RESULTS

This study included three groups**; Table (1):**

Group (I)

Included 30 patients with RA fulfilling the ACR criteria of diagnosis of RA (**Arnette et al., 1988).**

- twenty five patients (83.3%) were females and five patients (16.7%) were males whose ages ranged between 19 to 72 years (Mean ± SD 41.3 ± 13.3years) and their disease duration ranged between 1 to 23 years (Mean ± SD 5.67 ± 4.74 years).

Group (II)

Included 15 patients with OA fulfilling the ACR criteria for the diagnosis of knee OA (**Altman et al., 1986).** Twelve patients (80%) were females and three patients (20%) were males.

Group (III)

Included 15 apparent healthy subjects. Twelve healthy subjects (80%) were females and three healthy subjects (20%) were males.

Clinical results of RA group:

- **Table (2):** Shows clinical characteristics of RA patients:

  - Morning stiffness ranged from 5 to 240 minutes with a mean of   75

  - Visual analogue scale ranged from 1 to 10 minutes with a mean of 5.8

 - Grip strength ranged from 30 to 200 mmHg with a mean of 109.7

- Ritchie articular index ranged from 2 to 42 with a mean of 14.4.

- **According to clinical assessment of the knee, the patients were classified as; Figure (1).**

- Fourteen patients (46.6%) had inactive knees.

-Twelve patients (40%) had moderately active knees.

- Four patients (13.4%) had active knees.

.

- Results of Rheumatoid arthritis disease activity according to Mallya and Mace score; Figure (2).

The mean disease grading activity (MGDA) ranged between 1.33 to 3.5 (Mean ± SD 2.42±0.78).

According to MGDA the RA patients are classified into:

- Six patients (20%) had grade I activity.

- Ten patients (33%) had grade II activity.

- Eight patients (27%) had grade III activity.

- Six patients (20%) had grade IV activity.

Laboratory findings in RA group

- Table (3): Show: laboratory results of RA group where:
- ESR of first hour ranged between 5 to 120 mm/hr (Mean ± SD 44.1 ± 38 mm/hr).
- CRP ranged between negative (<6) to 42 mg/litre (Mean ± SD 14.3 ± 9.7 mg/litre).

- Hemoglobin (HB) ranged between 6 to 12 gm % (Mean ± SD 11.03 ± 2.4 gm %).

- WBC count ranged between 2.000 to 8.000 cell/mm^3 (Mean ± SD 6.48 ± 2.61 cells/mm^3).

- platelet count ranged between 150.000 to 700.000 cell/mm^3 (Mean ± SD 333.667 ± 129.99 cells/mm^3).

- Rheumatoid factor was present in twenty four patients (80 %).

Results of VEGF measurement:

- Table (4) and **figure (3): Show** VEGF serum levels in all groups.

The mean VEGF in RA patients was 555.7 pg/ml (SD± 217.7), with a highly significant increase (P < 0.001) as compared to OA group and healthy subjects.

-Table (5): **shows** Comparison between VEGF serum and synovial levels in RA patients.

VEGF level in synovial fluid was estimated in 14 patients who had knee effusion where its mean was 796.43 pg /ml (SD± 301.3). VEGF level in the synovial fluid showed a statistical significant increase (P<0.001) as compared to its level in the serum.

-Table (6): Shows VEGF serum and synovial levels in RA patients according to clinical knee score.

There was a statistically significant difference (p<0.05) as regard VEGF serum and synovial levels in RA patients graded according to their clinical knee score.

-Table (7) and figure (4): Show VEGF serum and synovial levels in RA patients according to disease activity grades.

There was a statistically significant differences (p<0.05) as regard VEGF serum and synovial levels in RA patients graded according to their disease activity.

-**Table (8):** Shows VEGF serum and synovial levels according to seropositivity in RA patients.

There was a statistically insignificant difference (p>0.05) as regard VEGF serum and synovial levels in and the seropositivity of RF in patients with RA.

-Table (9), figure (5) and figure (6): Show VEGF serum and synovial levels in RA patients according to type of medication.

VEGF serum level showed insignificant difference (p>0.05) in RA patients graded according to type of their medication.

Radiological findings in RA group

I) Conventional radiography:

 - **Figure (7): Shows Sharp score grades the RA patients ,**

 - Five patients (17%) had Grade I.

 -Eleven patients (36%) had Grade II.

 - Eight patients (27%) had Grade III.

 - Six patients (20%) had grade IV.

Table (10) and **figure (8):** Show VEGF serum level in RA patients according to their Sharp score grades.

- VEGF serum levels showed insignificant difference (p>0.05) in RA patients graded according to their Sharp score grades.

II) Musculoskeletal ultrasound examination:

A) Synovial thickness:

- Table (11) and **figure (9): Show** synovial thickness in all groups.

The mean synovial thickness in RA patients was 6.5mm (SD± 3.7), with a highly significant increase ($P < 0.001$) as compared to OA group and healthy subjects.

-Figure (10): Shows synovial thickness grades in RA group where:
 - Sixteen patients (53%) had grade I .

 - Four patients (13%) had grade II.

 - Ten patients (34%) had grade III.

-Table (12), figure (11) and figure (12): Show VEGF serum and synovial levels in RA patients according to synovial thickness grades.

There was a statistically significant difference ($p<0.05$) as regard VEGF serum level in RA patients graded according to their synovial thickness grades, while VEGF synovial level showed highly significant difference ($p<0.01$) in RA patients graded according to their synovial thickness grades.

B) Power Doppler:

- Table (13) and Figure (13): Show power Doppler grades in RA group where:
 - Thirteen patients (43%) had grade I.

 - Eleven patients (37%) had grade II.

 - Six patients (20%) had grade III.

-**Table (14):** Shows MGDA scores in RA patients according to power Doppler grades.

There was a statistically significant difference (p<0.01) as regard MGDA scores in RA patients graded according to their power Doppler.

-**Table (15) and figure (14)**: Show VEGF serum and synovial levels in RA patients according to power Doppler grades.

There was a statistically significant difference (p<0.05) as regard VEGF serum and synovial levels in RA patients graded according to their power Doppler.

Table (16): Shows musculoskeletal ultrasound findings in RA patients according to power Doppler grades.

There was a highly statistically significant difference (p<0.001) as regard both synovial thickness and diameter of in suprapatellar bursa (effusion) in RA patients graded according to their power Doppler.

C) Effusion:

-**Table (17)**: Shows VEGF serum and synovial levels in RA patients according to grades of effusion.

There was a statistically insignificant difference (p>0.05) as regard VEGF serum and synovial levels in RA patients graded according to their diameter of suprapatellar bursa.

Functional capacity of RA group

- Figure (15): Shows functional capacity grades of RA group where:
 - Seven patients (23.5%) had grade I .

 - Twelve patients (40%) had grade II.

 - Seven patients (23.5%) had grade III.

 - Four patients (13%) had grade IV

-Table (18): Shows VEGF serum and synovial levels in RA patients according to their functional capacity.

- VEGF serum and synovial levels showed insignificant difference (p>0.05) in RA patients graded according to their functional capacity.

Table (19): Shows Correlation coefficient between serum and synovial VEGF and different variables in RA patients.

* There was a postive significant correlation between VEGF serum and synovial levels (P < 0.05).

* A positive significant correlation was found between serum VEGF level and articular index (P<0.05), ESR (P<0.05), CRP (P<0.05) and synovial thickness (P < 0.05).

* A positive significant correlation was found between synovial VEGF level and ESR (P<0.05), MGDA (P<0.05) and effusion(P < 0.05).

* Synovial VEGF had highly positive significant correlations (P < 0.001) with synovial thickness.

* Hemoglobin level was significantly negatively correlated (P < 0.05) with both serum and synovial VEGF.

Table (1): Demographic characteristics among all studied groups.

Variable in RA Mean± SD	Age 41.3±13.3 years	P-value	Dis.duration 5.67 ± 4.74 years	P-value
OA	47.±5.7	>0.05	5 ± 4.11	>0.05
Healthy subjects	40 ± 13.1	>0.05	-------------	

Significant   (p<0.05)
Highly significant (p<0.001)

Table (2): clinical characteristics of RA patients.

Clinical Manifestations	Mean± SD
Morning stiffness	75.3±67.6
Visual analogue scale	5.77± 3.1
Ritchie articular index	14.4 ± 11.7
Grip strength	109.7± 50.8

Table (3): Laboratory results of RA group.

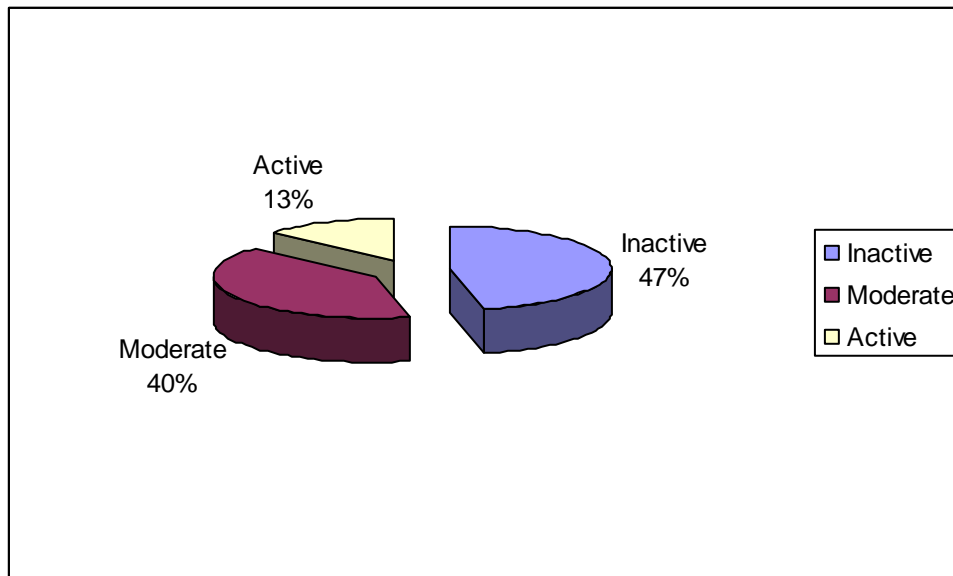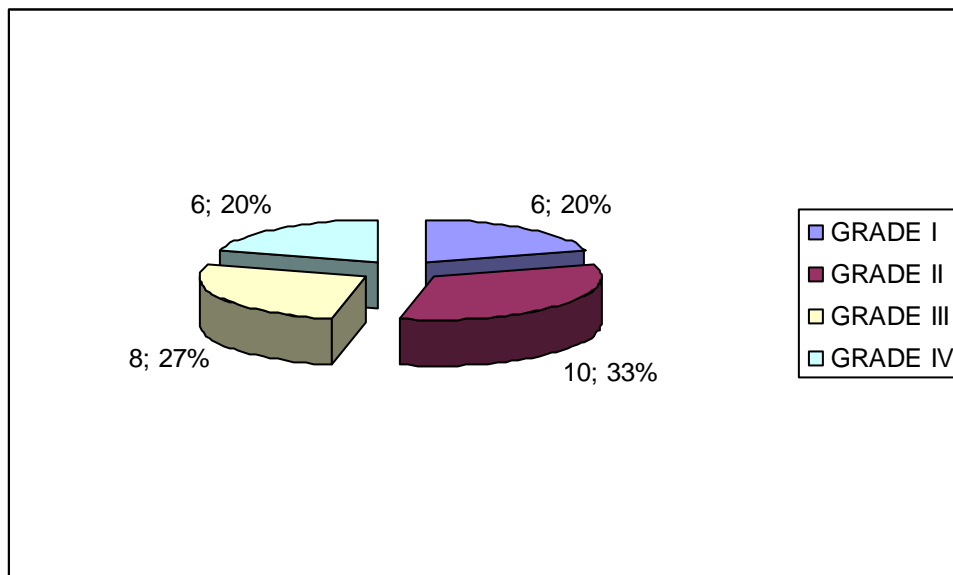| variable	Mean ± SD	Range	
		Min	Max
ESR (mm/hr)	44.1 ± 38	11	135
CRP(mg/L)	14.3± 9.7		
HB gm%	11.03 ± 2.4	6	12
WBCS cells/mm^3	6.48 ± 2.61		
Platelets cells/mm^3	333.667± 129.999	2.000	8.000

Figure (1): Clinical knee score in RA group.

Figure (2): Rheumatoid arthritis disease activity according to Mallya and Mace score in RA group.

Table (4): Comparison of VEGF serum levels among all groups.

RA Mean *555.7*		± SD *217.7*
	OA	**Healthy subjects**
	383.6 *± 93.1*	*299.3* *± 74.1*
T- test	*3.71*	*5.81*
P- value	*<0.001***	*<0.001***

*Significant   (p<0.05)
**Highly significant (p<0.001)

Table (5): Comparison between VEGF serum and synovial levels in RA patients

	VEGF serum	**VEGF synovial**
Mean	*555.7*	*796.43*
Standard deviation	*217.7*	*301.3*
T-test	*3.23*	
P-value	*<0.01 **	

*Significant   (p<0.05)
**Highly significant (p<0.001)

Table (6): Comparison between VEGF serum and synovial levels in RA patients in relation to their clinical knee scores.

	VEGF serum		**F**	**P**	**VEGF synovial**		**F**	**P**
	N	*Mean±SD*			*N*	*Mean±SD*		
Inactive	14	480.6±135	*3.87*	*<0.05 **	2	652.5±95.5	*5.17*	*<0.01 **
Moderate	12	523.2±105.7			8	648.9±204.2		
Active	4	916±367.1			4	1091.5±360.5		

*Significant   (p<0.05)
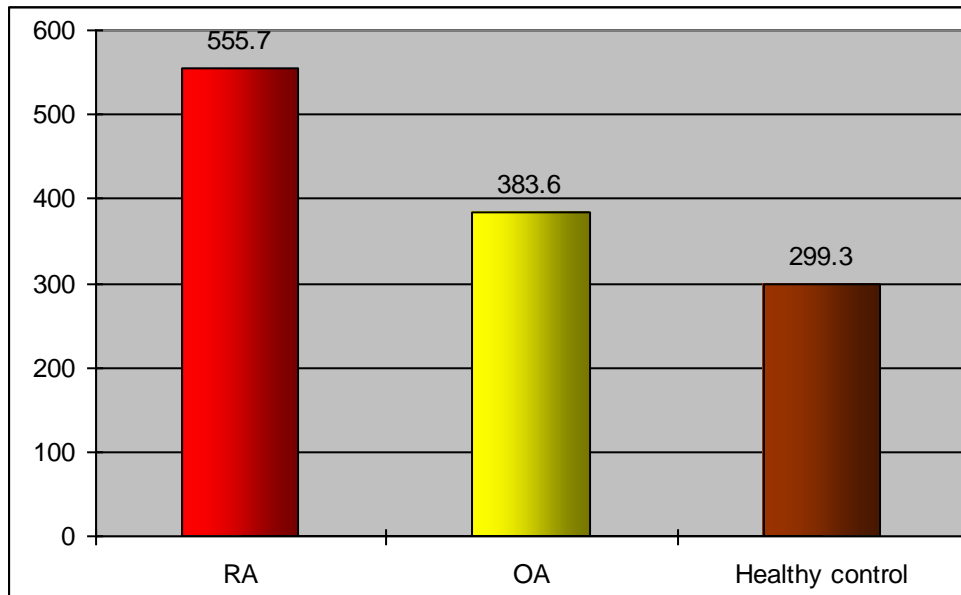***Highly significant (p<0.001)*
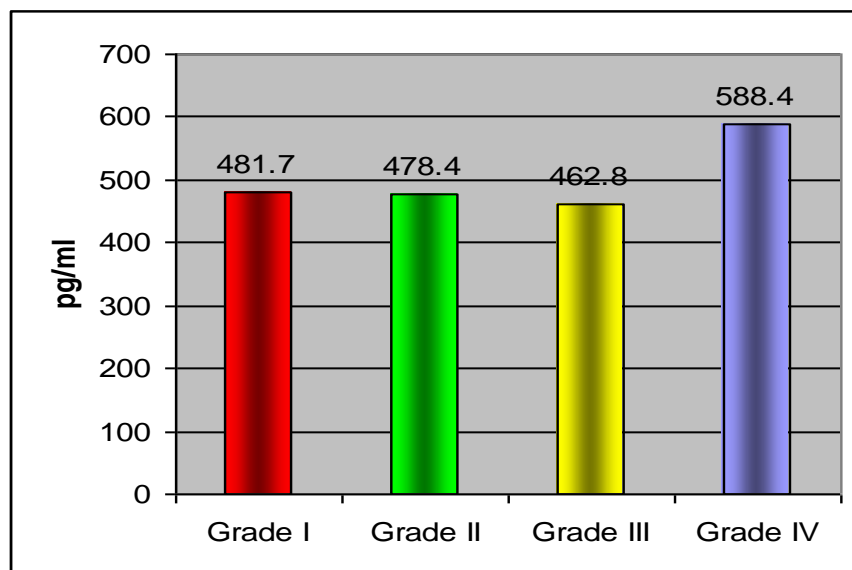
Figure (3): VEGF serum level in all groups.

Figure **(4): VEGF serum level according disease activity grades in RA group**

Table (7): Comparison between VEGF serum and synovial levels in RA patients in relation to their disease activity.

	VEGF serum		F	P	VEGF synovial		F	P
	N	Mean±SD			N	Mean±SD		
Grade I	6	462.8±122.8	3.11	<0.05 *	1	670±0	3.41	<0.05 *
Grade II	10	478.4±156.6			3	678±110.1		
Grade III	8	481.7±83.8			5	596±129.2		
Grade IV	6	588.4±291.8			5	1093±312.2		

*Significant   (p<0.05)
**Highly significant (p<0.001)

Table (8): Comparison between the association of serum and synovial levels and seropositivity in RA patients.

	Sero + Ve RA		Sero – Ve RA		T test	P
	N	(Mean ± SD)	N	(Mean ± SD)		
VEGF serum (Mean ± SD	24	**555.3 ± 235.5**	6	565.3 ± 140.3	0.16	>0.05 (non-significant)
VEGF synovial	11	790.4 ± 274.7	3	818.7 ± 460.3	0.1	>0.05 (non-significant)

*Significant   (p<0.05)
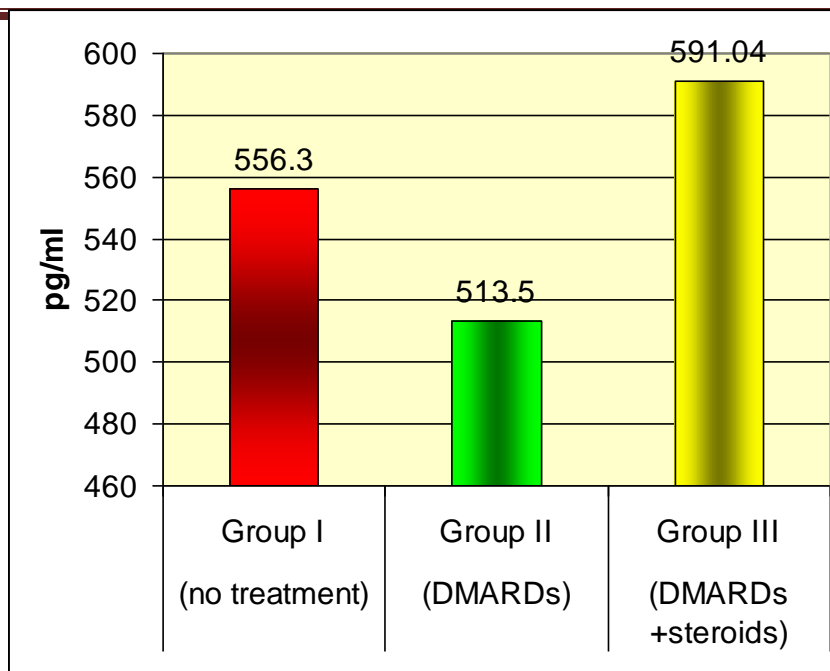**Highly significant (p<0.001)

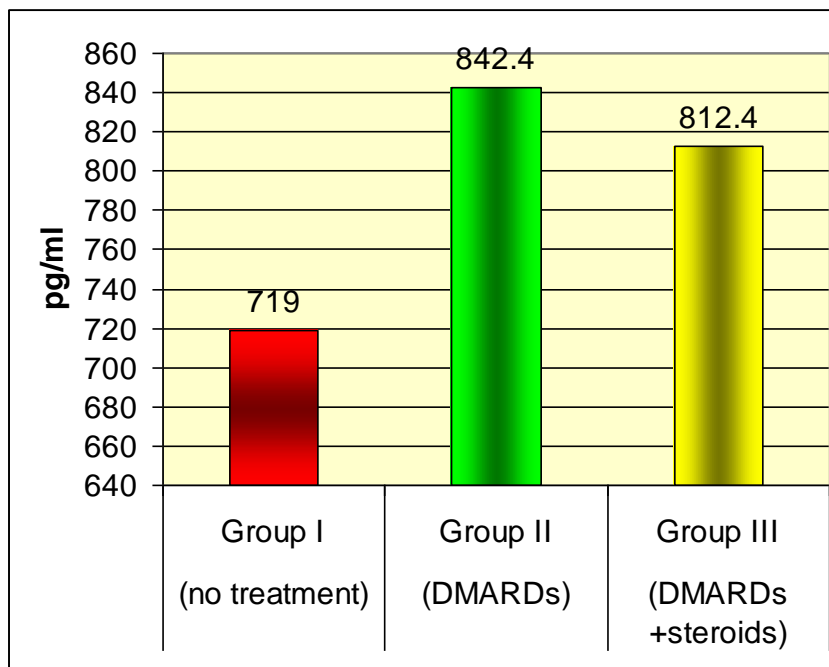**Figure (5): VEGF serum level according to medication in RA group.**

Figure (6): VEGF synovial level according to medication in RA group.

Table (9): Comparison between VEGF serum and synovial levels in RA patients according to type of medication.

	VEGF serum		F	P	VEGF synovial		F	P
	N	Mean±SD			N	Mean±SD		
GROUP I (NO TT)	4	556.3±143.3	2.21	>0.05 insig	4	719 ± 260.1	1.98	>0.05 insig
GROUP II (DMARDS)	12	513.5±270.25			5	842.4 ±291.47		
GROUP III (DMARD+STEROID	14	591.04±291.47			5	812.4± 387.79		

Significant   (p<0.05)
***Highly significant (p<0.001)*

Table (10): Comparison between VEGF serum level in RA patients in relation to their sharp score grades.

	VEGF serum		F	P
	N	Mean ± SD		
Grade I	5	466.6 ± 230.7	2.35	>0.05 Insignificant
Grade II	11	560.1 ± 129.9		
Grade III	8	655.1 ± 339		
Grade IV	6	489.2 ± 93.4		

Significant   (p<0.05)
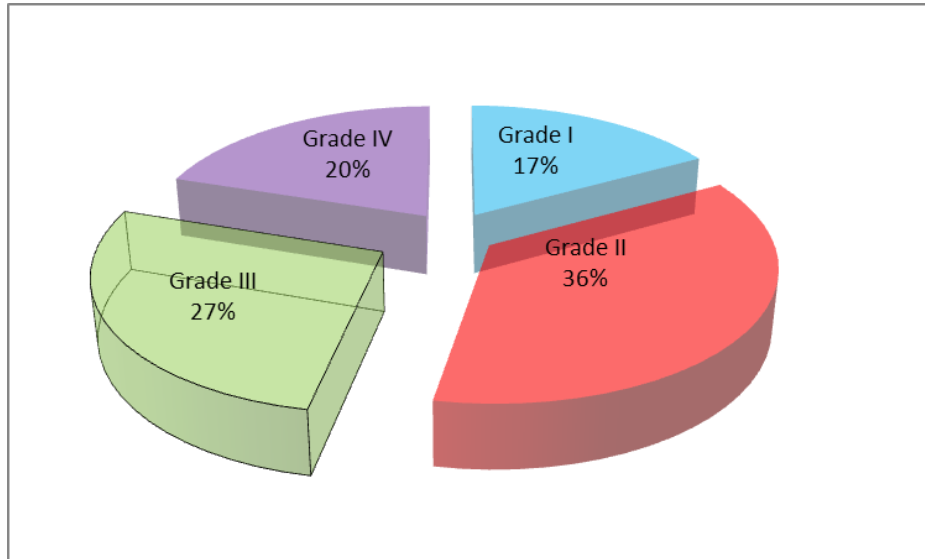***Highly significant (p<0.001)*

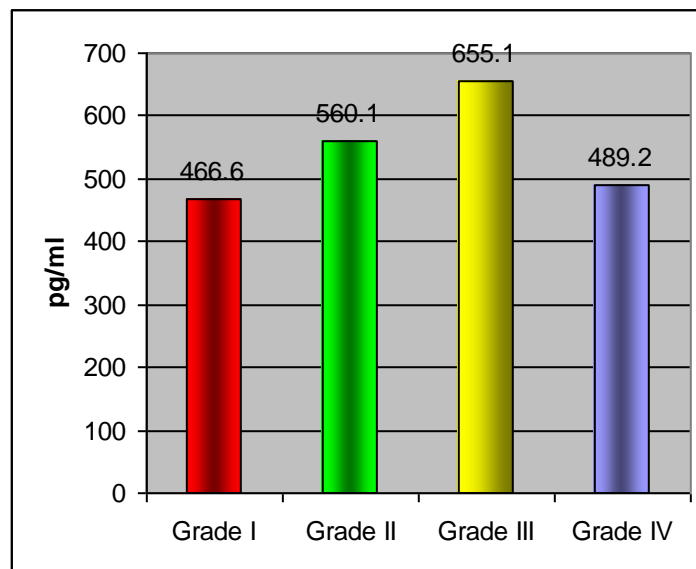**Figure (7): Sharp score radiological grades in RA group.**

Figure (8): VEGF serum level according to Sharp score grades in RA group.

Table (11): Comparison of synovial thickness among all groups.

RA Mean *6.5*		± SD *3.8 mm*
	OA	**Healthy subjects**
	0.67 ± 0.37	O.65 ± 0.4
T- test	8.31	8.34
P- value	<0.001 ** (highly significant)	<0.001 ** (highly significant)

*Significant   (p<0.05)
**Highly significant (p<0.001)

Table (12): Comparison between VEGF serum and synovial levels in RA patients according to grades of synovial thickness.

	VEGF serum		**F**	**P**	**VEGF synovial**		**F**	**P**
	N	*Mean±SD*			*N*	*Mean±SD*		
Grade I	16	*454.1±119.1*	*3.98*	*<0.05 **	2	477.5± 88.4	*5.83*	*<0.01 **
Grade II	4	*539.3±62.3*			3	652 ±78.6		
Grade III	10	724.8±278.6			9	915.4± 309.5		

*Significant (p<0.05)
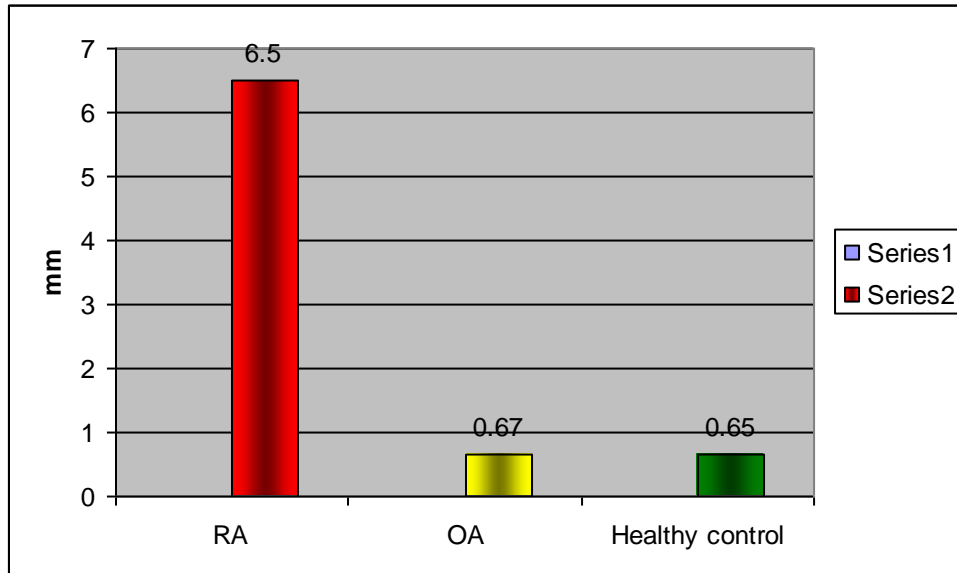***Highly significant (p<0.001)*

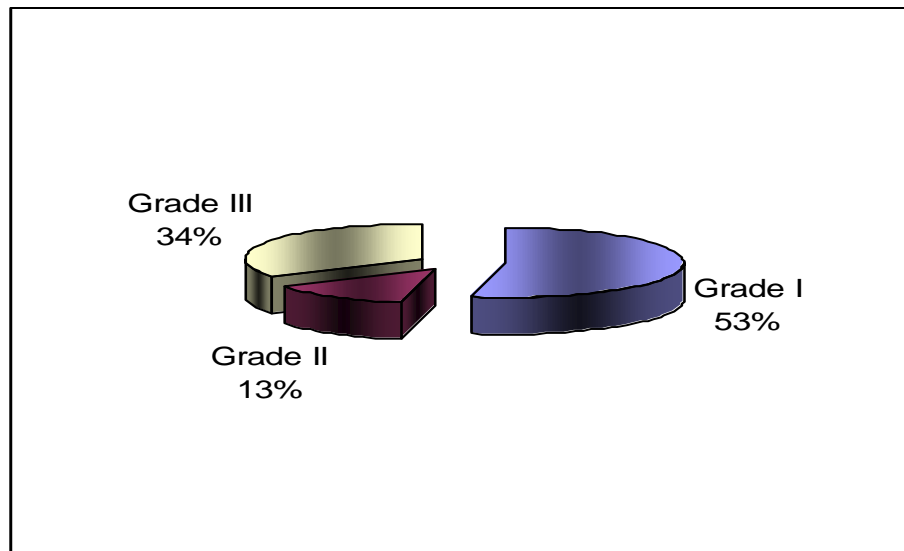**Figure (9): Synovial thickness in all groups.**

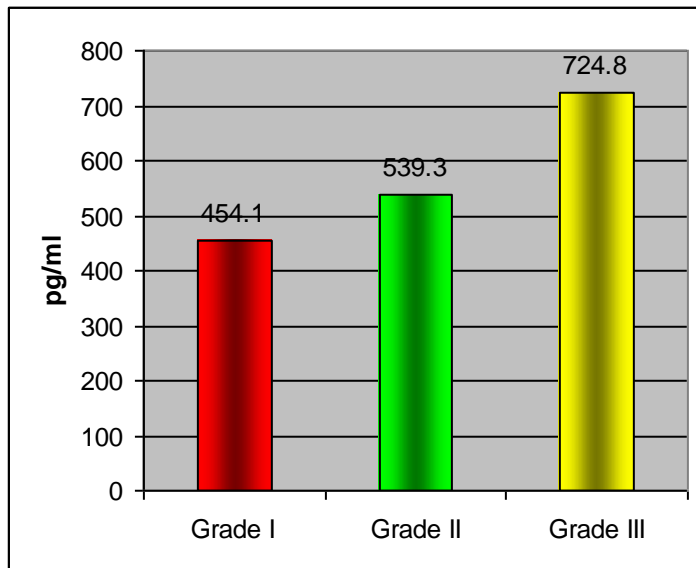**Figure (10): Synovial thickness grades in RA patients.**

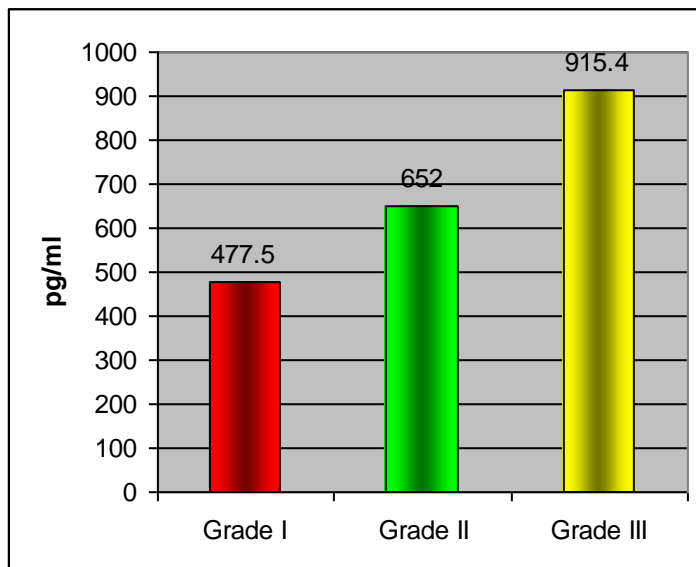**Figure (11): VEGF serum level according to synovial thickness grades in RA group.**

Figure (12): VEGF synovial level according to synovial thickness grades in RA group.

Table (13): Power doppler results among RA group.

	Number	*%*
Grade I	13	43.3
Grade II	11	36.7
Grade III	6	20

Table (14): Comparison between MGDA scores in RA patients according to their power Doppler grades.

	MGDA score		F	P
	N	Mean±SD	4.82	<0.01*
Grade I	13	2.31 ± 0.432		
Grade II	11	2.54± 6.42		
Grade III	6	3.195± 0.52		

significant   (p<0.05)
***Highly significant (p<0.001)*

Table (15): Comparison between VEGF serum and synovial levels in RA patients in relation to their power Doppler grades.

	VEGF serum		F	P	VEGF synovial		T test	P
	N	Mean±SD			N	Mean ±SD		
Grade 1	13	462.8±130.2	4.19	<0.05*	0	-------	3.83	<0.05*
Grade 2	11	505.9±76.9			8	648.9±204.2		
Grade 3	6	848.2±303.2			6	1045.2±303		

significant   (p<0.05)
***Highly significant (p<0.001)*

Table (16): Comparison between ultrasound findings in RA patients according to their power Doppler grades.

	Synovial thickness(mm)		F	P	Effusion (mm)	F	P
	N	Mean±SD			Mean±SD		
Grade I	13	3.4± 0.56	618	<0.001 **	2.83± 1.66	683	<0.001 **
Grade II	11	7.42±2.9			10.8± 6.88		
Grade III	6	11.72±2.63			15± 5.58		

Significant   (p<0.05)
**Highly significant (p<0.001)

Table (17): Comparison between VEGF serum and synovial levels in RA patients in relation to their effusion (suprapatellar bursa diameter).

	VEGF serum		F	P	VEGF synovial		T test	P
	N	Mean±SD			N	Mean ±SD		
Grade 1	15	465.3±120.3	2.65	>0.05 insig	0	-------	0.14	>0.05 insig
Grade 2	6	504.8±380.1			5	782.2±223		
Grade 3	9	606.9±146			9	804.3±349.9		

significant   (p<0.05)
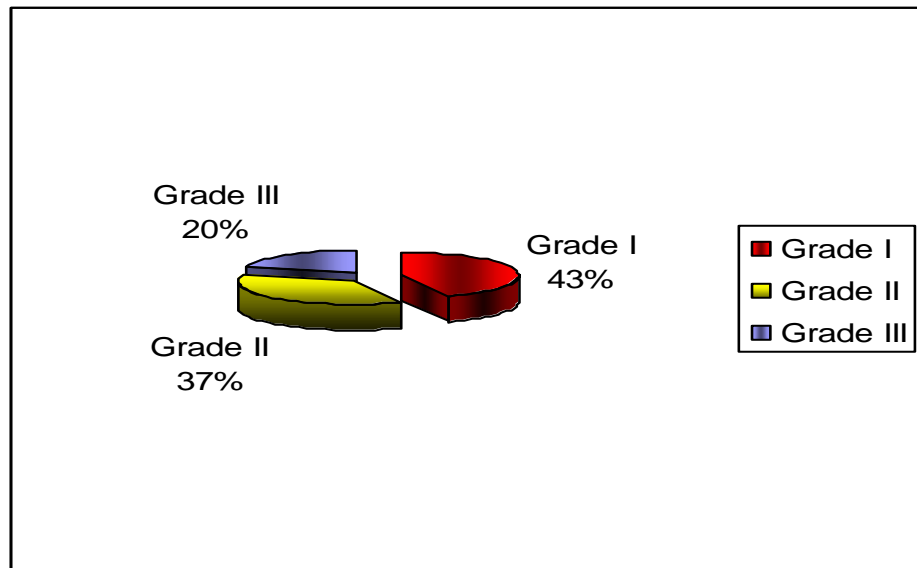***Highly significant (p<0.001)*
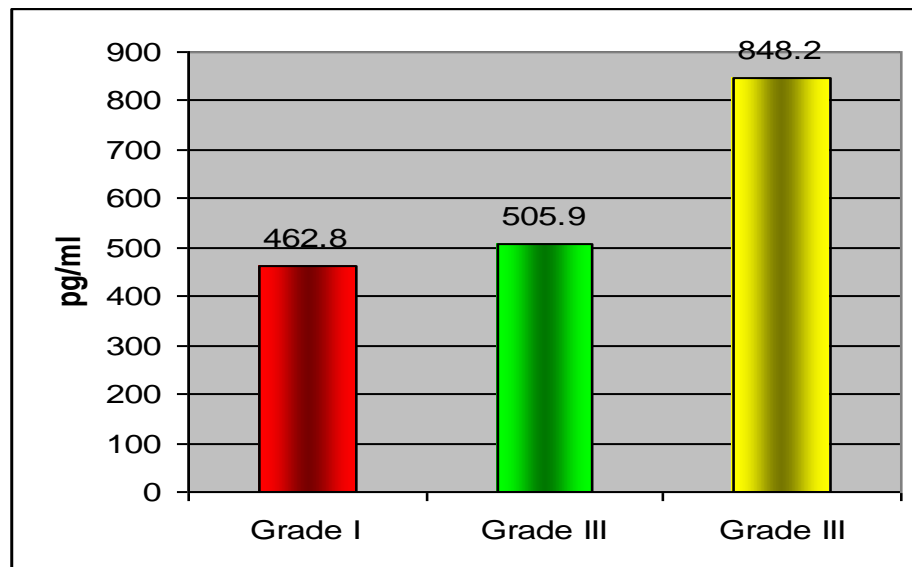
Figure (13): Power doppler grades in RA patients.

Figure (14): VEGF serum level according to power doppler grades in RA group.

Table (18): Comparison between VEGF serum and synovial levels in RA patients according to their functional capacity.

	VEGF serum		F	P	VEGF synovial		F	P
	N	Mean±SD			N	Mean±SD		
Grade I	7	**479.3±83.9**	2.14	>0.05 insig	2	605 ± 91.9	2.31	>0.05 insig
Grade II	12	545.3±108.9			6	741.7± 302.7		
Grade III	7	521 ± 205.8			3	875 ± 199.4		
Grade IV	4	781.3 ± 481.1			3	955 ± 473.6		

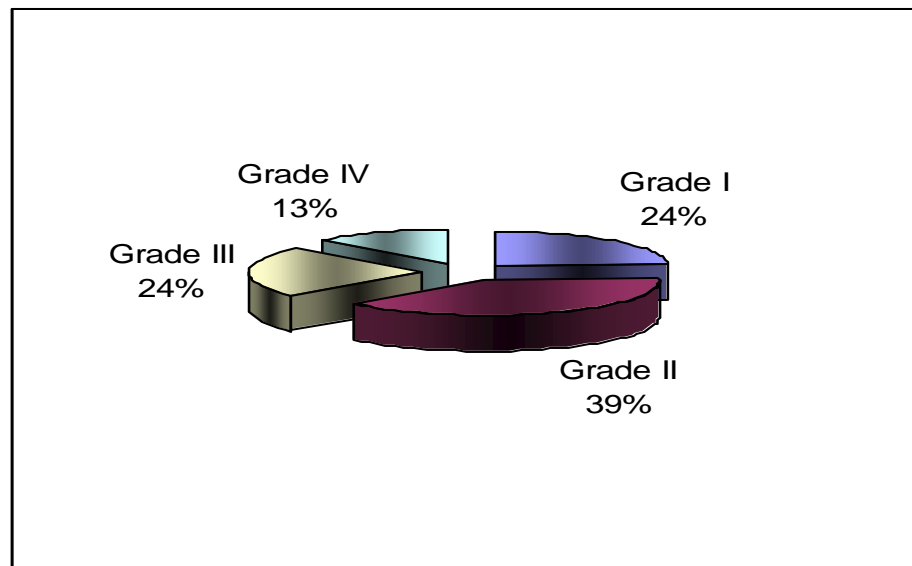*significant   (p<0.05)*
**Highly significant (p<0.001)

Figure (15): Functional capacity grades In RA patients.

Table (19): Correlation coefficients between serum a patients and synovial levels of VEGF and different variables in RA patients.

	VEGF serum (*r*)	VEGF synovial (*r*)
Age	*0.098*	*0.115*
Disease duration	*0.014*	*0.293*
Morning stiffness	*0.254*	*-0.35*
VAS	*0.287*	*0.42*
Articular index	*0.437**	*-0.19*
Grip strength	*-0.298*	*-0.22*
ESR	*-0.*432*	*-0.61**
CRP	0.569*	0.450
HB	*-0.370**	*-0.504**
WBCs	*0.305*	*0.398*
Platelets	*0.253*	*0.430*
RF	0.252	0.376
MGDA	*0.302*	*0.523**
VEGF serum	-------	*0.625**
VEGF synovial	*0.625**	------
Synovial thickness	*0.524**	*0.779***
Effusion	*o.292*	*0.563**

*Significant   (p<0.05)
**Highly significant (p<0.001)