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DEVELOPMENT OF RURAL ADOLESCENT GIRLS THROUGH SCIENTIFIC AND SOCIAL ENGINEERING AND SKILL DEVELOPMENT

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Introduction

Adolescence is the age of physical and mental development, emotional transition, curiosity, energy, creativity and desire to learn. In developing countries like India, there are strong culturally driven social biases, which deprive adolescent girls of educational opportunities and full expression of genetic potential. Families view girls as burden due to the oppressive dowry system and tend to reject them from birth, and even eliminate them resulting in low sex ratio [1]. Early marriage and child bearing [2,3], stunts their physical and mental growth, and adversely impacts their health and nutrition. It is an insidious form of child labour. With proper nurturing and empowerment, adolescent girls can become a valuable human resource for nation building. As future mothers they can be good agents of change. India has a high burden of under-nutrition, particularly in children, adolescence and pregnant and lactating women, primarily due to inadequate diet [4]. Frequent infections due to poor sanitation and access to safe drinking water also contribute. Qualitatively Indian diets are very deficient in micronutrients due to low intake of vegetables and fruits, legumes and animal products [4]. Against this background, the present study was taken up among adolescent girls in select villages of Medak district of Andhra Pradesh (AP), India.

The specific objectives of the study were:

- Assessment of Knowledge, Attitude and Practice (KAP) of adolescent girls on health, nutrition, environment and social issues
- Assess food consumption of the families
- Create awareness on the above mentioned scientific issues to bridge the knowledge gap
- Impart appropriate nutritionally and environmentally promotive farm skills and livelihood promotive non-farm skills

Materials and Methods

Study area

The study was conducted in 5 villages of the Narsapur Mandal of Medak district of Andhra Pradesh (AP), India, (covering total population of over 6000), in which the Dangoria Charitable Trust (DCT) has a presence and enjoys rapport with the community. Medak is one of the less developed districts in Telangana region of AP.

Knowledge, Attitude and Practice (KAP) survey

After initial sensitisation of the community through Focus Group Discussion (FGD) with the elders and the girls, all the girls in the age group of 10 to 18 years were enumerated through a door to door survey. An initial KAP survey on subjects like health, nutrition, environment and societal issues was done in a sub- sample of 240 girls (out of 412 girls), selected through stratified random sampling, based on cast (SC/ST/BC/OC). A structured, pre tested questionnaire was used with scope for open-ended questions. An end-line KAP survey was repeated after 18 months to assess the change in knowledge and practice. Important demographic information was also obtained. In the end-line survey, attempt was made to contact the same girls, but only 58 per cent of the initial cohort could be contacted and hence other girls matched for age and cast were included. Thus it is a cross-sectional study. Written consent from the parents was obtained. Since DCT does not have a formal ethics committee, consent of the Trustees of DCT was obtained before initiating the study. The responses were classified, tabulated in the form of frequencies, percentages, and the data analysed by proportion Z test to see the differences in proportions between the initial and final KAP assessment.

Diet survey

A semi-quantitative household diet survey was done during the initial and final surveys to examine the consumption of protective foods such as vegetables, pulses, and animal products [5]. The method involved obtaining information on the frequency of consumption of different foods by the family on a typical day when there is neither feasting or fasting and no guests. Estimate of per capita consumption was obtained by seeking information on the quantity of each food item cooked each day and number of household members above the age of 1 (capita) [5]. In rural communities, all members including adolescent girls eat from the same pot.

Education

Strategies for educating the girls included, FGD on select 'Balika dinams' (girls' days) either in the school after the school hours or in the village. Former was convenient in 3 villages where there are high schools. In the 2 villages where there were only primary schools, girls were gathered in the evenings in the village, or invited to the DCT campus on holidays. The schedule of Balika dinam could not be strictly adhered to due to scheduled and unscheduled ('bandhs') holidays, preparation for exams etc.

Topics such as nutrition (infant and child feeding practices, balanced diets appropriate for age and physiological status, cooking practices, nutrients in foods and their functions, identification of nutrition deficiency diseases), hygiene, sanitation, waste disposal, and common infectious diseases- their causes, prevention and management (in case of diarrhoeas) and social issues such as hazards of early marriage, gender discrimination and dowry system, importance of education etc were covered. A few classes on physiology of reproduction explaining menstrual cycle, conception and contraception were held in villages where there were high schools. The point that sex of

the child is not determined by female ovum but by male sperm was explained since women are often blamed for the birth of an unwanted female child. Teaching was done through question answers and quiz, rather than rote lecturing. Inexpensive teaching aids like pamphlets in the local language Telugu, on the above subjects were prepared and distributed freely so that the girls could educate the family as well. Slide and sound shows were also arranged in the villages in late evenings to educate the community.

Skill development

Being a farming community, nutritionally and environmentally promotive farming skills such as 1) raising homestead gardens with emphasis on micro-nutrient–dense vegetables (green leafy vegetables -GLV, beans - which also enrich the soil with nitrogen, tomatoes, drum stick etc and fruits like papaya, guava and mangoes); 2) nursery raising (drum stick, papaya, curry leaves and bachali - *Basila alba*), 3) vermi composting, and 4) use of botanical pesticides like neem kernel decoction and chilli garlic decoction, were imparted. For girls not going to schools, three months training in tailoring and embroidery was given in classes run by DCT. For interested girls, three days training in food processing was given by the Mahila Udyog Society, run by DCT, in its campus at Narsapur. Preparation of processed foods like cereal – pulse complementary foods, millet- based products (ragi malt, ragi papad, instant ragi dosa, ragi biscuits), making chutney powders with solar dried GLV, a variety of pickles, squashes etc was taught. Interested girls came for repeat training. Apart from the food processing, principles of food safety, HACCP and nutritional importance of the foods were also explained.

Results and Discussion

Demographic details

Over 80 per cent of the girls surveyed were in school. Among the dropouts only three girls were illiterate. Others had studied up to secondary school. By contrast 62 per cent mothers and 43 per cent fathers were illiterate, indicating generation transition in literacy. Over 90 per cent girls were not married in both the surveys. Farming was the major occupation of 87 per cent families, but land holdings were very small- (mean 1.7 acres, range 1-5 acres). Only 7.5 per cent families were landless. The rest had own or leased land. Most households (83%) had brick and mud houses and 82 per cent had separate kitchen. However, only 33 per cent households had latrines which were in use. Wood was the fuel used by 90 per cent households. Piped water through overhead tank was available for 70 per cent households. Rest used hand- operated bore well water, and 13 per cent got drinking water from Reverse Osmosis (RO) plants in the nearby village. Open drains were the main mode of waste water disposal. While, only few girls considered their home surrounding unclean; 21 per cent in the initial survey and 8 per cent in the final survey considered village surrounding unclean. Use of manure heap for solid waste disposal improved from 67 per cent in the initial survey to 90 per cent in the final survey. Similarly disposal of solid trash in open land decreased from 31 per cent to 2.5 per cent suggesting some impact of education on waste disposal and sanitation.

Knowledge and perception of girls on gender issues

Most girls (initial survey-87.5%, final survey-99.2%) could tell the age of adolescence as 10 to 18 years and age of menarche as between 10-18 years. Majority of the girls were opposed to the dowry system (initial survey-84.5%, final survey-87%) but expressed helplessness to change it. They also did not approve of gender discrimination, but in focus group discussion, accepted within the house gender roles which meant more leisure time for their brothers. Interestingly, in terms of parent care, they did not feel discriminated against, suggesting that even in the poor households; girls do receive parental attention, love and care. Most girls (77%) felt that both the parents are decision makers in the family even on financial issues. The impression of the girls may not capture the true picture. In the NFHS-3 survey, women's participation in household decision making in AP is reported to be only 40.4 per cent [3].

Knowledge of food and nutrition

Understanding of early initiation of breast feeding, age of complementary feeding, and avoidance of pre-lacteal foods was good to start with and improved with education (Table I). While it was recognised that colostrum feeding and breast feeding is good for health, their importance for preventing infections was not mentioned in the initial survey, but mentioned in the final survey by majority of the girls, signifying improvement in knowledge. While over 70 per cent girls responded that adolescent girls need more food for health, only 27 per cent could explain the need for growth as reason, initially. This percentage increased to 81 per cent in the final survey. In general, understanding of good cooking practices such as washing vegetables before cutting and not discarding excess rice water ('ganji'), after cooking was good. Despite this knowledge discarding 'ganji' is a well entranced practice difficult to change. Knowledge of foods for balanced diet, nutrients in foods and their functions, foods rich in specific nutrients and deficiency diseases- signs and symptoms (assessed by showing photographs), was confused. It showed some improvement, (particularly understanding of balanced diet), but some confusion persisted. These topics in nutrition do not form part of high school syllabus and the few lessons were probably insufficient for proper understanding of these scientific subjects.

Personal hygiene and infectious diseases

Almost all the girls reported bathing daily even during menstrual period, washing hands with soap after defecation and before and after meal, use of tooth paste or tooth powder and tooth brush. Use of charcoal for cleaning teeth was not mentioned. These responses if true signify healthy practices, not always seen in rural community. At least it implies right knowledge. More than 50 per cent girls who were menstruating (201 girls) used sanitary napkins as protection during menstruation- (commercial 25.3%, home-made, 38.3%). Rest used a cloth which was washed and reused.

Understanding of the causes of common water and air-borne infectious diseases was poor (Table II). Exception was

TABLE I

Knowledge of Nutrition: Percentage of Respondents

Parameter	Initial	Final
Time of initiation of breast feeding		
Within 1 hour	47.9	86.7***
The same day	38.8	9.6***
Importance of breast milk★		
Good for health	87.9	90.0
Prevents infection	1.7	74.0
Don't know	10.4	1.3
Importance of colostrum★		
Rich in nutrients	35.0	60.0***
Prevents infection	8.7	83.0***
Don't know	49.6	7.1***
Should pre-lacteal food be given		
No	62.9	97.5
If yes - What?★		
Sugar water	0	20.0***
Honey	50.0	32.0***
Buffalo milk	25.0	52.0***
Age of initiation of complementary food		
<6 months	12.1	6.3*
At 6 months	68.8	73.0
7-9 months	11.7	16.3
9-12 months	0.8	2.0
> 12 months	1.2	2.5
Don't know	5.4	Nil**
Food for adolescence girl compared to adult woman		
More food	77.6	90.9***
Less food	15.8	3.0***
Same	4.6	4.2
Don't know	2.0	2.1
Food during pregnancy		
More food	88.7	84.6
Less food	7.1	4.2
Same	2.9	10.0
Don't know	1.3	1.2
Food is necessary for★		
Good health	95.8	98.3

Significantly different from initial * P< 05, ** P <01 *** P<001 by proportions test ★ Multiple answers

mosquito bite as cause of malaria. Some improvement occurred after education, but considerable degree of confusion persisted. Though most girls had heard of tuberculosis, they could not describe the symptoms initially. However, in the end-line survey, more than 50 per cent mentioned symptoms like continuous cough, phlegm and loss of weight. While over 20 per cent girls explained contaminated syringes, contaminated blade and blood transfusion as the cause of AIDS/ HIV infection, only two per cent mentioned unsafe sex with multiple partners as the cause. There was marked improvement in this knowledge after education.

Household food frequency and consumption

Rice was the staple food and consumed daily, per capita consumption being around 420-425 g. Roti (salted, roasted, pancakes) either from wheat or maize or 'jowar' (sorghum) was also consumed almost daily (Table III). Foods like dal, (lentils) vegetables, including GLV, were consumed 2-4 times a week, but the quantity consumed was very low. Fruit consumption was mostly once or twice a week. Small quantity of milk was consumed daily in tea. Per capita consumption of milk showed a decrease from 79 g in the initial survey to 54g in the end-line survey. Egg was consumed 2-3 times a week, and meat once a week, in small quantity. The reasons for lower milk consumption in the final compared to the initial survey are not clear. Price rise is a possibility. The semi-quantitative food frequency and consumption method for the household diet survey used in this study has been reported earlier [5]. The frequency as well as the quantity of foods consumed in the present survey compares well with data obtained in earlier surveys done by DCT in villages of Narsapur mandal during 2007 and 2010[5]. Except cereals/millets, daily consumption of all the foods was markedly lower than recommended. Marginal differences between the two surveys may not be of physiological significance, even if statistically significant (Table III).

Acceptance of home gardens, green methods of farming and BYP

Over 200 girls out of a cohort of 412 girls raised home gardens. Total of 88 vermi compost beds were established with the compost mainly used for own farms. Approximately 50 per cent of vegetables produced were used for home consumption and the rest were sold. Initially less than 10 per cent of the girls were aware of vermi compost, organic pesticides and drip irrigation. In the final survey more than 75 per cent showed awareness regarding these environmentally promotive green methods of farming. Backyard poultry with high egg –yielding birds was accepted by only 35 families.

Acceptance of non-farm skills

Among girls staying at home, 31 received training in food processing and 22 in tailoring and embroidery. Several have purchased sewing machine and using their training for income generation. Food processing can be an income-generation option if centres for cluster of villages can be set up and marketing of produce organized. Some girls mentioned educating mothers in the family and village in complementary food making.

TABLE II

Knowledge of Infectious Diseases: Percentage of Respondents

Parameter	Initial	Final
Causes of infectious diseases★		
Diarrhoea		
Contamination of food and water	76.7	92.5***
Mosquito bite	82.9	51.3***
Don't know	11.2	5.9*
Jaundice		
Contamination of food and water	33.8	72.9***
Mosquito bite	37.1	45.4***
Contaminated blood and needle	13.3	48.3***
Don't know	57.5	14.2***
Malaria		
Contamination of food and water	72.1	56.3***
Mosquito bite	93.7	93.0
Don't know	5.7	2.5
Encephalitis		
Contamination of food and water	31.2	60.0***
Mosquito bite	35.8	74.9***
Don't know	62.5	12.0***
Knowledge regarding symptoms of tuberculosis★		
Continuous cough	0	75.6***
Cough with phlegm	0	67.5***
Loss of weight	0	54.0***
Can't say	100.0	11.2***
Causes of AIDS★		
Unsafe sex	3.3	68.0***
Sex with more partners	2.1	68.7***
Injections	21.2	81.7***
Blood transfusion	21.2	79.9***
Contaminated blade	20.0	68.3***
Can't say	68.8	0.5***

Significantly different from initial * P< 05, ** P <01 *** P<001 by proportions test ★ Multiple answers

TABLE III

Food Consumption: Mean Frequency / Week and g/Capita/Day Based on Family Diet

Type of food	Initial Mean±S.D	Final Mean±S.D
Number of respondents	240	240
Rice		
Frequency	6.94 ± 0.52	7.0 ± 0.000
Mean consumption per week g/capita/day	425.76 ± 123.84	421.79 ± 158.31
Wheat		
Frequency/week	1.88 ± 1.10	2.08 ± 1.511
Mean consumption per week g/capita/day	16.23 ± 43.28	24.12 ± 39.43*
Maize / Sorghum roti		
Frequency/week	3.29 ± 3.03	4.26 ± 2.39
Mean consumption g/capita/day	75.79 ± 123.07	83.46 ± 90.53
Pulse		
Frequency /week	2.3 ± 0.73	2.41 ± 1.09
Mean consumption per week g/capita/day	14.01 ± 14.39	19.15 ± 12.84***
Vegetables		
Frequency /week	3.18 ± 2.16	4.18 ± 1.58
Mean consumption per week g/capita/day	51.99 ± 44.66	69.98 ± 43.94 ***
Green Leafty Vegetables (GLV)		
Frequency /week	2.49 ± 0.72	2.21 ± 1.07
Mean consumption per week g/capita/day	48.86 ± 29.73	33.52 ± 6.37***
Milk and milk products		
Frequency /week	6.97 ± 0.38	6.58 ± 1.44
Mean consumption per week g/capita/day	79.03 ± 51.42	53.73 ± 39.86***
Eggs		
Frequency /week	1.75 ± 0.67	2.10 ± 1.15***
Mean consumption per week number/capita/day	0.23 ± 0.12	0.26 ± 0.19
Meat		
Frequency /week	1.07 ± 0.42	1.25 ± 0.49
Mean consumption per week g/capita/day	21.93 ± 11.70	27.08 ± 17.28***

Significantly different from initial * P< 0.05, *** P<0.0001 by proportions test

There are few reported studies of this kind on adolescent girls which combine educational and skill interventions. One noteworthy study on 'Better Life Options for Adolescent Girls' conducted by The Centre for Development and Population Activities (CRDPA) in 2001, demonstrated the beneficial impact of focused efforts towards development of adolescent girls through knowledge land social engineering, on their empowerment [6].

Summary and Conclusion

A study in adolescent girls from five villages of Narspaur mandal in Medak district of Andhra Pradesh, India was carried out to

assess their Knowledge, Attitude and Practice (KAP) regarding health, nutrition, environment and gender- related social issues and develop appropriate interventions. KAP survey was repeated after 18 months to assess change if any. A semi-quantitative food frequency diet survey was done to assess the family diet.

There was strong resentment of social customs like dowry, but acceptance of within family gender roles. Based on the findings in the initial KAP survey educational strategy was worked out and farm and non-farm vocational training given. Knowledge of right infant and child feeding practices and cooking methods was satisfactory to start with and improved with IEC. Knowledge of balanced diet and nutrients in food showed marked improvement. Understanding of nutrition deficiency diseases, functions of different nutrients and foods rich in specific nutrients also improved but some confusion persisted. These important subjects do not form part of middle school syllabus and few lessons were probably insufficient to make a good impact. Home diets were very poor in income-elastic foods like pulses, vegetables, fruits and animal products, emphasising need for promoting homestead production. Nutritionally and environmentally promotive farm technologies were well accepted. Understanding of aetiology of common infectious diseases except malaria, was also very poor. Again this subject is not part of high school syllabus. Important subjects in health and nutrition and gender issues should be part of high school syllabus.

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