



Assessment of Dietary Phytochemical Intake in School Going Children and Its Effect on Their Growth and Health

KEYWORDS

phytochemical intakes, health, growth

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ABSTRACT Phytochemicals are very important non-nutrient dietary factors helpful in maintaining health and prevention of diseases. In present study 300 children aged 8-14 years were selected by volunteering method. Information regarding diseases and dietary characteristics were collected by interview method. The anthropometric measurements were taken through respective standard procedures. The phytochemical intake of subjects was assessed on the basis of fruits and vegetables intake. Obtained results revealed that the age, height and weight of low, moderate and high phyto-taking groups found reciprocally increasing. However, mean haemoglobin and total serum protein of the subjects taking high to low levels of phytochemical foods were found not significantly different. But in better phyto-taking group lesser occurrence of anemia found. Similarly, decreasing occurrence frequent infections was found among children of higher phyto-intake found in. So the results indicate pro health effect of phytochemical intakes among school going children. Children should be promoted to take rainbow diet.

1. Introduction

Food and medicine are no longer separate topics, and the lines between them continue to blur as science continues to study food components. When nutrition research shifted its focus from prevention of nutritional deficiencies to prevention of chronic disease startling revelations emerged. It is now an accepted fact that eating a healthful diet can eradicate or prevent the onset of many diseases each year. One food element that has been scrutinized in a variety of studies is the phytochemical which is translated as "plant chemical". Epidemiological studies provide convincing evidence that diet rich in phytochemicals is associated with a lower incidence of degenerative diseases.[3, 4].

Oxidation causes our bodies to wear down thus making us more susceptible to diseases. Free radicals can adversely alter lipids, proteins and DNA and have been implicated in aging and a number of human diseases.[6] Phytochemicals acts as antioxidants and stabilizes these free radicals by donating an electron to them.[5]. Researches show that phytochemicals play important role in enhancing the health and nutritional status of children. It is also to play an important role in children's academic performance. [7] Proper nutrition in childhood can reinforce lifelong eating habits that contribute to children's overall well being and help them to grow up to their full potential and lead a healthy life. [9]. Keeping these facts in mind this study has been aimed to found out phytochemicals consumption by school going children and their effect on the variables like weight, haemoglobin, frequency of infections amongst them.

2. Methodology

The Sample: The study was preceded with the selection 300 school children aged 8- 14 years through purposive sampling method from The Shree Krishna Public school, Tilak nagar, Indore (MP). Data collection: A pre-tested and pre-designed performa was used to collect the information regarding diseases and dietary characteristics. Personal interview was made to collect information regarding dietary intake and food habits. The different anthropometric measurements age, height and weight as measured through respective standard procedures. Hemoglobin estimation was done by cyanmethaemoglobin method. The phytochemical intake of subjects was assessed by number of servings/week of fruits and vegetables taken by the subjects. Accordingly Low - 30 servings, Moderate - 31-50 servings and High- 50-80 servings was categorized. Statistical Analysis were done using mean,

Standard Deviation, frequency distribution, percentages, ANOVA and Chi-square test.

3. Results:

Table - 1
Anthropometric measurement (Mean±SD) and phytochemical intake of school going children

Indices	Phytochemical Intake Status			F Value
	Low (n=120)	Mod. (n=100)	High (n=80)	
Age (yr)	11.55±0.49	12.38±1.13	13.21±0.65	04.74*
Height (cm)	143.94±9.39	151.63±5.92	153.94±7.90	102.31*
Weight (kg)	40.26±2.46	41.29±4.63	43.87±2.79	7.26*

* Significant at 5 % level

From the above table it is clear that the obtained F value for the difference in mean values of the anthropometric measurements of the children taking high, moderate and low levels of phytochemical foods were found significant. It was indicated that the mean values for age were 11.55±0.49 yr, 12.38±1.13 yr and 13.21±0.65 yr, mean values for height were 143.94±9.39 cm, 151.86±5.92 cm and 153.94±7.90 cm. Mean weight values were 40.26±2.46 kg, 41.29±4.63 kg and 43.87±2.79 kg found respectively for low, medium and high phyto-taking groups. The mean values for all the three variables age, height and weight for the three comparative groups were found increasing from low to high phyto-intake.

Table - 2
Biochemical and phytochemical intake status of school going children

Indices	Phytochemical Intake Status			F Value
	Low (n=120)	Mod. (n=100)	High (n=80)	
Haemoglobin (gm %)	12.48±1.04	12.59±1.06	12.55±0.95	0.36
Total Serum Protein (gm %)	7.49±0.16	7.50±0.41	7.53±0.26	0.59

* Significant at 5 % level

From the above table it is clear that the obtained F value for the difference in mean values of the haemoglobin and total

serum protein of the subjects taking high, moderate and low levels of phytochemical foods were not significant. Furthermore the table indicates that the mean values of the haemoglobin for moderate and high phytochemical intake group 12.48 ± 1.04 gm% and 12.59 ± 1.06 gm% were higher than low phytochemical intake group 12.55 ± 0.95 gm%. While serum total protein showed differences among three phytochemical taking groups (7.49 ± 0.16 gm% for low, 7.50 ± 0.41 gm% for moderate and 7.53 ± 0.26 gm% for high) phytochemical intake groups.

Table 3
Distribution of school going children according to haemoglobin (gm %) and phytochemical intake status

Categories	Indices	Phytochemical Intake Status			Chi Value
		Low n=120	Mod. n=100	High n=80	
Anaemic	<11 girls <13.5 boys	61.67	47	35	28.2*
Normal	>11 girls >13.5 boys	38.33	53	65	

*Significant at 1 % level

The table shows that hemoglobin status was found statistically significantly associated with phytochemical intake. In all, with better phytochemical intake status percentage of anemic subjects found decreasing (61.67%, 47% and 35% respectively). Conversely in normal Hb category percentage of children found increasing with better phytochemical intake status (38.33% in low intake, 53% in moderate and 65% in high).

Table -5
Distribution of school going children according to frequency of infections and phytochemical intake status

Indices	Phytochemical Intake Status			Chi Square
	Low (n=120)	Mod. (n=100)	High (n=80)	
Infections/Yr				20.9*
Malaria	33.33	15	6.25	
Cough And Cold	58.33	70	62.5	
Hepatitis	8.33	4	2.5	
Typhoid	3.33	2	1.25	
Vomiting and diarrhea	33.33	25	18.75	

*Significant at 1% level

Above table indicates that the obtained Chi value for the association of the children in between phyto-intake status and the frequency of the occurrence of infections is significant on df - 8 at .01 level. The table further shows that frequency

occurrence of Malaria was found 33.33%, 15 % and 6.25%, Cough and Cold found 8.33%, 70% and 62.5%, Hepatitis 8.33%, 4% and 2.5%, Typhoid 3.33%, 2% and 1.25%, Vomiting / loose motion 33.33%, 25% and 18.75% cases reported respectively among low, medium and high phytochemical taking group recorded for the period of last 1 year.

Discussion

A nutritionally adequate diet is essential for optimal growth and development. Eating more fruits and vegetables help children to maintain a healthy weight, feel better and have more energy. Vegetables and fruits provide phytochemicals and considerable health significance to the human body. Keeping these facts in mind in present study the health and growth status of children has been studied Phytochemical intake of the subjects was computed by counting the number of serving of fruits and vegetables per week. Younger group showed low phyto-intake comparatively. A clear indication of linear relationship is found amongst better phytochemical intake with better weight status and height status. Studies frequently found supporting role of phytochemicals in childhood growth exposed the relationship between the adiposity, inflammation and the development of other metabolic disorders. [2, 10].

Most of the subjects showed normal haemoglobin and total serum protein levels. The relation between serum ferritin and haemoglobin, and dietary fruit and vegetable juice according to their vitamin C and fiber contents by multiple regression analysis found positively associated with intakes of juice. [11]

Occurrence of common infections in children, autoimmune illnesses, allergies, digestive complaints and headaches are common in early life. Visit to physicians and receive toxic medication impedes protective immune defenses, placing body more readily vulnerable to future illness. Many studies show that polyphenols do not accumulate in the blood, but are rapidly metabolized. Intestinal immune cells are able to interact with the contents of the lumen because of their location in the Peyer's patches and the intra-epithelium. [15, 17]

In present study the health status adjudged in terms of frequency of common infections showed a clear association in-between phytochemical intake and frequency occurrence of malaria, vomiting/ loose motions, hepatitis and typhoid. It is found that fruit and vegetable juice powder concentrate could support functional indices of health due to increased intake of various phytonutrients.[12, 14] From all these observations and deliberations it can be conclude that phytochemicals are very important non nutrient components of food and should be consumed by children judiciously in the form of veges and fruits. Low phyto intake may curtail their growth and health, so promotion of phytochemical intake among children of growing ages is indicated.

REFERENCE

- Cie lik E., A. Greda and W. Adamus, Contents of polyphenols in fruits and vegetables. Food Chem., 1994, 2006, pg 135-142 | 2. Castejón M. and Rodriguez A. Casado A "Dietary phytochemicals and their potential effects on obesity", Pharmacological Journal of Italian society, 2011 | 3. D. Prakash and K.R. Gupta, The antioxidant phytochemicals of nutraceutical importance. The Open Nutraceuticals J., 2009, pg 20-35 | 4. D. Prakash and N. Kumar, "Cost Effective Natural Antioxidants", Nutrients, Dietary Supplements and Nutraceuticals. 2011, pg 163-188 | 5. D. Prakash, G. Upadhyay, P. Pushpangadan and C. Gupta, "Antioxidant and free radical scavenging activities of some fruits", J. Complement Integr. Med., 2011, pg 1-19 | 6. Devagayam T.P., Tilak J.C. Bloor K.K. Sane K. S. Ghaskabdi S.S. Lele R.D. "Free radicals and antioxidants in human health: current status and future prospects. J Association Physicians India, 2004, pg.794-804 | 7. Florence MD, Asbridge M, Veugeler P.J. "Diet quality and academic performance." The Journal of School Health, 2008 | 8. Khandare A L., Venkataramana Y., Arlappan. N. Saxena R., Padmaja J., Sudershan Rao V., Damayanthi K., Dube A.K. Dietary Guidelines For Indians (NIN/ICMR)2011 | 9. Llargues E., Franco R., Recasens A., Nadal A., Vila, M., José Pérez M., Manresa J M., Recasens I., Salvador G., Serra J., Roure E., and Castells C., J Epidemiol Community Health., 2011 | 10. Mirmiran P., Bahadoran Z., Golzarand M., Shiva N., Aziz F., Pharmacol Res. Epub, 2011. | 11. Pénéau S., Dauchet L., Vergnaud A. C., Estaquio C., "Relationship between iron status and dietary fruit and vegetables based on their vitamin C and fiber content" | Am J Clin Nutr ition, 2008, vol. 87, pg 1298-1305 | 12. Porrini M., Riso P., Oriani G., "Spinach and tomato consumption increases lymphocyte DNA resistance to oxidative stress but this is not related to cell carotenoid concentrations". Eur J Nutr., 2002, pg,95-100. | 13. Riso P., Visioli F., Erba D., Testolin G., Porrini M., "Lycopene and vitamin C concentrations increase in plasma and lymphocytes after tomato intake, effects on cellular antioxidant protection." J Clin Nutr, 2004 | 14. Nantz M.P., Rowe C.A., Nieves C., West R.L., "Regular consumption of concord grape juice benefits human immunity" J Med Food 2011, pg 69-78 | 15. Salmi M, Adams D, Jalkanen S, "Cell adhesion and migration: IV: lymphocyte trafficking in the intestine and liver". Am J Physiol, 1999 | 16. William Sears and Martha Sears, "The Family Nutrition Book: Everything You Need to Know About Feeding Your Children - From Birth through Adolescence", 1999 |