



Research Article

A STUDY TO ASCERTAIN WHETHER YOGA AND MEDITATION THERAPY COMPLEMENT HAEMATINICS IN THE TREATMENT OF IRON DEFICIENCY ANAEMIA

Madhulika

Department of Physiology, Nalanda Medical College and Hospital, Patna, Bihar, India

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ABSTRACT

Background: Yoga is a rich treasure of physical and mental techniques that can be effectively used to create physical and mental well being¹. Since its introduction in modern culture it has enjoyed immense popularity as an adjunct to healthy living¹. In recent years few researches have hinted that yoga may improve certain hematological parameters. Present study has been done on patients suffering from iron deficiency anaemia to see how yoga and meditation affect haematinic treatment and to what extent.

Methods: For this study 100 adult anaemic males having no other apparent pathology were selected. They were divided into 4 groups of 25 each. Groups A and B were having mild anaemia (Hb = 9-12 gm/dl), and Groups C and D were having moderate anaemia (Hb < 9 gm/dl) before the start of the study. All 4 groups were given haematinics for 3 months. Groups B and D were subjected to yoga and meditation therapy in addition to oral haematinics. After 3 months the percentage increase in haemoglobin values in all 4 groups were compared. Further, the effect of age on haematinic response and yoga was also observed in all 4 groups by comparing subjects as age < 40 years and age ≥ 40 years.

Results: the percentage increase in Hb was greater in Groups B and D, and in those with age < 40 years.

Conclusion: yoga and meditation therapy administered together with haematinics demonstrated a greater erythropoietic response as compared to haematinics alone. Also, this response was observed to be better in younger age groups.

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INTRODUCTION

Yoga is an ancient Indian culture for physical, mental and spiritual development. The word “yoga” is derived from the Sanskrit word, “yuj” meaning to bind, join and yoke². It is a form of mind, body fitness that involves a combination of muscular activity and an internally directed mindful focus on awareness of the self, the breath and energy³. Several studies claim that yoga increases blood flow and levels of haemoglobin (Hb) and red blood cells (RBCs) which allows for more oxygen to reach the body cells, enhancing their function⁴. Thus it may have a potential therapeutic role in anaemia.

Anaemia is a common clinical entity affecting the adult population of both sexes especially in an underdeveloped state like Bihar. The commonest type of anaemia is iron deficiency anaemia which is much more prevalent in females than males. Etiology is diverse: inadequate dietary intake of iron, hookworm infestation, repeated attacks of malaria, gastrointestinal blood loss from peptic ulcers, inflammatory bowel disease, in infancy due to predominant milk diet, genitourinary infections,

during rapid growth spurt as in adolescence, during increased demand as in pregnancy, in multiparous women, menorrhagia, chronic inflammatory diseases, etc⁵. Usual signs are fatigue, pallor, reduced exercise capacity, cheilosis, koilonychia⁶. Untreated anaemia results in weakness, reduced work capacity and thus slows down economic growth. My study aimed to investigate the usefulness of yoga and meditation on anaemia caused by dietary deficiency of nutrients like iron, folic acid, vitamin B12, vitamin C etc.

MATERIAL AND METHOD

The study was conducted in the department of physiology of Nalanda medical college, Patna after obtaining necessary permission from the institutional ethics committee. 100 adult anaemic males were selected and were divided into 4 groups of 25 each, namely groups A, B, C and D. Groups A and B were selected from amongst the office staff, sweepers, peons, and a few first year medical students who happened to be mildly anaemic (Hb 9-12 gm/dl) and who thankfully volunteered for the study. Groups C and D comprised moderately anaemic patients (Hb < 9 gm/dl) from medicine ward, Nalanda medical college and hospital, Patna. The cases and controls were matched for age, occupation, dietary habits, socioeconomic status, etc. The study groups exclude females because factors like pregnancy, parity, menstrual disorders, previous caesarean

*Corresponding author: Madhulika

Department of Physiology, Nalanda Medical College and Hospital, Patna, Bihar, India

deliveries, pre or postmenopausal stage could lead to extreme values and affect results. Persons with history of recent trauma, recent major surgery, chronic illness were excluded. Persons with thyroid disorders and those taking steroids were also excluded. Before the start of the study all 100 subjects were given mass treatment with Mebendazole - 100 mg bd for 3 days to eradicate hookworm infestation. Those with chronic diarrhea, genitourinary infections were given suitable antibiotics in accordance with culture sensitivity report. Drugs to eradicate H. Pylori were given to those with stool positive for it. Patients with peptic ulcer were given Proton pump inhibitors, and the ones who had steatorrhea were given suitable enzyme preparations. Before the start of the study all 100 subjects were given dietary advice regarding consumption of healthy iron rich foods and to avoid excessive tea, coffee, alcohol and junk food.

Subjects from all four groups were given oral iron preparation namely Convicon capsules for 3 months. The preparation contains:-

Ferrous sulphate(dried) - 60 mg
 Vitamin B12 - 15 µg
 Folic acid - 1.5 mg
 Vitamin B6 - 1.5 mg
 Vitamin C - 75 mg

Groups B and D were advised to do yoga daily for 1 hour in the morning in addition to taking haematinics. The yogic exercises were performed sequentially as under:-

Asanas – suryanamaskar, padmasan, dhanurasan, bhujangasan, pawanmuktasan, paschimottasan, sasangasan, janusirasan – 3 min each

Pranayam – Anulomvilom -10 min Bhastrika, ujjayi, bhrumri – 3 min each

Kriyas – kapalbhati – 10 min

Mudras – pranam mudra, gyan mudra – 1 min each

Meditation – by onkaar and tratak - 5 min

Fasting blood samples were taken from all 100 subjects before the start of the study and Hb (gm/dl) was determined using Sahli's acid hematin method. The procedure was repeated again after 3 months in the yoga and non yoga groups and results were compared.

RESULT AND TABLES

Table 1

	Mild anaemia Hb 9-12 gm/dl		Moderate anaemia Hb <9 gm/dl	
	Group A Haematinics alone n = 25	Group B Haematinics + yoga n = 25	Group C Haematinics alone n = 25	Group D Haematinics + yoga n = 25
Mean Hb(gm/dl) before T/t	10.88	11.09	7.98	7.416
Mean Hb(gm/dl) after T/t	13.684	14.13	11.37	11.532
Net increase in Hb(gm/dl)	2.804	3.0418	3.39	4.1136
% increase in Hb	25.77%	27.43%	42.49%	55.54%

The above table shows comparison between the yoga groups and non yoga groups in both categories of anaemia – mild and moderate. The percentage increase in Hb in group A was compared with group B and that in group C was compared with group D. There was more improvement in the Hb percentage in the yoga groups – B & D as compared to the groups that were given haematinics alone. This shows that yoga and meditation has an additive effect to haematinics in the treatment of iron deficiency anaemia. The haematological benefits were more pronounced in moderately anaemics as compared to mildly anaemic individuals. Also, the improvement in haemoglobin was more in younger persons (age below 40 yrs) as compared to persons aged 40 yrs and above. This is evident from the following tables :-

Table 2

	MILD ANAEMIA Group A (Haematinics alone)	
	Age < 40 yrs n=15	Age ≥ 40 yrs n=10
Mean Hb (gm/dl) before T/t	10.88	10.89
Mean Hb (gm/dl) after T/t	13.84	13.45
Net increase in Hb	2.96	2.56
% increase in Hb	27.2%	23.5%

Table 3

	MILD ANAEMIA Group B (Haematinics + yoga)	
	Age < 40 yrs n=15	Age ≥ 40 yrs n=10
Mean Hb (gm/dl) before T/t	10.66	11.25
Mean Hb (gm/dl) after T/t	14.33	13.98
Net increase in Hb	3.2467	2.73
% increase in Hb	29.55%	24.266%

Table 4

	MODERATE ANAEMIA Group C (Haematinics alone)	
	Age < 40 yrs n=16	Age ≥ 40 yrs n=9
Mean Hb (gm/dl) before T/t	8.18	7.62
Mean Hb (gm/dl) after T/t	11.73	10.72
Net increase in Hb	3.55	3.10
% increase in Hb	43.39%	40.68%

Table 5

	MODERATE ANAEMIA Group D (Haematinics + yoga)	
	Age < 40 yrs n=16	Age ≥ 40 yrs n=9
Mean Hb (gm/dl) before T/t	7.575	7.133
Mean Hb (gm/dl) after T/t	12.0	10.70
Net increase in Hb	4.425	3.56
% increase in Hb	58.41%	49.9%

DISCUSSION

My study shows significant increase in Hb with yoga in both mild and moderately anaemic individuals, esp. so in the younger moderately anaemics below 40 yrs. Our findings are similar to those of McCall.T *et al*(2007) who reported that yoga increases blood flow and levels of Hb and RBCs which allows

for more oxygen to reach the body cells, enhancing their function⁴. We hypothesize that this may be attributed to stimulation of erythropoiesis by asanas or pranayam or both, by inducing hypoxia. A natural response to hypoxia is endogenous erythropoietin synthesis, which stimulates erythropoiesis. An earlier report by Malshe has suggested that benefits of pranayam may be due to daily self administered brief intermittent episodes of hypoxia causing release of erythropoietin and vascular endothelial growth factor⁹. Furthermore, yoga upregulates the expression of the gene nuclear erythroid factor-2¹⁰.

The nature of yogic practices is psychoneurophysical¹. Some yogic exercises cause a shift towards parasympathetic nervous system dominance, possibly via direct vagal stimulation¹¹. Studies by Innes KE *et al* have shown that yoga decreases the levels of 24-h urine norepinephrine and epinephrine levels.¹² Presence of norepinephrine is critical for normal erythropoiesis. However, as the dose of norepinephrine increases, normal erythroid precursor cell growth is inhibited. There may be a direct correlation between the magnitude and duration of the stress response and the resultant erythropoietic dysfunction¹³.

Literature reviews reveal that regular yoga practice increases the levels of thyroxine and prolactin hormones^{1,14}. Prolactin stimulates erythropoiesis by increasing erythropoietin secretion (Jepson & Lowenstein, 1967)¹⁵. Erythropoietin receptors have tyrosine kinase activity that acts by inhibiting apoptosis of RBCs resulting in their increased growth and proliferation. The stimulatory influence of thyroid hormones on erythropoietin production is associated with elevated quantities of erythropoietin in the kidneys (Peschle *et al*, 1972). Another view in this regard is that the thyroid hormones stimulate erythropoiesis through increased caloric requirements¹⁶.

Yogic asanas help digestion by keeping the spine straight, increasing intra-abdominal space, increasing blood flow and stimulating peristalsis¹. Deep breathing during pranayam improves oxygenation. Relaxed digestive system leads to better elimination. Parasympathetic dominance increases the secretion of digestive enzymes. These enzymes in turn lead to better absorption and assimilation of nutrients like iron, copper, nickel, cobalt, manganese, vitamin C, B12, and folic acid which are all needed for erythropoiesis¹.

Pranayam is documented to produce intense calming effect on mind and relieve psychological stress¹⁷. So, lastly it can be said that yoga, owing to its calming and distressing effect produces strong minded individuals with a good social and moral sense. Such individuals are more likely to follow the advice of avoiding junk food and eating healthy food.

Finally, our study results showed comparatively less improvement in Hb with yoga in the age group 40 yrs and above as compared to below 40 yrs. This reflects the well established fact that erythropoiesis diminishes with advancing age^{7,8}.

CONCLUSION

According to this study, yoga if included in lifestyle may serve as a useful adjunct to haematinics in the treatment of iron deficiency anaemia. It can enhance the working capacity of people and contribute to progress of the nation by saving DALYs (disability adjusted life years). Further similar research works in future involving larger study groups may throw more light on this finding.

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