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Date Supplement and Iron Salts Plus Physical Activity on Efficiency of Iron Absorption

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ABSTRACT

The aim of this study was to investigate the effect of date supplement and iron plus physical activity on anemic female students. This study includes 40 anemic female students, from the new valley university; they were divided into four equal groups ten in each group; 1st group ingested "date" plus exercise, 2nd group ingested date without exercise, 3rd group supplemented with iron salts with exercise, 4th group supplemented with iron salts without exercise, pre/post-test VO2max, pulse rate, Hb, iron, ferritin and O2 were determined. 5 ml venous blood was drawn from all participants for the pre/post variables. Dose of date sheet was (10 gm) twice daily, and dose of iron salts was one capsule (5mg) daily. Results: Results indicated that date supplement, and iron together with exercise affect positively the anemic female students. Conclusion: black dates and iron with or without hulls, are effective, safe and cheap supplements for improving hemoglobin and restoring iron stores to correct iron deficiency.

Key words: *Date supplement, iron salts, physical activity, and injured anemic female students*

INTRODUCTION

The plants are perfect remedies as they cost less, and easier to obtain without any troubles [1]. Dates are one of the major fruits cultured in many countries were desert prevail [2, 3]. It is one of the mankind's oldest cultivated plants [4]. Egypt is a well-known producer of dates, as their productions overcome other producers in Arab countries and Middle East, due to the convenience of cultivation of date in hot, dry climates and scanty rainfall [2, 3].

Many dates' products may be produced, such as tamruddin, which is a dried date, manufactured from rezaiz date at Tamar stage. While, green dates may be used for pickles and chutney, other date stage may be transformed to jam or sugar (dibis or molasses). Other products like date bars, paste are originated from dates at rutab stage. Also, date bars, paste and syrup are the end products of Tamar dates [5-7].

The Latin name of date palm (Phoenix dactylifera) reported by scientists, due to many benefits' outcome and its favors upon people and countries economy, as it is a blessed tree mentioned in Holy Quran [8].

Date was known by ancient Egyptians and was seen in their graves, they ate dates fresh or dried and as a sugar in date honey (molasses); date was reported to have a high nutritional value as it was the main nutrient of saint Mary. It contains high quantity sugar in dry and fresh dates, and produce a great deal of energy, as it can support the poor and rich people and its energy production overcome that of other fruits like grapes and mangoes, and contain fibers like cellulose which help in digestion and prevent constipation, the medical condition of being unable to empty the bowels [9].

Dates have hold an excellent reputation as containing many kinds of minerals, vitamins and trace elements such as boron, calcium, cobalt, copper, fluorine, zinc, together with vitamins "A, B, C", all kinds of antioxidants, anti-inflammatory, gastroprotective and hepatoprotective and nephroprotective compounds meaning it can protect different organs and systems of the body. Also, dates contain a high nutritive values of carbohydrates and proteins which are very important for energy production and growth, together with health benefits and disease problems as reported by many researchers [10-11].

While, chemical composition of dates depends upon the cultivated soil, conditions and its ripening stage [13, 14]. The variation of moisture affects the market cost and content of nutrients [15-17].

Anemias means deficiency of hemoglobin in the blood, which can be caused by either too few red blood cells or too little hemoglobin in the cells. There are several types of anemia due to causes: blood loss anemia after rapid hemorrhage, a plastic anemia due to lack of bone narrow functionality, mega plastic anemia due to vitamins and intrinsic factors, and hemolytic anemia may be caused by cells fragile easy to be ruptured while they go through the spleen, so, anemia may be caused by hypoxia resulting from diminished transport of oxygen by blood, which in turn decrease energy formation, as energy need oxygen supply plus nutrients like carbohydrates and fat, leading to energy production by the mitochondria [18].

Researchers reported the importance of supplements in enhancing fitness and performance in sport and help athletes to retard the state of fatigue. The most important supplements are those which are natural in origin such as date, fruits that contain vitamins, minerals and trace elements also glutamine as it released from the muscle, liver and brain together with products containing iron as it is very essential in oxygen transportation and energy production and the main product to prevent anemia, especially among girls and women [19, 20].

Adolescent girls are girls who are no longer children but are not yet adults, the word adolescent come from the Latin meaning to grow up. Adolescent ages between 10 to 19 years. The problem in developing countries is that, these girls marry at early age and have many diseases including anemia and deficiency of nutrition [21-23]. In India, dietary problems, habits and worm infestation are some causes of adolescent infected with anemia [24]. It is important to say that the early curing of anemia is for the sake of girls that are infected, because more health problems can be emerged in case the disease become a chronic disease that may affect the reproduction and health together with growth problem, as it was noticed that some female students fell and injured during exercising session, assessment lead to iron deficiency cause. There are many factors that contribute to the wide distribution of anemia, mainly decreased physical activity and unhealthy dietary together with mineral deficiency specially, iron, copper and selenium [25, 26].

Adamson [27] and Adamson and Longo [28] confirmed that in addition to mineral deficiency and iron in particular, other causes such as loss of blood during menstruation or loss of iron may aggravate the cases; also the assessment of ferritin is important in iron metabolism and its storage. Also, hemoglobin and RBCs are main variables in assessment of anemia, as the heme forming. Hemoglobin binds oxygen forming oxyhemoglobin which is important for energy production in mitochondria [28, 29].

Iron deficiency is thought to be caused by low iron intake or some diseases, and in women and girls due to blood loss by menstruation. Iron deficiency anemia results from decreasing blood formation of cells and iron deficiency in tissues occurs depending on the balance between iron intake and iron requirement. The development rate of iron deficiency in tissues and cells depends on the turnover rate of iron-containing proteins. Iron is also associated with several metabolism substances including mitochondria and neurotransmitters [28, 29].

Pulse rate is an important variable to indicate the general fitness and also cardiovascular state of performance. It is an easy way of assessment but has a great significance. By placing the finger over an artery near the skin surface such as antecubital artery, pulse can be felt and the number of pulses that can be counted per minute indicates the number of heart beats per minute. Pulse waves moves faster than the blood itself and the waves that are sensed are a representation of the heart rate in an easy method [30].

VO2max is the volume of oxygen that is maximally used by the active skeletal muscle; there are many methods for the assessment of VO2max, including direct and indirect methods [31].

Bassett and Howley [30] and Erikson *et al.* [32] added that VO2max is the most used method at determining performance and physical fitness and a good marker of cardiovascular soundness.

This study aimed to investigate the effect of date and iron salt supplement, together with physical activity on female students suffering from severe anemia.

Survey study: 35 students reported in physical education (first) group at new valley university for academic year 2017/2018, including 11 female students suffered from multiple injuries as a result of drowsiness in practicing sports; laboratory tests indicated that they suffered from anemia.

SUBJECTS AND METHODS

Subjects:

Forty anemic female students which were residents of the university city of Al-Kharga in the New Valley Governorate, and a written informed consent was taken from them. They were divided into four equal groups, ten in each; 1st group ingested "date" with exercise, 2nd group ingested "date without exercise", 3rd group supplemented with traditional iron salts with exercise, 4th group supplemented with traditional iron salts without exercise. A written informed consent was taken from all subjects participated in our study.

Pilot study

Pilot study was done on three female students before the main study by 3 days (15/1/2017) to make sure of the equipment and tools, if there is any problem in the study, and also to be sure from method of measuring marker and recording data.

The main study:

Pre-measurement occurred on 1/2/2017.

The proposed training program: was applied for 12 weeks, 3 units/week (a total of 36 units with unit time of 30-45 minutes). Intensity of loads begins below the average in the first two units, progress to the average for the rest unit with interval for 1-2 minutes and load increased gradually by 5% of the maximum.

Administration doses were:

- Date sheet was dried by solar energy and student took 10 gm date sheet twice daily before breakfast and before dinner.
- Traditional iron salts: the student took one capsule of 5 mg iron before breakfast.

Data collection tools:

- Rest meter was used for measuring height and medical scale for weight.
- Harvard step test was used for physical fitness VO2 by using platform (step) 50.8 cm high, stop watch, metronome.
- Pulse meter was used for measuring heart rate.
- Fitness index by equation = (10*test duration/S.)/(2*sum of heart rate) in recovery period.

Biochemical Analysis

- Hemoglobin determination using method of Choudhri et *al* [33] by spectrophotometer.
- Iron determination using method using Radioimmunoassay (RIA) according to method of Goldie and Thomas [34].
- Ferritin determination using Radioimmunoassay (RIA) according to method of Goldie and Thomas [34].
- O_2 determination using spectroscopic gas analyzer according to method of Lim *et al*, [35].

Sample Collection

- Blood samples (5 ml) were withdrawn before and after the experiment by a specialist, for determination of the Biochemical markers.
- All procedures were conducted in accordance with ethical guidelines and with approval from the ethical committee of Faculty of Physical Education Sports, University of New Valley.

Date varieties

- Dates at Khalal stage of maturity were obtained from the farms in New Valley Governorate, Egypt.

Methods:

Preparation of Tamruddin Sheets (TDS) samples:

The method of Tamruddin Sheet (TDS) preparation was carried out according to that given by Nadir, *et al.*, [36] as following:

- Date varieties were washed with tap water. Then, they were cut and pitted manually. Pitted dates were mixed with cold water at a ratio of 4 date pulp: 3water (w/w) and 0.5 % Na metabisulfite (from pitted date weight) was added to that homogenate to prevent discoloration. Then it was blended and homogenized using a blender (Braun 600 Watt) for 2 min to homogenize the mixture.

Production of TDS with Fiber

- A portion of 250 g from each variety of the homogenized mixture of boiled date was poured in aluminum foil tray (15.5 × 11 × 4), and smeared with few drops of paraffin oil.
- Each date variety was dried using different energy sources:
  a) Thermal energy from conventional oven at 50 ºC for 25 hours.
  b) Solar energy drier at 50 ºC for 20 hours.
- The obtained dried date sheets were rolled in a cellophane paper and packaged in polyethylene bags till analysis.

Chemical composition of date

Major chemical composition: We determined their proximate composition including moisture content, ash, crude protein, crude fat, crude fiber, total sugars (reducing and non-reducing) and minerals (P, K, Ca, Fe and Zn) as described in the **A.O.A.C.** [37].

Sensory Evaluation:

The prepared date products were subjected to sensory evaluation by 10 panelists from the staff in both (Food Technology Department, National Research Center and Nutrition and Food Science Department, Faculty of Home Economics) using 5-points score sheet according to the method described by Penfield and Campbell [38].

Determination of minerals:

The process was carried out according to the method described by A.O.A.C. in 2005 [37]. A known weight of ash for each sample was completely dissolved in HCl solution (1N) and quantitatively transferred into volumetric flask; the volume was set to 100 ml with HCl, and the estimation was made in the digested solution using Atomic absorption apparatus (PUG 100X series Atomic Absorption Spectrophotometers).

Statistical Analysis:

The statistical analysis was carried out using SPSS statistical software for sensory evaluation of date products. The results were expressed as mean ± SE. Data were analyzed by one-way analysis of variance (ANOVA). The differences between means were tested for significance using least significant difference test (LSD) at ($P < 0.05$) by SPSS [39].

RESULTS AND DISCUSSION

Chemical composition of date sheet (Tamruddin):

Chemical analysis was performed to TDS without fiber in both conventional oven and solar energy which maintained the best organoleptic properties as shown in Table (1) and Figure (1). Data showed that date sheet in conventional oven had higher content of ash and protein (2.74 % and 4.10 % respectively) compared with sheet in solar energy (1.63 % and 2.48 % respectively) due to the loss of moisture during solar drying process. With regard to date TDS without fiber, they contain higher protein and ash content with an average of 4.15 % and 2.29 % respectively as a result of using the whole fruit. Regarding reducing, non-reducing and total sugars date TDS without fiber in oven had showed higher values in comparison with the ones dried by solar energy. On the contrary, in case of date TDS with fiber, sample dried using solar energy showed higher values for reducing, non-reducing and total sugars than that dried in oven

Table 1: Chemical composition (%) of date products based on wet weight basis

Components (%) / Date Product	Moisture	Protein	Ash	TTA	Total Sugars	Reducing Sugars	Non-reducing sugars
A. Date Sheet							
Date Sheet without Fiber in Oven	12.84	2.74	4.10	12.07	87.21	47.51	39.7
Date Sheet without Fiber in Solar Energy	15.15	1.63	2.48	12.07	66.09	30.73	35.36

Date Sheet with Fiber in Oven	15.70	4.13	2.23	4.69	57.41	26.41	31
Date Sheet with Fiber in Solar Energy	18.23	4.18	2.35	4.69	69.74	29.22	40.52

Mineral composition presented in Table (2) showed that iron (Fe), potassium (K), calcium (Ca), phosphorous (P) and zinc (Zn) content for date TDS without fiber in both conventional oven and solar energy are 0.59 ppm and 80.5 ppm, 1.59 ppm, 17.4 ppm and 0.23 ppm respectively. In comparison with date TDS without fiber, date sheet with fiber in both conventional oven and solar energy had higher contents of potassium (K) and phosphorous (P) (86 ppm and 23.52 ppm respectively) and lower content for iron (Fe), calcium (Ca) and zinc (Zn) (0.3 ppm, 0.68 ppm and 0.01 ppm respectively).

Table 2: Mineral composition (ppm) of date products based on wet weight basis

Minerals / Date Product	Phosphorous (P)	Potassium (K)	Calcium (Ca)	Iron (Fe)	Zinc (Zn)
	ppm (part per million)				
A. Date sheet:					
Date Sheet without Fiber in Oven	17.40	80.5	1.59	0.59	0.23
Date Sheet without Fiber in solar energy	17.40	80.5	1.59	0.59	0.23
Date Sheet with Fiber in Oven	23.52	86	0.68	0.30	0.01
Date Sheet with Fiber in solar energy	23.52	86	0.68	0.30	0.01

Phytochemical composition of date sheet without fiber in conventional oven and solar energy:

Phytochemical composition [total phenolic content (TPC), total anthocyanin content (TAC) and total carotenoids (TC)] of Tamruddin Sheet (TDS) without fiber was shown in Table (3). From Table (3), there wasn't a great difference in total phenolic content (TPC) for all samples of Tamruddin Sheet without fiber as it ranged from 0.0624 to 0.0629 mg/kg. However total anthocyanin content (TAC) was higher in Tamruddin Sheet TDS in solar energy (1.559 mg/100g).

Table 3: Phytochemical composition [total phenolic content (TPC), total anthocyanin content (TAC) and total carotenoids (TC)] of TDS without fiber in conventional oven and solar energy

Minerals / Date Product	TPC (mg/kg)	TAC (mg/100g)	TC (mg/L)
Date Sheet without Fiber in Oven	0.0626	0.980	0.137
Date Sheet without Fiber in solar energy	0.0629	1.050	0.193
Date Sheet with Fiber in Oven	0.0625	0.676	0.439
Date Sheet with Fiber in solar energy	0.0625	1.559	0.130

Sensory evaluation:

Results of sensory evaluation for TDS without fiber from the different date is presented in Table (4). It was noticed that, the highest scores (mean ± SE) for color was given to in conventional oven, and also TDS dried with both methods,

TDS in both solar energies had the highest scores (mean ± SE) for taste (4.4 ± 0.27) which both conventional ovens had lower scores for taste.

However, the score for the odor was found to be not significant at $p \leq 0.05$ for TDS in both conventional oven and solar energy.

Table 4: Sensory evaluation scores (mean ± SE) of Tamruddin Sheet (TDS) without fiber in conventional oven and solar energy according to different characteristics

Samples / Characteristics	Date Sheet		
	Conventional Oven	lsd	Solar Energy
Color	$4.9^{A} \pm 0.10$	0.71	$4.2^{AB} \pm 0.29$
Degree of Chewiness	$3.8^{AB} \pm 0.33$	0.9	$4.2^{A} \pm 0.25$
Taste	$3.8^{AB} \pm 0.20$	0.75	$4.4^{A} \pm 0.16$
Odor	4.0 ± 0.30	NS	4.1 ± 0.31
Overall Acceptability	$4.11^{AB} \pm 0.21$	0.7	$4.35^{A} \pm 0.13$

Different superscript letters in the same row denotes significant differences ($p \leq 0.05$).

Table 5: Hemoglobin, Serum Iron, Ferritin, TIBC, oxygen, pulse and oxygen consumed for the third and fourth groups before taking the iron and at the end of the period of taking the iron for the sports practitioner and non-sports practitioner

sample		Sports Practitioner + Iron Disks												Non-Practitioner+ Iron Disks									
		Hb gm/dl		Serum Iron ug/looml		Ferritin ug/looml		TIBC gm/dl		O2		Pulse pulse/min		VO2 max ml/kg/min		Hb gm/dl		Serum Iron ug/looml		Ferritin ug/looml		TIBC gm/dl		O2		Pulse pulse/min		VO2 max ml/kg/min	
		Before	After	Before	After	Before	After	Before	After	Before	After	Before	After	Before	After	Before	After	Before	After	Before	After	Before	After	Before	After	Before	After	Before	After
1		5.15	10.20	32.00	78.54	8.50	9.80	670	530	91.00	93.00	75.00	77.00	43.00	55.00	5.12	9.40	33.10	60.90	8.00	9.40	600	525	91.00	91.00	80.00	79.00	45.00	45.00
2		5.62	10.90	40.20	80.90	9.15	10.70	600	505	95.00	95.00	80.00	75.00	57.00	64.00	5.51	10.10	36.30	75.40	9.45	11.70	680	505	94.00	94.00	81.00	81.00	59.00	60.00
3		5.20	10.34	34.00	79.74	8.55	10.10	650	502	91.00	94.00	77.00	80.00	54.00	57.00	5.14	9.80	33.40	69.70	8.10	9.10	620	540	91.00	91.00	80.00	80.00	52.00	52.00
4		5.40	10.80	37.00	80.90	9.00	10.24	605	565	92.00	95.00	84.00	78.00	57.00	62.00	4.40	10.00	35.30	73.30	9.20	11.00	675	505	92.00	93.00	81.00	81.00	57.50	59.00
5		5.65	11.00	42.67	81.00	9.56	11.00	600	540	95.00	96.00	87.00	77.00	58.00	66.00	5.80	10.34	38.90	76.00	9.65	12.00	695	510	94.00	94.00	82.00	82.00	60.00	61.00
6		5.12	10.10	30.43	75.73	8.16	9.55	688	522	90.00	91.00	86.00	77.00	42.80	54.50	5.10	9.45	32.85	57.90	7.90	9.00	600	530	90.00	90.00	76.00	76.00	43.00	43.20
7		5.75	11.10	43.00	82.46	10.77	11.10	575	580	95.00	96.00	75.00	80.00	60.00	66.50	5.90	10.40	40.90	77.83	10.10	12.60	705	610	95.00	95.00	82.00	82.00	60.00	62.10
8		5.10	10.00	30.10	66.98	8.10	9.15	690	595	85.00	91.00	87.00	75.00	42.00	53.00	5.00	9.22	30.15	55.10	7.64	8.90	595	515	85.00	85.00	75.00	75.00	43.00	43.00
9		5.38	10.40	36.90	80.10	9.00	10.20	620	500	92.00	95.00	85.00	76.00	56.00	60.00	5.20	10.00	34.00	72.00	9.00	10.89	650	560	92.00	92.00	81.00	81.00	57.00	57.00
10		5.00	10.00	30.10	65.00	7.94	8.65	710	600	83.00	90.00	85.00	75.00	42.20	52.00	5.00	9.00	29.20	50.00	7.20	8.38	580	500	83.00	83.00	72.00	72.00	42.00	42.00
Average		5.34	10.48	35.64	77.14	8.87	10.05	641	544	90.90	93.60	82.10	77.00	51.20	59.00	5.22	9.77	34.41	66.81	8.62	10.30	640	530	90.70	90.80	79.00	78.90	51.85	52.43

Table 6: Hemoglobin, oxygen, pulse and oxygen consumed for the first and second summers before taking the date sheet and at the end of the period of taking date sheet for the sports practitioner and non-sports practitioner

Samples	Sports Practitioner +Dates												Non-Practitioner + Dates									
	Hb gm/dl		Serum Iron ug/looml		Ferritin ug/looml		TIBC gm/dl		O2		Pulse pulse/min		VO2 max ml/kg/min		Hb gm/dl		Serum Iron ug/looml		Ferritin ug/looml		TIBC gm/dl		O2		Pulse pulse/min		VO2 max ml/kg/min	
	Before	After	Before	After	Before	After	Before	After	Before	After	Before	After	Before	After	Before	After	Before	After	Before	After	Before	After	Before	After	Before	After	Before	After

1	5.00	11.00	29.00	73.00	7,78	20.00	690	73	97.00	98.00	70.00	67.00	44.00	72.00	5.00	11.00	30.20	75.00	7.12	16.38	690	83	95.00	97.00	67.00	67.00	42.00	60.00
2	5.38	12.20	37.00	99.00	9.00	39.00	600	74	98.00	98.00	81.00	73.00	52.00	76.00	5.22	12.00	34.00	88.00	9.24	24.00	605	85	97.00	98.00	79.00	75.00	57.00	64.30
3	5.08	11.20	30.00	73.50	8.12	22.00	688	73	97.00	97.00	71.00	68.00	45.50	74.00	5.10	11.38	31.15	77.00	7.81	17.90	680	102	96.00	97.00	73.00	70.00	43.00	61.50
4	5.15	11.47	32.00	81.83	8.56	27.00	620	75	97.33	97.67	74.00	69.33	47.17	74.00	5.11	11.46	31.78	80.00	8.06	19.43	640	99	96.00	97.33	73.00	70.67	47.33	61.93

8.55	36.00	650	64	97.00	98.00	80.00	72.00	48.00	77.00	5.14	11.90	33.00	86.00	8.17	22.10	655	101	97.00	97.00	78.00
8.56	37.00	670	75	97.27	97.73	75.20	69.87	50.00	74.60	5.11	11.55	32.03	86.00	8.08	23.89	678	103	96.20	97.27	74.00
9.15	38.00	600	76	98.00	99.00	87.00	74.00	54.00	77.00	5.65	12.10	38.81	96.00	9.55	29.00	605	95	97.00	98.00	79.00
8.75	40.24	605	72	98.00	98.00	87.00	74.00	53.00	78.00	5.45	12.00	36.30	90.00	9.54	25.70	639	110	97.00	98.00	79.00
8.50	35.00	650	73	97.00	98.00	75.00	71.00	49.50	75.00	5.12	11.90	33.00	80.00	8.15	20.40	649	102	97.00	97.00	78.00
8.16	30.00	641	61	97.00	98.00	71.00	69.00	47.00	75.50	5.10	11.85	32.15	78.00	8.00	18.00	675	112	96.00	97.00	78.00
9.80	37.00	575	72	98.00	99.00	89.00	74.00	57.00	77.00	5.75	12.15	40.18	99.00	9.65	29.60	587	99	98.00	98.00	85.00

Concerning the different factors before exhausting Date sheet and traditional iron salts, there was also no basic differences as exhibited in Table (6), for the variables of the examination to be explicit, hemoglobin, iron, ferritin, O2, beat rate and VO2max, demonstrating the homogeneity in different factors before eating up dates and iron and before amusement allocating or non-allocating diversion in case of the data of the examination for eating up Date sheet or standard iron salts.

Heartbeat rate still was recorded before and after date sheet and iron supplementation, and amusement experts and non-sport specialists (Table 6) demonstrated a lower resting beat rate in the four social events of the examination. The date sheet supplementation, if there ought to be an event of diversions, female understudies revealed the least resting heartbeat rate among various get-togethers. The beat rate as is remarkable, is the amount of time addressed by the heart beat and palpated in shallow supply courses in a solitary minute, and the lower the beat palpated exceptionally still, the soundness of the heart illustrated. It is represented by various investigates that beat rate and VO2max are the best markers of health and execution. Contender beats is lower contemplated by non-contender. The possible purpose behind the lower measurement of the beat in contender appeared differently in relation to non-contender, which is a result of the effect of parasympathetic tangible framework provoking lower heartbeat and augmentation stroke volume. For this reason, usually it is stated that the component of athletic execution that can be cultivated, essentially depends upon the execution furthest reaches of his or her heart, since this is the most limiting association in the transport of adequate oxygen to the rehearsing muscles. Along these lines, the more unmistakable cardiovascular yield achieved by contenders over non-contenders is apparently the critical preferred standpoint of the readiness program [40, 41].

The eventual outcomes of hemoglobin obsessions if there ought to emerge an event of amusement expert + date sheet (Table 7) hemoglobin center addition after the expert of diversion and date sheet from 5.196±0.138 to

11.589±0.420 g/dl, these results rout hemoglobin centralization of nonpractitioner of diversion +date sheet which was 5.20±0.197 to 11.714±0.351 g/dl

Hemoglobin obsession also extended in case of amusements proficient + ordinary iron salts differentiated and non-sports master +traditional iron salts as showed in Table (7).

Table 7: Measurement of height, age, weight, hemoglobin, oxygen, pulse and oxygen consumed for four groups after the statistical analysis of the results

Samples	Hb		iron		ferritin		TIBC		O_2		Pulse		VO_2	
	Before	After	Before	After	Before	After	Before	After	Before	After	Before	After	Before	After
Sports Practitioner + iron disk	5.387± 0.281	10.484± 0.427^{b}	35.64± 5.08	76.635± 6.142^{b}	8.873± 0.843	9.948± 0.696^{c}	640.8± 46.841	543.9± 38.571^{a}	90.9± 4.094^{b}	93.6± 2.221^{b}	82.1± 6.342^{a}	77± 1.885^{a}	51.12± 7.740	58.95± 5.479^{b}
Non-practitioner of sport + iron disk	5.321± 0.326	9.771± 0.479^{c}	34.41± 3.6	70.063± 8.774^{b}	8.624± 0.975	10.297± 1.511^{c}	640± 40.427	530± 33.665^{a}	90.7± 3.888^{b}	90.8± 3.994^{c}	79± 4.886^{b}	78.9± 3.413^{a}	51.8± 7.728	52.41± 8.368^{c}
Sports Practitioner + dates	5.196± 0.138	11.589± 0.420^{a}	33.953± 3.78	83.143± 10.605^{a}	8.553± 0.391	32.424± 7.257^{a}	641.4± 34.497	71.6± 4.993^{c}	97.36± 0.456^{a}	97.94± 0.488^{a}	77.12± 3.431^{b}	70.72± 2.478^{b}	48.967± 3.343	75.31± 1.778^{a}
Non-Practitioner + dates	5.2± 0.197	11.714± 0.351^{a}	33.242± 2.57	83.6± 6.669^{a}	8.372± 1.263	21.68± 3.983^{b}	651.6± 30.148	99.2± 9.402^{b}	96.4± 0.669^{a}	97.36± 0.456^{a}	75.8± 3.966^{b}	72.8± 2.863^{b}	50.18± 6.496	62.323± 2.947^{b}
LSD	N.S	0.385	N.S	7.526	N.S	3.855	N.S	23.877	2.0606	2.108	4.370	2.482	N.S	4.830

The consumption of date sheet elevated the hemoglobin concentration compared to the traditional iron salts consumption in different groups.

These outcomes were similar to that of [42, 43]. They revealed that activity may build bulk together with development hormone. The hormone may expand muscle filaments and protein including globin of the hemoglobin, concerning the date sheet organization may help in expanding iron focus in the heme; that implies sports + date sheet expanded heme and globin which are principle constituents of the hemoglobin, with respect to O_2 fixation and VO2max (Table 7). The information demonstrated that athletic movement together with date sheet ingestion and customary iron salts uncovered a noteworthy expanded utilization of O_2 and VO2max in all the four groups, with an additional expansion esteems after date sheet and game experts.

The expansion of O_2 and VO2max detailed in this investigation, might be because of the expanded hemoglobin fixation which improved oxygen utilization to the dynamic skeletal muscles and different organs and frameworks of the body. Athletic exercises increment blood stream to the dynamic pieces of the body together with expanded iron focus revealed in this examination, imply that game and supplementation are the fundamental elements prompting an expanded O_2 and VO2max and wellness of the professionals of the investigation. These outcomes are in concurrence with Tschakovski and Hughson, [44]. The results concluded that oxygen diffusing limits, that is the measure of oxygen that diffuses through the respiratory layer every moment, is equivalent to diffusing limits expanded from non-athletes very still (23ml/min.) to dramatically increase in nonathlete amid maximal exercise, with respect to competitor, it is accounted for additionally, that there is another expansion in diffusing limits began from the adjustment of veins which prompted the procedure of angiogenesis because of adaption, by angiogenesis; it implied that veins were expanded in volume and divisions.

Information of Table (6) additionally demonstrated a rise of iron and ferritin focuses after physical action and date sheet ingestion and after administration of iron Tablets. This showed both game and iron enhancement may prompt a beneficial outcome on weak subjects. Chatterjea and Shinde [45] expressed that iron is a standout amongst the most basic follow components in the body and its diminished fixation may incite pallor. Additionally, fundamental or practical iron is significant for the digestion of the body and is the dynamic component for development of the heme of hemoglobin, myoglobin and that of the catalase catalyst. They additionally noted that activity and iron supplementation are the primary drivers into a single unit with dietary iron to expand blood iron and might be utilized to fix frailty.

Likewise, the higher the iron focus, the higher the measure of iron in the tissues that can assimilate and fuse in the proteins they orchestrate. Subsequently, a high iron focus is alluring.

additionally, Murray et al. [46] revealed that individuals can accomplish a high iron focus inside reference interim by eating nourishment wealthy in iron. Likewise, iron fixations are high in competitors. They included that ferritin is the iron putting away protein, found basically in the spleen, bone marrow and liver. Its amount in the body relates decidedly to that of iron. It increments through nourishment wealthy in iron, supplement and activities.

Carnethon et al. [47] revealed that VO2max is a significant wellbeing marker, as it is also a wellness marker, and both wellness and wellbeing are required for execution. Peterson and Bryant [48] detailed that as exercise standards move from the athletic domain to the medicinal setting, it is significant not exclusively to have a decent. Furthermore, there is a capacity to apply information of many molding programs to circumstances other than athletic populace. To have a superior life, one must receive a physical dynamic way of life, in view of preparing for wellness and sound eating routine for wellbeing, and state that activity have a protection job in medicinal services [49].

Table (7) demonstrated that date sheet actuated an improvement in all parameters tried over iron (hemoglobin, O_2, VO2max, beat rate and ferritin). The superseding impact of date sheet over conventional iron salts, might be because of the mind boggling added substances found in the event of date sheet contrasted with customary iron salts, which are iron, Vit C, Zinc, Biotin, Phytochemical synthesis as appeared in Tables 2 and 3. They all are considered as cancer prevention agents, that all together increment the ingestion of iron from date sheet in the stomach-related framework, which thus have a fast impact in relieving weakness, through the quick development of hemoglobin and increment iron fixation and ferritin. These factors also help in improvement of O_2 transport to dynamic muscles, prompting higher wellness and physical execution.

Table (7) additionally revealed that the results on iron, ferritin, hemoglobin together with O_2 and VO2max were profoundly improved in sport professionals compared with non-sport specialists, which showed that competitors run a lower hazard for pallor brought about by iron insufficiency. The reason might be that activity does not build iron misfortune through perspiration as it is unimportant and most competitors renew iron misfortune while eating more sustenance to meet their increased vitality requests. This is additionally in concurrence with the investigations of Shashley and Green [18] and Weight [50]. The above-mentioned data may demonstrate that the investigation by speculation is figured it out.

CONCLUSION

At last it may be presumed that, iron from dark dates with or without structures is shabby, safe, and successful in improving hemoglobin levels and reestablishing iron stores to address iron deficiency.

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