($p < 0.05$) when compared to patient group (before treatment). After three months all patients were healing from the infection due to successful therapy, serum IFN-γ, TGF-β, TNF- α, IL-1β, IL-6 and IL-8 levels were returned to the normal values (Table 1) and did not show significant differences ($p > 0.05$) between control group (healthy) and healing group (Table 2).

Table 3 shows the comparative significance (*p*-value) for the repeated measurements at different periods of contrasts (before, during and post healing).

Table 1: Concentrations of cytokines in serum of different study groups

Cytokine	*Concentrations of cytokines (pg/ml)			
	Control group	Patients groups		
		Before treatment	During treatment	Post healing
IFN-γ	102.7 ± 11.46	77.5 ± 15.95	183.4 ± 26.55	103.3 ± 12
TNF-α	14.12 ± 2.359	28.25 ± 3.61	63.5 ± 7.5	14.75 ± 2.25
TGF-β	44 ± 7.17	30.4 ± 4.15	37.8 ± 1.48	43.2 ± 7.29
IL-1β	4.01 ± 0.89	9.31 ± 1.38	14.12 ± 2.23	3.87 ± 2.16
IL-6	5.47± 1.66	12.85 ± 1.28	48.36 ± 6.82	5.08 ± 0.70
IL-8	16.38 ± 1.61	32.22 ± 2.16	333.6 ± 69.97	15.51 ± 1.10

* All cytokine concentrations were expressed as means ± standard deviation

Table 2: Comparisons Significant between Control and treated groups in its' different periods of treatments (Before, during and post healing)

Parameters	Control X Before		Control X During		Control X Healing	
	t-value	P-value	t-value	P-value	t-value	P-value
IFN-γ	4.057	0.001	-8.825	0.000	-0.114	0.910
TNF-α	-9.257	0.000	-19.57	0.000	-0.542	0.596
TGF-β	3.666	0.006	1.892	0.126	0.175	0.866
IL-1β	-8.051	0.000	-12.71	0.000	0.004	0.997
IL-6	-9.936	0.000	-19.18	0.000	0.683	0.504
IL-8	-15.87	0.000	-14.33	0.000	1.204	0.000

$p > 0.05$ Non significant

Table 3: Comparison between Significant (p-value) for the repeated measurements by different periods of contrasts (Before, during and post healing)

(i)	(j)	IFN-γ	TNF-α	TGF-β	IL-1β	IL-6	IL-8
Before	During	0.000	0.000	0.025	0.001	0.000	0.000
	Healing	0.006	0.000	0.003	0.002	0.000	0.000
During	Healing	0.000	0.001	0.175	0.000	0.000	0.000

$P > 0.05$ Non significant

Discussion

Chemotherapeutic cure of leishmaniasis is largely dependent upon the development of an effective immune response that activates macrophages to produce toxic nitrogen and oxygen intermediates to kill the amastigotes. This process is suppressed