Effect of dietary counselling and nutrition education on food intake among adolescent girls belonging to different socio-economic backgrounds, Bihar

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Abstract

Background: Adolescence period is described as “neither children nor adult” or as “growing-up years”. After infancy, adolescence period is the second fastest growth period. It is the period where transformation occurs from childhood to adulthood with extent biochemical, emotional, cognitive, physical and social development.

Methods: Study was carried out on 15-19 years age group of adolescent girls. Total number of adolescent girls was 100 and they were classified into three different groups’ i.e. upper class, middle class and lower class. The information related to dietary intake, food habit and knowledge about the food was obtained through interview schedules and food consumption of the subjects was assessed using a 3 days 24-hours recall method. Nutrition education package were delivered with the help of various education methods namely lectures, storytelling, drama and videos.

Results: It was showed that as income increased the intake of all food stuffs also increased. It was observed that after nutrition intervention and dietary counselling, intake of all food stuffs and nutrients was slightly increased by respondents of each socio-economic group. Positive changes were showed in every income group of girls.

Keywords: Adolescent girls, food intake, socio-economic group, dietary counselling, nutrition education

Introduction

Adolescence is one of the complex periods and this age group needs special care and attention, because it is the time when body requires more nutrients. We can say that adolescence is the most important period of the life cycle which gives second chance to the children to improve their health and also catch up their growth who had poor nutritional status in early life (Das et al. 2021) [2].

The adolescent population in India (243 million) is highest in the world followed closely by China (207 million) (Dave et al. 2017) [1]. Adolescents estimated over 21.4 per cent of the India population (Nair et al. 2017) [12]. Worldwide, it is expected that the number of adolescents will reach 1.13 billion by 2025 (Hussain et al. 2015) [14].

The World Health Organisation believes nutritional status is a prime indicator and also key elements for support of growth and development of adolescents. Nutritional status of adolescents of developing countries like India is poorer as compared to developed countries (Fatima et al. 2019) [4]. There are various factors which affect adolescent’s health and nutritional status directly or indirectly such as inadequate nutrition, lack of awareness about health and nutrition, early marriage, high migration rate etc. Poor socioeconomic status and low literacy levels are one of the major factors which lead to under nutrition in adolescent girls (Getachew et al. 2019) [6]. In India, the prevalence of under nutrition among school going girls is high, especially among tribal communities and rural areas (Filipe et al. 2013) [5]. Freedom from poor health and nutritional status is a basic human right for every individual. Proper knowledge of heath related issue and also dietary pattern could be a significant step towards breaking the vicious cycle of intergeneration under nutrition, obesity, anaemia and also various chronic diseases of adolescent girls. Poor socio economic status and low literacy level is a significant aspect which often leads to under nutrition in adolescent girls (Getachew et al. 2019) [6].

Materials and Methods

Bihar is the third largest state of India. As per the 2011 census, total population of Bihar is around 104,099,452 (49,821,295 female and 54,278,157 male). Population belonging to rural and urban areas are 89 per cent and 11.3 per cent respectively. Hence, Bihar was chosen purposively for the study.
Study was carried out on 15-19 years age group of adolescent girls. Total number of adolescent girls was 100 and they were classified into three different groups i.e. upper class, middle class and lower class according to the use of Kuppuswami socioeconomic status (SES) scale Performed modernized by Kumar et al. (2013). Out of total 100 respondents, 78 respondents from lower class families, 14 respondents from middle class families and 8 respondents from upper class families were selected for this present study. Kuppuswamy socioeconomic status was originally proposed in 1976. Socio economic scale is based on the three items-family income, education and occupation of head of the family’s. Information of these items was collected using SES scale (Kumar et al. 2013).

Education: Education refers to the individual’s ability to read and write. Education level of head of the family was categorized below:
1. Professional or honors.
2. Graduate or post graduate.
4. High school certificate.
5. Middle school certificate.
6. Primary school certificate.
7. Illiterate.

Occupational status: The term occupation is defined as the work or services from where family gets some kind of benefits like money to fulfil their daily needs.

Income
The term family income assigns to the gross income of the family earned by all members and which is available for their expenditure. The information related to dietary intake, food habit and knowledge about the food was obtained through interview schedules and food consumption of the subjects was assessed using a 3 days 24-hours recall method.

Selected respondents were interviewed based on whether different foods were consumed daily, on every other day, weekly basis, rarely or not consuming. Respondents were asked to convey their preference of frequency in food consumption from various food groups. Nutrition education package were delivered with the help of various education methods namely lectures, storytelling, drama and videos. In this study, individualized dietary counselling was conducted for the selected adolescent girls.

Respondents were asked about dietary habits and nutrition related various question. After delivering of nutrition lectures and dietary counselling, it was observed that the selected respondents developed proper knowledge of good dietary and health practices. To assess the impact of nutrition knowledge of adolescent girls, pre and post-test were conducted and respondents obtained “yes” or “no” categories. The scoring of each component was done on two points i.e. whether correct or incorrect. Right response was allocated with a score i.e. one while wrong response was given score zero. Total score obtained of each selected subject was summed up for each aspect separately.

In present study t test, mean and standard deviation was used to compare the mean food intake of different socio-economic group and also to find significant difference among all group of adolescent girls. The pre and post-exposure of the difference in knowledge gain of the respondents was also analyzed through t-test.

Results and Discussion
Data on effect of nutrition intervention and dietary counselling on food intake of selected adolescent girls from different socio-economic group is presented in Table 1, 2 and 3. The data depicted in (Table 1) found that before nutrition education, the daily intake of cereals and pulses by lower class girls was 208.6 and 18.41 g/day (69.53 and 30.68% of RDI). After imparting education and counselling, consumption of cereals and pulses by adolescents was slightly increased and the mean daily intake was 210.43 and 20.41 g/day (70.14 and 34.02% of RDI).

Daily consumption of green leafy vegetables, roots and tubers and other vegetables of girls of lower income group was 27.82, 32.65 and 30.12 g/day and these increased to 30.28, 34.69 and 32.35 g/day after nutrition education and counselling.

It was found that before counselling, the daily consumption of fats and oils by lower class girls were more as compared to RDI and the average intake was 26.25 g/day (105% of RDI) and it increased to 195.34 g/day (39.07% of RDI) after counselling and nutrition education.

The data depicted in the results showed that there was significant increase in knowledge of good dietary and health practices. To assess the impact of nutrition knowledge of adolescent girls, pre and post-test were conducted and respondents obtained “yes” or “no” categories. The scoring of each component was done on two points i.e. whether correct or incorrect. Right response was allocated with a score i.e. one while wrong response was given score zero. Total score obtained of each selected subject was summed up for each aspect separately.

In present study t test, mean and standard deviation was used to compare the mean food intake of different socio-economic group and also to find significant difference among all group of adolescent girls. The pre and post-exposure of the difference in knowledge gain of the respondents was also analyzed through t-test.

Table 1: Effect of nutrition education and dietary counselling on mean food intake of respondents belonging to lower class family

<table>
<thead>
<tr>
<th>Lower class n=78</th>
<th>Food groups</th>
<th>RDI (gm) #</th>
<th>Pre-test (gm)</th>
<th>Post-test (gm)</th>
<th>% change</th>
<th>t-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cereals</td>
<td>300</td>
<td>208.6±38.48 (69.53)</td>
<td>210.43±33.71 (70.14)</td>
<td>+0.61</td>
<td>0.31 (NS)</td>
<td></td>
</tr>
<tr>
<td>Pulses</td>
<td>60</td>
<td>18.41±4.28 (30.68)</td>
<td>20.41±4.28 (34.02)</td>
<td>+3.34</td>
<td>0.91 (NS)</td>
<td></td>
</tr>
<tr>
<td>GLV</td>
<td>100</td>
<td>27.82±5.4 (27.82)</td>
<td>30.28±6.06 (30.28)</td>
<td>+2.46</td>
<td>0.67 (NS)</td>
<td></td>
</tr>
<tr>
<td>Roots &amp; tubers</td>
<td>100</td>
<td>32.65±6.06 (32.65)</td>
<td>34.69±6.09 (34.69)</td>
<td>+2.04</td>
<td>0.29 (NS)</td>
<td></td>
</tr>
<tr>
<td>Other vegetables</td>
<td>100</td>
<td>30.12±11.91 (30.12)</td>
<td>32.35±11.35 (32.35)</td>
<td>+2.23</td>
<td>1.99 (NS)</td>
<td></td>
</tr>
<tr>
<td>Fruits</td>
<td>100</td>
<td>19.47±5.81 (19.47)</td>
<td>20.6±5.85 (20.60)</td>
<td>+1.13</td>
<td>1.20 (NS)</td>
<td></td>
</tr>
<tr>
<td>Milk &amp; milk products</td>
<td>500</td>
<td>86.46±114.67 (37.29)</td>
<td>95.34±112.73 (39.07)</td>
<td>+1.78</td>
<td>3.48 (NS)</td>
<td></td>
</tr>
<tr>
<td>Fats &amp; oils</td>
<td>25</td>
<td>26.25±9.97 (105)</td>
<td>23.34±6.34 (93.36)</td>
<td>-1.64</td>
<td>2.17 (NS)</td>
<td></td>
</tr>
</tbody>
</table>

*Values are mean ± SD.
*RDI= Recommended Dietary Intake (ICMR 2010) [9].
*n-indicates the number of respondents.
*Figures in parentheses indicate per cent of RDI.
*t-values indicated comparison of pre and post scores.
*Significant at 5%.
*NS-Non Significant.
Data in (Table 2) showed that before nutrition education, the average daily intake of cereals and pulses of adolescent girls of middle income group was 222.07 and 22.71 g/day (74.02 and 37.85% of RDI). After imparting education and counselling, consumption of cereals and pulses by adolescents was slightly increased and the mean daily intake was 239.03 and 32.07 g/day (79.68 and 53.45% of RDI).

Daily mean intake of green leafy vegetables, roots and tubers and other vegetables of girls of middle class group was 34.78, 38 and 43.07 g/day (34.78, 38 and 43.07% of RDI) and it increased to 41.5, 43.14 and 47.92 g/day (41.5, 43.14 and 47.92% of RDI) after nutrition education and counselling.

Before imparting knowledge, Consumption of fruits by respondents of middle class family was 23.28 g/day which increased to 31.57 g/day and intake of milk and milk product was 221.42 g/day (44.28% of RDI) and it increased to 240.78 g/day (48.16% of RDI) after counselling and nutrition intervention.

It was found that before counselling, the daily intake of fats and oils by middle class girls was more as compared to RDI (25 g). The consumption of fats and oils was 32.64 g/day (130.56% of RDI) and after one month of nutrition related training it was declined to 24.07 g/day (96.28% of RDI).

### Table 2: Effect of nutrition education and dietary counselling on mean food intake of respondents belonging to middle class family

<table>
<thead>
<tr>
<th>Food groups</th>
<th>RDI (gm)</th>
<th>Pre-test (gm)</th>
<th>Post-test (gm)</th>
<th>% change</th>
<th>t-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cereals</td>
<td>300</td>
<td>222.07±42.67 (74.02)</td>
<td>239.03±39.08 (79.68)</td>
<td>+5.66</td>
<td>1.09(NS)</td>
</tr>
<tr>
<td>Pulses</td>
<td>60</td>
<td>22.71±9.61 (37.85)</td>
<td>32.07±7.54 (53.45)</td>
<td>+15.6</td>
<td>2.86(*)</td>
</tr>
<tr>
<td>GLV</td>
<td>100</td>
<td>34.78±18.06 (34.78)</td>
<td>41.5±14.38 (41.5)</td>
<td>+6.72</td>
<td>1.08(NS)</td>
</tr>
<tr>
<td>Roots &amp; tubers</td>
<td>100</td>
<td>38±12.99 (38)</td>
<td>43.14±12.26 (43.14)</td>
<td>+5.14</td>
<td>1.07(NS)</td>
</tr>
<tr>
<td>Other vegetables</td>
<td>100</td>
<td>43.07±26.75 (43.07)</td>
<td>47.92±26.54 (47.92)</td>
<td>+4.85</td>
<td>0.48(NS)</td>
</tr>
<tr>
<td>Fruits</td>
<td>100</td>
<td>23.28±15.14 (23.28)</td>
<td>31.57±17.11 (31.57)</td>
<td>+8.29</td>
<td>1.35(NS)</td>
</tr>
<tr>
<td>Milk &amp; milk products</td>
<td>500</td>
<td>221.42±154.13 (44.28)</td>
<td>240.78±128.38 (48.16)</td>
<td>+3.88</td>
<td>0.36(NS)</td>
</tr>
<tr>
<td>Fats &amp; oils</td>
<td>25</td>
<td>32.64±5.31 (130.56)</td>
<td>24.07±9.49 (96.28)</td>
<td>-3.28</td>
<td>2.94(*)</td>
</tr>
</tbody>
</table>

- Values are mean ± SD.
- RDI= Recommended Dietary Intake (ICMR 2010) [9].
- n-indicates the number of respondents.
- Figures in parentheses indicate per cent of RDI.
- t-values indicated comparison of pre and post scores.
- *Significant at 5% NS=Non Significant.
Fig 2: Comparison between pre and post-test of daily food intake (% RDI) of middle class respondents (15-19 years)

Data in (Table 3) indicated that before nutrition intervention, the daily intake of cereals and pulses of respondents who belonged to upper class was 227.25 and 29.12 g/day (75.75 and 48.53% of RDI). After imparting education and counselling, intakes of cereals and pulses by selected girls were increased and the mean daily intake was 247.68 and 35.43 g/day (82.56 and 59.05% of RDI).

Daily mean intake of green leafy vegetables, roots and tubers and other vegetables of girls of upper class family was 36.5, 39.37 and 46.62 g/day and it increased to 44, 47.12 and 52.31 g/day after nutrition education and counselling.

Before imparting knowledge, it was showed that consumption of fruits by respondents of upper class family was 27.37 g/day which increased to 38.06 g/d and daily intake of milk and milk product was 243.75 g/day (48.75% of RDI) and it increased to 262.56 g/day (52.51% of RDI) after counselling and nutrition intervention.

It was found that before counselling, the daily intake of fats and oils by upper class girls were more as compared to RDI (25 g). The mean intake fats and oils was 35.87 g/day (143.48% of RDI) and after one month of nutrition education it was slightly declined to 24.37 g/day (97.48% of RDI).

Table 3: Effect of nutrition education and dietary counselling on mean food intake of respondents belonging to upper class family

<table>
<thead>
<tr>
<th>Upper class n=8</th>
<th>Food groups</th>
<th>RDI (gm)</th>
<th>Pre-test (gm)</th>
<th>Post-test (gm)</th>
<th>% change</th>
<th>t-value</th>
<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Cereals</td>
<td>300</td>
<td>227.25±15.12</td>
<td>247.68±31.31</td>
<td>+6.81</td>
<td>1.66</td>
<td>NS</td>
</tr>
<tr>
<td></td>
<td>Pulses</td>
<td>60</td>
<td>29.12±7.45</td>
<td>35.43±6.14</td>
<td>+10.52</td>
<td>1.84</td>
<td>NS</td>
</tr>
<tr>
<td></td>
<td>GLV</td>
<td>100</td>
<td>36.5±7.7</td>
<td>44±4.24</td>
<td>+7.5</td>
<td>2.41</td>
<td>*</td>
</tr>
<tr>
<td></td>
<td>Roots &amp; tubers</td>
<td>100</td>
<td>39.37±10.05</td>
<td>47.12±10.28</td>
<td>+7.75</td>
<td>1.52</td>
<td>NS</td>
</tr>
<tr>
<td></td>
<td>Other vegetables</td>
<td>100</td>
<td>46.62±28.14</td>
<td>52.31±24.59</td>
<td>+5.69</td>
<td>0.43</td>
<td>NS</td>
</tr>
<tr>
<td></td>
<td>Fruits</td>
<td>100</td>
<td>27.37±25.01</td>
<td>38.06±21.78</td>
<td>+10.69</td>
<td>3.41</td>
<td>**</td>
</tr>
<tr>
<td></td>
<td>Milk &amp; milk products</td>
<td>500</td>
<td>243.75±137.92</td>
<td>262.56±136.63</td>
<td>+3.76</td>
<td>0.17</td>
<td>NS</td>
</tr>
<tr>
<td></td>
<td>Fats &amp; oils</td>
<td>25</td>
<td>35.87±4.79</td>
<td>24.37±6.13</td>
<td>-46</td>
<td>4.17</td>
<td>**</td>
</tr>
</tbody>
</table>

Fig 3: Comparison between pre and post-test of daily food intake (% RDI) of upper class respondents (15-19 years)
The results of current investigation are supported by Kamalaja et al. (2018) [10], from that study it was found that intakes of all foods and nutrients by both experimental and control groups were not adequate. But after imparting education it was showed that intakes of all food groups were higher in the experimental group than control group. So from that study it was confirmed that nutrition education was given positive impact in dietary habits of the respondents.

**Conclusion**

It was showed that as income increased the intake of all food stuffs also increased but when it was compared with Recommended Dietary Intake (ICMR 2010) [8], a gradual decline was observed in every income group. Regarding consumption of fats and oils by respondents of every income group were more as compared to RDI. It was observed that poor nutritional status of adolescent girls was found low in group were more as compared to RDI. It was observed that consumption of fats and oils by respondents of every income group were more as compared to RDI. It was observed that poor nutritional status of adolescent girls was found low in

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