ORIGINAL RESEARCH

Effect of yoga practices on proinflammatory and anti-inflammatory cytokine

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ABSTRACT

Background: One of the biggest environmental problems of our day is air pollution. Growing industrialization exposes the average person to toxins that have a negative impact on his health in both developed and developing nations. The present study assessed the effect of yoga practices on selected proinflammatory and anti-inflammatory cytokine. **Materials & Methods:** 80 healthy subjects of both genderswere divided into 2 groups of 40 each. In group I, subjects performed yoga intervention for a period of three months. Each yoga session was conducted for 45 min, six days a week, for 12 weeks, excluding weekly holidays. Group II (control) did not undergo any yoga training and continued with their daily schedule. A 5 ml venous blood samples were collected at the baseline and after three months.The level of proinflammatory and anti-inflammatory cytokines was measured. **Results:** Group I had 18 males and 22 females and group II had 20 males and 20 females. The mean age was 41.2 years in group I and 40.2 years in group II. The mean weight was 63.7 kgs in group I and 61.4 kgs in group II, height was 162.0 cms in group I and 163.2 cms in group II, BMI was 23.8 Kg/m^2 in group I and 22.8 Kg/m^2 in group II. The difference was significant ($P< 0.05$). Pre and post IL-1β level in group I was 0.74 and 0.52 and in group II was 0.82 and 0.92. IL- 10 level was 3.1 and 6.4 and in group II was 3.4 and 2.7 respectively. **Conclusion:** According to the current study, those who practice yoga may have lower levels of pro-inflammatory and higher levels of anti-inflammatory cytokines.

Keywords: Cytokine, Inflammation, Yoga

INTRODUCTION

One of the biggest environmental problems of our day is air pollution. Growing industrialization exposes the average person to toxins that have a negative impact on his health in both developed and developing nations.[1] Industrial workers in particular, who come into close contact with the contaminants, suffer the most from their negative impacts.[2]

It is clear that the common pollutants of the iron and steel industries are sulfur oxides (SOx), nitrogen oxides (NOx), hydrocarbons (HC), carbon monoxide (CO), hydrogen sulfide (H2 S), ozone (O3), dust, and hazardous compounds. For workers in these industries, these pollutants are the cause of major health issues linked to cardiovascular and respiratory conditions. Pro-inflammatory cytokines rise and a systemic inflammatory response occurs as a result of exposure to these contaminants.[3]

In addition to pollutants, medications, and infections, stress has been identified as a significant contributor to inflammation. According to earlier research, those who are under a lot of stress have higher levels of pro-inflammatory cytokines.[4] Sedentary lifestyles and physical inactivity have also been linked to an increased risk of chronic low-grade inflammatory diseases.On the other hand, inflammation is the body's defensive system against diseases brought on by microorganisms.[5] The body maintains a balance between proinflammatory and anti-inflammatory cytokines. In both acute and chronic illnesses, this balance is essential for an immediate immunological response.[6] The present study assessed the effect of yoga practices on selected proinflammatory and anti-inflammatory cytokine.

MATERIALS & METHODS

The study consisted of 80 healthy subjects of both genders All gave their written consent to participate in

the study.
Data such as name, age, gender etc. was recorded. Subjects were divided into 2 groups of 40 each. In group I, subjects performed yoga intervention for a period of three months. Each yoga session was conducted for 45 min, six days a week, for 12 weeks, excluding weekly holidays. Group II (control) did not undergo any yoga training and continued with their daily schedule. A 5 ml venous blood samples were collected at the baseline and after three months.The level of proinflammatory and anti-inflammatory cytokines was measured.Results thus obtained were subjected to statistical analysis. P value < 0.05 was considered significant.

RESULTS

Table I Distribution of subjects

Groups	Group I	Group II
Status	Yoga	No yoga
M:F	18:22	

Table I shows that group I had 18 males and 22 females and group II had 20 males and 20 females.

Table II Demographic data

Variables	Group I	Group II	P value
Age (mean)	41.2	40.2	0.19
Weight (kgs)	63.7	61.4	0.35
Height (cms)	162.0	163.2	0.71
Body mass index (Kg/m^2)	23.8	22.8	0.83

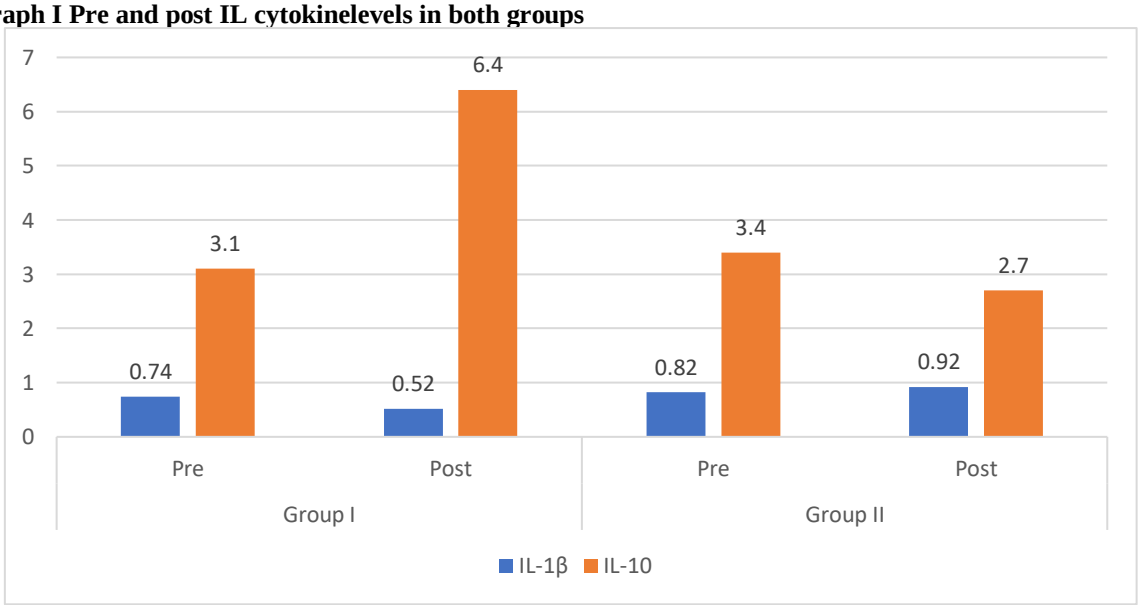
Table II shows that mean age was 41.2 years in group I and 40.2 years in group II. The mean weight was 63.7 kgs in group I and 61.4 kgs in group II, height was 162.0 cms in group I and 163.2cms in group II, BMI was 23.8 Kg/m^{2}in group I and 22.8 Kg/m^{2}in group II. The difference was significant (P< 0.05).

Table III Pre and post IL cytokinelevels in both groups

Variables	Group I		Group II		P value
	Pre	Post	Pre	Post	
IL-1β	0.74	0.52	0.82	0.92	0.62
IL-10	3.1	6.4	3.4	2.7	0.73

Table III, graph I shows that pre and post IL-1β level in group I was 0.74 and 0.52 and in group II was 0.82 and 0.92. IL- 10 level was 3.1 and 6.4 and in group II was 3.4 and 2.7 respectively.

Graph I Pre and post IL cytokinelevels in both groups



DISCUSSION

Inflammation is the body's defense mechanism against diseases brought on by microorganisms. The body maintains a balance between proinflammatory and anti-inflammatory cytokines.[7] In both acute and chronic illnesses, this balance is essential for the immune system's quick reaction. However, new research has demonstrated that exercise has anti-inflammatory properties.[8,9] Regular exercisers have been found to have higher amounts of IL-10 and IL-1ra and lower levels of pro-inflammatory cytokines such as TNF-α, IL-1α, IL-1β, and specific chemokines

like IL-8. Previous studies have shown that regular exercise reduces pro-inflammatory cytokines while increasing anti-inflammatory cytokines.[10,11]The present study assessed the effect of yoga practices on selected proinflammatory and anti-inflammatory cytokine.

We found that group I had 18 males and 22 females and group II had 20 males and 20 females.Rajbhoj et al[12]studied the effect of yoga practices on selected proinflammatory and anti-inflammatory cytokine among industrial workers. Forty- eight male study participants, aged 30-58 years, were randomly divided into experimental (n=24) & control (n=24) groups. Pro-inflammatory cytokine IL1β and anti-inflammatory cytokine IL-10 were evaluated at the baseline and at the end of 12 wk of yoga training in both the groups. During the experimental study, all the study participants continued with their daily lifestyle and diet. The result of within group comparison revealed that the yoga group showed a significant decrease in IL-1 β while significant increase in IL-10 ($p < 0.05$), whereas the control group revealed no change in IL-1 β ($p > 0.05$) and IL-10 ($p > 0.05$). Further, the results between the groups confirmed that the yoga group had significantly lower level of IL-1 β and increase in IL-10 as compared to control group ($p < 0.05$).

We found that mean age was 41.2 years in group I and 40.2 years in group II. The mean weight was 63.7 kgs in group I and 61.4 kgs in group II, height was 162.0 cms in group I and 163.2 cms in group II, BMI was 23.8 Kg/m^2 in group I and 22.8 Kg/m^2 in group II. According to Li et al[13]of 35 trials addressing the effects of yoga on anxiety and stress, 25 noted a significant decrease in stress and/or anxiety symptoms when a yoga regimen was implemented; however, many of the studies were also hindered by limitations, such as small study populations, lack of randomization, and lack of a control group. Fourteen of the 35 studies reported biochemical and physiological markers of stress and anxiety, but yielded inconsistent support of yoga for relief of stress and anxiety.

We found that pre and post IL-1β level in group I was 0.74 and 0.52 and in group II was 0.82 and 0.92. IL-10 level was 3.1 and 6.4 and in group II was 3.4 and 2.7 respectively. Belotto MF et al[14] in their study found that the exercise decreased serum levels of tumour necrosis factor (TNF)-α (6%), cytokine-induced neutrophil chemotactic factor 2 alpha/beta (CINC-2α/β) (9%), interleukin (IL)-1β (34%), IL-6 (86%), C-reactive protein (CRP) (41%) and FFA (40%) in diabetic rats when compared with sedentary diabetic animals. Exercise also attenuated the increased responsiveness of leucocytes from diabetics when compared to controls, diminishing the reactive oxygen species (ROS) release by neutrophils (21%) and macrophages (28%). Exercise did not change neutrophil migration and the proportion of neutrophils and macrophages in necrosis (loss of plasma membrane integrity) and apoptosis (DNA fragmentation). Serum activities of creatine kinase (CK) and lactate dehydrogenase (LDH) were not modified in the conditions studied. Therefore, physical training did not alter the integrity of muscle cells.

The shortcoming of the study is small sample size.

CONCLUSION

Authors found that those who practice yoga may have lower levels of pro-inflammatory and higher levels of anti-inflammatory cytokines.

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