IMPACT OF OCCUPATION OF HOUSEHOLD HEAD IN HEALTH AND NUTRITIONAL STATUS OF ADOLESCENT GIRLS IN RANCHI TOWN OF JHARKHAND

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This paper is an attempt to analyse the impact of Occupation of the Household Head in enhancing the status of health and nutrition in adolescent girls in Ranchi town. Adolescents are the future of the nation, forming a major demographic and economic force. Adolescence refers more broadly to the phase of human development encompassing the transition from childhood to adulthood. Adolescence comprises 1/5th to 1/6th of population of any area and this important demographic dividend has to be considered in framing policies. The period of adolescence holds special place in the life span of girls. Proper nutrition and good health is important in this phase of life. This health and nutrition are of prime concern especially in underdeveloped regions, Jharkhand being one. In the term of natural and human resources, Jharkhand is considered the richest state but it suffers from high incidence of malnutrition among children and anaemia among adults. Studies done by Menon et al (2008) and IFPRI (2008) indicate that Jharkhand ranked 16th among 17 major states of the country. The state Annual Health Survey (AHS) 2012-13 records that 51% of children suffer from stunting(low height weight ratio) indicating long run chronic undernutrition rather than short term fluctuation in diet and also that there is negligible inter district variation (Smith and Haddad 2003) indicating that child malnutrition is a universal challenge in the state. AHS also records that approx 84% of women in Jharkhand are anaemic. Poor health is an established fact for Jharkhand but it is the health of adolescent girls that is of concern as they are the future mothers. It is therefore imperative to study the health and nutrition status of adolescent girls in urban areas and examine the role played by occupation of the household head in it. With the help of a pre-framed schedule primary data collected from 200 sampled adolescent girls of Ranchi town, the study concludes that there is statistically significant association between occupation of the household head and status of health (BMI) and nutrition of adolescent girls. . However no significant association in health status of adolescent girls in terms of stunting and wasting was observed. The health and nutritional status of adolescent girls in the study area may be improved with increase in the employment opportunities and income of their parents.

Keywords: *Adolescence, Nutritional Index, Stunting, Wasting, BMI Occupation of the Family Head*

INTRODUCTION

The word Adolescent is derived from Latin word "Adolesere" means to grow to maturity. This Adolescent period accelerated physical, biochemical and emotional development. There are nearly one billion adolescents in the world accounting for 20-25% of the total population in the developing counties. In India, the adolescent population constitutes more than one fifth (23%) of the total population (Roy et al 2000)[1]. Adolescence period is characterized by rapid increase in height, weight and hormonal changes resulting in sexual maturation (Gupta 1990)[2]. Most girls begin a rapid growth spurt between the ages of 13 and 19 years.

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Adolescence, one of the nutritional stress periods of life with profound growth, comes with increased demands for energy, protein, minerals and vitamins (Gopalan et al.2001)[3]. In India, poor nutrition, early bearing and reproductive health complications compound the difficulties of physical development in adolescent girls (Manford and Picciano 2000)[4].

India, being a country in developmental transition, faces the dual burden of pre-transition diseases like undernutrition and infectious diseases as well as post-transition, lifestyle-related degenerative diseases such as obesity, diabetes, hypertension, cardiovascular diseases and cancers. According to National Family Health Survey (2005-06) and UNICEF[5], 2008 Reports, 46% of preschool children and 30% of adults in India suffer from moderate and severe grades of protein-calorie malnutrition as judged by anthropometric indicators. Currently, India is in nutrition transition with 10% rural adults and 20% urban adults suffering from over nutrition leading to an emerging double burden of malnutrition (Gopalan, 2008)[6]. In a county like India with varying social customs and common beliefs against females there is a high prevalence of malnutrition amongst girls. Increased physical activity combined with poor eating habits and the onset of menstruation contributes to accentuating the potential risk for adolescent's poor nutrition (Bhaskaran 2001)[7]. High severe malnutrition amongst girls has been reported from West Bengal (Sen & Sengupta 1983)[8]. Dietary habits of adolescent girls in slum areas are very poor (Parimalavalli et al. 2007)[9].

The nutritional needs of males and females of the same age differ with in childhood but diverge after the onset of the pubertal growth spurt not only in energy requirement (2200 Kcal for adolescent girls and 2500 – 3000 Kcal for boys) but also in composition. The WHO (2006)[10] study also observed that almost half of the adolescents of both sexes were not getting even 70% of their daily requirement of energy.

The severity of the problem of poor health and nutrition of adolescent girls can be understood with the help of available data at global, national and regional level. WHO (2006)[11] noted that in south-east Asian region, a large number of adolescent suffer from malnutrition which adversely affect their health and development.

The main focus of this study is to examine the role of occupation of household head in determining the health and nutrition of adolescent girls in the study area.

Health and Nutrition

Nutrition is that process by which living organisms obtain food in adequate quantity and quality and use it for growth, metabolism, and repair. Its stages include adequate quantity and quality ingestion, digestion, absorption, transport, assimilation, and excretion. In recent times, it has emerged as a science that deals with food and nourishment, including dietary guidelines, food composition, and the roles that various nutrients have in maintaining health. There are six categories of nutrients that the body needs to acquire from food: protein, carbohydrates, fat, water, vitamins and minerals. A balance diet must contain adequate quantities of these together with essential micronutrients like calcium, zinc, potassium, iron, Sodium chlorides, phosphorus, magnesium etc. Dietary modifications might be prescribed for a variety of physiological as well as mental disorders. In addition recommended dietary allowances (RDA) differs by age, sex, nature of activities, rural / urban living status, and cost of diet the family can afford depending on their economic condition and so on. Special diet is recommended for pregnant and lactating women & of later adolescents especially girls also have specified recommended dietary allowances.

A healthy citizen is an asset to the nation. A state of well-being contributes to raise national productivity and improve many social indicators of better living. The Constitution of the World

Health Organization, which came into force on April 7, 1948, defined health "as a state of complete physical, mental and social well-being." i.e. a state dependent on the presence or absence of diseases.

Today, three types of definition of health seem to be possible and are used. The first is that "health is the absence of any disease or impairment". The second is that health is "a state that allows the individual to adequately cope with all demands of daily life (implying also the absence of disease and impairment)". The third definition states that "health is a state of balance, an equilibrium that an individual has established within himself and between himself and his social and physical environment".

OBJECTIVES OF THE STUDY

The study aims to examine the health and nutritional status of adolescent girls in the study area and their association with occupation of the household head.

And in view of this objective the following hypotheses are formulated

- There is no association between occupation of the household head and nutritional status (measured by nutritional index) of adolescent girls of Ranchi Town.

- There is no association between occupation of the household head and health status as measured by Stunting, Wasting and BMI of adolescent girls in Ranchi town.

DATA SOURCE

Study is basically based both on primary data but secondary data is also used. Secondary data has been collected from government reports and publications like Different rounds of National Family and Health Survey (NFHS)[12], standard height and weight chart by WHO,2007[13] growth reference for adolescents, 10 food plan has been used as given by nutrition expert group of ICMR[14], Journals like- The National Medical Journal of India, Journal of Economic and Social Development, Economic and Political Weekly, Nutrient Requirements and Recommended Dietary Allowances for Indians, web-sites relating to health and Nutrition eg. www.health.gov,au>...> Child and Youth Health, www. unicef.org/india/nutrition etc. have been explored to see the work done by earlier authors on similar topic.

The study attempts to draw conclusions on empirical research questions and hypotheses to justify the work. For this, the present study uses primary data on status of health and nutrition of respondent adolescent girls. It also focuses on the exploratory variables responsible for the status of health and nutrition of each respondent adolescent. Primary data has been collected by interview and pre-framed schedule method on sampled adolescent girls from Ranchi town. The urban area of Ranchi has heterogeneous population consisting primarily of two main groups- Tribal (26.19%) and Non-tribal (73.81%), who differs considerably in their socio- economic condition, life style and eating habits, hence affecting their health and nutritional status. Further Tribal population consists of three religious groups namely – Hindus, Christians and Sarna. The non-tribal population of Ranchi consist of Hindu, Muslim, Christian, Sikh, Buddhist, Jain, Parse etc. These subdivisions have been proportionately included in the sample.

Selection of Variables for the Study

Identification of the causal relationship among the different variables of any study is an essential concern of this investigation. A causal relationship between the two variables exists only when one

of them may logically be considered as the cause of the other. Therefore, for analyzing the data, two sets of variables has been chosen. They are: Dependent Variable, and Independent Variable

A) Dependent Variables

Dependent Variable for Nutrition - Nutritional Index (Y_1) has been calculated for each sampled adolescent girl. The Nutritional Index has been computed as the ratio of actual intake of each type of food consumed and the required intake as per standard ICMR[6] table.

Dependent Variable for Health - Based on anthropometric measures of age, height and weight, Body Mass Index (BMI), Stunting and Wasting status has been computed for each respondent as per WHO reference data. Body Mass Index (BMI) of each adolescent girl has been divided into 5 groups as per WHO 2007 reference namely severe thinness, thinness, normal, overweight and obesity. Also Stunting and Wasting status have been categorized into 3 sub heads severe, moderate and normal based on the WHO reference data.

Following Notations have been used for the dependent variables in the study:

Y_1 = Nutritional Index (the range 0 to 1, actual intake/desired intake as per ICMR, nutrition expert group)

Y_2 = Stunting Status (Normal, Moderate and Severe according to WHO)

Y_3 = Wasting (Normal, Moderate and Severe according to WHO)

Y_4 = Body Mass Index (BMI) [Severe Thinness, Thinness, Normal, Overweight and Obese as per WHO reference data, 2007]

B) Independent or Explanatory Variables

Both nutrition and health depends on a no. of variables. Based on extensive study of available literature, a no. of such explanatory variables has been identified. Those taken for investigation in this study include age, height, weight and occupation of the household head.

Techniques used to Quantify the Dependent Variables

For Computation of Health and Nutritional Status 4 indicators have been made. To find the nutritional status, nutritional index of each respondent has been computed using actual intake/required intake as per ICMR, nutrition expert group. To find the health status, anthropometry measures have been used which uses height, weight and age to access the status of stunting, wasting and also to compute the BMI. In this study the WHO Reference data on stunting, wasting and BMI has been used to classify them, which is discussed below

Y_1: Nutritional Index

It has been computed by the help of nutrition intake according to 10 food plan given by Nutrition Expert Group in India (ICMR). Nutritional intake index has been calculated by dividing actual intake by required intake. The range of Nutritional Index is 0-1.This range has been categorized into three groups, namely-

1. Low Nutritional Index $.25 \leq N.I \leq .50$

2. Moderate Nutritional Index $.50 \leq N.I \leq .75$

3. High Nutritional Index $N.I \geq .75$

Y_2: Stunting Status

Low length-for-age, stemming from slow physical growth of the foetus and the child which results in a failure to achieve expected length as compared to a healthy, well-nourished child of the same age, is a sign of stunting. Stunting is an indicator of past growth failure. It is associated with a number of long-term factors including chronic insufficient protein and energy intake, frequent infection, sustained inappropriate feeding practices and poverty. **Stunting status** has been computed as **normal, moderate and severe** according to the growth reference of WHO, 2007. For measuring stunting as per the WHO standard method which is most commonly used, cut-off is on Standard deviation units or Z-scores, which is **-2** standard deviations, irrespective of the indicators used. Stunting below -2 SD from median is considered moderately and stunting below -3SD from median are severely stunted.

$Y_2{}^*$ **Stunting Index** has been computed by actual figure of height according to age by required figure (height for age). Actual height is recorded by interview of each respondent and required or standard height for age has been taken from growth reference of WHO, 2007.

Y_3: Wasting Status

Wasting (weight-for-height) is the result of a weight falling, significantly below the weight expected from a child of the same length or height. Wasting indicates current or acute under-nutrition resulting from failure to gain weight i.e. actual weight loss. Causes of weight loss include inadequate food intake, improper feeding practices, disease and infection or more frequently, a combination of these factors. Wasting in a child and a population group can change rapidly and shows marked seasonal patterns associated with changes in food availability or disease prevalence to which it is very sensitive. Because of its response to short-term influences, wasting may be used for screening.

Wasting Status has been computed as normal, moderate and severe which based on the classification of WHO. Weight and height of adolescent girls is recorded while interviewing each respondent and it is compared with WHO reference data and after that classified them into above three groups, NCHS/WHO. For measuring wasting as per the WHO standard method which is most commonly used, cut-off is on Standard deviation units or Z-scores, which is **-2** standard deviations, irrespective of the indicators used. Wasting below -2 SD from median is considered moderately and wasting below -3SD from median are severely wasted. This status helps to identify children suffering from current or acute under -nutrition or wasting and is useful when exact ages are difficult to determine.

$Y_3{}^*$ **Wasting Index** has been computed by actual figure of weight according to height by required figure of weight for height. Actual height is recorded while interviewing each respondent and required or standard height for age has been taken from NCHS/WHO. This index helps to identify children suffering from current or acute under -nutrition or wasting and is useful when exact ages are difficult to determine.

Y_4: BMI (Body Mass Index)

The BMI is defined as the body mass divided by the square of the body height. It is universally expressed in units of kg/m², resulting from mass (in kilograms) and height (in metres). Commonly

accepted BMI ranges are

Underweight ≤18.5 kg/m^2

Normal Weight 18.5 to 24.9(25)

Overweight 25 to 30

Obese ≥30

For measuring, BMI the most commonly used cut-off is Standard deviation units or Z-scores given by WHO 2007 reference data for 5-19 years, which is -2 standard deviations, irrespective of the indicators used. According to WHO BMI of an individual have been classified into 5 standard categories:

Severe Thinness (<-3SD), Thinness (<-2SD), Normal (>-2SD and <+1SD), Overweight (>+1SD but <+2SD), Obesity (>+2SD)

Sample Size and Sampling Design

Sample size refers to the no. of sample units to be selected for the study. As the study requires estimation of multiple characteristics and relationships, standard statistical tools of selecting sample size cannot be applied. Also the population parameters are not known, as adequate information about the universe (mean, SD) are not available. Hence a sample size of 200 is decided based on the size selected in similar studies done by earlier researchers.

Multistage Stratified Random Sampling method has been used to select sample respondents. A sample of 200 adolescent girls has been selected on the basis of stratified proportionate random sampling. The study is based on cross sectional study carried out in Ranchi town, from the month of September 2017 to December 2017, the capital town of State of Jharkhand. The total of 53 wards of Ranchi town has been grouped into two-i.e. Tribal dominated wards and Non-Tribal dominated wards according to proportion of Tribal in the population as per 2011 census. In census of 2011 of Jharkhand, 26% population were ST population, so the wards having 26% and above Tribal population, have been taken as Tribal dominated wards. After stratifying the 53 wards of Ranchi town, it was found that the wards no. 1, 2, 7, 8, 10, 12, 13, 15, 19, 35, 36, 47, 48, 51, and 53 were Tribal dominated and rest are non-Tribal dominated wards**.** Out of these 6 wards (3 from tribal dominated wards- comprising of ward no 10, 12 and 19. & 3 from non- tribal dominated wards- comprising of ward no.21, 24 and 25) were randomly selected. As the period of adolescence covering 10 to 19 years is marked by two distinct stages, the sample has been accordingly selected to cover Pre-puberty period (10 to 12 years) and Post puberty period (13 to 19 years).

A pilot study was done to mark the households in each selected ward having adolescent girls of pre-puberty age, post-puberty age and also those households having adolescent girls of both ages.

1/3rd of the sampled adolescent girls comprised of girls between 10 to 12 years and who have not reached puberty. The rest 2/3rd include the girls of age 13 to 19 and those whso are in the post puberty phase. Thus from each selected ward, 12 adolescent girls of pre-puberty stage and 23 of post puberty stage were selected by method of systematic random selection of households. The final sample comprising of 68 adolescent girls of pre-puberty period and 132 of post-puberty period allowing for non-respondents/errors and ommissions.

The sample design used in the present study based on the method of Multistage Stratified Random Sampling is as follows:

Sample Plan/Design

Sample design is based on Multistage sampling using stratified random sampling. This is carried out in 3 stages

Stage 1: Selection of ward: The whole ward of Ranchi town has been classified into tribal dominated wards and non-tribal dominated wards according to the census 2011, the tribal population is 26%, so those wards having 26% or more than 26% of ST population has been taken as tribal dominated wards. After this classification it was found that there were 15 wards of tribal dominated and rest 38 were non-tribal dominated wards.

Stage 2 Out of 15 tribal dominated wards 3 wards were randomly selected and also 3 wards from non-tribal dominated wards were randomly selected.

Stage 3: After selecting the wards, the household list of these wards were obtained from Ranchi Municipal Corporation. Then household having 10 to 19 years of age of adolescent girls was selected. Data has been collected by schedule method by face to face interview method. A total of 200 adolescent girls were selected by proportionate stratified random sampling method as per design given below:

Table 1: Sample Design for Selection of Adolescent Child

A			B		
3 Tribal Dominated Wards Ward No- 10,12, & 19 (100 Adolescent girls)			3 Non-tribal Dominated Wards Ward No.-21, 24 and 25 (100 Adolescent girls)		
Ward	**Pre Puberty**	**Post Puberty**	Ward	Post Puberty	Post Puberty
1	12	23	1	12	23
2	12	23	2	12	23
3	12	23	3	12	23
Total Selected	36*	69**	Total Selected	36*	69**
*Only 34 were finally taken **Only 66 were finally taken					

The adolescent period comprises of the ages between 10-19years. 1/3rd of the sampled adolescent girls have been selected between 10 to 12 years and who have not reached puberty. The rest 2/3rd include the girls of age 13 to 19 and those who are in the post puberty phase. Data has been collected in two rounds

1st Round - Selection of households having

Pre-Puberty Adolescent Girls   Category I

Post-Puberty Adolescent Girls   Category II

Both Pre & Post-Adolescent Girls   Category III

For example initially ward no. 10 was selected and it was found that the total no of household in this ward was 2929 according to Census 2011. The study is of adolescent girls, so only those households were relevant which had adolescent girls. Through pilot survey such house were listed. In category I there were 130 no of relevant households, in Category II 140 households and in Category III, 110 households were listed as having adolescent girls.

2nd Round – Systematic Sampling Method was used to select households in order to get data from household having both Pre & Post Puberty Adolescent girls. From the Census, 2011, the total no of households of different wards has been taken. Systematic random sampling method has been used. For pre puberty adolescent girl's category I and III was selected and there were 240 such households in ward no. 10. 20th households have to be selected, as k=N/n=20th [240/12=20] Where N=Population size, n= sample size and k= household (20). So from, every 20th household, an adolescent girl has been taken who is in pre-puberty period. Same has been done for post-puberty period, category II and III was selected and there were 250 such households in ward no. 10. Therefore k= N/n=250/23=10th. Therefore, from every 10th household, an adolescent girl has been taken who is in post-puberty period. The same process has been done for all the selected wards. In ward no 19 kth factor was 15. While collecting the data, one household was found locked, as the family had gone away for vacation, in that case the next of the kth factor i.e 16th household was taken and subsequently the next household 16+15=31st was been taken.

METHOD OF DATA ANALYSIS

The Study is based on assessment of status of health using parameters based on Anthropometric measurements of physical body composition. For assessment of Nutritional Status, the dietary intake of adolescent girls was used.

At exploratory stage of research evaluation of health using anthropometric technique (age, height and weight give BMI, Stunting and Wasting Indices of each respondent has been computed for each and was taken for study. This was compared with standardised norms to give health status.

For studying the health status of respondent, 3 indicators has been used, Health Index has been computed using the following formulae

- BMI =weight/height^2 (weight is in kg and height is in metre.)

- Stunting status=actual height-for-age has been compared with WHO standardisations and classified into normal, moderate and severe.

- Wasting Status=actual weight-for-height recorded by interview and compared with WHO standardisations and classified into normal, moderate and severe.

For nutritional status data on food intake using 10 food plan (given by nutrition expert ICMR) for adolescent girls of urban areas, both in their pre and post puberty stage, has been recorded in schedule and compared with standardised norms of nutrition. The Table of balanced diet for medium class family using the10 food plan is as follows-

Table 2: Food Plan Balanced diet (gms) at moderate cost for school children and adolescents

Foodstuffs	School Children				Adolescent Girls	
	10-12 years		13-15 years		16-18 years	
	V*	NV**	V	NV	V	NV
Cereals	290	290	400	400	320	320
Pulses	70	60	70	50	70	50
Green Leafy Vegetables	100	100	100	100	150	150
Other Vegetables (roots & Tubers)	75	75	150	150	150	150
Fruits	100	100	100	100	100	100
Milk	600	400	600	400	600	400
Fat & Oils	30	30	30	30	30	30
Mean, Fish and eggs	---	60	---	80	---	80
Sugar & Jiggery	30	30	30	30	30	30
Peanut	40	30	40	30	50	30

Source- ICMR (Handbook of Food and Nutrition, Swaminathan, M. S., 2010)

 *Vegetarian; **Non-vegetarian

As I.C.M.R has given different food plan for different age groups based on different income groups, nature of works etc. The 10 food plan is suited for school going and adolescent age group in the study area. Required quantity for each food items for adolescent girls has been determined according to the I.C.M.R. Nutrition Expert Group, 1968. The experts have given balanced diet for various categories of households such as high cost, moderate cost, low cost. Balanced diets at high cost includes liberal amounts of costly food such as milk, eggs, meat, fish, and fruits and moderate quantities of cereals, pulses, nuts and fats. Balanced diets at moderate cost include moderate amounts of milk, eggs, meat, fish, fruits, and fats and liberal amounts of cereals, pulses, nuts and green leafy vegetables, whereas balanced diets at low cost include small amounts of milk, eggs, meat, fish and fats and liberal amounts of cereals, pulses, nuts and green leafy vegetables. As most of the people in the study area come under medium income group, balanced diet at moderate cost has been taken. Nutritional index has been computed as the ratio intake of each of the 10 type of food to the corresponding required intakes. To fulfil the objectives of the study and test the related hypotheses appropriate statistical analysis has been done. This has been done across social and religious groups, marital status, income and occupation of the family and education level of mother using descriptive analysis of data obtained from interview and pre framed schedule method with questions being dichotomous, multiple choice questions, question with scale options or metric options. .

Descriptive analysis of health and nutritional status has been done using averages; SD (Standard Deviation), CV (Co-efficient of Variation), percentage and also appropriate diagrams has been used.

Causal/ Inferential Analyses has been done to the find the relationship between dependent variable and independent variables using following statistical tools-

i)   **Correlation-** Karl Pearson coefficient of correlation has been used to find the relationship between dependent variable and independent variable. Dependent variable like Income of the family and dependent variables for the study are Body Mass Index (BMI) and Nutritional Index.

Testing the significance of the correlation coefficient

The statistical test for the significance of a correlation coefficient is relevant t-statistic. The hypothesis to be tested is mentioned below:

$$H_o: p = 0$$

$$H_1: p \neq 0$$

Test statistic is given by,

$$t_{n-2} = \frac{r\sqrt{n-2}}{\sqrt{1-r^2}}$$

Where,   p = population correlation coefficient between the variables X and Y

r = Sample correlation coefficient between the variables X and Y

n - 2 =The degrees of freedom

Given the value of r and n, the value of the test statistic t could be computed. Now for a given level of significance, if computed value is greater than tabulated value with n - 2 degrees of freedom, the null hypothesis of no correlation between X and Y is rejected.

(ii) Chi-Square Test- Some explanatory variables are non quantifiable or categorical in nature. Marital status, family type, occupation of the household head, education level of mother, working status of mother, availability of sanitation facility, quality of drinking water, etc are such variables identified and also taken for this study. To find the association between these and the dependent variables (Body Mass Index (BMI), Stunting Index, Wasting Index and Nutritional Index) Chi-Square Test or Frequency Test at 5% level of significance has been used.

STATUS OF NUTRITION OF ADOLESCENT GIRLS BY OCCUPATION OF THE HOUSEHOLD HEAD IN RANCHI TOWN

From a detailed review of available literature, it has been found that numerous factors influence the health status and food choices of adolescent. These may be grouped into categories. The first include appeal for food, craze for trendy foods, mood, body image, habit, media and association of food of people, convenience, preferences for outside food and peer influence. The second category covers socio-demographic family traits like parental influence on eating behaviour, culture, religion, beliefs and factors like family income, location, access to food, family occupation, level of education of parents, especially mothers and occupation of family (WHO, 2012)[15].

Occupation of the family head plays an important role to provide nutritious food and also better quality and quantity of balanced diet which is prime necessity for a good health. In this study, the occupation of family has been divided into 4 heads namely-organised sector + business, unorganised sector, agriculture, and worked as daily worker. The distribution of adolescent girls as per occupation of the household head in the study area is given by the given table and graph-

Table 3: Occupational Composition of Family Heads of Sampled Adolescent Girls of Ranchi Town

Total No.(%)	Occupation of the family head				Total
	Organised + Business	Unorganised	Agriculture	Daily worker	
	91(45.5%)	46(23%)	34(17%)	29(14.5%)	200

Source; Own Computation from Primary Data

Figure 1 : Occupational Composition of Sampled Adolescent Girls of Ranchi Town
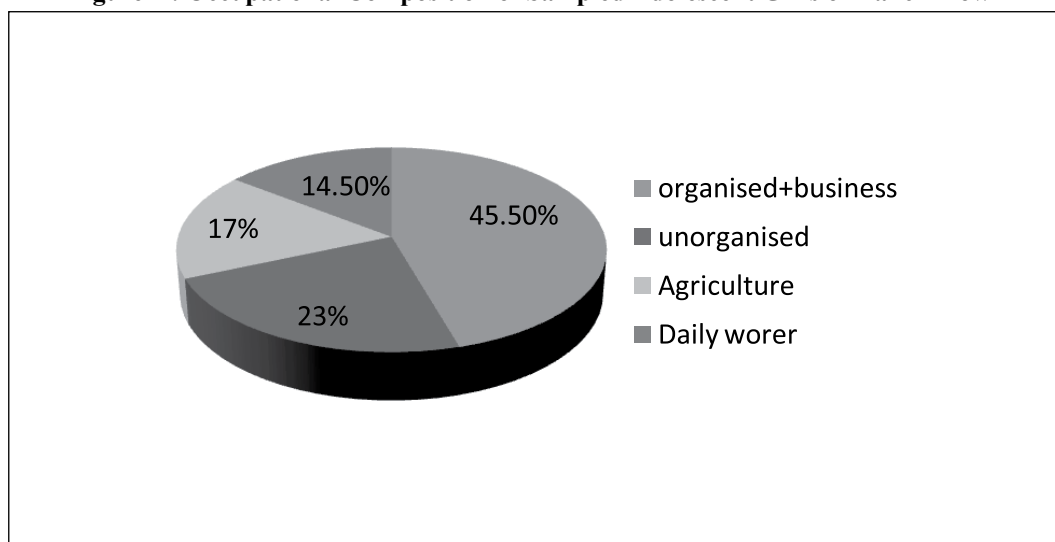
Source; Table No. 2

## a) Association between Nutrition Intake And Occupation of Household Head

Primary data obtained from sampled adolescent girls has been tabulated below:

Table 4: Number (in figure and %) of Adolescent girls having low, moderate and high Nutrition Index according to occupation of the family head

Nutritional Status	Occupation of the family head				Total
	Organised+ Bussiness	Unorganised	Agriculture	Daily worker	
Low	6(06.59%)	12(26.08%)	6(17.64%)	5(17.24%)	29
Moderate	40(43.95%)	24(52.17%)	20(58.82%)	19(65.51%)	103
High	45(49.45%)	10(21.73%)	8(23.52%)	5(17.24%)	68
Total	91	46	34	29	200

Source; Own computation from Primary Data

Figure 2: Number (in figure) of Adolescent Girls having low, Moderate and High Nutrition Index according to occupation of the family head
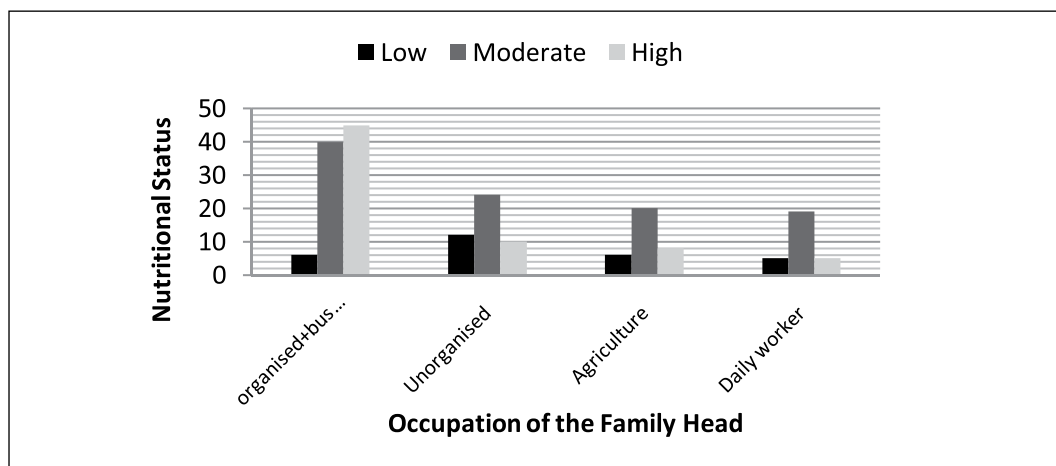
Source; Table No. 4

From the above table and also by graph it is clear that most of the sampled adolescent girl's parent engaged in organised and unorganised sector. And also the nutritional status of adolescent from this category of parent's occupation is best among all the occupation of family heads.

Table 5: Association between Average Nutritional Index and Occupation of the Family Head

Nutritional Status Organised +business		Occupation of the family head				
		Unorganised	Agriculture	Daily worker	Total	
Low		6	12	6	5	29
Moderate		40	24	20	19	103
High		45	10	8	5	68
	Total	91	46	34	29	200
	Expected frequency					
Health status Organised +business		Occupation of the family head				
		Unorganised	Agriculture	Daily worker	Total	
Low		13.26	6.70	4.95	4.23	
Moderate		47.10	23.81	17.60	15.01	
High		31.10	15.72	11.62	9.91	
chi square= 0.00085						

Source-Own Computation from primary data

To test whether there is any association between nutrition intake and occupation of the family, following hypotheses have been formulated as,

Null Hypothesis

H_0: There is no association between average nutritional status and occupation of the family head.

And Alternative Hypothesis is

H$_1$:   There is association between average nutritional status and occupation of the family head.

To test the hypotheses Chi- Square test at α=0.05 has been carried out and the results are as follows-

As the value of chi-square is less than .05, the null hypothesis is rejected. So **there is association between nutrition intake and occupation of the household head.** Certain occupations of family heads were found to such that adolescent girls of those families had better Nutritional Index. In general the percentage of adolescent girls with moderate or high Nutritional Index was much higher in those families where the head was in organised sector and business. Lowest Nutritional Index was found in families of agriculturists.

## (b) Association between Stunting and Occupation of the Household Head

The status of health (Stunting as health indicator) of sampled adolescent girls in the study area according to occupation of the family head has been given through following table and graph-

Table 6: No. (in fig. and %) of Adolescent girls having not stunted, moderate and severe stunted according to occupation of the family head

Health status Organised+Business	Occupation of the Family Head				
	Unorganised	**Agriculture**	**Daily Worker**	**Total No.**	
Not Stunted	74(81.31%)	31(67.39%)	24(70.58%)	18(62.06%)	147
Moderate	12(13.18%)	10(21.73%)	5(14.70%)	5(17.24%)	32
Severe	5(05.49%)	5(10.86%)	5(14.70%)	6(20.68%)	21
Total No.	91	46	34	29	200

Source: Own computation from Primary Data

Figure : 3 (in fig. and %) of Adolescent Girls having Not Stunted, Moderate and Severe Stunted According to Occupation of the Family Head
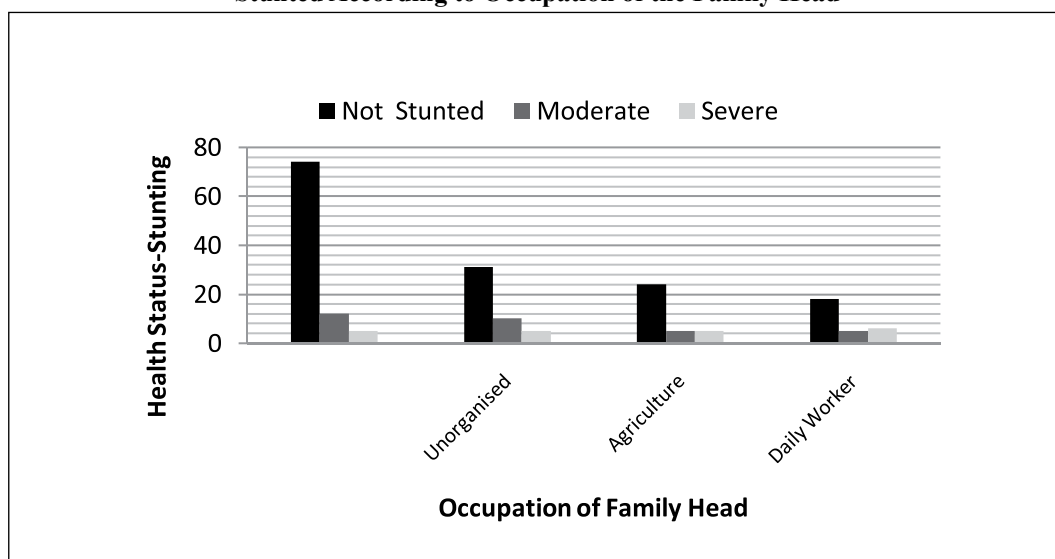
Source; Table No.6

From the table and graph above it has been seen that the adolescent girls who are not stunted and also moderately stunted are from those parents who are engaged in organised and business sectors.

To test whether there is any association between health status-Wasting as health indicator and occupation of the family head, a null hypothesis has been formulated as,

H_0: Occupation of the family head has no role on determining the health (Stunting as health indicator) of adolescent girls.

H_1: Occupation of the family head has role on determining the health (Stunting as health indicator) of adolescent girls.

Table 7: Association between Health Status- Stunting and Occupation of the Family Head

Health status	Occupation of the family head				
	Organised+ Business	Unorganised	Agriculture	Daily Worker	Total
Not Stunted	74	31	24	18	147
Moderate	12	10	5	5	32
Severe	5	5	5	6	21
Total	91	46	34	29	200
Expected frequency					
Health status	Occupation of the family head				
	Organised+ Business	Unorganised	Agriculture	Daily Worker	
Not Stunted	66.89	33.81	24.99	21.32	
Moderate	14.56	7.36	5.44	4.64	
Severe	9.56	4.83	3.57	3.05	
Chi- Square=0.195875586					

Source-Own Computation from primary data

Hence null hypothesis is accepted as the value of chi square is greater than .05.It means **there is no association between occupation of the family head and health status (in case of Stunting as health indicator) of adolescent girls.**

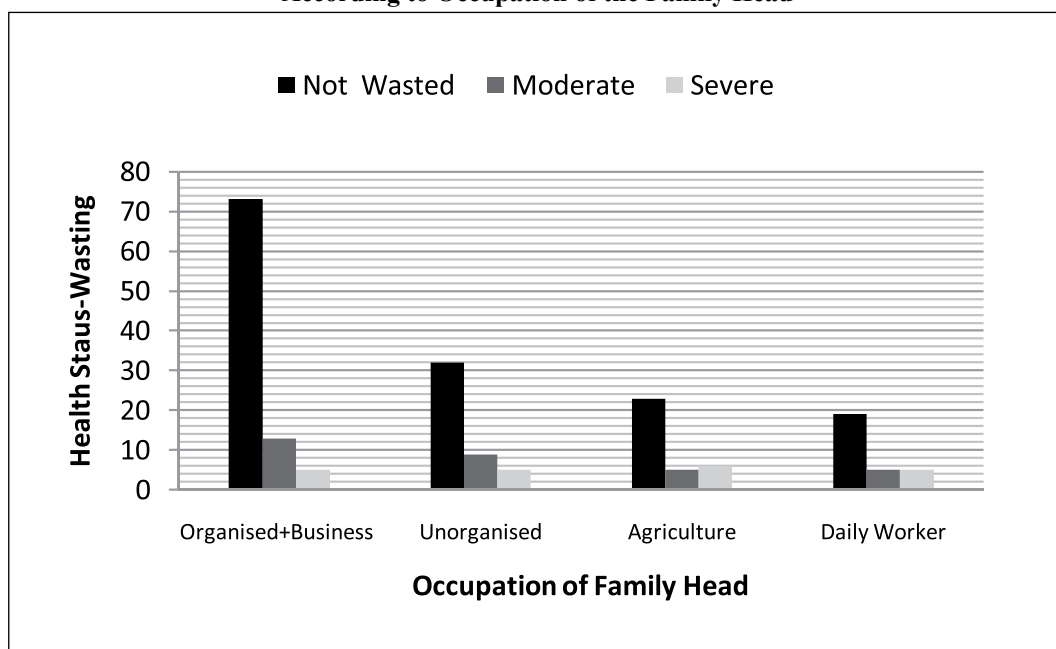## c)   Association between Wasting and Occupation of the Family Head

The status of health (Wasting as health indicator) of sampled adolescent girls in the study area according to occupation of the family head has been given through following table and graph-

Table 8: No.(and %) of Adolescent girls having Not Wasted, moderate and Severe Wasted According to Occupation of the Family Head

Health status Organised+ Business	Occupation of the Family Head				
	Unorganised	Agriculture	Daily Worker	Total No.	
Not Wasted	73(80.21%)	32(69.56%)	23(67.64%)	19(65.51%)	142
Moderate	13(14.28%)	9(19.56%)	5(14.70%)	5(17.24%)	38
Severe	5(05.49%)	5(10.86%)	6(17.64%)	5(17.24%)	20
Total No.	91	46	34	29	200

Source: Own computation from Primary Data

Figure No. 4; No. of Adolescent Girls having not Wasted, Moderate and Severe Wasted According to Occupation of the Family Head

Source; Table No.8

From the table and graph above it has been seen that the adolescent girls who are not wasted and also moderately wasted are from those parents who are engaged in organised and business sectors. But severely wasted adolescent girls are same in numbers in all the category of occupation of family head.

To test whether there is any association between health status (Wasting as health indicator) and occupation of the family head, a null hypothesis has been formulated as,

H_0: Occupation of the family head has no role on determining the health (Wasting as health indicator) of adolescent girls.

Table 9: Association between Health Status Wasting & Occupation of the Family Head

Health status	Occupation of the Family Head				
	Organised+ Business	Unorganised	Agriculture	Daily Worker	Total
Not Wasted	73	32	23	19	142
Moderate	13	9	5	5	38
Severe	5	5	6	5	20
Total	91	46	34	29	200
Expected frequency					
Health status	Occupation of the Family Head				
	Organised+ Business	Unorganised	Agriculture	Daily Worker	Total
Not Wasted	66.89	33.81	24.99	21.32	
Moderate	14.56	7.36	5.44	4.64	
Severe	9.56	4.83	3.57	3.05	
Chi- Square= 0.344725					

Source-Own Computation from Primary Data

Hence null hypothesis is accepted as the value of chi square is greater than .05.It means **there is no association between occupation of the family head and health status (in case of Wasting as health indicator)** of adolescent girls. So, occupation of the family head is not an important factor to determine the health status of adolescent girls in the study area.

**d)   Association between BMI and Occupation of the Family Head**

The status of health (BMI as health indicator) of sampled adolescent girls in the study area according to occupation of the family head has been given through following table and graph-

Table 10: Distribution of Different levels of BMI of Adolescent Girls in the Study Area According to Occupation of the Family Head

Health status	Occupation of the Family Head				
	Organised+ Business	Unorganised	Agriculture	Daily Worker	Total
Severely thin & thin	8(08.79%)	9(19.56%)	15 (44.11%)	17(58.62%)	49
Normal	72(79.12%)	30(65.21%)	14(41.17%)	7(24.13%)	123
Overweight & Obese	11(12.08%)	7(15.21%)	5(14.70%)	5(17.24%)	28
Total	91	46	34	29	200

Source: Own computation from Primary Data

Figure 5 : Distribution of different levels of BMI of Adolescent Girls in the Study Area According to Occupation of the Family Head
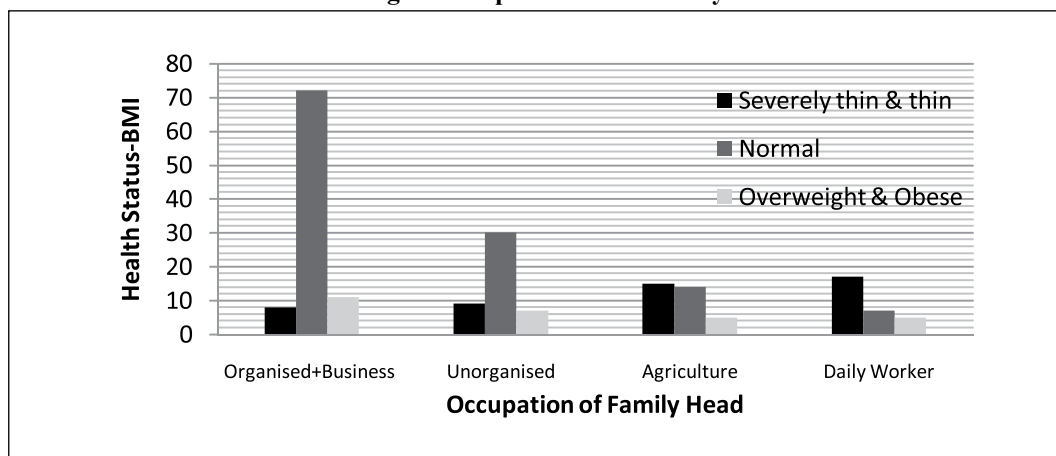
Source; Table No.10

From the above table and graph, it may conclude that normal BMI and also the problem of overweight and obese are mostly found in those adolescent girls whose parents are engaged in organised sectors and doing business. Most of the adolescent girls who are severely thin and also thin are found whose parents are worked as daily worker.

Table 11: Association between Health Status- BMI and Occupation of the Family Head

Health status	Occupation of the Family Head				
	Organised+ Business	Unorganised	Agriculture	Daily Worker	Total
Severely thin & thin	8	9	15	17	49
Normal	72	30	14	7	123
Overweight & Obese	11	7	5	5	28
Total	91	46	34	29	200

Expected frequency

Health status	Occupation of the Family Head				
	Organised+ Business	Unorganised	Agriculture	Daily Worker	Total
Severely thin & thin	22.30	11.27	8.33	7.11	
Normal	55.97	28.29	20.91	17.84	
Overweight & Obese	12.74	6.44	4.76	4.06	
Chi- Square= 0.0000					

Source-Own Computation from primary data

To test whether there is any association between health status (BMI as health indicator) and occupation of the family head, a null hypothesis has been formulated as,

H_0: Occupation of the family head has no role on determining the health (BMI as health indicator) of adolescent girls.

H_1: Occupation of the family head has role on determining the health (BMI as health indicator) of adolescent girls.

Here null hypothesis is rejected as the value of chi square is less than .05.It means **there is association between occupation of the family head and health status (in case of BMI as health indicator) of adolescent girls.** So it may safely conclude that the health status of adolescent girls when it is reflected by BMI is depends on occupation of the family head.

FINDINGS

- There is association between nutrition intake and occupation of the family head. Certain occupations of family heads were found to such that adolescent girls of those families had better Nutritional Index. In general the percentage of adolescent girls with moderate or high Nutritional Index was much higher in families where the head was in organised sector and business. Lowest Nutritional Index was found in families of agriculturists. This difference in nutritional status by occupation of family head was statistically significant.

- There is no association between occupation of the household head and health status (in case of Stunting and Wasting as health indicator) of adolescent girls.

- There is association between occupation of the household head and health status (in case of BMI as health indicator) of adolescent girls. So it may safely conclude that the health status of adolescent girls when it is reflected by BMI is depends on occupation of the family head.

CONCLUSIONS

Occupation of the household head has definite and significant effect on health and nutritional status of children and adolescents girls. This is the key factor to be addressed for prevention or improvement of childhood malnutrition. In this study it is found that the most of the bread earners of the family were engaged in agriculture and casual labours with irregular income. Due to this reason parents are not able to provide adequate diet to their children leading to poor health of the adolescent girls. So improving the economic condition of the family is of paramount importance. Skill enhancement, generation of employment opportunities, effective function of Public Distribution System (PDS) and also increase food items given by this system and provisions for self-employment would be the major actions towards improvement in health of adolescent's girls. Based on empirical data from Ranchi town, the study examines the health and nutrition status of adolescent girls and establishes that education level of mother plays a crucial role in assigning their health.

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