Impact of Self- Help groups on the household nutrition in Semi arid tropic (SAT) villages of Mahboobnagar district, Telangana, India

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DECLARATION

I do hereby declare that the dissertation entitled " **Impact of Self- Help groups on the household nutrition in Semi arid tropic (SAT) villages of Mahboobnagar district, Telangana, India"** is an original and independent record of project work undertaken by me under the supervision of **Dr R Padmaja, Scientist , RP-MIP , at International Crops Research Institute for the Semi-Arid Tropics (ICRISAT), Patancheru, India**, during the period of my study as a part of curriculum of Masters in Home Science (Food and Nutrition).

Hyderabad By

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J.SHIRISHA

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LISTOFABBREVATIONS

BMI	:	Body Mass Index
Cm	:	Centimeters
CU	:	Consumption Units
FAO	:	Food and Agriculture Organisation
Gm	:	Grams
HH	:	Household
IAP	:	Indian Academy of Pediatrics
ICMR	:	Indian Council Medical Research
ICRISAT	:	International Crop Research Institution for Semi-Arid Tropics
Kcal	:	Kilocalories
Kg	:	Kilograms
MFI	:	Microfinance Institution
MUAC	:	Mid upper Arm Circumference
NABARD	:	National Bank for Agriculture and Rural Development
NCHS	:	National Center for Health Statistics
NGO	:	Non-Government Organisation
NIN	:	National Institute of Nutrition
NONSHG	:	Non Self Help Groups
RDA	:	Recommended Dietary Allowance
Rs	:	Rupees
SD	:	Standard Deviation

SHG	:	Self Help Groups
UNICEF	:	United Nations children's Fund
VLS	:	Village Level Studies
WHO	:	World Health Organisation

Title	**:**	**" Impact of Self- Help groups on the household nutrition in Semi arid tropic (SAT) villages of Mahboobnagar district, Telangana, India"**
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Abstract

Thousands of the poor and the marginalized population in India are building their lives, their families and their society through Self help groups. The SHGs proved a way in reduction of poverty, increasing the financial support, self confidence among the members, decision making and entrepreneur skills. The SHGs was used by the government, NGOs and others worldwide to empower and to give lives to the poor. Since observing the programme outcomes the present study under taken to evaluate the "impact of self- help groups on the household nutrition in semi arid tropic (SAT) villages of Mahboobnagar district, Telangana, India".

These study was conducted at Aurepalle and Dokur (VLS) villages of ICRISAT. Socio-economic and nutritional status was assessed by collecting information on demographic profiles, income, occupation, expenditure pattern, anthropometric measurements, clinical observation, frequency of food and diversity and nutrients intake was measured and analysed the difference between the SHG and Non SHG households.

The results showed that there is no impact of SHGs on nutritional status of households in terms of nutritional anthropometry, food intake, diversity of diets. Increased income availability from SHGs was proven in many ways like increased income, asset possession but not in terms of increasing the nutrition.

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CHAPTER I

INTRODUCTION

"The fastest way to change society is to mobilize the women of the world." -- Charles Malik

Women participation plays a significant role in rural employment. They put their entrepreneurial skills in all the rural employment activities such as agricultural operations, poultry, sheep rearing, dairy, fire wood cutting and selling, sale of agricultural produce etc. Though they put maximum efforts in rural employment activities, their economic status has not improved and their livelihood is poor. Even with sufficient entrepreneurial potential, they may not be able to convert their entrepreneurial dream into a reality due to poor financial strength (Gurumoorthy, 2000).

The origin of SHG is from the brain child of Gramin Bank of Bangladesh, which was found by the economist, Prof. Mohammed Yunus of Chittagong University in the Year 1975, to provide micro-finance to rural women. In Bangladesh, micro-finance has been established as a most powerful instrument to tackle poverty.

The small beginning of linking only 500 SHGs to banks in 1992, had grown to over 0.5 million SHGs by March 2002 and further to 8 million SHGs by March 2012 according to a report by NABARD. In southern states, almost 100 per cent of the SHGs linked to banks in the pilot stage, while the total number of SHGs linked in southern states shrank to 46 per cent by March 2012. (Archana Kumari,2013).

Poor families living below the poverty line were then organized into SHGs established with a mixture of government subsidy and credit from investment banks. The main aim of these SHGs is to focus on income generation and raising poor families above the poverty line. The SHGs are supported and trained by nongovernment organizations (NGOs), community based organizations (CBOs), individuals, banks self-help promoting institutions, and microfinance institutions (MFI). The most prominent models of delivery for microfinance in India continue to be SHGs, promoted by the state governments, NGOs, a few regional rural banks, and specialized MFIs that use various models to make both group and individual loans. The southern states of India experienced the largest concentration of SHG activities, both with state support, and promoted by private MFIs (Saha et al.,2013).

The 9th Five Year Plan of the government of India had given due recognition on the importance and the relevance of the Self-help group method (SHG) to implement developmental schemes at the gross root level. Thousands of the poor and the marginalized population in India are building their lives, their families and their society through Self help groups. Consisting of 10-20 members, the SHG is a method of organizing the poor people and the marginalized to come together to solve their individual problems. It is implemented by the government, NGOs and other institutions worldwide to meet the financial needs of rural poor women and to strengthen collective self help capacities of the poor, leading to their empowerment. It is a more attractive scheme with less effort and a tool to remove poverty and improve the women entrepreneurship and financial support in India. The SHGs-Bank Linkage Programme is emerging as a cost effective mechanism for providing financial services to the "Unreached Poor".

The SHG Programme plays a central role in the lives of the poor. There is evidence of increased household income through SHGs. At the individual level, it attracts relatively empowered people and, that empowerment occurs among some clients through programme participation. The process of empowerment manifests itself in increased self-esteem and decision-making at the family level. Since women are the sole family caretakers, proper emphasis should be given to the rural women for which finance is required. The SHGs have proved the way for economic independence of rural women (Sundaram., 2012).

Empowering women contributes to the social development of a country whether developed or underdeveloped. Women constitute an equal share with men in the total population of our country. In few regions, women outnumber men in total population. While devising various policies for rural and socio-economic development, women's empowerment cannot be ignored. Various schemes introduced by the government to combat rural unemployment have met with marginal success. Considering the need for women empowerment in the light of their changed role in the contemporary society, the government has introduced several schemes to provide financial freedom and earning opportunities to them (Rao *et al*., 2014).

A vast literature demonstrating that public investments in women empower them to make choices, benefits not only them as individuals, but also their families and communities (Schultz 1995; Nussbaum 2000). There is also proof that women are less risky borrowers, and more responsive to the threat of social sanctions that form the basis of recent group lending schemes (Armendariz and Morduch 2005). A positive impact on the socio-economic conditions and the reduction of poverty of SHG members and their households has also empowered women

members substantially and contributed to increased self-confidence and positive behavioural changes in the post-SHG period as compared to the pre-SHG period (Sushil Kumar Mehta *et al.,* 2011).

In India, before introducing this scheme for rural women, their role in financial aspects was largely negligible. But in recent years the most significant emerging system called SHG is a major breakthrough in improving lives of womenfolk and alleviating rural poverty. However the significant success of several SHGs shows that the rural poor are indeed efficient to manage credit and finance. Women participation in Self Help Groups have obviously created tremendous impact upon the life pattern and style of poor women and have empowered them at various levels not only as individuals but also as members of the family, members of the community and the society as a whole. They come together for the purpose of solving their common problems through self-help and mutual help.

SHGs have an in-built mechanism where emphasis has been given over capacity building of women through developing their dialoguing skills. An SHG functions through its regular meetings, where members perform transactional activities and discuss over different related issues. This discussion among the group members is the means through which they give voice to their needs and it proves to be a platform for addressing their social and economic problems and enlightening their inner selves as well. The SHGs provide economic benefits in certain areas of production process by undertaking common action programmes, like cost-effective credit delivery system, generating a forum collectively, learning with rural people, promoting democratic culture, fostering an entrepreneurial culture, providing a firm base for dialogue and cooperation in programmes with other institutions, possessing credibility and power to ensure participation and helping to assess an individual member's management capacity. SHGs enhance the equality of status of women as participants, decision-makers and beneficiaries in the democratic, economic, social and cultural spheres of life. They have inculcated a great confidence in the minds of rural women to succeed in their day to day life (Ritu *et al*.,2003). Program had three main impacts: increases in social capital and economic empowerment, nutritional improvement (despite persistent drought at the time), and an increase in consumption for participants of new groups. The findings did not, however, find increases in income or assets, but interestingly, the effects were not limited to group members, indicating spill-over effects for communities in which SHGs were formed (Deininger and Liu ,2009).

Food security of members of households has improved after participation in SHGs. Acute malnutrition among children, infant and child mortality / premature adult deaths have

comparatively declined. Simultaneously it has also made a positive impact on the education of girl children (Joy Deshmukh-Ranadive 2004).

Women constitute a major part of beneficiaries of micro-finance activities in India. It helps women to gain control over the means of living and lift themselves out of poverty and vulnerability. By saving one rupee per day per head they themselves evolve as the driving force and borrow from their savings and invest in their family with the income they generate through this microfinance. It helps women to achieve economic and political empowerment within their homes, their villages and their countries. Since many of the studies have shown the positive impacts of SHG's on aspects like women empowerment, decision making, self confidence, increased availability of assets, entrepreneurial skills, loan repayment and utilization. One needs a good nutritional status to perform their fullest potential by using best of their resources. Many of the government programmes are targeting women of SHG due to easy mobilisation. So, the present study was an aimed to evaluate the "Impact of Self Help Groups on the Household Nutrition in Semi-Arid Tropic (SAT) villages of Mahboobnagar district, Telangana,India " with the following objectives:

1. To assess the socio-economic conditions and nutritional status of SHG and Non SHG Households of Aurepalle and Dokur villages of Mahaboob nagar District.
2. To study the impact of SHGs on socio-economic and nutritional status of the selected Households.
3. To compare the nutritional status of SHG families with Non SHG families of selected Households.
4. To compare the present socio-economic and nutritional status of SHGs Households with the results of previous studies of ICRISAT in the same villages.

1.1 NEED AND IMPORTANCE OF THE STUDY

Empowerment is better possible through a group approach and SHGs being the most active women group organizations in the state of Andhra Pradesh. The present study evaluates the SHGs impact on socio economic conditions and nutritional status of the households and gives an insight into the village scenario.

The study would contribute to the existing knowledge and theoretical impact of SHGs. Finally the study results is to be useful to policy planners, administrators, researchers, academicians, NGO personnel and others interested in both nutritional assessment and socio economic activities effect of SHGs.

1.2 LIMITATIONS OF THE STUDY

i. The present study used ex-post facto research design. So, all the limitations associated with this design make for the limitations of the study.

ii. The study, being a student investigation had the usual limitations of time and resources.

iii. The study was conducted in selected areas hence; the findings are applicable to similar situations only.

iv. Finding of the control group at the field level became difficult because most of the women are member of SHG.

v. Clinical signs was observed by using a standardized picture chart which needs to be confirmed by bio chemical tests and one day food weighment was done for the sub sample of 30 households i.e 20 SHG and 10 Non SHG.

1.3 PRESENTATION OF THE REPORT

The investigation has been organized in six chapters. The first chapter covers the introduction including objectives, need, importance and limitations of the study. The second chapter gives a brief review of literature on various impacts of SHGs. The third chapter describes the materials and methods used for the study includes research design, sampling procedure, methods of data collection and analysis. The fourth chapter infers the results of the investigation and related discussion. The fifth chapter deals with the summary and conclusions. The literature consulted and cited in the presentation has been presented under the section 'Literature cited'. The instruments used for data collection are given as appendices at the end of all the chapters.

CHAPTER II

REVIEW OF LITERATURE

The study on the Impact of Self Help groups on the Household Nutrition in Semi-Arid Tropic (SAT) villages of Mahboobnagar district, Telangana, India was carried out in Aurepalli and Dokur villages of Mahboobnagar district. The Self-Help Group movement became a silent revolution within a short span in the rural credit delivery system in many parts of the world. It has been documented in most of the developing countries including India. The income generating activities taken up by the SHGs and access to the banks and financial institutions in AP attracted the attention of not only other States but at international level also. Many dignitaries from other states and other countries visited Andhra Pradesh and praised the SHG movement and implementation of SHG-Bank Linkage program in Andhra Pradesh. The other State governments are also taking the practice as a model and are sending teams to study the implementation of the program with an aim to implement in the same way in their states.

This chapter reviews the work done on SHGs by various researchers under the following heads.

2.1 ORIGIN AND PRESENT SCENARIO OF THE SHGS

2.2 WOMEN EMPOWERMENT

2.2.1 SOCIAL EMPOWERMENT

2.2.2 DECISION MAKING

2.3 IMPACT ON EXPENDITURE AND CONSUMPTION PATTERNS

2.4 PARTICIPATION IN SOCIAL SERVICE ACTIVITIES

2.5 SOCIO-ECONOMIC EMPOWERMENT

2.6 MICRO-CREDIT FINANCE AND HEALTH

2.7 INCOME GENERATION ACTIVITIES -BENEFITS

2.8 DIETARY PATTERN AND NUTRTITIONAL STATUS OF RURAL HOUSEHOLDS

2.9 HOUSEHOLD INCOME AND POVERTY ALLEVATION

2.1 Origin and present scenario of the self-help groups:

The origin of SHG is from the brain child of Gramin Bank of Bangladesh, which was found by the economist, Prof. Mohammed Yunus of Chittagong University in the Year 1975, to provide micro-finance to rural women. In Bangladesh, micro-finance has been established as a most powerful instrument to tackle poverty.

The SHGs in India were formed by Mysore Resettlement and Development Agency (MYRADA), an NGO in 1985 due to breakdown of the large cooperatives organized by MYRADA. By 1986–87, there were nearly 300 SHGs in MYRADA's projects. MYRADA then approached NABARD for an action research project on self-help groups. Within the same timeline, Asian and Pacific Regional Agricultural Credit Association (APRACA) weighed options and agreed on further action for effectively increasing credit access for the poor. In India, NABARD and a member of APRACA, carried out an elaborate study which gave useful insights into the dynamics of group organization, saving potential and repayment ethics of the poor. Encouraged by the results of the study and action research project of MYRADA and NABARD, in consultation with the Reserve Bank of India (RBI), Commercial Banks and NGOs, launched a pilot project in 1991–92 for linking of SHGs with banks. Thus, the micro finance activity is the result of NABARD'S work that started in February 1992 through an initial pilot project promoting 500 SHGs. RBI had advised Commercial Banks in July 1991 to extend finance to SHGs as per NABARD guidelines. Subsequently, the linkage project was extended to RRBs and Cooperatives.

According to the Status of Micro Finance in India 2009-2010 of NABARD there are 69,53,000 SHGs in the country whose savings are linked with banks and 48,51,000 SHGs having loan outstandings as on 31 March 2010. The estimated number of families covered under this model is about 970 lakhs. The total savings amount of all the SHGs with banks as on 31 March 2010 amounts to Rs.6198.71 crore and the total amount of loans outstanding against SHGs as on 31 March 2010 is Rs.28038.28 crore. The SHG-Bank Linkage Model is the largest financial inclusion programme in the world. The recovery performance is also high where 203 banks out 302 banks have reported recovery of more than 80% of SHG loans as on 31 March 2010. Eight Public Sector Banks have reported a figure of more than or equal to 95% recovery and 10 Public Sector Banks have reported a recovery between 80-94%. While the bankers are generally happy about the recovery performance.Success of microfinance largely depends upon the quality of SHGs and how it functions. Thus SHGs can be treated as core element of microfinance

programs. According to Singh (2011) some of the basic working principles and functions of an SHG are

a) Group members usually create a common fund by contributing their small savings on a regular basis;

b) Group evolves a flexible system of working (sometimes with the help of NGOs) and manages pooled resources in a democratic way;

c) Loan requests are considered by group in periodic meetings and competing claims on limited resources are settled by consensus;

d) Loans are given mainly on trust with minimum paper with and without any security;

e) The loan amounts are small, frequent for short duration and are mainly for conventional purposes;

f) The rates of interest vary from group to group and the purpose of the loan. It is higher than that of banks but lower than that of moneylenders;

g) At periodic meetings, besides collecting money, social and economic issues are also discussed; and

h) Defaults are rare due to group pressure and intimate knowledge of the end use of credit.

Saha et al.,(2013) described that Poor families living below the poverty line were then organized into SHGs established with a mixture of government subsidy and credit from investment banks. The main aim of these SHGs is to focus on income generation and raising poor families above the poverty line. The SHGs are supported and trained by nongovernment organizations (NGOs), community based organizations (CBOs), individuals, banks, self-help promoting institutions, and microfinance institutions (MFI). The most prominent models of delivery for microfinance in India continue to be SHGs, promoted by the state governments, NGOs, a few regional rural banks, and specialized MFIs that use various models to make both group and individual loans. The southern states of India experienced the largest concentration of SHG activities, both with state support, and promoted by private MFIs (Figure 2.1).

The SHGs can also be community platforms from which women become active in village affairs, stand for local election or take action to address social or community issues like the abuse of women, alcohol, the dowry system, schools, water supply and so on.

The small beginning of linking only 500 SHGs to banks in 1992, had grown to over 0.5 million SHGs by March 2002 and further to 8 million SHGs by March 2012 according to a report by NABARD. In southern states, almost 100 per cent of the SHGs linked to banks in the pilot stage, while the total number of SHGs linked in southern states shrank to 46 per cent by March 2012. On the other hand, the share of eastern States (especially, West Bengal, Odissa, Bihar) shot up to over 20 per cent as per NABARD data of micro financing. This means that SHGs are being self-reliant in southern states and are in a mature phase, while it is still gaining its ground in eastern states. But the day is not far away when it will stand with strength in the eastern states too. (Archana Kumari,2013).

Millennium Development Goals aim at reducing poverty, improving health and education, empowerment of women, protecting environment and enhancing other aspects of human welfare. In India, the goals of millennium declaration were followed even before the adoption by the United Nations General Assembly, in the form of policy framework and number of schemes for rural development. The movement towards sustainable rural development will lead to the achievement of MDG. Such achievement is possible through the modern tool to combat poverty and ensure rural development, commonly known as micro finance through SHGs. Apart from savings and credit; SHGs were also able to address social issues like health, education, sanitation, drinking water, alcoholism etc

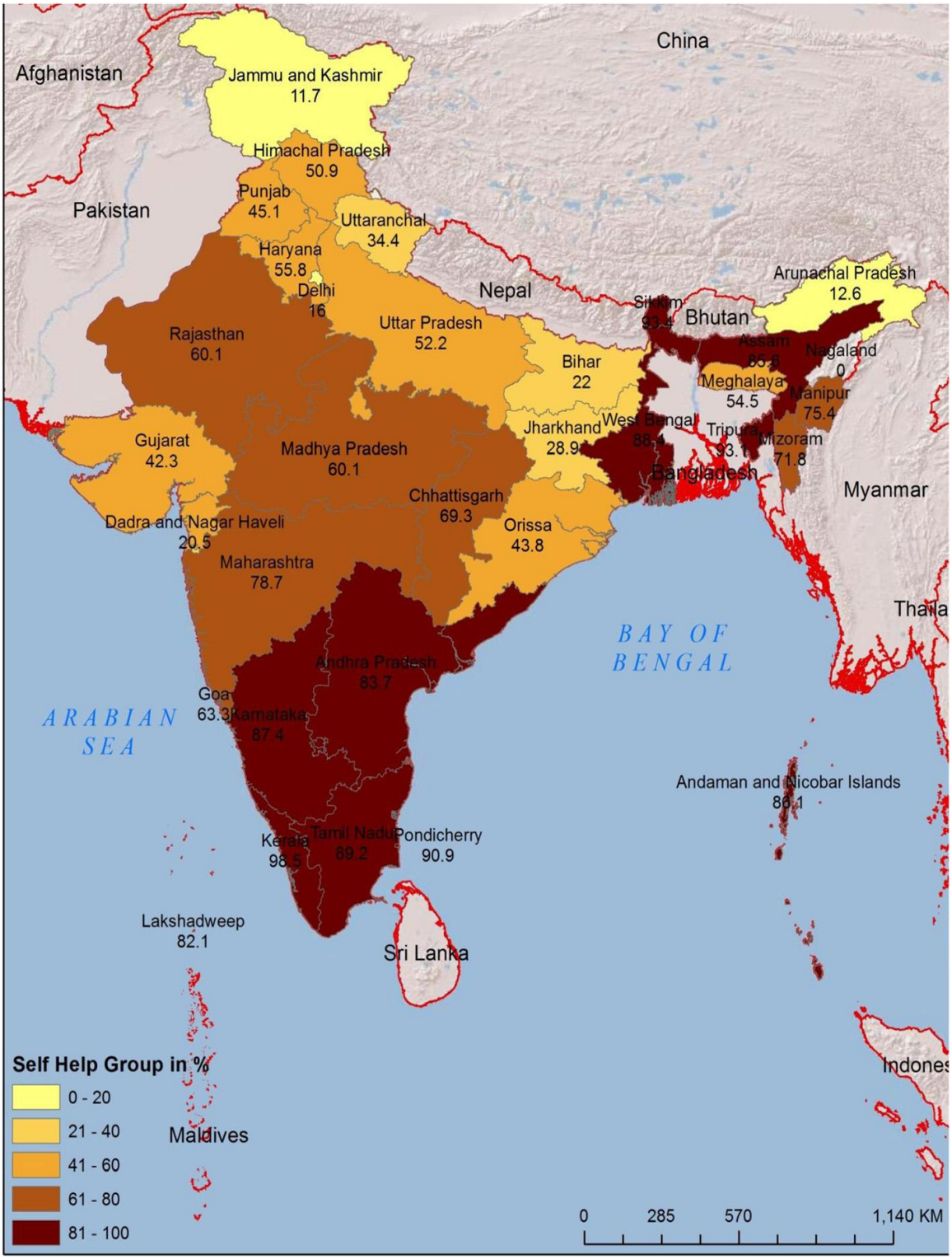

Figure: 2.1 Density of Self Help groups in different status of India.

2.2 WOMEN EMPOWERMENT

Empowering women is one of the most crucial concerns of the Millennium Development Goals of the United Nations. One of the crucial goal is to upgrade the status of women and facilitate their integration into the total social development(Varghese ,2011).

A set of recent studies has also focused on SHGs in the state of Andhra Pradesh, which accounts for 40 percent of all SHGs in India (Galab and Rao 2003; Aiyar, Narayan et al. 2007).Various studies conducted by NABARD, National Council of Applied Economic Research (NCAER) and Institute for Social and Economic Change (ISEC) speak in one voice about the paradigm change in the ways rural poor women think and act in the post-SHG phase. SHG members could undertake tasks like travelling alone to the next town or city, going alone to hospitals, handling certain amount of money, addressing a forum, etc with confidence in post SHG phase.

In behavioral changes, studies found that more than 70% of women respondents reported improvement or even significant enhancement in their ability to face problems. Overall findings indicate that the decision making capacity of women members with various SHG activities has improved from pre-SHG situation. SHG members were part of the decision making process in children's education, purchase of assets, marriage of their daughters, etc. Members also reported in changing undesirable habits of their husbands. Recent panchayat elections in Kerala brought to focus the active participation of women from Kudambashree project. In another instance, while revamping the Public Distribution System (PDS), the Chathisgarh Government entrusted PDS outlets to community based organisations, panchayats and SHGs (NABARD, 2010).

Vasudeva (2004) rewarded Andhra Pradesh SHGs by saying that they are steadily bringing a silent revolution in the empowerment of women in rural areas and have achieved a respectable position in the country overall in the states.

Formation of Self Help Groups (SHG) is a potent medium that can ensure the all round development of women particularly in rural areas. The impact of Self Help Groups is significant in terms of self-worth like confidence cum capacity building by proving self employment opportunities to meet the financial crisis. It also improves the decision making capacity in terms of various social, political, economic, health and educational affairs and mobilizes women to fight against various types of exploitations against them in family and society at large (Heena and Tabasum ,2013). It has also empowered women members substantially and contributed to increased self-confidence and positive behavioral changes in the post-SHG period as compared to the pre-SHG period (Sushil Kumar Mehta *et al.*, 2011).

At the individual level, there is evidence that the programme attracts already relatively empowered people and that empowerment occurs among some clients through programme participation(Sundaram, 2012).

Palanichamy (2011) reported that SHG enhanced the equality status of women as participants, decision maker and beneficiaries in the democratic, economic, social and cultural spheres of life.

Preethi (2011) revealed that with regard to empowerment of SHG women majority were in medium(57.50%) category followed by high (35.0%) category and low(7.5%) category in Chittoor District. In East Godavari majority high (33.75%) and low(5.0%) of empowerment. In Nalgonda District majority of respondents were in medium (58.75%) category followed by high (37.50%) and low (3.75%) category of empowerment.

2.2.1 SOCIAL EMPOWERMENT

As per NCAER (2008) survey, 92.0 per cent of households reported that the social empowerment of women has increased over a period after joining SHGs. The percentage of households reporting improvement in such empowerment was highest in Maharashtra (95.4 per cent),followed by Orissa (94.4 per cent), Karnataka (93.6 per cent), Andhra Pradesh (91.5 per cent), Uttar Pradesh (90.3 per cent) and Assam (86.5 per cent).

An exploratory study of the(Jaya S Anand 2004) functioning of selected SHGs in the district of Malappuram in Kerala showed SHG intervention has improved the living standards, inculcated saving and loan repayment habits and had brought about a positive change in attitudes, social skills thereby leading to empowerment in 52% of the respondents.

The process of empowerment manifests itself in increased self-esteem and decision-making at the family level(Sundaram,2012)

Acute malnutrition among children, infant and child mortality / premature adult deaths has declined. Children's school enrolment and regularity in school attendance has improved. Further, when SHGs address issues such as the establishing of *Ammavadi* (Baby care center), made a positive impact upon the education of girl children (Joy Deshmukh-Ranadive 2004).

Sarumathi and Mohan(2011) reported that SHGs were social empowered (98.9%) among the rural women.

Darshana(2008) reported that one of the remarkable qualities after joining SHGs was empowerment. Almost 83 per cent of respondents were agreed. The most outstanding was the increase in confidence levels and courage to discuss issues and speak openly. Almost 88 per cent affirmed this triat.

Rama Krishna and Krishna Murthy (2003) analysed the role of SHGs in empowering rural poor in Paravda village of Visakhapatnam. The study revealed that SHG was successful to some extent in achieving social empowerment and related in a positive impact on decision making, communication skills, building up self-confidence and increased living standards of women of SHGs.

Kondal (2014) observed that 59% respondents are increased their communication skill in corresponding with the other villagers and with their mandal level officers and 41% of respondents did not show any improvement their communication skill with their officers.

2.2.2 DECISION MAKING

Selvaraj (2005) reported that the SHG women had a major role in decision making and the middle aged women were highly empowered when compared to women of age group.

Suchetha Shukla (2004) stated that independent decisions by women on spending money and saving for themselves was highest in Punjab followed by Kerala and lowest in Orissa.

It was observed that 52% of SHGs showed an increase in decision making in agriculture sector and 48% of respondents did not take any decision in agriculture while fifty seven percent increased their decision making in other activities of the family and 43% did not take decisions in the other activities of the family(Kondal ,2014).

2.3 Impact on expenditure and consumption patterns:

Increased levels of employment and income of SHG households are expected to raise their expenditure on various items. The level and growth rate of annual household expenditure on food and non-food items are reported by several authors. While the expenditure on food included cereals, pulses, edible oils, vegetables, milk, and milk products, meat and fish, sugar, gur, and other items, the expenditure on non-food included clothing, footwear, consumer durables, pan, beedi & cigarettes, intoxicants, ceremonies, newspaper, travel and also on education and health (Ghosh 2012).

A collaborative study by NABARD and APMAS (2009), based on primary data collected from 109 SHGs from 9 blocks of 4 districts of Assam during 2007-08, revealed that the SHG Bank Linkage Programme (SBLP) yielded social and economic benefits to a high percentage of the sample SHGs. More than 80 per cent of the SHGs experienced improvement in savings habit, access to formal credit and its availability; over 80 per cent of SHGs experienced increase in

income, and more than 50 per cent experienced increase in expenditure on food, education and health; about 75 per cent experienced decline in family debts, interest burden and dependence on moneylenders; more than 80 per cent have positive experience about women leadership development and their interaction with government officials. The results of some micro-level studies from De and Sarker (2010), Dhanya and Sivakumar (2010), Kashyap and Kashyap (2010), Kumar (2010), Moyle et al.,(2006) demonstrated positive impact of SBLP on the socio-economic conditions of SHGs members.

NCAER (2008) found that SHG-Bank Linkage programme has influenced the consumption pattern of member households. The average annual growth rate of expenditure on food items registered an increase of 5.1 per cent and 5.4 per cent higher on non-food items. The average annual growth rate of expenditure on food and nonfood was thus higher than 5 per cent respectively at the All-India level (six states).

Swamy V and Tulasimala BK(2013) found that the mean family non-food expenses have increased from Rs. 3596 in pre-SHG situation to Rs. 6228 after SHG impact, registering an improvement to the extent of 73.24%.

2.4 Participation in social service activities:

In Maharashtra state, a project that trained women SHG members as health workers, initiated literacy programmes and provided funds for household health emergencies showed in the two decades after 1970 a reduction in infant mortality from 176 to 19 per 1000, a birth-rate decline from 40 to 20 per 1000, nearly universal access to antenatal care, safe delivery, and immunization and a decline in rates of malnutrition from 40% to less than 5% (Rosato *et.,al* 2008).

Studies in India and Bangladesh have shown the positive effect of SHGs on reducing exclusion (Mohindra *et al*., 2008) , improved childcare and contraceptive use (Hadi, 2001 and 2002).

Mark *et al*.,(2003) stated that only 35% of women respondents knew the name of their members of Panchayat, while an impressive majority of (86%) women reported having voted in the last election and 74% reported of being influenced by their husbands or being compelled to vote for certain candidate.

SHGs had a positive impact on beneficiaries especially women in respect of social and economic empowerment which increased their participation in the development programmes, ability to

meet government officials, awareness about property rights and marketing(Rama Krishna and Krishna Murthy,2003).

2.5 Socio-economic empowerment:

Self Help Groups a major role in transforming rural economy. Micro finance helps the rural poor to improve their life standard and fulfil their credit needs. SHGs are new innovation in the field of rural economic development, to finance the rural people and also to satisfy their credit needs. This in turn will help to transform the rural economy by way of improving the economic status of each and every individual member of the SHG in the rural areas apart from providing scope for women empowerment. Thus, SHGs play a major role in women empowerment, micro-finance through bank linkages in collaboration with NGOs and contribute to the rural economy (Arunkumar, 2005).

Anuppalle and Reddy (2008) observed the greater improvement in social, economical, political and health conditions of the rural women after joining in the SHGs in India particular at Andhra Pradesh compared to the other countries like Africa and Indonesia. SHGs had a positive impact on social and economic empowerment (Rama Krishna and Krishna Murthy, 2003).

2.6 Micro-credit finance and health:

Globally there is emerging evidence to show that microfinance programmes have created non-financial benefits including improvements in health, hygiene and sanitation (Ahnquist *et .,al*,2012 and Subramanyam *et.,al* 2011). It has been observed that most SHGs whose basic focus is upon economic issues (savings & credit facilities for the members) have not performed satisfactorily in enhancing the knowledge and awareness on health related issues among women. In recent times women have gained appreciably as a result of joining SHGs and there by being able to meet their health related expenditure by borrowing money from the group.

Saha et.,al (2013) reviwed a clustered randomized trial assessment of the impact of a participatory women's group through community mobilization programme among the indigenous communities of Jharkhand and Odisha states of India. The trial found newborn babies born to mothers associated with a women's group significantly improved the likelihood of surviving within the first six weeks of their lives, compared to babies born to analogous households in control communities.

Anuppalle and Reddy (2008) observed the improvement in health conditions of the rural women after joining in the SHGs was more in India in particular at Andhra Pradesh compared to the other countries like Africa and Indonesia.

2.7. Income generation activities –benefits:

The data collected in the NCAER (2008) survey revealed that employment per household increased from 314 person days in pre-SHG situation to 400 person days in post-SGH situation, registering an increase by 86 person days (i.e., by 27.3 per cent). Female employment increased by 29.5 per cent – from 122 person days to 158 person days; male employment increased by 26.0 per cent – from 192 person days to 242 person days. This indicates that as compared to male members, female members have benefited more in terms of employment opportunities from the linkage programme.

Bruhn and Love (2009) have recorded a rise in informal business and employment which led to an increase in income on an average of about 7%.

Increasing enterprise activity within households, expanding employment opportunities for the poor in non-farm enterprises, empowering women, and improving the accessibility of other financial services at the community level (Swamy V and Tulasimala BK 2013).

Study by Swain and Adel Varghese(2009) has shown that in case of Indian SHG members with longer participation in SHGs, members move away from pure agriculture as an income source towards other sources such as livestock income. Training by NGOs positively affected asset creation but the type of SHG linkage per se has no effect.

Joy Deshmukh-Ranadive (2004) reported that SHG has improved opportunities to generate livelihoods.

Bharatamma *et al*.,(2006) reported that there was 25.7 per cent gain in empowerment in Gadag taluk, 25.0% in Shirahatti and 23.1% in Mundaragi taluks through income generating activities. The overall gain in empowerment in Gadag district was 24.6 %.

Nalini *et al*., 2013 revealed that maximum number of women SHG members of borrowers availed loan for the purpose of income generating activities (38.89%), followed by animal husbandry activities (22.22%), health measures (14.81), consumption purpose (11.11), agriculture (7.41%) and education (5.56). While, in case of men SHG members major borrowings were for agriculture (53.70%), followed by animal husbandry (16.67%), income

generating activities (12.97%), education (5.56%), health (3.70%), family consumption (3.70%) and other purpose (3.70%).

2.8 Dietary pattern and nutritional status of rural households:

Deininger and Liu (2008) stated that SHGs helped to improve food consumption and nutritional status of the poor. The mean value of the per family food expenses has increased from Rs. 4849 in pre-SHG situation to 8216 Rs. after SHG impact registering an improvement to the extent of 69.41% (Swamy and Tulasimala 2013).

Positive impacts on nutritional intake in program areas, overall heterogeneity of impacts between members of pre-existing and newly formed groups, as well as non-participants has been reported by Klaus Deininger and Yanyan Liu, 2009.

Jeejebhoy *et al*.,(2001) reported affect of SHGs on women's economic decision making and reported that in Punjab majority of women participated in discussion on foods (71.2%) followed by jewellery (31.1%) and major goods (16.5%). With regard to Muslim and Hindu women in Uttar Pradesh, major participation was found to be with jewellery, while a great majority of 84.4% and 89.0 per cent of Muslim and Hindu women respectively participated in decisions regarding food.

Joy Deshmukh-Ranadive (2004) reported increased food security of members of households after participation in groups.

2.9 Household income and poverty alleviation:

A major objective of the SHGs is to alleviate poverty by extending banking services to the poor, thereby helping them to enhance employment and income opportunities to come out of poverty. Evidence shows that the percentage of poor households declined from 58.3 per cent in pre-SHG situation to 33.0 per cent in post-SHG situation, indicating that the incidence of poverty among SHG households declined substantially by 25.3 percentage points, after about five years of bank linkage. The annual rate of poverty reduction turns out to be 10.0 per cent at the all India level (NCAER, 2008).

Self Help Groups reduce poverty and vulnerability of the poor by increasing capital / asset formation at the household level, improving household and enterprise incomes, enhancing the capacity of individuals and households to manage risk (Swamy and Tulasimala 2013).

A study by Sushil Kumar Mehta *et al.,* (2011) showed a positive impact on the socioeconomic conditions and the reduction of poverty of SHG members and their households.

Geeta Manmohan et al., (2008) views that Micro finance is such a tool, which directly hits the poverty by helping poor or enabling them not only to survive but also to improve their standard of living.

Anila (2012) reported that self help groups in the study area increased the income level of the respondents nearby 16 percent respondents were in the income group of 1000 – 1500 before joining the scheme, but that percentage has increased to 18.83 after joining the group. The percentage of respondents of the income group 1500-2500 was 35 before joining the scheme. It has increased to 36.67 after joining the group.

Sarumathi and Mohan(2011) found that poverty declined to the greater extent (92.00%) among rural women of SHGs.

Rangi *et al.* (2002) found that majority of the respondent families(58%) had net monthly income between Rs. 2000 and Rs. 6000, 12 per cent between Rs. 6000 and Rs. 8000, 2 per cent between Rs. 8000 and Rs. 10,000 and 22 per cent between Rs. 10,000 and above. The casually employed workers in agricultural and nonagricultural sectors had comparatively low income because employment was for a limited period in each month.

Vivek Kumar Tripathi and Tanu Marwah 2013 reported that SHGs were intended to strengthen viable, small businesses, to result in increased household income and savings, and thus alleviating the crunch of economic poverty.

The review of extent of literature on micro-finance reveals that the existing studies highlight the impact of SHG and microfinance on economic improvements in households, capacity building and empowerment. Integrated studies highlighting the harmonious impact of SHGs, NGOs and Micro Finance on the socio-economic aspects of rural households are, however, rare to come across. So, there is a need to study how micro finance through self help groups play a pivotal role in sustainable rural development and effect on nutritional status. In other words, the main focus of the present study is to observe the SHGs impact on the nutritional status.

Chapter III

MATERIALS AND METHODS

The research on “Impact of Self-Help Groups on The Household Nutrition In Semi - Arid Tropic (SAT) Villages Of Mahboobnagar District, Telangana, India” was conducted during March - May 2014.The materials and methodology used for conducting the study and analysis of data are given in the following heads:

3.1 Research design

3.2 Location of study

3.3 Selection of sample

3.4 Selection of tool

3.5 Data analysis

3.1 Research Design

"Research is defined as a process of steps used to collect and analyze information to increase our understanding of a topic or issue.”

Research design has its origin in a term which means to go around or to explore. It is a detailed outline of how an investigation will take place. The term "research design" refers to how a researcher puts a research study together to answer a question or a set of questions. Research design works as a systematic plan outlining the study, the researchers' methods of compilation, details on how the study will arrive at its conclusions and the limitations of the research.

An exploratory research design was adopted to conduct the study. Exploratory research design is a type of research conducted for a problem, but the problem itself has not been clearly understood. In other words, exploratory research is a process of gathering facts and doing research that later allows for the team to create the best research design or data collection method available for specific subjects. This research design was adopted to explore the impact of self-help groups on the household nutrition in SAT villages of Telangana.

3.2 Location of Study

The locations selected for the study were Aurepalle and Dokur villages of Mahboobnagar district, Telangana, India. The present Mahbubnagar district was also known as Palamooru and Rukmammapeta, located in the Telangana.

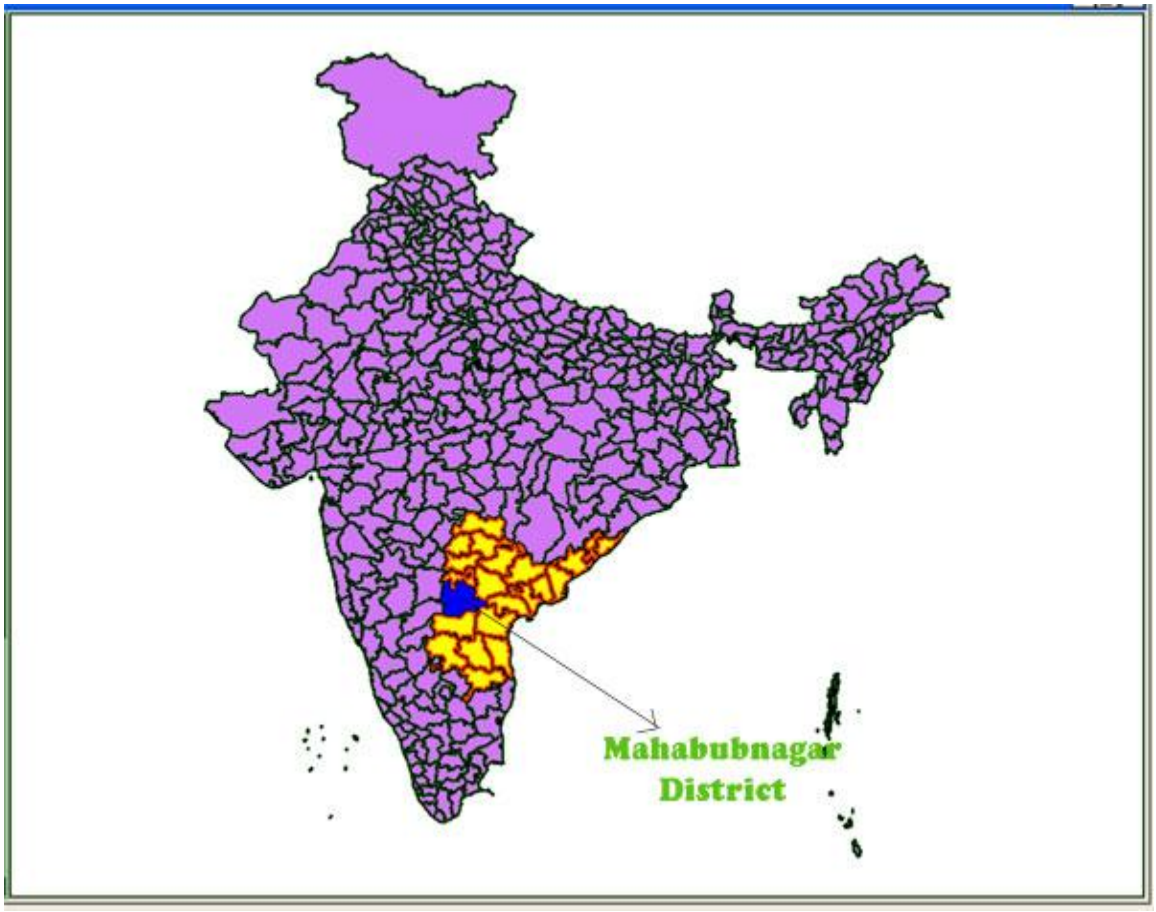

Figure.3.1: Location of Mahboobnagar district of Telangana,India.

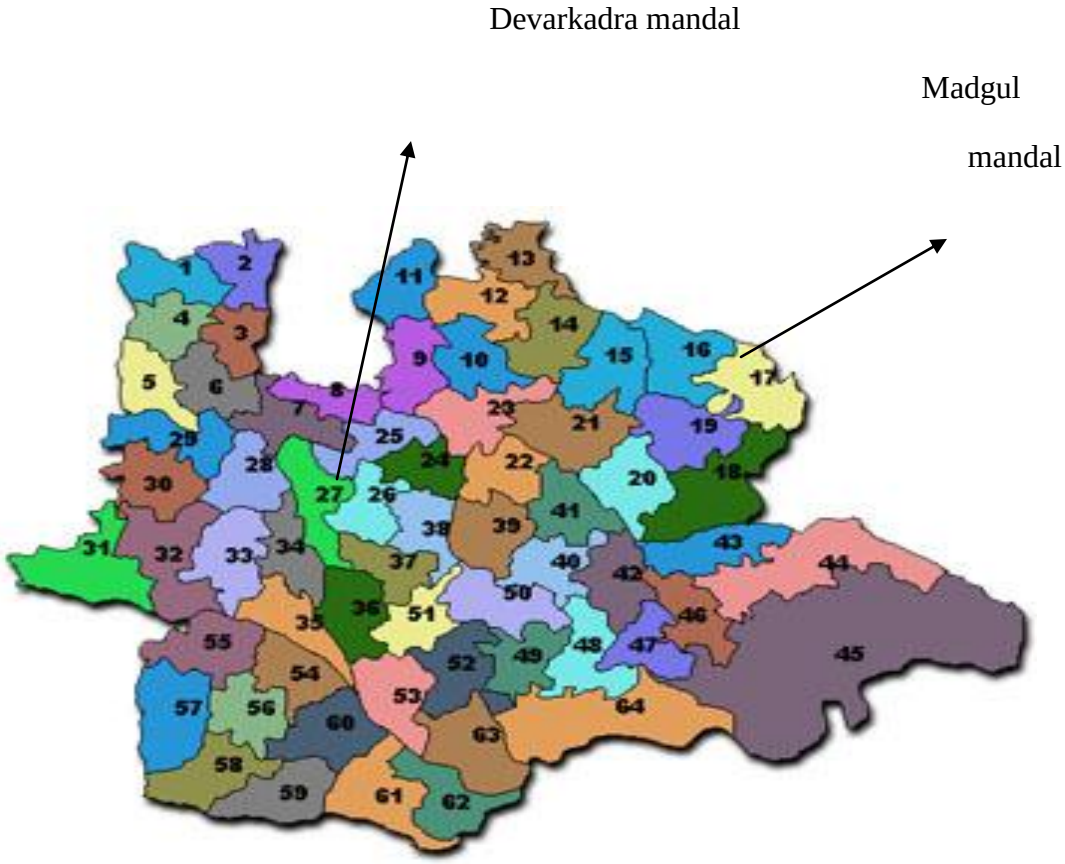

Figure 3.2: Location of Madgul mandal and Devarkadra mandal of Mahboobnagar.

The details of the selected villages are as follows:

3.2.1. Aurepalle Village

Aurepalle (16° 51'N 78° 37' E) is situated in Madgul mandal in Mahbubnagar District (16° 73' N and 77° 98' E) in the Telangana. To reach Aurepalle, one needs to travel to Amangal town, which is about 60 km from Hyderabad on the Hyderabad-Kalvakurthi State Highway and then travel a further distance of 10 km East on a tar road.

Aurepalle has an annual rainfall of about 700 mm, distributed erratically. Soil depth ranges from 15 to 45 cm. Cotton, paddy, sorghum, pearl millet, castor and pigeon pea are the major crops cultivated in the village.

3.2.2. Dokur village

Dokur (77°50'E 16°36'E) in Devarkadra mandal of Mahabubnagar district (16°73'N 77°98'E) is about 125 kilometers south of Hyderabad and can be reached via Devarkadra on the Hyderabad-Raichur road. The village is 5 kilometres to the west of Devarkadra on an untarred

road. The village fell under the jurisdiction of Atmakur mandal in 1975-76 and now falls under Devarkadra mandal. Dokur's original name was "Dakur" derived from the Indo-Persian Urdu word "daku," meaning "gang of armed dacoits". It is believed that dacoits used to take shelter in Dakur due to its thick vegetation. Eventually, the name Dakur became corrupted to Dokur.

The village is drought prone and adequately represents the semi-arid tropics. The annual maximum temperature of the village is 40°C and minimum temperature is 20° C, while the normal rainfall in the village is 730 mm, distributed erratically. Traditionally, agriculture has been the main livelihood of the villagers. However, over time, due to persistent drought and drying up of irrigation water sources, agricultural productivity and cultivated area declined drastically. This led to fallowing of land season after season, enabling bushes to grow wildly and increase in the wild boar population. The major crops grown are paddy, groundnut, castor, pigeon pea and cotton. Emigration to cities, mainly Hyderabad, to work on construction projects has been on the rise, and has become an important source of income for many poor families.

3.3 Selection of sample

Sixty SHG and 15 Non SHG households were selected as experimental and control households respectively from each of the two villages Aurepalle and Dokur making a total of 120 SHGs and 30 Non SHG households. Random stratified sampling procedure was used for the selection of the sample. In Aurepalle 52 out of 60 SHG households and 8 out of 15 Non SHG households were selected from the VLS where as in Dokur village it was 19 and 8 respectively.

3.4 Selection of Tool

A detailed interview schedule was developed to collect information from the SHG and Non SHG household.

3.4.1 Interview schedule

Interview schedule is a data collection technique in which the interviewer physically meets the interviewee and asks the questions related to the research topic in a predetermined order, and records his or her response to each (given appendices A).

Interview schedule was prepared with questions related to impact of SHG and NON SHG household nutritional status with the following broad heads: i.e ((i) Socioeconomic status which includes sources of income, Housing details, Expenditure pattern of food, clothing, education and health.(ii)Nutritional status assessment mainly dealt with complete household's anthropometric, clinical and dietary assessment. SHG group Membership details SHGs were elicited separately for SHG Households which include loan details, participation, awareness of

social action programmes, health and nutrition, access and utilization of support systems change in decision making role.

3.4.2 Nutritional Assessment

3.4.2.1 Anthropometric Assessment

The anthropometric measurements height, weight, mid-upper arm circumference and triceps skin fold measurements were taken for children and parents.

3.4.2.1.1 Height: Distance from the crown of the head of the bottom of the feet (heels) while the child is measured standing (for children 2 years of age or older).

Length: Distance from the crown of the head to the bottom of the feet (heels) while the child measured supine (for children less than 2 years of age) is called length.

The subject should stand erect looking straight on a leveled surface, without shoes with heels together and toes apart. The anthropometer (height rod)should be placed behind the subject in the center of the heels perpendicular to the ground .The investigator standing on the left side of the subject should firmly hold the chin of the subject with his/her left hand and the occiput of the subject with his right little finger in the Frankfurt plane (an imaginary line joining the tragus of the ear and the eye).The moving head piece of anthropometer (height rod) should be placed in the sagittal plane over the head of the subject applying a slight pressure to reduce the thickness of hair. The reading should be taken when the height rod is still in position.

Infantometer is used to measure the length of children below 2years.The infantometer flat surface and child is made to lie down on the infantometer in supine (lying down on the back of the body) position and knees, legs need to be held straight and firm without bending with help of assistant and the feet should touch the sliding board and reading/measurement is noted against the scale in cm.

3.4.2.1.2 Weight: Body weight is mainly made up of muscles, fat, bone and internal organs. Weight is measured using electronic weighing machine for adults and children below 2 years are measured using electronic infantometer which shows the reading/measurement in kgs. The child is made to lie down on the electronic infantometer with minimal clothing and then the child should be stable without moving before recording child' weight and the final correct measurement is noted down in kg.

3.4.2.1.3 BMI: Body Mass Index also called as the Quetelet's index is the ratio of weight (Kg)/ height $(m)^2$. BMI=Weight (Kgs)/height $(meters)^2$

The calculated BMI for each child was plotted in the age and sex specific WHO BMI percentile graphs(2007) (Annexure)

BMI classification in children Below 18years (WHO)

1 Underweight <3 percentile

2 Mild underweight < 3-15

2 Normal 15-85 percentile

3 Overweight 85-95 percentile

4 Obese >97 percentile

BMI classification in adults (WHO)

1 Underweight < 18.5

2 Normal 18.5-23.0

3 Overweight 23.0-27.0

4 Obese >27.0

3.4.2.1.4 MUAC: It is the measurement of a child's arm circumference at the midpoint between the tip of the shoulder and elbow. It is measure with a flexible fibre glass tape on the left hand. The mid-point between the tip of the olecranon of the fore-arm bone ,ulna, is located with the

Figure 3.3: Measuring height and weight of the respondents

Figure 3.4: Measuring length of an infant and MUAC of male adult

arm flexed at the elbow and marked with a marker pen .The arm is left hanging freely and the fibre glass tape is gently ,but firmly placed embracing the arm without exerting too much pressure on the soft tissues. The reading is taken in cm, with the tape still in position.

MUAC Classification in Children 12–60 Months (FAO, 1993a)

1 Normal > 13.5 cm

2 Moderate wasting 12.5–13.5 cm

3 Severe wasting < 12.5

3.4.3 Clinical Assessment

Clinical examination is an important practical method for assessing the nutritional status of community. It is based on the examination for changes, believed to be related to inadequate nutrition that can been seen or felt in superficial epithelial tissues especially skin , eyes , hair and buccal mucosal in organs near the surface of the body such as parotids and thyroid glands. Typical nutrient deficiency symptoms Protein Malnutrition, Thiamine deficiency, Niacin deficiency, Vitamin C deficiency, Vitamin A deficiency Riboflavin deficiency, Vitamin D deficiency, Iron deficiency and Florosis. (Jelliffe 1966) were listed in a table and all the household members were observed for clinical signs and symptoms of nutritional deficiencies.

3.4.4 Dietary Assessment

3.4.4.1 Food Frequency Questionnaire

Food Frequency Questionnaire It is a method useful to obtain information regarding the consumption of specific groups of foods. This method is designed to obtain qualitative information about usual food consumption patterns. The questionnaire consists of two aspects (i) a list of foods and (ii) a set of frequency of use response categories. The lists of foods are mostly focused on specific food groups of foods, particular foods, or food consumed and the frequency of consumption. The aim of the food frequency questionnaire is to assess the frequency with which certain food items or food groups are consumed during a specific time period i.e Daily (AD)/Alternate Day/Twice in a week (TW)/Once in a week (OW)/Once in a forthnight (OF)/Once in a month (OM)/ Occasionally (O).In the field a complete information with regard to frequency of consumption of each food group including each item under the group was obtained for all the 150 households by interviewing women respondent in the family.

3.4.4.2 Dietary diversity

Dietary diversity Is a qualitative measure of consumption that reflects household access to a variety of foods and is also a proxy for nutrient adequacy of the diet. The dietary diversity scores are given based on simple count of food groups that a household or an individual has consumed over the preceding 24 hours. The household dietary diversity score(HDDS) is meant to reflect, in a form , the economic ability of a household to access a variety of foods. Scoring is given based on consumption of each food groups i.e score 1 is given for consumption of particular food group and score 0 is given for no consumption of particular food group.

3.4.4.3 Weighment Method: It is a diet survey method conducted by weighing edible raw and cooked foods consumed by an individual or family. All the raw food ingredients are weighed in grams and calculated per consumption unit per day. Consumption is based on the energy requirement, an arbitrary caloric coefficient values have been assigned for persons of different age, sex and activity groups then total consumption units was assessed which is utilized to calculate the total food intake of raw food items using table of Nutritive Value of India Foods (Gopalan et al., 2012).Intake/CU/day (g) = Raw amounts of each food/Total CU .Proximate nutrients of total Energy, Protein and Fat intake were calculated along with % of adequacy for foods consumed.

In the field one day weighment method was followed where all the raw food ingredients to be utilized for that day before cooking by the whole family/household was on a sub sample 20 SHG households (10 HH from each village) and 10 NON SHG Households (5 HH from each village) by weighing accurately raw ingredients using a 1kg food balance with the help of a structured diet survey questionnaire. Intake of quantity of each food item, total energy, protein, fat intake and % adequacy of nutrients of total quantities of food groups(cereals, pulses ,fat, vegetables, milk, meat, fruits and sugar) per day was calculated.

After the preparation of the schedule it was pre-tested on 10 samples to test the validity and reliability. Depending on the data gathered and gaps found, the schedule was modified and final schedule was prepared.

Figure 3.5: Diet survey through food weighment

3.5 Data analysis

The statistical tools used for analysis of general information like age, education, caste, occupation, income and marital status were average, percentages, mean and standard deviation. For comparison of income and expenditure of SHG and Non SHG T-test was used. For food frequency and dietary diversity percentage was done and for weighment T-test was used. Correlation was used between the independent variables such as age of the SHG women, membership years, education and household income on dependent variables like BMI and Dietary diversity score. For ICRISAT village level studies previous anthropometry data of (2010 to 2014)T-test was used.

Chapter IV
RESULTS AND DISCUSSION

The research study entitled " Impact of self help groups on the household nutrition in Semi Arid Tropic (SAT) villages of Mahboobnagar district, Telangana, India" was carried out in Dokur and Aurepalle villages with the aim to compare the SHG household and Non SHG households in terms of socio economic conditions and nutritional status and evaluate the impact of SHGs on household nutrition. Sixty SHG households and 15 Non SHG households were selected from each of the two villages forming a total of 120 SHG and 30 Non SHG households. Keeping in mind, the conceptual frame work of the study with reference to the objectives, the empirical evidences obtained through objective research procedures had been analyzed in the context of objectives by subjecting them to appropriate statistical and analytical tests. The findings are presented and discussed in this chapter.

4.1 Demographic Characteristics of SHG and Non SHG Households

The demographic characteristics of selected SHG and Non SHG households was obtained through a structured schedule. Information on composition of families as age, gender, education, occupation and marital status was obtained and the data is presented under specific headings in the following sections.

Age, gender, marital status and caste distribution of SHG and non SHG households was compiled and presented as number of persons in each category and as percentages in table 4.1.

4.1.1 Population in gender groups

The total population of SHG was 495 with 259 men and 236 women and that of non SHG was 98 with 49 men and 49 women. There seems to be a good male: female ratio of 100:100 in Non SHG, which is a good sign compared to 52:48 of SHG.

4.1.2 Age groups of population

On the basis of chronological age the members of the household were classified under four groups, namely infants (<1year), children (1-10years), adolescents (11-18years) and adults (≥19). The age wise distribution indicates that 67% of SHG family members were adults, followed by 19% adolescents, 12% children and 2% infants. Among Non SHG households the percentage of adults was high with 73%, with 16% of adolescents, 7 % children and 4 % infants.

Table 4.1. Demographic classification of SHG and Non SHG households

Category	SHG		Non SHG	
	N	%	N	%
Age(years)				
Infants (below 1year)	8	2	4	4
Children (1- 9 years)	61	12	7	7
Adolescents (10-18 years)	93	19	16	16
Adults (19 and above)	333	67	71	73
Total	**495**	**100**	**98**	**100**
Gender				
Male	259	52	49	50
Female	236	48	49	50
Total	**495**	**100**	**98**	**100**
Marital status				
Married	251	50	54	55
Un-Married	203	41	35	36
Widow	40	8	9	9
Divorced	1	1	0	0
Total	**495**	**100**	**98**	**100**
Caste				
OC	15	13	6	20
BC	89	74	21	70
SC	16	13	3	10
ST	0	0	0	0
Total	**120**	**100**	**30**	**100**

4.1.3 Marital status of population

Based on the marital status the householders were grouped into four categories. About 50% of the SHG population was married, 8% widows and 1%divorced and the rest of the members were not in that age group. In the Non SHG population, 55% were married, 9% were widows and 36% were in not eligible category.

4.1.4 Caste of population

The households were categorized into different caste groups of OC, BC, SC and ST. Accordingly, out of the 120 households of SHGs 74% belonged to BC, while 13 % belonged to SC and 13 % of them belonged to OC category. From the 30 Non SHGs 70% belonged to BC, 20% belonged to OC and 10 % belonged to SC communities.

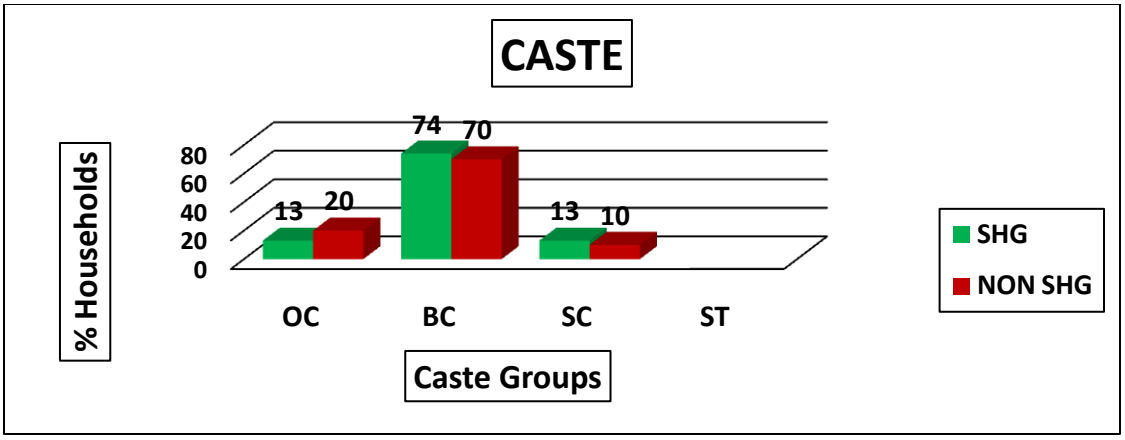

Figure 4.1: Caste wise distribution of SHG and Non SHG households

4.2 Socio Economic Status of SHG and Non SHG Households

The information on educational status, occupation, income, assets, liabilities and expenditure pattern was compiled from the questionnaires and details are given in this section.

4.2.1 Education

The educational level of the SHG and Non SHG households is given in table 4.2. Among the SHG households, 40% of the population was illiterate, followed by 22% had high school education, 19% had primary school education, 7% had college education, 5% had intermediate education and 6% of them were below five years, some of them attending anganwadi and 1 % of them were literate to sign.

Among the Non SHG households 45% population was illiterate, followed by23 % being high school educated, 9% of them were attending intermediate college education, 7% had primary school education, 6% had college education and the remaining 10% of them were children below five years, some of them were attending anganwadi.

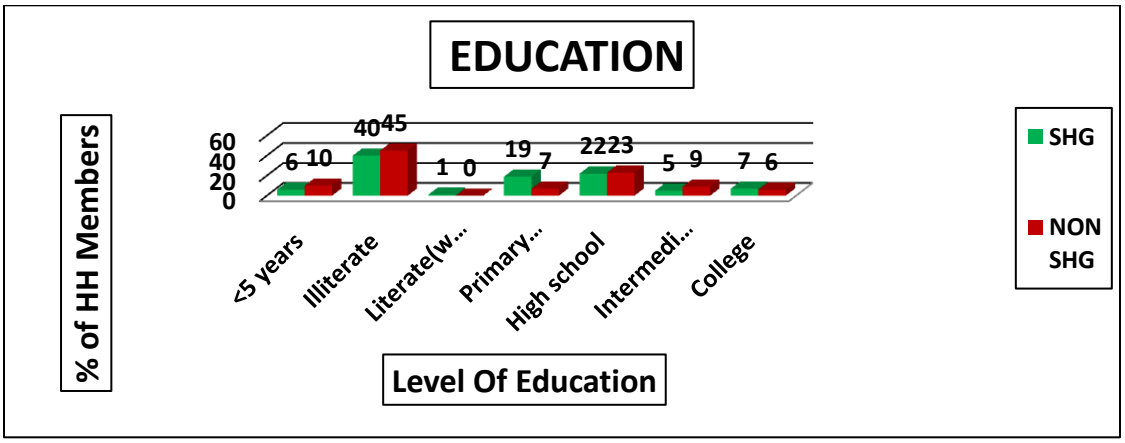

Figure 4.2: Distribution of education of SHG and Non SHG household members.

4.2.2 Technical skills

The skill training obtained by SHG and Non SHG (table 4.2) showed that 96% of SHG and 97% of Non SHG have not undergone any training. Among SHGs 2% had driving skills, 1% had tailoring skills, 1% were mechanics. Among Non SHGs 1% had done polytechnic, another 1% had typing and computer skills and 1% had driving skills.

Table 4.2: Distribution of SHG and Non SHG household members based on education and technical skills

Category	SHG (n=495)		Non SHG (n=98)	
	N	**%**	**N**	**%**
Education				
<5 years	29	6	10	10
Illiterate	200	40	44	45
Literate to sign	7	1	0	0
Primary Education	92	19	7	7
High school	109	22	22	23
Intermediate	27	5	9	9
College	31	7	6	6
Total	**495**	**100**	**98**	**100**
Technical skills				
No training	477	96	95	97
Polytechnic	-	-	1	1
Tailoring	3	1	-	-
Mechanic	3	1	-	-
Typing & Computers	-	-	1	1
Others	11	2	1	1
Total	**495**	**100**	**98**	**100**

4.2.3 Occupation

The population of SHG and Non SHG was categorized into 9 groups of occupation and the details are presented in table 4.3. While 45% of SHG and 42% of Non SHG were unemployed as per age or gender, 19% each of SHG and Non SHG were occupied as agricultural labour, 19% and 18% were involved in cultivation in their own agricultural fields from the respective groups of SHG and Non SHG.

Among SHGs 4% were involved in non-agricultural labor, 4% were either self employed / business holders, 3% were private job holders, 3% were in cattle / sheep rearing, 2% were drivers and 1% were job holders in government sector.

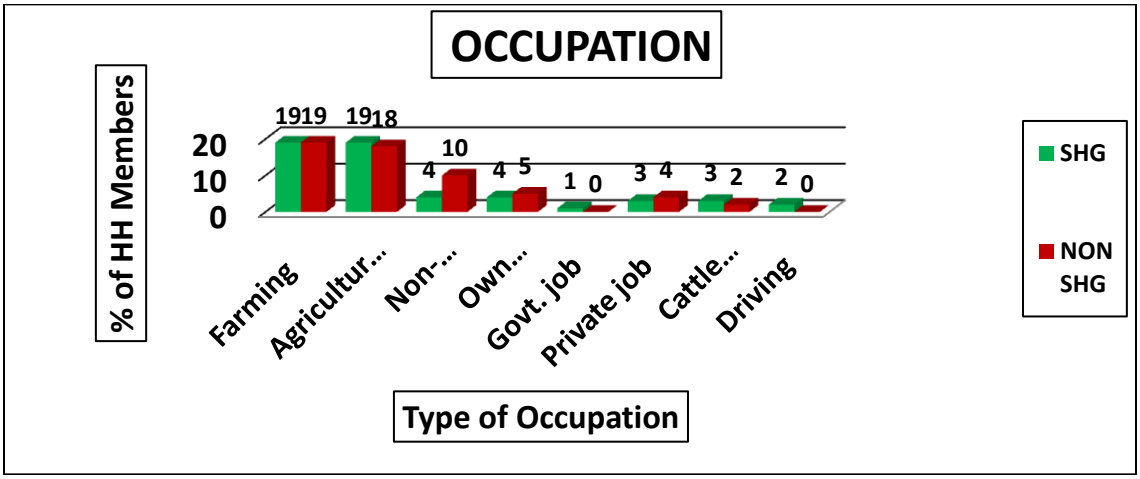

Figure 4.3: Distribution of occupation of SHG and Non SHG household members.

Ten percent of Non SHGs were involved in non-agricultural labor, 5% were self employed/ business holders, 4% were private job holders and the rest of 2% took up cattle/ sheep rearing as their occupation.

4.2.4 Income

Based on the annual income, the households were grouped into three categories of income and the distribution of SHG and Non SHG is given in table 4.3.

Nearly 34% of SHG and 43% Non SHG belonged to low income group with an income of Rs.20,000/- to Rs.60,000/- per annum. While 27% each of SHG and Non SHG were in middle income category with Rs.60,000 to Rs.1,00,000/-, 39% of SHG and 30% of Non SHGs were in high income category with earnings ≥Rs.1,00,000/-.

Table 4.3 Occupation and income status SHG and Non SHG Households

Description	SHG Houses(n=120)		Non-SHG Houses (n=30)	
	N	%	N	%
Household annual income				
Rs.20,000-60,000/-	41	34	13	43
Rs.60,000-1,00,000/-	32	27	8	27

≥Rs.1,00,000/-	47	39	9	30
Total	**120**	**100**	**30**	**100**
Occupation				
Farming	92	19	18	19
Agricultural labor	95	19	18	18
Non-Agricultural labor	22	4	10	10
Own business / Self Employment	21	4	5	5
Govt. job	4	1	0	0
Private job	13	3	4	4
Cattle rearing	13	3	2	2
Driving	8	2	0	0
No occupation	227	46	41	42
Total	**495**	**100**	**98**	**100**

4.2.5 Housing conditions

The housing conditions and facilities of the households are given in table 4.4. Majority of the SHGs were in own house (99%) and 1% stayed in rented house. In SHGs, 65% had minimum facilities like drinking water, toilet and drainage, 35% households had good ventilation and sanitation conditions.

Among Non SHG respondents 97% stayed in own house and 3% in rented house. In Non SHGs, 60% had minimum facilities like drinking water, toilet and drainage, 40% households had good ventilation and sanitation conditions.

4.2.6 Ownership of assets

The assets owned by the respondents were divided as movable and immovable category given in table 4.4

Among SHG majority of them 98% are owns a house followed by 88% of them owns land and 9% of them owns shop as a small enterprise in the village. Among movable assets ownership 23% own two wheeler and among electronic goods 72% own TV , 9% own refrigerators and 3% of them had other appliances like coolers, electric cooker. Livestock of 12% poultry and 13% sheep/goats was adding additional income to the SHG households.

In the Non-SHGs, all the households own a house (100%), 80% of them own land and 7% own a shop. Movable assets owned by Non SHG households include two wheelers in 7%. while 53% own TV, 7% own refrigerators and 7% rear poultry and 3% sheep/goats which was adding income.

4.2.7 Bank transactions

Bank transactions like fixed deposits, savings, loans and insurance are given in table 4.4.

Among SHG households 1% had savings account, 4% had fixed deposits, 47% of them took loans specifically on land and 43% had insurance. Similarly in Non SHGs 3% had savings account, 33% of them took loans specifically on land and 47 % had insurance.

Table 4.4 Housing, movable and immovable assets and facilities of SHG and Non SHG households

Description	SHG Houses		Non-SHG Houses	
	N	%	N	%
Housing conditions				
Type of House				
Own	119	99	29	97
Rented	1	1	1	3
Total	120	100	30	100
Housing facilities				
House with all facilities	42	35	12	40
House with minimum facilities	78	65	18	60
Total	120	100	30	100
Ownership of assets				
Owner ship of immovable assets				
House	118	98	30	100
Land	105	88	24	80
Shop	11	9	2	7
Ownership of movable assets				
Two Wheeler	27	23	2	7
Television	86	72	16	53
Refrigerators	11	9	2	7
Other Household Appliances	3	3	0	0
Poultry	14	12	2	7
Sheep/goats	16	13	1	3
Bank Transactions				
Deposit - Savings Bank	1	1	1	3
Fixed Deposit	5	4	0	0
Loans	56	47	10	33
Insurance	52	43	14	47

4.2.8 Expenditure

Expenditure on food, children's education , clothing and health was given in table 4.5

For food 30% of the households were spent 10,000 to 30,000/- among SHGs where as 40% for Non SHGs followed by 66% of SHGs and 50% Non SHGs households were spent 30,000/- to 60,000/- and 4% SHGs and 10% Non SHG households spent above 60,000/- annually.

Similarly on children's education 79% of the SHG and 77% Non SHGs spent below 5,00/- , 13% households of SHGs and 10% Non SHGs were spent 5,00 to 10,000/- and 8% of the SHG and 13 % Non SHG households spent above 10,000 /- for year. clot Seventy six percent SHG and 80% Non SHGs households spent 1,000 to 5,000 /-, 22% of the SHG and 17 % Non SHG households spent 5,000 to 10,000/- and 2% of the SHG households and 3% Non SHGs were spent above 10,000/-,

While 92% of SHG and 87% Non SHG households were spent 1,000/- to 5,000/- on health similarly 7% and 10% of SHG and Non SHG households were spent 5,000 to 10,000/- and 1% and 3% of SHG and Non SHGs were spent above 1,00,000/- for health care facilities annually.

Increased levels of employment and income of SHG households are expected to raise their expenditure on various items. The level and growth rate of annual household expenditure on food and non-food items are reported by several authors. While the expenditure on food included cereals, pulses, edible oils, vegetables, milk, and milk products, meat and fish, sugar, gur, and other items, the expenditure on non-food included clothing, footwear, consumer durables, pan, beedi & cigarettes, intoxicants, ceremonies, newspaper, travel and also on education and health (Ghosh 2012).

The data indicated Non SHG households were spent high income on food than the Non SHG where as expenditure on health was high for the SHG than the Non SHG. The expenditure pattern for clothing and children's education were same for the SHG and Non SHG households.

Table 4.5 Expenditure pattern of SHG and Non SHG households

Description	**SHG Households (n=120)**		**Non-SHG Households (n=30)**	
	N	**%**	**N**	**%**
Expenditure on food (Yearly)				
10,000-30,000(Rs.)	36	30	12	40
30,000-60,000(Rs.)	79	66	15	50

60,000 and above(Rs.)	5	4	3	10
Total	**120**	**100**	**30**	**100**
Expenditure on education(Yearly)				
0-500(Rs.)	95	79	23	77
500-10000(Rs.)	15	13	3	10
Above 10000(Rs.)	10	8	4	13
Total	**120**	**100**	**30**	**100**
Expenditure on clothing(Yearly)				
1000-5000(Rs.)	91	76	24	80
5000-10000(Rs.)	26	22	5	17
Above 10000(Rs.)	3	2	1	3
Total	**120**	**100**	**30**	**100**
Expenditure on health(Yearly)				
1000-5000(Rs.)	111	92	26	87
5000-10000(Rs)	8	7	3	10
Above 10000(Rs.)	1	1	1	3
Total	**120**	**100**	**30**	**100**

Anuppalle and Reddy (2008) observed the improvement in health conditions of the rural women after joining in the SHGs was more in India in particular at Andhra Pradesh compared to the other countries like Africa and Indonesia. The results were partially correlated with the results of Swamy V and Tulasimala BK(2013) reported that the mean family non-food expenses have increased from Rs. 3596 in pre-SHG situation to Rs. 6228 after SHG impact, registered an improvement to the extent of 73.24%.

The results of the t-test showed that there is a significant ($P< 0.05$) difference between income of the SHG and Non SHG households. Which also shows the increased socio-economic conditions of the SHG households. But for the expenditure patterns there was no significant difference which shows increased income not utilized for the expenditure on food also a reason for the no difference between the food and nutrient intake of the both the households in further analysis

Table 4.6 T-test results for income and expenditures of SHG and Non SHG households

Attributes	SHG(n=120)	NONSHG(n=30)	P value
	Mean±SD	Mean±SD	
Income	106352.5±78886.81	82480±59973.09	0.03*
Expenditure on food	39283.3±14337.58	38120±18028.07	0.37^{NS}
Expenditure on clothing	5062.5±4932.98	5166.667±8642.65	0.47^{NS}
Expenditure on Education	4228.3±13417.57	6520±21205.44	0.28^{NS}
Expenditure on Health	4048.3±2767.39	4266.66±3628.74	0.37^{NS}

Significant Level-- P-value-P<0.01 *- Significant at 5% level $^{NS-}$ Non-significant

.

The nutritional status of adult men and women was significantly associated with the religion, community, type of house, type of family, occupation of the head of the household, literacy status, monthly per capita income, land holding, electrification, source of drinking water, sanitary latrine, type of cooking fuel, morbidity and family size. The prevalence of overweight/obesity was significantly high among the pucca house residents, joint families or extended nuclear families, higher monthly per capita income, engaged in business and service, land lords, large farmers, presence of electricity, sanitary latrines and HHs using LPG for cooking purposes (NNMB, 2012).

4.2.9 Loan utilization

Loan utilization pattern was shown in Fig.4.4

The highest per cent of members are utilized the loan amounts for domestic purpose followed by for the purpose of agriculture, education of the children and brought gold/silver.

Very few per cent was spent on income generating activities(4%) and asset creation(8%).

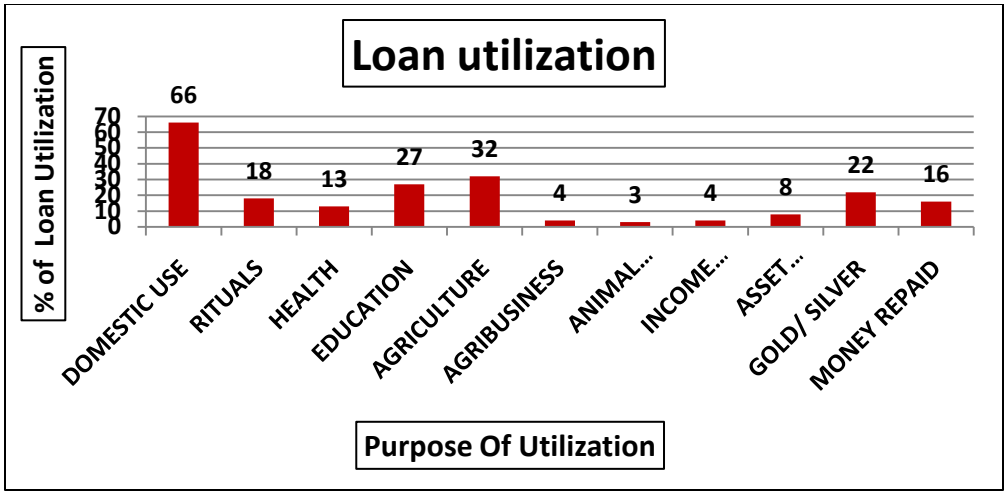

Figure 4.4: Loan utilization by SHG members.

4.3 Assessment Of Nutritional Status Of SHG And Non SHG Households

Nutritional assessment is the interpretation of information obtained from anthropometric, biochemical , clinical and dietary methods and determine whether the individual is well nourished or undernourished. Consequence of inadequate intakes of food for long periods of time, or as a result of seasonal fluctuations in intakes of food (UNICEF, 1998) could be visualized through these measurable criteria.

In the present study nutritional status of the SHG and Non SHG households was assessed through anthropometry, clinical and dietary methods and the results are presented under the respective headings.

4.3.1 Anthropometry Assessment of SHG and Non SHG households

Nutritional anthropometry is referred by Jelliffe (1966) as "measurements of the variations of the physical dimensions and the gross composition of the human body at different age levels and degrees of nutrition ".Anthropometric measurements are of two types, growth and body composition, and have been widely used for the assessment of the nutritional status of population.

Nutritional status of SHG and Non SHG households was assessed by measuring height and weight of all family members and mid upper arm circumference of children. Anthropometric measurements of children are compared with the age specific norms as per IAP(2006), NCHS ,

WHO(2007) and FAO(1993) reference tables. Adult weight for height and body mass index are compared against and WHO cut off values.

4.3.1.1 Anthropometric Assessment of Children

The height and weight of children were compared with the NCHS standards (Appendices B). The table shows the mean height and weight of children were low when compared with the reference values of NCHS. Among boys 73% and in girls 87% were lower than the reference height for their age. About 27% among boys and in girls 13% of them were up to the standard. This shows stunted growth among children , it is observed more among the girls than boys.

Weight also compared with NCHS standards showed among boys 78% and in girls 90% were lower than the reference value and 22% in boys and 10% in girls were up to the standard value. The weight is a good indicator of healthiness but the children are showing very low for their reference weight for age specifically girls are in worst situation it may be due to prolonged under nutrition, heredity , environmental factors , lack of mother's care and maternal nutrition.

Among NONSHG children height of the boy shows 86% and girls 57% of them are lower than the standard height for the age. 14% of the boys and 43% of girls are up to the standards. Boys are more stunted than the girls of NONSHG household.

Weight of the children shows among boys 86% are lower and 14% are up to the standard among girls 71% lower and 29% are up to the standards of NCHS. It is noticed boys are more under weight than the girls when compared with the standards.

The height ranged between 123 and 162 cm with a mean of 146.19 cm. Weight of the adolescent girls were somewhat similar to those of height which fell below the NCHS standard values (Kumar et al.2006).

The physical growth of infants and children has long been recognized as an important indicator of health and wellness. Growth charts have been used for a century to assess whether a child is receiving adequate nutrition and for screening potentially inadequate growth might be indicative of adverse health conditions (WHO,2010).

4.3.1.2 Height/age, Weight/age and BMI/ age of Children according to WHO Percentiles

Children of all SHG and Non-SHG households were measured for height, weight and BMI and each individual’s measurements were compared with standard reference of WHO

(2007) percentile classification. The distribution of children in different groups is given table 4.6 (Figure 4.5).

4.3.1.2.1 Height/age

The height for age classification in percentiles indicated that 32 and 42% of boys and girls respectively, making a total of 37% in SHG and 43 and 29% of boys and girls of Non-SHG i.e., a total of 38% were found to be in <3 percentile group, indicating that most children were stunted in both the groups. A moderate percent of children, 28% boys and 48% girls, totally 32% in SHG and 36% boys and 13% girls, totally 29% in Non-SHG were found to be in a low degree of height / age, falling in mild stunted category of 3-15 percentile. While 31 and 13% of boys and girls respectively in SHG, with a total of 23% and 14 and 29% of boys and girls respectively in Non-SHG, forming a total of 19% were found to be in optimal height/age category, between 15-85 percentile. Just a small percentage of SHG (1%) children were found to have a higher body stature for age (85-95 percentile) which indicates the healthy growth and 8% boys and girls 5% together forming a total of 7% and 7% boys and 29% girls contributes to 14% among SHG and Non SHG children are relatively higher in height when compared to their age specific norms.

Thirty seven to 38 % of children below 18 years were stunted with low height/age (<3 percentiles) in both SHG and Non- SHG, while a quarter of children were also mildly stunted (3-15 percentiles) in both the groups, and an average of 21% of each of SHG and Non-SHG children were in a healthy height/ age percentile category of 15-85. A greater percent of girls in SHG were observed with mild to severe stunting more than boys.

Greater percentage of children falling under mild to severe stunting in both SHG and Non-SHG indicate that the children were not receiving adequate food, mostly diets were limiting in protein and there was a long duration mild to moderate malnutrition with intermittent morbidity. Self help grouping does not seem to have had any positive influence on child's nutritional status as measured by height/age. Relatively Non SHG children was less which contributed to a higher percentage when compared to SHG children.

The prevalence of underweight and stunting was significantly higher among children belonging to nuclear families, living in kutcha house, lower per capita income , among children whose fathers were engaged in labor work, among children of illiterate parents, HHs not having electricity, not having sanitary latrines and using firewood for cooking purposes (NNMB, 2012).

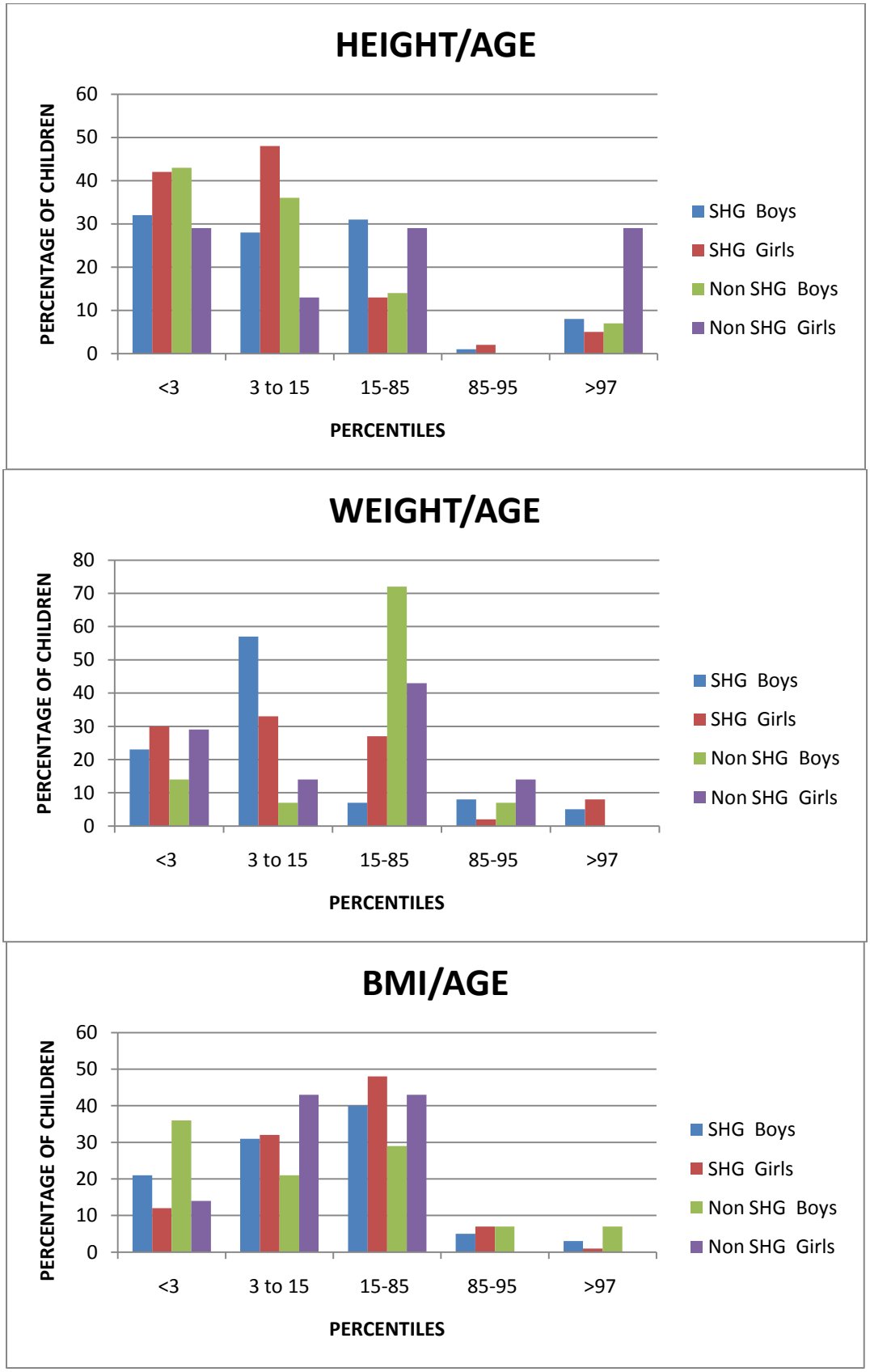

Figure 4.5: Distribution of Height/age, weight/age and BMI/age of SHG and Non SHG Children

4.3.1.2.2 Weight/age

Weight for age classification of girls and boys of SHG and Non SHG children was given in table 4.7

The data showed that 26 % of SHG, with 23 and 30% of boys and girls respectively and 19% of Non SHG with 14 and 29% of boys and girls respectively were severely malnourished, falling under <3 percentiles. About 50% of SHG and Non-SHG children, 57% boys and 33% girls in SHG and 7% boys and 14% girls in Non-SHG were in the 3-15 percentile group indicating slight to moderate risk of malnutrition. Fifteen percent of SHG children with 7% boys and 27% of girls and 61% of Non-SHG children with 72% boys and 43% girls were in the 15-85 percentile category indicating a healthy weight for age followed by 7% SHG children with 8 and 2% of boys and girls among Non SHG 10% with 7% of boys and 14% girls were in the relatively overweight category. About 7% SHG children with 5 and 8% of boys and girls were under obese category it is >97.

Similar to height/age, about 15% to 36 % each of SHG and Non-SHG children of both the groups being in low weight for age category, indicating a mild to severe degree of malnutrition. Among SHG boys malnutrition prevalence was observed more while among Non SHG girls it is observed more. Poor environmental factors and low socio-economic status and inadequate nutrition of the child are responsible for low anthropometric measurements than the standards (Shashi Singh and Indira Bishnoi, 2005).

Table 4.7 Distribution of children of SHG and Non SHG households in height / age , weight/ age and BMI /age percentile classification of WHO,2007.

Percentiles	SHG Children(n=137)			Non SHG Children(n=21)		
	WHO Classification					
	Height / age classification in percentiles					
	Boys	**Girls**	**Total**	**Boys**	**Girls**	**Total**
<3	32(25)	42(25)	37(50)	43 (6)	29 (2)	38(8)
3-15	28(21)	48(23)	32(44)	36 (5)	13(1)	29(6)
15-85	31(24)	13(8)	23(32)	14(2)	29(2)	19(4)
85-95	1(1)	2(1)	1(2)	-	-	-
>97	8(6)	5(3)	7(9)	7(1)	29(2)	14(3)
Total	**100(77)**	**100(60)**	**100(137)**	**100(14)**	**100(7)**	**100(21)**
	Weight/age classification in percentiles					
<3	23(18)	30(18)	26(36)	14(2)	29(2)	19(4)
3-15	57(44)	33(20)	47(64)	7(1)	14(1)	10(2)
15-85	7(5)	27(16)	15(21)	72(10)	43(3)	61(13)
85-95	8(6)	2(1)	5(7)	7(1)	14(1)	10(2)
>97	5(4)	8(5)	7(9)	-	-	
Total	**100(77)**	**100(60)**	**100(137)**	**100(14)**	**100(7)**	**100(21)**
	BMI/ age classification in percentiles					
<3	21(16)	12(7)	17(23)	36(5)	14(1)	29(6)
3-15	31(24)	32(19)	31(43)	21(3)	43(3)	29(6)
15-85	40(31)	48(29)	44(60)	29(4)	43(3)	32(7)
85-95	5(4)	7(4)	6(8)	7(1)	-	5(1)
>97	3(2)	1(1)	2(3)	7(1)	-	5(1)
Total	**100(77)**	**100(60)**	**100(137)**	**100(14)**	**100(7)**	**100(21)**

Figures in the parenthesis indicate number of children

The National Family Health Survey (NFHS-II) in India reported the prevalence of underweight among children younger than 3 years in 2005–2006 to be nearly 46%, a figure representing only a marginal decline from the rates recorded in 1992–1993 (51%) and 1998–1999 (47%).

4.3.1.2.3 Body Mass Index/age

The BMI for age classification in percentiles indicated that 21 and 12% of boys and girls respectively, making a total of 17% in SHG and 36 and 14% of boys and girls of Non-SHG together a total of 29% were found to be in <3 percentile group, indicating that the children were severely undernourished in both the groups. A moderate percent of children, 31% boys and 32% girls, totally 31% in SHG and 21% boys and 43% girls, totally 29% in Non-SHG were found to be falling in mild underweight category of 3-15 percentile. While 40 and 48% of boys and girls respectively in SHG, with a total of 44% and 29 and 43% of boys and girls respectively in Non-SHG, forming a total of 32% were found to be in optimal weight/height category, between 15-85 percentile which indicates the healthy weight. Six percentage of SHG children with 5% boys and 7% girls and 1% boys among Non SHG found to at risk for overweight followed by 3 and 1% of boys and girls of SHG household, 1% of Non SHG boys were obese when compared to BMI for age.

Thirty seven to 23% of children below 18 years were severely underweight (<3 percentiles) in both SHG and Non SHG, while a 30% of children were also mildly underweight (3-15 percentiles) in both the groups, and an average of 38% of each of SHG and Non SHG children were in a healthy weight percentile category of 15-85. An equal percent of boys and girls in Non SHG were observed with mild to severe underweight than the SHG children.

Greater percentage of children falling under mild to severe underweight in both SHG and Non SHG indicate that the children were not receiving adequate food, mostly diets were limiting in protein specially from milk and there was a long duration mild to moderate undernutrition with intermittent morbidity. Self help grouping does not seem to have had any positive influence on child's nutritional status as measured by BMI. Relatively Non SHG children was less which contributed to a higher percentage when compared to SHG children.

Study conducted in an urban slum of Varanasi depicted that 70 per cent of the adolescent girls had BMI < 20 , 51.43 percent of the study subjects were suffering from

chronic energy deficiency (CED) while stunting was present in 10 percent of the adolescent girls (Singh and Mishra 2001).

4.3.1.3 Mid Upper Arm Circumference of Children between 1- 5 years

The mid upper arm circumference (MUAC) of children below years was compared with the FAO, 1993 reference standards. The cut off points for MUAC suggested for children between 12-60 months are '>13.5cm-Normal', '12.5 to 13.5cm-moderate wasting' and '<12.5cm-severe wasting' categories. Children falling in the three cut-off levels of MUAC are given in table 4.8.

Measurement of the circumference of the mid-upper arm has been proven to be a useful and practical means of assessing protein calorie deficiency of early child hood (Jelliffe *et al.*,1962).

Table 4.8 Distribution of 12- 60 months old children of SHG and Non SHG in MUAC categories (FAO, 1993a)

MUAC Cut-off levels	SHG (n=24)						Non-SHG (n=8)					
	Boys		Girls		Total		Boys		Girls		Total	
	N	%	N	%	N	%	N	%	N	%	N	%
>13.5cm (Normal)	10	91	9	70	19	79	2	50	3	75	5	63
12.5-13.5cm(Moderate wasting)	1	9	2	15	3	13	1	25	1	25	2	25
<12.5cm(Severe wasting)	-	-	2	15	2	8	1	25	-	-	1	12
Total	**11**	**100**	**13**	**100**	**24**	**100**	**4**	**100**	**4**	**100**	**8**	**100**

Nineteen children of 12-60 months out of 24 of SHG and 5 out 8 of Non-SHG were in 'Normal MUAC' category. While 3 children in SHG and 2 in Non-SHG were in 'Moderate wasting' category and 2 in SHG and 1 in Non-SHG were in 'Severe Muscle Wasting' category. Mild to moderate degree of protein energy deficiency, probably due to faulty food habits during infancy and early childhood could be assumed to be the reasons for this condition.

4.3.2 Height, Weight and Body Mass Index of Adults

The mean height, weight and body mass index of adults of the SHG and Non-SHG are given in table 4.9.

Table 4.9 Height, weight and BMI among adults of SHG and Non SHG households

Details	SHG(n=301)		Non SHG(n=60)	
	Men(n=149)	Female(n=152)	Men(n=28)	Female(n=32)
Age(years)	42.95 ± 16.43	41.02 ±14.21	45.55 ± 16.06	46.56 ± 17.96
Height(cm)	160.78 ± 14.55	151.33 ±6.13	163.09 ± 5.84	149.95 ± 6.39
Weight(Kgs)	55.89 ± 11.98	49.76 ±10.08	58.01 ± 13.85	50.37 ± 10.32
BMI(kg/m²)	21.41 ± 3.55	21.68 ± 4.01	21.68 ± 4.26	22.38 ± 4.15

The mean height of men of SHG was 161±15 cm and that of men of Non SHG was 163±6 cm and mean height of women was 151±6cm and 150±6cm among SHG and Non SHG respectively without much difference between the groups. The mean weight of men was 56±12kgs and 58±14 kgs and that of a women was 50±10kgs and 50±10kgs in the groups of SHG and Non SHG respectively without much difference between the groups. The mean BMI (kg/m²) was 21.41±3.45 and 21.68±4.26 among men and 21.68±4.01 and 22.38±4.15 in women from SHG and Non SHGs respectively without much difference between SHG and Non SHG adults. The mean BMI of both men and women in both groups indicate that men and women were in normal healthy category.

The results were consistent with the results that of NNMB (2012)mean weight and height of adult men 54.6kg ±10.65 and 163.7cm ±6.65 and 47.3kg ±10.2 and 151.0cm ±6.07 for adult women and mean BMI 20.3kg/m2±3.47 for men and 20.7kg/m2 ±4.09 for women.

Men and women of the SHG and Non SHG were compared for desirable weights for their heights with NCHS reference tables. The results showed that among men of SHG 48% were normal, 37% were lower than the desirable weight and 15% were either

overweight/ obese. Among women of SHG 50% were normal, 40% were underweight and 16% of them were overweight for their height.

Among Non SHG 43% men and 44% women were in the desirable range of weight for height, while 33% of men and 26% women were underweight and 24% of men and 30% of women were overweight.

From the results it was clear that nearly 50% of men and women of SHG were in the desirable range, the incidence of underweight was more in SHG compared to Non SHG. Relatively a high percent of men and women of Non SHG were found to be overweight compared to SHG suggesting differences in energy consumption and expenditure pattern and also difference in type and quantity of energy nutrients.

Men and women of SHG and Non SHG households were distributed in BMI cut off levels of WHO and are given in table 4.10. BMI below 18.5 was considered underweight, BMI between 18.5- 23.0 as normal, between 23-27 as overweight and > 27 as obese. BMI reflects the positive association between height and weight (Khan et al. 2004).

Table 4.10 Distribution of SHG and Non SHG adults according to BMI classification

BMI (kg/m²)	SHG						NONSHG					
	Male (n=148)		Female (n=152)		Total	%	Male (n=28)		Female (n=31)		Total	%
	N	%	N	%			N	%	N	%		
Underweight (<18.5)	35	24	35	23	70	23	7	25	5	16	12	20
Normal (18.5-23)	92	62	85	56	177	59	15	54	17	55	32	54
Overweight (23-27)	16	11	26	17	42	14	5	18	8	26	13	22
Obese (>27)	5	3	6	4	11	4	1	3	1	3	2	4

About 23% of SHG (24% men and 23% of women) and 20% of Non SHG (25% men and 16% women) were underweight and 59% of SHG (62% of men and 56% of

women) and 54% of Non SHG (54% men and 55% women) adults were in the normal BMI. Fourteen percent of SHG (11%men and 17% women) and 22% Non SHG (18% men and 26% women) were overweight and 11% SHG (3% men and 4% women) and 4% Non SHG (3% men and 3% women) were obese.

Though a high percent of SHG and Non SHG adults were in the normal BMI range, overweight was found to be high among Non SHG compared to SHG. While the percent of underweight were same among men and women of SHG there was 6% higher incidence of overweight among women of SHG compared to men. Among the Non SHGs the incidence of underweight was more among men and overweight was more among women.

It was observed that nearly 1/4th of SHG and Non SHGs were facing undernutrition and another 1/4th were found to be over nourished indicating a double burden of under and overnutrtion among the SHG and Non SHGs.

Ferro-Luzzi and Sharma (2005) concluded that there is a relationship between BMI and an independently assessed measure of socio-economic status.

4.4 Clinical assessment of SHG and Non SHG households

Clinical examination has always been and remains an important practical method of assessing the nutritional status of a community essentially the method based on examination for changes believed to be related to inadequate nutrition that can be seen on felt in superficial epithelial tissue, especially the skin, eyes, hair and buccal mucosa or in organs near the surface of the body, such as the parotids and thyroid glands, occasionally this may be supplemented in the field (Jelliffe,1966).

Clinical assessment was done for all the members of the households for finding the nutritional deficiencies. Clinical signs and symptoms used as good indicators for identifying macro and micro nutrient deficiencies in additional to the anthropometry and dietary assessment.

The clinical signs and symptoms identified among the members are given in table 4.11.

Among SHG households 0.6 % members are identified with dryness of the skin and followed by 1.01 % members had Conjunctival xerosis and another 0.4 % of the members observed with Corneal xerosis which indicates the vitamin A deficiency. Similarly 0.40% observed with chelosis , another 0.40 % with angular stomatitis and 0.20% with the fissures on tongue which indicates the B-complex vitamins deficiency. Among all the nutrients deficiencies iron deficiency was identified high specifically among elderly, adolescent girls, women and school children. 8.68 % exhibits paleness of inner side of eye lids, 8.02% pale eyes, tongue, lips and face, 0.20% tiredness/lack of energy and 0.20% spoon shaped nails. 0.20 % were mentally retarded which indicates iodine deficiency. About 1.01% had mottled teeth and 0.20 % dental cavities which indicates fluorine deficiency.

Table 4.11 Clinical assessment of SHG and Non SHG Households

S.NO	Clinical symptoms	SHG(n=495)		Non-SHG(n=98)	
		N	%	N	%
1	**Vitamin A**				
	Dryness of skin	3	0.60	1	1.02
	Bitot spots	14	2.82	9	9.18
	Conjunctival xerosis	5	1.01	-	-
	Corneal xerosis	2	0.40	-	-
2	**Riboflavin**				
	Chelosis	2	0.40	2	2.04
	Angular stomatitis	1	0.20	-	-
3	**Niacin**				
	Fissures on tongue	2	0.40	-	-
4	**Iron**				
	Paleness of inner side of eye lids	43	8.68	8	8.16
	Pale eyes, tongue, lips and face.	40	8.08	8	8.16
	Tiredness/lack of energy	1	0.20	-	-
	Spoon shaped nails	1	0.20	-	-
5	**Iodine**				
	Mental retardation	1	0.20	1	1.07
6	**Florosis**				
	Mottled teeth	5	1.01	3	3.06
	Dental cavities	1	0.20	-	-

Similarly 1.02% dryness of the skin, 9.18% with bitot spots, 2.04% chelosis, 8.16% paleness of inner side of eye lids, 8.16% pale eyes, tongue, lips and face, 1.07% mental retardation and 3.06% mottled teeth are identified among Non SHG households members.

It was reported from NNMB (2012) that there was a decline in the prevalence of most of the clinical signs of nutritional deficiency, over the period from 1975-79 to 2011-12. The prevalence of marasmus (1.3% to nil), Bitot's spot (1.8% to 0.2%), angular stomatitis (5.7% to 0.3%) declined over the same period.

4.5 Dietary assessment of SHG and Non SHG households

Dietary assessment is the process of evaluating what people eat by using one or several intake indicators. It is the best approach for identifying nutrients that are likely to either be under-or over consumed by the individual or groups of interest. It also can be used to identify food patterns and preferences.

Dietary assessment was done through food frequency questionnaire, food weighment and dietary diversity to identify the food consumption pattern, food and nutrients intake and food preferences of SHG and Non SHG households.

4.5.1 Food Frequency Questionnaire

The frequency of foods consumed by SHG and Non SHG was obtained through food frequency questionnaire by using options like daily(D), alternative day(AD), twice in a week(TW), once in a week(OW), once in forth night (OF), once in month(OM) and occasionally(OC). The frequency of consumption of food groups for SHG and NONSHG was given in table 4.12

4.5.1.1 Cereal and Millet Intake

The data shows that the rice was the staple food for all the SHG and Non SHG which is consumed every day. Next to rice sorghum consumption was high about 25% of SHG and Non SHG households consumed on alternate days followed by an average of 12% households of SHG and Non SHG was consumed sorghum twice in a week. Consumption of wheat is also high on twice a week basis for both the SHG(54%) and Non SHG (60%) followed by a alternative day consumption was 10% for both groups which is obtained from the Public Distribution System(PDS) of the Government of India. Daily intake of bread or bun noticed from the SHG and Non SHG was 36% and 20% on daily basis followed by 23% and 10% was consumed by both the SHG and Non SHG in a frequency of alternate day and twice in a week. Most of the SHG and Non SHG were take morning bread or bun with tea which is convenient to consume where most of them leave for the agriculture or labor work. Other products like vermicelli, bombay rava and maida was consumed by both groups once in fort night and during the festivals.

Intake of rice products like puffed rice, flakes preparations was not reported since it was not a habit of the particular area.

It is noticed that next to the rice ,sorghum and wheat consumption was high for the SHG and Non SHG households. Since there is no breakfast intake other products of cereals and millets was reported very less from the SHG and Non SHG. Almost the similar frequencies and the intake of cereals and millets was noticed from the SHG and Non SHG households was the influence residence of the geographic area , cropping pattern and availability from food sources forms the background.

4.5.1.2 Pulse / Legume intake

Pulses contributes to most of the protein requirement. The intake of red gram was noticed from the SHG households 38% and 53% was consuming on alternate day and twice in a week where as for Non SHG household it is noticed as once in a week and once in fort night. This difference was due to red gram was obtained through PDS for SHG in case of

Non SHG households it is not accessed because they are relatively little high income who can afford from retail basis. The intake of was noticed 23% in frequency of alternate day and twice in a week for Non SHG and for SHG it was high in a frequency of once in fort night and once in week. Bengal gram was consumed high on a frequency of occasional basis by SHG where as for Non SHG it is noticed once in fort night followed by black gram was consumed by both groups on a occasional basis.

The overall consumption of red gram was high for SHG and green gram was high for Non SHG households. Consumption of pulses was little higher for SHG than the Non SHG households.

4.5.1.3 Fats and Oils Intake

The data shows groundnut oil intake was 44% and 43% every day for SHG and Non SHG where as intake of palm oil was 50% and 40% and for sunflower 6% and 17% respectively.

A high intake of palm oil and groundnut oil was noticed for SHG and Non SHG households. Sunflower oil was used by SHG once in a week and 17% was used every day by Non SHG households.

4.5.1.4 Vegetable- A Intake

Among green leafy vegetables gogu consumption was 23% and 10% twice in a week for both SHG and Non SHG households followed by 16% to 29% and 20% to 30% among SHG and Non SHG households consumed once in a week, fort night and month. Next to gogu, amaranth consumption was 43% among both the households in a frequency of once in a week followed by 16-20% and 10-23% consumption was noticed for SHG and Non SHG households in a frequency of once in fort night and once in month. Spinach was consumed 55% and 40 % for SHG and Non SHG households once in a fort night. Cabbage intake was 7-10% for both the groups. Fenugreek, coriander, curry leaves was more frequent but less quantity consumption noticed.

Daily consumption of the both the groups was low but the consumption of gogu was high on a weekly twice basis because it is grown in the fields of the respondents. Amaranth and spinach was consumed mostly on a weekly basis because respondents attend a weekly market nearby mandals Devarakadra for Dokur and Amangal for Aurepalle.

4.5.1.5 Vegetable -B Intake

Among the other vegetables the most frequently consumed vegetables are tomato, brinjal on a daily basis by SHG and Non SHG households. all the gourds like bitter gourd, bottle gourd, ridge gourd and snake gourd was consumed by both the SHG and Non SHG households on an average of 50-60% in a frequency of once in a week. Cluster beans ladies finger , kovai and cucumber were consumed on a weekly basis.

Most of the vegetables are consumed on a twice in a week and once in a week by both groups gourds, tomato and brinjal intake was high for SHG and Non SHG households.

4.5.1.6 Fruits Intake

Most of the fruits was consumed with a frequency of once in a month or occasionally by SHG and Non SHG households. Among all the fruits banana , grape and guava consumed an average of 30-40% on a weekly basis. The other fruits like papaya, sweet lemon and water melon were consumed with a frequency of once in fort night and once in a month. Sapota, custard apple and pomegranate was consumed occasionally.

Consumption of banana, grape was noticed once in a week of 30-35% but the fruit consumption was less for both groups it is due to low availability, lack of awareness on micronutrients provided by fruits and low affordability.

4.5.1.7 Milk and Milk Products Intake

Cow milk was consumed 8% and 7% for SHG and Non SHG households. A high frequency of consumption was noticed for buffalo milk as 67% and 70% for SHG and Non SHG households every day. Twenty six percent and 30% of curd intake noticed from SHG

and Non SHG households. Buttermilk also used by 3-6 % on a daily basis for both the groups.

Skimmed milk powder intake also noticed 4% and 3% among SHG and Non SHG households. The frequency of buffalo and cow milk was more for both the groups.

It is observed that even though the frequency noticed milk was used to make the tea for onetime daily by both groups and most of the milk was sold to the milk collection centers was practiced in both the villages. Even though milk was said to be reference food which contains most of the nutrients. This situation also links with underweight and stunted growth of the children of school age.

4.5.1.8 Meat and Meat Products

Among meat and meat products egg consumption was 63% and 47% for SHG and Non SHG households twice in a week which is less expensive when compared to the other vegetables. Next to egg, chicken was consumed once in a week frequency of 69% and 60% by SHG and Non SHG respectively. Sheep/ goat meat was taken with a frequency of once in fort night by 63% and 47% for SHG and Non SHG households. Prawns intake was occasional with a percent of 28 and 33 was consumed by both the SHG and Non SHG households.

The intake of meat and meat products was high with a frequency of once in a week for SHG and Non SHG households.

4.5.1.9 Sugars Intake

Sugar intake of the SHG and Non SHG was 97% every day. Jaggery was occasionally consumed by SHG and Non SHG households as 93% and 90%. Honey also consumed occasionally 17% and 7% by SHG and Non SHG households. The sugars intake was noticed similar to both SHG and Non SHG households.

Table 4.12 Frequency of Food Groups Consumption By SHG And Non SHG Households

S. No	Food Items	SHG(n=120)							Non SHG (n=30)						
		D %	AD %	TW %	OW %	OF %	OM %	OC %	D %	AD %	TW %	OW %	OF %	OM %	OC %
	CEREALS														
1	Rice	100	-	-	-	-	-	-	100	-	-	-	-	-	-
2	Sorghum	7	28	14	4	-	1	8	10	23	10	7	10	-	7
3	Wheat	4	17	54	18	3	-	2	7	3	60	20	7	-	-
4	Bread	36	23	10	16	1	-	2	-	-	-	-	-	-	-
5	Bun	-	-	-	-	3		21	20	23	10	23	3	-	-
6	Vermicelli	1	-	-	1	5	8	54	-	-	-	-	3	-	27
7	Bombay rava	-	1	-	11	69	2	8	-	-	-	-	3	7	67
8	Maida	-	-	-	1	2	2	45	-	-	3	10	63	13	
	PULSES														
1	Red gram	2	38	53	4	-	-	-	-	-	3	10	37	-	-
2	Green gram		3	4	17	54	4	13	-	23	23	3	36	7	-
3	Bengal gram	-	-	-	8	3	16	62	-	-	7	13	30	-	20
4	Black gram	-	-	1	5	6	2	53	-	-	-	3	-	3	53
	FATS AND OILS														
1	Groundnut oil	44	1	-	3	2	-	4	43	3	-	-	3	-	7
2	Palm oil / Dalda	50	1	1	-	15	3	23	40	-	-	3	10	10	33
3	Sunflower oil	6	7	-	11	5	-	5	17	-	3	-	7	-	-
	VEGETABLE-A														
1	Amaranth	-	-	-	43	20	16	18	-	-	-	43	10	23	17
2	Spinach	-	-	2	12	55	26	3	-	-	-	20	40	27	10
3	Gogu	-	3	23	29	28	16	3	-	3	10	20	30	20	3
4	Mint	-	-	-	4	4	-	1	-	-	-	3	7	-	3
5	Coriander	3	-	4	28	13	3	10	7	3	-	23	20	3	10
6	Curry leaves	77	11	1	3	1	-	3	70	7	7	-	3	-	3

7	Cabbage	-	5	-	1	2	1	10	3	3	-	3	3	-	7
8	Fenugreek leaves	1	1	1	12	60	15	1	-	-	-	7	40	20	3
9	Drumstick leaves	-	-	-	3	1	-	1	-	-	-	-	3	3	-
	VEGETABLE-B														
1	Bitter gourd	-	-		13	17	13	37	-	-	-	10	13	10	37
2	Bottle gourd	-	-	2	50	16	19	2	-	-	-	53	3	10	10
3	Ridge gourd	-	-	1	78	15	4	1	-	-	-	83	10	3	
4	Snake gourd	-	-		7	6	4	45	-	-	-	10	3	16	23
5	Cluster beans	-	-	4	75	4	-	3	-	-	7	70	3	-	-
6	Cucumber	-	2	36	16	2	-	1	-	3	37	13	-	-	-
7	Tomato	-	25	47	21	3	-	-	23	60	13	-	-	-	-
8	Brinjal	1	6	18	74	-	-	-		13	17	70	-	-	-
9	Chillies	9	3	10	48	13	1	2	7	3	7	47	7		7
10	Kovai	3	1	3	82	3	-	-	-	-	-	70	3		3
11	Ladies finger	-	-	1	70	2	-	-	-	-	-	60	-	-	-
12	Drumstick	-	-	1	3	1	-	-	-	-	-		-	-	-
13	Green mango	-	-	1	3	-	-	-	-	-	-	3	-	-	-
	FRUITS														
1	Guava	-	-	-	3	3	1	43	-	-	-	3	3		50
2	Banana	1	2	6	44	33	7	7	-	-	13	33	37	10	3
3	Grape	-	1	3	18	38	27	7	-	-	7	10	37	30	10
4	Papaya	-	-	-	2	4	3	23	-	-	-	3	17		13
5	Apple	-	-	1	1	3	3	28	-	-	3	-	7	10	13
6	Orange	-	-	-	-	-	1	33	-	-	-	3	-	-	23
7	Pomegranate	1		-	-	-	-	5	-	-	-	-	-	-	7
8	Mango	-	-	-	-	-	-	1	-	-	-	-	-	-	-
9	Sweet lemon	3	-	1	3	3	4	47	-	-	-	-	7	10	33
10	Water melon	1	-	-	3	23	9	25	-	-	-	-	13		43
11	Custard apple	-	-	-	-	-	-	4	-	-	-	-	-	-	7
12	Sapota	-	-	-	-	-	-	3	-	-	-	-	-	-	3
	MILK AND														

	MILK PRODUCTS														
1	Cow milk	8	-	-	-	-	-	-	7	-	-	3	3	-	-
2	Buffalo milk	67	-	-	3	1	-	1	70	-	-	-	3	-	-
3	Curd	26	7	4	3	5	1	4	30	-	-	3	3		10
4	Butter milk	6	-	-	1	2	-	3	-	3	-	-	-	-	-
5	Khoa		-	-	-	-	-	3	-	-	-	-	-	-	-
6	Skimmed milk powder	4	-	-	-	-	-	2	3	-	-	3	-	-	-
	MEAT AND MEAT PRODUCTS														
1	Chicken/ bird meat	-	-	3	69	21	-	-	-	-	7	60	27	-	-
2	Sheep/Goat meat	-	-	-	16	63	17	3	-	-	-	20	47	20	7
3	Beef	-	-	-	3	-	1	-	-	-	-	-	3	-	-
4	Pork	-	-	-	-	1	-	1	-	-	-	-	-	-	3
5	Fresh Fish	-	-	1	1	-	3	51	-	-	-	-	7	-	50
6	Dry fish	-	1	-	-	1	1	4	-	-	-	-	-	3	3
7	Egg	1	5	63	24	-	-	-	3	10	47	33	-	-	-
8	Prawns	-	1	4	3	1	28	-	-	-	3	-	-	-	33
9	Crabs	-	-	-	-	-	2	-	-	-	-	-		-	3
	SUGARS	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1	Sugar	97	-	-	2	-	-	-	97	-	-	-	-	-	3
2	Honey	-	-	-	-	-	-	17	3	-	-	-	-	-	7
3	Jaggery	-	1	-	-	-	-	93	-	-	-	-	-	-	90

4.5.2 Household Dietary diversity

To measure dietary diversity (FAO 2010), household food access to a variety of foods was obtained through the data on food consumption frequency collected using a structured questionnaire and daily consumed food groups were given a score of '1' each and not consumed daily were scored '0'. The pooled data of foods consumed daily is given in table 4.13 for both SHG and Non-SHG families.

Table 4.13 Food Groups included in the dietaries of SHG and Non-SHG Households

S.NO	Food Groups	Food Items	SHG(120)		Non SHG(30)	
			Yes=1	NO=2	Yes=1	NO=2
1	Cereals	Rice, wheat, sorghum and other millets	100(120)	-	100(30)	-
2	Pulses	Redgramdal, Bengalgramdal., Blackgramdal etc..	15(18)	85(102)	3(1)	97(29)
3	Vegetable-A	Amaranth, Spinach, Gogu, Curry leaves etc…	8(10)	92(110)	7(2)	93(28)
4	Vegetable -B	Gourds, Beans, Tubers	36(43)	64(77)	27(8)	72(22)
5	Fruits	Apple, Grapes, Banana, Orange etc..	4(5)	96(115)	-	100(30)
6	Milk and Milk products	Cow milk, Buffalo milk, Curd etc..	83(99)	17(21)	83(25)	17(5)
7	Meat and meat products	Chicken, Mutton, Egg ,Fish	1(1)	99(119)	3(1)	97(29)
8	Fats and Oils	Groundnut, Palm oil, Sunflower etc..	100(120)	-	100(30)	-
9	Sugars	Sugar ,Jaggery	97(116)	3(4)	100(30)	-

Figures in the parenthesis indicate number of households

Dietary diversity was assessed by inclusion of foods from different food groups indicate that cent percent of SHG and Non-SHGs consumed cereals, sugars and cooking oil. Nearly 83% both SHGs and Non SHG had a habit of using milk in the form of tea consumption . Daily pulse consumption was only 15% of the SHG and only 3% of Non-SHG households. As per the

vegetables are concerned both SHG nor Non-SHG families had very poor intake 8 and 7% of green leafy vegetables, 36 % of SHGs and 27 % of Non-SHGs consumed other vegetables which was also less to moderate . Four percent of SHGs had the habit of regular consumption of fruits which was poor and no intake was reported among Non SHG. While 1% of SHGs and 3% Non-SHGs eat at least any one non vegetarian food like chicken, meat, egg or fish on a regular basis, majority of both the groups did not consume this food group daily.

The household practices of including foods from the nine food groups, cereals, pulses, vegetable-A, vegetable-B, fruits, milk and milk products, meat and meat products, fats and oils and sugars provided valuable information on the dietary diversity of households. It was observed that mostly five food groups namely cereals, vegetable-B, milk products, oils and sugars were being consumed by the majority of SHG and Non-SHGs. From the food groups consumed, it is clear that the households were consuming nutritionally imbalanced food, providing carbohydrate and fat calories mostly, and deficient in protein both in terms of quality and quantity and the possibility of micronutrient deficiency cannot be ignored due less or no frequent intake of pulses, leafy vegetables, fruits and meat products. Similarly other studies showed dietary diversity scores have been positively correlated with adequate micronutrient density of complementary foods for infants and young children (FANTA, 2006) , and macronutrient and micronutrient adequacy of the diet for non breast-fed children (Hatloy *et al.,* 1998; Ruel *et al.,* 2004; Steyn *et al.,*2006; Kennedy *et al.,* 2007), adolescents (Mirmiran *et al*., 2004) and adults (Foote *et al*., 2004; Arimond *et al*., 2010).

It is observed from the above table both the SHG and NONSHG households are not meeting the RDA for energy and protein where opposite to the fat. The results were found to be rejecting the results of Deininger and Liu (2008) that SHGs helped to improve food consumption and nutritional status of the poor. Despite of a decline in food and nutrient intake a improved nutritional status noticed due to non-nutritional factors such as improvement in access to safe drinking water, better out-reach of health care services coupled with improvement in socio-economic conditions (NNMB, 2006).

The Household Dietary Diversity Score (HDDS) for individual households was calculated and distribution of SHG and Non-SHGs under different ranges of HDDS are given in table 4.14

Table 4.14 Distribution of SHG and Non-SHGs under Household Dietary Diversity Scores

S.no	**Dietary Diversity Scoring**	**SHG** (n=120)	**Non SHG**(n=30)
1	Lowest Dietary Diversity (≤3)	23(27)	27(8)
2	Medium Dietary Diversity(4-5)	68(82)	70(21)
3	High Dietary Diversity (≥ 6)	9(11)	3(1)
	Total	100(120)	100(30)

Figures in the parenthesis indicate number of household

From the dietary diversity scores (DDS) obtained by different households, it was clear that 68% of SHGs and 70 % of Non-SHGs were found to be under Medium dietary diversity with 4-5 food groups consumed. The rest of the households 9 % of SHGs and 3 % of Non-SHGs were under High dietary diversity with ≥ 6 food groups consumed. About 23 % among SHG and 27 % Non SHG were found to be under lowest range with ≤ 3 food groups consumption.

The high dietary diversity score is indicative of better food intake practices and on an average 9% SHGs and 3% Non-SHGs were found to have such food practices. The Medium dietary diversity group have limitations in their food intake practices, which could be attributed to variations in income and educational status and also availability of resources and cost concerns.

4.5.2 Food weighment

The food consumed for the day was obtained through food weighment and calculated nutrient are compared against RDA and given in table 4.14 (Figure 4.3).

In the respective order of SHG and Non SHGs , the intake of different foods per consumption unit(CU) was 414 ± 80 gms and 413 ± 83 gms from cereals, 35 ± 37 gms and 27±26 gms from pulses, 27 ± 11 gms and 29 ± 20from fats and oils, 10 ± 26 gms and 6 ± 12 from green leafy

vegetables(veg-A), 130 ± 74 gms and 166 ± 114 from other vegetables (veg-B), 68 ± 82 gms and 87 ± 57 from milk and milk products, 26 ± 54 gms and 26 ± 75 from meat products and 18 and 9 gms from sugars. No fruit consumption was recorded in the SHG, while 65 ± 205 gms of fruit was consumed by Non SHGs. No significant difference (P<0.01) was found both among SHG and Non SHG in consumption of all the nine food groups.

Table 4.15 Consumption of food groups of SHG and NONSHG households per consumption unit(CU)

S.NO	Food groups (gms)	SHG	NON SHG	P- value	RDA*(gms)
1.	Cereals	413.5±80.28	412.6±83.48	0.48	420
2.	Pulses	34.91±37.28	26.83±26.2	0.24	60
3.	Fats and oils	26.88±11.45	28.74±19.90	0.43	20
4.	Veg-A	10.04± 26.42	5.54±11.70	0.26	100
5.	Veg-B	129.66±74.24	155.54±114.33	0.26	100
6.	Milk & milk products	65.73±81.76	87.26±57.26	0.17	300
7.	Meat &meat products	26.44±54.25	25.96±75.13	0.49	100
8.	Fruits	0	64.9±205.2	0.17	100
9.	Sugars	18.42±8.97	20.42±8.81	0.28	25

Significant Level-- P-value-P<0.01 Non-significant
Source: Dietary guidelines for Indians- A manual, 1999, NIN,ICMR, Hyderabad.

When the consumption of foods was compared with recommended food allowances of ICMR, it was observed that cereal consumption of both SHG and Non SHG was almost close to requirement, but the mean pulse consumption was found to be 25 to 33gms less than the requirement in SHG and Non SHG respectively. The fat consumption was greater than the requirement by 7 to 9 gms in SHG and Non SHG respectively. Green leafy vegetable intake was very low in both the groups by nearly 90 to 94 gms against a requirement of 100 gms. Intake of roots and other vegetables was found to be more than the requirement in both the groups, where Non SHG consumed more than SHG. The milk intake was meeting 1/4th of the requirement of 300 gms in both the groups. Consumption of meat and meat products was also found to be meeting 1/4th of the requirement. Fruit intake was nil in SHG and Non SHG on the day of weighment except for one family of Non SHG. Sugar intake was moderately good, less only by 5

to 7 gms compared to the requirement. Low intake of different food items was related to poor economic status (Venkateswaralu 2003).

Based on the consumption of food groups data is understood that the diets are having inadequate sources of protein as the pulse, milk and meat intake was found to be less. Similarly the micronutrient intake would have been less due to lack of fruit intake and meager intakes of green leafy vegetables. Adequate cereal and sugar intake and a higher intake of fats and oils is indicative of calorie fulfillment per CU in both SHG and Non SHGs. NNMB, 2012 reported the decreasing trend in the intakes of roots & tubers (6g) milk & milk products (21ml), sugar & jaggery (9g) and other vegetables (6g). However, a marginal increase was also observed in the intakes of GLVs (8g), and fats & oils (2g).

In general comparison of intake of each of the food groups per consumption unit did not show any significant difference between SHG and Non SHG. Though the mean food intake values of individual groups showed mild to moderate differences, the SD values seem to have nullified the difference.

Table 4.16 Nutrient intake of SHG and NONSHG households per consumption unit(CU)

Nutrients	SHG(n=20)		NONSHG(n=10)		P value
	Mean±SD	% Adequacy	Mean±SD	% Adequacy	
Energy(kcal)	2028.33±308.83	87.37±13.02	2109.5±386.93	90.89±16.70	0.28
Protein(gm)	49.38±17.29	82.26±28.81	48.35±21.06	80.55±35.11	0.44
Fat(gm)	33.60±11.38	137.41±45.48	40.9±26.98	163.58±107.94	0.21

Significant Level-- P-value-P<0.01 Non-significant

The mean energy intake of SHG and Non SHGs per consumption unit was 2028±309 and 2110±387 k cal respectively. The protein intake of both the groups was almost same with 49±17 and 48±21 gms in SHG and Non SHGs. The fat intake per CU was 34±11 gms in SHG and 41±27 gms in Non SHGs.

The mean intake of each nutrient when compared against the recommended dietary allowances (RDA) of ICMR revealed that the percent adequacy of energy was 87% ± 13 % in SHG and 91% ± 17 % in Non SHG indicating a gap of 9 to 13% deficit and that the percent deficit was more in SHG compared to Non SHG. But no significant difference was found between SHG and Non SHGs ($P< 0.01$). The protein content of the diet consumed was also less than the requirement and met only 82 % ± 29 % and 81 % ± 35 % of the requirement in the SHG and Non SHGs respectively without any significant difference($P<0.01$) between the groups. Percent adequacy of fat was high with 137% and 164 % in SHG and Non SHGs respectively compared to the RDA and no significant difference ($P<0.01$) was found between the groups.

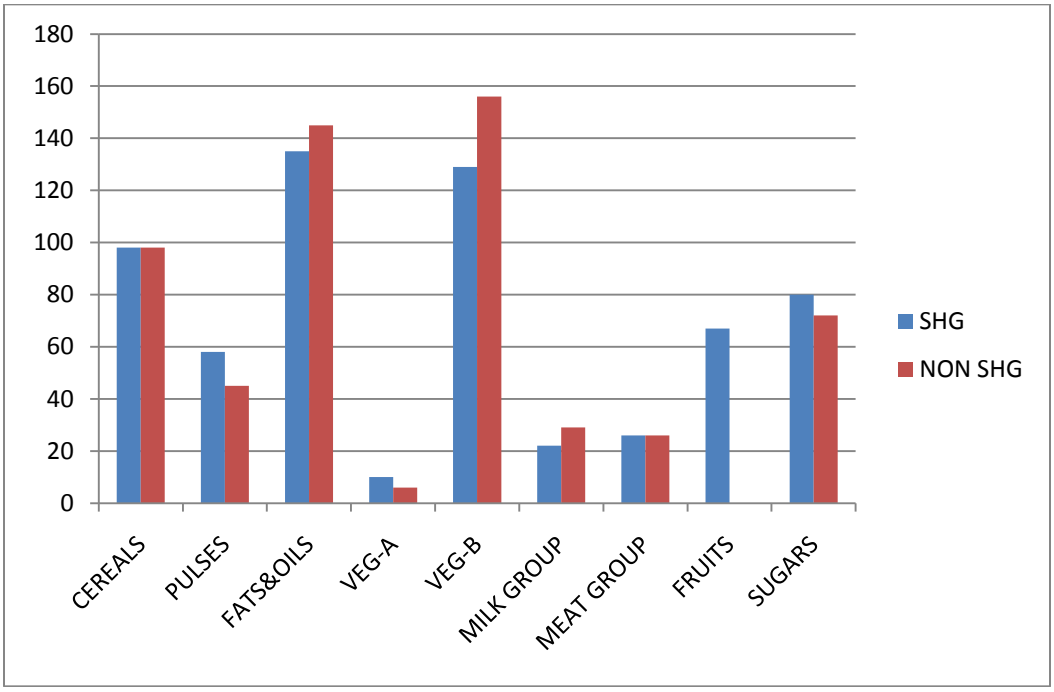

Figure 4.6. Food groups intake of SHG and Non SHG households

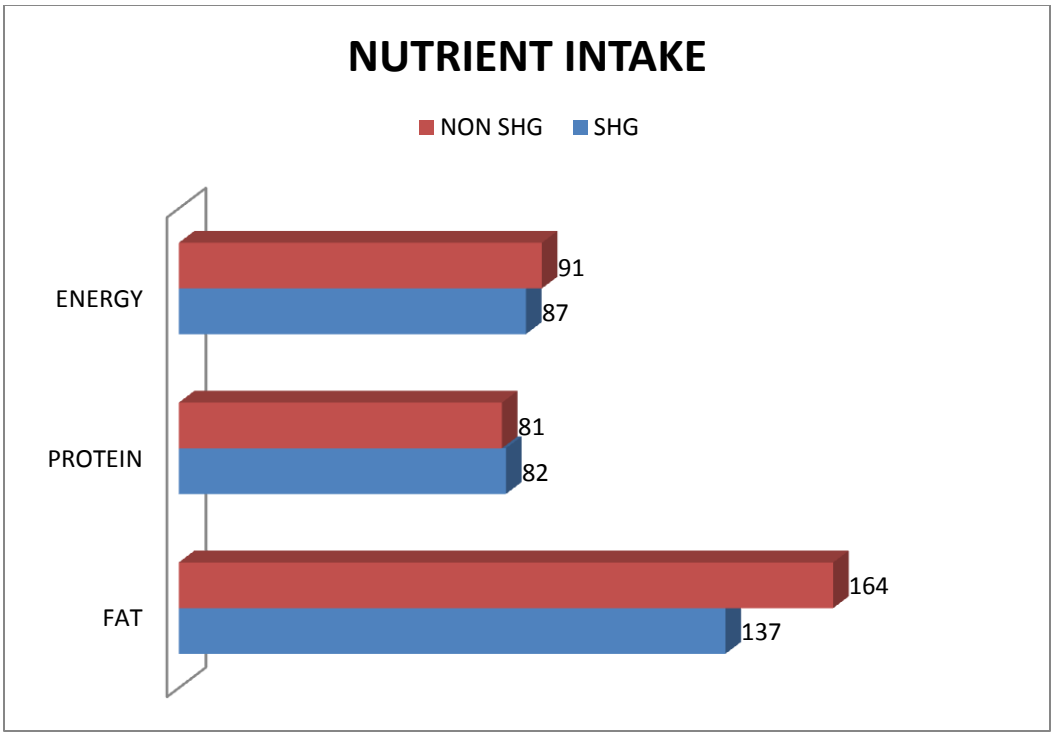

Figure 4.7: Nutrients intake of SHG and Non SHG households

The National Sample Survey Organization (NSSO, 2006) carried out the survey during different time points also observed decrease in the intake of energy and proteins over the periods, while that of fat intake has increased during the same period. Similar results were found that the intake of all the nutrients declined over a period of 4 decades. The intake of protein has declined by 13 g/CU/day over a period of time (NNMB, 2012).

From the food intake and nutrient adequacy data it can be inferred that Self Help Grouping has not influenced neither the food intake in terms of dietary diversity, quantity of foods consumed from different food groups nor the nutrient adequacy. The inadequate food consumption were also reflected by the anthropometric measurements which were lower than the reference ranges.

Similar results were found among the rural adolescent girls of Marathwada region were consuming all nutrients below the recommended, revealed gross deficiency of nutrients. The anthropometric measurements were not satisfactory in the selected girls and these were the reflection of less nutrient intake of the adolescent girls Varsha *et.*,al (2008).

4.6 Impact of SHG on Socio economic and nutritional status

Correlation was tested between the independent variables like income, number of membership years, women of the SHG (respondent) age, education and dependent variables such as BMI and DDS and the results are given in table 4.17

Table 4.17 Correlation between independent and dependent variables

S.NO	Variables	BMI	DDS
1	Income	0.02^{NS}	0.20*
2	SHG membership Years	-0.02^{NS}	0.15^{NS}
3	SHG respondent Age	-0.02^{NS}	0.03^{NS}
4	Education of SHG respondent	0.18*	0.08^{NS}

Significant Level-*P- >0.05 ^{NS} -Non significant

It was observed that there is a correlation between the education level of the SHG women and BMI (P >0.05) which indicates that women were maintaining healthy BMI, and that knowledge and awareness on good eating habits was better in SHG women. There was a significant association found between income and dietary diversity score (P >0.05), which infers that high income levels will lead to better and varied intake of foods among SHG households. The results of the other studies also indicating that increased dietary diversity scores was associated with socio-economic status (Hoddinot and Yohannes,2002; Hatloy *et al.,* 2000). The variables, namely age, education and number of years of SHG membership did not show any significant correlation with dietary diversity. From the correlation matrix it was understood that there is no impact of SHG membership on the nutritional status of households.

4.7 Variation in BMI of adult's in comparison with ICRISAT's longitudinal Village Level Studies(VLS)

Percent Deviation of BMI of adult's in comparison with previous anthropometric data of ICRISAT's longitudinal studies on VLS sample in the villages was estimated and the details are presented in table 4.18. The same subjects were traced back and their BMI was collected.

Table 4.18 BMI of SHG adults of VLS households of 2010,2011,2012 and 2014

Years	BMI	
	Mean±SD	P-value
2010 and 2011(n=90)	20.39±3.18 20.35±3.31	0.32^{NS}
2010 and 2012(n=41)	20.81±4.09 21.13±4.19	0.15^{NS}
2012 and 2014(n=48)	20.98±4.05 21.28±4.12	0.21*
2010 and 2014(n=105)	20.55±3.68 21.28±3.86	0.04**

Significant Level-*-P- >0.05 **-P- >0.05 ^{NS}- Non significant

The adults of the SHG households were compared for their BMI, over the years. The data shows that there is no significant difference (P< 0.05) between the BMI of adults from 2010 and 2011. Similar results were found between the 2010 and 2012 with respective BMI of adults.

Significant difference (P< 0.05) was found between the BMI of adults in 2012 to 2014. Similarly there was significant difference between the adults of the SHG between 2010 and 2014. In general BMI has improved over years, but at any point of time, it remained in good nutritional status category of 'Normal or ideal BMI'.

These results indicate that SHGs have improved their food intake and prospered over years, probably due to changes in employment opportunities, increased income sources and increased availability of food.

Chapter V

SUMMARY AND CONCLUSIONS

The research study, " Impact of self help groups on the household nutrition in Semi Arid Tropic (SAT) villages of Mahboobnagar district, Telangana, India" was carried out in Dokur and Aurepalle villages with the objective of assessment of impact of SHGs on household in terms of socio economic conditions and nutritional status. Sixty SHG households and 15 Non SHG households were selected from each of the two villages forming a total of 120 SHG and 30 Non SHG households.

The total population of SHG was 495 with 259 men and 236 women and that of non SHG was 98 with 49 men and 49 women. The age wise distribution indicates that 67% of SHG family members were adults, followed by 19% adolescents, 12% children and 2% infants. Among Non SHG households the percentage of adults was high with 73%, with 16% of adolescents, 7 % children and 4 % infants. Out of the 120 households of SHGs 74% belonged to BC, while 13 % belonged to SC and 13 % of them belonged to OC category. From the 30 Non SHGs 70% belonged to BC, 20% belonged to OC and 10 % belonged to SC communities.

About 50% of the SHG population was married, 8% widows and 1%divorced and the rest of the members were not in that age group. In the Non SHG population, 55% were married, 9% were widows and 36% were in not eligible category.

The educational status of SHG household indicated that 40% of the population was illiterate, followed by 22% had high school education, 19% had primary school education, 7% had college education, 5% had intermediate education and 6% of them were below five years, some of them attending anganwadi and 1 % of them were literate to sign.

Similarly among Non SHG households 45% population was illiterate, followed by23 % being high school educated, 9% of them were attending intermediate college education, 7% had primary school education, 6% had college education and the remaining 10% of them were children below five years, some of them were attending anganwadi.

The technical skills of the SHGs showed that 2% had driving skills, 1% had tailoring skills, 1% were mechanics. Among Non SHGs 1% had done polytechnic, another 1% had typing and computer skills and 1% had driving skills.

The occupation of the households were 45% of SHG and 42% of Non SHG were unemployed as per age or gender, 19% each of SHG and Non SHG were occupied as agricultural labour, 19% and 18% were involved in cultivation in their own agricultural fields from the respective groups of SHG and Non SHG followed by SHGs 4% were involved in non-agricultural labor, 4% were either self employed / business holders, 3% were private job holders, 3% were in cattle / sheep rearing, 2% were drivers and 1% were job holders in government sector. Ten percent of Non SHGs were involved in non-agricultural labor, 5% were self employed/ business holders, 4% were private job holders and the rest of 2% took up cattle/ sheep rearing as their occupation.

Nearly 34% of SHG and 43% Non SHG belonged to low income group with an income of Rs.20,000/- to Rs.60,000/- per annum. While 27% each of SHG and Non SHG were in middle income category with Rs.60,000 to Rs.1,00,000/-, 39% of SHG and 30% of Non SHGs were in high income category with earnings ≥Rs.1,00,000/-. There is a significant difference ($P<0.05$) found between SHG and Non SHG households. But the effect of income was not seen in expenditure pattern of the SHG and Non SHG households.

Majority of the SHGs were in own house (99%) and 1% stayed in rented house. In SHGs, 65% had minimum facilities like drinking water, toilet and drainage, 35% households had good ventilation and sanitation conditions followed by Non SHG respondents 97% stayed in own house and 3% in rented house and had 60% minimum facilities like drinking water, toilet and drainage, 40% households had good ventilation and sanitation conditions.

Among SHG majority of them 98% are owns a house followed by 88% of them owns land and 9% of them owns shop as a small enterprise in the village. Among movable assets ownership 23% own two wheeler and among electronic goods 72% own TV , 9% own refrigerators and 3% of them had other appliances like coolers, electric cooker. Livestock of 12% poultry and 13% sheep/goats was adding additional income to the SHG households.

In the Non-SHGs, all the households own a house (100%), 80% of them own land and 7% own a shop. Movable assets owned by Non SHG households include two wheelers in 7%. while 53% own TV, 7% own refrigerators and 7% rear poultry and 3% sheep/goats which was adding income.

For food 30% of the households were spent 10,000 to 30,000/- among SHGs where as 40% for Non SHGs followed by 66% of SHGs and 50% Non SHGs households were spent 30,000/- to 60,000/- and 4% SHGs and 10% Non SHG households spent above 60,000/- annually.

Similarly on children's education 79% of the SHG and 77% Non SHGs spent below 5,00/- , 13% households of SHGs and 10% Non SHGs were spent 5,00 to 10,000/- and 8% of the SHG and 13 % Non SHG households spent above 10,000 /- for year. clot Seventy six percent SHG and 80% Non SHGs households spent 1,000 to 5,000 /-, 22% of the SHG and 17 % Non SHG households spent 5,000 to 10,000/- and 2% of the SHG households and 3% Non SHGs were spent above 10,000/-. While 92% of SHG and 87% Non SHG households were spent 1,000/- to 5,000/- on health similarly 7% and 10% of SHG and Non SHG households were spent 5,000 to 10,000/- and 1% and 3% of SHG and Non SHGs were spent above 1,00,000/- for health care facilities annually.

The child anthropometry showed that when compared to NCHS standards among boys 73% and in girls 87% were lower than the reference height for their age. About 27% among boys and in girls 13% of them were up to the standard. This shows stunted growth among children , it is observed more among the girls than boys.

Weight also compared with NCHS standards showed among boys 78% and in girls 90% were lower than the reference value and 22% in boys and 10% in girls were up to the standard value. The weight is a good indicator of healthiness but the children are showing very low for their reference weight for age specifically girls are in worst situation it may be due to prolonged under nutrition, heredity, environmental factors, lack of mother's care and maternal nutrition.

Among Non SHG children height of the boy shows 86% and girls 57% of them are lower than the standard height for the age. 14% of the boys and 43% of girls are up to the standards. Boys are more stunted than the girls of Non SHG household.

Weight of the children shows among boys 86% are lower and 14% are up to the standard among girls 71% lower and 29% are up to the standards of NCHS. It is noticed boys are more under weight than the girls when compared with the standards.

Thirty seven to 38 % of children below 18 years were stunted with low height/age (<3 percentiles) in both SHG and Non- SHG, while a quarter of children were also mildly stunted (3-15 percentiles) in both the groups, and an average of 21% of each of SHG and Non-SHG children were in a healthy height/ age percentile category of 15-85. A greater percent of girls in SHG were observed with mild to severe stunting more than boys.

Similar to height/age, about 15% to 36 % each of SHG and Non SHG children of both the groups being in low weight for age category, indicating a mild to severe degree of malnutrition. Among SHG boys malnutrition prevalence was observed more while among Non SHG girls it is observed more. Poor environmental factors and low socio-economic status and inadequate nutrition of the child are responsible for low anthropometric measurements than the standards (Shashi Singh and Indira Bishnoi, 2005).

Thirty seven to 23% of children below 18 years were severely underweight (<3 percentiles) in both SHG and Non SHG, while a 30% of children were also mildly underweight (3-15 percentiles) in both the groups, and an average of 38% of each of SHG and Non SHG children were in a healthy weight percentile category of 15-85. An equal percent of boys and girls in Non SHG were observed with mild to severe underweight than the SHG children.

Nineteen children of 12-60 months out of 24 of SHG and 5 out 8 of Non-SHG were in 'Normal MUAC' category. While 3 children in SHG and 2 in Non-SHG were in 'Moderate wasting' category and 2 in SHG and 1 in Non-SHG were in 'Severe Muscle Wasting' category. Mild to moderate degree of protein energy deficiency, probably due to faulty food habits during infancy and early childhood could be assumed to be the reasons for this condition.

The mean height of men of SHG was 161±15 cm and that of men of Non SHG was 163±6 cm and mean height of women was 151±6cm and 150±6cm among SHG and Non SHG respectively without much difference between the groups. The mean weight of men was 56±12kgs and 58±14 kgs and that of a women was 50±10kgs and 50±10kgs in the groups of

SHG and Non SHG respectively without much difference between the groups. The mean BMI (kg/m^2) was 21.41±3.45 and 21.68±4.26 among men and 21.68±4.01 and 22.38±4.15 in women from SHG and Non SHGs respectively without much difference between SHG and Non SHG adults. The mean BMI of both men and women in both groups indicate that men and women were in normal healthy category.

Men and women of the SHG and Non SHG were compared for desirable weights for their heights with NCHS reference tables. The results showed that among men of SHG 48% were normal, 37% were lower than the desirable weight and 15% were either overweight/ obese. Among women of SHG 50% were normal, 40% were underweight and 16% of them were overweight for their height. Among Non SHG 43% men and 44% women were in the desirable range of weight for height, while 33% of men and 26% women were underweight and 24% of men and 30% of women were overweight.

About 23% of SHG (24% men and 23% of women) and 20% of Non SHG (25% men and 16% women) were underweight and 59% of SHG (62% of men and 56% of women) and 54% of Non SHG (54% men and 55% women) adults were in the normal BMI. Fourteen percent of SHG (11%men and 17% women) and 22% Non SHG (18% men and 26% women) were overweight and 11% SHG (3% men and 4% women) and 4% Non SHG (3% men and 3% women) were obese.

Among SHG households 0.6 % members are identified with dryness of the skin and followed by 1.01 % members had Conjunctival xerosis and another 0.4 % of the members observed with Corneal xerosis which indicates the vitamin A deficiency. Similarly 0.40% observed with chelosis , another 0.40 % with angular stomatitis and 0.20% with the fissures on tongue which indicates the B-complex vitamins deficiency. Among all the nutrients deficiencies iron deficiency was identified high specifically among elderly, adolescent girls, women and school children. 8.68 % exhibits paleness of inner side of eye lids, 8.02% pale eyes, tongue, lips and face, 0.20% tiredness/lack of energy and 0.20% spoon shaped nails. 0.20 % were mentally retarded which indicates iodine deficiency. About 1.01% had mottled teeth and 0.20 % dental cavities which indicates fluorine deficiency. Similarly 1.02% dryness of the skin, 9.18% with bitot spots, 2.04% chelosis, 8.16% paleness of inner side of eye lids, 8.16% pale eyes, tongue,

lips and face, 1.07% mental retardation and 3.06% mottled teeth are identified among Non SHG households members.

Dietary diversity was assessed by inclusion of foods from different food groups indicate that cent percent of SHG and Non-SHGs consumed cereals, sugars and cooking oil. Nearly 83% both SHGs and Non SHG had a habit of using milk in the form of tea consumption . Daily pulse consumption was only 15% of the SHG and only 3% of Non-SHG households. As per the vegetables are concerned both SHG nor Non-SHG families had very poor intake 8 and 7% of green leafy vegetables, 36 % of SHGs and 27 % of Non-SHGs consumed other vegetables which was also less to moderate . Four percent of SHGs had the habit of regular consumption of fruits which was poor and no intake was reported among Non SHG. While 1% of SHGs and 3% Non-SHGs eat at least any one non vegetarian food like chicken, meat, egg or fish on a regular basis, majority of both the groups did not consume this food group daily.

From the dietary diversity scores (DDS) obtained by different households, it was clear that 68% of SHGs and 70 % of Non-SHGs were found to be under Medium dietary diversity with 4-5 food groups consumed. The rest of the households 9 % of SHGs and 3 % of Non-SHGs were under High dietary diversity with ≥ 6 food groups consumed. About 23 % among SHG and 27 % Non SHG were found to be under lowest range with ≤ 3 food groups consumption.

When the consumption of foods was compared with recommended food allowances of ICMR, it was observed that cereal consumption of both SHG and Non SHG was almost close to requirement, but the mean pulse consumption was found to be 25 to 33gms less than the requirement in SHG and Non SHG respectively. The fat consumption was greater than the requirement by 7 to 9 gms in SHG and Non SHG respectively. Green leafy vegetable intake was very low in both the groups by nearly 90 to 94 gms against a requirement of 100 gms. Intake of roots and other vegetables was found to be more than the requirement in both the groups, where Non SHG consumed more than SHG. The milk intake was meeting 1/4th of the requirement of 300 gms in both the groups. Consumption of meat and meat products was also found to be meeting 1/4th of the requirement. Fruit intake was nil in SHG and Non SHG on the day of weighment except for one family of Non SHG. Sugar intake was moderately good, less only by 5 to 7 gms compared to the requirement. Low intake of different food items was related to poor economic status (Venkateswaralu 2003).

The mean intake of each nutrient when compared against the recommended dietary allowances (RDA) of ICMR revealed that the percent adequacy of energy was 87% ± 13 % in SHG and 91% ± 17 % in Non SHG indicating a gap of 9 to 13% deficit and that the percent deficit was more in SHG compared to Non SHG. But no significant difference was found between SHG and Non SHGs ($P< 0.01$). The protein content of the diet consumed was also less than the requirement and met only 82 % ± 29 % and 81 % ± 35 % of the requirement in the SHG and Non SHGs respectively without any significant difference($P<0.01$) between the groups. Percent adequacy of fat was high with 137% and 164 % in SHG and Non SHGs respectively compared to the RDA and no significant difference ($P<0.01$) was found between the groups.

The results was negatively correlated with the Zahir Hussain and Syed Zafar (2012) Deininger and Liu (2009) studies which showed an increase in income that has been spent on better nutrition.

It was observed that there is a correlation between the education level of the SHG women and BMI ($P >0.05$) which indicates that women were maintaining healthy BMI, and that knowledge and awareness on good eating habits was better in SHG women. There was a significant association found between income and dietary diversity score ($P >0.05$), which infers that high income levels will lead to better and varied intake of foods among SHG households.

The results are partially correlated with the studies of Swamy V and Tulasimala BK (2013), NCAER (2008), Sushil Kumar Mehta *et al.*, (2011), Geeta Manmohan et al., (2008), Anila (2012), Sarumathi and Mohan(2011) , Rangi *et al.* (2002), Vivek Kumar Tripathi and Tanu Marwah (2013) which reported that empowerment of women through SHGs has led to benefits not only to the individual women and women groups but also to the family and community as whole through collective action in the process of development .

The adults of the SHG households were compared for their BMI, over the years. The data shows that there is no significant difference ($P< 0.05$) between the BMI of adults from 2010 and 2011. Similar results were found between the 2010 and 2012 with respective BMI of adults.

Significant difference ($P< 0.05$) was found between the BMI of adults in 2012 to 2014. Similarly there was significant difference between the adults of the SHG between 2010 and

2014. In general BMI has improved over years, but at any point of time, it remained in good nutritional status category of 'Normal or ideal BMI'.

The results showed that there is no impact of SHGs on nutritional status of households in terms of nutritional anthropometry, food intake, diversity of diets. Increased income availability from SHGs was proven in many ways but not in terms of increasing the nutrition.

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IMPACT OF SELF- HELP GROUPS ON THE HOUSEHOLD NUTRITION

ACHARYA N.G. RANGA AGRICULTURAL UNIVERSITY

Department of Foods & Nutrition, College of Home Science, Hyderabad -2014

I. General Information :

Name of the head of the household		Village	
Name of the respondent		Mandal	
Mobile number		District	
Religion:	1.Hindu 2.Muslim 3.Christian 4. Sikh 5. Any other	Caste	Category : OC / BC / SC / ST
Date of interview:	Start time of the interview (hh:mm)……..	End time of the interview (hh:mm)……..	Are you a member of ICRISAT VLS? Yes/No If yes indicate the VLS HH ID: ……

II. Demographic and Socio-economic conditions of the family:

S. No.	Name of the Family member	Relation to Head of the family	DOB / Age	Gender	Marital Status	Education	Technical Skills	Occupation	Income
A	**B**	**C**	**D**	**E**	**F**	**G**	**H**	**I**	**J**
1									
2									
3									

4									
5									
6									
7									

Coding for Demographic and Socio-economic conditions

C. Relation to the head of the family	**G. Education**
01 : Head of the family 02 : Wife / Husband 03 : Daughter / Son 04 : Son-in-law / Daughter-in-law 05 : Grandson / Grand Daughter 06 : Parents 07 : In laws 08 : Brother & Sister 09 : Brother-in-law / Son-in-law 10 : Nephew / Niece /sisters/ Brothers 11 : Other relation 12 : Adopted 13 : Servant 14 : No Relation 15 : Don't know	01 : <5 years 02 : Illiterate 03 : Literate 04 : Primary Education 05 : Intermediate 06 : High school 07 : Technical Training 08 : >10^{th} class 09 : College
F. Marital status	**H. Technical work**
01 : Married 02 : Un-Married 03 : Widow 04 : Divorced 05 : Destitute	01 : No training 02 : Polytechnic 03 : Electrician 04 : Nursing 05 : Plumber 06 : Tailoring 07 : Mechanic 08 : Welding/Glass cutting 09 : Borewell & Motor Repair 10 : Typing & Computers 11 : Others

I. Occupation

01 : Farming
02 : Agricultural labor
03 : Non-Agricultural labor
04 : Own business / Self Employment
05 : Govt. job
06 : Private job
07 : Cattle rearing
08 : No occupation

III. Income from different sources:

S. No.	Sources	Daily(Rs)	Monthly (Rs)	Yearly (Rs)
1	Agriculture			
2	Agriculture labour			
3	Any other labour work			
4	Employment			
5	Technical Work			
6	Any income generating enterprise, specify			
7	Small Enterprise			
8	Animal Husbandry			
9	Self employment (Tailoring etc)			
10	Income from livelihood programmes like MGNREGS			
11	Others(if any specify)			

IV. Housing conditions:

1. Details of Housing : a) Rented b) Own

2. Type of House : a) Hut b) Mud walls / Tiled roof c) Brick wall / Thatched Roof

d) Brick walls with shed e) Pucca house / Concrete Building

3. Drinking water facility : a) Tank b) Bore well c) Well d) Tap e) Mineral Water f) Any other source, specify

4. Sanitation facility

A) Ventilation facility : a) Well ventilated b) Moderately ventilated c) Poorly ventilated

B) Type of toilet : a) Septic latrine b) Flush/ Pour c) Open fields d) Any other, specify

C) Drainage facilities : a) Open b) Closed c) No drainage

D) Garbage disposal : a) Open front yard b) Open back yard c) Garbage pit d) Compost pit

V. Other information on Socio-economic Indicators

S.No.	Particulars	Yes / No	Value/Amt. (Rs.)
1	Ownership of Immovable Assets by the Household		
	A) Land		
	B) House		
	C) Shop		
	D) Others (Please Mention)		
2	Ownership of Movable Assets by the Household		
	A) Two Wheeler		
	B) Television		
	C) Cable Connection		
	D) Refrigerators		
	E) Other Household Appliances (Please Mention)		
3	Ownership of Other Assets by the Household		
	A) Cattle		
	B)Poultry		

	C)others if any		
4	Banking Transactions / Investments		
	A) Deposit - Savings Bank		
	B) Fixed Deposit		
	C) Loans		
	D) Insurance		
	E) Others, If Any		

VI. Expenditure Pattern

Particulars	Yes/No	Amount Spent (Rs.)	Remarks
1. Food			
A. Traditional (home food)			
B. Purchased from Market/Packed Food			
2. Housing A. Own house B. Rented			
3. Clothing (Purchase of Readymade or Cloth and stitching)			
4. Consumption of Fuel / Energy			
5. Education of Children			
6. Major illness of any family member			
7. Access Medical Facilities (Traditional/Modern)			
8. Entertainment / Leisure			
9. Celebrations / Participation in Social Customs / Traditions like, Worship, Births /Marriages / Death Rituals, ceremonies etc (add expenditure to one another)			
10. Any other (Specify)			

VII .Incidence of Morbidity

Names of all family members in the household (use one line for each bout of sickness even if it means using multiple lines for each member) ***Collect this data for both the bouts as separate rows***	Member ID incase of ICRISAT VLS sample	Were you sick or disabled * in the last 7 days Yes=1; No=2	Were you sick or disabled in the last 14 days Yes=1; No=2	What were the symptoms /diseases(list in the order of severity)? How long did it last?						How many days were you unable to carry out your usual activity ?	Where did you go for treatment ?
		**Disability here means unable to carry out the daily activities*		Symptom 1		Symptom 2		Symptom 3			
				Code	Days	Code	Days	Code	Days		

Symptom codes:	**Treatment codes:**
1. Diarrhoea 2. Dysentery 3.Vomiting 4.Refusal to Eat 5.Fever 6. Ear infection 7. Eye Infection 8. Scabies 9.Boils 10.Cold 11. Breathlessness 12.Whooping Cough 13.Cough 14.Measles 15.Chickenpox 16. Jaundice 17.Sore mouth 18.Weakness 19.Body pains 20. Malaria 21. Any others, Specify.	1.Local Doctor (Qualified) 2. RMP Doctor 3. Nearest town 4. Local nurse 5.Self Medication 6. Any other, specify.

VIII. Membership in Self Help Groups (SHG):

Are you a member of the SHG? Yes/No

(If Yes, continue this section. If No, skip this section and go to section XIV)

1. Name of SHG :

……..

2. Number of members in SHG :

……..

3 Name of leaders of the SHG :

……..

4. Date of starting :

……..

5. Who motivated you to join in SHG :

……...……..

a) Govt.dept b)NGO c)Bank d) Cooperative society e)Self f)Any other(specify) …….

6. Caste composition of group: Mixed caste/Same caste: ……. ……..

7. Before becoming SHG member, did you belong to any group or organization: ……

a) Mahila mandal b) Mothers committee c) School education committee d)Youth organization

e) Any other (specify)……

8. Reasons for joining SHG? a) To save, b) To avail loan, c) to initiate income generating activity,

d) To access Govt. Schemes e) any other

9. Indicate frequency of meetings of SHG

:……..

a) Monthly b) Fortnightly c) Weekly d) No meetings

10. Financial Information of SHG member:

A) What is the frequency of savings?:…….

a) Monthly b) Fortnightly c) Weekly d) Daily

B) Are you making extra savings? Yes/No

If yes, personal or group?

(*Extra savings are all other savings apart from regular depending on seasonality of income)*

C) What is the amount of total saving per month?:Rs……

D) Do you save in noncash form? Yes /No:……..

If yes, what are the types/items of non-cash forms of savings

:i)……..ii)……iii)……..

(*non-cash forms of savings may include items such as grains, sugar, vegetables, labour in lieu of cash etc…)*

E) What is your saving as on today? Rs……..

F) Group lending particulars:

11. Did you take any loans from SHG? Yes/No

a) If yes, number of loans taken:…….

b) Loan utilization and repayment

S.No	Loan category	Amount(Rs)	Repayment(Rs)	Rate of Interest(Rs)
1.	Consumption Loans			
	Domestic-functions & rituals			
	Health			
	Education			
2.	Investment Farm sector			
	Agriculture			
	Agribusiness			
	Animal Husbandry			
3.	Investment business sector			
	Income generation activity			
	Asset creation			
	Any other			
	Total			

12. Did you take up any income generating activities as SHG member? Yes/No.
    If yes, what type of economic activities?
    i) Individual economic activities:

S. No	**Economic activities**	**Nature**		**Investment**	**Income**	**Remarks**
		Full time / part time	**Seasonal / Annual**			
1						
2						

3						

ii) Group economic activity

S. No	Economic activities	Nature		Investment	Income	Remarks
		Full time / part time	Seasonal / Annual			
1						
2						
3						

13. Types of intervention/social action programmes/activities/awareness programmes taken up by SHGs:

Sl. No.	Activity	Response	
		Yes	No
1.	Health		
2	Immunization		
3	Education		
4	Adolescent programme		
5	ICDS/Nutrition/Anganwadi		
6	Non formal education		
7	Water and sanitation programme		
8	Any Others (Specify)		

14. Access /utilization of supporting systems:

S.No		Yes	No	Purpose
1.	Adhar card			
2.	Gas/ Deepam			
3.	Electricity			
4.	Job card (MGNREGA)			
5.	Ration card- Groceries			
6.	Pensions			
7.	Arogyasri card			
8.	Anganwadi A. Preschool education B. SNP for <3yrs C. SNP for 3-6yrs D. SNP for pregnant and lactating E. Nutritional education for mothers F. Immunization			
9	Bank sector A. Savings B. Agricultural loans C. Education D. Gold loans			
10	Primary health centre A. Routine health aliments B. Immunization			

	C. Deliveries D. Vasectomy/Hysterectomy			
11	N G O			
12	Any other specify			

15. New skills after joining SHGs: Did you undergo any training programme? Yes/No
If yes, please provide the details below:

S.No	Title	Duration	Location / Place / Institution
	Record the impact of training in terms of skills improved in (Please tick)	1. SHG management 2. Reading 3. Writing 4. Account keeping 5. Bank operations	6. Occupation 7. Handling of instruments 8. Income generation activities 9. Any other

16. On which areas your awareness has improved after joining SHGs?

Sl. No	Issues	Response: Yes/No	If yes, what aspects	If no, Why
	General Issues			
1	Employment opportunities			
2	Entrepreneurial activities /Income generating activities			
3	Social issues			
4	Welfare programmes in the locality			
5	Banking			
6	Assets			
7	Socioeconomic status			
8	Adoption of new technologies in agriculture			
9	Agriculture and allied activities			

10	Indigenous technologies			
11	Organic pesticides			
12	Own enterprise			
	Health			
1	Access to PHC & regular checkup especially during pregnancy			
2	Immunization			
	Nutrition			
1	Is there any effect on food pattern due to SHG?			
2	Do you accept or feel there is an impact on your household nutrition after joining SHG?			
3	Did you have any nutrition education classes after joining SHG?			
4	Do you think there is any betterment in health status of the family after joining SHG?			
5	Is there any nutrition incorporation into cooking?			
6	Is there any Change in cooking practice after joining SHG?			
7	Any others			

17. Is there any change in food habits/ food pattern after joining SHG?

i) Increased consumption of particular food group like milk /meat .....

ii) No. of meals per day.....

iii) Type of food eaten in the morning: a. Same as lunch b. Left over rice c. Other breakfast items d. Not eaten

IX. Decision making

1) Is there your contribution increased in decision making after joining SHG ?

a) Yes b) No c) No change

2) If yes, who and on what decisions?

Sl.No	Decisions about/on	Who takes decision a) SHG Member b) Head of the family c) Mother- in-law d) Sister-in-law e) Others (specify)
1	Children's Education	
2	Finances	
3	Household health care	
4	Life cycle ceremonies	
5	Household Budget	
6	Basic commodities	
7	choices of food purchase and cooking practices at household levels	
8	Any others	

X . Anthropometric Measurements:

S.no	**Name**	**Height (cm)**	**Weight (kg)**	**MUAC (cm)**
1				
2				
3				
4				
5				
6				
7				
8				
9				
10				

11				

XI. Clinical Assessment:

Use the picture chart for identification of signs and symptoms of the nutrient deficiencies.

Deficiencies	**Signs and symptoms**	**IDs/Names of the family member**
1.Protein Energy Malnutrition	Kwashiorkar	
	Marasmus	
	Weakness, Lack of energy	
	Copper color hair	
	Thin, easily pluckable hair	
	Edema in extremities and abdomen	
	Moon face	
	Loss of subcutaneous fat	
2.Vitamin-A Deficiency	Night blindness	
	Dryness of skin	
	Bitot spots	
	Conjunctival xerosis	
	Corneal xerosis	
3.Riboflavin Deficiency	Cheilosis	
	Angular stomatitis	
	Atrophic papille	
4.Thiamine Deficiency	Loss of ankle and knee jerks	
	Edema of body parts	
	Tenderness of calf muscles	
	Loss of sensation, decreased reflex	
	Palpitation/Tachycardia	
5. Niacin Deficiency	Pellagra	
	Majenta red tongue	
	Swollen papillae of mouth	
	Fissures on tongue	
6.Vitamin-C Deficiency	Swollen gums	
	Bleeding gums	
	Lack of blood clotting	
	Petechiae	
7.Vitamin-D Deficiency	Bowed legs	
	Pigeon chest	

	Knock knees	
	Soft and uncalcified anterior fontella(below 18 months)	
8.Iron Deficiency	Paleness of inner side of eye lids	
	Pale eyes, tongue, lips and face.	
	Tiredness/lack of energy	
	Edema of feet	
	Spoon shaped nails	
10.Iodine Deficiency	Thyroid gland swelling	
	Protruding eyes	
	Growth retardation	
	Deafness	
	Mental retardation	
11.Florosis	Mottled teeth	
	Dental cavities	

XII. Dietary assessment through Dietary Diversity and Food Frequency

Please think carefully about the foods and drinks that you have consumed during the last month. I will now go through a list of foods and drinks with you and I would like you to tell me during the past one month, how many days did the household eat it.

Name of the food	Did you eat this food? Yes/No	Indicate whether eaten Daily(D) / Alternate Day(AD)/ Twice in a week(TW)/ Once in a week(OW)/ Once in a fortnight(OF)/ once in a month(OM)/Occasionally (C)
Cereals		
Rice		
Sorghum		
Wheat		
Pearl millet		
Finger millet(Ragi)		
Maize		
Bajra		
Korra		
Sama		
Varrigallu		
Bread		
Bun		
Vermicelli		
Bombay rava		
Maida		
Noodles		

Any other cereals		
Pulses & legumes		
Chickpea dal (gram/Chana)		
Masoor dal (Lentil)		
Redgram		
Greengram		
Bengalgram		
Blackgram		
Rajmah		
Cow pea		
Peas		
Soya bean		
Any other pulses		
Fats and olis		
Groundnut oil		
Palm oil / Dalda		
Sunflower oil		
Soybean Oil		
Cotton oil/ Safflower oil		
Mustard oil		
Vegetable oils		
Cotton seed oil		
Butter		
Any other oils		
Vegetables		
Bitter gourd		
Bottle gourd		
Ridge gourd		
Snake gourd		
Country beans		
Cluster beans		
French beans		
Keera		
Cucumber		
Pumpkin		
Tomato		

Brinjal		
Chillies		
Any other vegetables		
Green leafy vegetables		
Amaranth		
Spinach		
Gogu		
Mint		
Coriander		
Curry leaves		
Cabbage		
Tamarind leaves		
Fenugreek leaves		
Drumstick leaves		
Ponaganti kura		
Ambat chukka		
Gangavayallu kura		
Any other GLF		
Fruits		
Guava		
Banana		
Grape		
Papaya		
Apple		
Orange		
Pomegranate		
Mango		
Sweet lemon		
Water melon		
Custard apple		
Any other fruits		
Milk & milk products		
Cow milk		
Buffalo milk		
Curd		

Butter milk		
Khoa		
Panner		
Skimmed milk powder		
Any other milk sources		
Meat & meat produts		
Chicken/ bird meat		
Sheep/Goat meat		
Beef		
Pork		
Fresh Fish		
Dry fish		
Egg		
Prawns		
Crabs		
Quails		
Any other fleshy products		
Sugars		
Sugar		
Honey		
Jaggery		
Sugarcane juice		
Any other		
Nuts		
Groundnuts		
Gingelly seeds		
Dry coconut		
Almonds		
Cashewnut		
Pista		
Any other		
Pickles(Non-veg)		
Mutton		
Chicken		
Prawns		
Fish		

Pickles(Veg)		
Mango		
Tomato		
Amla		
Gogu		
Cauliflower		
Lemon		
Any other		
Beverages		
Tea		
Coffee Cool drinks		
Badam milk		
Butter milk		
Horlicks		
Boost		
Coconut water		
Any other		
Fried Foods		
Pakodi		
Samosa		
Aloo bajji		
Mirchi bajji		
Veg/egg bonda		
Mysore bajji		
Any other		
Sweets		
Kheer		
Kesari		
Laddu		

Gulab jamun		
Ice cream		
Halwa		
Payasam		
Any other		
Snacks		
Cake		
Noodles		
Soups		
Biscuits		
Any other		
Savouries		
Boondi/khara		
Muruku/Sev		
Fried channa		
Sauce/ketchup/Jam		
Meal/Tiffin/tea in hotel		
Mid day meals		
Social meal (Marriage/Shradh/etc.)		
Others (please specify)		

XIII. FOOD WEIGHMENT METHOD

1	**Names of the members in the household**					
2	**Age of the members**					
3	**Activity status(S/M/H)**					
4	**Consumption units**					
	Meal Timings	**Meal**	**Ingredients**	**Raw weights (gms)**		

XIV. Interview of a Non SHG member

1. Have you ever joined a SHG? Yes/No. If yes, please ask the below questions. If No, go to question 2.
    a. When did you join the SHG?
    b. Who was the leader of that SHG?
    c. When did you dropout from the SHG and why?
    d. Was the SHG dissolved and why?
    e. Did you benefit from the SHG? Yes/No. If yes, please indicate in what way you have been benefitted?
2. What was the reason for not joining the SHG?
3. Do you think that you have benefitted from not joining the SHG? If yes, how?
4. Do you think that you have been deprived of benefits by not joining SHG? Yes/No.

If yes, In what way?

5. Do you think you will be able to join a SHG group in the future? Yes/No. If yes,
    a. Would you join the group of the same caste or a different caste? Yes/No
    b. Would you be the leader of that group? Yes/No

Appendix 2: Distribution of height, weight and BMI of SHG household children(Birth to 18 years)

Age (years)	Boys(n=77)				Girls(n=60)			
	Height (cm)	Weight (kg)	BMI	Tot no	Height(cm)	Weight(kg)	BMI	Tot no
Birth to 1	80±19.80	8.10±0.57	13.65±5.70	2	61.3	6.3	16.77	1
2	78.8	8.8	14.17	1	78.45±2.19	10.05±0.92	16.31±0.58	2
3	85	10.1	13.98	1	88.48±15.54	12.20±4.60	15.24±1.26	5
4	90.90±5.84	11.90±1.70	14.36±0.94	4	92.83±8.20	12.0±0.82	14.04±1.61	3
5	101.50±12.64	16.43±5.78	15.55±1.55	3	101.32±12.48	13.80±2.50	13.45±1.03	4
6	111.73±12.06	18.00±5.28	14.31±2.36	7	114.67±15.36	19.73±11.37	14.14±4.61	3
7	110.3	16.50	13.56	1	113.66±9.49	19.90±7.09	15.05±2.73	5
8	147.7	20.6	9.44	1	118.98±7.09	21.68±6.33	15.05±2.46	5
9	126.0±4.65	22.24±2.65	14.05±1.89	5	122.03±4.87	16.87±3.64	11.47±3.15	3
10	128.77±6.36	26.79±7.61	16.01±3.50	7	131.18±12.61	27.68±9.68	15.68±2.13	6
11	140.97±11.40	28.30±6.35	14.08±0.93	3				0
12	146.80±8.27	34.37±8.74	15.75±2.15	3	137.97±2.42	30.87±2.25	16.20±0.63	3
13	145.62±9.27	38.11±8.09	17.80±2.03	10	147.1	42	19.41	1
14	154.92±11.64	47.07±11.15	19.36±2.71	6	147.32±6.89	40.28±7.62	18.74±4.40	5
15	157.30±9.93	46.33±10.08	18.50±2.52	7	149.32±3.92	40.55±5.62	18.14±1.85	4
16	164.80±22.75	39.83±11.85	15.12±4.93	4	152.30±1.41	39.25±7.42	16.89±2.89	2
17	160.88±9.92	49.43±8.27	19.03±2.12	4	151.34±5.25	44.56±7.15	19.36±1.90	5
18	170.28±17.96	52.68±14.47	18.41±4.97	8	151.33±3.45	44.27±5.50	19.32±2.15	3

Distribution of height, weight and BMI of NONSHG household children(Birth to 18 years)

Age (years)	Boys(n=14)				Girls(n=7)			
	Height (cm)	Weight (kg)	BMI	Total no	Height(cm)	Weight(kg)	BMI	Total no
Birth to 1	64.33±7.23	7.65±3.03	17.78±3.98	3	80	9	14.06	1
2	-	-	-	0	93.3	12.1	13.90	1
3	-	-	-	0	80.6	9.5	14.62	1
4	65.8	6.5	14.4	1				0
5	-	-	-	0	94.2	12.5	14.09	1
6	-	-	-	0	-	-	-	0
7	-	-	-	0	-	-	-	0
8	-	-	-	0	-	-	-	0
9	130.3	21.1	12.43	1	-	-	-	0
10				0	-	-	-	0
11	134.1	24.6	13.68	1	-	-	-	0
12	163.2	45.5	17.08	1	143.5	26.8	13.01	1
13	138.3	36.9	21.3	1	154.8	37.2	19.2	1
14	151.15±14.35	32.45±2.90	14.28±1.44	2	-	-	-	0
15	164.1	46.2	17.16	1	-	-	-	0
16	159.95±2.05	45.50±4.24	17.77±1.20	2	-	-	-	0
17	-	-	-	0	-	-	-	0
18	167.3	51	18.22	1	160	52	20.31	1

Appendix 3:Correlation results of SHG and Non SHG Households

SHG

S.no	Variables	HH Income	SHG Years	Age of SHG respondent	Education of SHG respondent
1	SHG BMI	-0.018^{NS}	-0.024^{NS}	0.114^{NS}	0.157^{NS}
2	HH Dietary diversity	0.208^{NS}	0.150^{NS}	0.036^{NS}	0.090^{NS}

Significant Level-- P-value-P ≥ 0.5 ^{NS}-Non-significant

Non SHG

S.no	Variables	HH Income	Age SHG Respondent	Education of SHG Respondent
1	Respondent BMI	-0.31^{NS}	-0.12^{NS}	0.41^{NS}
2	HH Dietary diversity	-0.09^{NS}	-0.05^{NS}	-0.30^{NS}

Significant Level-- P-value-P ≥ 0.5 ^{NS}-Non-significant