

International Journal of Advanced Biochemistry Research



ISSN Print: 2617-4693
 ISSN Online: 2617-4707
 IJABR 2023; SP-7(2): 01-03
www.biochemjournal.com
 Received: 03-04-2023
 Accepted: 02-05-2023

Shubhada Golatkar
 PG Student, Department of
 Biochemistry, T. N. Medical
 College & BYL Nair Ch.
 Hospital, Mumbai,
 Maharashtra, India

Dr. Sanjay Swami
 Associate Professor,
 Department of Biochemistry,
 T. N. Medical College & BYL
 Nair Ch. Hospital, Mumbai,
 Maharashtra, India

Dr. Smita Swami
 Assistant Professor
 Department of Biochemistry,
 Grant Medical College and Sir
 J.J. Group of Hospitals,
 Mumbai, Maharashtra, India

Dr. Anuradha Kanhere
 Ex-Professor, Department of
 Biochemistry, T. N. Medical
 College & BYL Nair Ch.
 Hospital, Mumbai,
 Maharashtra, India

Corresponding Author:
Shubhada Golatkar
 PG Student, Department of
 Biochemistry, T. N. Medical
 College & BYL Nair Ch.
 Hospital, Mumbai,
 Maharashtra, India

Nutritional assessment of adolescent children in slums with reference to certain vitamins

Shubhada Golatkar, Dr. Sanjay Swami, Dr. Smita Swami and Dr. Anuradha Kanhere

DOI: <https://doi.org/10.33545/26174693.2023.v7.i2Sa.181>

Abstract

Adolescence is the most important phase in human development. As per the UNICEF (United Nations International Children's Emergency Fund) Report 2019, Oct 31, more than 80% of adolescents in India suffer from "hidden hunger" (a form of undernutrition). Whereas, this is the period where the developing body is in need of increased nutrition. Adolescents are deficient in nutrients such as iron, folic acid, zinc, vitamins etc. 50 healthy and 50 underprivileged adolescence from the slum area were distributed as group I and 2 respectively within the age of 14-18 years. The study parameters i.e. Vitamin A, E, C levels were evaluated and the results indicated significant differences in the test study group.

Keywords: Adolescence, teen, teenage, vitamins, slum, under-nutrition

Introduction

Childhood/teenage undernourishment is a major health problem in India, especially in slums. It is one of the most common causes of morbidity and mortality among children and adolescent throughout the world [1]. Adolescence is a period where increased nutrition is a crucial requirement. On 31st October 2019, UNICEF (United Nations International Children's Emergency Fund) released a report on "Adolescents, Diets & Nutrition: Growing well in a changing World 2019". It declared that 80% of adolescents in India suffer from "Hidden Hunger". Hidden hunger is a form of under-nutrition where the intake and absorption are inversely proportional. Factors that contribute to such conditions is consumption of low intake of nutrition / poor diet leading to infections and poor survival. Vitamins are essential nutrients required in small quantities and play a major role in growth and development, repair and healing wounds, maintaining healthy bone and tissues, for the proper functioning of an immune system and other biological functions [2, 3]. These slum adolescents are deficient in nutrients such as iron, folic acid, vitamins A, E and C. Therefore, the present study was undertaken to gauge the levels of these certain nutrients.

Material & Methods

The following study was carried out at Govandi, a healthcare centre run by BYL Nair Charitable Hospital. 100 subjects were enrolled which were distributed in two groups of 50 each. 50 healthy controls and 50 adolescents as test group in the age of 14-18 years, age and sex-matched. The test group belonged to lower socio-economic strata as they belong to slum.

Inclusion & exclusion criteria

50 healthy adolescents in age 14 to 18 years belonging to non-slum areas basically belonging from good economic strata were assessed for nutritional status. 50 undernourished adolescents in the same age group belonging to underprivileged areas/slum belonging to lower socio-economic income group were included. The adolescents having systemic disease like HIV, cancer, infectious diseases etc were excluded from the study. The study was approved by the institutional Ethics Committee. Written Consents were obtained from the subjects' parents as the study group included minors.

Sample collection

The subjects were given prior information about blood collection. The blood was withdrawn by vein puncture using sterile disposable needles and syringes. After collection, the blood was allowed to clot at room temperature for 1-2 hrs. The serum was separated and used for testing vitamins. Vitamin A and E were estimated by HPLC kit method [4, 5] and vitamin C by DNPH method [6]. The data of all groups were compared with controls using appropriate statistical tests, standard deviation, students 't' test and p-value.

Results & Discussion

The present study was carried out to gauge the levels of certain vitamins in the adolescent population in the Mumbai slums.

All the estimated vitamins were found to be significantly decreased in the adolescence as compared to the control group (Table 1)

Table 1: Serum levels of Vitamin A, E & C

		Mean	t	p-value
Vitamin A (ng/ml)	Control	551.69±41.24	--	--
	Test	393.27±78.21	13.60	≤0.001
Vitamin E (µg/ml)	Control	15.17±1.13	--	--
	Test	11.62±4.09	3.5	≤0.001
Vitamin C (mg %)	Control	83.24±6.22	--	--
	Test	28.95±9.61	37.13	≤0.001

40% & 15% more micronutrients are required in adolescents for their adult weight and height respectively. Lack of this intake can affect /delay sexual development and slower their overall growth and development.

Serum Vitamin A levels (Table 1) were found to be significantly decreased compared to the controls (393.27 ng/dl±78.21 and 551.69 ng/dl±41.24 respectively). Our results are at par with Ikepeazu Ebele *et al.* [7], Henrietta O *et al.* [8] and Chipulkar *et al.* [9], where the levels of the micronutrient were found to be significantly depleted. Vitamin A is also said to play an important role in iron absorption [10]. Biswas AB and his associates in their research has demonstrated that vitamin A deficiency is directly linked to reproduction, fetal development, immune system, cell differentiation & proliferation [11].

Vitamin E is a known antioxidant scavenging free radicals and molecular oxygen. Vitamin E is naturally found in food of plant origin, especially whole grains, seeds and oils. For the antioxidant property to be more effective, the intake should be appropriate [12]. Malnutrition leads to vitamin E deficiency proceeding towards consequential conditions like anaemia, frequent infections [13]. A decrease in vitamin E status may be observed highly due to its antioxidant property scavenging the free radical.

Vitamin C (Ascorbic acid) is an essential component involved in many crucial functions like, it prevents scurvy, helps in normal functioning of blood vessels, helps in growth, repair of skin, bone connective tissues etc. It also helps in absorption of important mineral iron which is an essential part of RBC. Its also involved in wound healing, it also protects cells against free radical damage [14]. Our result is in accordance with Ravindran RD *et al.* [15], Bansal PG [16], and En-Obong *et al.* [8] all observed declined levels of vitamin C. In a slum, adolescent populations there barely are chances of getting fresh fruits & vegetables regularly. This leads to severe deficiency symptoms including right from bleeding gums, dry skin, feeling weak, tired etc.

This study clearly exhibit that all the micronutrients are decreased in the adolescent population leaving in the study slum area. This strongly suggests the fact that the demand for micronutrients increases in the adolescence due to the growth process.

Conclusion

While there are no second thoughts on how malnutrition affects human body. In conclusion, our study emphasises on how the most common problem -malnutrition i.e deficiency of micronutrients affects the quality of life. Adolescence is a vulnerable point of life where nutritional requirement is a must. A healthy diet, clean drinking water which is a basic necessity is most important to provide optimal support and cognitive development in the adolescence. The study is indicative that the adolescence living in slum are deprived of this basic necessity and this is to be provided and taken into consideration on priority.

Limitations

Unfortunately, due to time and budget constraint, we could not extend this study by providing proper dietary recommendations and/or nutritional supplements to the study group. Pre and post-studies could have added the advantage to current study data.

Reference

1. Pal A, Pari AK, Sinha A, Dhara PC. Prevalence of under-nutrition and associated factors: a cross-sectional study among rural adolescents in West Bengal, India. *Int. J Pediatr Adolesc Med.* 2017;4(1):9-18.
2. Jacob JA, Nair MK. Protein and micronutrient supplementation in complementing pubertal growth. *Ind. J Paediatrics.* 2012;79(1):S84-91.
3. Brenhouse HC, Schwarz JM. Immuno adolescence: neuroimmune development and adolescent behaviour. *Neurosci Biobehav Rev.* 2016;70:288-299.
4. Estimation of vitamin A by HPLC assay, Eagle Biosciences, Inc. Available at: Vitamins A & E HPLC Assay | Eagle Biosciences | Vitamin Assay
5. Estimation of Vitamin E by HPLC assay, Eagle Biosciences, Inc. Available at: Vitamins A & E HPLC Assay | Eagle Biosciences | Vitamin Assay
6. Joseph H, Carl Kuther. Determination of ascorbic acid in whole blood and urine through the 2,4, dinitrophenylhydrazine derivative of dehydroascorbic acid 399-407.
7. Ikepeazu E, Neboh E, *et al.* Serum levels of iron, total iron-binding capacity and vitamin A in maternal and cord blood. *Curr Pediatr Resear.* 2010;14(1):9-13.
8. Henrietta N, Odoh IF, Ikwuagwu OE. Plasma vitamin A and C status of in-school adolescents and associated factors in Enugu State, Nigeria. *J Health Popul Nutr.* 2003;21(1):18-25.
9. Chipulkar SA, Agte VV, Mengale SS, *et al.* Are lifestyle good predictors of retinol and vitamin C deficiency in apparently healthy adults? *Eur J Clin Nutr.* 2002;56(2):96-104.
10. Allen LH, Rosado JL, Casterline JE, *et al.* Lack of haemoglobin response to iron supplementation in anaemic Mexican preschoolers with multiple micronutrient deficiencies. *Am J Clin Nutr.* 2000;71(6):1485-94
11. Biwas AB, Mitra NK, Chakraborty I, *et al.* Evaluation of vitamin A status during pregnancy. *J Indian Med Assoc.* 2000;98:525-29.

12. Oliveira NR, Jaime PC. The meeting between sustainable rural development and health promotion in the food guide or the Brazilian population. *Health and Society*. 2016;25:1108-21.
13. Abrol P, Sharma N, Lal H. Vitamin E status in protein energy malnutrition. *IJCB*. 1997;12(2):125-7.
14. Johnson L. Vitamin C deficiency. Merck Manual Consumer Version Medically reviewed. Accessed 2nd Dec 2022. Available at: Vitamin C Deficiency - Disorders of Nutrition - Merck Manuals Consumer Version; c2022.
15. Ravindran RD, Vashist P, Gupta SK, *et al*. Prevalence and risk factors for vitamin C deficiency in north and south India: a two-centre population-based study in people aged 60 years and over. *PLoS One*. 2011;6(12):e28588.
16. Bansal PG. Plasma vitamin C status of adolescent girls in a slum of Delhi. *Indian Pediatr*. 2014;51(11):932-3.