegetables were important supplier of vitamin

A. Rich women were able to maintain a good nutrient intake during the crisis, although their fat intake decreased. Urban poor and rural poor, landless women experienced decreased intake of most nutrients in the "transition" period, but increased intake during crisis. To maintain the food security at home, the women developed several coping strategies. As an acute reaction to the crisis, relatives and neighbours gave foods to the poor women. Rice fields, lands, and home gardens constituted important food resources and income for women and their families.

Imdad Seema et al,(2010) This study shows is conducted in primary school children association with socio economic factor it is clear that childhood malnutrition is associated with a number of socioeconomic and environmental characteristics such as poverty, parents' education/occupation, and access to health care services. Low levels of nutrition among children cause serious long and short-term consequences in their physical and mental growth Paternal literacy level is indirectly associated with child nutritional status. Father's education may be important because he plays more active role in certain health-seeking decisions and household income in our social set up. This study showed that nutritional status (50.9% children of illiterate fathers' were malnourished as compare to 19.5% children of literate fathers) among Children whose father were illiterate was poor as compare to children of educated fathers.

Maternal education and household wealth showed statistically significant association with childhood malnutrition. The world maps of poverty and literacy closely coincide with that of malnutrition. Literate mothers can influence health of their children by

challenging traditional beliefs and attitudes, leading to a greater willingness to accept developmental initiative and utilize modern healthcare. Beneficial effects of maternal education have been observed to be more significant in case of sufficient but not abundant resources.

Bamji and Thimamma,(2000) Nutritional status, particularly of women and children is the most sensitive indicator of overall socio-economic development in this study is done in rural of Narsapur block of Medak district in the state of Andhra Pradesh in South India. This is a drought-prone, under-developed district where the main occupation is dry-land agriculture. In rural areas women, particularly those from poor families, contributes substantially to family income by participating in a variety of occupations. In fact, many women are engaged in more than one occupation. In the present study, primary occupation was considered. Thus the majority of families was landless or had small land holdings. The community was primarily agrarian, but a small percentage was engaged in other primary occupations such as artisans, petty business and factory labor with very few in government jobs. It is interesting to note that though the working women spent 5-7 hours on economic activities, they spent only 20-30 minutes lesser time than the housewives on child care and housework. Amongst the working women, those who worked for wages worked longer hours and devoted slightly lesser time for childcare and housework than those who were self-employed. This may be due to the fact that the latter have greater control over their time than the former. Occupation as well as land holding tended to influence food and nutrient intake as well as the nutritional status of the mothers though the effects were not statistically significant.

Ahemed (2011) this study deals with adolescents dietary and Physical activity practices which may, if extended into the future, lead to poor health status. The dietary habits of Cuam's adolescents- as indicated by weight loss practices and fast food, sweetened soda, fruit and vegetable intakes are sub-optimal, ven when compared to Adolescent from the U.S. mainland.

In summary, sub-optimal food intake, too little physical activity, and being overweight have an important impact on the current and long-term health of adolescents. Since the prevalence of overweight among the adolescent population on Cuam is high, programs should be designed and implemented in Cuam schools to encourage more healthful eating patterns, increase physical activity, and to prevent and possibly reverse overweight adolescents. The most cost effectives target combat this problem would be to strengthen existing curricula in both public and private schools on Cuam in subject areas such as physical education health, science and consumer and family sciences known as 'home economic.

Roa (2001) study talk that there was significant variation in under-nutrition prevalence amongst children from a single tribal community (Shabar) based on whether they lived in urban, rural and forest areas. Analysis of the various anthropometric nutritional indices amongst children aged between 5 to 19 years from three different habitats (urban, rural and forest) of Orissa revealed that the highest prevalence of underweight, stunted, wasted and under-nutrition, based on less than 5th percentile of BMI, was observed among forest children. However, the prevalence of underweight among the Gond tribal children of

Kalahandi district of Orissa (89.30%) was higher compared to the studied Shabar children of all the three habitats.

Jane et al,(2009) study this talk that at the household level, income and wealth are linked to child well being through the effects that purchased goods and services have on the proximate determinants of child health. Greater household income and assets directly raise the ability to purchase sufficient quantities of nutritious foods, clean water, clothing, and adequately-ventilated housing, fuel for proper cooking, safe storage of food, personal hygiene items, and health services. They also talk were at the individual level, greater education for mothers contributes to new skills, beliefs, and choices about sound health and nutritional practices that directly influence the proximate determinants of child health. For instance, knowledge obtained during a mother's education can affect choices about antenatal care and about children's nutrition, hygiene, and health care. To the extent that more-educated mothers make healthier choices for themselves during pregnancy, education will have a direct effect on the health of the child at birth. For example, in Cambodia, women with secondary schooling and above were twice as likely to receive antenatal care and 70 percent more likely to take iron pills while pregnant as those with no education. Also at the individual level, father's education is an important determinant of household wealth and income. Unlike the effects of mother's education on child health, which operate through decisions about the proximate determinants as noted above, father's education is believed to affect child health indirectly and more distally, through its effect on household income.

Haglin et al,(2005) mainly deals with Food habits and meals patterns of Cameroon .This study further indicates that Cameroon is a country with clear lifestyle differences between urban and rural people. The difference is becoming increasingly obvious nowadays compared with the past. Influences from the lifestyle on food habits and meals patterns are indicated in the present study. There was a higher frequency of junk food consumption among urban than rural adolescents. In the urban area, food is readily available in a variety of settings and sold by a multitude of vendors in school yards. Food from vendors is cheap and consists mostly of junk food. Adolescents in the urban area were therefore accustomed to buying junk food from vendors during break times at lunch and in-between meals. This study, as in other studies carried out in Africa, it was common for urban and some rural adolescents to receive daily pocket money from their parents to buy food at school .The high frequencies of junk food and in between meals in urban adolescents could also be due to the fact that they had more pocket money than rural adolescents. Some adolescents in the rural area did not eat at school owing to a lack of pocket money. A study carried out in Africa shows that pupils from families with higher economic status consumed more junk food than adolescents from families with lower economic status.

There was a difference between urban and rural adolescents in milk consumption. In the urban area, milk products are available and affordable, and are consumed during breakfast as a drink with sugar and bread, whereas in the rural area breakfast is composed of leftover traditional food.

In contrast to the urban area, milk products are expensive, less available and not considered as food in the rural area. Meat/fish/eggs are more available and affordable in the urban areas, while in the rural areas they are eaten on special occasions owing to high prices and low availability.

In the urban area in Cameroon, adolescents ate more junk food, had a higher amount of pocket money, and were engaged in fewer manual activities and walking than adolescents in the rural area. The food habits in rural adolescents were characterized by traditional food, and despite a lower frequency of meat/fish/eggs, vegetables, cereals and milk products, AMA, BMI and waist/hip ratio were higher in rural than in urban adolescents.

Significance of the Research Topic

Tamangs are one of the scheduled tribes of Sikkim along with Bhutia, Lepcha, Subba and other tribes of Sikkim region. Due to various socio economic inequalities and cultural differences all the sub groups among 'Tamangs' exhibit unique cultural aspects. Even the dietary habits are different among Tamang community.

There are no systematic studies on nutritional aspects among Tamang Community particularly in this region. Hence, it is important to unravel the nutritional status of these Tamang community of Pakyong sub- division which falls in East district of Sikkim.

Objectives of the study

1. To assess the Body Mass Index of Tamang community.
2. To examine the relationship between Body Mass Index and socio- economic conditions.
3. To understand the association of Body Mass Index with regards to lifestyle and food habits.

Materials and methods of the study

The present research study was conducted in Pakyong sub-division east district of Sikkim from 1st March to 31st July 2016.No statistical technique was applied in the selection of individual and household for the research study manage to collected data from both male and female of 320 subjects by survey from different village of house to house visit. There are 28 villages which are comes under Pakyong sub-division. The research studies employ both quantitative and qualitative aspects for the collection of relevant data. This study shall be conducted in Pakyong sub-division of East district of Sikkim. This place is almost inhabited by all the major three communities like Bhutia, Lepcha, Nepali and others communities with a total population of 36392.And 11589 are belong to schedule tribe population ,2015 are belongs to schedule caste population and others. Total number of male is 18,795 and total number of female is 17,597 (Census of India, 2011).

Census details of Tamang   from different village

Total house	pakka	kaccha	Total population	male	female	Joint family	Nuclear family	Extended family
143	120	23	810	408	402	11	130	2

Religion and Educational details

bhuddist	Others	primary	secondary	Higher secondary	graduate	P.G	NO data
130	13	188	146	226	134	20	12

Occupation details of Tamang

farmer	Private	Govt.	student	House wife	retired	Jobless
226	62	137	243	118	14	12

Anthropometry

The sample consists 173 females and 147 males. All data was collected through random sampling method following a survey of house to house visit. Cross sectional data on 320 subjects from the Tamang community and all subjects were divided into two age group adolescent (13-19 years) and adult (20+years). An anthropometric rod and a weighing scale to the nearest of 0.1 cm and 0.5 kg respectively was used to measure height and weight with subjects wearing light clothes following the standard technique of Lohman et al. (1998).

Data on Socio-Economic conditions

Collection of qualitative data was collected by schedule in which interviews were conducted to document their types of occupation, family income, monthly income,

monthly expenditure, and marital status. Data was also collected directly from each subject by using a schedule. The per capita monthly income of the households was classified as follows:

Above 75th percentile (>Rs. 5000) = High income group (HIG)

50th to 75th percentile (Rs. 2857-5000) = Middle income group (MIG)

Below 50th percentile (<Rs. 2857) = Low income group (LIG)

Data on educational attainment of individuals were classified into four categories, namely, primary, secondary, higher secondary and graduate and above. The primary level of education includes those individuals who studied up to class V. In the secondary level of education, we included those individuals who attended standard VI to X. Higher secondary level of education included those who attended standard XI to XII. In the graduate and above level of education, we included those individuals who have completed graduation and those pursuing higher studies.

Data on occupation of each subject were classified into four categories such as government employee, private, student and housewife. Data on age and marital status were also collected for the present study.

Data on physical activity, television time and food habits

Information on food habits were collected from each subject following a recalled method of one week periods. The data on physical activity and television time was also collected.

The data on television time were divided into two categories: less than or equal to two hours, between three to four hours above. Data on moderate physical activity was classified into three groups, less than or equal to two hour, between three to four hours and five hours and above. Data on food habits, especially non-vegetables intake were divided into one-two times a week, three-four times a week and five times and above.

Statistical Analysis

The data were analyzed using MS-Excel software for the present research. The parameters taken were analyzed statistically to find out the mean, standard deviation for the anthropometric measurements. Prevalence of overweight/obesity has been evaluated using Asian cut-off points (WHO 2000). According to Asian cut-off points, BMI $\geq 27.5 \text{kg/m}^2$ has been considered as obese, BMI between 23.5-27.4 kg/m^2, considered as overweight, BMI between 18.5-23.4kg/m^2 indicates normal and BMI below 18.5kg/m^2 considered as underweight. Prevalence of overweight/obesity was calculated in relation to different socio-economic conditions, physical activity, and television time and food habits. In order to test the level of significance, both t-test and chi square have been used in the present study. Women who are pregnant at the time of the survey or women who had given birth during the two months preceding the survey were excluded from the analysis.

MAP OF PAKYONG, SIKKIM, INDIA

www.googlemap.com

CHAPTER - 2

LAND AND PEOPLE ETHNOGRAPHY OF TAMANG

The Himalayan state of Sikkim became part of Indian Union in 1975 as a 22nd state. It has a total area of 7096 square kilometers which is the smallest compare to the other adjoining states of the Himalayas its has a total population of 6,10,577 (Census; 2011). Comprising mainly of the ethnic groups the Lepcha, Bhutia and Nepalese. The Lepchas are considered the original inhabitants of Sikkim. The lingua franca of the state is Nepali and it is included in the Vlll Schedule of the Constitution of India. At the state level, however, there are, besides Nepali, seven other languages recognized by the Government of Sikkim. They are Bhutia, Lepcha, Limbu, Rai, Newari,Gurung, and Tamang.

The Tamangs are tribes belonging from Tibet-Burman speaking group, language family. They have their distinct culture as evident from their traditional & social customs, food habits, costumes & dresses, songs and dances, musical instrument, festivals and language and their way of life which lies substantive similarities with the other tribes following Buddhism. The Tamangs are one of the most ancient ethnic group in the hills of Sikkim and from the year 2003 it got included into the category of schedule tribes of Sikkim. It is believed that they originally came from Tibet and Spoken the Tibetan-Burman language. (Gurung, 2010).

Tamang is one of the oldest tribes of Nepal. "Ta"means horse "mang" means ghost or spirit. Therefore the meaning is "horse riding spirit". Historically they are known as

"Murmis" meaning "people of the frontiers or borderlands" alternately known as Ishang or Sain. They were the outstanding horsemen and horse riding spirits during the Bonpo practice. They were a branch of the Tibetan tantric vajrayana sect of Buddhism known as Ningmapa Panth. They were mostly found in Nepal, East Bhutan, Myanmar and Sikkim and some parts of Duras and Jalpaiguri (Krishnendu Dutta, 2010).

Different scholars have expressed their opinions suggesting the meaning of the word "Tamang" some Scholars said that the word Tamang came from their principle occupation as "horse traders" and some say it is Mountain Army or cavalry. The "Tamag" were migrated from Lhasa (Tibet) to Himalayan region Temal hill in the 8th century after conversation from Bon Dharma to the Mahayana Nyingmapa Buddhist Dharma. There were many Tibetan Sub-sects of whom Tamangs were main security & protection force of the place & king. That is why Tamag is a Tibetan word that was willfully mispronounced & intentionally changed to "Tamang" by the So-called first Hindu Monarch just after the creation of Nepal (Lama, 2010).

Most of the Tamangs inhabit areas around lower Teesta valley and Rangit valley namely West ,East and south districts .They live in areas of Soreng, Richenpong and Chakung in West district, Jorethang, Damthang , Melli, Ratepani and Timi – Tarku in south district ,Central Pendam, Assam Linzey, Ranka and Gangtok in east district of Sikkim.

Tamangs are a Mongolian or semi –Mongolian tribe and have probably descended from a Tibetan stock modified by intermixture with Nepal race. Tamang are one of the major Tibeto- Burman speaking communities who are originally called Bhote. However the

Tamang originates from their occupation as horse traders as Ta in Tibetan means horse and mang means traders.

Tamangs after having acquired much of the traits of Nepali community avoided the Bhote.Tamangs have their own language and script and share several words with the Tibetan language through the Sikkim official language, the government recognized Tamang as one of the official language s of Sikkim. Tamang language is being taught up to primary level in schools.

Geographical Distribution

The Tamangs of Sikkim are found mainly in the Lower Teesta valley and Rangit valley, i.e. in the districts of East, South and West. Hill Slopes, tops of the outer spur, and narrow riverine valley on the resistant rock of the Darjeeling ridge of the lower Teesta and rangit valley are the palces inhabited by Tamangs. The Tamang concentrated areas are Soreng, Rinchenpong and Chakung in the West districts, Jorthang, Damthang, Melli, Rateypani ,Kateng and Timi-Tarku in South district: central pendam, assam Lingzey, Ranka and Gangtok in the east district of Sikkim (Singh, 1993).

District wise Tamang population in Sikkim

District	Total	Male	Female	Sex ratio
East	20423	10583	9840	930
West	6142	3173	2969	936
North	1898	979	919	939
South	11024	5724	5304	927
Total	39491	20459	19032	

Source: State Socio Economic Census, Government of Sikkim, 2006

Food Habits

The Tamang are mostly non-vegetarian. They take all kinds of meat, fruits and vegetables. They take rice, maize, moong, peas, beans, masur, and use mustard oil as cooking mediums. They consume roots, tubers, vegetables, and fruits. They drink milk, and few of them smoke. They are occasionally take alcohol,taking home-brewed alcohol drinks or even generally marketed stuff. Blon Thar Tamang do not take buffalo. Negi and Lopchen thar Tamangs do not take pork. Champa is the favourite food at higher altitude. Khabjey,Nram Jhiro,Champa, Babr, Syalroti, alum and beef are their favourite food (Subba,2011).

Kinship System

The Tamang are the endogamous group and are divided into a number of exogamous clans (ru). The Murmis or Lamas are divided into two great division (i) Baratamangs and (ii) Atharajat. The Baratamangs are the pure Murmis and are considered socially superior to Atharajat being merely Tibetans there was no such things as caste amongst the murmis

in the olden days,and although prior the Gurkha conquest the Murmis were divided into Barathamangs and Atharajat, nevertheless there was no social difference between them. Prior to the Gurkhas conquest the Barathamangs and Atharajat eat and drank together and intermarried. The term Atarajat was given in those days to the progeny of a Murmi with any foreigner merely as a distinctive name for the mixed breed, although of mixed blood, was accepted into the Murmi nationality without questions and enjoyed all the privileges of any other Murmis. But with the Gurkha conquest and the conquestent influences brought to bear, many changes have taken place. Originally the Barathamangs were divided into twelve clans(ru) Only; viz:Baju, Bal, Dumjans, Ghising, Giaba, Gole, Mikchan, Mokthan, pakring, Siangdan, Thing and Yonjan. Nowadays there are a very much large number. The Atharajat were divided into three clans (ru) viz: Gothar(Progeny between Murmis and Khasas or Thakurs); (ii) Narba: (Progeny between Murmis or Newars); (iii) Sangri: (Progeny between Murmis and mangars, Gurung, Limboo, Rai or Sunar) . The Barathamangs are also known as rui choprat. Marriage is prohibited among the rus of the respective groups Subba(2011).

Dress

About 20 to 30 years old male Tamangs used to wear Bankatey Bhoto, Kachar, Daura-Suruwal (Black color), Ista-coat, white cap or feta, Waist-belt(white) and Khukuri in the waist-belt, While the female Tamangs used to wear Chit ko Fara(Shyahama), Red or maroon colour Fariya, Makhamali cholo, Mujetro, hand woven Burko and Bakhu or Syahama. But now, they became conscious of their traditional dresses. The male

Tamangs also wear their traditional dresses. The male Tamang also wear their taraditional dresses such as Chuwa (Bukhu), Tunga, Bhoto, Birkey topi, Gada(Gya) and Surki (Coat). The females wear Syahama (Gunyu), Dorma(Fariya), Cholo, Chuwa(Bakhu), Pangden and docha. The small girls wear Dhandhar (Fariya). The Tamang's general habitat being at higher elevation the cold climate marked by forest and occasional snowfall necessitates people the use of warm garments. The occasional dress of a Tamang differs little from the Tibetan or a Sherpa. Both sexes wear a long gown "Bakkhu" that extends right upto the feet. The man headdress may be the wool or fur known as "Tagi" or "Usya" and the footwear as exceedingly warm "Ducha" and "Punga" The men of warmer places wear "Khenjo" or "Khenjar", Surlung, and Surtam. The women wear "Guney" or "Shyama" and Pangden on the backside. They wear "Hangrey" "Kragu" or "Ghakel" n the upper body and Sirphul. Ringa on the head. The female ornaments are Chyalden, Chyaldeng, Chyaldo, Nachyap, Phuli and Munri n the Nose Yachyap, Bala on the hand, chyap, Chakka on fingers, Nhali, Aalong, Chyoldo, Chepto Sun, Dhungri, Butil, Jyadum on the ear, Jantar, Red munga, Shi as garments and Kalli on the legs "Gao" (Star –shaped bracelet), and bangles. Married women wear Potey, potey-Tilhar, The males wear earring called Biku or Aalong.Male babies are also given silver bangles on the first "Bhat Khuwai" (Khan khawaa). The urban Tamangs wear either " Daura-suruwal or western coat and pant now (Subba, 2011).

Folk Songs and Dance

The folks songs are about the naivete of their life and culture, varied in contentand meanings, composed in Tamang dialect and Tamang " whai" reflect the philosophy and ethos of civilization. They sing the songs in all festive occasions along with Damphu dance. These song are Damphu songs duet songs, religious songs of Lamas or Bakpa, Tamang Sello etc.Damphu Sello dance, lama or Bakpa dance of the monastery.The popular folk dance of Tamangs are Damphu nach, Chomlu nach, Mhendomaya nach, Lama Bakcham nach, Manichhepa, Tormamharso nach and Jungwa nach.

The hilly tribe, who has their own significant musical instrument called "DAMPHU" which is played in the occasion of worship and prayer, social picnics or get together and in other significant occasion. According to oral history which Santveer Lama has mentioned in his 'Tamba- Koiten' where he mentioned about the king who is regarded has Hindu god Mahadeva and queen as 'Parvati', where the story starts with the hunting of goat and to make goat immortal with the queen's request by making Damphu with its skin (Subba, 2011).

Tamang musical instrument are divided into five groups:

Stringed instruments- played with figure

Stringed instrument- played with a bow

Percussion instruments

Wind instruments played by blowing in the air from mouth and

Wind instrument played with the figures.

Apart from Damphu there are other important instruments which are made from different type of resources including human bone. Among these the Damphu is considered as most important musical instrument which is of two types: regular damphu and bird damphu.

Religion and Belief System:

The Tamangs were "Bonist" (animist) in the beginning but now have adopted Mahayana sect of Buddhism. However, they have retained many "Bonist" practices such as Khepa-Soom (a practice of paying homage to the ancestors with blood sacrifices), Banbo sherab(an act of giving affectionate farewell of the departed soul "Thunda Sorshi" with offerings) etc.

Festivals

The Tamangs observe festival of their own such as Lotshar which takes place on December-january along with many Buddhist festivals such as Guru Rimpocvhey's Trungkar Tshechu, Saga Dawa, Dukpa Tsheshi, Lhabab-Duechen, Pang Lhabsol, Loosung and join the Hindu festivities of Dashain, Tihar etc. But now they celebrated their most important festival sonam lochhar durning the month of January.

Language & Literature

Tamangs have their own script and language. The Tamang language share several words in common with Tibetan language. The state government of Sikkim has recognized the Tamang language as one of the State language of Sikkim. Now, the Tamang Language is being taught in the schools upto the primary level of education

Tamang is not a written language ,those who have lived for a long in a society where the Lingua frame in Nepali ,have accustomed in some area to transcribing texts in their own language into the Devanagari alphabet .Santabir lama ,whose effort traced the history ,culture of language and the process of migration which compled him to go back to his native place to know about his own Tamang culture .It was his effort which make them explain about the Tamang lames and their manuscripts of Tigten Tamehyoi,Kukpai Khachyoi and Ruichan Cyopge, all extracted from Tibtan book.Santabir lama was the person to note down in first writing the traditions contained in the lama through his book may contain simple copies of Tibetan tradition well known elsewhere , but it also contain description of Tamang customs not previously describing by Nepales or by westerns (Subba, 2011).

Rites of Passage (Lifecycle)

Birth, Marriage and Death are the major events of life: The Lama conducts the worship of the Buddha and the Phola or the family deity and the ceremony at the time of birth, held as a purificatory rite. The purification ceremony and the worship are performed on

the fifth day after birth for a boy and on the third day for a girl. The naming (thapsang) of the child id done on the same occasion. Utensils used by the mother and the child are kept separate till the ceremony of thapsang is over. The Lama gives the name and what the name would be depends on the time of birth. The Lama also makes predictions about the future of the child. For the assumption of priesthood there is no prescribed age, though it is normally gone through between eight and ten years- in a ceremony called the tachet, performed by the senior most Lama (Loben) and the younger Lamas. The head of the person intending to become a Lama is shaved completely (Subba, 2011).

Marriage: Endogamy is the norm among the Tamangs, though the cases on community exogamy have been increasing these days. A marriage through negotiation (magne) is the common practice, though elopement (yhuram) is becoming popular to avoid heavy expenses on marriage. The Lamas are allowed to marry, except those who want to become galong, Monogamy, junior sororate are the general forms of marriage. Residence is patrilocal. Divorce and separation on grounds of maladjustment with social approval are allowed. A widow or widower, a male or female divorcee can marry. "Jharikal" is also in practice.

An unique feature of a Tamang matrimony is the "REM" (RIT) system in which the bridegroom on his party will have to submit twelve different verities of the articles to the bride's parents. The payment is not to be considered as a compensation for the bride but it is a token of gratitude and respect to the bride's parents for having agreed to offer their daughter. The Rem is a social custom which also serves to highlight and solemnize the

occasion. The articles may include perishable items like oil-cooked rice breads, home made liquor, raw meat etc. and non perishable items like money, rice, living fowl, etc. The articles are decorated with kokomhendo (Totola ko phul). The marriage rituals are performed in a number of stages that includes: (i) selection of partner and consent to marriage by the girl's parents; (ii) Submission of parents to the bride's parents; (iii) invitation to the guests; (iv) recitation of mantras by the Lamas in the groom's house; the dressing of the groom, the elders' blessing to the groom; (v) the wedding procession with the groom arriving at the bride's house with dancing parties of "Damphu Whai" songs and damphu dance/Sello dance; (vi) Welcome by the elders and the dance party of the bride side; (vii) a function called the "Phydam" held to introduce the bride to the groom and groom's relatives; (viii) the marriage solemnization ; (ix) a welcome given on the return of the bridal party to the groom's house; (x) the return of the couple to the girl's house after three days and presentation of alcohol to the girls parents in duran ceremony .

No Tamangs marriage can be deemed to be completed without the due observance of "Chardam saimundri" a common practice in many hill tribes, which forms a very important and unavoidable part of the ceremony. In this, the elderly family members inclusive of parents of bride and elderly villagers of both sides witness and formally pronounce or declare the fact of the marriage between the bride and the groom and this will be patiently heard by all present. This also involves the taking of oath verbally by both the bride the groom that they shall never separate from each other and shall always live as true husband and wife. As tradition the bridegroom will submit certain prescribed eatables, a hen and a cock as well as a sum of twelve rupees for this ceremony. The fowl

curry along with the liquor and all as a mark of the ceremony having been accomplished then eat other items. The marriage is now, deemed to be officially solemnized and confirmed. Nowadays, in many cases the groom putting the vermilion mark at the parting of the bride's hairs the Pote put around the neck, the at the auspicious time of marriage is also in practiced before the sacrificial fire due to the influence of Hinduism, while the Lama chants mantras (Subba, 2011).

Death: After a death funeral rites are performed under the direction of the Lama. A sacred lamp (chimi) , a dagger (goja) and a looking glass are placed near the dead body. The Lama indicates the time and the directions in which the dead dead body would be taken out, Sacred flags (lungdras) flown on the occasion come to 108 or fewer. The dead body is cremated. Mourning (somra) continues for three days, with the ancestors being worshiped. Use of salt and oil items is prohibited during this time. A piece of deceased's bone is sometimes kept in the monastery (gumpa ghonba). The purificatory rite begins after an interval of seven days, and the final rites takes palce on the forty-ninth days after the dead and is known as the ceremony on the forty-ninth day (Sungu). Consideration of expenses are coming in the way of the elaborate ceremonial, and the ritual are now being curtailed. (Subba 2011).
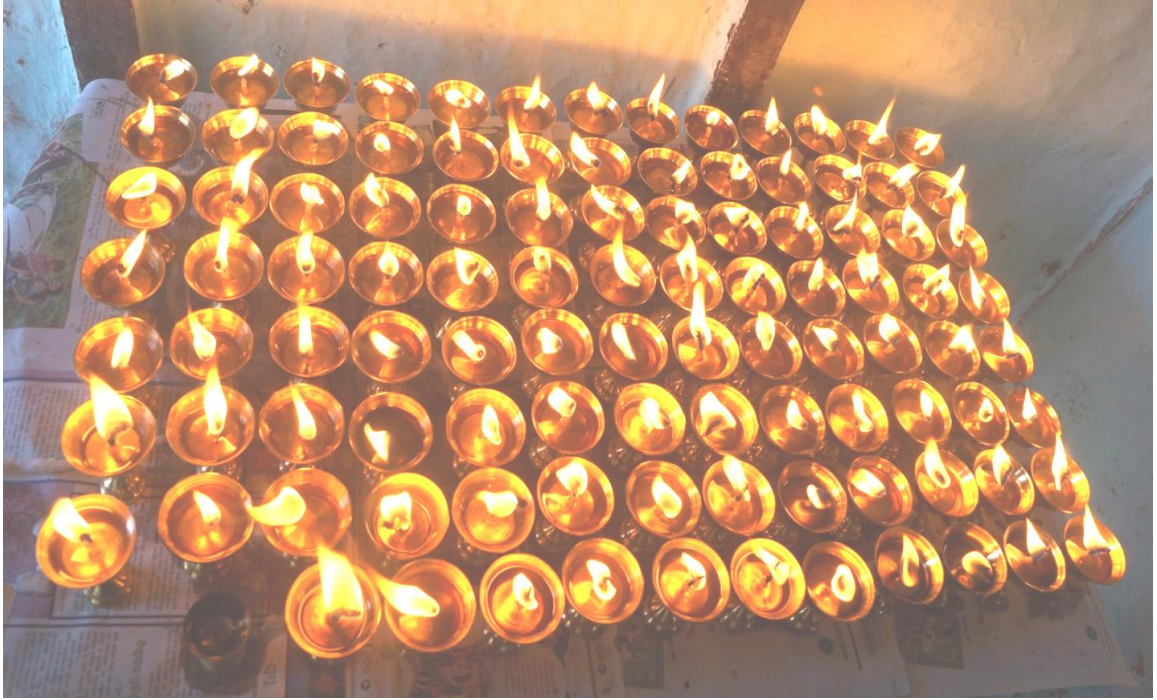
Pictures showing sacred lamp (chimi)

CHAPTER - 3

RESULTS

Findings of the present study are discussed below:

Table-1: Basic data on mean height, weight and BMI among adolescents and adult males

Age group	Number	Mean height(cm)± SD	Mean weight(kg)±SD	Mean BMI±SD
13-19	63	155.47 ±7.68	51.95± 9.185	21.46±3.33
20+	84	155.42±7.89	52.79±9.424	21.81±3.33
		t=3.90;df =107;p<0.05	t= 5.37;df=137;p<0.05	t=3.19;df=129;p<0.05

Table-2: Basic data on mean height, weight and BMI among adolescents and adult females

Age group	Number	Mean height(cm)± SD	Mean weight(kg)±SD	Mean BMI±SD
13-19	71	155.50±7.67	51.95±9.121	21.46±3.34
20+	102	155.58±7.75	52.72±9.36	21.73±3.30
		t=3.24;df=137;p<0.05	t=4.87;df=162;p<0.05	t=3.65;df=163;p<0.05

Table-1 shows basic data on mean height, weight and BMI with standard deviation of the Tamang males of Pakyong. The table shows that the mean height (155.47±7.68) was higher among the adolescents. The mean height (155.42±7.89) was found among adult males. However, the mean weight (51.95±9.185) was found higher among adolescent males. The mean weight 52.79±9.424) was found among adult. The mean BMI

(21.81±3.33) was found higher among the adult males and (21.46±3.33) were found among the adolescent males.

Table-2 shows basic data on mean height, weight and BMI with standard deviation of Tamang females of Pakyong. The table shows that mean height (155.58±7.75) was found higher among adult females. The mean height (155.50±7.67) were found among adolescent females. However, the mean weight (52.70±9.36) was found higher among adult females. The mean weight 51.95±9.21) was found among adolescent females. The mean BMI (21.73±3.30) was found higher among the adult females and (21.46±3.34) were found among the adolescent females.

Table-3:- Distribution of different BMI values among adolescents and adult males

Age group	Number	Under weight	Normal	Over weight/obese
13-19	63	23(36.51)	32(50.79)	8(12.70%)
20+	84	11(13.10%)	46(54.76%)	27(32.14%)

χ^2= 12.85; df= 4; p <0.05

Fig 1: Show distribution of different BMI values among adolescents and adult males

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Table-4:- Distribution of different BMI values among adolescents and adult females

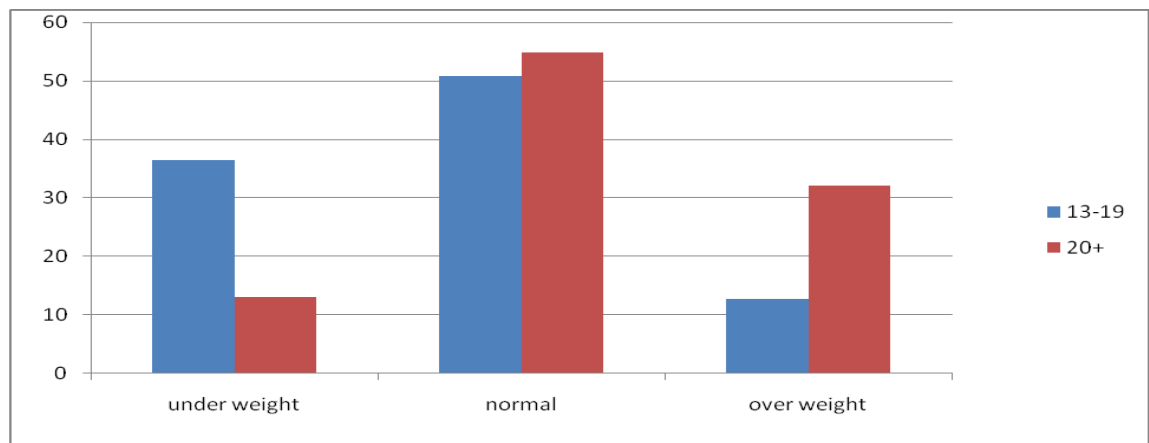| Age group	Number	Under weight	Normal	Over weight/obese
13-19	71	18(25.35)	41(57.75%)	12(16.90%)
20+	102	14(13.72%)	45(44.12%)	43(42.16%)
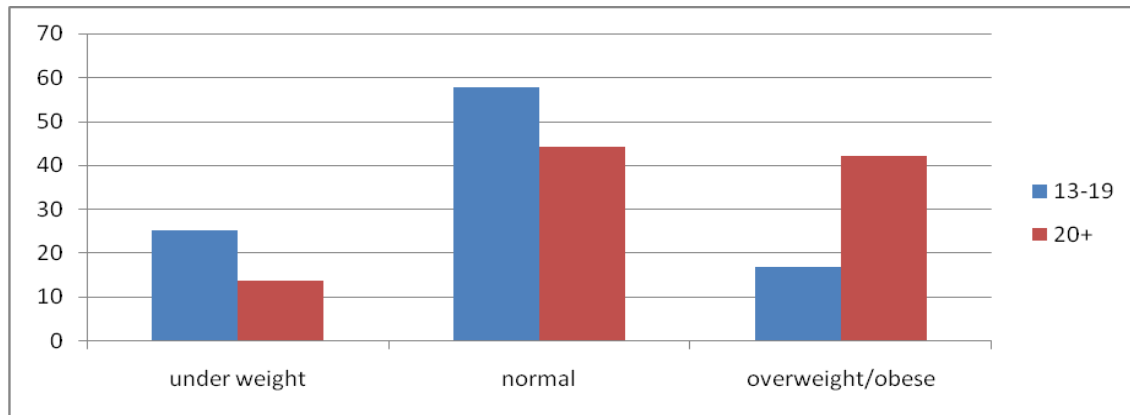
Fig 2: Show distribution of different BMI values among adolescents and adult females

Table-5:- Distribution of different BMI values (overall)

Age group	Number	Under weight	Normal	Over weight/obese
Male	147	34(23.13%)	78(53.06%)	35(23.81%)
Female	173	32(18.50%)	86(49.71%)	55(31.79%)
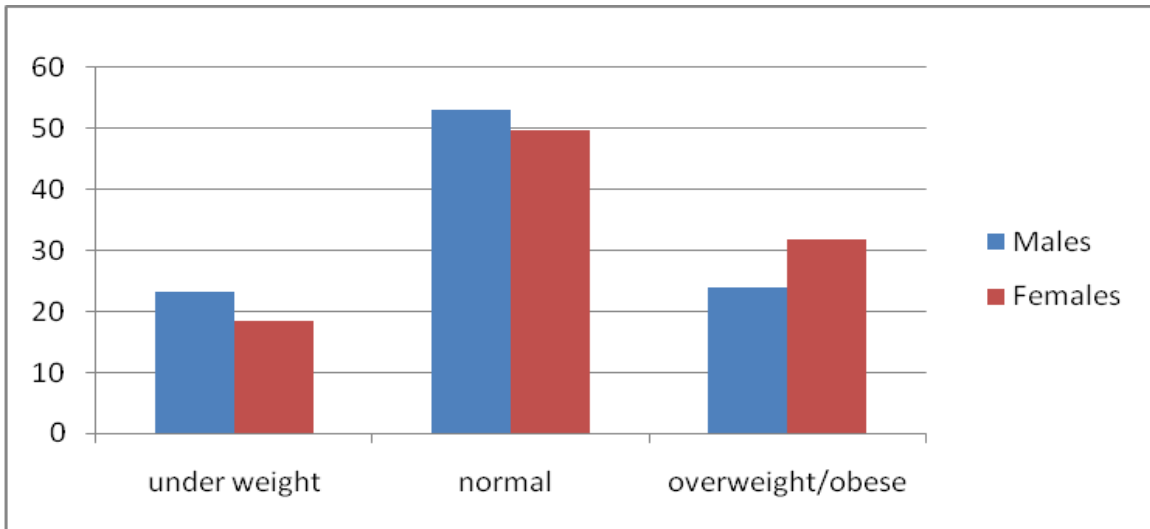
Fig: 3 Shows distribution of different BMI values (overall)

Table 3: shows the nutritional status of adolescent and adult male of Tamang of Pakyong. The above table shows that the frequency of overweight/obesity of adult males (32.14%) followed by adolescent males (12.698%).However the frequency of underweight is 36.51% was found higher among adolescent males and which is followed by adult male 13.10%. Table 4: shows the nutritional status of adolescent and adult females of Tamang of Pakyong. The above table shows that the frequency of overweight/obesity is higher among adult females (42.16%) followed by adolescent females (16.90%). However the frequency of underweight is 25.38% was found higher among adolescent females and which is followed by adult females 13.72%.

Again table 5: shows the overall nutritional status among males and females of Tamang of Pakyong. The above table shows that the frequency of overweight/obesity is higher among female (31.79%).However the frequency of overweight/obesity is 23.81% was found among adult. The frequency of underweight 23.13% is found higher among the male then the female and frequency of underweight 18.50% is recorded among the

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female. The differences in the distributions of different BMI values in different age group were statically significant.

Table 6-: Distribution of BMI values in relation with income group among adolescents and adult males

Age group	Income group	Number	Underweight	Normal	Overweight/obese
13-19	Lower income	31	19(61.29%)	12(38.71%)	0(0.00%)
	Middle income	23	4(17.39%)	14(60.87%)	5(21.74%)
	High income	9	0(0.00%)	6(66.67%)	3(33.33%)
20+	Lower income	44	11(25%)	27(61.36%)	6(13.64%)
	Middle income	19	0(0.00%)	12(63.16%)	7(36.84%)
	High income	21	0(0.00%)	7(3.33%)	14(66.67%)

Fig 4-: Distribution of BMI values in relation with income group among adolescents males

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Fig 4.1-: Distribution of BMI values in relation with income group among adults males

Table6.1: Overall distribution of different BMI values in relation with income group among adolescent and adult males

Income group	Number	Underweight	Normal	Overweight/obese
Lower income	75	30(40%)	39(52%)	6(8%)
Middle income	42	4(9.50)	26(62%)	12(28.5%)
High income	30	0(0.00%)	13(43.33%)	17(56.67%)

χ^2= 42.57; df= 4; p <0.05
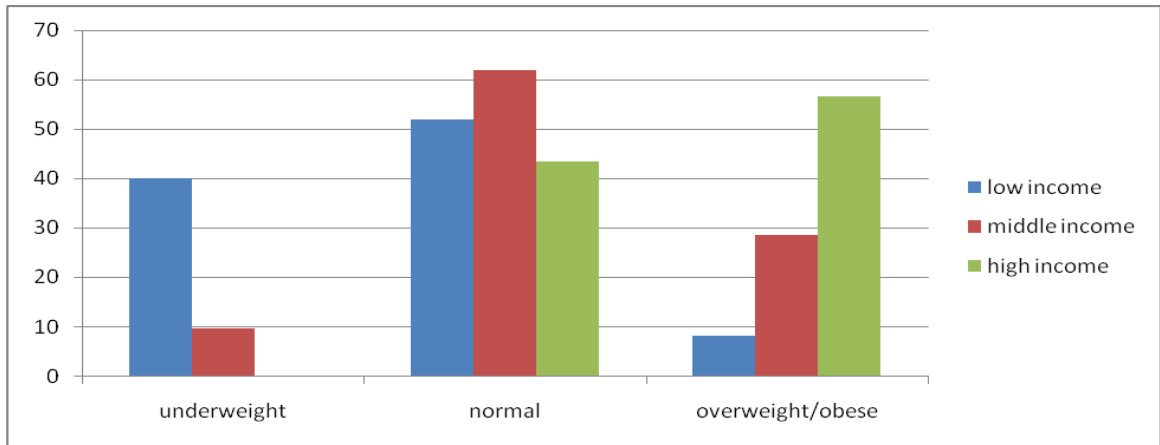
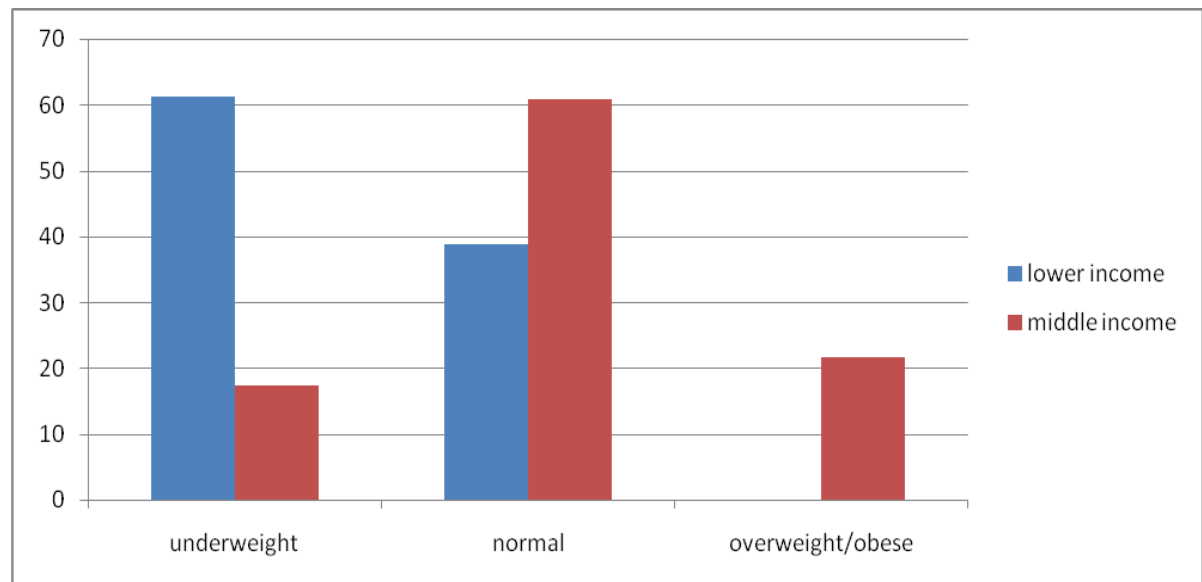Fig: 5 Shows overall distribution of different BMI values in relation with income group among adolescent and adult males

The distribution of BMI values in relation to economic condition of the family in different age group .Table 6: shows the BMI values in relations to economic condition of the adolescent and adult males of Pakyong. The above table shows that the frequency of overweight/obesity 33.33 percent among adolescent males in higher income family. The frequency of underweight 61.29% and 38.71 percent were found among lower and middle income family.

Again in adult the prevalence of underweight 25 percent was higher among the lower income family and frequency of overweight/obesity 66.67 percent was found among the higher income group family. However the frequency of overweight/obesity 36.84 percent and 13.64 percent were found among middle and lower income group family respectively.

.Table 6.1 shows the overall BMI values in relations to socio economic condition of males two age groups. The frequency of overweight /obesity 56.67 percent was found

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among higher income group family. This was followed by the frequency of overweight/obesity 28.5 percent found among middle income group and 8 percent found among the lower income group. The frequency of underweight 40 percent was found higher among lower income group family and 9.5 percent found among the middle income group family. The differences in the distribution of BMI values in relation with income were statistically significant.

Table-7: Distribution of BMI values in relation with income group among adolescents and adult females

Age group	Income group	Number	Underweight	Normal	Overweight/obese
13-19	Lower income	42	18(42.86%)	23(54.76%)	1(2.38%)
	Middle income	14	0(0.00%)	9(64.29)	5(35.71%)
	High income	15	0(0.00%)	9(60%)	6(40%)
20+	Lower income	47	13(27.66%)	31(65.96%)	3(6.38%)
	Middle income	32	1(3.125%)	12(37.5%)	19(59.375%)
	High income	23	0(0.00%)	2(8.70%)	21(91.30%)
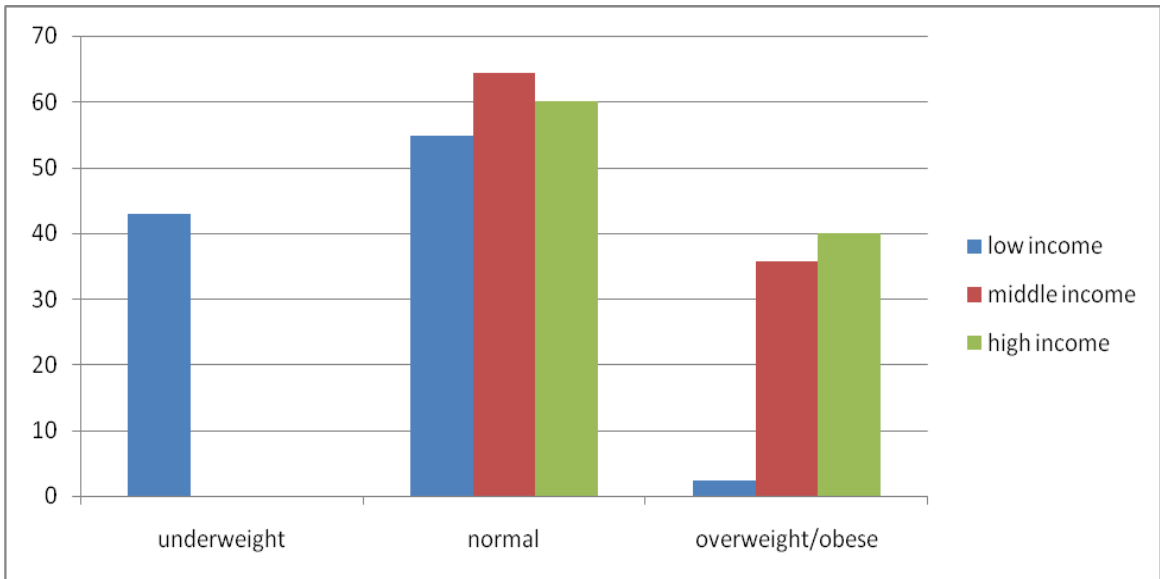
Fig 6: Distribution of BMI values in relation with income group among adolescents females
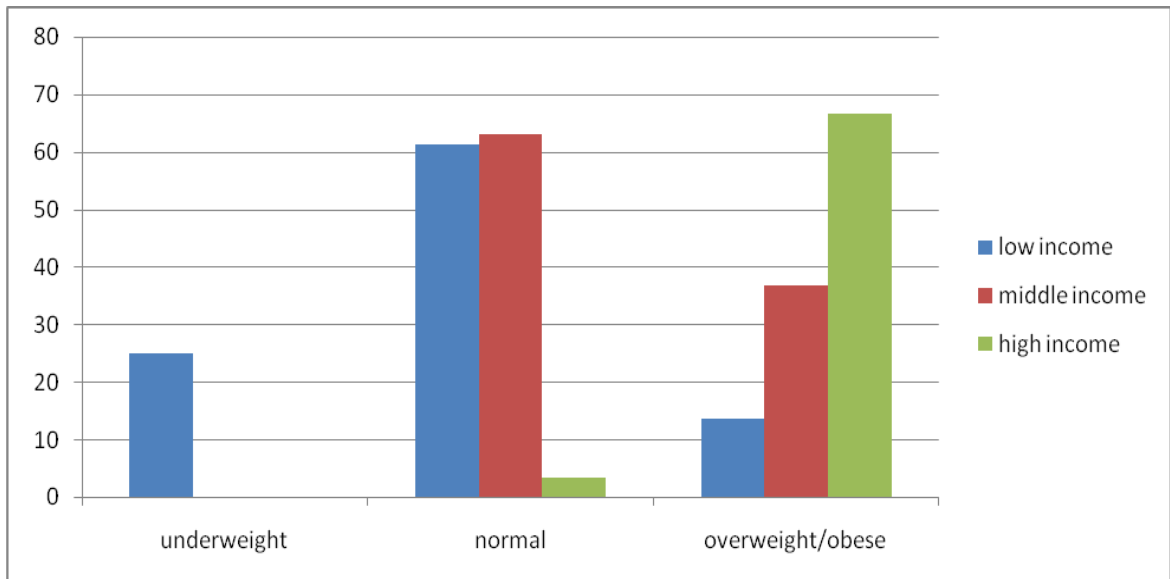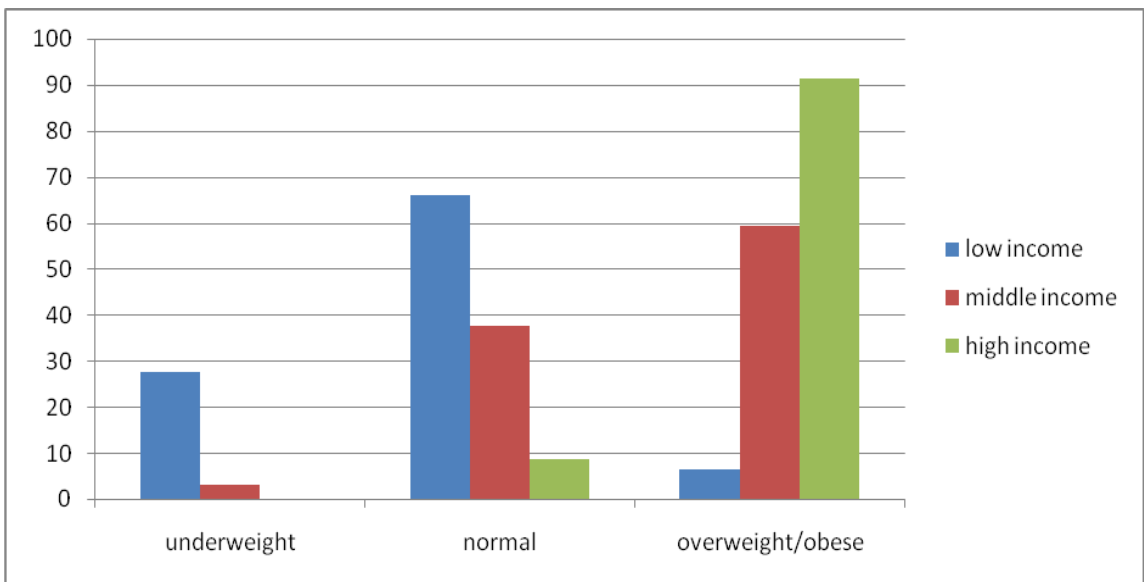

Fig 6.1: Distribution of BMI values in relation with income group among adult females

Table7.1: Overall distribution of different BMI values in relation with income group among females adolescent and adult

Income group	Number	Under weight	Normal	Over weight
Lower income	89	31(34.83%)	54(60.67%)	4(4.5%)
Middle income	46	1(2.173%)	21(45.65%)	24(24%)
High income	38	0(0.00%)	11(28.95%)	27(71.05)

χ^2= 77.38; df= 4; p <0.05
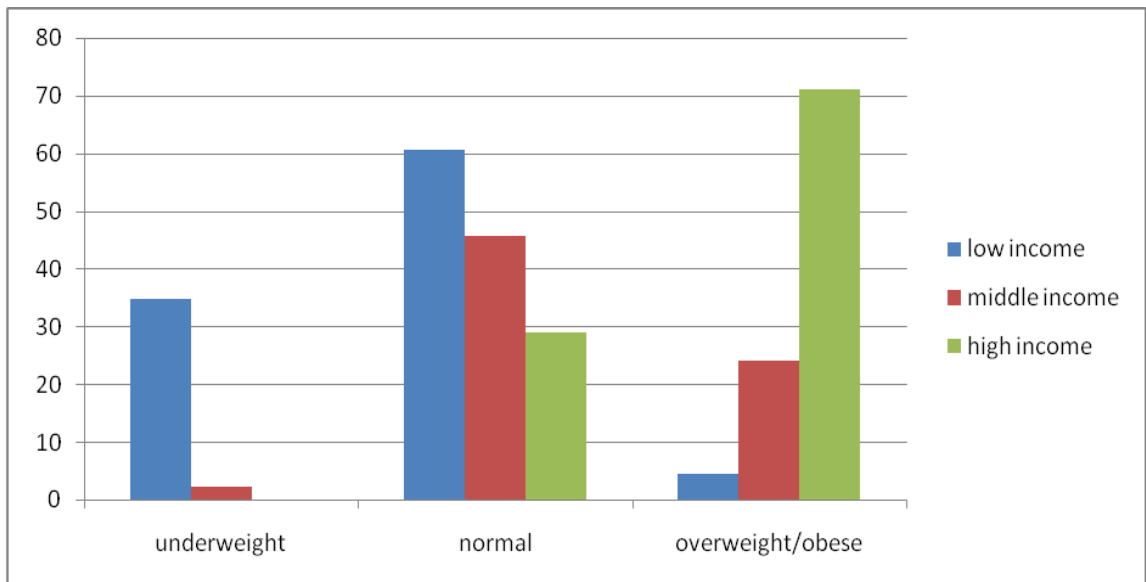
Fig: 7 Overall distributions of different BMI values in relation with income group among females adolescent and adult.

The distribution of BMI values in relation to economic condition of the family in different age group Table 7: shows the BMI values in relations to economic condition of the adolescent and adult females of Pakyong. The above table shows that the frequency of overweight/obesity (40%) among adolescent females in higher income family. This was followed by the frequency of overweight/obesity among middle income 35.71

percent and lower income group family 2.38 percent. The frequency of underweight 42.86 percent was found among lower income family.

Again in adult the prevalence of underweight 27.66 percent was higher among the lower income family 3.125 percent was found among the middle income group family. The frequency of overweight/obesity 91.30 percent was found among the higher income group family. However the frequency of overweight/obesity 59.375 percent and 6.38 percent were found among middle and lower income group family respectively. Table 7.1 shows the overall BMI values in relations to socio economic condition of females of two age groups.The frequency of overweight /obesity 71.05 percent was found among higher income group family. This was followed by the frequency of overweight/obesity 24% found among middle income group and 4.5 percent found among the lower income group. The frequency of underweight 34.83 percent was found higher among lower income group family and 2.17 percent found among the middle income group family. The differences in the distribution of BMI values in relation with income were statistically significant.

Table-8: Distribution of BMI values in relation with education levels among adolescents and adult males

Age group	Education	Number	Underweight	Normal	Overweight/obese
13-19	Primary	0	0(0.00%)	0(0.00%)	0(0.00%)
	Secondary	46	18(39.13%)	23(50%)	5(10.87%)
	H.Secondary	14	3(21.43%)	8(57.14%)	3(21.43%)
	Gradute +	3	2(66.67%)	1(33.33%)	0(0.00%)
20+	Primary	36	8(22.22%)	18(50%)	10(27.78%)
	Secondary	32	0(0.00%)	18(56.25%)	14(43.75%)
	H.secondary	8	1(12.5%)	5(62.5%)	2(25%)
	Gradute+	8	2(25%)	5(62.5%)	1(12.5%)
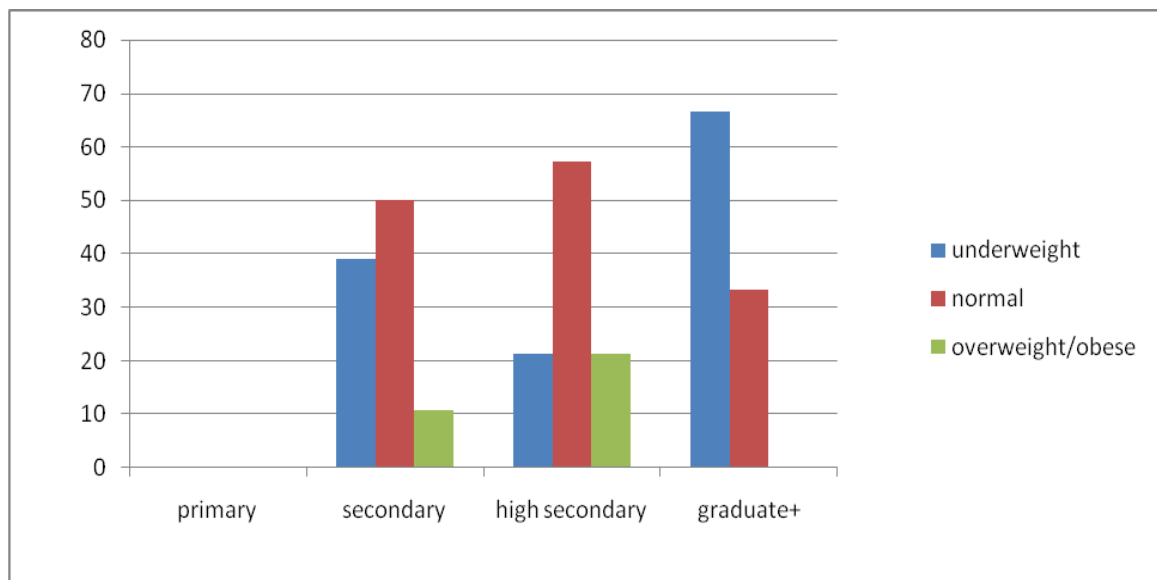
Fig:8 shows distribution of BMI values in relation with education levels among adolescents males
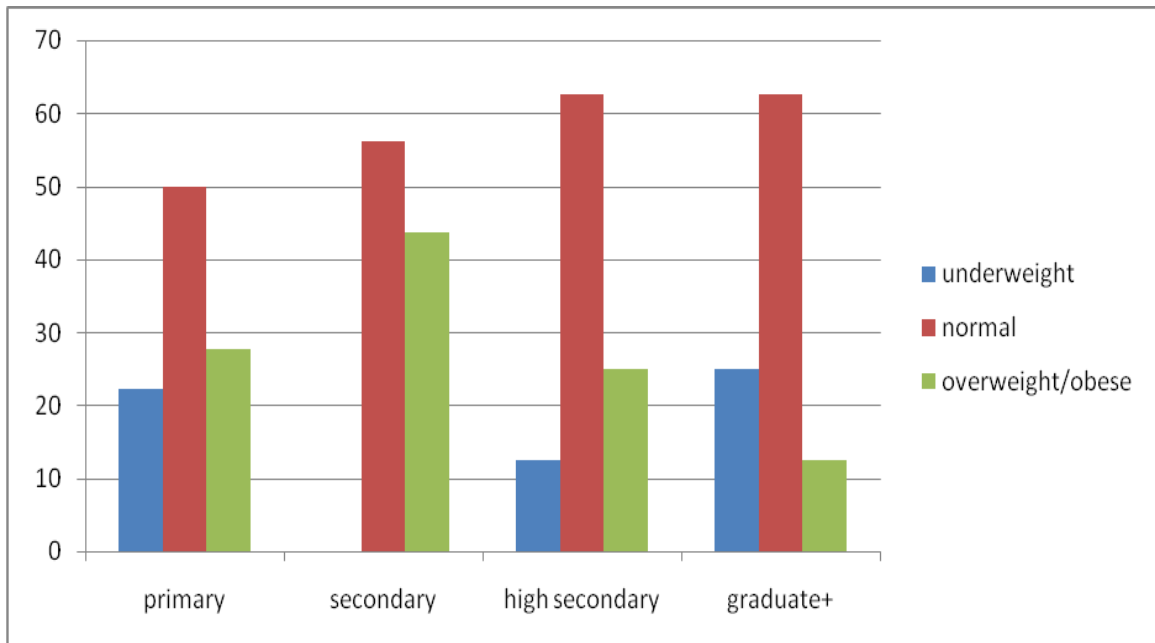
Fig: 8.1shows distribution of BMI values in relation with education levels among adult males

Table8.1: Overall distribution of BMI values in relation with educational levels among males

Education	Number	Under weight	Normal	Overweight/obese
Primary	36	8(22.22%)	18(50%)	10(27.78%)
Secondary	78	18(23.08%)	41(52.56%)	19 (24.36%)
Higher Secondary	22	4(18.18%)	13(59.09%)	5(27.73%)
Graduate+	11	4(36.36%)	6(54.55%)	1(9.09%)

$\chi^2 = 2.75$; df= 6; p <0.05
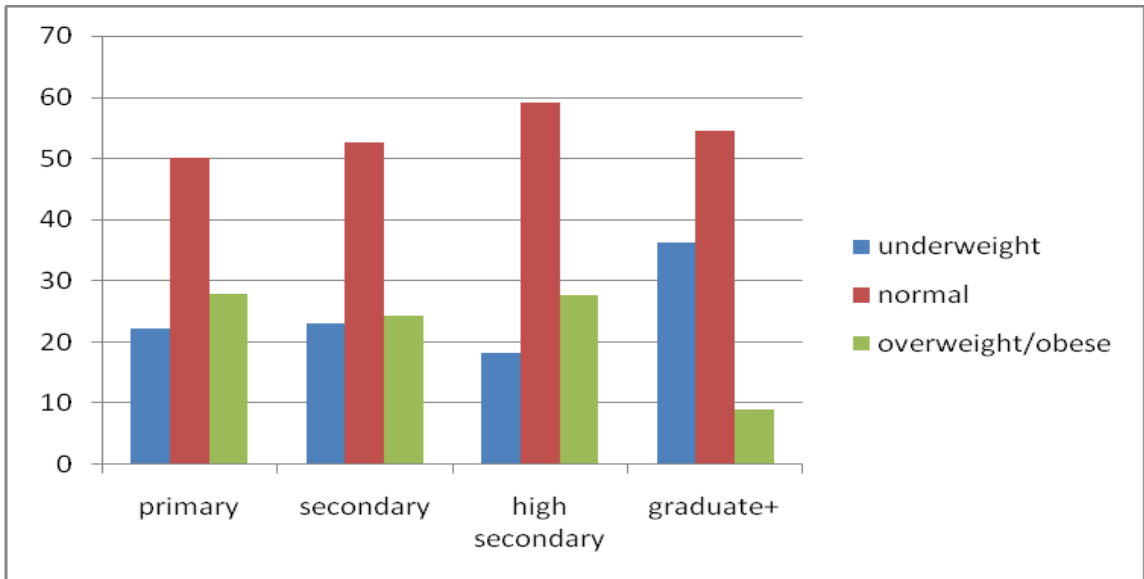
Fig 8.2: Overall distribution of BMI values in relation with educational levels among males

Distributions of different BMI values in relation to educational levels in different age groups are given in table-4. Among males adolescent and adult age group, the frequency of overweight/obesity (21.43%) was found higher among those who attained higher secondary education. However the frequency of overweight/ obesity 10.87 percent were found among adolescent males those who attained secondary level of education. The frequencies of underweight 66.67 percent, 39.13 percent and 21.43 percent were found in graduate level education, secondary education and higher secondary level of education respectively. Among adult males, the frequency of underweight 25 percent, 22.22 percent and 12.5 percent was found among the graduate level education, primary education and higher secondary level of education respectively. The frequency of overweight/obesity 43.75 percent was found higher among the secondary level of education. The frequencies of overweight/obesity 27.78 percent, 25 percent and 12.5 percent were found among

adult males who attained primary education, high secondary education and graduate level of education respectively.

The overall distributions of overweight/obese and underweight in relation with educational levels among Tamang males of Pakyong village are given in table-8.2. The table shows that the frequency of overweight/obesity 27.78 percent was found higher among males who attained primary level of education. Whereas, the frequency of overweight/obesity 27.73 percent, 24.36 percent and 9.09 percent was found among higher secondary level of education, secondary level of education and graduate and above level of education. However, the frequency of underweight 36.36% percent was found relatively higher among those who attained graduate and above level of education. The frequency of underweight 23.08 percent, 22.22 percent and 18.18 percent was found among secondary level of education, primary level of education and higher secondary education respectively.

Table-9: Distribution of BMI values in relation with education levels among adolescents and adult females

Age group	Education	Number	Underweight	Normal	Overweight/obese
13-19	Primary	0	0	0	0
	Secondary	60	18(30%)	34(56.67%)	8(13.33%)
	Higher Secondary	10	0(0.00%)	7(70%)	3(30%)
	Gradute+	1	0(0.00%)	0(0.00%)	1(100%)
20+	Primary	55	7(12.73%)	25(45.45%)	23(41.82%)
	Secondary	36	5 (13.89%)	15 (41.67%)	16 (44.44%)
	High secondary	6	2(33.33%)	3(50%)	1(16.67%)
	Graduate+	5	0(0.00%)	2(40%)	3(60%)

Fig: 9 shows distribution of BMI values in relation with education levels among adolescent females
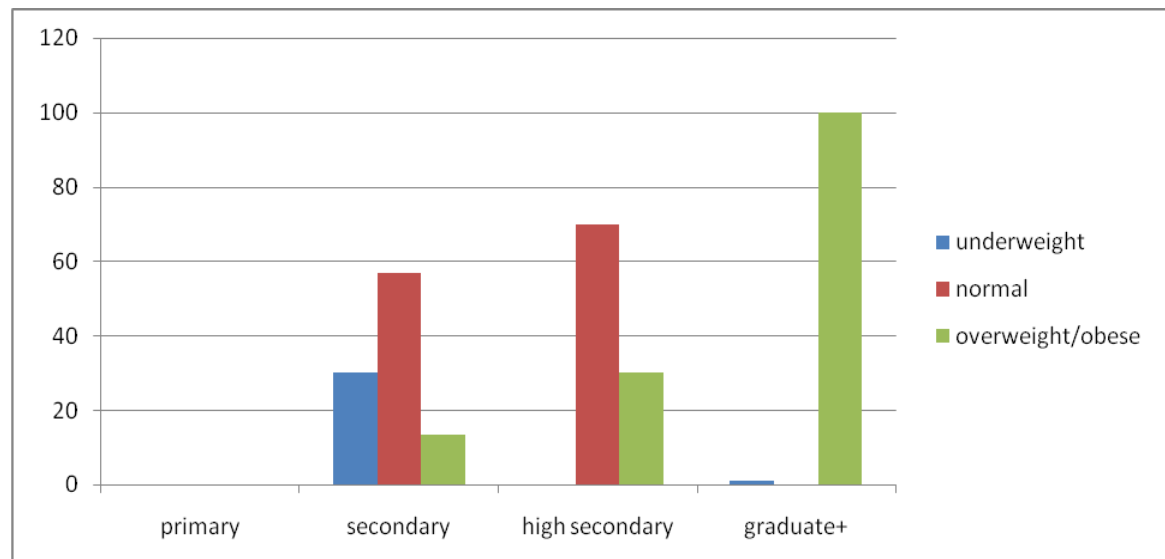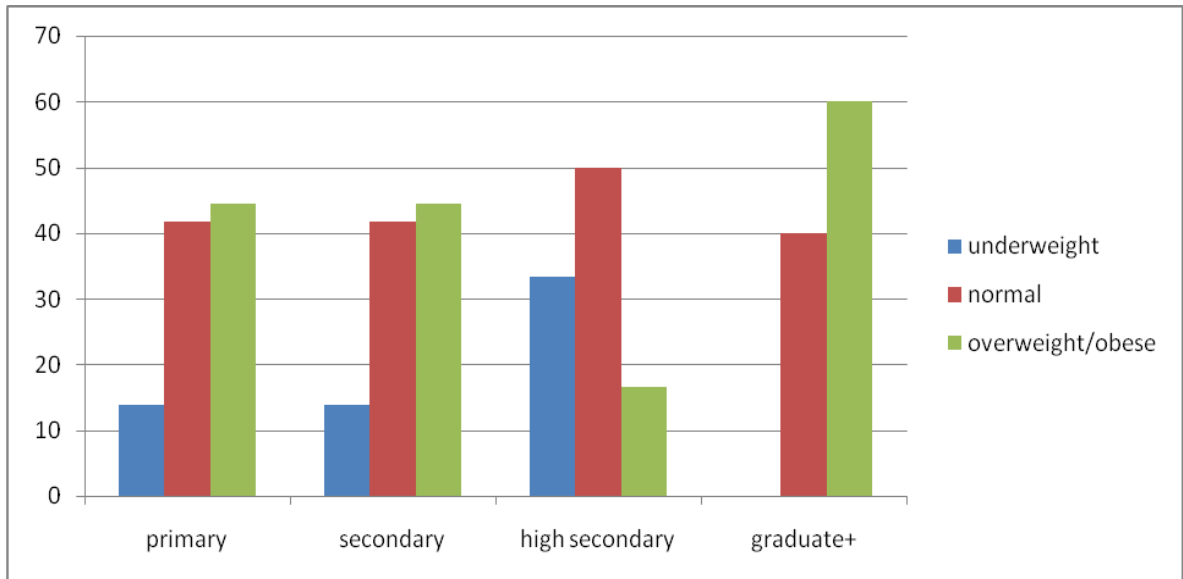
Fig 9.1 shows distribution of BMI values in relation with education levels among adult females

Table9.1: Overall distribution of BMI values in relation with educational levels among females

Education	Number	Under weight	Normal	Overweight/obese
Primary	55	7(12.73%)	25(45.45%)	23(41.82%)
Secondary	96	23(23.91%)	49(51.04%)	24(25%)
Higher Secondary	16	2(12.5%	10(62.5%)	4(25%)
Graduate+	6	0(0.00%)	2(33.33%)	4(66.67%)

χ^2= 10.70; df= 6; p <0.05
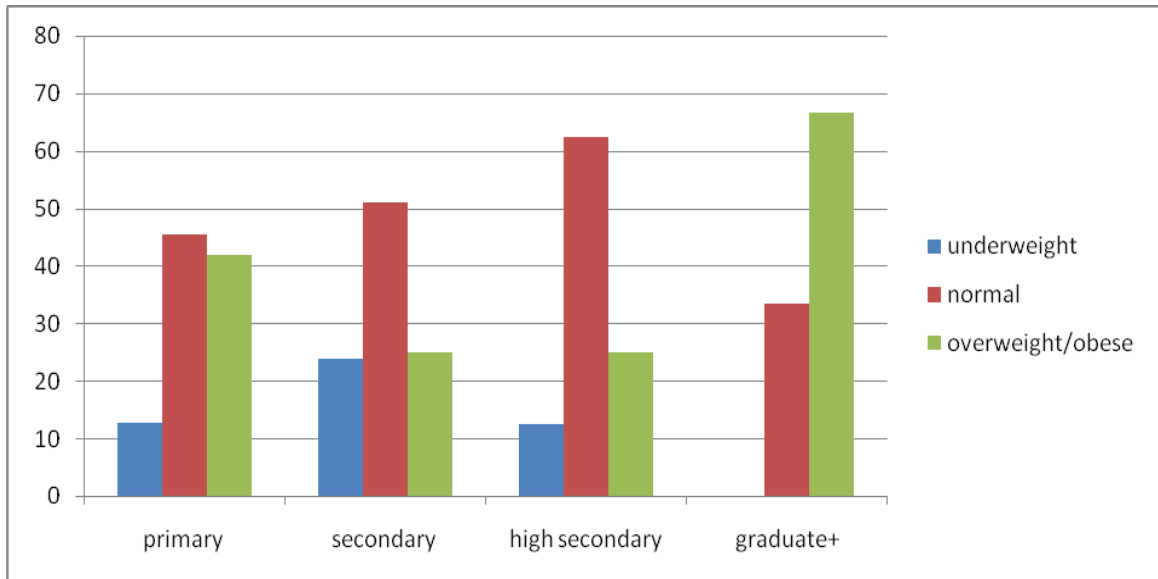
Fig 9.2 shows distribution of BMI values in relation with education levels among adolescents and adult females.

Distributions of different BMI values in relation to educational levels in different age groups are given in table-9. Among females adolescent and adult age group, the frequency of overweight/obesity 100 percent was found higher among those who attained higher graduate and above level of education. However the frequency of overweight/ obesity 30 percent and 13.33 percent were found among adolescent females those who attained   higher secondary and secondary level of education. The frequencies of underweight 30 percent were found in secondary level education. Among adult females, the frequency of underweight 33.33 percent and 13.89 percent and 12.73 percent was found among the higher secondary level of education, secondary and primary level of education respectively. The frequency of overweight/obesity 60 percent was found higher among the graduate and above level of education. The frequencies of overweight/obesity 44.44 percent, 41.82 percent and 16.67 percent were found among adult females who

attained secondary level of education, primary education, high secondary level of education respectively.

The overall distributions of overweight/obese and underweight in relation with educational levels among Tamang females of Pakyong village are given in table-9.2. The table shows that the frequency of overweight/obesity 66.67 percent was found higher among females who attained graduate and above level of education. Whereas, the frequency of overweight/obesity 41 percent, 25 percent and 25 percent was found among primary level of education, secondary level of education and higher secondary level of education. However, the frequency of underweight 23.91 percent was found relatively higher among those who attained secondary level of education. The frequency of underweight 12.73 percent and 12.5 percent was found among primary level of education and higher secondary education respectively. The differences were statistically significant.

Table-10: Distribution of BMI values in relation with marital status among adult females

Number		Underweight	Normal	Overweight/obese
Married	86	12(13.99%)	38(48.10%)	36(41.86%)
Unmarried	16	2(12.5%)	87(57.70%)	7(43.75%)

$\chi^2 = 6.97$; df= 2; p <0.05

Fig 10: Distribution of BMI values in relation with marital status among adult females

The distribution of BMI values in relation to marital status among adult females Tamang of Pakyong east district of Sikkim table-10. The table shows that the frequency of overweight/obese (43.75%) was higher among unmarried females than married (41.86%). The frequency of underweight (13.99%) was higher among married than unmarried (12.5%).

Table-11: Distribution of BMI values in relation with marital status among adult males

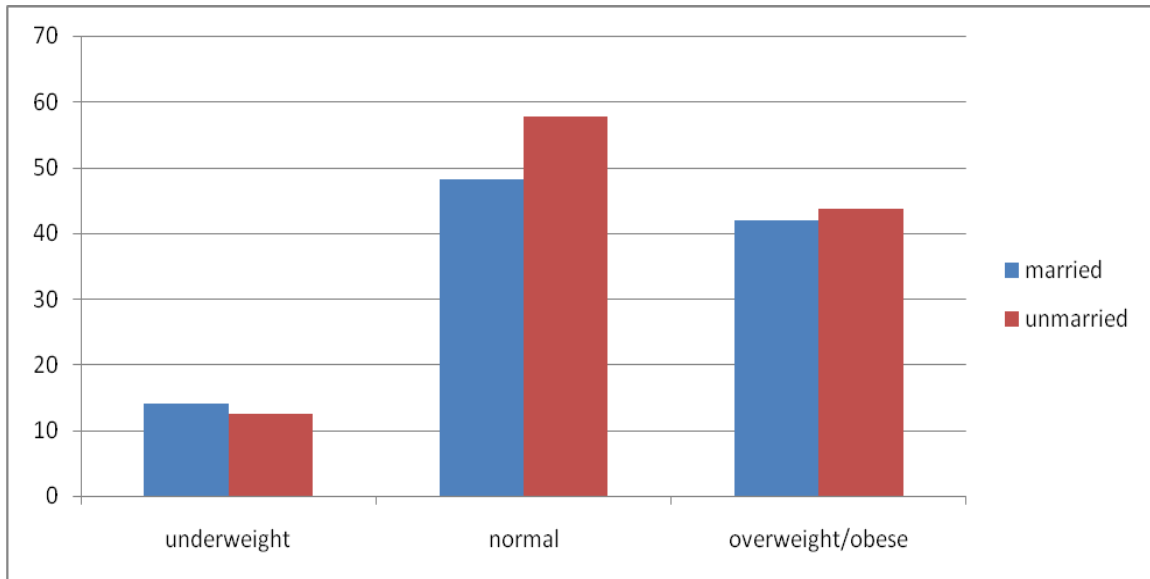| Number		Underweight	Normal	Overweight/obese
Married	64	9(14.06%)	27(42.19%)	28(43.75%)
Unmarried	20	2(10%)	13(65%)	5(25%)

χ^2= 3.22; df= 2; p <0.05
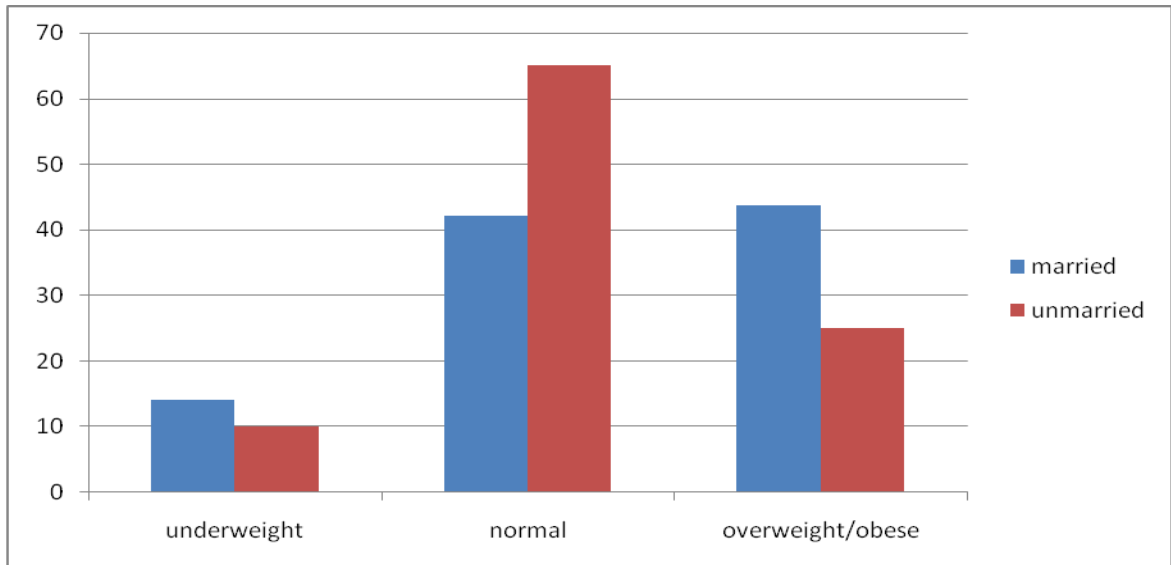
Fig: 10.1 Distribution of BMI values in relation with marital status among adult males

The distribution of BMI values in relation to marital status among adult males Tamang of Pakyong east district of Sikkim. Table-11 shows that the frequency of overweight/obese (43.75%) was higher among married males than unmarried (25%). The frequency of underweight (14.06%) was higher among married than unmarried (10%). The differences in the distribution of different BMI values in relation with marital status among adult females were statistically significant.

Table 12: Overall distribution of BMI values in relation with occupation among adolescents and adult male

Occupation	Number	Underweight	Normal	Overweight/obese
Student	74	26(35.14%)	39(52.70%)	9(12.16%)
Govt. employee	18	0(0.00%)	5(27.78%)	13(72.22%)
Private	55	8(14.54%)	34(61.82%)	13(23.64%)
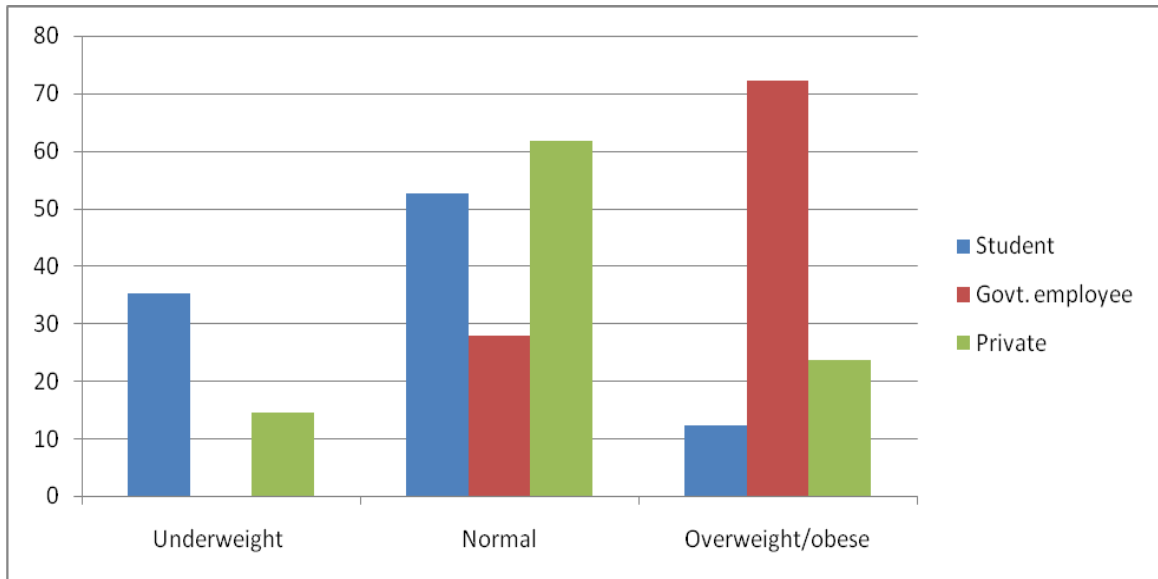
Fig: 11 shows Overall distribution of BMI values in relation with occupation among adolescents and adult male.

Table-12 shows the overall distribution of BMI values in relation with occupation among male Tamang of all age group. The frequency of overweight/obesity was found higher among the government employee (72.22%) and private employee (23.64%) student (12.16%).The frequency of underweight (35.14%) was found higher among those who are still students as compare private (14.54%). The differences in BMI values in relation with occupation were statically significant.

Table 12.1: Overall distribution of BMI values in relation with occupation among adolescents and adult females

Occupation	Number	Underweight	Normal	Overweight/obese
Student	79	20(25%)	46(58.22%)	13(16.46%)
Govt. employee	7	0(0.00%)	0(0.00%)	7(100%)
House wife	87	12(18.79%)	40(45.98%)	35(40.23%)
Private	0	0(0.00%)	0(0.00%)	0(0.00%)
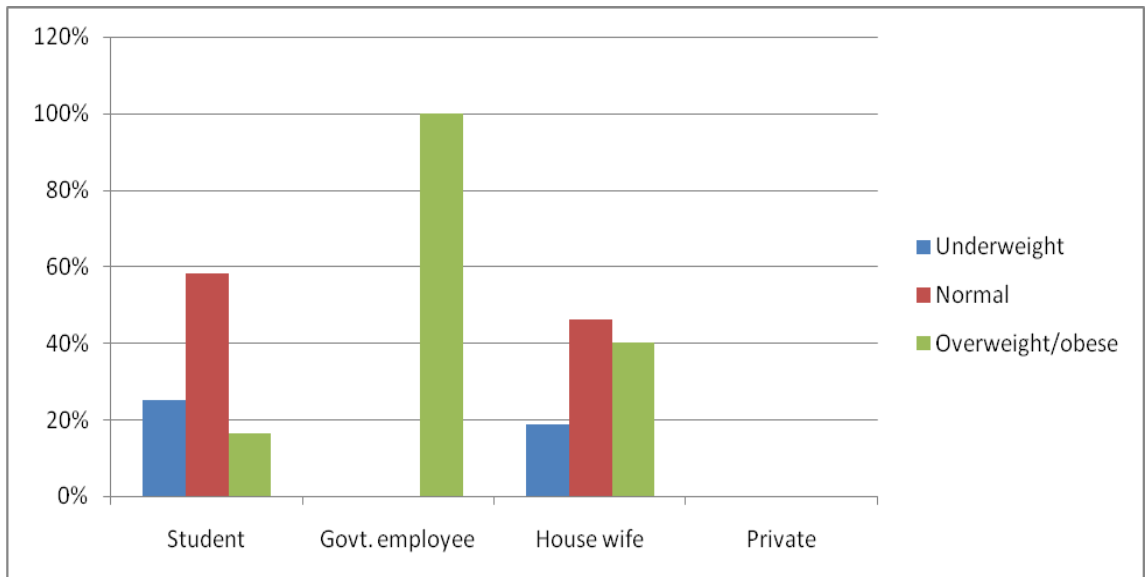
Fig: 12 shows overall distribution of BMI values in relation with occupation among adolescents and adult females.

Table-12.1 shows the overall distribution of BMI values in relation with occupation among females of Tamang of all age group. The frequency of overweight/obesity was found higher among the government employee (100%) followed by housewife (40.23%), and student (16.46%).The frequency of underweight (30.67%) was found higher among

those who are still students as compare private (13.79%) and house wife (13.64%). The differences in BMI values in relation with occupation were statically significant.

Table-13: Distribution of BMI values in relation with television watching among adolescents and adult male

Age group	Television time per day	Number	Underweight	Normal	Overweight/obese
13-19	≤2hrs.	56	23(41.07%)	28(50%)	5 (8.930%)
	3-4hrs.	7	0 (0.00%)	4(57.14%)	3(42.86%)
20+	≤2hrs.	57	11(19.30%)	38(66.67%)	8(14.045)
	3-4hrs.	27	0(0.00%)	8(29.63%)	19(70.37%)
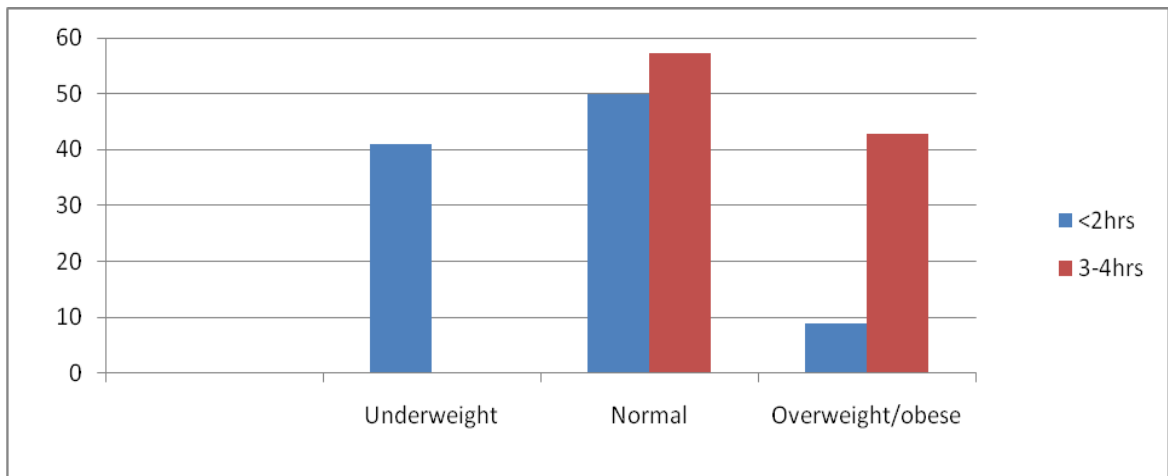
Fig: 13 show distribution of BMI values in relation with television watching among adolescents males.

Fig 13.1: Distribution of BMI values in relation with television watching among adult males.

Table-13.1: Overall distribution of BMI values in relation with television watching among male   both two age groups.

Television time per /day	Number	Underweight	Normal	Overweight/obese
≤2hrs.	113	34(30.09%)%)	66(58.41%)	13 (11.50%)
3-4 hrs	34	1(1.16%)	12(35.29%)	22(64.71%)

χ^2= 43.93; df= 2; p <0.05
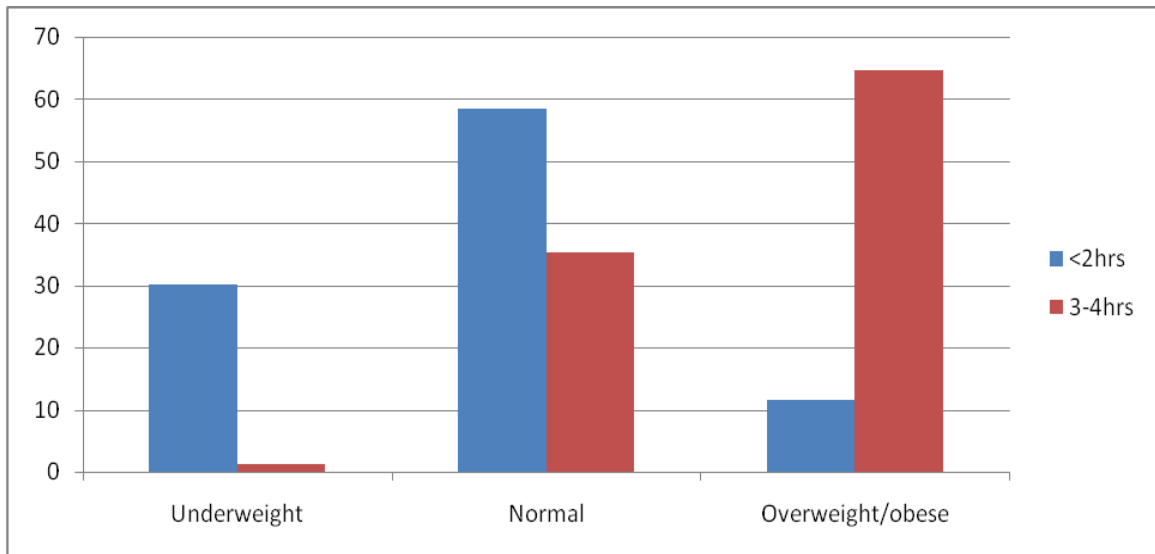
Fig: 13.2 Overall distribution of BMI values in relation with television watching among male both two age groups.

The frequency of overweight/obesity and underweight in relation with television watching is given in table-13. This table shows that the frequency of overweight/obesity 42.86 percent was found higher among adolescent male who spent between three to four hours on television watching and it was followed by the frequency of overweight 8.93 found among who spent below two hours. The underweight frequencies 41.07 percent were found among adolescents male who watched television two hours and below. In case of adults male the frequency of overweight/obesity 70.37 percent was reported higher among those who spent between three to four hours on watching television and 14.04 percent were found among who spent two hours and below. The frequency of underweight 19.30 percent was found among adult males watching television two hours and below.

Overall distribution table 13.1: shows that the frequency of overweight 64.71 percent was higher among those who spent between three to four hour on television watching than below two hours television watching 11.50 percent. The frequency of underweight among all age groups of males who spent less than two hours on television watching was 30.09 percent.

Table-14: Distribution of BMI values in relation with television watching among adolescents and adult females

| Age group	Television time per day	Number	Underweight	Normal	Overweight/obese
13-19	≤2hrs.	55	17(30.91%)	34(61.82%)	4(7. 27%)
	3-4hrs.	16	1(6.25%)	7(43.75%)	8(50%)
20+	≤2hrs.	66	14(21.21%)	43(69.15%)	9(13.64%)
	3-4hrs.	36	0(0.00%)	2(5.56%)	34(94.44%)

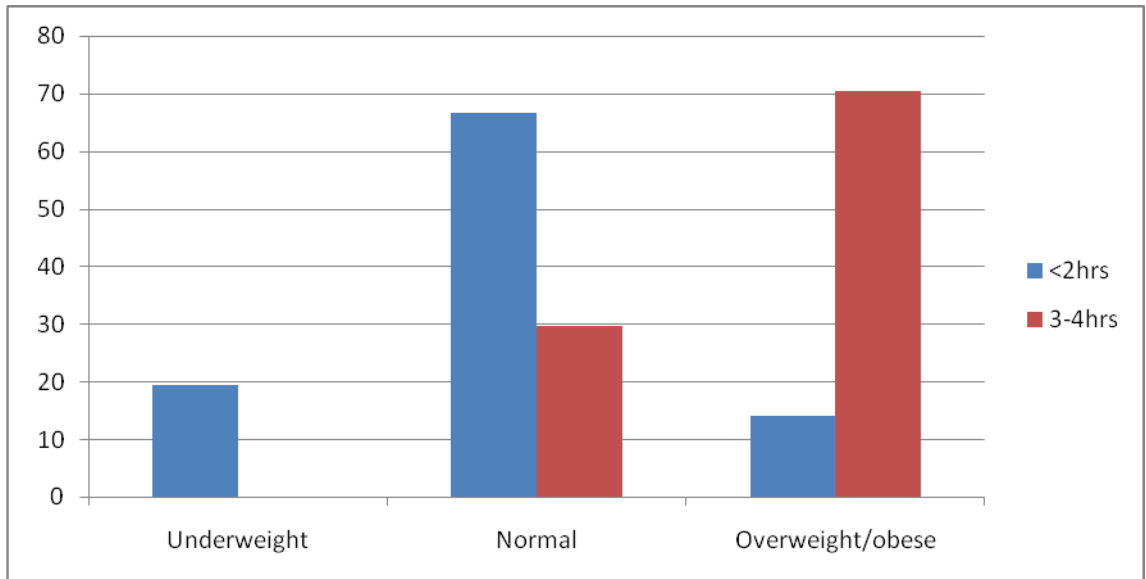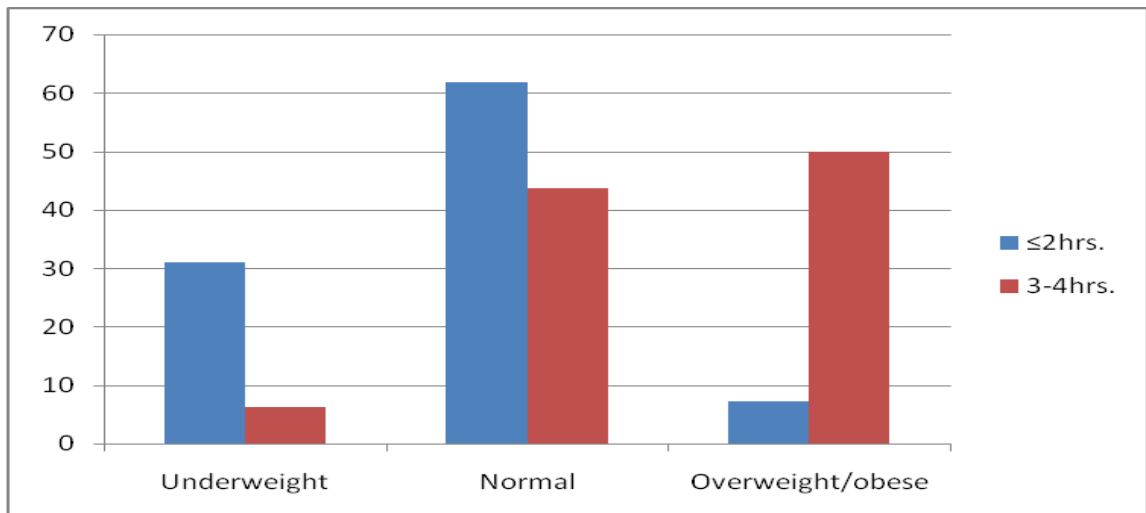Fig 14: Distribution of BMI values in relation with television watching among adolescents females
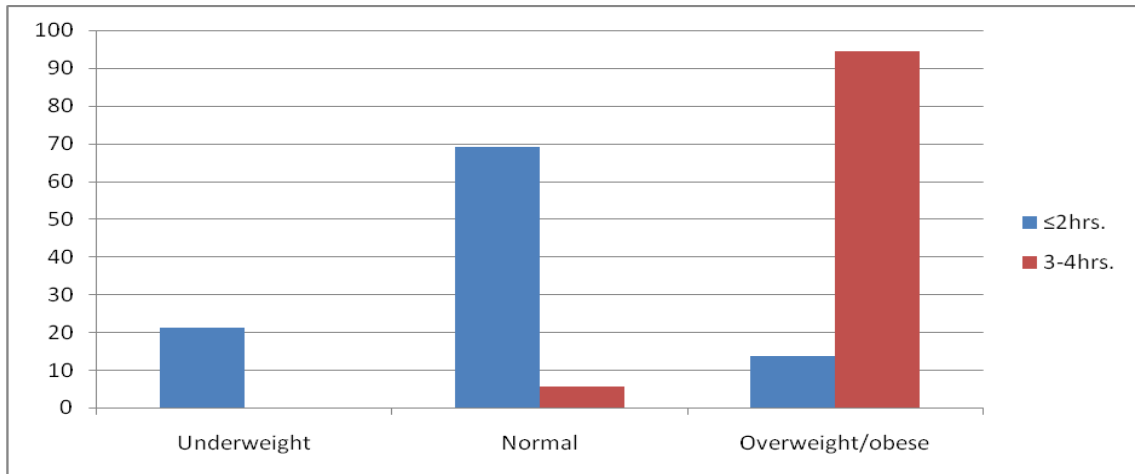
Fig 14.1: Distribution of BMI values in relation with television watching among adult females.

Table-14.1: Overall distribution of BMI values in relation with television watching among females both two age groups.

Television time per /day	Number	Underweight	Normal	Overweight/obese
≤2hrs.	121	31(25.62%)	77(63.64%)	13(10.74%)
3-4 hrs	52	1(1.92%)	9(17.31%)	42(80.77%)

$\chi^2 = 82.84$; df= 2; p <0.05
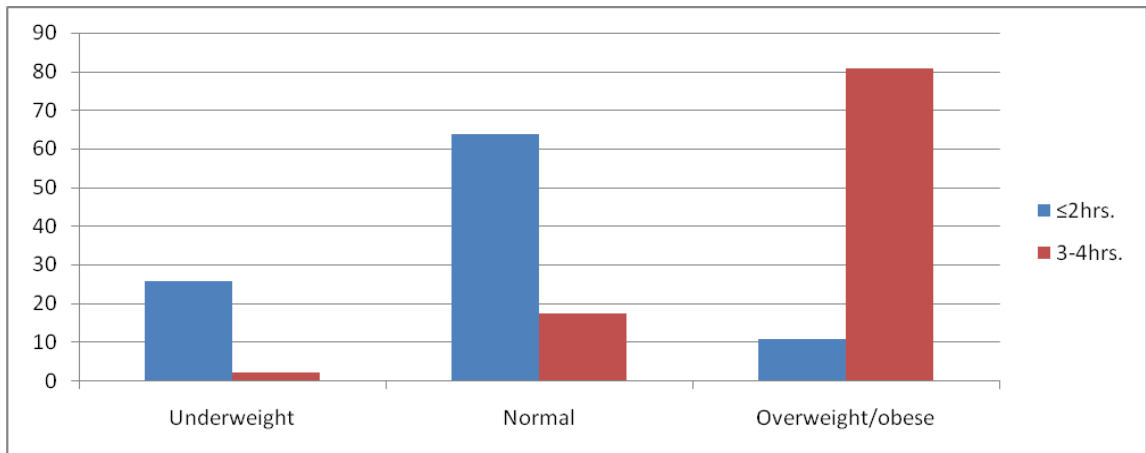
Fig: 14.2 Overall distribution of BMI values in relation with television watching among females both two age groups.

The frequency of overweight/obesity and underweight in relation with television watching is given in Table 14: shows that the frequency of overweight/obesity 50 percent was found higher among adolescent females who spent between three to four hours on television watching and it was followed by the frequency of overweight 7.27 found among who spent below two hours. The frequency of underweight 30.91 percent and 6.25 percent was found among adolescent females who watched television below two hours and between three to four hours respectively.. In case of adults females the frequency of overweight/obesity (94.44%) was higher among those who spent between three to four hours on watching television and 13.64 percent were found among who spent two hours and below. The frequency of underweight 21.21 percent was found among adult females watching television two hours and below.

Overall distribution table 14.1: shows that the frequency of overweight (80.77%) was higher among those who spent between three to four hour on television watching than below two hours television watching (10.74%). The frequency of underweight among all

age groups of female who spent below two hours on television watching was (25.62 %) whereas it was (1.92%) among those who spent between three to four hours on watching television.

Table-15: Distribution of BMI values in relation with intake of non-vegetables among , adolescents and males

Age group	Non-vegetarian	Number	Underweight	Normal	Overweight/obese
13-19	1-2 times	33	20(60.61%)	13(39.39%)	0 (0.00%)
	3-4 times	25	2 (8%)	17(68%)	6 (24%)
	5+ times	5	1(20%)	2 (40%)	2 (40%)
20+	1-2 times	33	11 (33.33%)	22 (66.67%)	0 (0.00%)
	3-4 times	44	0 (0.00%)	23 (52.27%)	21 (47.73%)
	5+ times	7	0 (0.00%)	1 (14.29%)	6 (85.71%)
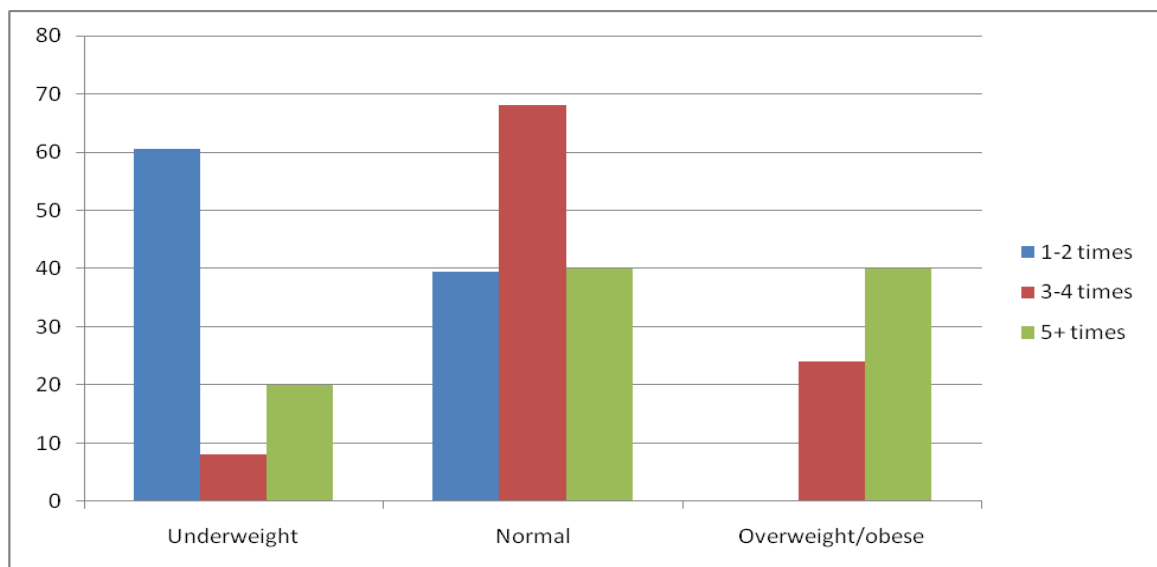
Fig 15: Distribution of BMI values in relation with intake of non-vegetables among adolescents males

Fig 15.1: Distribution of BMI values in relation with intake of non-vegetables among adults males

Table 15.1: Overall distribution of different BMI values in relation with food intake of non-vegetables among male.

Non-vegetarian	Number	Underweight	Normal	Overweight/obese
1-2 times	66	31(46.90%)	35 (53.03%)	0 (0.00%)
3-4 times	69	2 (2.90%)	40 (57.97%)	27 (39.13%)
5+ times	12	1 (8.33%)	3 (25%)	8 (66.67%)

χ^2= 63.43; df= 4; p <0.05
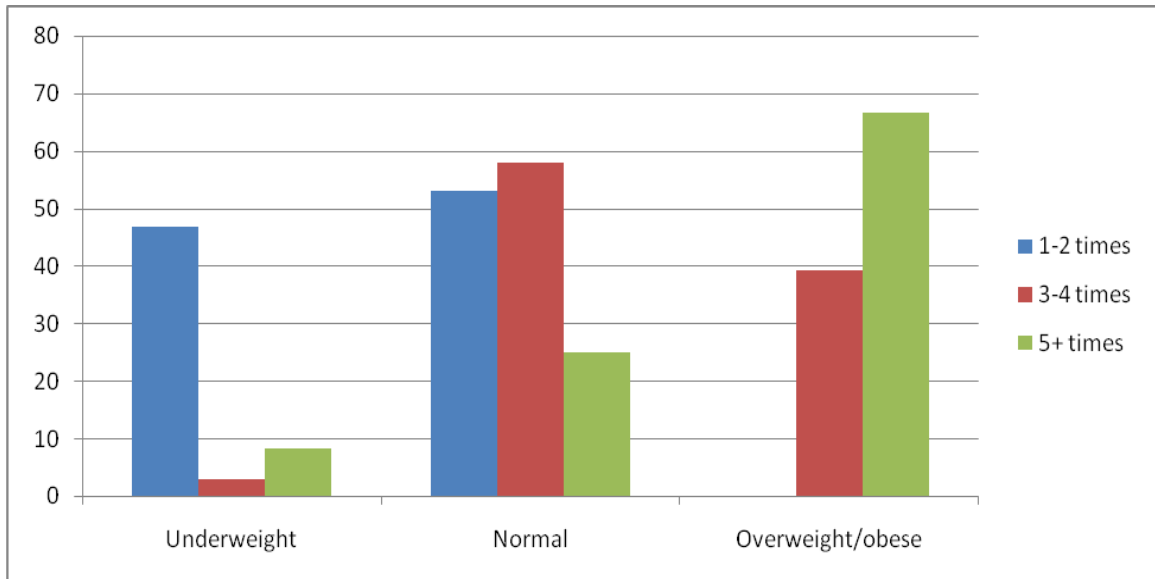
Fig 15.2: Overall distribution of different BMI values in relation with food intake of non-vegetables among male.

Distribution of different BMI values in relationship with the intake of non-vegetable food and nutritional status among Tamang males of Pakyong are given in table-15. The table shows that the prevalence of overweight/obesity (40%) was found among adolescent male who eat non-vegetables five and above times a week. Which was followed by the frequency of overweight/obesity 24 percent was found among who eat non- vegetables three to four times in week. The frequency of underweight 60.61 percent was higher among who eat non- vegetable one to two times in week. However 20 percent and 8 percent were found among male adolescent who eat non-vegetables between three to four times and one to two times respectively. Again, among the adult males, the frequency of underweight (33.33%) was found higher among those who eat non-vegetables one to two times in week. Among adult males who take non-vegetables more than five times, the frequency of overweight/obesity was 85.71 percent. Whereas, those who eat non-

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vegetables three to four times a week, the frequency of overweight/obesity was 47.73 percent.

 Overall study on nutritional status in relation with the intake of non-vegetables shows that the higher frequency of overweight/obesity (66.67%) was found among adolescent and adult both male who eat non-vegetables over five times a week it was followed by the frequency of overweight (39.13%) who eat non-vegetable items three to four times a week. The frequencies of underweight (46.97%),(8.33%)   and (2.90%) were reported among who eat non-vegetables between one to two times, over five times and three to four times respectively.

Table-16: Distribution of BMI values in relation with intake of non-vegetables among , adolescents and adult females

| Age group	Non-vegetables	Number	Underweight	Normal	Overweight/obese
	1-2 times	41	18 (43.90%)	23 (56.11%)	0 (0.00%)
13-19	3-4 times	25	0 (0.00%)	16 (64%)	9 (36%)
	5+ times	5	0 (0.00%)	2 (40%)	3 (60%)
	1-2 times	38	13 (34.21%)	25 (65.79%)	0 (0.00%)
20+	3-4 times	53	1(1.89%)	19 (35.85%)	33 (62.26%)
	5+ times	11	0 (0.00%)	1 (9.10%)	10 (90.90%)
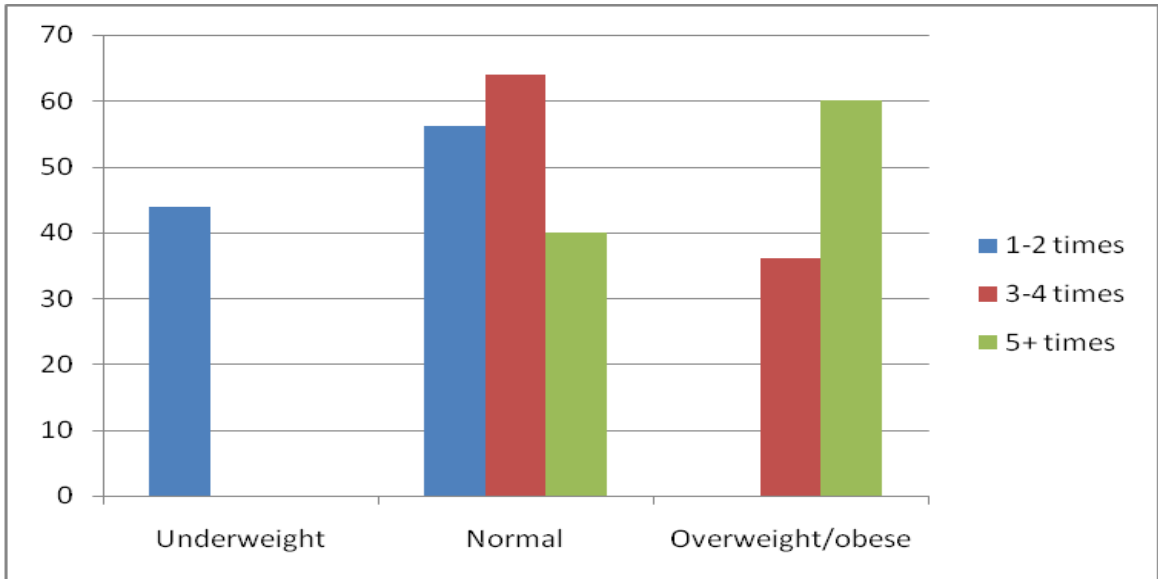
Fig 16: Distribution of BMI values in relation with intake of non-vegetables among adolescents females
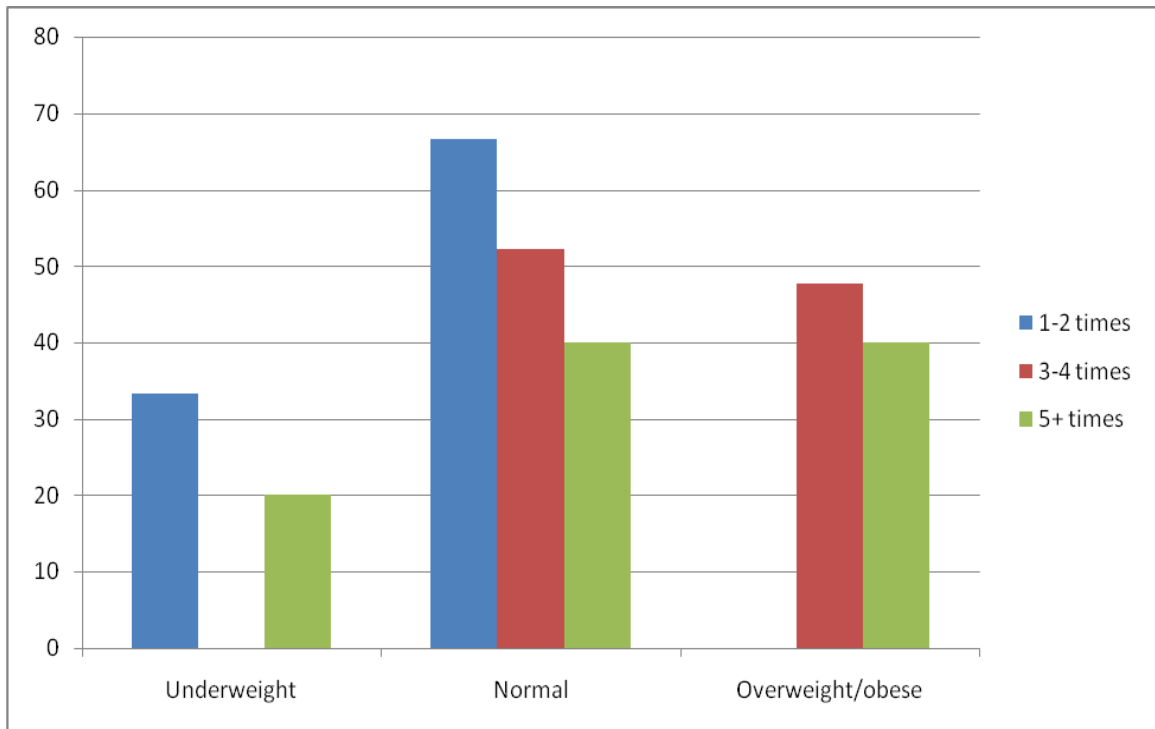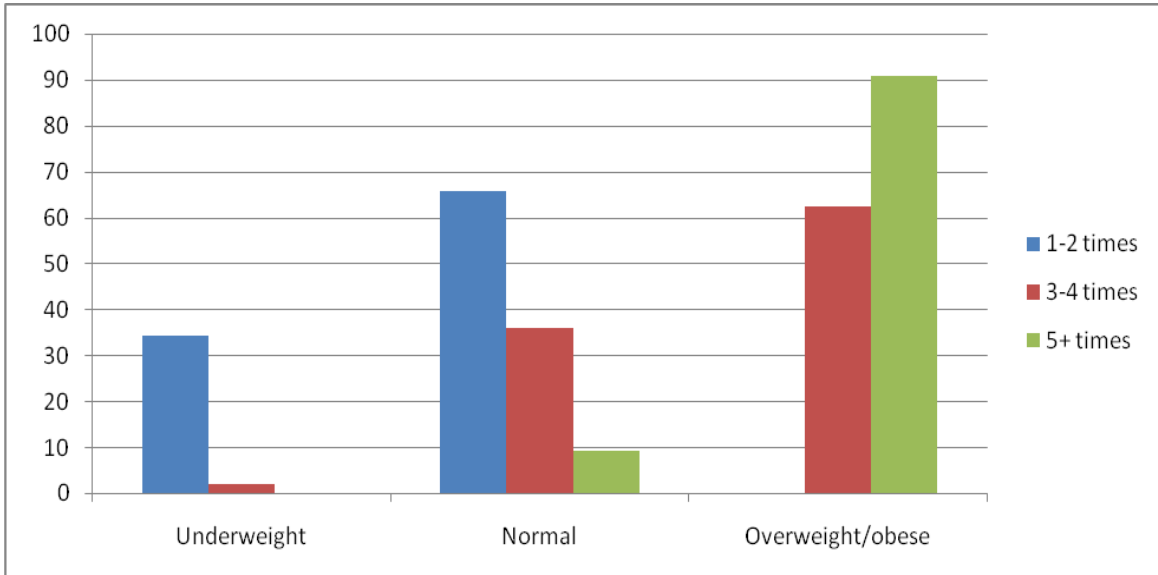

Fig 16:1 Distribution of BMI values in relation with intake of non-vegetables among adult females

Table 16.1: Overall distribution of different BMI values in relation with food intake of non-vegetables among females.

Non-vegetarian	Number	Underweight	Normal	Overweight/obese
1-2 times	79	31(39.24%)	48 (60.76%)	0 (0.00%)
3-4 times	78	1 (1.28%)	35 (44.87%)	42 (53.85%)
5+ times	16	0(0.00%)	3(18.75%)	13(81.25%)

$\chi^2 = 88.58$; df= 2; p <0.05
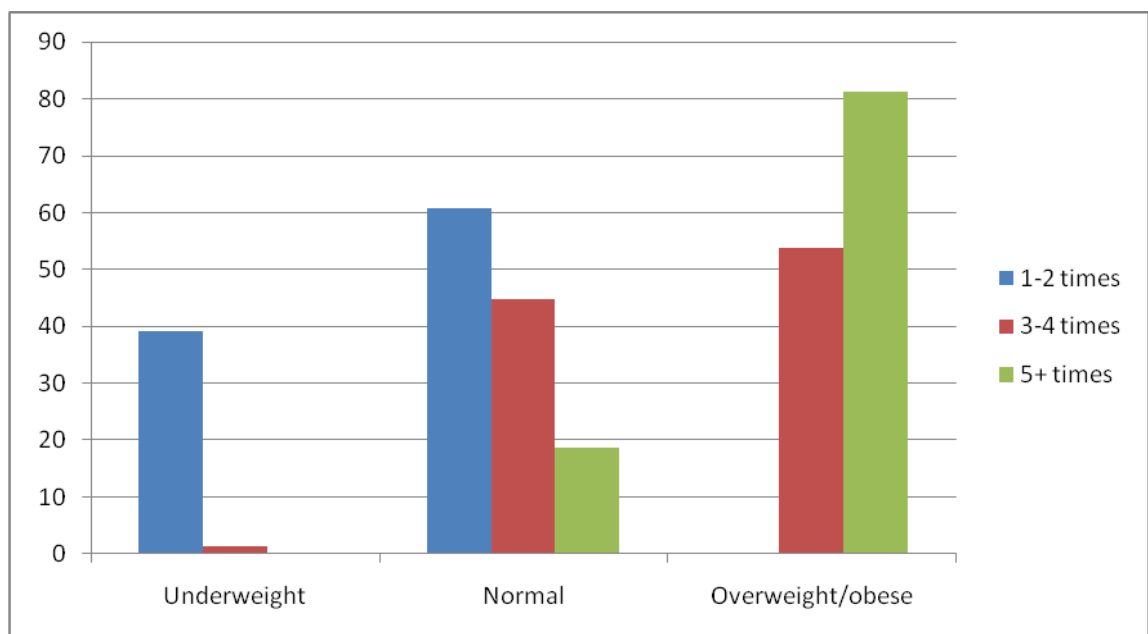
Fig 16.2: Overall distribution of different BMI values in relation with food intake of non-vegetables among females.

Distribution of different BMI values in relationship with the intake of non-vegetable food and nutritional status among Tamang females of Pakyong are given in table-16. Show that The frequencies of underweight 43.90 percent were found higher among adolescent females who eat non-vegetables between one to two times in a week The frequency of overweight/ obesity 60 percent,36 percent found among adolescent who eat

non-vegetable   five times and above and three to four times. In adult female the frequency of overweight/obesity 90.90 percent which was higher among who eat non-vegetable food five times and above and which is followed by the frequency of overweight 62.26 percent found among who eat non- vegetable three to four times. The frequency of underweight 34.21 percent and1.89 percent found among who eat non-vegetable one to two times and three to four times in a week respectively. Overall study on nutritional status in relation with the intake of non-vegetables shows that the higher frequency of overweight/obesity 81.25 percent was found among adolescent and adult female who eat non-vegetables over five times a week it was followed by the frequency of overweight 53.85 percent who eat non-vegetable items three to four times a week. The frequencies of underweight 39.24 percent and 1.28 percent were reported among who eat non-vegetables between one to two times, three to four times respectively.

Table 17: Distribution of different BMI values in relation with physical activity among adolescents and adult males.

Age group	Physical activity per/week	Number	Underweight	Normal	Overweight /obese
13-19	<2hr.	17	1(5.88%)	10(58.82%)	6 (35.30%)
	3-4hrs.	31	13 (41.94%)	16 (51.61%)	2 (6.45%)
	≥ 5hrs.	15	9 (60%)	6(40%)	0 (0.00%)
20+	≤2hr.	73	8 (10.96%)	39 (53.42%)	26 (35.62%)
	3-4hrs.	11	3(27.27%)	07(66.64%)	1(9.09%)
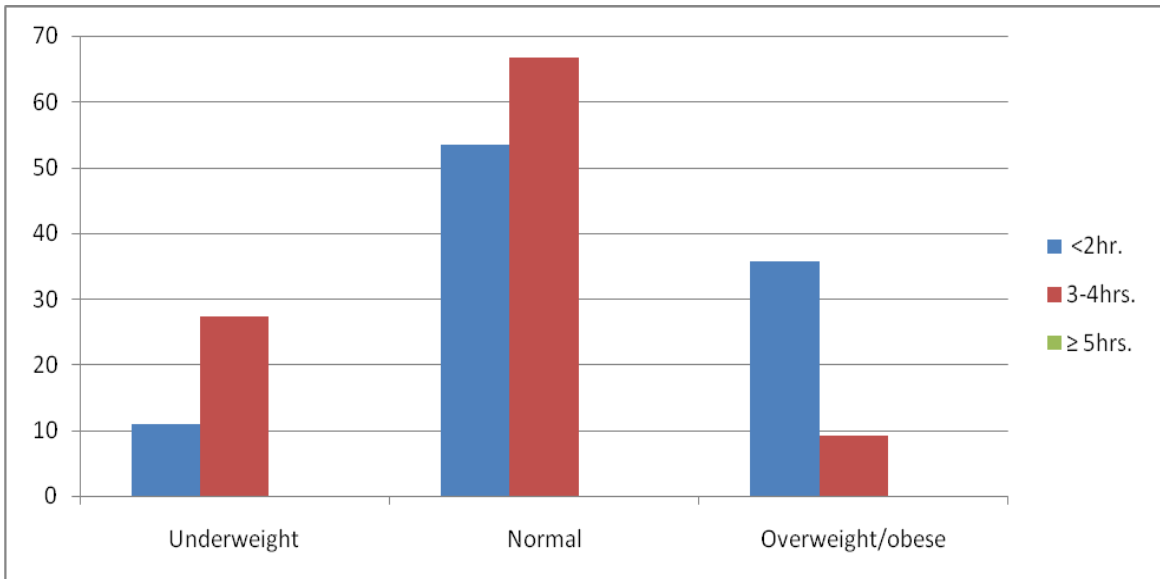
Fig 17: Distribution of different BMI values in relation with physical activity among adolescents males.

Fig 17.1: Distribution of different BMI values in relation with physical activity among adult males

Table 17.1: Overall distribution of different BMI values in relation with physical activity among males

Physical activity per week	Number	Underweight	Normal	Overweight/obese
≤2hr.	90	9(10%)	49(54.44%)	32 (35.56%)
3-4hrs.	42	16(38%)	23 (54.76%)	3(17.14%)
≥5hrs.	15	9 (60%)	6(40%)	0 (0.00%)

χ^2= 33.81; df= 4; p <0.05
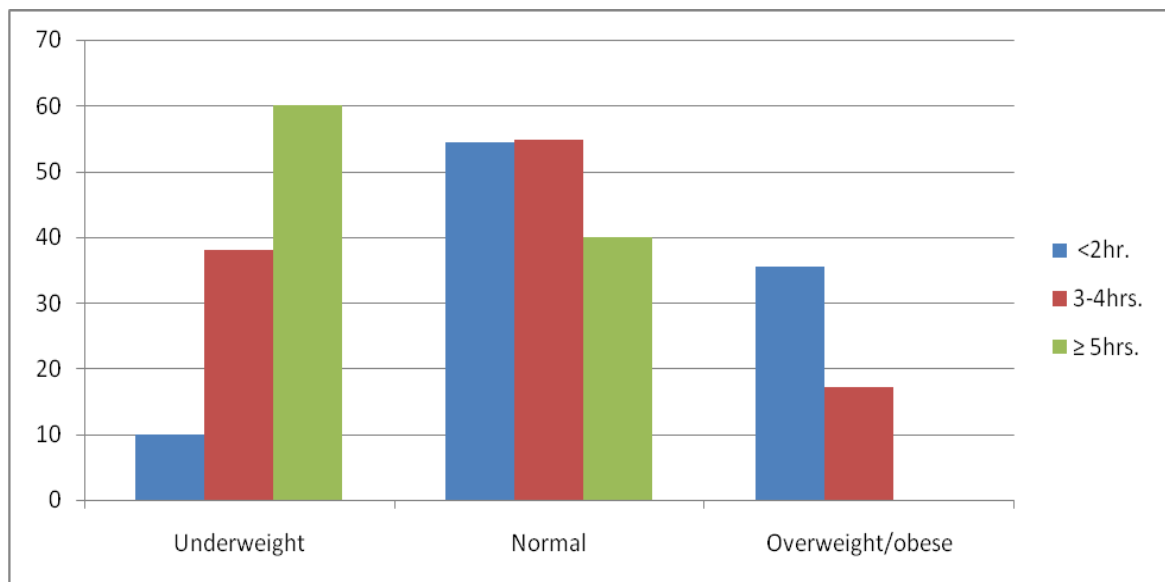
Fig 17.2: Overall distribution of different BMI values in relation with physical activity among males.

The distribution of different BMI values in relation with physical activity among adolescents and adult Tamang male of Pakyong shown table-.17 This table shows that the frequency of overweight/obesity (35.30%) was higher among adolescent who exercised two hour and below in a week which is followed by the frequency of overweight/obesity 6.45% who exercised is less than four and three hour . The frequency

of underweight (60%) was found among adolescent who exercised five hours and above. Underweight 41.94 percent and 5.88 percent was found among adolescent male who exercised between two to three hours and one hour respectively. Among adults male, the higher frequency of underweight (27.27%) was found among those who exercised five hours and above. The frequency of underweight 10.96 percent was reported among those who exercised two hour and below .The frequency of overweight 35.62 was found among whose exercised is two hours and below. This is followed by the frequency of overweight 9.09 percent were found among those who exercised five hours and above.

Overall overweight/obesity frequency (35.56%) was found higher among male of all age group who exercised for two hour and below. This was followed by overweight 7.14 percent among who exercised less than four hour and three hour. The frequency of underweight among who exercised for five hour and above was 60 percent. This was higher than those who exercised between three to four hours (38%) and one hour and below (10%).

Table 18: Distribution of different BMI values in relation with physical activity among adolescents and adult females.

| Age group	Physical activity per/week	Number	Underweight	Normal	Overweight/ Obese
13-19	<2hr.	26	1(3.85%)	15(57.69%)	10 (38.46%)
	3-4hrs.	41	14 (34.15%)	25 (60.98%)	2 (4.87%)
	≥ 5hrs.	4	3 (75%)	1 (25%)	0 (0.00%)
20+	≤2hr.	97	12 (12.37%)	42 (43.30%)	43 (44.33%)
	3-4hrs.	5	2 (40%)	3 (60%)	0 (0.00%)
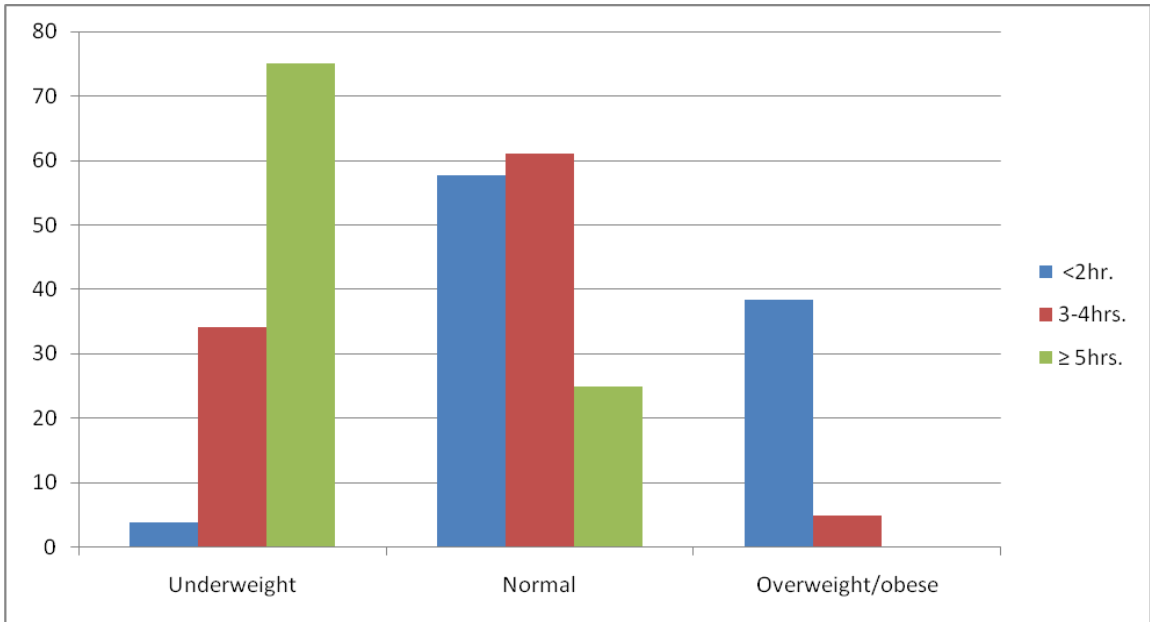
 Fig 18: Distribution of different BMI values in relation with physical activity among adolescents females
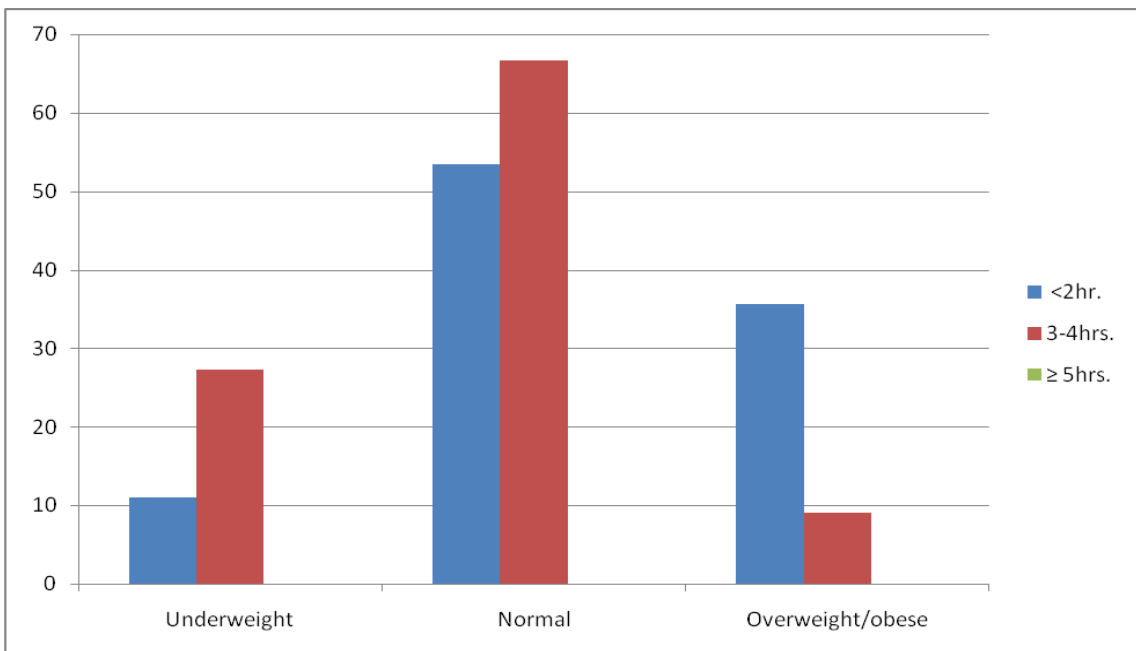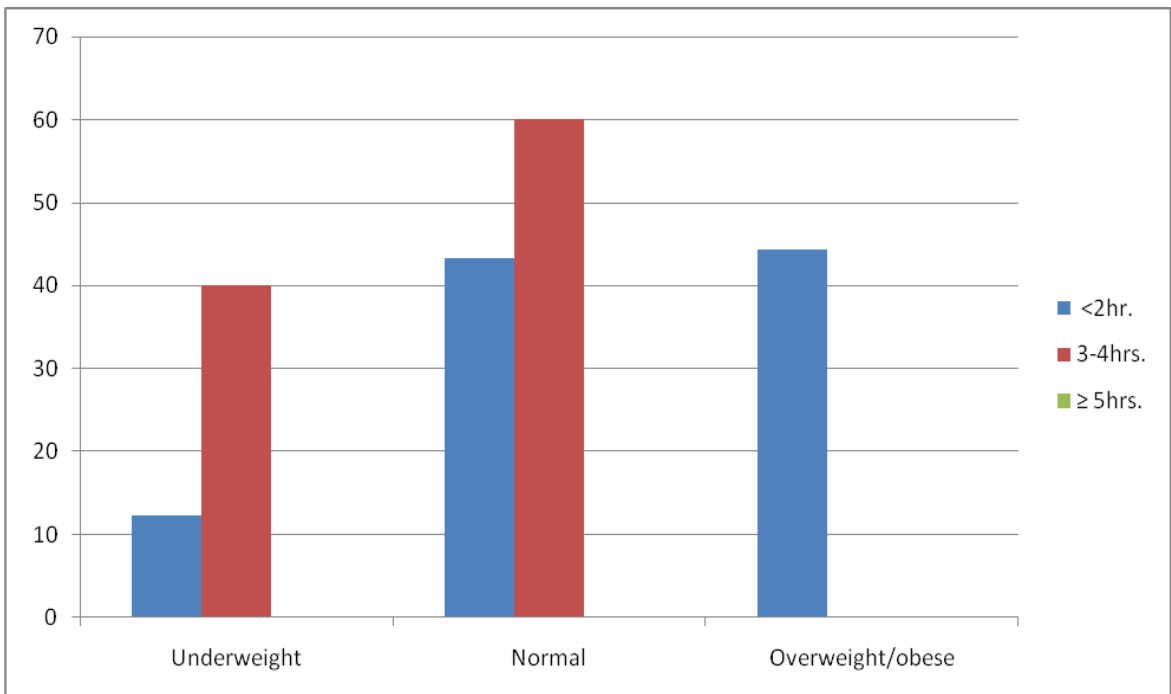

Fig 18.1: Distribution of different BMI values in relation with physical activity among adult females

Table 18.1: Overall distribution of different BMI values in relation with physical activity among females

Physical activity per week	Number	Underweight	Normal	Overweight/obese
≤2hr.	123	13(10.57%)	57(46.34%)	53(43.09%)
3-4hrs.	46	16(34.78%)	28 (60.87%)	2(4.35%)
≥5hrs.	4	3 (75%)	1(25%)	0 (0.00%)

$\chi^2 = 36.71$; df= 4; p <0.05
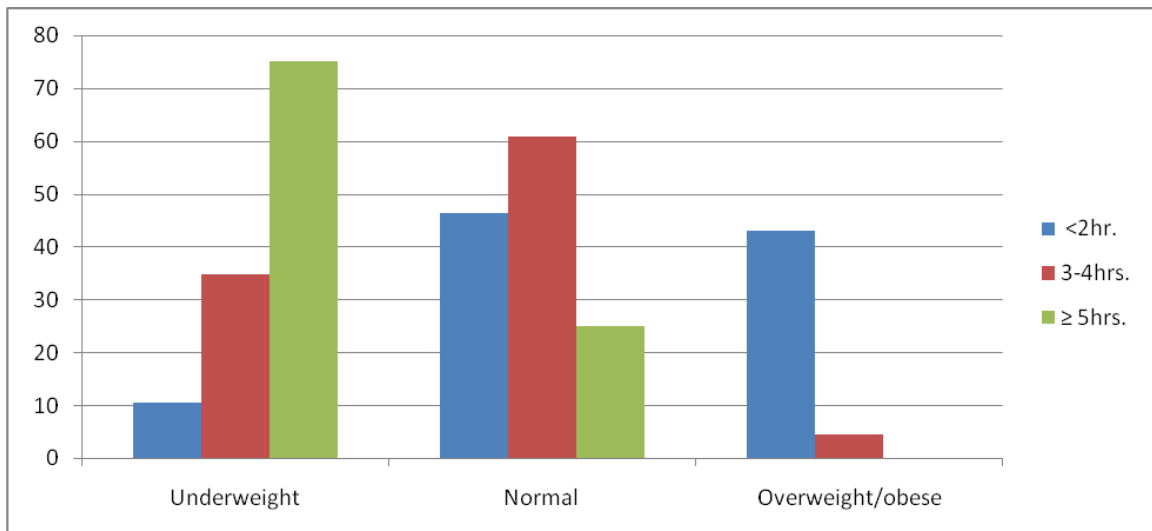
Fig 18.2: Overall distribution of different BMI values in relation with physical activity among females.

The distribution of different BMI values in relation with physical activity among adolescents and adult Tamang females of Pakyong shown table-.18 This table shows that the Among adolescent female the frequency of overweight/obesity (38.46%) was higher among who exercised two hour and below which was followed by the frequency of overweight/obesity 4.87 percent who exercised less than four and three hour. and underweight (75%) was found only among those who exercised for five hour and above

however the frequency of underweight 34.15 percent 3.85 percent found among the who exercised less than four hour and three hour and one hour and below. Again in adults female frequency of overweight/obesity (44.33%) was higher among who exercised one hour and below in a week. The frequency of underweight (40%) was found among who exercised five hours and above. Underweight 12.37 percent was found among adults female who exercised two hour and below respectively.

Overall overweight/obesity frequency (43.09%) was found higher among females of all age group who exercised for two hour and below. This was followed by overweight 4.35 percent among who exercised less than four hour and three hour. The frequency of underweight among who exercised for five hour and above was 75 percent. This was higher than those who exercised between three to four hours (34.78%) and one hour and below (10.57%).

Table 19: Distribution of different BMI values in relation with consumption of alcohol among adult males.

Age group	Alcohol per/week	Number	Underweight	Normal	Overweight/obese
20+	<2hr.	65	11(16.92%)	33(50.77%)	21(32.31%)
	3+.	19	0(0.00%)	7 (36.84%)	12 (63.16%)

The distribution of BMI values in relation with consumption of alcohol among the adult males of Tamang of Pakyong .Table 10 shows the frequency of overweight/obesity (63.16%) was found higher among those who take three and above times in week. This was followed by the frequency of overweight/obesity 32.31% among those who take less

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than two times alcohol in week. However the frequency of underweight 16.92% was found among adult males those who take less than two times alcohol a week.
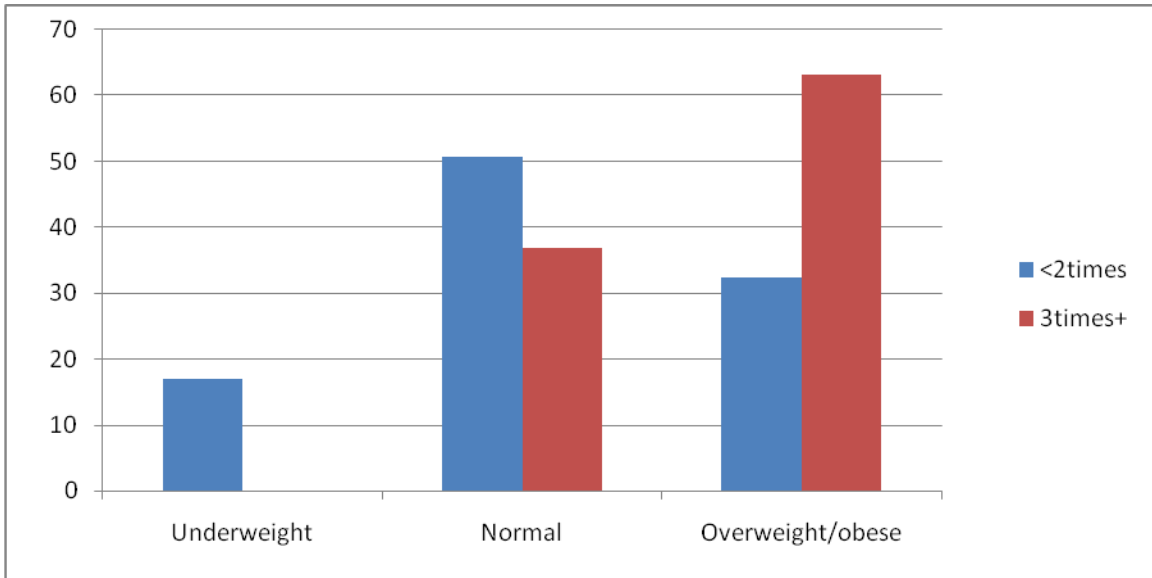
Fig 19: Distribution of different BMI values in relation with consumption of alcohol among adult males.

Table 20: Distribution of different BMI values in relation with consumption of alcohol among adult females.

Age group	Alcohol per/week	Number	Underweight	Normal	Overweight/ obese
	<2hr.	76	12(15.79%)	37(48.68%)	27 (35.53%)
20+	3 +.	26	2 (7.693%)	8 (30.769%)	16(61.538%

The distribution of BMI values in relation with consumption of alcohol among the adult females of Tamang of Pakyong Table: 20 shows the frequency of overweight/obesity (61.538%) was found higher among adult females those who take three and above times in week. This was followed by the frequency of overweight/obesity 35.53% among those

who take less than two times alcohol in week. However the frequency of underweight 15.79% was found among adult females those who take less than two times alcohol a week. This was followed by the frequency of underweight 7.693% were found those who take alcohol three and above times a week.
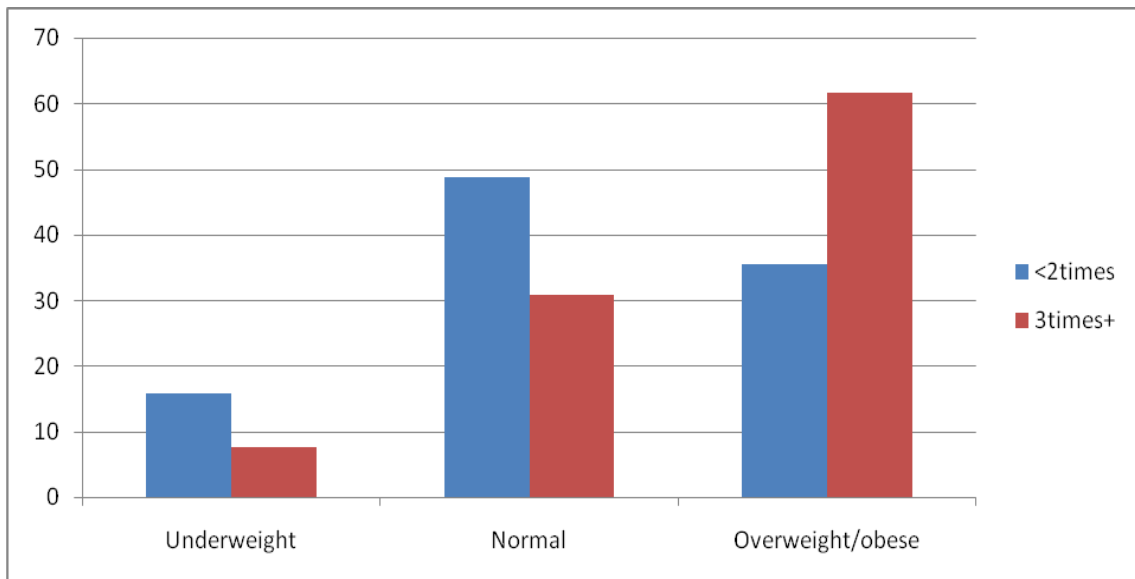
Fig 20: Distribution of different BMI values in relation with consumption of alcohol among adult females

CHAPTER - 4

DISCUSSION

The present research study provides the nutritional status of Tamang males and females of Pakyong east district of Sikkim. The distribution of underweight and overweight in relation to different socio-economic conditions, lifestyles and food habits are discussed in the present study. The mean height, slightly higher in adolescent group and mean weight and mean BMI values are found higher among the adult males. Where the mean height, mean weight and mean BMI values are found higher among the adult females. Further, it was observed that the mean height, weight and BMI increase with increasing age groups in female group. The differences in the distributions of these values in the different age groups are highly significant. The study further indicates that the adult males and females show the higher frequency of overweight/obese. However, the prevalence of underweight is significantly higher among the adolescent age group males age group and female age group.

The study also indicates that prevalence of overweight/obesity is positively associated with high income group of family among adolescents and adult males and same result found among females adolescent and adult belonging from high income group of family in the present study. The frequency of underweight shows higher among adolescents and adults male and females in the lower income groups. However, the overall prevalence of overweight/obesity shows significantly higher among the higher income family. The study further indicates that the frequency of overweight/obesity tends to increase with

increasing the level of income. Whereas, the overall frequency of underweight increases with decreasing the level of income groups. Higher income family have sufficient money and they can easily afford and get easy access to good nutrition food, better lifestyles and better health facilities as compared to the lower income family. Some others studies also provides that The economic status of households is an indicator of access to adequate food supplies, use of health services, availability of improved water source and sanitation facilities, which are prime determinants of child and maternal nutritional status. A study of DHS survey conducted in developing countries shows that women from low economic status households were most affected by malnutrition (Grima and Genebo, 2002).

However the frequency of overweight/obesity shows fluctuation among the adult primary level of education, secondary and high secondary level of education in males groups. The overall frequency of overweight/obesity found higher among the primary level of education of males. The frequency of underweight is recorded higher among the graduate level of education because those who are underweight from graduate and level of education they are doing more involved in some kind of sports and physical activity. And those who are belonging to overweight from primary level of education they might be less aware of nutrition food they eat lots of poor food as compared to other level of education.

The frequency of overweight/obesity shows fluctuation among the adult primary level of education, and graduate and above level of education in females groups. The overall frequency of overweight/obesity found higher among the graduate and above level of

education of females. The overall frequency of overweight/obesity found significantly higher among the higher educated females. The frequency of underweight is recorded higher among the secondary level of education. The prevalence of tends to underweight decrease with increasing the levels of education of the females. The higher educated people spent more of their time on reading, writing, and in front of the computer/television are more of sedentary lifestyles.

Marital status of women in association with household and other socioeconomic status affects their nutritional status (Grima and Genebo 2002). In present study shows Married women show higher frequency of overweight and higher frequency of underweight than the unmarried women in adult age group. Again in males adult married males shows the higher frequency of overweight/obese.

The overall distribution of overweight/obesity is higher among the government employees in males in the present studies. Because the government employees have better life style and they can easily assessed all the kind facility as compare to other occupational level of people and another reason behind get more fat among the government employees are , most of the time they used to spent their time in light work rather than more excessive .An apart from it ,if we look housewife as whole they have been doing less work and basically roaming around child and family member , and also their working is decreasing due to the take care of child . These study talks that higher association of overweight and obesity with low activity occupations compared to high activity occupations (A.Edward et al., 2016).

In present studied, it is found that the frequency of underweight among the school going student in male age and females age groups, because among the student they are getting enough time three meals of day, and another reason is that most of the student are not able to afford whatever they want due to socio-economic condition of the family.

The distribution of different BMI values in relation with television time shows fluctuation among the adolescent and adult males of Tamang of Pakyong East District of Sikkim. The prevalence of overweight/obesity is found higher among who spent more time on watching television. The frequency of underweight is higher among who spent less time on television in males of different age groups. The prevalence overweight is higher among those who spent more on television and the frequency of underweight is recorded higher in those who spent fewer hours on television. Again in females The prevalence of overweight/obesity is found higher among females who spent more time on watching television. The frequency of underweight is higher among the adolescents who spent less time on television. However, among adult females, the prevalence overweight is higher among those who spent more on television and the frequency of underweight is recorded higher in those who spent fewer hours on television. The overall distribution which is positively associated with those who spend more hours on television. The overall prevalence of underweight is found among Tamang males and females spending fewer hours on television. Some others study shows that commercials and mass media have a significant effect on our eating habits. The amount of time spent in front of the television and the content watched can be a reason for developing obesity. Television not only

contributes to physical inactivity but commercials and other programs also encourage us to eat more. TV viewing is contributing factor to child obesity (R.Anna et al., 2015).

Even dietary habits plays an important role in determining nutritional status of present study community where the most of the study population are non vegetarians. The present study shows that the frequency of underweight is higher among those who consume non vegetarian less than two times in adolescent males and frequency of overweight is higher among those who consume more than five times non vegetarian food among adolescent. Again in adult males the frequency of underweight among those who consume less than two times in a week and the frequency of overweight is higher among those who consume more than five times non vegetable in a week. However, overall study shows that BMI values of Tamangs of Pakyong, east district of Sikkim positively link with dietary habits and present study shows the frequency of over weight is higher among those who consumed more than five times non vegetarian items of males all age groups .however the frequency of underweight is positively associated with those who consumed non-vegetable less than two times in week .In females frequency of underweight is higher among those who consume non vegetarian less than two times in adolescent females and frequency of overweight is higher among those who consume more than five times non vegetables among adolescent. Again in adult females the frequency of underweight among those who consumed less than two times in a week and the frequency of overweight is higher among those who consume more than five times non vegetarian in a week.

However, overall study shows that BMI values of Tamangs of Pakyong, east district of Sikkim positively link with dietary habits and present study shows the frequency of over weight is higher among those who consumed more than five times non vegetable items of females all age groups. However the frequency of underweight is positively associated with those who consumed non-vegetable less than two times in week. Diet as an important factor influencing weight gain. Children consuming vegetarian food tend to be lighter and leaner than non-vegetarian children and data was proved statistically .In correlation to result there is a study done by Ramachandran Y in Kerala reported slightly higher prevalence of obesity among non-vegetarian than vegetarian (H.Soumyashree et al.2015).

Non healthy diet is characterized by skipping breakfast, irregular intake of three meals daily, frequent snaking, eating less variety food, increased intake of fatty food, frequent eating of fried food and increased intake of refined sugar products including soft drink (I.Fahmi.Lotfi,2015).

Physical activity one the parameter plays an important role in determining the nutritional status. The present research found that the higher frequency of overweight/obesity is inversely associated with physical activity among adolescent and adult males and females. However, the frequency of underweight is higher among adolescents, adult males those who spend more hours in working place or exercised. Overall result indicated that the frequency of overweight/obesity is significantly higher among both males who spend fewer hours in working place or exercised. However, the frequency of underweight

is higher among adolescents, adult females those who spend more hours in working place or exercised. Overall result indicated that the frequency of overweight/obesity is significantly higher among both males who spend fewer hours in working place or exercised. The overall frequency of underweight tends to increase with increasing times in physical activities, which means less physical activity is associated with overweight or obese. Inactive physical activity means there is no movement of body and more fat is accumulated resulting more overweight/obese higher chances of getting diseases also. If a person is doing more physical activity or person work in field means body burn more calories which result in less chance of being overweight/obese. Physical activity guideline for Americans 2008 (Strong et al., 2005).

Children who spent greater time in physical activities such as playing general outdoor games were less at risk for being overweight or obese. Technological advances in the form of hand-held electronic devices and computer games, and television programs have probably contributed to adopt a lifestyle that involves to less physical activity and more sedentary activity (A.Tahmeed et al., 2103).

Physical activities play important roles in protection against obesity as well as its importance in the regulatory system controlling the storage, distribution and utilization of calories. This study revealed that physically inactive and less daily active students were more obese and overweight than among physically active and high daily active students (I.Fahmi.Lotfi, 2015).

Again, the consumption of alcohol play an important role in maintaining the nutritional status Most of the family of study population they consumed alcohol in adult both male and females. The more frequent consumption of alcohol is positively associated with increasing prevalence of overweight/obesity among adult males. The frequency of underweight shows higher among adult males consumed alcohol fewer times a week. Again frequent consumption of alcohol is positively associated with increasing prevalence of overweight/obesity among adult females. The frequency of underweight shows higher among adult females consumed alcohol fewer times a week. Further, the present study among Tamang of Pakyong East district of Sikkim indicated that the overall prevalence of overweight/obesity is positively associated with the consumption of alcohol. Whereas, the overall frequency of underweight increases with reducing the consumption of alcohol per week. Were those who consumed more times alcohol means they consumed more junk food like chips, oily food items, and meat items which can have higher chance for overweight/obese. Therefore, the study indicates that those who consume more alcohol are associated with overweight/obese and those who consume less alcohol.

CHAPTER - 5

CONCLUSION

In conclusion, the present study highlights the nutritional status of Tamang males and females of Pakyong East District of Sikkim. Study shows the distribution of different BMI values among adolescents and adult males and females in relation with different socio-economic conditions, certain lifestyles and food habits, particularly the consumption of non-vegetable foods. The prevalence of overweight/obesity among Tamang of Pakyong is influenced by certain socioeconomic factors like family income, occupation and physical activities. The present study confirms the observations of other studies that show higher levels of under nutrition in adolescent and adult which is highly influenced by households with low earnings, or households in rural area. It can also be concluded that there was high level of overweight /obese with low level of education even house with high level of income.

Food habits specially the consumption of non-vegetable foods plays an important role determining the nutritional status in the present research, especially the consumption of alcohol in adult group not only in male but also influence in female nutritional status in the present research.

From the present study it has been found that the frequency of overweight/obese was greater among the high income people, due to good socio-economic condition and also involvement less physical activity .While there was vice versa among the middle and lower status people income it can inconvenient to access all the modern stuff and also need to pay more attention to daily physical activity which is their strategy of life.

From the occupational levels, higher number of obesity found among male government job holder because their high level of income, while among female government holders and house wives, there was also seen of the higher rate of overweight/obese. Different factors like income, occupation is highly effect on BMI values that means is highly significant .Moreover, among higher level of educated women (graduate and above) they are much obese due to their easy life style. Among the male higher number of overweight/obese were primary and high secondary level of education , due to less physical activity and less responsibility towards family an seem as independent.

Food habits also play an important role to determining the nutritional status in present research, consuming of food patterns like red meat it will help to increase accumulation of fat in our body. While vegetarian seem around underweight may be the influence by the income, where each and every family cannot effort meat for their every day meal. Whereas, consumption of alcohol lead to collect fat in our body because continuous taking of alcohol, lead to compel to more food. It is also seen around us that consumption of alcohol operates income level of individual.

As the study involves a holistic approach towards the understanding of the nutritional status of Tamang males and females of two age groups.

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APPENDIX

Tamang house at Taza village of Pakyong Sub-division

Picture showing the interview taking in Tazas village East Sikkim

Picture showing the interview taking in Dugalakha village, East Siikim

Pictures showing the weight measurement of Tamang women of Taza, East Sikkim

Pictures showing some of field areas of Pakyong, East Sikkim