Prevention Of Nutritional Disorders In Adolescent Girls

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ABSTRACT: -
Adolescence is a transition period between childhood and adulthood characterized by puberty. It is a growth spurt in which an individual undergoes various physical, physiological, emotional and social changes. Therefore, nutritional needs are increased as compared to school years. An adolescent girl goes through a lot of changes which may lead to a number of disorders if unnoticed. For example, menstruation may lead to anaemia; hormonal changes may lead to obesity, infertility, PCOS, acne vulgaris and desire to be slim may lead to anorexia nervosa or bulimia & other problems like mood swings etc. In adolescent girls nutrition is of utmost importance because it will influence not only her own health but also health of the next generation (foetus) during reproduction period. Many other disorders like diabetes mellitus, dyslipidaemia, osteoporosis etc. may develop in later years. Such major health related problems can be prevented by few changes in lifestyle such as modifying dietary habits, intake of balanced diet, physical activities for digestion, absorption and assimilation of ingested food. These all are better described in Ayurveda. Details will be provided in paper.

Key Words: Adolescent girls, Nutritional disorders, Diet & related rules.

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INTRODUCTION

Adolescence is one of the most rapidly growing phases of human development. W.H.O. defines adolescents as those people between 10 to 19 years of age.\(^1\) Some 1.2 billion adolescents make up 18% of world’s population\(^2\) and out of them, more than half lives in Asia. In absolute numbers India is home to more adolescents i.e. around 253 million. Every fifth person is between 10 to 19 years of age.\(^3\) Adolescent girls form an important vulnerable sector of population that constitutes about 1/10th of Indian population. Nearly 50% of adolescents (63 million girls and 81 million boys) aged between 10-19 years are malnourished in India\(^4\). 56% adolescent girls are anaemic in India (NFHS-3, 2006). A number of disorders develop in these adolescent girls due to their bad eating habits and poor lifestyle. Ayurveda not only described nutritional properties of food items but also discussed nutrition as per individual needs, described guidelines to be followed while preparing and eating the meal. Positive frame of mind while eating is equally important. Another principle of Ayurveda is the principle of Agni (digestive strength). If Agni (digestive strength) is normal, there will be proper digestion, absorption and assimilation of nutrients. Various Yogasana (body postures) and Pranayama (controlled breathing techniques) have been described to keep Agni (digestive strength) in normal state and for relaxation of body and mind. Therefore nutritious diet, positive frame of mind and physical activities to improve Agni (digestive strength) together forms a complete package to prevent nutritional disorders in adolescent girls.

MATERIALS AND METHODS

The Ayurvedic scriptures, modern available literature and Internet services were referred in regard to this paper. Causes of nutritional disorders in adolescent girls and their preventive measures were thoroughly reviewed and discussed ahead.

RESULT

Adolescence is the beginning of productive life hence it is a critical stage of life. Adolescents gain approximately 15-20% of adult height and 50% of adult weight Adolescent age is the age of second growth spurt. Typically, girls have their growth spurt 2 years earlier than boys. The maximum linear growth also known as peak height velocity occurs at an average age of 11.5 years in girls. Average gain in height is 5-6 cm and peak height velocity is as much as 8-10cm per year. At this time girls mainly gain body fat 1.14 kg/year\(^5\). There is variation between different children. Recommended dietary allowance for girls is as follows:
Table 1: Recommended Dietary Allowance (RDA) in Indian girls (2010)

<table>
<thead>
<tr>
<th>Sr. No.</th>
<th>Age of Girl (in years)</th>
<th>Body weight (kg)</th>
<th>Net energy (kcal/day)</th>
<th>Protein (g/day)</th>
<th>Fat (g/day)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>10-12</td>
<td>35</td>
<td>2010</td>
<td>40.4</td>
<td>35</td>
</tr>
<tr>
<td>2.</td>
<td>13-15</td>
<td>46.6</td>
<td>2330</td>
<td>51.9</td>
<td>40</td>
</tr>
<tr>
<td>3.</td>
<td>16-17</td>
<td>52.1</td>
<td>2440</td>
<td>55.5</td>
<td>35</td>
</tr>
</tbody>
</table>

Nutritional disorders of adolescent girls generally develop due to abnormal food behaviour like e.g. irregular meals/ skipping meals, dependency on snacks, over eating or under nutrition and due to reasons for food choices e.g. vendor facility, easy access to ready to eat food, availability of cheaper fast food, advertisements and media, ignorance about role of food and nutrition in future health etc. The outcome of nutritional imbalance appears either in a short duration or effect is visible after long time.

Ayurvedic scriptures have described nutritional disorders, their causes, prevention and management. Acharya Charaka has explained Atisthula (overweight) and Atikrisha (underweight) and a whole chapter “Santarpaniyam Adhyaya” about nutritional disorders. Their causes and management has also been discussed. Ashta Ahara Vidhi Vishesa Ayatana (eight factors determining utility of food), Ahara Vidhi Vidhana (rules to be followed while eating), nutritious food items, Rasayana, Yogasana (body postures) & Pranayama (controlled breathing techniques) to improve Agni (digestive strength), Nidra (proper sleep) are important factors in prevention of nutritional disorders in adolescent girls.

DISCUSSION

For better understanding and correlation between Ayurvedic and modern concept regarding this topic, nutritional disorders in adolescent girls is being discussed under two categories:
1) Santarpana Janya Vyadhi (The disorders due to over nutrition)
2) Aptarpana Janya Vyadhi (The disorders due to under nutrition).
Causes of nutritional disorders in adolescent girls:

a) The causes of Santarpana Janya Vyadhi (The disorders due to over nutrition) in adolescent girls are:

i. Snigdha Ahara (Oily and fat rich food): Pizza, Burger, Deep fried food preparations.

ii. Madhura Ahara (Sweets): All type of sweets, Candies, Chocolate, Soft drinks, Muffins, Pastries and cakes, cookies.

b) The causes of Aptarpana Janya Vyadhi (The disorders due to under nutrition) in adolescent girls are:

i. Snigdha Ahara (Oily and fat rich food): Pizza, Burger, Deep fried food preparations.

ii. Madhura Ahara (Sweets): All type of sweets, Candies, Chocolate, Soft drinks, Muffins, Pastries and cakes, cookies.

iii. Pichhila and Guru Ahara (Slimy and Heavy food): Chowmin, Butter, Bread, deep fried food items.

Anoopa and Jaangla Maansa Rasa (Non Vegetarian diet): Examples of Anoopa Maansa are Pork meat, sea food and birds like duck, swan, living in or around water. Examples of Jaangla Maansa are poultry meat, mutton, beef meat, meat of Sambher animal, dog meat.
v. _Atimatra_ (Overeating): Excessive quantity of food, increased frequency of meals or snacks in between the major meals, heavy to digest food taken more often, one type of constituent in excess e.g. Sweets.

vi. _Cheshta Dvesha_ i.e. sluggish activities or reduced physical activity.

vii. _Shaiyasana Sukha_ i.e. enjoys sitting or lying down postures.

viii. _Diva Swapana_ i.e. day sleep.

b) The causes of _Aptarpana Janya Vyadhi_\(^7\) (The disorders due to undernutrition) in adolescent girls are:

i. _Langhana_ (Habit of skipping meal): Usually girls try to skip meal due to fear of weight gain.

ii. _Pramitashana_ (Very low quantity of food intake as compared to body requirement): may be due to fear of weight gain or over consciousness about outlook.

iii. _Ruksha Annapaana_ (Affection towards dry food items) e.g. affection for Chapatti, rice, dry vegetables, roasted grains, peanuts, dry fruits. No affection for fresh fruits, water intake and fluid rich food items like pulses, soups, milk etc.

iv. _Kriyati Yoga_: Hyperactive: Body and mind remain in a state of restlessness.

v. _Nidravega Vinigrah_ (Awakefulness while sleeping)

vi. _Shoka, Krodha_: To be in a state of mental stress, anger, anxiety most of the time.

vii. _Vikaara Anushaya_: Diseased conditions from a longer duration.

Prevention of Nutritional Disorders of Adolescent Girls:

_Ashta Ahara Vidhi Vishesha Ayatana_ (eight factors determining utility of food) and _Ahara Vidhi Vidhana_ (rules to be followed while eating) are the general guidelines to be followed for prevention of _Santarpana Janya Vyadhi_ (The disorders due to over nutrition) and _Aptarpana Janya Vyadhi_ (The disorders due to under nutrition).

_Ashtha Ahara Vidhi Vishesha Aayatana_\(^8\): These are the tools or principles which determine the utility of food.

_Pракритि_ (Nature of the substance): Diet should be planned based on its constituent’s basic nature. e.g. _Mudga_ (Green gram), _Adhaki_ (Pigeon pea), _Masoor_ (Pink lentil) are _Laghu_ (light/ provide less calories). These will be beneficial in _Santarpana Janya Vyadhi_. _Masha_ (Black gram), _Gritta_ (clarified butter), _Mahisha Dugdha_ (buffalo milk), _Maansa_ (meat) are _Guru_ (heavy/ provide high calories). So, these should be consumed in case of _Aptarpana Janya Vyadhi_.

_Karana_ (Processing of substance) e.g. while preparing _Bhata_ (cooked rice) if raw rice is washed many times, they become light to digest. Similarly if _Manda_ (rice water) is drained out they become _Laghu_ (light) and are beneficial in _Santarpana Janya Vyadhi_. If no _Manda_ (rice water) is separated from cooked rice or raw rice are washed once only, they are beneficial for _Aptarpana Janya Vyadhi_.

_Sanyoga_ (Combinations of the substances) e.g. _Mahisha Ghritta_ (clarified butter extracted from buffalo milk)/_Guda_ (jaggery) is added in diet, it is good in _Aptarpana Janya Vyadhi_. _Madhu_ (honey) is added in diet it will be beneficial in _Santarpana Janya Vyadhi_.

_Rashi_ (Quantum of substances) Quantity of meal can be taken as a whole i.e. meal with a number of major ingredients like _Chappati_, _rice_, _Daal_ (pulses), vegetables, _meat_ is _Sarvagraha Rashi_ i.e. a balanced diet. If quantity of one ingredient is increased it is called _Parigraha Rashi_. e.g. if quantity of _Daal_ (pulses) or _Maansa_ (meat) is comparatively increased it would be beneficial for _Aptarpana Janya Vyadhi_. If quantity of meal...
or snacks is reduced it will be beneficial for Santarpana Janya Vyadhi.

v. Desha (Habitat of substance) e.g. Daal (pulses) iv. like Maasha (black gram), Rajmash (Kidney beans), Nuts and fruits like apple, apricot, v. Maansa (Meat), profuse Ghee are usually consumed in upper hilly area of Himalayan ranges. The people residing in this region are able vi. to digest such Guru (heavy to digest) food items due to harsh climatic and working conditions. Thus, these food items should be given or added vii. in the diet of girls who live in such Desha viii. (habitat).

vi. Kaala (Time): In case of Santarpana Janya ix. Vyadhi, adolescent girl should extend the time interval between two meals and in case of Aptarpana Janya Vyadhi time interval between x. two meals should be reduced.

vii. Upyogasanstha (Dietetic rules): Dietetic rules mostly depend on Agni (digestive strength). In case of Santarpana Janya Vyadhi meal should be taken when one feels hungry not on the basis of cravings. In case of Aptarpana Janya Vyadhi meal should taken as soon as one feels hungry, doesn’t matter how many times a day.

viii. Upyokta (Habits of the individual) : Adolescent girls must know, evaluate and decide, what is beneficial and what is harmful for her. Parents should set example and inculcate healthy eating habits right from childhood.

Ahara Vidhi Vidhana: These are rules which should be followed while eating.

i. Ushana: Food should be warm.

ii. Snigdha Food should be unctuous. Quantity of Snigdha food items like Ghritta, milk, water should be increased in Aptarpana Janya Vyadhi.

iii. Matravata: Food should be in proper quantity. More quantity in Aptarpana Janya Vyadh but keeping in mind the state of Agni (digestive strength) and quantity of food should be less for Santarpana Janya Vyadhi.

Jeerna-ashniyata: Eat only after digestion of previous meal. It is applicable to everyone.

Avirudha Veeryama: Eat food preparations without any contradictory potency. e.g. Mango shakes should be avoided.

Ishta Desh, Ishata Sarva Upkarana: Intake of food in proper place and with all required accessories.

Na ati Druta : No hurry should done while eating.

Na ati Vilamba: Meal should not be eaten very slow.

Ajalpana Nahasaana: Intake of food without talking and laughing. One should concentrate on food while eating.

Atamaanama Abhisamikshya: Eat food after observing oneself.

a) Prevention of Santarpana Janya Vyadhi (Over Nutritional Disorders)\textsuperscript{[9,10]}:

Herbal preparations

- Haritki (Terminalia chebula) with Madhu (honey)
- Trifla Kwatha (decoction of three fruits: Embellica officinalis, Terminalia chebula and Terminalia bellerica)
- Kwatha (decoction) of the mixture of following drugs –Nagarmotha (Cuperus scariosus), Gokshura (Tribulus terrestris), Aaragvadha (Cassia fistula), Patha (Cyclea peltata), Khadira (Acacia catechu), Nimba (Azadirachta indica), Trifla, Devdaaru (Cedrus deodara), Haridra (Curcuma longa), Daruwaridra (Berberis aristata), Kutaja chhaala (bark of Holarrhena antidysentrica).
- Kwatha (decoction) of Trifla, Trikatu (combination of Zingiber officinale, Piper longum, Piper nigrum), Vidanga (Embelia ribes), Ajmoda (Trachyspermum roxburghianum) and
add Sattu (powder of roasted Bengal gram), Taila (oil) and Madhu (honey).

- Takra (buttermilk) and Haritki (Terminalia chebula)
- Tryushana (combination of Zingiber officinale, Piper longum, Piper nigrum) Hingu (Ferula asafoetida), Ajmoda, Chhoti Aela (Elettaria cardamomum).
- Loha Raja (Iron powder)
- Trifla Rasayana

ii. **Ekala Dravya** (single food content) which should be specifically added in routine diet are:
- Takra
- Old butter
- Yava (Oats)
- Old wheat
- Old Madhu (honey)
- Gou-Ghritta (clarified butter of cow)
- Pulses: Mudga, Arahara (Red gram), Kulatha (Horse gram)
- Ruksha Anna: Channaka (Roasted Bengal gram), Bhune Yava (Roasted oats)
- Sattu (Powder of Bengal gram)
- Amalaki (Embellica officinalis) with meal
- All Vegetables specially Parwala (Trichosanthes dioica)

iii. **Dietary preparations:**
- Sharbata of Madhu (honey in water)
- Trifla Kwatha (decoction of Trifla)
- Takrarishta (Fermented buttermilk formulation)
- Dadhi Manda (water of curd)
- Yava Bhaat (parboiled Barley)
- Moonga Amalaka Yusha (Soup of Green gram added with Embellica officinalis)

iv. **Physical and mental exercises (Vyayama and Chintana)**
- Yogasana (Body postures)\[11\]:
  - Vajrasana
  - Shashankasana
  - Ardhamatsyendrasana
  - Katichakrasana
  - Pashchimottanasana
  - Uttanapadasana
  - Pawanmuktasana
- **Agni Varadhaka** (digestive strength enhancing) Pranayama\[12\]:
  - Nadishudhhi (Anulom vilom)
  - Surya bhedhi
  - Bhastrika
  - Bhramari
  - Kapalabhati
  - Agnisara

b) **Prevention of Aptarpana Janya Vyadhi** (Under Nutritional Disorders)

i. **Brihniya Dravya** (Body mass improving food items) which should be specifically added in routine diet\[13-16\]:
- Milk of buffalo
- Ghritta of buffalo
- Fresh butter
- Cream of milk
- New grains e.g. rice and wheat
- Maasha (Black gram)
- Juice of sugarcane
- Food items made up of Jaggery.
- Madhu (Honey): Because it acts as Yogvahi. Honey accentuates the uptake and assimilation of food.
- Non vegetarian food specially Gramya, Aanoo, Audaka Maansa Rasa e.g. meat of goat, sheep, pork, chicken, fish. **Brihniya** (Body mass improving) food preparations\[15,16\]:
  - Ghol i.e. when curd is churned without mixing water and without extracting butter.
  - Curd mixed with sugar.
- **Brihanartha Bhaat**: Rice can be cooked along with highly nutritious contents like Ghritta, dry fruits, Sugar, milk etc.
- **Panaka (drink)** made from seasonal fruits
- **Puplika** (Fried Chapatti made of wheat flour)
- **Lapsika** (Semi liquid preparation of semolina added with Ghritta, sugar and milk)
- **Mudga and Maasha Yusha**
- **Brahma Rasayana, Chyawan Prasha**

iii. **Taila Abhyanga** (Full body massage) with Brihaniya oils e.g. Ksheer Bala Taila, Maha Maasha Taila, Til Taila.

iv. **Nidra** (Sound sleep and sleep during day hours): The beddings and cushions should be comfortable.

v. **Virama, Priyadarshana**: Take complete rest and live in a pleasant environment.

vi. **Yogasana** (Body postures)

   - *improve* Agni (digestive strength) and thus provide proper digestion and assimilation of food as well as it provide relaxation. The common *Asanas* which should be practised are:
   - Vajrasana
   - Shashankasana
   - Pawanmuktasana
   - Makrasana
   - Shavasana

vii. **Pranayama** (Controlled breathing techniques) which should be practiced are:

   - Nadi shudhhi (Anulom Vilom)
   - Bhramari

**CONCLUSION**

Therefore, it is concluded that to prevent nutritional disorders in adolescent girls, balanced diet should be encouraged. Nutritional adequacy should be ensured. Eating behavioural problems should be discouraged. Adolescent girls and their parents or care takers should be educated about balanced diet and nutritional requirement as per age. Family members should set good examples to their children regarding good eating habits. Nutritional deficiencies should be identified early and quick intervention should be done.

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