

## Influences of Dates Consumption on Hemoglobin Concentration of Pregnant Woman at BPM Siti Fatimah Cimahi

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### Abstract

Iron deficiency anemia (IDA) is one of the most serious public health issues in the world. In Indonesia, anemia still be one of four unsolved nutrition problem. One of the indications of anemia is low concentration of hemoglobin (Hb). Overcoming IDA can be done by consuming iron supplement, and iron-rich food. One of the iron-rich food is dates. This study aims to know influences of dates consumption on Hb concentration of pregnant woman. Method used in this research is quasi experimental design with test before and after treatment. The sample group consists of 17 first trimester pregnant women. Subjects are selected by purposive random sampling technique. Hb was determined using Sahli's haemoglobinometer. Obtained Hb data was analyzed using univariate and bivariate with T student dependent as statistic assay. Result of the assays are average respondents before treatment are affected by moderate anemia (7.02 mg %) and average respondents after treatment are also affected by mild anemia (10.97 mg %). Dates consumption resulted in significant increment of Hb concentration (p-Value 0.01). Health workers can suggest dates consumption to pregnant women to increase Hb concentration and eliminate nausea caused by Iron supplement.

**Key words: Dates, hemoglobin, quasi experimental design**

### Introduction

IDA affect 20% - 89 % pregnant woman in the world with Hb below 11 gr % as indicator. In Indonesia, prevalence of IDA in pregnancy are 3.8% at first trimester, 13.6 % at second trimester, and 24.8 % at third trimester (Manuaba, 1998). Overall, the prevention and successful treatment for iron deficiency anemia remains woefully insufficient worldwide, especially among underprivileged women and children (Jeffery, 2013). IDA in pregnancy in underdeveloped countries should be categorized as national problem due to the causes which is the low level of social welfare and potentially cause varying degrees of deficiency, from low iron stores to early iron deficiency and IDA, these conditions are dangerous to both baby and mother (Apil *et al*, 2015). IDA on pregnancy could cause With porphyrin, iron will form a heme which will bind to protein resulting hemoglobin, an iron-containing oxygen-transport metalloprotein in red blood cells of all vertebrates (Hoffbrand, 2005). IDA on pregnancy could cause miscarriage, partus prematurus, inersia uteri and long partus (weak mother), atonia uterine and haemorrhage (Manuaba, 2001).

Since iron supplement consumption as IDA treatment could cause side effects (nausea, constipation, diarrhea, and balck stool) that need to be avoided by pregnant women due to its inconvenience and danger (IQWiG, 2014), alternative treatment such as Iron-rich food need to be optimized and introduced by health workers. Efficacy of iron rich food such as dates to treat IDA has not investigated profoundly. Seven pieces of dates (100gr) consist 3 – 13.7 mg of iron which theoretically can provide 10 - 45.7 % of iron demand in pregnancy (WHO, 2012). Based on facts above, this research aims to study influence of dates on Hb concentration in pregnant women.

### Method

Permission to conduct research at BPM Siti Fatimah Cimahi was submitted to STIKes A.Yani Cimahi by concerning ethics listed in table 1. The lowest threshold value for hemoglobin (Hb) in pregnant women is <11 g/dL during the 1st and 3<sup>rd</sup> trimesters (Apil *et al*, 2015). Subjects are selected by using purposive sampling technique. Size of sample needed in simple research is between 10 – 20 respondent (Sugiyono, 2017). With criteria such as anemia (HB < 11 mg %), does not have other complication or disease, and not in IDA treatment. Population in this research are pregnant women in first trimester with anemia (Hb < 11 mg %) in BPM Siti Fatimah Cimahi, March 2015. Based on observation in January until February 2015, there are 23 pregnant women with anemia in first trimester.

**Table 1. Ethics Of Conducting Research  
 (Komisi Nasional Etik Penelitian Departemen Kesehatan RI, 2004)**

No.	Ethics
1.	Informed consent contain information of dates that can increase Hb concentration.
2.	Respondents treated appropriately and have right to decide whether accept or not to become research subject without any constraint or sanctions ( <i>right to self determination</i> )
3.	Each respondent was given same treatment ( <i>justice</i> )
4.	Treatment given is beneficial for patients ( <i>beneficence</i> )
5.	Researcher did not publish name (anonymity) and conceal information of respondents (confidentiality).( <i>right of privacy</i> )
6.	Respondent not treated as tool, but treated as human and also given protection and treatment which is beneficial for respondents ( <i>Non-maleficent</i> )

Research design used is quasi experimental design with test before and after treatment. Every subject was given consultation about benefit of dates on increasing Hb and daily 7 pieces of dates (*Phoenix dactylifera*) (100 gr) for 4 days as treatments. Hb concentration of each subject was determined using Sahli's Haemoglobinometer before and after treatments. Average HB concentration of subjects before and after treatments are categorized into not anemia (Hb 11 gr %), mild anemia (Hb 9-10 gr %), moderate anemia (Hb 7 – 8 gr %), or severe anemia (Hb < 7 gr %) <sup>19</sup>. Data of HB concentration obtained was analysed by univariate and bivariate methods in order to determine significancy of HB concentration change.

Statistic assay that conducted in this research is paired sample T-test. The purpose of using the assay is to know the difference between 2 mean of Hb Concentration of pregnant woman before and after treatment with condition if P-value < 0.05 null hypothesis (Ho) is rejected and if P-value is >0.05 null hypothesis (Ho) is accepted.

## Results

Result of univariate analysis is presented on table 2. Average Hb concentration before treatment indicate moderate anemia (7.02 mg %) and average Hb concentration after treatment indicate mild anemia (10.97 mg %).

**Table 2.**

Data of respondents			
Variabel	Mean	SD	(Min-Max)
Age	22,41	8,280	18 – 30
Parity	1,76	0,903	1 – 4
Weight	48,82	7,876	38 – 62
HB before treatment	7,02	0,699	6 – 8
HB after treatment	10,97	0,945	8 - 10

Bivariate analysis result is presented in table 3. P-value resulted from T student assay is 0.01 which means increment of average Hb concentration before and after treatment is significant. This result represent positive influence of dates consumption by pregnant woman on their Hb concentration.

**Table 3.**  
**Influence Of Dates Consumption On Hb Concentration**  
**Of First Trimester Pregnant Woman**

Variable	Before treatment		After treatment		T		P
	Mean	SD	Mean	SD	Before	After	
Hb (%)	7.02	0.699	10.97	0.945	41.375	39.130	0.01

### Discussion

From the research data, Hb concentration of pregnant women before treatment indicate moderate anemia (7.02 mg %). This condition is related to blood accretion or hydraemia or hypervolemia which is normal in pregnancy. The accretion stated from 10<sup>th</sup> week of pregnancy until its maximum in between 32<sup>th</sup> and 36<sup>th</sup> week. In IDA, increment of blood cells is not proportional with increment of plasma resulting in blood dilution. Portion of blood contents are 30% plasma, 18% blood cells, and 19% hemoglobin (Wiknjosastro, 2002). Physiologically, blood dilution will decrease heart workload that usually increase during pregnancy.

After consumption of 7 dates daily for four days, Hb concentration of sample groups increase and indicate mild anemia (10.9mg %). This increment of Hb concentration is related to consumption of dates, one of iron-rich food. Despite its iron content, dates also contain other nutrition needed by pregnant woman and can support blood generation such as protein (1.8 - 2 %), fiber (2 - 4%), vitamins, glucose (5-50 %), biotin, niacin, folic acid, and minerals such as calcium, sodium, and potassium (Jahromi et al, 2007). Carbohydrate and fat in dates can support Hb synthesis by forming Succinyl-CoA which with glycine through porphyrinogen pathway will form protoporphyrin (Muray et al, 2003 & Sotolu et al, 2012).

Previous clinical and preclinical researches also resulted in positive effect. Combination of dates that rich in glucose, Ca, Fe, Zn, Cu, P and niacin, with palmyrathatrigin, vitamin A, and coconut that rich in Na and K can improve Hb concentration of anemia patient (Barta, 2008). A pre-clinical assay of administration of 60 - 120 mg/Kg dates extract resulted in increment of iron concentration on normal rat (Pravitasari, 2009). Zen also reported that 100% dates extract administration can improve Hb concentration of 50 % of male rat wistar strain population that given low-iron food (Zen, et al, 2013).

Treatment of IDA in pregnant women are oral therapy of iron supplement (60 mg/day) which can increase Hb concentration as much as 1 gr%/month. Nowadays, national program suggest to use combination of 60 mg of iron and 50 ng of folic acid as prophylaxis dose for anemia (Saifudin, 2002). Other treatment is parenteral therapy which is only needed when the patient cannot tolerate oral iron supplement, have malabsorption condition, digestive tract disease, or in third trimester of pregnancy (Wiknjosastro, 2002). Administration of 1000 mg ferrum dextran (20 mg) intravenous or 2 x 10 ml/ IM at gluteus can increase Hb more rapidly, 2 gr%/month (Manuaba, 2001).

Although pharmacological treatments of IDA resulted in higher increment than side therapy such as iron rich food consumption, they still have weakness such as adverse effect of iron supplement that needed to be prevented by pregnant woman and inconvenience of parenteral therapy. Beside the convenience of therapy, dates consumption also provide phytochemical substance such as natural salicylate in low dose. Salicylate known as material for aspirin, a pain-killer and fever drug. Therefore, the experts expect low dose of salicylic in dates continually can ease headache. Dates also contain potuchsin hormone that can shrink blood vessel in uterus to prevent bleeding. Beside potuchsin and salicylate, dates also contain phenol and carotene as antioxidant. High potassium content in dates can support potassium needed by neuron and give neuron stimuli. Therefore, consumption of dates can increase intelligence and prevent memory loss. These effect is beneficial for the fetus. Other phytochemicals contained in dates is oxytocin which can assist lactation and labor (Saryono et al, 2016).

Theoretical amount of iron provided by daily consumption of 100g dates (3-13,7 mg) is still inadequate to fully support iron demand of pregnant women which is 20-30 mg a day (WHO, 2012). Hence, final Hb concentration is still in mild anemia category. Hb concentration of subjects can be improved to reach concentration of Hb >11% by prolong the treatment duration and increase the amount of daily dates consumed.

## Conclusion

IDA in pregnancy can lead to serious maternal and fetal complications. Consumption of iron-rich food such as dates can significantly increase Hb concentration of 1<sup>st</sup> trimester pregnant women with moderate anemia. This treatment has potential to be used as treatment and prevention of IDA in pregnancy. Although the amount of iron provided by dates is not as much as iron supplement, dates can provide other nutrients needed for blood generation and free of iron supplement adverse effect which may harm mother and child. Health practitioner can recommend dates as alternative therapy for IDA in pregnancies. For further research, optimization of species, and plantation of dates can be done to maximize iron contained. Other aspects needed to be optimized are daily amount and served form of dates consumed to maximize amount of iron absorbed. Further research of Daily consumption as prevention of IDA can be beneficial.

## References

- Manuaba, I.B.G., 1998. Ilmu Kebidanan Penyakit Kandungan dan Keluarga Berencana. Jakarta: EGC
- Jeffery, L.M., 2013. Iron Deficiency Anemia: A Common and Curable Disease. Cold Spring Harb Perspect Med 2013;3:a011866
- Api1, o., Breyman, C., Çetiner, M., Demir, D., Ecdar, T., 2015. Diagnosis and treatment of iron deficiency anemia during pregnancy and the postpartum period: Iron deficiency anemia working group consensus report. Turk J Obstet Gynecol, 12(173), 81.
- Okafor, Ifeyinwa, M., Asemota, Enosakhare, A., Antai, A. B., Usanga, Essien, A., 2013. Prevalence of Iron Deficiency Anaemia among Pregnant Women in Calabar, Cross River State Nigeria. IOSR-JPBS. 7, 60-64
- Hoffbrand, A.V., 2005. Kapita Selekta Hematologi. EGC, Jakarta.
- Manuaba, I. B. G., 2001. Ilmu Kebidanan Penyakit Kandungan dan Keluarga Berencana. EGC, Jakarta.
- Institute for Quality and Efficiency in Health Care (IQWiG), 2014. Pregnancy and birth: Do all pregnant women need to take iron supplements?. The U.S. [National Library of Medicine](#), US.
- WHO, 2012. Guideline: Daily iron and folic acid supplementation in pregnant women. World Health Organization, Geneva.
- Sugiyono. 2007. *Metode Penelitian Administrasi*. Alfabeta, Bandung.
- Komisi Nasional Etik Penelitian Departemen Kesehatan RI, 2004. Pedoman Nasional Etik Penelitian Kesehatan. Komisi Nasional Etik Penelitian Departemen Kesehatan, Jakarta.
- Wiknjastro, Hanifa, 2002. Ilmu Kebidanan. Yayasan Bina Pustaka Sarwono Prawirohardjo, Jakarta.
- Jahromi, K.M, Jafari, A., Rafiee, S., Mohtasebi, S.S., 2007; A survey on some physical properties of date alm tree, Journal of Agricultural Technology. 3(2), 317-322.
- Murray, R.K., Rodwell, V.W., Bender, D., Botham, K.M., Weil, P.A., Kennelly, P.J., 2003. Harper's Illustrated Biochemistry, 28th Edition. McGraw Hill Professional, New York.
- Sotolu, A.O, Kigbu, A.A., Oshinowo, J.A., 2011. Nutritional Evaluation Of Date Palm ( Phoenix dactylifera) Seeds and Fruit As Source Of Feeds In Aquaculture. EJEAF Che, 10(5).
- Barh, D., Mazumdar, B.C. 2008. Comparative Nutritive Values of Palm Saps Before and after Their Partial Fermentation and Effective Use of Wild Date(PhoenixsylvestrisRoxb.)
- Pravitasari, 2009. Efek Ekstrak Buah Dates terhadap Peningkatan Kadar Hemoglobin Darah secara in Vitro. Fakultas Kedokteran Universitas Islam Sultan Agung (UNISSULA), Semarang.
- Zen, A.T.H., Pertiwi, D., Chodidjah, 2013. Pengaruh Pemberian Sari Dates (Phoenix dactylifera) terhadap Kadar Hemoglobin Studi Eksperimental pada Tikus Putih Jantan Galur Wistar yang Diberi Diet Rendah Zat Besi (Fe). Fakultas Kedokteran Universitas Islam Sultan Agung (UNISSULA), Semarang.

*Saifuddin*, A.B., 2002. Pelayanan Kesehatan Maternal dan Neonatal. Yayasan Bina Pustaka Sarwono

Prawirohardjo, Jakarta.

Kamila, K.H., Mohammad, M.S., 2014. A Laboratory Study of Anemia in Children Aged 6 Months to 6 Years in Erbil City. *Medical Journal of Babylon*. 11(2).

Saryono, Anggraeni, M.D., Rahmawati, E., 2016. Effects of dates fruit (*Phoenix dactylifera*) in the female reproductive process. *International Journal of Recent Advances in Multidisciplinary Research*. 3, 1630-1633.