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Assessment of Nutritional Status and Dietary Risk Factor for Malnutrition in Adolescent of Jamnagar District

Adolescent is the age when most people are taking faulty dietary articles as well as habits. There are certain rules described in Ayurveda for health regarding diet. Timing of the food, items of the food articles, consumption of water in quantity and timing, sleeping habits, frequency of food items with quantity all plays important in nutritional status of an individuals. Proper use of nutrient food items with habits of food nourishes the adolescent who are suffering from malnutrition.

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Original Article

Assessment of Nutritional Status and Dietary Risk Factor for Malnutrition in Adolescent of Jamnagar District

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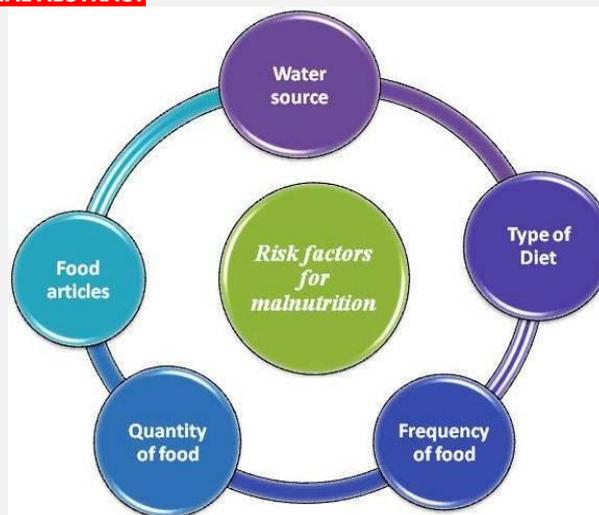*Central Ayurvedic Research Institute of Drug Development (CCRAS, Ministry of AYUSH, Govt of India), 4-CN block, Sector-5, Bidhannagar, Kolkata 700091. [1]Department of Basic Principles, IPGT & RA, Gujarat Ayurved University, Jamnagar 361008. [2]Department of Rasa Shastra and Bhaishajya Kalpana, All India Institute of Ayurveda, Sarita Vihar, New Delhi 110076, India.*

ABSTRACT

Introduction: Adolescence is a period of crest growth for boys and girls. Nutritional requirements in relation to age are more during adolescence. The nutritional status which is often poor during early life gets worsened as the adolescent growth spurts happened. The common causes of malnutrition among adolescents in the poor community may be of less access to food and inadequate knowledge about dietary requirements. No study has been conducted on adolescent of particular Jamnagar district to determine their nutrient intake and nutritional status. The present study was conducted to fill this gap in the knowledge. *Methods*: Adolescent between age group of 16-25 years who has lived in Jamnagar for at least 5 years was considered eligible to be enrolled for the study from the surrounding area of Jamnagar district with problem of poor weight, poor growth, lean and thin body complains were taken for study. After taking a complete history emphasizing on milestones and dietetic history this problem is selected for present study. *Results*:58.00 % of patients were taking fermented items in food**,** 60.00 % of patients had to take food in poor quantity, 29.00 % of patients had taking food in moderate quantity, it can be conclude in this regards that poor quantity of food may ultimately leads to malnutrition. *Conclusion*: This may be due to tense life of studying, away from parents, exposure to sunlight, much activeness, faulty food habits which are leading to malnutritionin that particular age group. Therefore, lack of proper nourishment most of the poor adolescents are more effected to malnutrition.

PICTORIAL ABSTRACT

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1. INTRODUCTION

Jamnagar is situated in the southern region of Gujarat. The district has 10 talukas and total land area is 14125 sq km. Malnutrition situation in Jamnagar is a serious public health problem amongadolescent.[1] Undernutrition is an important cause of many diseases.[2] A study conducted in 2002 by MHFW (Ministry of Health and Family Welfare) concluded that, undernourished is prevalent in the Jamnagar about 21 % adolescent are anemic and 36 % utilize non iodized salt (Reproductive and Child health Project District level household Survey-2002, MHFW). Calorie deficient food intakes and wrong dietary belief and faulty practices may play an important part in determining the nutritional profile of adolescent and having long term varied consequences.[3] However, adolescent's diet and underlying factors are poorly documented.[4] The present study aim to assess the nutritional status of adolescent persons between age of 16-25 years and to assess the dietary risk factors for malnutrition.[5] Analytical cross sectional study design was used in analysis conducted in Jamnagar district. The study covered a period of three months; September to November 2013.

2. MATERIALS AND METHODS

Adolescent between age group of 16 to 25 years who has lived in Jamnagar for at least 5 years was considered eligible to be enrolled for the study from the surrounding area of Jamnagar district with problem of poor weight, poor growth, lean and thin body complains were taken for study. After taking a complete

history emphasizing on milestones and dietetic history this problem is selected for present study.

2.1 Study variables

Nutritional status and level of knowledge about dietary habits are indicated by Anthropometric indices and response of questions.

2.2 Inclusion and exclusion criteria

Underweight adolescents between age group 16-25 years without any bar of sex, religion and race. Age group less than 16 and more than 26 years and who are supposed to have infectious diseases like Tuberculosis, Congenital and hereditary problems, malignancies, malabsorption syndrome, metabolic error and the children less than 60% of ideal weight for age will be excluded.

2.3 Sampling procedure and criteria for assessment

A consecutive sampling procedure was used to recruit adolescent into the study. The duration of study was three months; September to November 2013. All adolescent who meet inclusion criteria and written informed consent was taken from all adolescent on their first visit. At the survey site underweight adolescent were selected from IPGT and RA, Jamnagar hospital OPD and IPD. CTRI/2013/06/003775 [Registered on: 21/06/2013] by starting with provision of information regarding the study to after which they were requested to sign the consent form for participation in the study. The numbers of adolescent taken for survey are 100.

Both qualitative and quantitative techniques were employed to collect data. Specific questionnaire was adopted to assess the Nutritional status. The anthropometric measurements were obtained using weighing machine and measure tape. The specific proforma was developed to assess the nutritional status and dietary risk factors.

3. OBSERVATION

The observations made during survey study on various factors are shown in tables and diagrams. Age wise distribution, food related habits, other habits, anthropometric measurements, Hemoglobin and BMI of 100 patients are depicted in Tables 1, 2, 3, 4 and 5 respectively.

The data shows that maximum number of patients belongs to age group of 21-25 year i.e. college going age. This may be due to the fact that during this period adolescent are away from their parents, and spent their day time in outside home. Exposure to sunlight and infectious diseases, unhealthy food habits, lack of personal attention, physical stress due to playing are the contributing factors leading malnutrition in particular age group. Maximum patients in this study were male. The incidence of malnutrition is found in male adolescent than in female adolescent in this study. However the magnitude of disease is equal in both male and female. Any way a detailed survey has to be undertaken in this direction to come to a definite conclusion in regard to sex and malnutrition in adolescent.

Maximum number of patients was from lower middle class society. People cannot afford to have the food which fulfills the nutritional demand and hence becomes prone to malnutrition. Though it is proved that malnutrition lives in poverty, but in present study only majority of patients from poor class it may be because of lack of awareness (due to illiteracy), regarding health and nutritious diet. Maximum patients were unmarried. But it cannot be said that unmarried person are more prone to malnutrition. In the present study maximum number of patients was from Hindu religion. This may be due to the fact that Jamnagar is a Hindu dominated area. Hindus are vegetarian and likely to be undernourished. Maximum number of guardians in the present study was higher secondary educated i.e. 56.00 %, which is followed by primary education i.e. 44.00 %. Education is very important in maintenance of health in general. Maximum numbers of parents were businessman (43.00%), 35.00 % were laborers and 22.00 % were in service. In the given majority in Jamnagar most of the population belongs to their own business so in the present study children are being taken to hospital obviously of higher population group. Whereas among laborers due to lack of time and other socioeconomic reasons proper medication at proper time is not given for an ill child. So in the present study more cases were from business class which cannot be correlated to their higher incidence of malnutrition in this class. About 95.00 % were immunized and only 05.00% were unimmunized. Active and passive immunity is very important for the body to combat the diseases. Our immune response is very specific in nature. For a particular antigen specific antibody is released. The adolescent were given immunization against dreadful disease such as polio, diphtheria, mumps measles etc. There is least chance of these to develop after immunization. However other disease causing organisms can still attack the patients and cause disease. The disease such as respiratory tract infection diarrhea which was common among the patients of this study was because of this reduced immunity which substantiate attribute to the production of malnourishment.[6] Data shows that maximum number of patients belongs to rural habitat. In rural life style there is a trend of add promoting food articles, road side junk food, unnatural

food and living environment are the responsible factor for more incidence of disease in that area.[7]

Most of the patients i.e. 41.00 % were addicted to chewing tobacco followed by 10.00 % and18.00 % were addicted to pan and smoking. After tobacco chewing, the saliva is expelled out leading to improper moistness of food due to which the Ptylin like enzymes also cannot act upon it. Therefore, the improper digestion leads malnutrition. Smoking, pan and tobacco chewing decrease tension and pyloric sphincter leading to regurgitation of the alkaline material from duodenum, into the stomach neutralizing the acidity of stomach leading to improper digestion which is one of the causes of malnutrition. Majority patients were consumers of municipality water whereas 31.00 % consumes Dunkey water and 20.00 % consumes deep well water. Contaminated drinking water is one of the main sources of infection, tube well water is hard and unhygienic comparative to the municipal pipe water. Improper sanitation is one among the major cause for spread of infestation which further leads to malnutrition.[8]

Maximum numbers of patients were having vegetarian food. Improper making of food with lots of spices doesn't give any nutritious value. It can be concluding regarding Jamnagar is vegetarian dietprone area. The frequency of non-vegetarian is much less compared to vegetarian food. Among non-vegetarian food, patients preferred eggs, fish and red meat. All are nutritional but can cause indigestion because of their nature to digest. Maximum numbers of patients take food three times per day whereas 40.00 % patients take more than three time day. Taking food during digestion of previous taken food leads to indigestion therefore this undigested food can't be utilized as nutrition which further leads to malnutrition.[9] 60.00 % of patients had to take food in poor quantity, 29.00 % of patients had taking food in moderate quantity, it can be conclude in this regards that poor quantity of food may ultimately leads to malnutrition.

Most of the patients were skipping their meals sometimes. According to biological clock the digestive enzymes are secreted at the routine time of food taking. Skipping meals hamper the circardian rhythm which further leads to many diseases.[10] Maximum numbers of patients were going sometimes outside home for food. Most of foods that served in restaurants contain high amount of fat and calories and they can be detrimental to health if they are consumed on regular basis. Regular time of breakfast, lunch and dinner is good for health as it digest food properly. If one can't eat regular it again hamper the circadian rhythm which affects the digestion and leads to malnutrition. Furthermore, most of the bakery items are made up of processed wheat flour (which removes fibre contents), and

baking soda, these food items have very low nutritious value. Food items such as kurkure and wafers due to attractive packing quickly gains attention as these items have very good taste, people get habituated to eat these food items frequently, which produces acidity and leads to indigestion. It is also found that adolescent in Jamnagar are habituated to eat Gathiaas these are prepared in road side shops with unhygienic condition, so these food items comes under bad food, it is one of the culprit, which causes malnutrition.

Majority of patients takes chocolate, Ice cream, cold drinksetc. regularly. Are very chilled and may lead to malnutrition. Excessive eating of chocolate make digestion poor which in long term leads to malnutrition.[11] Irregularity in meal was found maximum. Less quantity of food and irregular timing of food may lead to indigestion which further leads to malnutrition. Maximum adolescent of patients were not taking green vegetable in diet, green vegetables supplies essential micronutrients like irons, vitamins etc. These are rich in fiber contents, which contribute to bulk formation of defecation, so it is essential to eat green vegetable in daily diet. If adolescent fails to eat it, results in improper formation of digestive food, severely affecting growth of the child. 58.00 % of patients were taking fermented items in food, frequent use of fermented items like idli, dosa etc. having heavy digestion properties, causes malnutrition. Majority patients were drinking excessive water. Excessive water intake is causative factor of improper digestion. In survey, maximum number of patients was found to drink raw water. There are much chances of contamination in raw water. Chilled water may directly leads to improper digestion leads to malnutrition.

Irregular sleeping time and disturbed sleep were found maximum. It may be due to faulty habits like watching T.V. and sometimes due toexcessive burden of studies may leads tomalnutrition. A large majority, mainly middle class and upper class people regularly go outin late nights and take dinner very late and sleep late at night. This is a major abuse ofbody systems causing many nutrition related problems.Majority of the patients awakening time was irregular, due to these; adolescent may neglect the urges and also leads to improper digestion.

It was observed during survey study that most of the adolescent were taking food irregularly, more spicy and sweet which is also one of the causes of malnutrition. Most of patients neglect the urge of defecation or urination which may cause indigestion and therefore one cannot get useful nutrients which lead to malnutrition. The results of 100 patients shows that

majority patients have low hemoglobin, low BMI and less anthropometric measurements which means majority of adolescents are under malnourishment in Jamnagar district.

These facts is well reflected through the observation that majority ofthe surveyed adolescent were underweight because of faulty dietary habits and faulty life style.Due to these, most of the adolescentwere suffering from gastrointestinal disorders which reflect the nutritional deficiency in them.Etio-pathogenesis of malnutrition is mainly due to faulty diet and dietary habits. Collegegoing adolescents > 18-20 year is more prone to malnutrition. This may be due to tense life ofstudying, away from parents, exposure to sunlight, much activeness, faulty foodhabitswhich are leading to malnutritionin that particular age group.So, lack of proper nourishmentmost of the poor adolescents are more effected to malnutrition. It may be due to unhygienic condition of poor and lower middle class people.

Table 1. Age wise distribution of 100 patients

Factors	Feature	Number of Patients	Percent (%)
Age (Year)	18-20yrs	47	47
	21-25yrs	53	53
Sex	Male	54	54
	Female	46	46
Socio-eco. Status	Poor	47	47
	Lower middle	51	51
	Middle	2	2
Marital status	Married	46	46
	Unmarried	54	54
Religion	Hindu	95	95
	Muslim	5	5
Education	Illiterate	01	01
	Primary	07	07
	Secondary	29	29
	Graduate	42	42
	Post graduate	21	21
Immunization	Un immunized	5	5
	Immunized	95	95
Residential area	Slum	33	33
	Rural	53	53
	Urban	14	14

Table 2. Food related habits of 100 patients

Factors	Feature	Number of Patients	Percent (%)
Water source	Deep well	20	20
	Municipality	49	49
	Dunkey	31	31
Type of Diet	Vegetarian	51	51
	Mixed	49	49
Frequency of food	One time per day	04	04
	Two time per day	14	14
	Three time per day	42	42
	More time per day	40	40
Quantity of food	Poor	60	60
	Moderate	29	29
	Good	11	11
Frequency of eating out side home	Often	19	19
	Sometimes	31	31
	Rarely	29	29
	Never	21	21
Frequency of eating out side home	Often	21	21
	Sometimes	27	27
	Rarely	23	23
	Never	01	1
Frequency of milk and milk products	Often	22	22
	Sometimes	27	27
	Rarely	21	21
	Never	00	00
Frequency of cereals	Often	24	24
	Sometimes	36	36
	Rarely	35	35

	Never	05	05
Frequency of oily food	Often	27	27
	Sometimes	43	43
	Rarely	32	32
	Never	08	08
Frequency of fruits	Often	00	00
	Sometimes	16	16
	Rarely	52	52
	Never	32	32
Frequency of fruits	Often	26	26
	Sometimes	16	16
	Rarely	48	48
	Never	10	10
Frequency of vegetables	Often	00	00
	Sometimes	16	16
	Rarely	52	52
	Never	32	32
Frequency of beverages	Often	42	42
	Sometimes	34	34
	Rarely	18	18
	Never	05	05
Wake up time	Before 9 am	55	05
	After 9 am	05	14
	Not fixed	40	40
Sleep time	Before 12 o clock	38	38
	After 12 o clock	14	14
	Not fixed	48	48
Breakfast time	Between 7 to 8 am	29	29
	After 8 am	35	35
	Not fixed	36	36
Lunch time	Between 12:00 to 1:30pm	42	42
	After 1:30pm	06	06
	Not fixed	52	52
Dinner time	Between 7 to 9 pm	45	45
	After 9 pm	17	17
	Not fixed	38	38
Breakfast	Mixture, biscuit, fries, wafers etc.	78	78
	Homemade nutritious food	22	22
Biscuits	Everyday	58	90
	5 - 6 days/week	18	
	3 - 4 days/week	05	
	1 - 2 days/week	09	
	Not taking	10	10
Bakery items	Everyday	30	78
	5 - 6 days/week	12	
	3 - 4 days/week	20	
	1 - 2 days/week	16	
	Not taking	22	22
Kurkure/ Wafer	Everyday	33	84
	5 - 6 days/week	13	
	3 - 4 days/week	13	
	1 - 2 days/week	25	
	Not taking	16	16
Gathia	Everyday	02	70

	5 - 6 days/week	13	
	3 - 4 days/week	17	
	1 - 2 days/week	38	
	Not taking	30	30
Chinese	Everyday	04	76
	5 - 6 days/week	13	
	3 - 4 days/week	25	
	1 - 2 days/week	34	
	Not taking	24	24
Hotel food	2 times/week	12	64
	1 time/week	37	
	3 time/2 week	07	
	1 time/month	08	
	Not taking	36	36
Cold drinks	Everyday	24	72
	5 - 6 days/week	12	
	3 - 4 days/week	17	
	1 - 2 days/week	19	
	Not taking	28	28
Ice cream	Everyday	14	73
	5 - 6 days/week	00	
	3 - 4 days/week	24	
	1 - 2 days/week	35	
	Not taking	27	27
Chocolate	Everyday	77	100
	5 - 6 days/week	10	
	3 - 4 days/week	04	
	1 - 2 days/week	09	
	Not taking	00	00
Milk articles	Milk with salted items	59	59
	Milk with non veg.	03	03
	Milk with curd	11	11
	Milk with fruit	32	32
	Milk shake	21	21
	Curd at night	56	56
Food articles	Taking	44	44
	Non taking	56	56
	Taking	58	58
	Non taking	32	32
	Taking	43	43
	Non taking	57	57
Water intake	Less	33	33
	Moderate	22	22
	Excessive	45	45
	Row	63	63
	Filtered	15	15
	Boiled	06	06
	Chilled	16	16

Table 3. Other habit wise distribution

Other Habit		Number of Patients	%
Habit of eating before/after lunch / dinner	Yes	65	65
	No	35	35
Taking more fried, spicy items	Yes	64	64
	No	36	36
Taking sweet food articles everyday	Yes	54	54
	No	46	46
Avoid eating/drinking even though hungry /thirsty	Yes	53	53
	No	47	47
Neglect the urges	Yes	56	56
	No	44	44
Sleeping during day soon after lunch	Yes	62	62
	No	38	38
Eat food to fast/slow	To fast	36	36
	To slow	64	64
Washing hand before eating	Yes	68	68
	No	32	32
Watching TV/talking while eating	Watching TV	52	52
	Talking	48	48
Sleeping habit	Between 8-9 pm	22	22
	>10 pm	24	24
	Irregular	54	54
	Between 6-7 am	12	12
	>7 am	37	37
	Irregular	57	57
	Deep	46	46
	Disturb	54	54

Table 4. Anthropometric Measurements of 100 patients

Measurements	Number of Patients	Mean ± SD
Neck circumference	100	35.23 ±2.67
Mid arm circumference	100	30.72 ± 2.83
Fore arm circumference	100	23.95 ± 1.19
Chest circumference	100	45.93 ±6.12
Abdomen circumference	100	34.35 ±1.26
Hip circumference	100	70.6 ±4.89
Mid Thigh circumference	100	26.66 ±4.99
Mid calf circumference	100	20.86 ±5.09

Table 5. Hemoglobin and BMI of 100 patients

BMI	Number of Patients	Mean ± SD
Hb	100	12.72 ± 1.58
Height (metre)	100	1.53 ± 0.04
Weight (kg)	100	48.07 ± 5.58
BMI (kg/m^2)	100	20.66 ± 2.68

4. CONCLUSION

The study showed that carbohydrates, proteins, vitamin B-complex, iron, calcium, sodium which are the main nutritional parameters and main source of energy are not taken properly by the people present in this study. Since sample size of study is very less, broader studies are required to re-assess results and to explore those aspects which remained untouched. Similar studies may be conducted selecting other nutritional variables contributing to health efficiency of male and female individuals on other regions of India with other age groups.

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CONFLICT OF INTEREST None declared

CONTRIBUTORS Dr. Amin Hetalben has screened out the patients data collected for her PhD work. Prof. Mahesh Vyas is the guide and Dr. Hitesh Vyas is the Co-guide for the PhD work. The present paper is made from the data collected during PhD work. The data of adolescent was screened with relevant materials and presented here in the form of article.

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