



## Physiology

## DRY FRUITS SOAKED IN HONEY TO IMPROVE DAY TO DAY ACTIVITIES AND HAEMOGLOBIN IN UNDERGRADUATE STUDENTS

<b>A. Chandra Sekhar</b>	Department of Physiology, Rajiv Gandhi Institute of Medical Sciences, Kadapa, Andhra Pradesh
<b>Nasar Ahamed R</b>	Department of Physiology, Rajiv Gandhi Institute of Medical Sciences, Kadapa, Andhra Pradesh
<b>Karthik Ganesh Mohanraj</b>	Department of Biomedical Research Unit and Lab Animal Centre (BRULAC), Aveetha Dental College, Saveetha Institute Medical and Technical Sciences, Saveetha University, Chennai, India
<b>N. Ashok Vardhan*</b>	Department of Biochemistry, Department of Biomedical Research Unit and Lab Animal Centre (BRULAC), Aveetha Dental College, Saveetha Institute Medical and Technical Sciences, Saveetha University, Chennai, India *Corresponding Author

**ABSTRACT** **Introduction:** Nowadays in regular life style of students, it became very common of eating junk food rather than the nutritional foods which are required to maintain the metabolism to boost up their day to day activities. The supplementation of adequate amounts of proteins, minerals and vitamins along with some amount of sugars is beneficial for the individual to maintain healthy lifestyle. It's an effective nutritional diet to have dry fruits soaked in honey (DSH) regularly to maintain the metabolisms intact. These all are very helpful in different health aspects.

**Material and Methods:** 60 undergraduate students were participated in this study. 2ml of venous blood were collected in the clinical laboratory for the estimation of haemoglobin (Hb), blood sugar levels before and after regular intake of DSH. Participants were examined for the blood pressure by using sphygmomanometer. Also activities like puzzles were given to assess the active involvement of participants.

**Results:** There is a significant improvement ( $p < 0.05$ ) in the students involvement in different activities compared to after and before regular intake of DSH. And there is highly significant ( $p < 0.005$ ) improvement in the Hb levels in the participants after regular intake of DSH. A significant ( $p < 0.05$ ) control on blood pressure levels in the participants after regular intake of DSH. There is no significant difference in the blood glucose levels before and after DSH.

**Conclusion:** Our findings state that the nutritional supplementation of DSH is very helpful in the improvement of Hb as well as the attention against different activities. It's helpful in the maintenance of normal blood pressure levels. And it's not causing any other side effects like excess weight gain or high blood glucose in the participants.

**KEYWORDS :** Dry fruits, Honey, Hb, Blood pressure, problem solving activities

### INTRODUCTION

Nutrition plays a major role in the regular life style to perform daily activities and to maintain the health of the individual (Krehl W A., 1983). The balanced diet will give the required amount of carbohydrates, proteins, vitamins, minerals and fibers to the body need for its proper functioning (Indian Govt Guidelines). It is known that brain needs 20% of total body glucose to be activated state and for the musculature maintenance it's much dependent on the proteins which were taken through the diet. Vitamins and minerals have their crucial role to play in different metabolisms. So the defect in the intake of required amount of foods can lead to different metabolic problems associated with nutritional deficiencies (E Hukisson et al., 2007).

But in the current life style especially among student community, it became very passion to have fast foods, chemical persevered foods and junk foods rather than the nutritional foods. It can lead to be hyper active and too tasty for some time because of different ingredients present in those foods, but it leads to put on excess weight, abnormalities in blood pressure levels, which also may result in different metabolic problems (Yahya Farjana., 2013, Monika Singh et al., 2014).

It is better to avoid these types of foods and to get habituate with nutritional rich healthier foods for the well being. Such food habits also show effects on their active involvement in problem solving and learning skills (Allen A. Denio et al., 1984, Sarah J. Spencer et al., 2017). Taking into consideration to replace the existing type of food condition with some nutritious foods in the regular meal will show some effect on their daily intake of nutrients and finally on the health status. Supplementary foods such as milk, leafy vegetables, dry fruits (almonds, pistachios, cashews, Raisins etc.), honey, helps in retaining recommended dietary allowances of vitamins, minerals and fibers (Saeed Samarghandian et al., 2017).

### MATERIALS AND METHODS:

In the present study was carried on a total of 60 undergraduate students both male and female, and those are occasionally skipping their breakfast while attending classes in the morning sessions. Students who are habituated of eating junk foods, high amounts of beverages, less physical activities in their regular life style were included in this study. These selected students were recommended to have one full spoon of dry fruits (almonds, pistachios, cashews, Raisins) soaked in honey for one month regularly without skipping breakfast.

### Sample collection

Informed consent was obtained from the participant before sample collection. 2ml of venous blood collected from the anterior cubital vein before and after one month of regular intake of DSH and distributed in EDTA tube for the Hb analysis and plain collection tubes and centrifuged in 3000rpm for serum collection. Then serum was separated and analysed to estimate the Hb levels and blood glucose levels of the participants by using automated and semi automated analyzers (mindray haematology analyzer and erba-chem semi auto analyzer). Assessment of blood pressure was performed before and after regular intake of DSH by using sphygmomanometer. And the active involvement in different activities was assessed by conducting tests and problem solving abilities.

60 participants divided into two groups based on their gender  
 Group A: 30 healthy male participants with normal BMI of 19.0 - 24.9  
 Group B: 30 healthy female participants with normal BMI of 19.0 - 24.9

### Inclusion Criteria

Age group of eighteen to twenty years  
 Normal BMI (19.0 – 25.0)  
 Both male female

**Exclusion Criteria**

- Obese individuals
- Hypertension
- Diabetes mellitus
- Not willing to carry one month intake of DHS regular

**Results**

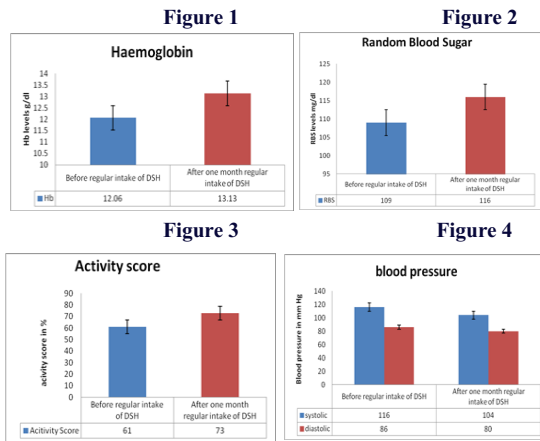
**Table1. Mean and SD values of Hb, Random Blood Sugar, Blood pressure levels and activity score percentage in males before and after regular intake of DSH**

s.no	Parameter	Before regular intake of DSH	After one month regular intake of DSH	Significance values (p- value)
1	Hb	12.06 ± 1.02 g/dl	13.13 ± 0.86 g/dl	P<0.005
2	RBS	109 ± 14 mg/dl	116 ± 09 mg/dl	P<0.05
3	Systolic Blood pressure	116 ± 08 mm Hg	104 ± 04 mm Hg	P<0.05
	Diastolic Blood pressure	86 ± 02mm Hg	80 ± 02 mm Hg	
4	Activity score	61 ± 11 percentage	73 ± 14 percentage	P<0.05

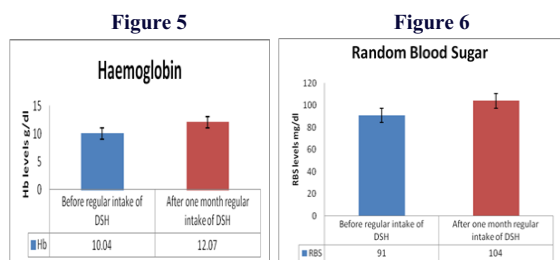
**Table2. Mean and SD values of Hb, Random Blood Sugar, Blood pressure levels and activity score percentage in females before and after regular intake of DSH**

s.no	parameter	Before regular intake of DSH	After one month regular intake of DSH	Significance values (p- value)
1	Hb	10.04 ± 0.79 g/dl	12.07 ± 0.48 g/dl	P<0.005
2	RBS	91 ± 07 mg/dl	104 ± 05 mg/dl	P<0.05
3	Systolic Blood pressure	108 ± 05 mm Hg	102 ± 03 mm Hg	P<0.05
	Diastolic Blood pressure	84 ± 02 mm Hg	80 ± 01 mm Hg	
4	Activity score	59 ± 11 percentage	76 ± 11 percentage	P<0.005

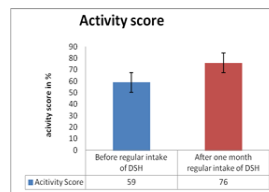
**Figure 1-4: Mean and SD values of Hb, Random Blood Sugar, Blood pressure levels and activity score percentage in males before and after regular intake of DSH**



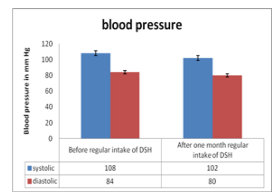
**Figure 5-8: Mean and SD values of Hb, Random Blood Sugar, Blood pressure levels and activity score percentage in females before and after regular intake of DSH**



**Figure 7**



**Figure 8**



**DISCUSSION**

In the comparison of results between before and after regular intake of DSH has shown significant changes in both male and female participants. In males the haemoglobin improved from 12.06 ± 1.02 g/dl to 13.13 ± 0.86 g/dl it shows highly significant p<0.005 as well as in females it has improved from 10.04 ± 0.79 g/dl to 12.07 ± 0.48 g/dl it shows highly significant p<0.005. Almonds those were present the DSH may be responsible for the improvement of Hb levels, almonds are considered to be very effective for improving haemoglobin. Almonds help in the formation of new blood cells and also increase the haemoglobin level in the blood. Unsaturated fats, vitamin B, phosphorus, copper and iron present in nuts helps in the proper functioning of all the crucial organs of our body (Rávilá Graziany Machado de Souza et al., 2017, Yi M, Fu J, Zhou L, et al., 2014).

In males there is slight increase in the random blood sugar from 109 ± 14 mg/dl to 116 ± 09 mg/dl as well as in females it has increased from 91 ± 07 mg/dl to 104 ± 05 mg/dl it shows there is slight increase in RBS but its not very high which may can leads to gain excess weight or obese condition. The sugars that present in the honey are monosaccharides around 39% of fructose and 31% of glucose which are readily utilized by the brain to be active. And according to the study “Nuts as a replacement for carbohydrates in the diabetic diet” (Diabetes Care, August 2011) intake of nuts every day can improve glycaemic control and serum lipids in people with type 2 diabetes (Otten J, Stomby A et al., 2017, Alvarez-Suarez, J.M et al., 2010).

Both systolic and diastolic pressures of all the participants were normal slightly higher in very few cases its also been significantly lowered to their very normal levels in all participants the results comparison has been shown in figure 4 and figure 8. In the both male and female the significance value is p<0.05 (Mohammadifard N et al., 2015, Schlörmann W et al., 2015).

Activity score of participants calculated based on the improvement in their problem solving skills and alertness, male participants shown an improvement in there problem solving skills and active participation improved was 61 ± 11 % to 73 ± 14 % it shows significant p<0.05 as well as in females it has improved from 59 ± 11 % to 76 ± 11 % it shows highly significant p<0.005. This is due to the monosaccharides which are readily utilized by the brain present in the honey and the dry fruits almond, pista and cashew which are very helpful in the memory boosting and reduction in the oxidative stress by their antioxidant nature (Francis H, Stevenson R., 2013).

**CONCLUSION**

Our findings state that the nutritional supplementation of DSH is very helpful in the improvement of Hb as well as the attention against different activities. Its helpful in the maintenance of normal blood pressure levels. And it is not causing any other side effects like excess weight gain or high blood glucose in the participants. Our findings from the study strongly recommends that the daily intake of nutritious rich foods like DSH has dry fruits, nuts, dates which are taken along with milk or honey may show very good effect on both physical and mental development of children in the present scenario of student lifestyle.

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