









Assessment of an Integrated Nutrition Communication Approach to Educate the School Going Adolescent Girls Living In Urban Slums of Hyderabad, Telangana State, India

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Abstract


Purpose: Consumption of right diet during the adolescent phase is a critical issue among the adolescent population as their eating behavior is significantly influenced by the peers. Therefore, a study was carried out to educate the School going adolescent girls living in urban slums of Hyderabad, Telangana, India on right nutrition. **Methods** –The study was carried out in two randomly selected government schools after obtaining approval from the Scientific Advisory Committee (SAC). About 200 girls each from eighth and ninth standards were recruited as study subjects. The age of the participants ranged from 13-15 years. After obtaining baseline data, intervention was carried out on 8 focal themes related to nutrition, health and family life education, by using well designed educational material. **Results:** A significant increment in the knowledge levels on all the focal themes was observed among the adolescent girls in the experimental school. After completion of the study, considering the ethical issues, the control group was also given education on 8 focal themes. **Conclusions and Implications:** It was observed that an integrated approach in communication methods such as combining print media like charts, folders with electronic media, using CD alongside interpersonal communication significantly improved the knowledge levels of these girls on nutrition and family-life education.


Keywords: Adolescent girls, Family life education, Iron deficiency anaemia, Iodine deficiency disorders.

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1. Introduction

Adolescent phase is a transitional and critical phase of life between childhood and adulthood. During this period, rapid physical growth and development takes place and this is characterized by physiological and emotional changes. Food and nutrition play a very important role during this period. Adopting healthy eating habits and regular physical exercise regimen is essential for optimal growth and development. During this phase, there is an increased demand for adequate nutrient intake for meeting the requirement of body and bone growth as adolescents gain 50% of their adult weight, more than 20% adult height and 50% of the skeletal mass (Tarvinder et al., 2007). Adolescent girls need to be educated on nutritional themes as they play a vital role as “Home makers” in future. Maternal nutrition plays an important role in the development of foetus and the outcome of pregnancy. Poor nutritional status and lack of awareness about the requirement of nutrition during pregnancy and lactation always push the vulnerable and the undernourished women at risk to pregnancy related complications and may lead to delivery of low birth weight babies. There are various factors which influence adolescents’ eating behaviour and these include taste preferences, knowledge on nutrition, socio-economic factors, media using habits and other factors like accessibility to fast food centres (Mollie et al., 2007; Ruchi et al., 2009). In a study, it was observed that adolescent girls preferred more carbonated beverages and fast foods to nutritious traditional foods irrespective of their socio-economic background (Raghunatha et al., 2007). Also, these girls were found to be lacking knowledge on many important nutritional themes (Reza and Maryam, 2006). Lack of education on aspects of nutrition and family life have been shown to be a major reasons behind the high morbidity and mortality rates among pregnant and lactating women and children. Therefore, the present study was taken up to sensitize the adolescent girls, on vital aspects of nutrition through need-based and pre-tested print and audio-visual educational material.

2. Methods

2.1. Selection of Schools

After obtaining approval from the SAC (Institution Review Board) vide reference no., ET02/ST/1/08-09 and Institutional Ethical Committee (IEC17/13/I) the study was carried out in randomly selected schools. The schools were matched for their students’ strength, economic strata, nutrition knowledge levels and age group before initiating the study.

The adolescent girls belonged to the lower economic strata. They were in the mid- adolescent age group as per WHO classification (13-15yrs), studying in 8th and 9th classes and their age ranged from 13-15 years. The study was a follow-up study as the subjects were the same both at the baseline as well as at the end line.

2.2. Development of an Interview Schedule and Pre-Test

Interview schedule with 90 short questions covering 8 focal themes related to nutrition, health and family life was developed consisting of both open and closed ended questions. Questions related to demographic details were also included. The questionnaire was pretested among adolescent girls in a school before study. The school where the pretest was carried out was not included in the main study.

2.3. Main Study

Two schools of Zilla Parishad Govt. High schools were randomly selected from the lower economic strata in Hyderabad, India from the list obtained from the District Education Officer. By adopting purposive sampling, 200 girls of the 13 -15 yrs age group were recruited and all the subjects were assessed for their baseline knowledge on the following 8 focal themes after collecting their demographic particulars.

1. Adolescent Phase
2. Nutrition and Calcium
3. Breast feeding and Complementary feeding/Infant feeding
4. Food groups and Balanced diet
5. Vitamin A
6. Anaemia and Folates
7. Iodine Deficiency Disorders(IDD)
8. Family Life / education

After the analysis of the baseline data, Information, Education and Communication (IEC) material such as folders, charts and a folk art based video CD (Fig 1; 6 no.) in regional language were developed on the above mentioned themes and administered to the adolescent girls through the science teachers in a class room setting.

The folders were distributed among the adolescent girls before 15 days of the intervention. The intervention was given through oral presentation by the Science teachers on all the focal themes in the presence of Project Investigators. The charts were displayed at the venue. After a week, the video CD containing relevant nutrition information on selected themes was screened to the students. The end line survey was conducted after a 15 day interval by using the same interview schedule which was used at the baseline study and the post interventional knowledge was assessed.

2.4. Statistical Analysis

Mean percentage value was calculated for the monthly income of the parents. For all other aspects SPSS 19.0 version was used to calculate X² value for both baseline and endline data in experimental and control group. The value <0.05 was considered to denote significant knowledge improvement.

3. Results

The baseline data of the both Intervention (Malkajgiri area) and control group (Uppal area) were matched as no significant difference in the knowledge levels of the adolescent girls was observed.

3.1. Demographic Particulars

The age of adolescent girls ranged from 13 to 15 years with the mean being 12.8 years. Most of the girls had no knowledge about their height (98%) and weight (89%). About 64% of the mothers were illiterate and 35% of the girls' mothers were home makers. Others were labourers, maids employed at homes and were involved in other odd jobs to earn their livelihood. Around 58% of the girls' fathers were illiterate and were involved in construction work, labour work, painting, driving of cabs and rest of them had primary and higher secondary education. The family's income ranged from Rs.2000/ (30 US\$) - to Rs.3000/ 45 US\$- / month (1US\$ = Rs. 66.6).

The results obtained after analyzing the post intervention data are discussed here and the knowledge increment percentages are given in [Table 1](#).

1) Adolescent Phase

Adolescent Phase is the key stage in the lifecycle to be understood by the adolescents. Therefore, creating awareness among the adolescent girls is all the more important as this phase is very critical in the Life cycle. As regards the adolescent phase, 4 aspects of the theme i.e., adolescent phase, adolescent age, physiological changes, physical changes such as height, weight and other growth spurt indicators were assessed. An increment of 20.1% in the knowledge levels of the adolescent girls about the adolescent phase was observed in the experimental group as against a marginal increment of 5.2% in the control group. However, with regard to the other aspects of the theme such as adolescent age, a significant improvement was observed as 22% of increment in the knowledge levels was observed in the experimental group as against 2.4% in the control group. As regards the physiological changes, a significant increment of 17.5% in the knowledge levels was observed in the experimental group as against 9.3% in the controls during the same period.

In the control group, there was no improvement as no significant difference in knowledge levels between the baseline and endline was found, indicating impact of nutrition education as intervention in the experimental group.

2) Nutrition and Calcium

Right nutrition plays a very important role in the proper growth of adolescent girls and calcium requirement is very high during this period. At the baseline in the experimental group, about 84.4% of the adolescent girls indicated the importance of proper nutrition for normal and healthy growth during the adolescent phase. About 67.2% girls indicated the requirement of calcium as one of the nutrients for proper growth and development. As regards the knowledge related to calcium-rich foods such as milk, milk products, egg and meat etc., 22.7% of the girls reported right information. However, 50% of the girls indicated the importance of calcium in bone development.

A significant increase ($P < 0.01$) in the knowledge levels of adolescent girls about the requirement of nutrients (84.4 to 93.7%), calcium requirement (67.2 to 90.1%), calcium for bone development (50 to 82.4%) was observed in post intervention data. Knowledge related to calcium-rich foods increased from 22.7% to 35%. In the post intervention, when compared to the knowledge increment between and control and the experimental group, it was observed no significant improvement in the knowledge levels on the importance of requirement of

nutrients between these two groups. However, the rest of the parameters related to calcium requirement, bone development and health and knowledge about calcium rich foods a significant increment in the knowledge levels was observed in the experimental group over control group.

3) Breast Feeding and Complementary Feeding

Education on breast feeding and complementary feeding practices is very important for the adolescent girls as they are at the threshold of family life. At the baseline in the intervention group, although 76.6% of the adolescent girls indicated the necessity of breast feeding to infants, only 44.5% of them cited the importance of feeding 'colostrum' immediately after delivery. After intervention, a significant improvement was observed in the knowledge levels as 76.8% of the adolescent girls indicated the importance of colostrum in the post intervention phase. Also, 30% of these girls indicated the presence of maternal antibodies in the post intervention as against 16% of girls before the intervention. As regards the exclusive breast feeding practices for the first 6 months, about 76.6% expressed their awareness at the baseline and this was increased to 93.7% in the post intervention. All the parameters related to breast feeding and complementary feeding practices were statistically significant ($P < 0.01$) after post intervention.

Regarding knowledge levels of complementary feeding, 35.9% children reported that complementary feeding should be initiated after 6 months at the baseline and there was significant increment (59.2%; $P < 0.01$) in the knowledge levels after intervention in the experimental group.

In the post intervention, the knowledge increment with regard to exclusive breast feeding (17.1% as against 5.5% in the control group), importance of colostrum (32.3% as against 11.4%) and complementary feeding (23.5% as against 2.5%) were significant in the experimental group as compared to the control group.

4) Food Groups and Balanced Diet

Rapid physical growth during adolescence demands more energy as well as macro and micro nutrients. As regards the classification of foods, a significant improvement in the knowledge levels among the adolescent girls in the experimental group was observed from 46.9 to 85.2%, energy foods (4.7 to 22.5%), sources of energy (49.2% to 85.9%), importance of fats in the diet (62.5 to 83.1%). With regard to the reason for intake of fats, at the baseline 20.3% of the girls mentioned that fats are important for the growth and also since they contain essential fatty acids (EFAs). After intervention, 52.1% of the girls realized the importance of the fats. A significant improvement in the knowledge levels was observed on protein rich foods (35.9 – 52.1%), protective foods (63.3 – 84.5%). Regarding the protective foods, adolescent girls were aware that leafy and other vegetables are the important sources vitamins and minerals. About 46.9% of the girls were aware of the concept of balanced diet. After intervention, 79.6% could also explain different functions of food groups indicating efficacy of the IEC material. The percentage knowledge increments in the experimental and control groups are given in the table 1.

5) Vitamin A

At the baseline in the intervention group, about 77.3% adolescent girls indicated that they were aware about night blindness but the correct reason for night blindness due to Vitamin A deficiency (VAD) was mentioned by only 44.5%. But, when the girls were asked to indicate the symptoms of VAD, only 43.8% indicated the symptoms VAD such as Bitot's spots. As regards the prevention of VAD, 9.4% of the girls indicated the importance of doctor's consultation and 50% of the girls indicated importance of dietary modification. About 37.5% of the girls provided the details of vitamin A rich foods like Green Leafy Vegetables (GLVs), yellow coloured fruits and vegetables such as papaya, yellow pumpkin etc.

After intervention, a significant improvement in the knowledge levels of night blindness (77.3 to 90.8%), causes of blindness due to VAD (44.5 to 73.9%), symptoms of VAD (43.8 to 68.3%), dietary modifications to combat VAD (50 – 83.8%) and vitamin A rich foods (37.5 to 83.8%) was observed.

The knowledge increment with regard to dietary modification of Vitamin A (33.8 against 15.2% in control) and Vitamin A rich Foods (46.3 against 6.3% in control) was significant over the girls in the control group.

6) Anaemia and Folates

In the intervention group, about 36.7% of the adolescent girls indicated that they were aware about the causes of Iron deficiency anaemia (IDA), 55.5% of the girls indicated the symptoms of anaemia like pallor, weakness, disinterest in work etc. As regards the prevention of anaemia, about 37.5% of the girls indicated the importance of Iron and folic acid tablet consumption while 34.4% of the adolescent girls expressed the importance of

consumption of GLVs. Regarding folate and folate-rich foods, 46.1% of the girls indicated the importance of folate in neural tube formation and 28.1% of the girls emphasized folate-rich foods like GLVs etc.,

Similarly, there was a knowledge improvement in the intervention group with regard to the causes (36.7 to 64.1%) with an increment of 27.5% and prevention of anaemia (37.5 to 76.8%) with an increment of 39.3%. As regards the folate rich foods, about 28.1% of the girls had knowledge about folate-rich foods and after intervention the knowledge increased to 43% with an increment of 14.9 over the control group.

As regards the knowledge increment of intervention group viz., symptoms of anaemia (32.5 against 18.2% in control group), causes for anaemia (27.5 against 1.5% in control group), prevention of anaemia by through consumption of IFA (39.3 against 2.5% in control) and importance of folate (32.8 against 5.9% in control).

7) Iodine Deficiency Disorders (IDD)

At the baseline in the intervention group, about 46.1% of adolescent girls had awareness about IDD but they were not aware about the significance of iodine fortified salt as 13.3% of them only could identify it as a preventive method.

After intervention, a significant improvement in the knowledge of IDD (46.1 to 83.8%) with an increment of 37.7% in the intervention group and its prevention by using Iodized salt (13.3 to 44.4%) was observed with an increment of 31.1%.

8) Family Life Education

Health educators lay firm emphasis on family life education as most of the girls get married during adolescence. As the adolescent girls comprise a major portion (about one-fifth) of country's population, important concepts like puberty, Sexually Transmitted Diseases (STDs) and Human Immuno Deficiency Virus (HIV), education on avoidance of early marriages and other hygiene related issues were emphasized.

In both Intervention and control groups, most of the adolescent girls were aware of the age at which girls attain menarche and there was no significant difference between the baseline and endline. Similarly, there was no significant difference in the knowledge levels of right age for marriage as more than 85% in both control and intervention group adolescent girls could correctly cite it as 18 years and above. When the girls were asked about Acquired Immuno Deficiency Syndrome (AIDS), 63.3% of the adolescent girls expressed that they were aware of HIV/ AIDS and 50% of the girls of the intervention group could identify the modes of transmission. After intervention, awareness about AIDS and mode of its transmission increased to 95.1% and 92.3% respectively with an increment in the knowledge levels about HIV (31.8 against 18.1% in the control group) and mode of transmission (42.3 against 16.3 in the control group)

4. Discussion

Adequate nutrition for adolescent girls is a public health challenge in India. This becomes even more daunting among girls belonging to the under privileged sections such as slums/rural areas. Nutrition education is being considered as an affordable and sustainable public health measure in this direction. Schools provide suitable settings for any health intervention as most of the adolescent girls gather at one place. Adolescent girls are the most important group as this phase though transitional, critical and important stage of life (Nurul et al., 2010). The girls of this age group are prospective mothers and home makers. Therefore, the present study was carried out in the schools to educate adolescent girls living in urban slums on aspects of nutritional knowledge and family life education. Recent reports indicate that most of the adolescents are obese or over weight and on other hand, 50% of the children were also reported to be under nourished due to unhealthy eating practices (Sandra, 2006). So, as to improve the quality life of the adolescent girls, eight themes were considered for the present study. As most of the adolescent girls were found to be aware of the aspects of physical and physiological changes, the knowledge related to nutrition in a life cycle approach was inadequate. The present study intervention significantly improved knowledge levels on all the focal themes. As most of the adolescents are influenced by their peer groups regarding their food choices, there is high probability of those children consuming more junk foods and carbonated beverages (Alexandra et al., 2013). Therefore, it is important to form nutrition clubs in the schools to promote nutrition education as well as physical activity among adolescents to maintain their health and also to check overweight and obesity among this group.

Content analysis of school science curricula reveal that nutrition component in the text books was inconsistent and inadequate. Also, there is no continuity of nutrition topics between 8th class and 9th grades, while, knowledge related to these topic is very much essential for the adolescent girls (Subba et al., 2011). Therefore, two schools included in this study belong to poor income group and parents' qualification also was not

very high. Based on the baseline data and science curriculum of sixth to tenth class, the questionnaire and IEC material were developed and used for education of the adolescent girls. The intervention material includes eight focal themes in the form of folders and a folk art based video CD in the regional language. Covering all the aspects of these themes, the questionnaire was re-administered after the intervention. The significant improvement in the experimental group indicated the efficacy of the intervention material namely folders and folk art based video CD. No significant improvement was observed in control group inspite of exposure to media and teaching of the lessons related to nutrition through the teachers.

Further, this study suggested that comprehensive school intervention should include regular attendance and hands-on learning in gardening and cooking. It has also revealed that the changed school meal programme giving adequate importance to nutrition, environment for proper physical activity (Morton *et al.*, 2016) gardening and cooking lessons has effectively increased the preference for a variety of fresh foods and vegetables. Further, it is important to develop effective family based intervention strategies to promote the consumption of vegetables and fruits among the adolescents for the improvement of micro-nutritional status (Nicole *et al.*, 2004). Therefore, there is a need to revise the Science curriculum on different aspects of nutrition including family life education.

Strong emphasis needs to be laid on dietary diversification like inclusion of variety of foods in the daily diet, especially coarse cereals and millets and fresh fruits and vegetables. Seasonal foods are relatively inexpensive and hence their use should be advocated. This vital message on the significance of dietary diversification was emphasized in the study. This, perhaps, is fundamental in popularizing the concept of balanced diet among the target group.

5. Conclusion

The IEC material (print and audio visual) which was developed for adolescent girls on different focal themes significantly improved the knowledge levels of adolescent girls. The material can serve as a resource material for the trainers of front line health functionaries involved in health education. Formation of Nutrition clubs, 'Oorja' (Energy) clubs in the schools to inculcate interest among adolescents to practice right nutrition with proper physical activity would promote good health among youngsters, which in turn can build better societies in the future.

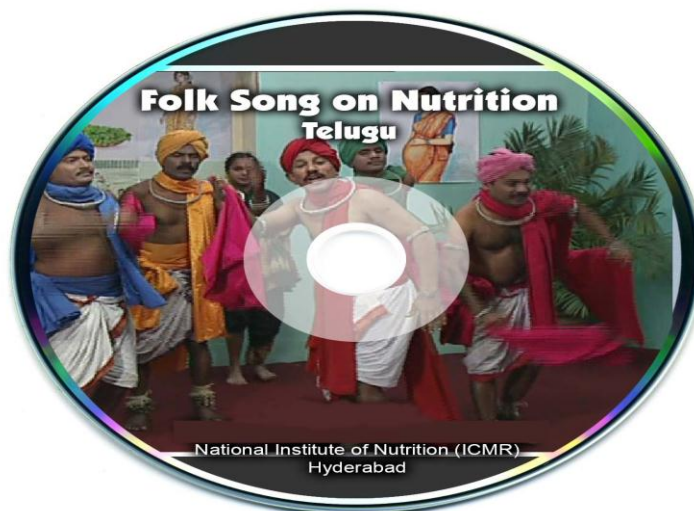
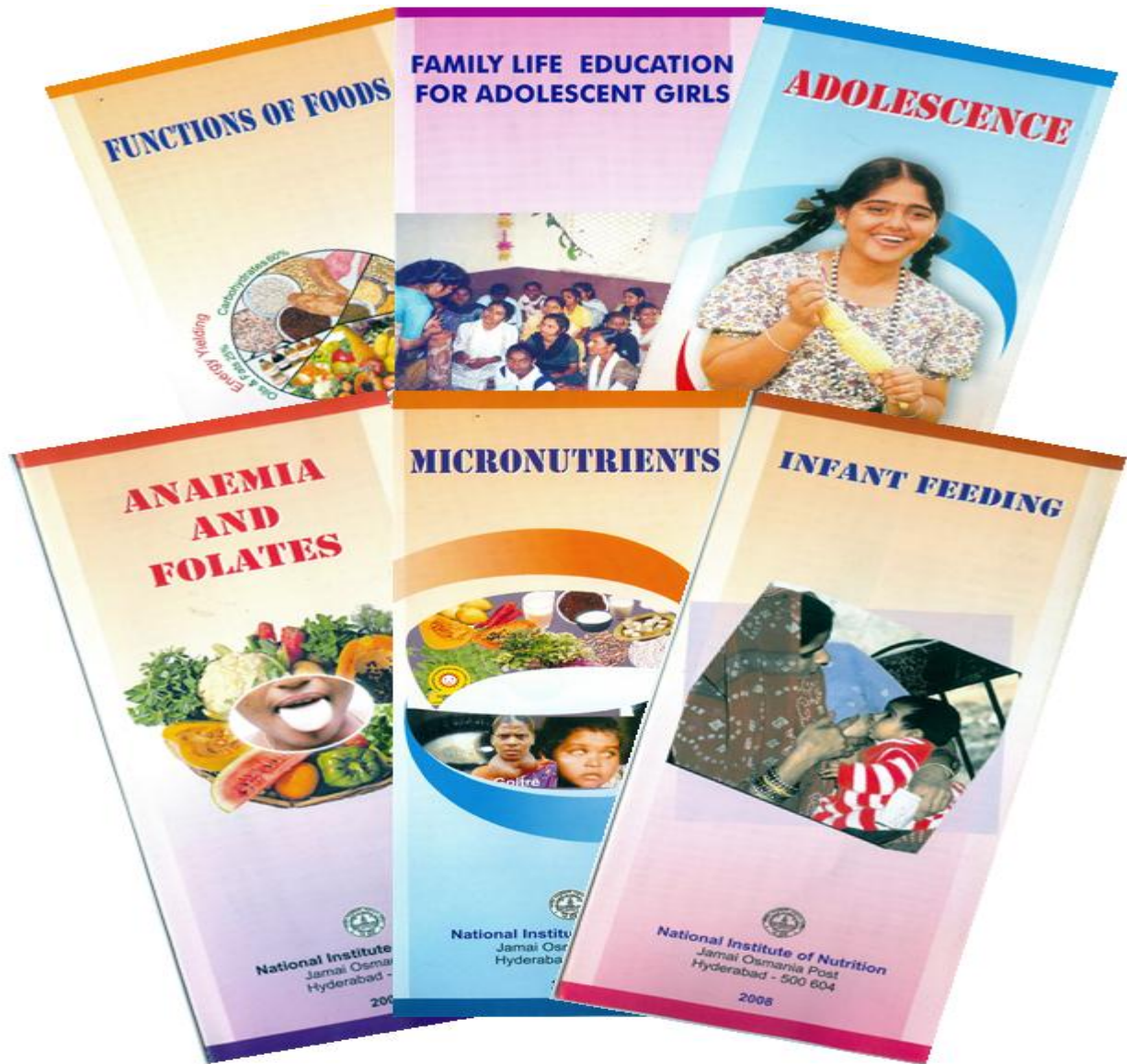
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Table-1. Impact of IEC on nutrition and health knowledge levels among Adolescent girls living in urban slums

SI. No	Parameter	CONTROL		EXPERIMENTAL	
		Uppal		Malkajigiri	
		Baseline	Final / Endline	Baseline	Final / Ennline
1.	Adolescent phase				
	Adolescent phase	75.2	70.6 (NS)	75.0	95.1**
	Adolescent age (10-18 yrs)	66.4	64.0 (NS)	69.5	91.5**
	Physiological changes during adolescent phase	68.1	58.8 (NS)	71.9	89.4**
2	Type of physiological changes (Height, weight and facial changes)	9.4	8.1 (NS)	53.9	66.2**
	Nutrition & Calcium				
	Requirement of nutrients	84.0	77.2 (NS)	84.4	93.7*
	Calcium requirement	55.0	51.5 (NS)	67.2	90.1**
	Importance of calcium for bone development	27.7	22.1 (NS)	50.0	82.4**
3	Knowledge about calcium diet food Milk & milk products, egg, meat	12.7	11.8 (NS)	22.7	35.0**
	Breastfeeding and complimentary feeding				
	Exclusive breast feeding (6 months)	74.6	69.1(NS)	76.6	93.7**
	Importance of colostrum	26.1	14.7*	44.5	76.8**
4	Complimentary feeding (after 6 months)	22.5	25.0	35.9	59.2**
	Food groups and balanced diet				
	Food group classification	13.4	5.1*	46.9	85.2*
	Knowledge about foods (Energy yielding foods)	10.1	2.2	4.7	22.5**
	Sources of energy	63.5	63.2 (NS)	49.2	85.9**
	Knowledge about Fats	15.6	17.2 (NS)	62.5	83.1**
	Reasons, why we need fat				
	Growth of the body, essential fatty acids	27.2	30.2 (NS)	20.3	52.1**
	Protein rich food	21.8	12.5 (NS)	39.1	49.3**
	Knowledge about protein rich foods Pulses, egg, milk, meat	12.7	14.0 (NS)	35.9	52.1*
	Vitamin and mineral rich food	33.9	31.6*	63.3	84.5**
	Balanced diet	15.0	5.9**	46.9	79.6**
5	Define balanced diet (Meat, GLV, rice, vegetable, dal)	2.6	1.4	1.6	31.7**
	Knowledge about Vitamin A				
	Knowledge about night blindness	71.7*	60.3*	77.3	90.8**
	Causes of night blindness Deficiency of vitamin A	36.8	22.1**	44.5	73.9
	Symptoms of vitamin A deficiency Bitot spots	9.4	11.0	43.8	68.3**
	Prevention of vitamin A deficiency Consulting doctor	30.6	24.3	9.4	16.2**
	Dietary modification of vitamin A	40.1	25.0**	50.0	83.8**
6	Vitamin A rich foods (GLV, Yellow coloured fruits)	54.1	47.8	37.5	83.8**
	Anaemia and folate				
	Symptoms of anaemia	39.7	21.5*	55.5	88.0**
	Causes for anaemia Deficiency of iron	4.6	5.1	36.7	64.1**
	Importance of folate	4.6	3.7 (NS)	17.2	33.8**
	Symptoms of anaemia	19.2	11.8*	46.9	70.4**
	Prevention of anaemia Take iron tablets	6.2	3.7	37.5	76.8**
	Knowledge about iron rich food items (GLV)	14.3	11.8	34.4	46.5**
	Importance of folate	19.9	14.0**	46.1	78.9
7	Folate rich foods (GLV)	5.5	0.7	28.1	43.0*
	Iodine Deficiency Disorders (IDD)				
	Knowledge of IDD	39.2	40.1	46.1	83.8**
8	Prevention of IDD by iodized salt	16.1	18.2	13.3	44.4**
	Family life education				
	Menarch age what	73.6	66.2**	80.5	82.4 (NS)
	Right age – marriage 18<	87.0	83.1 (NS)	85.2	85.9 (NS)
	AIDS/ HIV – Do you know	53.4	35.3**	63.3	95.1**
	Mode of transmission of AIDS	36.2	19.9**	50.0	92.3*

NS – Not significant; *P<0.05; **P<0.01



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