



## A study to assess the effectiveness of honey dates amla mix on biochemical markers among adolescent girls with Iron deficiency anaemia

Bhuvanewari G\*

Saveetha College of Nursing, SIMATS, Chennai-602105, Tamilnadu, India



### Article History:

Received on: 18 Dec 2019

Revised on: 29 Jan 2020

Accepted on: 30 Jan 2020

### Keywords:

Iron deficiency anaemia,  
adolescent girls,  
honey dates amla mix

### ABSTRACT

WHO Global Database on Anaemia for 1993-2005, covering almost half of the world's population, estimated the prevalence of anaemia worldwide at 25 per cent. The aim of the study is to determine the effectiveness of honey dates amla mix on biochemical markers among adolescent girls with Iron deficiency anaemia. Quantitative experimental and control group pre and post-test design was used in this study. The study was conducted among adolescent girls in two different residential homes. Total study population is 170 adolescent girls were selected by simple random sampling technique. 85 adolescents girls were assigned to the experimental group and 85 participants in control group. For experimental group honey dates amla mix was given for 3 months whereas in the control group iron and folic acid supplementation were provided. The study results shows that pre and post-test intervention scores of control and experimental group were compared by Wilcoxon scores rank test. Comparison of pre-test and post-test scores of severity of anemia, clinical variables, and level of fatigue and level of satisfaction, bio chemical parameters (reticulocytes, MCV, haematocrite, serum iron, serum ferritin, TIBC) were assessed in both experimental and control group. Between the experimental and control group (unpaired 't' test) reticulocytes, mcv, haematocrite, serum iron serum ferritin showed significant changes in the pre test and post-test but there is no changes in TIBC. The study concluded that alternative nutritional therapy was effective for enhancing the blood haemoglobin & biochemical parameters level, decreased the clinical variables and fatigue level among the adolescent girls with iron deficiency anemia.

### \*Corresponding Author

Name: Bhuvanewari G

Phone: 9043872624

Email: [Bhuvana.prabha1981@gmail.com](mailto:Bhuvana.prabha1981@gmail.com)

ISSN: 0975-7538

DOI: <https://doi.org/10.26452/ijrps.v11i2.2200>

Production and Hosted by

IJRPS | [www.ijrps.com](http://www.ijrps.com)

© 2020 | All rights reserved.

### INTRODUCTION

Anaemia is the most common nutritional deficiency disorder in the world.

#### Global burden of anaemia

A recent UNICEF's "State of the World's Children 2011" report says that more than half (56%) of adolescent girls in India are suffering from anaemia. Anaemia is evaluated to contribute in excess of 115,000 maternal deaths and 591,000 perinatal deaths per year (UNICEF, 2011; Raj and Chopra, 2016). Indian situation: India has the world's most noteworthy commonness of iron insufficiency pale-ness among ladies, with 60 to 70 present of the pre-adult young ladies being anaemic (Rajaratnam

*et al.*, 1969; Sadik, 2010; WHO, UNICEF, UNU, 2001; Hussain *et al.*, 1970). Studies directed in various districts of India show that the pervasiveness of frailty was 52.5% in Madhya Pradesh, 37% in Gujarat, 41.1% in Karnataka, 85.4% in Maharashtra, 21.5% in Shimla, 56.3% in Uttar Pradesh, 77.33% in Andhra Pradesh, 58.4% in Tamil Nadu and in Kerala (19.13% among understudies and 96.5% in the innate zone) (Nyambedha *et al.*, 2001; Budgam and Vaida, 2013; Srivasuki, 2012). The significant hazard factors distinguished from the above investigations were financial status, blood misfortune during monthly cycle, wholesome status, hand cleanliness and worm invasion (Beard, 2000; Hallberg and Hulthén, 2000; Eid *et al.*, 2013).

### Need for the study

Nutrition like honey dates and amla mix (one medium size honey dipped amla, and one dates every day for three to 6 months) are the most absorbable types of iron. Ferrous sulfate (325 mg for every day) is inadequately consumed and all the more much of the time causes issues with gastrointestinal miracle and blockage (Deshpande *et al.*, 2013; Carr and Frei, 1999). So along with iron and folic acid the alternative nutritious herbal supplementation that is honey dates amla mix it will increase the RBC count and also the amla contains the ascorbic acid it can absorb the iron easily and increase the hemoglobin in the human blood. Many of the studies prove that there are many alternative therapy are in practice to increase the blood hemoglobin level such as amla juice, beetroot juice, legumes, coriander leaves, spearmint, pumpkin seeds and drumstick leaves juice etc. One among the alternative nutritional therapy is honey dates amla mix. This is easily available in rural areas and has no side effects. This honey dates amla mix can significantly improve the blood hemoglobin level. Hence this study was conducted on the effect of honey dates amla mix on iron deficiency anemia.

### Objective

To determine the effectiveness of honey dates amla mix on biochemical markers among adolescent girls with Iron deficiency anaemia.

### Ethical considerations

The pilot study and main study were conducted after getting approval from the Institutional Ethical Committee of Saveetha Medical College and Hospital (008/04/2015/IEC/SU) Dated 23<sup>rd</sup> April 2015. Permission was obtained to conduct the study from the residential homes. Informed consent and assent forms were translated into Tamil. Written informed consent was obtained from the institutional author-

ity of the residential home and the written assent form was signed by the participants for their willingness to participate in the study. Ethical principles were followed and adhered to protect the rights of the participants. Confidentiality of the data was ensured throughout the study.

## MATERIALS AND METHODS

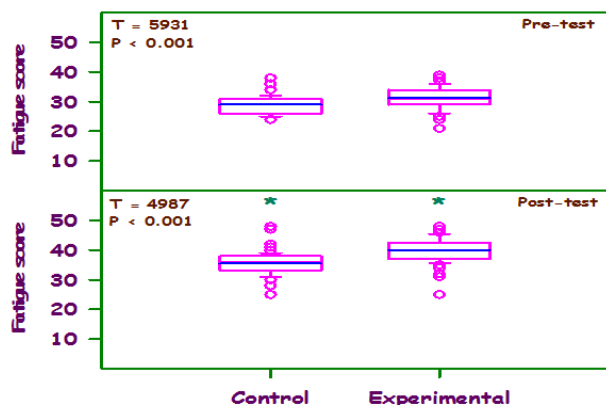
A quantitative evaluation approach was used in this study. The true experimental study (Pre-test post-test, control group) research design was adopted in the present study. The study was conducted among adolescent girls in two different residential homes at Thiruvalluvar Gurukulam at Kancheepuram, as a experimental group, Thiruvalluvar Gurukulam at Kaliyampoondi as a control group, The total population of adolescent girls was 142 in Thiruvalluvar gurukulam, Kancheepuram and 126 in Thiruvalluvar gurukulam hostel, Kaliyampoondi respectively. For the pilot study 20 adolescent girls were selected (control 10 + experimental 10) and for the main study 170 adolescent girls were selected (control 85 + Experimental 85). Among the anaemic adolescent girls who consented to participated in the study were included with inclusion and exclusion criteria. From which the adolescents who met the inclusion criteria was selected by simple random sampling technique by lottery method. Slips were prepared in equal shape and size and names of the adolescents and their age were written. The written slips were kept in a box and shuffled properly. The slips were taken one by one from the box until the desired number was achieved. By same method 85 adolescent girls were selected from both the groups.

### Statistical methods

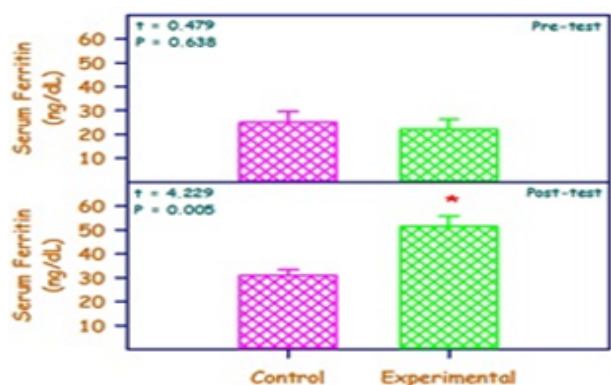
The data was analysed by using descriptive and inferential statistics. The data were expressed as mean  $\pm$  SE and as frequency distribution. Paired and unpaired test was used for the comparisons of mean of experimental and control groups. Level of haemoglobin were calculated by Friedman one way Repeated measure analysis of variance it used to multiple comparison vs control group (Dunnet's Method), signs & symptoms, level of fatigue and level of satisfaction were calculated by Mann-Whitney Rank Test, Chi square test was used to associate the level of hemoglobine concentration with selected demographic variables. A probability of 0.05 or less was taken as measurably noteworthy. The examination and plotting of charts were done utilizing Sigma Plot 13 (Systat Software Inc., USA).

**RESULTS AND DISCUSSION**

The severity of anaemia results of the pre-test level of haemoglobin was assessed by WHO anaemia severity assessment scale in two groups.

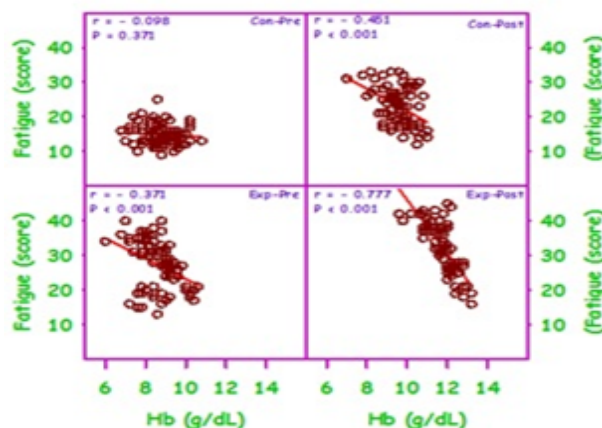


**Figure 1: Level of fatigue in control and experimental groups among adolescent girls in pre and post-test**



**Figure 2: Serum ferritin level in control (conventional) and experimental (herbal) groups of adolescent girls. Mean + SE (n = 10 each)**

The comparisons of both groups of level of hemoglobin were calculated by one way repeated measures analysis of variance on rank. (Dunnett’s method). The simple ‘t’ test was used to analyse the level of haemoglobin between the control and experimental group result showed that there is no significant difference in pre-test, whereas post-test-1,2,3 level of haemoglobin highly significant with a difference (p<0.001). A detail analysis was done to assess the clinical symptoms of anaemia during pre test and post in control and experimental group. Data was analysed using Mann-Whitney rank sum test between control and experimental group showed there is not a statistically significant difference (p=0.561) whereas control and experimental post test results showed there was statistically



**Figure 3: Correlation of haemoglobin level and level of fatigue on honey dates amla mix on iron deficiency anemia among control and experimental groups of adolescent girls. Mean + SE (n = 85)**

significant difference (p<0.001). Wilcoxon signed rank test scores within control pre-test and post-test clinical symptoms result showed significant difference (w=1602: p<0.001) In experimental group pre-test and post test result showed there is highly significant changes (w=3313:p<0.001) for the clinical symptoms. The data was analysed using non parametric test as fatigue score is a discrete variable. Wilcoxon signed rank test within experimental pre-test and post-test showed significant difference in level of fatigue (p<0.001). In control group there is no significant difference (P<0.001) for the level of fatigue. After intervention post test score of control and experimental group were compared by Mann Whitney test was highly significant (P<0.001). These results proved that herbal (honey dates amla mix) therapy was very effective to reduce the fatigue level on iron deficiency anaemia among adolescent girls (Figure 1). Regarding the level of satisfaction both the control and experimental groups in post-test intervention were assessed by Mann - Whitney Rank sum test. (p=<0.001) it indicated that there was a significant difference in satisfaction level in experimental (herbal) group than the control group. This showed that herbal therapy (honey dates amla mix) was more satisfactions than the control (conventional) group. The effectiveness of honey dates amla mix on iron deficiency anaemia and biochemical parameters among both groups A detailed analysis was done on the changes of biochemical parameters like, level of haemoglobin, MCV, reticulocytes, serum iron, serum ferritin, TIBC, saturation between the before and after the intervention among the control and experimental group participants. The pre and post-test intervention scores of control and exper-

imental group were compared by Wilcoxon scores rank test. Comparison of pre-test and post-test scores of bio chemical parameters (reticulocytes) in both experimental and control group. Between the experimental and control group (unpaired 't' test) reticulocytes did not show significant changes in the pre-test and post-test. Within control group (paired 't' test) reticulocytes shows significant difference ( $p < 0.01$ ) were as in experimental group it showed highly significant difference at ( $p < 0.01$ ). Comparison of pre-test and post-test scores of bio chemical parameters (MCV) in both experimental and control group. Between the experimental and control group (unpaired 't' test) MCV did not show significant changes in the pre-test and post-test. Within control group (paired 't' test) MCV did not showed changes in pre-test and post-test were as in experimental group MC showed significant changes at ( $p < 0.001$ ). Comparison of pre-test and post-test scores of bio chemical parameters (SERUM IRON) in both experimental and control group. Between the experimental and control group (unpaired 't' test) serum iron did not show significant changes in the pre-test and post-test. Within control group (paired 't' test) serum iron showed changes in pre-test and post-test were as in experimental group serum iron showed highly significant changes at ( $p < 0.001$ ). Comparison of pre-test and post-test scores of bio chemical parameters (Serum ferritin) in both experimental and control group. (Figure 2). Between the experimental and control group (unpaired 't' test) serum ferritin did not show significant changes in the pre-test and post-test. Within control group (paired 't' test) serum iron showed changes in pre-test and post-test ( $p = 0.217$ ) were as in experimental group serum iron showed highly significant changes at ( $p < 0.001$ ). Comparison of pre-test and post-test scores of bio chemical parameters (Transferrin) in both experimental and control group. Between the experimental and control group (unpaired 't' test) serum ferritin did not show significant changes in the pre-test and post-test. Within experimental and control group (paired 't' test) serum Transferrin did not show any significant changes at ( $p < 0.05$ ). Correlation of haemoglobin with level of fatigue: In pre-test control group the haemoglobin was showed negative correlated with fatigue but not statistically significant ( $r = -0.098$ ,  $p < 0.371$ ). In control post-test was negative significant correlation in ( $r = -0.451$ ,  $P < 0.001$ ), were as experimental pre and post-test Correlation of haemoglobin and level of fatigue showed positive significant correlation. ( $r = -0.371$ ,  $p < 0.001$ ), ( $r = -0.777$ ,  $p < 0.001$ ) (Figure 3). The present study showed that if the haemoglobin

level was higher means the level of fatigue was decreased (quality of life was increased) and there is significant reduction of clinical symptoms of iron deficiency anemia among adolescent girls. The current study results revealed that 63 (74%) of adolescent girls in experimental group belong to the age group 13- 15 years and in control group also majority 72 (84.7%) belong to 13-15 years. With regard to the religion majority 59 (69.4%) of adolescent girls in experimental group belong to the Hindu religion and in control group also majority 52 (61.1%) belong to Hindu religion. With regard to education status the majority 53 (62.3%) of adolescent girls in experimental group belong to the 8th standard and in the control group also majority 42 (49.4%) belong to 8th standard. Demographic variables like educational status of the adolescent girls ( $X^2 = 11.802$ ) and number of years of residence ( $X^2 = 13.696$ ) were significant. Regarding post-test clinical variables like Menstrual Cycle, Duration of Menstrual Cycle, Frequency of menstrual cycle, No. of pads used/day ( $X^2 = 7.941$ ,  $X^2 = 20.505$ ,  $X^2 = 14.862$  &  $X^2 = 12.617$  respectively) were significant, while there was no significant difference in the remaining demographic variables that the experimental and control groups were matched.

In this present study out of 85 adolescent girls from each group, experimental pre-test result showed that (20)23.5% mild anemia, 62(73%) with moderate anemia, and 3(4%) had severe anemia, whereas control group 32(38%) had mild anemia, 50(59%) girls had moderate anemia, 3(4%) had severe anemia. In post-test level of haemoglobin in experimental (herbal) group result shows that 23(27%) had mild anemia, 15(18%) had moderate anemia, 48(56%) had no anemia, no one had severe anemia whereas control group, 38(41.1%) moderate anemia, 13(15%) had moderate anemia, 36 (42%) had no anemia. The present examination was as per study led by [Biradar et al. \(2012\)](#) the commonness of frailty was 41.1% (with that of serious pallor being 0.6%, that of moderate pallor being 6.3% and that of gentle anemia being 34.6%. It was seen that the pervasiveness of iron deficiency was high in late young people (15-19yrs) when contrasted with that in the early teenagers (10-14yrs) ([McLean et al., 1993](#)). A lion's share of the young ladies had mel-low anemia. The prevalence of weakness was significantly high among the young ladies who had a place with the low financial status. The mean and 't' value of the pre-test and post-test discoveries of iron insufficiency pallor in exploratory gathering of found that mean pre-test score was 8.6 with the SE of 0.097 Mean post-test 3 score was expanded to 11.749 with SE of 0.08. Change in the score was

factually tried. The determined 't' esteem 18.84 was exceptionally huge at  $p < 0.001$ . Which shows that natural blend was successful for improving the degree of hemoglobin. These discoveries are predictable with the investigation led by an investigator evaluates the viability of nectar dates amla blend supplementation in anticipation of pallor. From these investigation discoveries it was apparent that mediation was powerful in improving the degree of hemoglobin (Cella *et al.*, 2002). The comparable examination led demonstrated that iron supplementation is related with decreased abstract proportions of weakness yet not with target enhancements in physical limit. Given the worldwide pervasiveness of both iron insufficiency and exhaustion, patients and specialists could consider utilization of iron-rich nourishments or iron supplementation to improve manifestations of weariness without reported anaemia (Bridges *et al.*, 1995; Acaster *et al.*, 2015). The present investigation understanding with the predominance of paleness among some school-going kids in Dhaka. An endeavor has additionally been made to evaluate the seriousness of weakness and iron status among the school-going oppressed kids by estimating serum iron (SI), serum TIBC and serum ferritin (SF) and investigate a connection between hemoglobin level and different parameters of iron sustenance. A considerable number of pointers have been utilized in deciding the iron deficiency (Jacobsen *et al.*, 2004; Miller, 2013). The present examination understanding with the commonness of pallor among some school-going youngsters in Dhaka. An endeavor has likewise been made to evaluate the seriousness of frailty and iron status among the school-going oppressed youngsters by estimating serum iron (SI), serum TIBC and serum ferritin (SF) and investigate a connection between hemoglobin level and different parameters of iron sustenance. A significant number of pointers have been utilized in deciding the iron deficiency (Rati and Jawadagi, 2012). Subjective and quantitative approval of the FACIT-weariness scale in iron lack sickliness (Acaster *et al.*, 2015). Common symptoms of IDA include fatigue and exercise-associated dyspnoea, poor mental performance and cold intolerance (Rosenzweig and Volpe, 1999; Miller, 2013; Cella *et al.*, 2002). There is also evidence that decreases in hemoglobin are related to increases in fatigue duration (Jacobsen *et al.*, 2004). The present study confirms that if haemoglobin levels is higher means the level of fatigue decreased (quality of life increased) and there is significant reduction of clinical symptoms of iron deficiency anaemia among adolescent girls. However, improvement was shown after supple-

mentation. So alternative nutritional herbal supplementation would reduce the iron deficiency anaemia. Adolescent girls therefore constitute a group at risk of iron deficiency, and specific attention should be given to them during adolescence to ensure that their dietary intake of iron is adequate to their requirements. The present investigation was as per study led by Jagadeesh (2011) found that statistic factors like age religion kind of family pay and clinical factors like BMI age menarche, recurrence of menstrual cycle and so on impact on level of hemoglobin. Rati and Jawadagi (2012) conducted an examination on commonness of frailty and uncovered that the predominance of iron deficiency more among young ladies who were over 14 years old, standard periods, menstrual seeping for over 5 days, young ladies from low financial conditions and has a place with vegan diet.

## CONCLUSION

The results of the present study have demonstrated that alternative herbal supplementation is effective treatment of iron deficiency anaemia among adolescent girls, Honey dates amla is palatable. Since Honey dates amla is palatable adolescence are motivated easily & hence there is improvement seen in the symptoms earlier. No side effects, Level of satisfaction is more, The overall improvement in anaemia status is 42% in control group and 56% in experimental group, The Honey dates amla shows less side effects while for IAF Supplementation regime shows abdominal discomfort, constipation, nausea, and skin rashes were also seen. While Compare with other studies.

## ACKNOWLEDGEMENT

**Author express sincere thanks to all the experts for their valuable suggestions**

1. Dr. P. Mangala Gowri, Principal, Saveetha college of nursing, SIMATS, Chennai.
2. Dr. Hepshibha Kerubhamani, Saveetha Medical College & Hospital, SIMATS, Chennai.
3. Dr. Vijayaragavan, Ph.D, Director of Research, SIMATS, Chennai.
4. Mr. Subramaniam, Secretary, Thiruvallur Gurukulam, Kancheepuram.

## Conflict of Interest

The authors declared no competing interests.

## REFERENCES

- Acaster, S., Dickerhoof, R., DeBusk, K., Bernard, K., Strauss, W., Allen, L. F. 2015. Qualitative and quantitative validation of the FACIT-fatigue scale in iron deficiency anemia. *Health and Quality of Life Outcomes*, 13(1):60.
- Beard, J. L. 2000. Iron Requirements in Adolescent Females. *The Journal of Nutrition*, 130(2):440S-442S.
- Biradar, S. S., Biradar, S. P., Alatagi, A. C., Wantamutte, A. S., Malur, P. R. 2012. Prevalence of anaemia among adolescent girls: A one year cross-sectional study. *Journal of Clinical and Diagnostic Research*, 6(3):372-377.
- Bridges, K. R., Seligman, P. A., Handin, R. I., Stosel, T. P., Lux, S. E. 1995. Disorders of iron metabolism. *Blood: Principles and Practice of Hematology*. ISBN: 0397509448.
- Budgam, J., Vaida, N. 2013. Nutritional status of children living in orphanages in district. *International Journal Of Humanities And Social Science Invention*, 2(2):36-41.
- Carr, A. C., Frei, B. 1999. Toward a new recommended dietary allowance for vitamin C based on antioxidant and health effects in humans. *The American Journal of Clinical Nutrition*, 69(6):1086-1107.
- Cella, D., shei Lai, J., Chang, C.-H., Peterman, A., Slavin, M. 2002. Fatigue in cancer patients compared with fatigue in the general United States population. *Cancer*, 94(2):528-538.
- Deshpande, N., Karva, D., Agarkhedkar, S., Deshpande, S. 2013. Prevalence of anemia in adolescent girls and its co-relation with demographic factors. *International Journal of Medicine and Public Health*, 3(4):235-235.
- Eid, N. M. S., Al-Awadi, B., Vauzour, D., Oruna-Concha, M. J., Spencer, J. P. E. 2013. Effect of Cultivar Type and Ripening on the Polyphenol Content of Date Palm Fruit. *Journal of Agricultural and Food Chemistry*, 61(10):2453-2460.
- Hallberg, L., Hulthén, L. 2000. Prediction of dietary iron absorption: an algorithm for calculating absorption and bioavailability of dietary iron. *The American Journal of Clinical Nutrition*, 71(5):1147-1160.
- Hussain, M., Hossain, A. M., Bhuyan, A. H. 1970. Nutritional Status of Resident Female Orphans of Selected Orphanages of Dhaka City. *Journal of Bangladesh Society of Physiologist*, 5(2):66-70.
- Jacobsen, P. B., Garland, L. L., Booth-Jones, M., Donovan, K. A., Thors, C. L., Winters, E., Grendys, E. 2004. Relationship of hemoglobin levels to fatigue and cognitive functioning among cancer patients receiving chemotherapy. *Journal of Pain and Symptom Management*, 28(1):7-18.
- McLean, E., Cogswell, M., Egli, I., Wojdyla, D., De Benoist, B. 1993. Worldwide prevalence of anaemia, WHO Vitamin and Mineral Nutrition Information System, 1993-2005. *Public Health Nutrition*, 12(04):444-444.
- Miller, J. L. 2013. Iron Deficiency Anemia: A Common and Curable Disease. *Cold Spring Harbor Perspectives in Medicine*, 3(7):a011866-a011866.
- Nyambedha, E. O., Wandibba, S., Aagaard-Hansen, J. 2001. Policy implications of the inadequate support systems for orphans in Western Kenya. *Health Policy*, 58(1):83-96.
- Raj, A., Chopra, A. 2016. A study showing correlation between anaemia and common parasitological diseases among adolescent girls in villages of PHC Belkhera, Madhya Pradesh, India. *International Journal of Community Medicine and Public Health*, 3(1):373-379.
- Rajaratnam, J., Abel, R., Asokan, J. S., P. J. 1969. Prevalence of anemia among adolescent girls of rural Tamilnadu. *Indian Pediatrics*, 37(5):532-536.
- Rati, S. A., Jawadagi, S. 2012. Prevalence of Anemia among Adolescent Girls Studying in Selected Schools. *International Journal of Science and Research*, 3(8):358-358.
- Rosenzweig, P. H., Volpe, S. L. 1999. Iron, Thermoregulation, and Metabolic Rate. *Critical Reviews in Food Science and Nutrition*, 39(2):131-148.
- Sadik, A. 2010. Orphanage Children in Ghana: Are Their Dietary Needs Met? *Pakistan Journal of Nutrition*, 9(9):844-852.
- Srivasuki, K. P. 2012. Nutritional and Health Care Benefits of Amla. *Journal of Pharmacognosy*, 3(2):141-151.
- UNICEF 2011. The state of the world's children 2011. *Adolescence: An Age Opportunity*.
- WHO, UNICEF, UNU 2001. Iron deficiency anaemia: assessment, prevention, and control. In *WHO*, Geneva.