

## EXECUTIVE SUMMARY

### Background

Adolescence (10 – 19 years – WHO) is a period of rapid growth: up to 45% of skeletal growth takes place and 15 to 25% of adult height is achieved during the adolescent growth spurt and up to 37% of total bone mass may be accumulated. Thus, during the period of adolescence nutrient needs are the greatest.

Adolescents therefore constitute a nutritionally group for a number of reasons, including their high requirements for growth, their eating patterns and their susceptibility to environmental influences. Compounded with growth, adolescent vulnerable pregnancy exposes both mother and child to adverse health and socioeconomic consequences, particularly if the mother is stunted or undernourished. Hard physical work, as commonly observed in low-income populations, may impose additional physiological stress and nutritional requirements in adolescence. Girls are particularly at high risk because of gender discrimination. In addition to this, adolescent girls may be at risk for inadequate intake of iron and calcium. The main nutritional problems of adolescents are under nutrition and Iron deficiency anemia along with other micronutrient deficiencies;

There is a dearth of data on adolescents' nutritional status despite the fact that adolescents' nutritional problems represent a heavy health burden since they make up roughly 20% of the total world population and almost 21% of the population in West Bengal.

The available reports focus on the high prevalence of undernutrition and micronutrient malnutrition particularly anemia among adolescents in South East Asia and India including limited data from West Bengal. The present study was thus aimed at providing a status profile of adolescent nutrition among vulnerable groups (in terms of development index) in West Bengal to facilitate formulation and revision of policies, plans and programs to improve the status of adolescent nutrition among vulnerable populations in West Bengal.

## Objectives

The **primary objective** of this study was:

To assess the status of Nutrition among Adolescents of vulnerable populations in West Bengal

The **specific objectives** were:

- 1) To identify the key nutritional problems prevalent in adolescents
- 2) To identify key determinants and risk factors for these problems
- 3) To formulate relevant recommendations to modify or strengthen existing strategies and programs on prevention and control of these conditions.

## Methodology

A Cross sectional study was conducted among a sample adolescent population selected from the requisite number of villages from the selected GP in the selected **block (Kalinagar Gram Panchayat in Sandeskhali I, North 24 Pgs; Bidhannagar Gram Panchayat in Matiali, Jalpaiguri and Gangmuri Joypur Gram Panchayat in Rajnagar, Birbhum)**. The block having maximum SC and ST population was selected from each selected district and the district selected from each of the 3 strata (on the basis of West Bengal HDR) as follows:

| <u>Strata</u>  | <u>District</u>  |
|----------------|--|
| 1. (HDR 1-5)   | Kolkata, Howrah, <b>North 24 Parganas</b> , Darjeeling, Burdwan.           |
| 2. (HDR 6-10)  | Hooghly, Midnapore, South 24 Parganas, Nadia, <b>Jalpaiguri</b>            |
| 3. (HDR 11-17) | Coochbihar, Bakura, Dinajpur, <b>Birbhum</b> , Murshidabad, Purulia, Malda |

## Development of Interview schedules and observational checklists

The draft instruments were developed by the core research team in close partnership with the State Development and Planning Department, relevant technical experts from different sectors and investigators. Draft instruments were pre-tested and finalized after a workshop with salient stakeholders. The interview schedules and observation checklists were developed keeping the objectives of the study in mind. Instruments included a mixture of structured close ended and semi structured open ended questions.

## Data Collection

Nutritional status and its prime determinants and risk factors were assessed from the data collected in the Household Schedule. Assessment of vitamin deficiency was also done in the selected adolescents by investigators trained for this purpose. Hb estimation was done in 10% of the selected adolescents and anemia was diagnosed according to WHO guidelines (Demaeyer, 1989). Dietary information was collected by trained investigators using 24 hour dietary recall and food frequency questionnaire in 5% adolescent households in the selected district. The nutrient intake was compared with recommended dietary allowances (RDA). Indices of Household Coping Strategies developed by Radimer, Olson, and Campbell (1990) and Maxwell (1996) were used to estimate food security. Qualitative data on relevant issues was collected through in-depth interviews and focus group discussions conducted by technical experts.

## Data Analysis

Quantitative data was transferred into Excel spreadsheets for cleaning and analysis. Qualitative data was analyzed manually and results validated by triangulation.

## Potential Limitations and biases

The **24-hour dietary recall (24HR)** used in this study is one of the most common methods used by surveys to assess diet. It is considered a reliable estimate of a respondent's diet for the period covered.. However, the 24HR captures only a snapshot of the respondent's recent diet, not his/her long-term or usual diet. **A major weakness of the 24HR is the reliance on self-reports of dietary intake. These may be affected by memory and intentional misreporting, for instance, over reporting of "good" foods like fruits and vegetables**

**The Food Frequency Questionnaire (FFQ) on the other hand is limited to the foods on the questionnaire and does not account for food portion sizes.**

Our choice of the 24-hr dietary recall of cooked food was made with full recognition of its limitations and the unresolved arguments regarding its use. Its use seems appropriate with a population such as that in the study, where, especially in rural areas, there is little day-to-day variation in the diet and the number of foods eaten is limited.

The interviewers were trained dietitians experienced in collecting dietary data in field situation.

Since the same set of interviewers collected all the dietary data used in this study the possibility of **interviewer bias** from one area to another was reduced.

Another potential limitation of this study is its reliance **on self reported morbidity – which is prone to both under and over reporting**. However, since the reports were based on responses to probes using working definitions of the ailments, this limitation was minimized. Moreover using female interviewers to interview female respondents, better responses were obtained.

## **Results:**

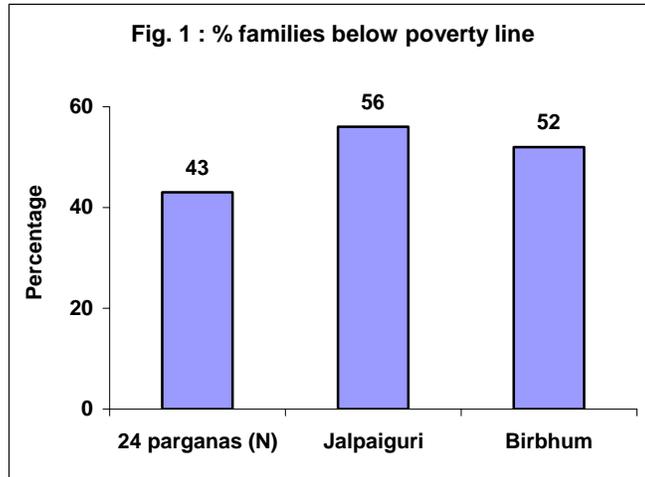
### **Background**

In the selected sample of respondents in North 24 Pgs, 25% are in the 10-11 year age group, 29% are in the 12 – 13 year age group, 19% in the 14-15 year age group, 13% in the 16-17 year age group and 14% in the 18-19 year age group. In the total sample, 46% are males and 52% females. Of the selected sample of adolescents in Jalpaiguri, 25.7% were in the age group of 12-13 years followed by 22.6% in the age group of 10 – 11 years. 66.7% were in the 10-15 year age group and 33% in the 16-19 year age group. In all the age groups, females outnumbered males. In the selected sample of respondents in Birbhum, 24% are in the 10-11 year age group and another 24% are in the 12 – 13 year age group, 18% in the 14-15 year age group, 17% in the 16-17 year age group and 16% in the 18-19 year age group. **In the total sample, 52.3 % are males and 47.7% females.**

**Majority of the selected sample of adolescents in every district were Hindus.**

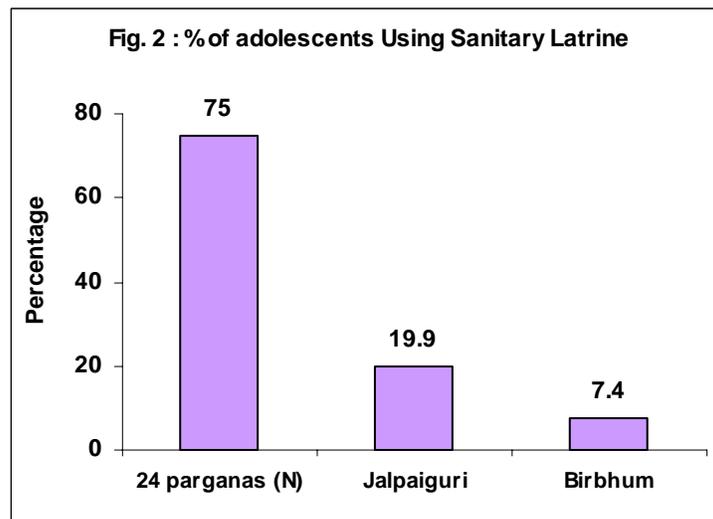
Care was taken to select blocks with predominantly SC and ST populations; hence **majority of the sample population belonged to Scheduled Tribe and Scheduled caste.** \*\* Muslim 78 (12%) is included in General Caste

Considering the fact that the study specifically focused on vulnerable underdeveloped populations in the selected districts, **the percentage of families below poverty line (>40%)** in the selected samples was more compared to the State rural average of 31.9 %and the National rural average of 27% (Fig. 1).



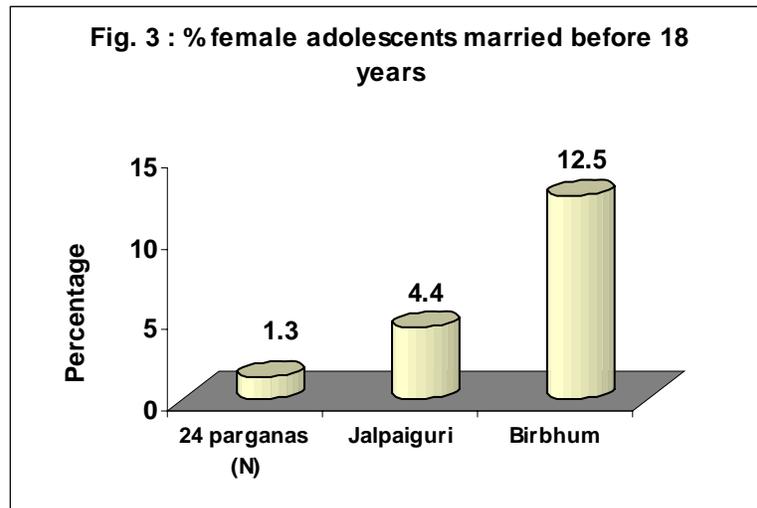
In the selected sample of adolescents, in North 24 Pgs, 6% were illiterate, 28% had completed primary school, 45% had completed middle school, 13.6% had completed secondary school and 7% had completed higher secondary; in Jalpaiguri, 6% were illiterate, 28% had completed primary school, 45% had completed middle school, 13.6% had completed secondary school and 7% had completed higher secondary and in Birbhum, 8% were illiterate, 16.7% had completed primary school, 50.9% had completed middle school, 20.9% had completed secondary school and only 3% had completed higher secondary.

Majority (75%) of the adolescents in the selected block of North 24 Pgs were using sanitary latrine whereas majority (80%) of the adolescents in the selected blocks of Jalpaiguri and Birbhum were not using sanitary latrines. Despite intensive efforts in Total Sanitation Campaign, such low usage rates are cause for concern (Fig. 2).



Majority of the selected sample of adolescents were engaged in Sedentary or Moderate type of physical activity. Heavy/vigorous physical activity was found in <20% of the selected sample of adolescents.

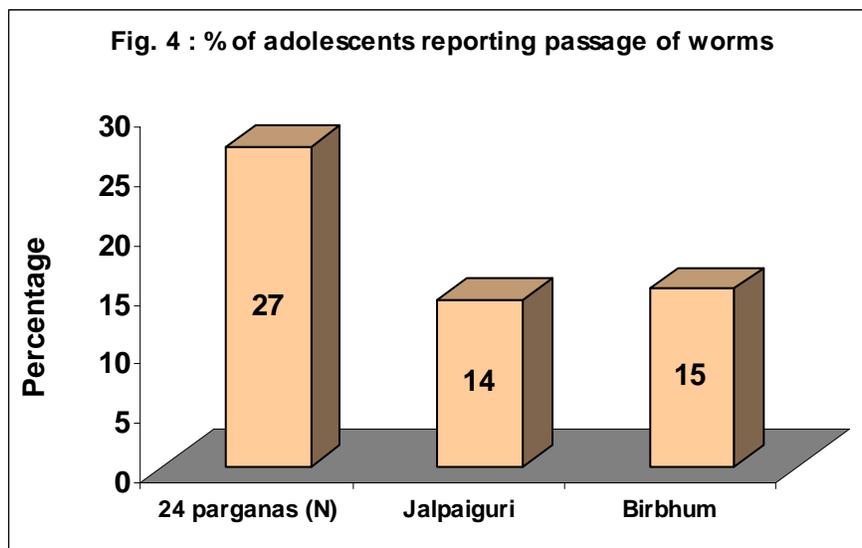
Of the 1119 female adolescents above 12 years of age 65 (5.8%) were married before 18 years of age. Among the married female adolescents, 35.7% were married before the age of 16 years

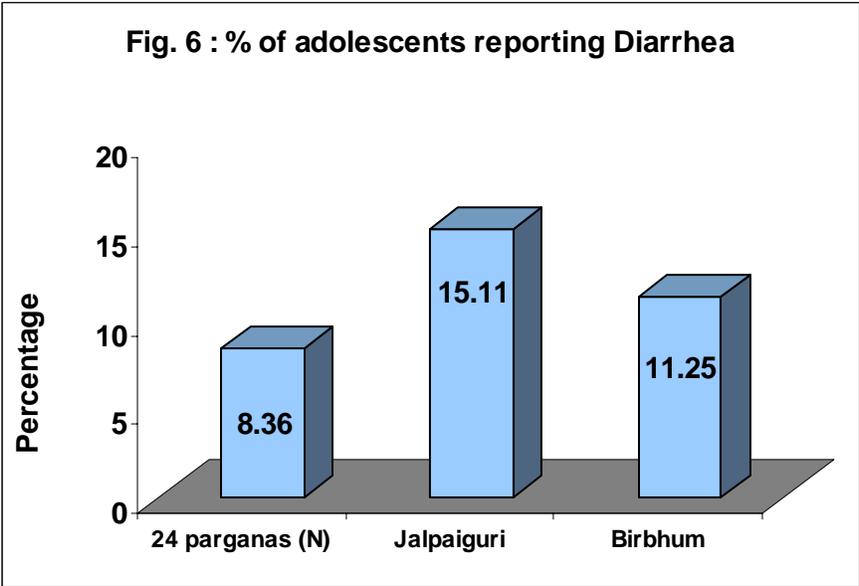
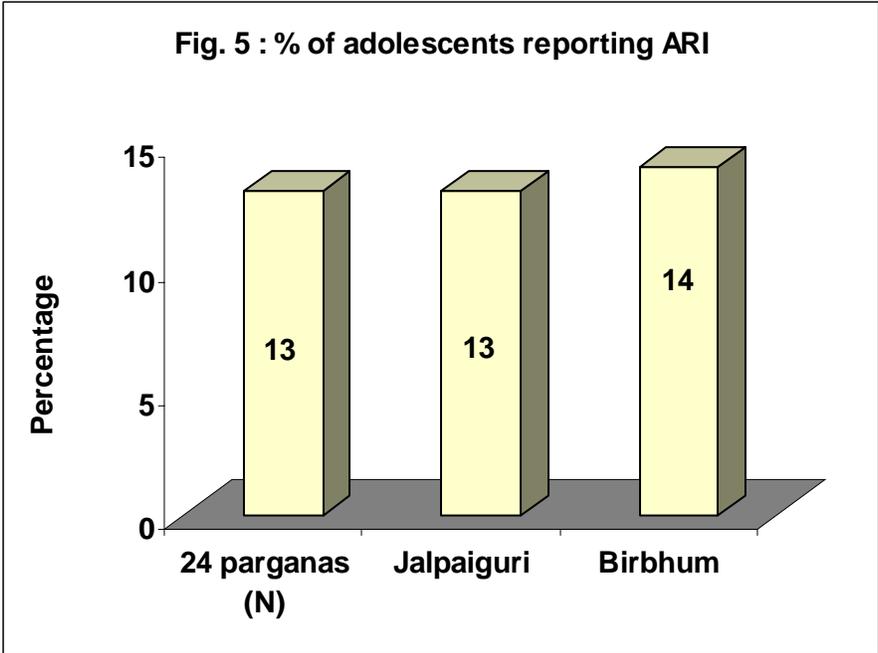


Majority of the adolescent girls had attained menarche at 12-13 years

Common morbidities reported were diarrhea, ARI, passage of worms, asthma and skin disease.

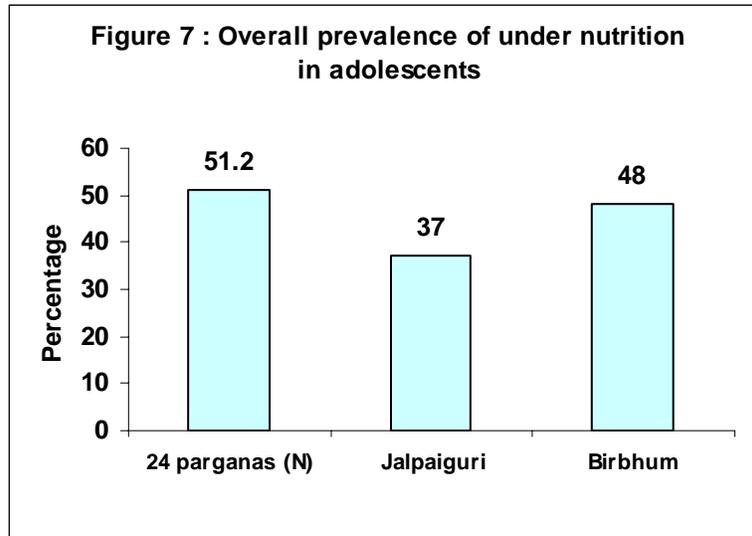
Multiple episodes were common with diarrhea and ARI.



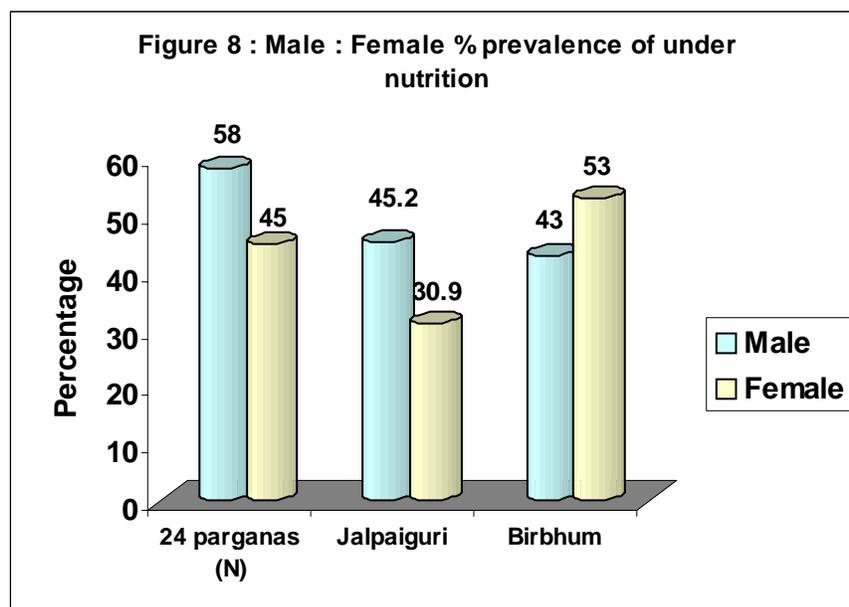


## UNDERNUTRITION

In the present study, overall prevalence of under nutrition among adolescents of vulnerable population in North 24 Pgs is 51.2%; in Jalpaiguri, the prevalence of under nutrition was 37% and in Birbhum, overall prevalence of under nutrition among adolescents is 48%.



Prevalence of undernutrition in males is more than 40% in all districts and is more than prevalence in girls in North 24 Pgs and Jalpaiguri.

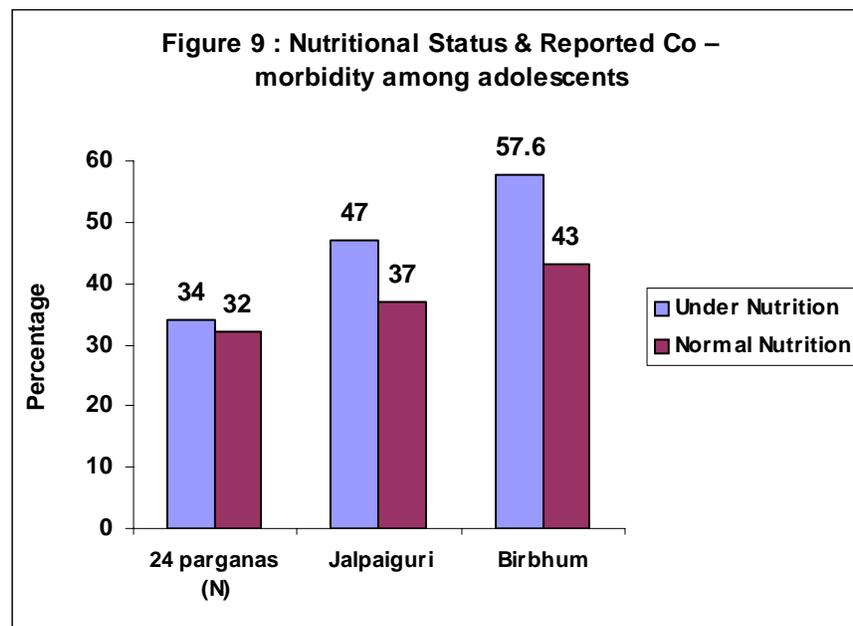


- The mean BMI for age of boys, ranged between the 5<sup>th</sup> and 10<sup>th</sup> percentile values of the reference curve (NCHS). The mean BMI for age of girls ranged between the 10<sup>th</sup> and 25<sup>th</sup> percentile values of the same reference curve. Status of nutrition was poor in the adolescents of the selected vulnerable population groups. It was found to be poorer in adolescent boys compared to that of adolescent girls. One possibility is a differential maturation in boys and girls; another one, which warrants further investigation, is connected with the high rates of anemia, which could affect body weight of boys more than girls because the former put on more muscle than the latter.
- The second set of plotting on the Agarwal growth charts revealed that the mean BMI for age values in all age groups in male adolescents lay between the 25<sup>th</sup> and 50<sup>th</sup> percentiles of the Agarwal reference curve whereas the female adolescent had poorer mean at the start (between 10<sup>th</sup> to 25<sup>th</sup> percentile value of reference curve) the mean values improved gradually with increase in age till 17 years.
- Mean stature for age fell below the cutoff point of 3<sup>rd</sup> percentile value (NCHS) from 13 to 17 years of age in Jalpaiguri, from 11 to 18 years of age in Birbhum and from 15 years of age with improvement at 18<sup>th</sup> and 19<sup>th</sup> year of age in North 24 Pgs among female adolescents. 20 to 25% of 18 year old female adolescents (except those from North 24 Pgs) had height less than 1.45m with risk of obstetric complications.
- In the selected adolescent population in Birbhum the mean wt for age values in each age group was found to be equal to or lower than the 5<sup>th</sup> percentile value in the CDC reference growth charts in all age groups. The deficiency was more marked from 16 years in boys and girls In North 24 Pgs the mean wt for age values in the 10 to 15 year age group varying between 5<sup>th</sup> to 10<sup>th</sup> percentile values of the reference curve both for male and female adolescents In Jalpaiguri, as in Birbhum the mean wt for age values in the 10 to 15 year age group of adolescent males was less than the 5<sup>th</sup> percentile value of the reference curve, with the gap progressively becoming worse after 14 years. The picture was marginally better in female adolescents where majority of mean wt for age values was less than the 5<sup>th</sup> percentile value of the reference curve The mean values of the stature for age for male adolescents fell between the 3<sup>rd</sup> and 10<sup>th</sup> percentile values in the NCHS reference curve with lower values for the 14 to 18 year age groups in Jalpaiguri the 10 year age group in Birbhum and from the 16 year age grouping North 24 Pgs.

- Comparing the weight and height with the country specific standards prepared by Agarwal it was found that in most age groups, the female adolescents had mean weight for age value above the 20<sup>th</sup> percentile value of the reference curve whereas the male adolescents fared worse with mean weight for age value below 10<sup>th</sup> percentile value of the reference curve in all age groups. The mean height of both male and female adolescents however was below the 3<sup>rd</sup> percentile value of the reference curve in all age groups.
- The evolved picture depicts that undernutrition reflected in weight for age values, is a problem in both male and female adolescents, more in males than in females. All adolescents were also bearing the burden of chronic undernutrition – some of it passed on from childhood – as reflected in their comparatively short stature for age.

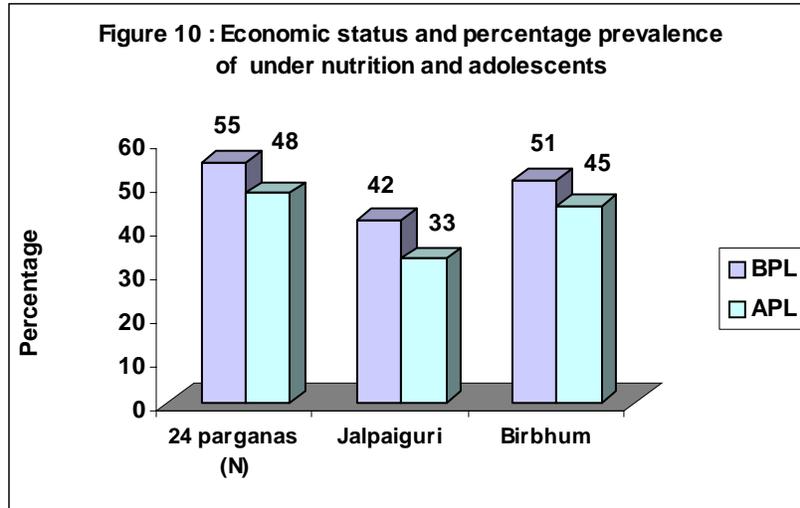
## Determinants and Risk Factors

Study findings revealed that under nutrition in adolescents was determined mainly by concomitant co-morbidity. The prevalence of reported co morbidity was significantly higher in the undernourished adolescents compared to those with normal nutritional status especially in Jalpaiguri and Birbhum

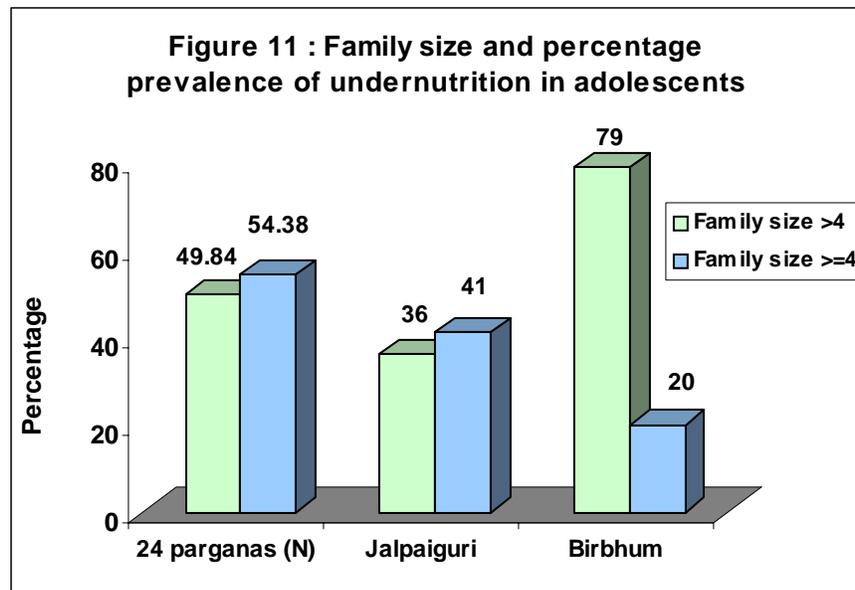


Another prime determinant of undernutrition among adolescents was poverty

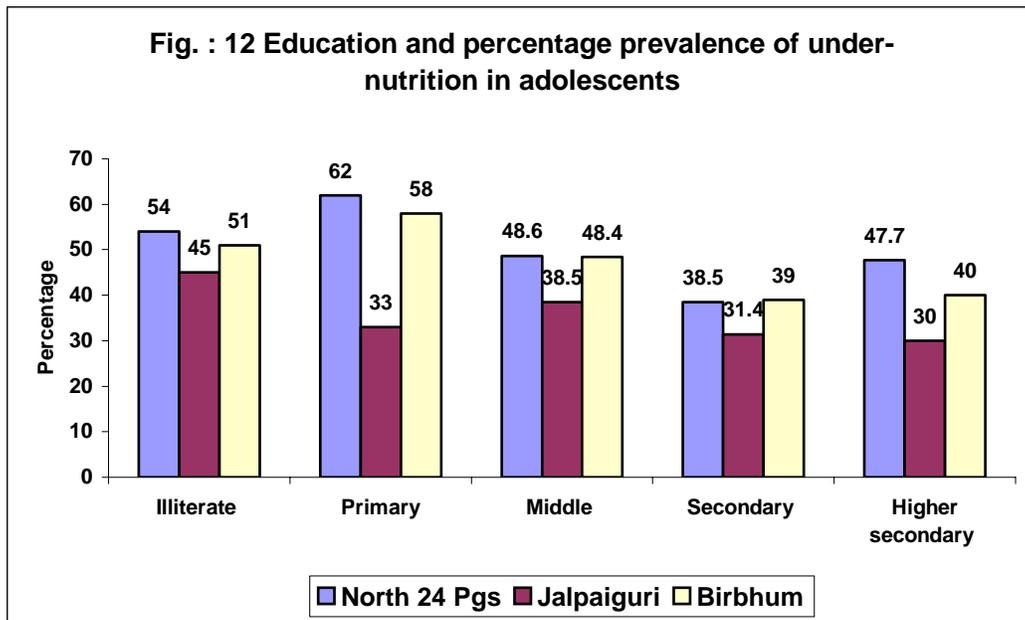
In the present study, the number of undernourished adolescents among BPL families was found to be more than those among APL families in all the studied districts



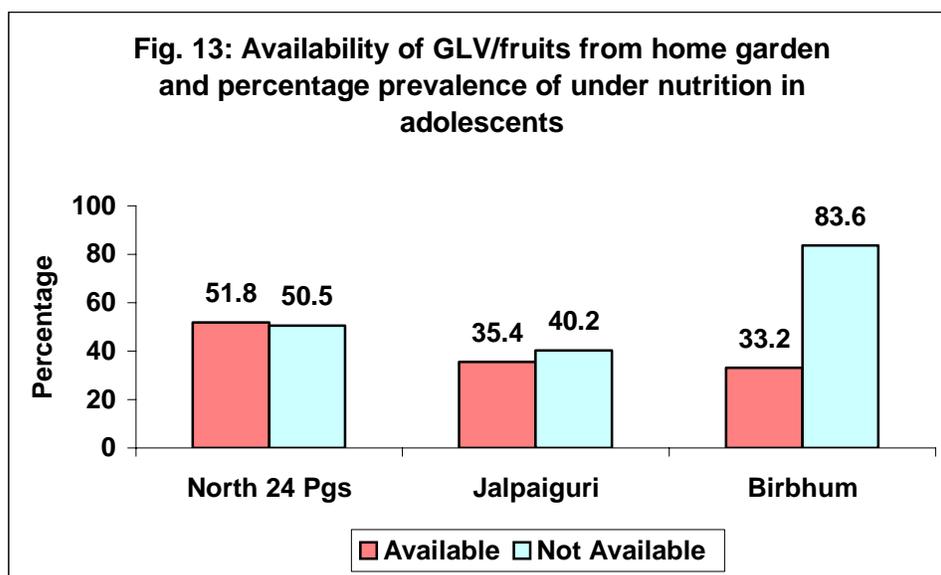
Family size did not significantly influence nutritional status contrary to expectations, except in Birbhum. The household food distribution in larger families affected adolescents in Birbhum more because they were not attending school in sufficient numbers and benefiting from the supplementary nutrition programs in school as in North 24 Parganas, nor were they employed early as in Jalpaiguri where adolescents especially girls were economically empowered by their employment in tea gardens.



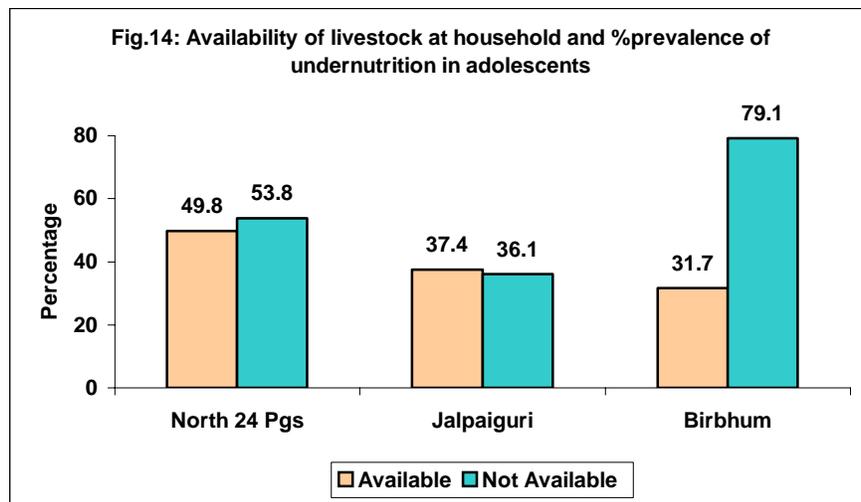
No significant correlation was observed between educational status and nutritional status of adolescents



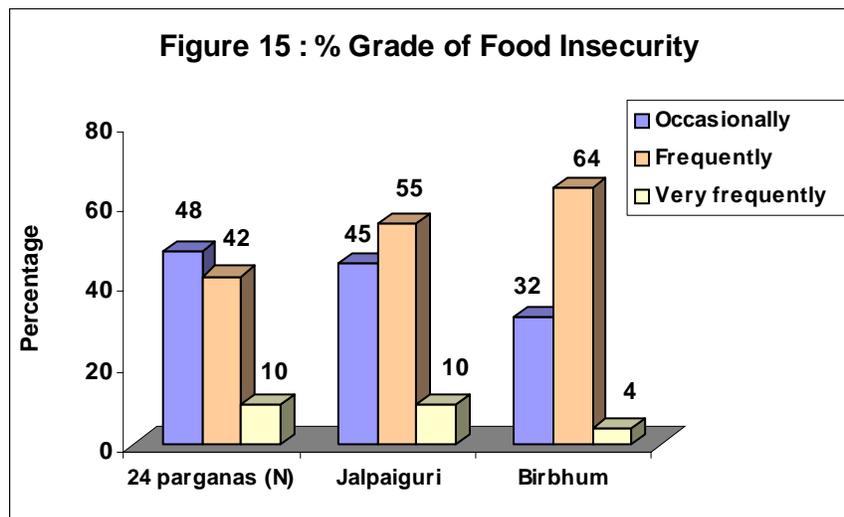
Although the availability of GLV/fruits from home garden is expected to increase availability and hence intake of nutrients, yet the findings of the present study revealed that such **availability did not affect the nutritional status of the adolescents** except in Birbhum. This points to the poor status of nutrition education in the community in general. In Birbhum, poverty and lack of availability of GLV/fruits in the local markets forced intake from home garden and thereby improved nutritional status.



The availability of milk/egg/flesh/mutton from domestic livestock did not affect the nutritional status of the adolescents in the present study. The prevalence of under nutrition among adolescents in whose households these were available was not significantly different from the prevalence among adolescents in whose households these were not available except in Birbhum where the prevalence of under nutrition among adolescents in whose households these were available was significantly less than the prevalence among adolescents in whose households these were not available. In most of the households in North 24 Parganas and Jalpaiguri produce from livestock were sold for economic benefit and not directly added to the family pot.



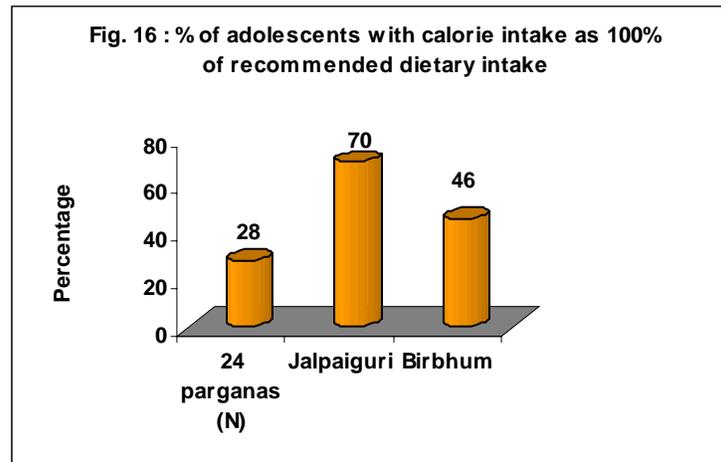
Food insecurity was almost universal and majority of households had to borrow food or buy in credit from local grocer's shop.



## DIETARY PATTERN AND FOOD DIVERSIFICATION

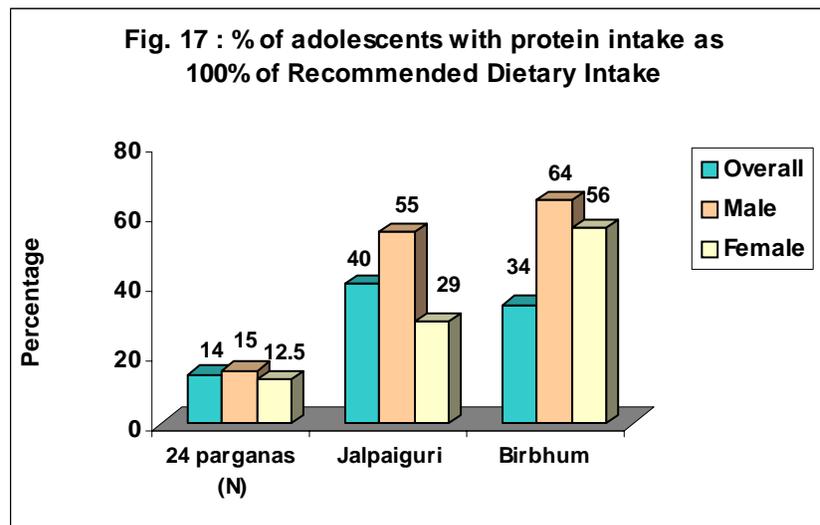
### a) Calories

Total calorie intake in adequate amount (100% RDA) , also indicative of food security, ranges between 28% to 70% in this study – contrary to expectations, the lower range is observable among the vulnerable population in North 24 Pgs, a district ranking higher in the HDR index



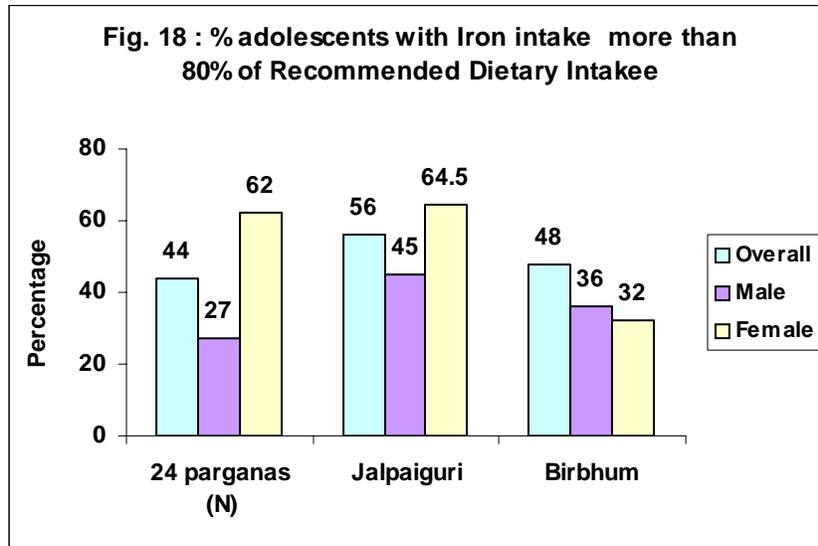
### b) Protein

40% to 60% of the adolescents in these vulnerable populations had protein intake above 80% of the RDA



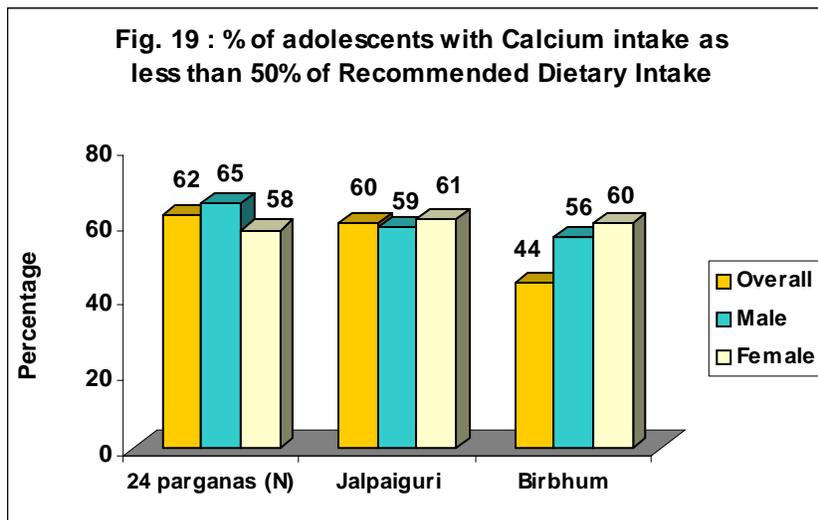
### c) Iron

40% to 60% of the adolescents in these vulnerable populations had iron intake above 80% of the RDA. Though intakes were not very low the higher prevalence of anemia among male and female adolescents can be probably attributed to poor bio availability of dietary iron due to the predominance of non haem iron and vegetables rich in phytates and other chelating agents which limit iron absorption.



### d) Calcium

The intake of calcium was found to be grossly deficient among adolescents in the study populations. 40% to 60% of these adolescents were having calcium intake less than 50% of the recommended dietary intake



Calcium is present in both plant and animal sources. The richest source of calcium among animal foods is milk and among the vegetable sources are green leafy vegetables. Among the leafy vegetables, fenugreek, amaranth and drumstick leaves are particularly rich in calcium and the first two are eaten by the adolescents in the study populations but the presence of phytates and oxalates in these vegetables limit the bioavailability of Calcium. Rice is a poor source of calcium and may be the reason why the present study populations which had rice based diets coupled with very poor intake of milk had gross deficiency of Calcium intake.

### **Food Diversification Pattern**

In the selected population from **North 24 Pgs**, green leafy vegetables or other vegetables were consumed frequently by adolescents- availability in home garden was found in almost 56% of the selected house holds; but the quantity of intake was inadequate. The frequency and amount of consumption of fruits was poor. A fruit like Guava which is a rich source of vitamin C and can help improve absorption of iron was rarely consumed. Consumption of fish was more in this area ( 28% of the adolescent respondents had intake more than 15days a month) This probably accounts for 42% of the adolescent respondents having more than 50% of the recommended dietary intake of protein.

Almost 70% of the adolescent respondents did not consume milk at all and 60% either did not consume /rarely consumed eggs despite availability of domestic livestock in 65% of the selected house holds. This accounts for the fact that 62% of the adolescent respondents had calcium intake much below( <50%) the recommended intake for these age and sex groups.

In the selected population from **Jalpaiguri**, green leafy vegetables or other vegetables were not consumed everyday by any adolescent despite availability in home garden in 68% of sample house holds. Similarly the consumption of fruits was also poor. Among those who consumed fruits, most ate bananas and some ate apples .Guavas which are a rich source of vitamin C were consumed only 1-3 days a week by 15% of the respondents. Consumption of animal protein was better in this area with diverse intake of mutton, chicken, beef .pork and crabs, but comparatively the intake of fish was less. 60% of the selected adolescent respondents had more than 50% of recommended dietary intake of protein.

Almost 50% of the respondents did not consume milk at all and 15% did not consume eggs at all despite availability of domestic livestock in 69% households. The calcium intake was found to be

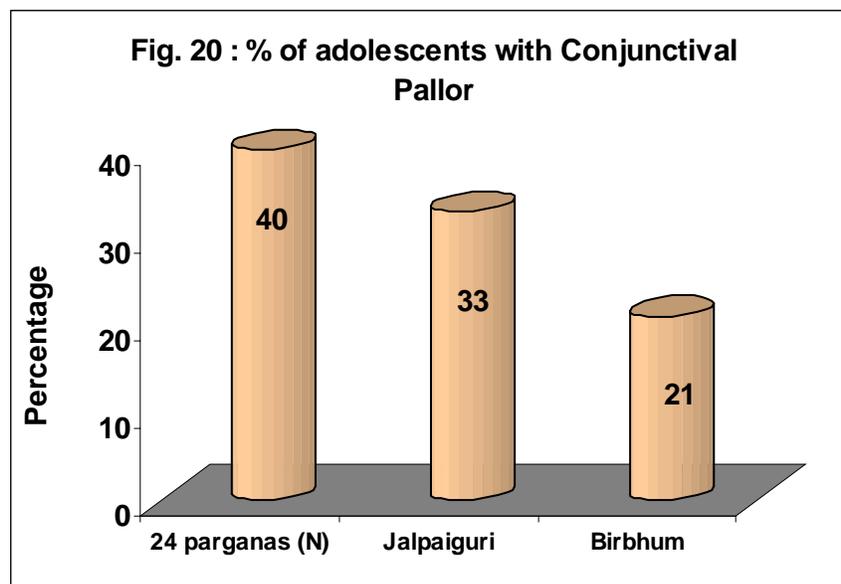
much below the recommended intake for this age and sex groups. 60% of the adolescents had Calcium intake less than 50% of recommended intake.14% had intake less than 20% of recommended intake.

In the selected population from Birbhum, green leafy vegetables especially local varieties were consumed frequently by adolescents- availability in home garden in almost 71% of the selected house holds – but the quantity of intake was very meager. The frequency and amount of consumption of fruits was poor. Guavas and other local fruits rich in vitamin C were rarely consumed. Almost 68% of the adolescent respondents did not consume milk at all despite availability of domestic livestock in 66% of the selected house holds. This accounts for the fact that 62% of the adolescent respondents had calcium intake much below (<50%) the recommended intake for these age and sex groups despite frequent intake of snails

## Micronutrient Malnutrition

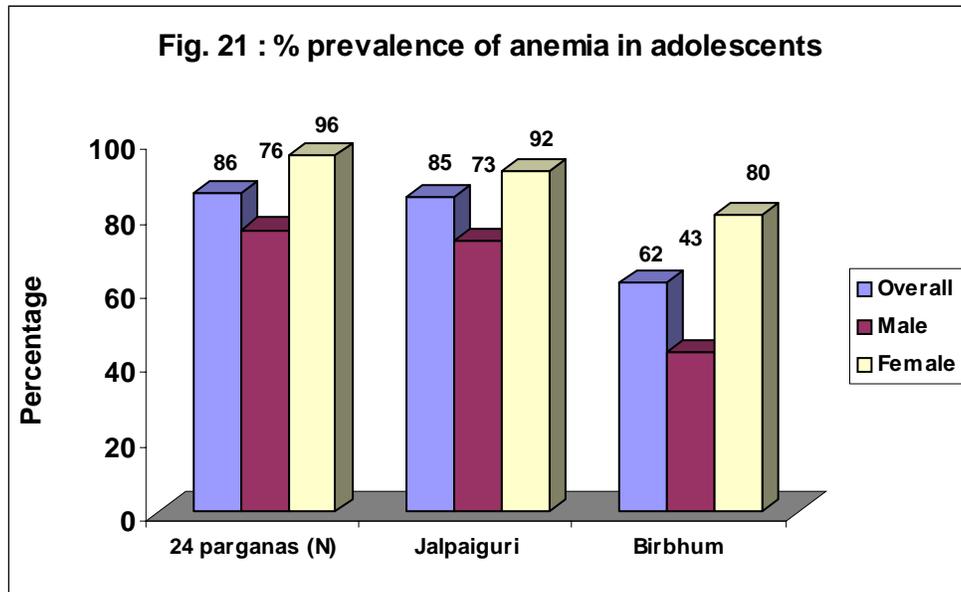
### Prevalence of anemia:

Conjunctival pallor, the clinical sign for anemia was commonly observed in adolescents in the study populations ranging from 20% to 40%



The overall prevalence of anemia (60% to 90%) along with the prevalence in male and female adolescents was high > 40 per cent according to the epidemiological criteria for assessing the

severity and magnitude of nutritional anemia in populations (FAO/WHO, 1992). It was much higher than NFHS reports and earlier reports from West Bengal and other parts of India.



Only about 45% to 55% of adolescents had dietary iron intake exceeding 80% of the recommended amount for age and sex. The dietary intake was better among female compared to male adolescents.

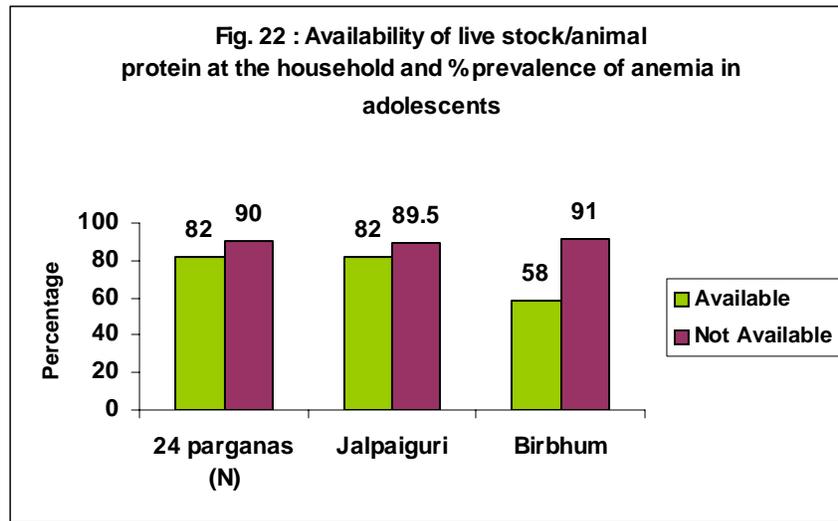
An interesting observation that emerges is that iron intakes are not very low. No correlation was demonstrable between the iron intake and the prevalence or degree of anemia present in adolescents in the present study. In India as in the study areas of West Bengal almost all-dietary iron of the lower income groups is derived from vegetable foods. A common feature of such diets is the high level of iron absorption inhibitors in the diet such as phytic acid and fibre and or consumption of tea along with the meals. Thus low bioavailability of the dietary iron plays a major role in the widespread deficiency of this micronutrient.

#### **Inappropriate dietary pattern of adolescents in the study populations**

- Predominantly cereal based with little supplementation with roots and tubers.
- Frequency of consumption of fish was more in North 24 Pgs. But quantity was inadequate
- Consumption of animal protein was better in Jalpaiguri with diverse intake of mutton, chicken, beef .pork and crabs
- Consumption of snails was more frequent in Birbhum along with consumption of eggs.
- Frequency and amount of consumption of fruits was poor.

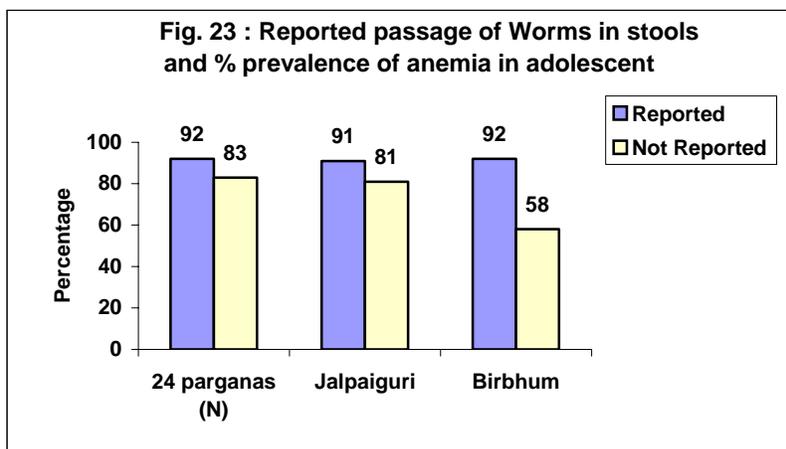
- Green leafy vegetables or other vegetables were consumed infrequently

In the present study, the grade of anemia was related to the availability of live stock/animal protein at the household –anemia was commoner in adolescents whose households did not rear livestock (89.5%) than in those whose households reared livestock (82%). From the dietary pattern analysis in these households, it was evident that adolescents whose household reared livestock, did not necessarily include the produce e.g milk, egg and flesh/meat; this was especially true for female adolescents. However the livestock produce was sold and adds to the household income, corroborating the abovementioned hypothesis of income related rise in total iron intake.



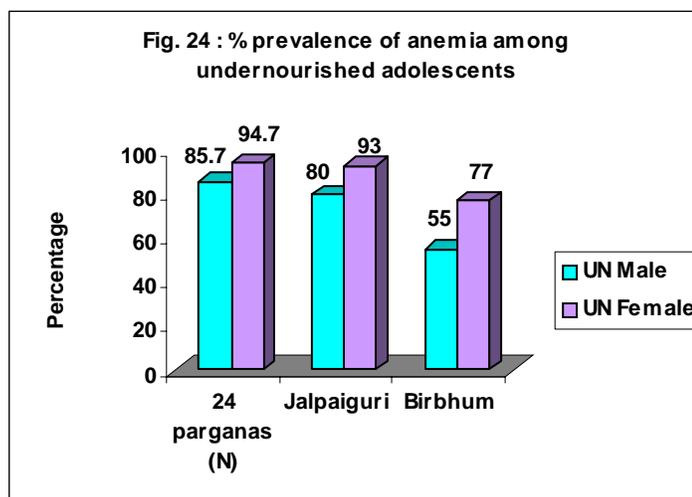
The typical diet of adolescents in the study population is generally one of moderate to low intake of iron in relation to requirements, a very low bio-availability of iron due to low intake of enhancers like ascorbic acid, meat and flesh foods, far too many inhibitors of iron absorption, and low incomes that result in generally low food intake of iron. It is in this setting that wide spread iron deficiency and anemia develops, which gets further deteriorated with poor environmental and personal sanitation and high incidence of parasitic infestations.

In the present study, prevalence and severity of anemia was observed to be more in adolescents reporting history of passage of worms in stools



Among those reporting passage of worms within last one month, both moderate and mild grades of anemia were higher compared to those who did not have such history, except in Jalpaiguri where Hb levels was not different from the non-infested individuals and can be explained by the fact that the effect of parasites on iron status is dependent on several other parameters such as the intensity of the infection, worm load, previous dietary iron intakes and age-sex of individuals. Endemicity in prevalence of other parasites like roundworms (*Ascaris lumbricoides*) which act by impairing absorption, and in case of severe infestation, by reducing appetite and food intake coupled with very poor practice of hand washing after defecation and taking meals, may be the cause behind the high prevalence of anemia despite high usage of sanitary latrines as in North 24 Pgs.

The Double Burden – Anemia and undernutrition was found to co exist in majority of the adolescent population in the vulnerable groups studied. This has important implications for relevant program implementation.



## QUALITATIVE

### Concept of under Nutrition:

Under nutrition is reflected by weakness and wasting.

The problem was more among boys because:

- Boys had several harmful addictions of tobacco
- Boys work more
- Boys do not have regular meals at regular times

Some who differed said, “Meyera  $\bar{o}$  onek kaj kore, sharadin dhan shedhdho kore”. “Meyera to nijera beshi kore khabar niye khete parena” : “Meyederi beshi hobe. Pete bachcha niyeo o'ther mathe kaj korte jete hoy je”

Except the PRI group no other group on respondents were aware of any government schemes / services in this regard.

For the majority, food insecurity of different degrees persisted throughout the year.

Awareness regarding nutritive value of locally available, affordable and acceptable food items was very poor. GLV from their home gardens was not eaten in sufficient quantities. Home grown fruits like papaya and guavas were also not eaten regularly. As one male adolescent stated – “Phol to dui shomoy khai – oshukh korle ar pujo hole”

### Food based dietary guidelines

Dietary guidelines based on local/area specific availability was not available with the care providers nor were they aware of the nutrient values of locally available, acceptable and commonly consumed food items. Consequently nutrition counseling opportunities were missed and even when advice was given they were in general terms – as the ANM stated “ amra shadharonoto shak shobji pholmul khete boli” – without giving specific examples with locally available and affordable food items.

### Suggestions of participants for improving the situation:

Social issues were reflected more in the opinion of the adults. Whereas mothers emphasized more on delaying age at marriage and age at first child birth, fathers and PRI group focused more on economic development.

Lack of awareness was stated by all adult groups as one of the prime reasons for faulty food habits leading to undernourishment.

#### **Availability and Accessibility issues:**

##### **PDS**

PDS was functioning in a decrepit manner – rations were distributed only twice a week during working hours making it difficult for the poor daily wage earners to procure the same. The quality and quantity of the food grains was very poor – hence majority preferred to buy these from the open market, where it was available after working hours and at almost the same rate. PDS was mostly sought for fuel.

##### **IEC**

**The situation regarding the use, display and comprehensibility of IEC material was very poor.** Informative signages were observed at the boundary walls of the subcentres and at the Dharmagola mostly related to age at marriage, antenatal check ups, Iron supplementation during pregnancy, diet during pregnancy, institutional delivery, spacing and “Sharbik Swasthyo Bidhan” (Universal Sanitation). When viewer ship was tested, all the adult males said that they never read the signage, despite walking past them almost every day.

In some subcentres banners had been used for all purposes from serving as curtains to tablecloths and mops. Even when they were hung up six / seven were put up huddled in the same place instead of being uniformly distributed.

Crowded signages 4' x 3' carrying 10 – 15 lines were observed with clumsy overlapping of sentences. Dismal display of few posters on Vitamin – A and Iron supplementation was noted in areas not frequently visited by patients.

Overall no display was ever observed regarding adequate and appropriate dietary recommendations for adolescents.

#### **Existing relevant programs**

- Existing programs for adolescents like **Kishori Shakti Yojana** were not fully operational in the blocks selected and in the present functional system, was not addressing the nutritional components.

- The **Gramin Rozgar Yojana** did provide some economic security to the adolescent males but the limitation of work for 100 days, led a sizeable proportion of adolescent males to leave home in search for work.
- **No community outreach programs on Nutrition Education** was observed or reported. The CFNEU – Community Food and Nutrition Education unit was non-existent at the block levels. In Mother's meetings **AWWs** addressed infant feeding particularly exclusive breast feeding and nutrition of pregnant mothers. Nutrition of adolescents – girls or boys – was not reported as discussed in any opportunity of provider-beneficiary interaction. The **ANMs** did not address this issue during their household visits as they were more burdened with, pulse polio, routine immunization, DOTS, Family Health Survey and ECCR updating. Even the doctors (qualified or quacks) or the nurses never attempted any nutrition counseling during interaction with beneficiaries. There was also **no existing mechanism for screening those at risk – by wt and ht estimation or BMI computation either in schools, health facilities or ICDS centers.** **No estimates of total number of adolescents** in the area were readily available from existing records and reports of any of these sectors or from the Panchayat.
- In the **school setting**, nutrition education was limited to a few pages in the text books of “swasthyo shiksha”. Nutrition promotion including food hygiene and hand hygiene was totally neglected. School health appraisal was limited to screening for diseases and did not screen or counsel those at risk or suffering from undernutrition. Distribution of fruit trees like mango trees was observed in North 24 Parganas but the purpose and importance of home gardening was not explained to the recipients.
- The PRI members did not prioritize this issue and were not including these problems in their discussions and action plans.

## RECOMMENDATIONS

### Policies and Programs

- **More complete picture of the status of nutrition in the total adolescent population** needs to be developed by developing a system of relevant data collection and sharing and tracking the collected data in a common resource pool involving all relevant sectors, especially health, P&RD, W&CD and Education departments.

- PDS can be used as a vehicle to address the existing gaps in dietary intake with reference to RDA especially in BPL population. Reviewing and redesignating the amount of foodgrains distributed in PDS is essential especially to take care that the **MINIMUM PER CAPITA INTAKE AS PER RDA is provided through rations** – especially for adolescents. A more client friendly system of PDS with appropriate quality assurance also need to be worked out.
- The existing massive problem of adolescent anemia needs renewed focus on increasing the intake of absorbable iron by increasing the bioavailability of the iron in the diets through dietary counseling with local food based guidelines and providing iron through medicinal supplementation. This necessitates **re structuring IFA SUPPLEMENTATION programs with special focus on adolescent populations – girls and boys**
- Attention should also be given to controlling infestations and infections that cause lowering of Hemoglobin levels.
- For adolescent nutrition to be specifically addressed, an **integrated approach comparable to the IMNCI program** of WHO is proposed, with promotion, prevention, and treatment components. As in the IMNCI strategy for children, adolescents irrespective of sex should be screened for under nutrition and anemia and managed at the community level by frontline workers on the basis of simple standard uniform operational protocols developed for this purpose. However, there have to be multiple entry points rather than only health care, since contacts of adolescents with health services are scarce, except perhaps in pregnancy
- **Health and Nutrition Promotion Days** can be designated at least twice a month for intensive focus on:
  - Preparing family wise list of adolescents
  - Delivery of health and nutrition package including screening for undernutrition and subsequent nutrition counseling and deworming where necessary along with IFA supplementation at outreach sessions for adolescents
- **Strengthening the existing SUPPLEMENTARY NUTRITION PROGRAMS** e.g. the SNP at ICDS and MDSM at schools would improve basic nutritional status and reduce vulnerability among adolescents.
- Since there is significantly higher prevalence of vitamin deficiency among those adolescents who did not have GLV/Fruits available in home gardens **promotion of local need based KITCHEN GARDEN/home garden** should be emphasized. The STATE HORTICULTURE

DEPT can be roped in to provide technical and logistic support from Krishi Projukti Sahayak (KPS), to promote GP based plans for kitchen/home/school gardens with locally acceptable and suitable GLV/Fruit plants in the line of a social movement like social forestry.

- **FOOD PRESERVATION AND PROCESSING-** Considering the cost factor of fruits and GLVs which limits its use in some cases, innovative initiatives need to be fostered in processing and preservation of locally available produce. The PRI can be involved in this endeavor as part of decentralized planning for micro finance and community action plans for capacity enhancement of care givers at household level.
- The most important change agents for nutrition are the anganwadi workers and the ANMs. **Nutritional assessment should be an inherent part of preventive health care services to adolescents. There should be a systematic dietary enquiry in adolescents, at least in cases of too low BMI, during pregnancy, and when specific micronutrient deficiencies are suspected.**
- It is necessary to adopt **settings based approach to nutrition education for adolescents.** Settings include primary health-care services, schools, worksites, recreation setting and cultural or sporting group. Primary focus should be on nutrition promotion, and the central role of the school. In addition to education on dietary diversification, schools may be an effective vehicle for IFA supplementation – adolescent girls should be a priority target group but judging from prevalence data in this study, boys too should be targeted for iron-folate supplements.

#### **IEC and BCC**

- Undernutrition is invisible and not a felt need in the community despite the magnitude of the problem. It is necessary to urgently **generate public awareness and debate** by launching a vigorous awareness campaign on adolescent under nutrition and anemia
- Developing a **comprehensive IEC strategy** for adolescent nutrition.
- **Developing messages to address the major gaps identified**, with emphasis on nutrition needs of boys. The messages disseminated now, are ill understood by the target audience, so, new messages need to be developed with involvement of the adolescents.. Particularly in the case of nutrition initiatives, it is important to know and incorporate community best practices as messages.

Emphasizing the need for increasing the absorbable iron intake, increasing the consumption of vitamin C foods and reducing the consumption of iron absorption inhibitors through relevant dietary or cooking practices, is promoted through many channels.

- Developing local food based dietary guidelines along with low cost recipes for preparing appropriate food

Key messages like

- (i) Consume cereals in the form of sprouts more frequently
- (ii) Always consume fruits like guava (other local ascorbic acid rich fruits to be included) with your meals and
- (iii) Avoid drinking tea with the meal, may be targeted to the general population and the vulnerable groups.

At the same time indigenous fruits rich in ascorbic acid will have to be identified and promoted for cultivation by the agriculture sector.

- Developing personal hygiene, hand hygiene, home hygiene and food hygiene related IEC material for use by frontline workers, teachers, SHGs and other relevant community based stakeholders.
- Upgrading current training manuals for service providers – ANMs, AWWs and school teachers, to include promotion of adolescent nutrition along with prevention and management of common nutritional problems in adolescence.
- All opportunities for client provider interaction should be utilized to disseminate awareness regarding dietary improvement to meet recommended intakes. Credibility of health care providers should be used to disseminate messages on health consequences of undernutrition and anemia and benefits of prevention, especially importance of a diversified diet and improved hygiene and sanitation, whenever they interact with people (e.g. during illness episodes). IEC materials distribution to be combined with relevant commodities (e.g., distribution of IFA tablets simultaneously with handbills or pamphlets for anemia prevention).

- Since access to health care facilities are limited, more outreach group nutrition education sessions with skill development through actual demonstration of acceptable recipes with locally available food, should be done. Self help groups can be harnessed for this purpose with mobilization of adolescent self help groups.
- Awareness regarding welfare programs should be enhanced through SHGs and Panchayat
- Efforts have to be made to involve community groups, such as youth clubs, parents and teachers in nutrition programs.

### **Training and capacity building**

- Training of frontline workers (ANMs and AWWs) on common simple standard uniform operational protocols for promotion, prevention, and treatment through integrated approach comparable to the IMNCI program
- Training of service providers and change agents (e.g ASHAs) on how to use IEC materials for nutrition promotion and in nutrition counseling skills
- Training of school teachers for nutrition promotion along with skills for screening and counseling for undernutrition
- Capacity building at the grassroots level especially with focus to develop and use adolescent SHGs for the purpose of nutrition and home hygiene (personal hygiene including hand hygiene, safe use of water, domestic and peri domestic sanitation and food hygiene) promotion. Strengthening and incorporating the Kishori Shakti Brigade locally for this purpose will be effective.

### **Follow up action:**

The challenge is to help in promoting desired nutrition promotion and prevention practices. The Indian Public Health association with its strong technical expertise and district based network of all categories of public health professionals can collaborate in the following action areas in future:

- Assessment of the status of nutrition in the total adolescent population of West Bengal
- Development of simple standard protocols for screening and managing undernutrition
- Development of food based dietary guideline based on local diet along with low cost recipes for preparing appropriate food
- Development of training resource for nutrition counseling

- Development of training resource for food hygiene, hand hygiene and home hygiene for use at community level
- Conducting training for all the categories mentioned above.
- Upgrading current training manuals for service providers – ANMs, AWWs and school teachers, to include promotion of adolescent nutrition along with prevention and management of common nutritional problems in adolescence
- Formulating need based IEC and BCC strategy and need based IEC material to promote adolescent nutrition in West Bengal
- Operational Research on impact of different interventions on adolescent nutrition – especially IEC and BCC interventions.