RESULTS

This study comprised 40 patients suffering from rheumatoid arthritis (RA) and 34 normal persons as a control group (Table 1a & 1b).

They were classified into two groups :

Group (I) :

Included 40 patients suffering from RA. The patient's ages ranged between 20-50 years (mean 33.7 ± 8.6). [Table 2].

They were 29 females (72.5%) and 11 males (27.5%) [Table 3, Fig. 1].

This group was subdivided accoridng to Albumin Creatinine ratio (A/C) = 3 - 30 mg/mml (microalbuminuria) into :

Subgroup IA : Patients without microalbuminuria :

Patients having A/C ratio < 3 mg/mmol. They aged between 20-47 years (mean 35.2 ± 0.3). They were 11 females (78.6%) and 3 males (21.4%).

Subgroup IB : Patients with microalbuminuria :

Patients having A/C ration 3 - 30 mg/mmol. They aged between 20-50 years (mean 32.9 ± 8.8). They were 18 females (69.2%) and 8 males (30.8%).

No significant difference was observed between percentage of sex affection in group IA and group IB (P>0.05). [Fig. 2].

Group II :

Included 34 normal healthy subjects who were considered as a control group. Their ages ranged between 18-65 years (mean 36.9 ± 13.7). They were 18 females (52.9%) and 16 males (47.1%).

No significant difference was observed between percentage of the sex affection in group IA and group IB (P>0.05).

RESULTS OF CLINICAL STUDIES

- **Table (4) & Fig. (3)** show duration of RA disease in group IA and group IB. In group IA, the duration of RA disease ranged between 2-13 years (mean 5.6 ± 3.4) and ranged between 2-15 years (mean 9.8 ± 3.8) in group IB.

  A significant difference was observed between group IA and group IB (P<0.05).

- **Table (5)** shows the functional capacity according to Steinbrocker grading. In group IA : 1 patient (7.1%) in grade I, 11 patients (7.8%) in grade II, 2 patients (14.3%) in grade III. In group IB, 2 patients (77%) in grade I, 20 patients (76.9%) in grade II and 4 patients (45.4%) in grade III.

  No significant difference was observed between percentage of any grade affection and group IA and group IB.

❋ **Table (6) & Fig. (4)** show duration of morning stiffness in group IA and group IB. Duration of morning stiffness in RA patients without microalbuminuria (IA), ranged between 0.10-0.50 hours (mean 0.32±0.15), and those with microalbuminuria (IB) ranged between 1.0-3.0 hours (mean 0.93±0.56).

A highly significant difference was observed between duration of morning stiffness and microalbuminuria ($P<0.01$).

❋ **Table (7)** shows that 12 patients were under NSAID therapy, microalbuminuria was detected in 7 patients (66.6%), 7 patients were under pencillamin therapy, microalbuminuria was detected in 6 patients (85.7%), 10 patients were under gold therapy and microalbuminuria was detected in 8 (80%). Two patients (66.7%) from 3 patients had microalbuminuria under methoteraxate therapy, while 4 patients under dagrinol therapy, microalbuminuria was detected in 1 patient (25%). Under salazopurine therapy 1 patient (25%) from 4 had microalbuminuria.

RESULTS OF LABORATORY STUDIES

❋ **Table (8) & Fig. (5),** show the incidence of A/C ratio in group I, group IA and group IB in comparison to group II.

A/C ratio in group II ranged between 0.5-2.8 mg/mmol.

In group I, A/C ratio ranged between 0.7-23 mg/mmol.

A significant difference was observed between group I and group II ($P<0.05$). In group IA, A/C ratio ranged between 0.7 - 2.8 mg/mmol. No significant difference was observed between group IA and group II ($P>0.01$).

In group IB, A/C ratio ranged between 3 - 23 mg/mmol. Highly significant difference was observed between group IB and group II. ($P<0.05$).

❋ **Table (9) & Fig. (6),** show A/C ratio in group IA and group IB.

In group IA, A/C ratio ranged between 0.7-2.8 mg/mmol (mean 1.9 ± 8.7) and in group IB, ranged between 3-23 mg/mmol (mean 7.6 ± 5.5).

A significant difference was observed between group IA and group IB ($P<0.05$).

❋ **Table (10) & Fig. (7),** shows ESR in group IA and group IB :

ESR ranged between 20-100 mm/h (mean 65.4 ± 20.2) in group IA and ranged between 10-130 mm/h (mean 58.8 ± 28.8) in group IB.

No significant difference was observed between the two groups ($P>0.05$).

❋ **Table (11) & Fig. (8 & 9),** shows CRP in group IA and group IB : CRP ranged between 0.5-6 mg% (mean 1.9±1.8) in group IA and in group IB ranged between 0.6-13 mg% (Mean 7±4.6).

A highly significant difference was observed between group IA and group IB ($P<0.01$).

❋ **Table (12),** shows HB values in group IA and group IB ; in group IA, HB values ranged between 10-13.5 gm% (mean 11.9±1.0) and in group IB, it ranged between 5.5-14 gm% (mean 11.7±2.1).

A non significant difference was observed between group IA and group IB ($P>0.05$).

❋ **Table (13) & Fig. (10),** show Rf in group IA and group IB ; in group IA, RF was positive (+ve) in 8 cases (57.1%) and negative (-ve) in 6 cases (42.9%), in group IB, RF was +ve in 8 cases (30.8%) and -ve in 18 cases (69.2%).

A non . significant difference was observed between percentage of RF in both groups IA and IB.

❋ **Tables (14) & (15),** show correlation coefficients between microalbuminuria and investigatory parameters (Clinical & Laboratory) :

- Disease duration shows a significant correlationn coefficient ($r = 0.372$) with microalbuminuria ($P<0.05$).

- Duration of morning stiffness shows a significant correlation coefficient (r = 909) with microalbuminuria (P<0.01).
- CRP (r = 0.852) had a highly significant correlation (P<0.01).
- Non significant correlation (r = 0.204) was observed between ESR values and microalbuminuria (P>0.05).
- A negative correlation (r = -843) was observed between HB values and microalbuminuria (P>0.05).
- A negative correlation (r = -81) was observed between RF and microalbuminuria.

Table (1a) : Master sheet of RA patients

No	Age Years	Sex	A/C	RA Hr.	CRP	Hb %	ESR min	RF	Fun Cap	Mor. stif.	Drugs
1	35	F	1.2	3	0.5	12	70	-	II	0.5	Salazopurin
2	38	F	23	14	16	2.5	100	-	II	2	NSAIDs
3	22	M	18	7	16	13	80	-	II	3	Pencillamine
4	41	F	16	12	15	11	70	-	II	2	NSAIDs/Gold
5	24	F	17	8	12	11	110	+	II	3	Gold
6	42	M	14	15	10	11.5	40	+	II	3	NSAIDs
7	28	F	12	9	8.6	11.5	40	+	II	2	Gold
8	39	M	17	11	11	13	40	-	II	2	NSAIDs/Gold
9	30	F	7	6	9	13.5	30	+	II	2	NSAIDs/Pencillamine
10	35	M	7	14	3.6	13	60	+	III	2	NSAIDs/Pencillamine
11	29	F	7	8	7	10	60	+	II	2	Gold
12	36	F	6.8	12	7.2	11.5	50	+	II	3	NSAIDs
13	21	F	6	6	8.6	12	10	+	II	2	Gold
14	37	F	5.5	11	10	13	70	-	II	2	Pencillamine
15	27	F	6	7	7.8	13	70	-	II	2	NSAIDs/Pencillamine
16	45	F	4.9	14	0.8	11.5	60	+	III	1	Methotraxate
17	23	F	4.8	9	1	13	70	+	II	1.5	Methotraxate
18	40	F	4.3	11	2.5	10.5	70	+	II	2	NSAIDs
19	28	F	4	7	7.0	12	10	+	II	2	NSAIDs
20	38	F	4.2	13	5.2	12	130	-	II	2	NSAIDs/Dagrinol
21	25	F	3	15	5.2	12	60	+	III	1	Salazopurine
22	48	M	3	12	0.6	12.5	20	-	III	1.5	Pencillamine
23	20	M	3.8	3	0.8	11.5	20	+	II	1.5	Dagrinol
24	50	F	3	14	0.8	14	70	+	II	2	Salazopurine
25	23	M	3.8	4	4.4	11	40	+	II	2	Dagrinol
26	41	F	3.6	12	4.0	12	70	+	II	2	Gold
27	27	M	3	2	7.0	12	50	+	II	1.5	Gold
28	40	F	2.8	3	0.6	11.5	70	+	II	0.5	NSAIDs
29	33	M	2.5	8	0.6	12	60	-	II	0.25	Pencillamine
30	36	M	2.5	13	2.2	13	30	+	II	0.5	Gold
31	31	F	2.6	2	0.6	11.5	60	-	II	0.5	NSAIDs
32	39	M	2.8	9	0.8	11.5	20	-	II	0.5	NSAIDs
33	23	F	2.6	11	2.4	11.5	70	-	II	0.5	Gold
34	47	F	0.7	3	0.5	12.5	70	+	II	0.5	NSAIDs
35	24	F	0.8	6	0.5	13.5	85	+	III	0.25	Dagrinol
36	42	F	2.5	4	6.0	12.5	80	-	II	0.25	Dagrinol
37	20	F	2.6	7	2.0	10.5	100	+	II	0.5	NSAIDs
38	38	F	1.2	3	4.8	10	70	+	II	0.5	NSAIDs
39	47	F	1.2	2	0.8	11	70	-	II	0.5	Methotroxate
40	38	F	1	4	4.0		60	-	III	0.5	Salazopurine

Table (1b) : Master sheet for controls

Sex	Age (Years)	A/C
Male	27	4.7
Female	34	4.7
Male	22	2.5
Male	65	6.8
Female	52	2.7
Female	18	2.8
Male	38	0.8
Male	42	0.9
Male	40	1.2
Female	44	1.2
Male	26	1.2
Male	22	2.5
Female	55	2.6
Female	49	1.2
Female	49	2.8
Female	22	2.5
Male	18	0.9
Female	34	0.8
Female	34	0.8
Male	27	0.7
Male	20	2.1
Male	28	2.7
Female	38	1.8
Female	51	2.2
Male	60	0.7
Male	44	1.5
Female	44	0.5
Female	28	0.8
Female	60	1.8
Female	55	1.9
Male	35	0.6
Male	19	2.4
Female	20	0.8
Female	35	1.3

Table (2) : Age distribution among the studied groups

	X	+SD	Range		t	P
			minimum	maximum		
Studied groups :						
RA patients (n=40)	33.7	±8.6	20.0	50.0	1.205	0.05
Controls (n=34)	36.9	±13.7	18.0	65.0		(NS)
RA patients :						
Without microalbuminuria (n=14)	35.2	±8.3	20.0	47.0	0.783	0.05
With microalbuminuria (n=26)	32.9	±8.8	20.0	50.0		(NS)

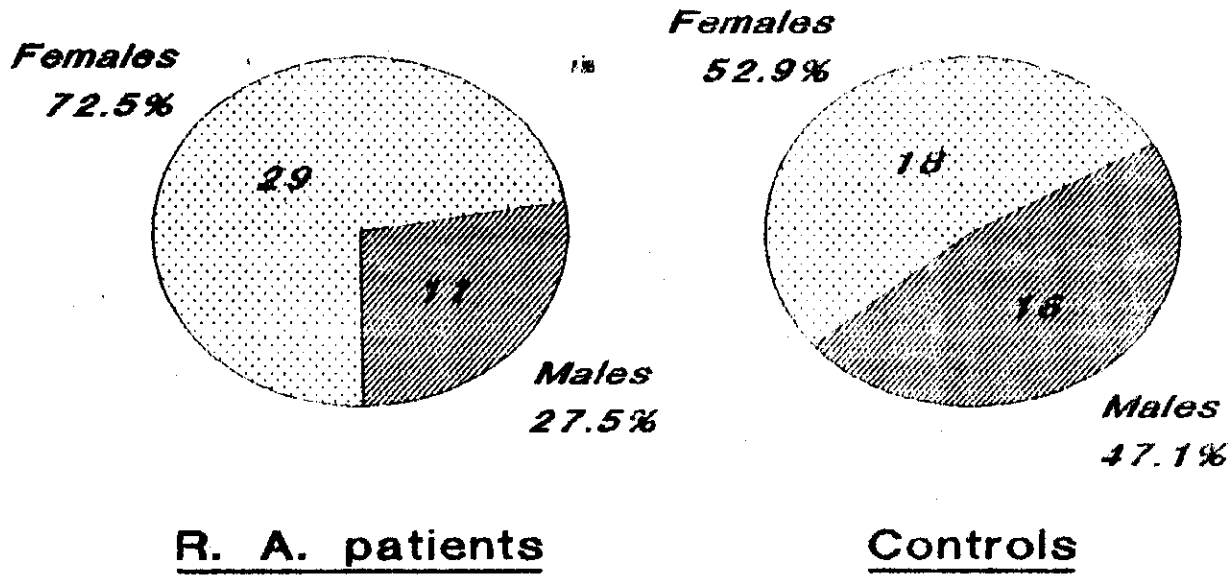
NS = Non Significant

Table (3) : Sex distribution among the studied groups

Sex	Females		Males		Total	
	No.	%	No.	%	No.	%
Studied groups :						
RA patients (n=40)	29	72.5	11	27.5	40	100.0
Control (n=34)	18	52.9	16	47.1	34	100.0
Z	1.742		1.742			
P	>0.05 (NS)		>0.05 (NS)		-	
RA patients :						
Without microalbuminuria (n=14)	11	78.6	3	21.4	14	100.0
With microalbuminuria (n=26)	18	69.2	8	30.8	26	100.0
Z	0.631		0.631			
P	>0.05 (NS)		>0.05 (NS)		-	

NS = Non significant

Fig.(1): Sex distribution of the studied groups.



R. A. patients Controls

Fig.(2): Sex distribution of the studied groups.

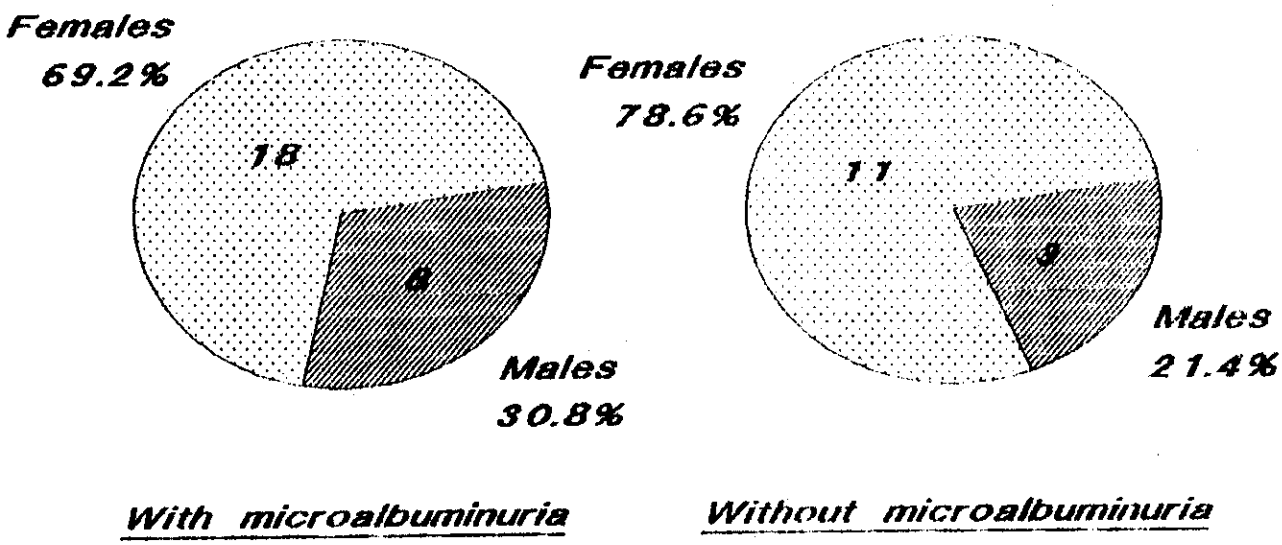


Table (4) : Duration of rheumatoid arthritis disease as regards microalbuminuria

Disease duration in years / Patients	$\bar{X}$	±SD	Range	
			minimum	maximum
Without microalbuminuria (n=14)	5.6	± 3.4	2	13
With microalbuminuria (n=26)	9.8	± 3.79	2	15
t	3.465			
p	< 0.05 (S)			

S : Significant

Fig.(3):Disease duration among cases of R.A. according to microalbuminuria

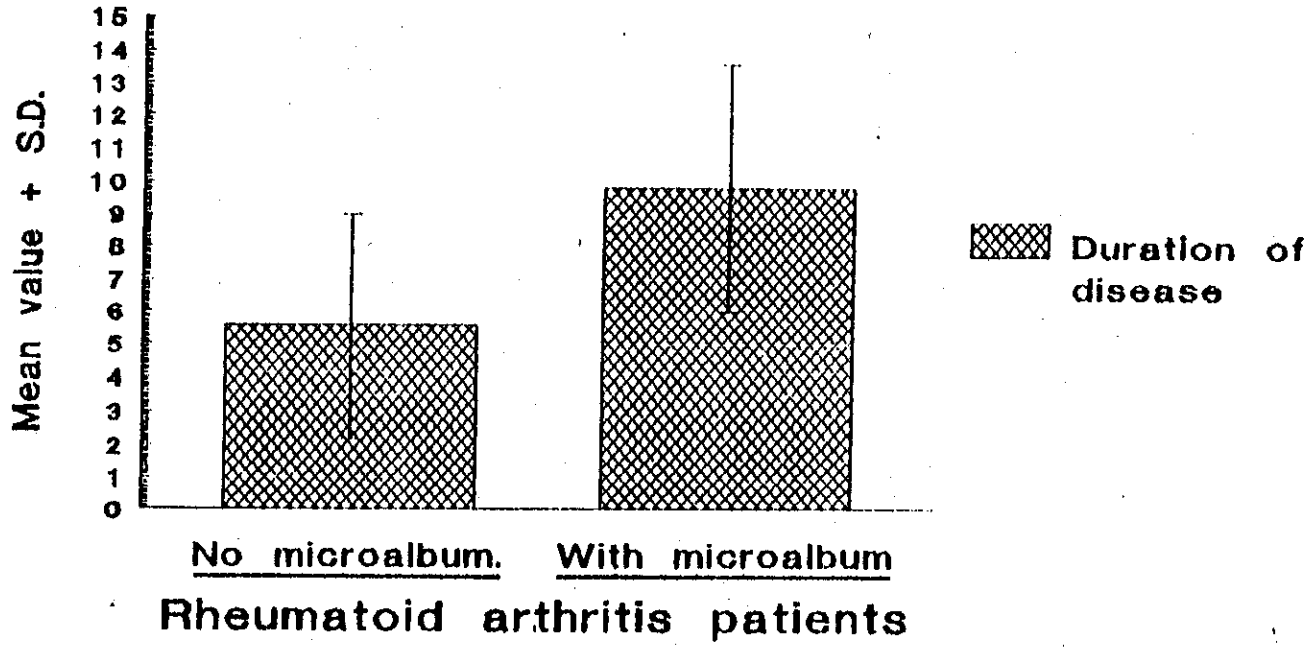


Table (5) : Functional capacity in rheumatoid arthritis with and without microalbuminuria

Functional capacity / Patients	I		II		III	
	No.	%	No.	%	No.	%
Without microalbuminuria (n=14)	1	7.1	11	78.6	2	14.3
With microalbuminuria (n=26)	2	7.7	20	76.9	4	15.4
Z	0.063		0.119		0.093	
P	>0.05 (NS)		>0.05 (NS)		> 0.05 (NS)	

NS : Non significant

Table (6) : Duration of morning stiffness among the studied patients with rheumatoid arthritis as regards microalbuminuria

Duration of morning stiffness in hours / Patients	$\bar{X}$	±SD	Range	
			minimum	maximum
Without microalbuminuria (n=14)	0.32	± 0.15	0.10	0.50
With microalbuminuria (n=26)	0.93	± 0.56	1.0	3.0
t	3.987			
p	< 0.01 (S)**			

S** : Highly Significant

Fig.(4): Duration of morning stiffness among R.A. cases accord. to microalbum.

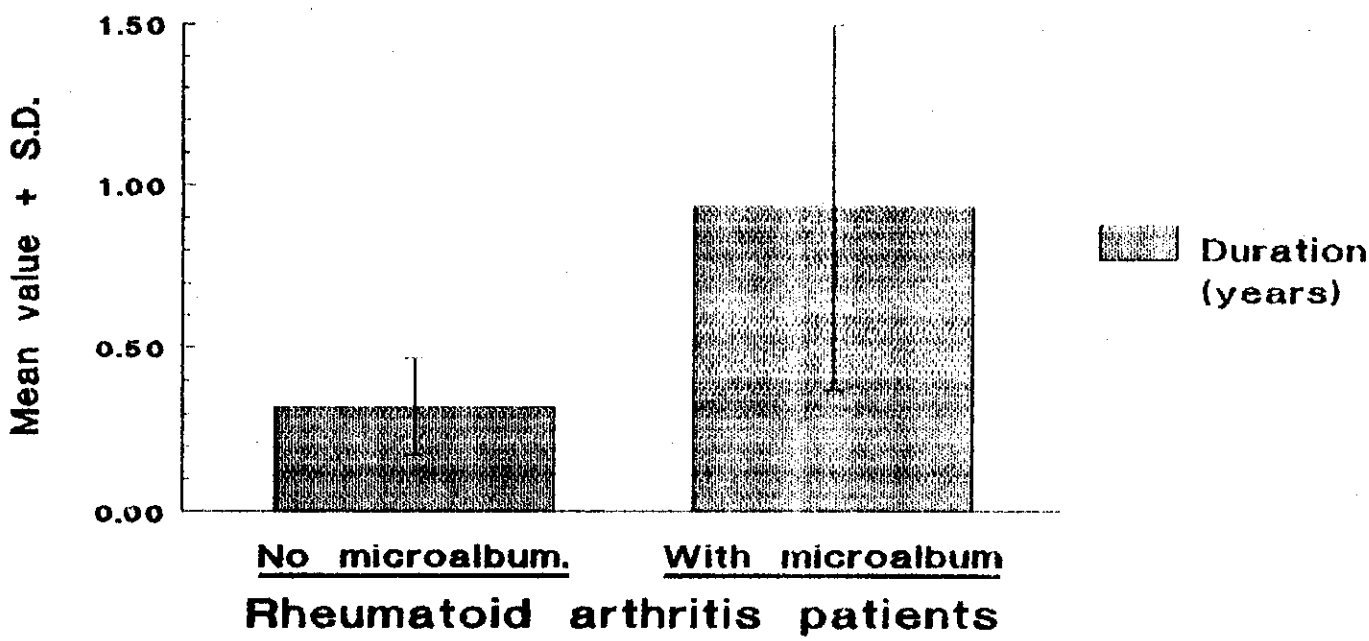


Table (7) : Types of drugs used in treatment of rheumatoid arthritis as regards microalbuminuria

Types of drugs / Studied patients	Without microalbuminuria (n=14)		With microalbuminuria (n=26)		Total (n=40)	
	No.	%	No.	%	No.	%
NSAID	4	33.9	7	66.6	12	100.0
Pencillamine	1	14.3	6	85	7	100.0
Gold	2	20	8	80	10	100.0
Methoterxate	1	33.3	2	66.7	3	100.0
Dagrinol	3	75	1	25	4	100.0
Salazopurine	3	75	1	25	4	100.0

Table (8) : Comparison between the studied group regarding albumin/creatinine ratio in relation to control group

				A/C ratio in group I (n=40)	A/C ratio in group IA (n=14)	A/C ratio in group IB (n=26)
A/C ratio in group II (n=34)	1.68	$\bar{X}$		5.62	1.93	7.61
	± 0.82	± SD		± 5.21	± 0.87	± 5.5
	0.5	Range	minimum	0.7	0.7	0.3
	2.8		maximum	23.0	2.8	2.3
	t			4.35	0.91	6.2
	P			(S^*)	>0.05(NS)	< 0.01(S^{**})

A/C ratio : albumin / creatinine ration (microalbuminuria)

S^* : Significant

S^{**} : Highly significant

NS : Non Significant.

Fig.(5):Comparison between R.A.patients and controls regarding Alb./Creat.Ratio

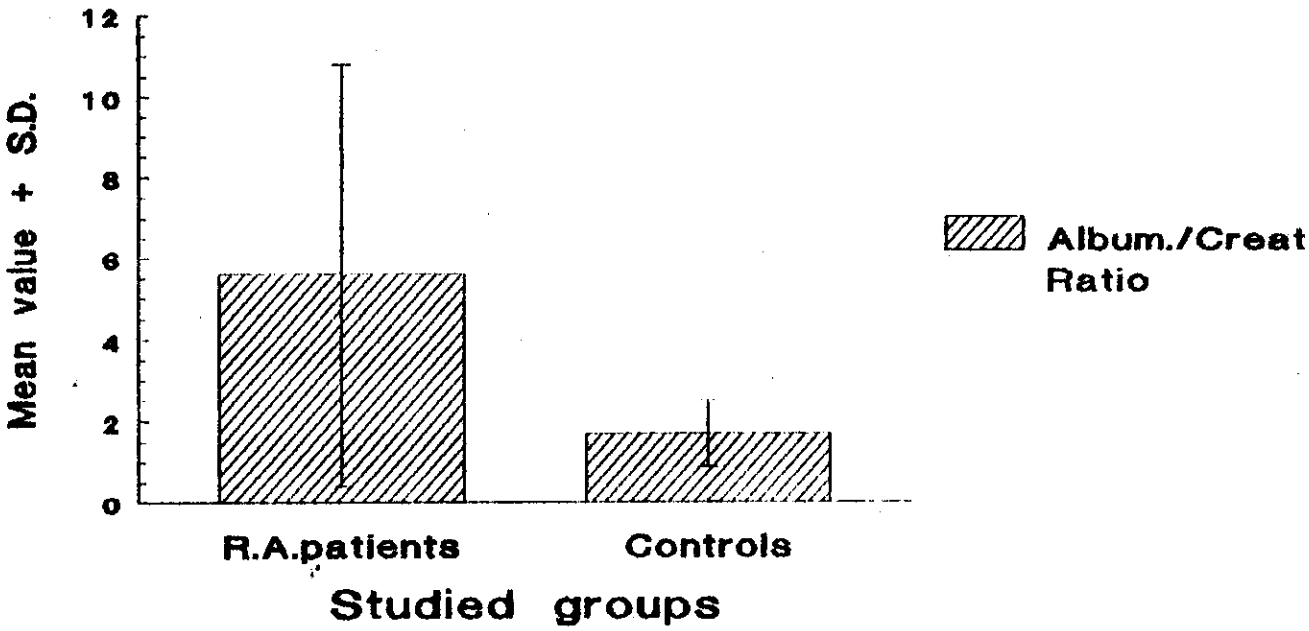


Table (9) : Albumin / creatinine ratio between patients with rheumatoid arthritis

A/C ratio (mg/mmol) / Patients	$\bar{X}$	±SD	Range	
			minimum	maximum
Without microalbuminuria (n=14)	1.9	± 8.7	0.7	2.8
With microalbuminuria (n=26)	7.6	± 5.5	3	23
t	3.815			
p	< 0.05 (S*)			

A/C ratio : albumin / creatinine ration (microalbuminuria)

S* : Significant

Fig.(6):Albumin/Creatinine Ratio among R.A.patients accord.to microalbuminuria

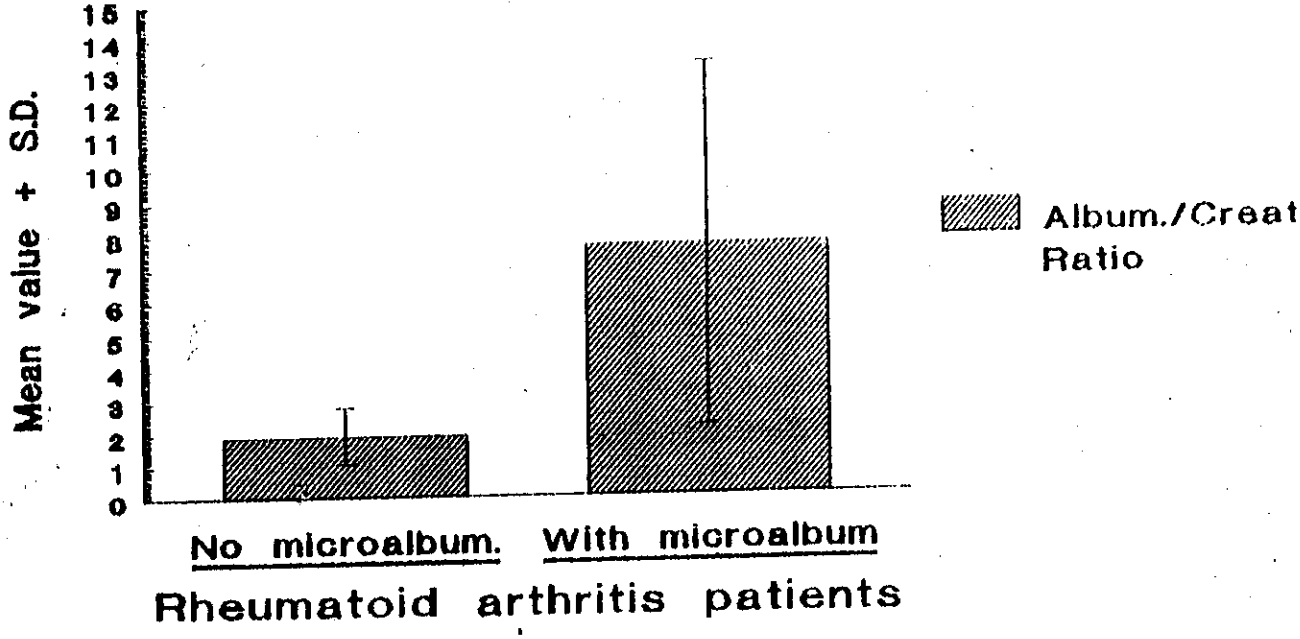


Table (10) : ESR between the studied patients with rheumatoid arthritis as regards microalbuminuria

ESR (mm/h) / Patients	$\bar{X}$	±SD	Range	
			minimum	maximum
Without microalbuminuria (n=14)	65.4	± 20.2	20	100
With microalbuminuria (n=26)	58.8	± 28.75	10	130
t	0.751			
p	> 0.05 (NS)			

ESR : Erythrocyte Sedimentation Rate

NS : Non Significant

Fig . (7) Correlation between albumin / creatinine ratio and ESR in RA Patients .

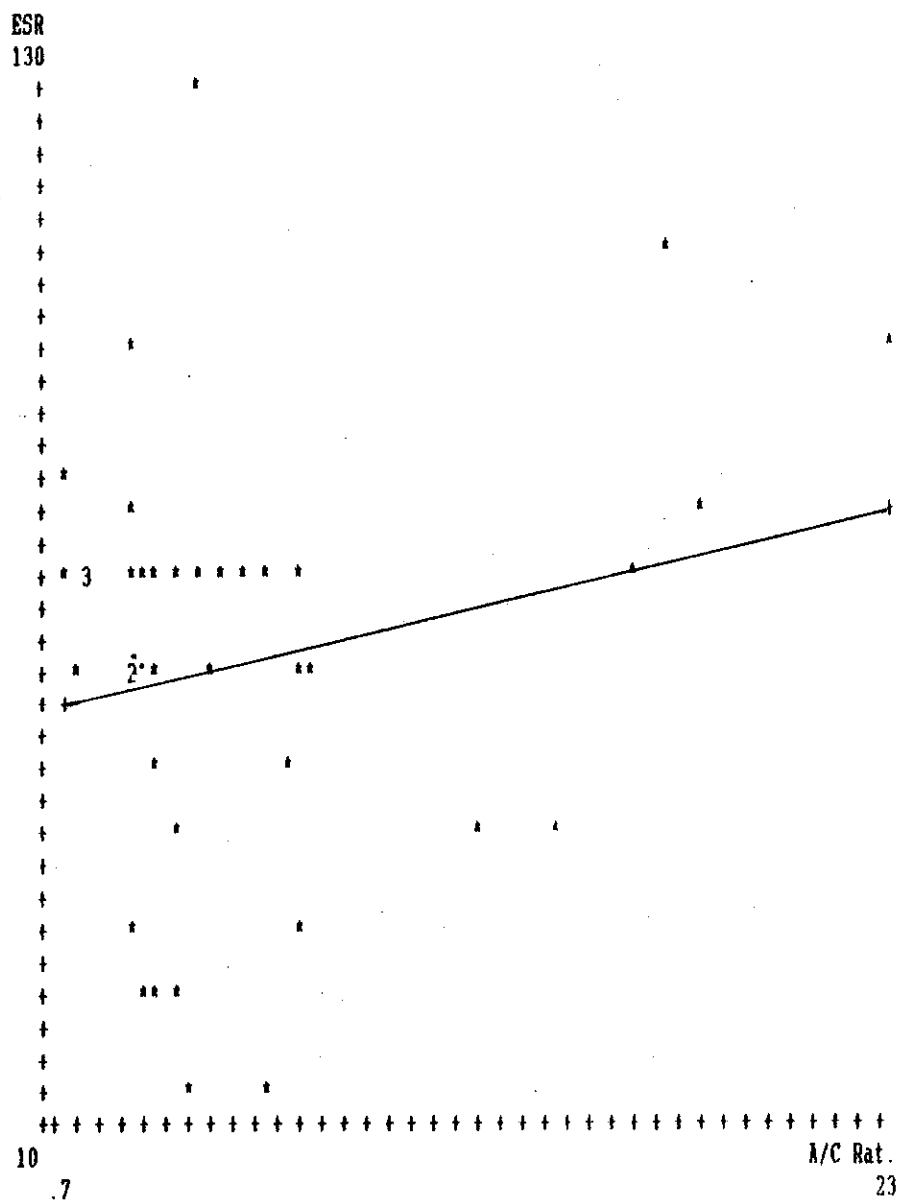


Table (11) : C-reactive protein in rheumatoid arthritis patients with and without microalbuminuria

CRP (mg%) / Patients	$\bar{X}$	±SD	Range	
			minimum	maximum
Without microalbuminuria (n=14)	1.87	± 1.8	0.5	6
With microalbuminuria (n=26)	7	± 4.6	0.6	16
t	3.928			
p	< 0.01 (S^{**})			

CRP : C-reactive protein.

S^{**} : Highly Significant

Fig.(8): C-reactive protein among cases of R.A. according to microalbuminuria

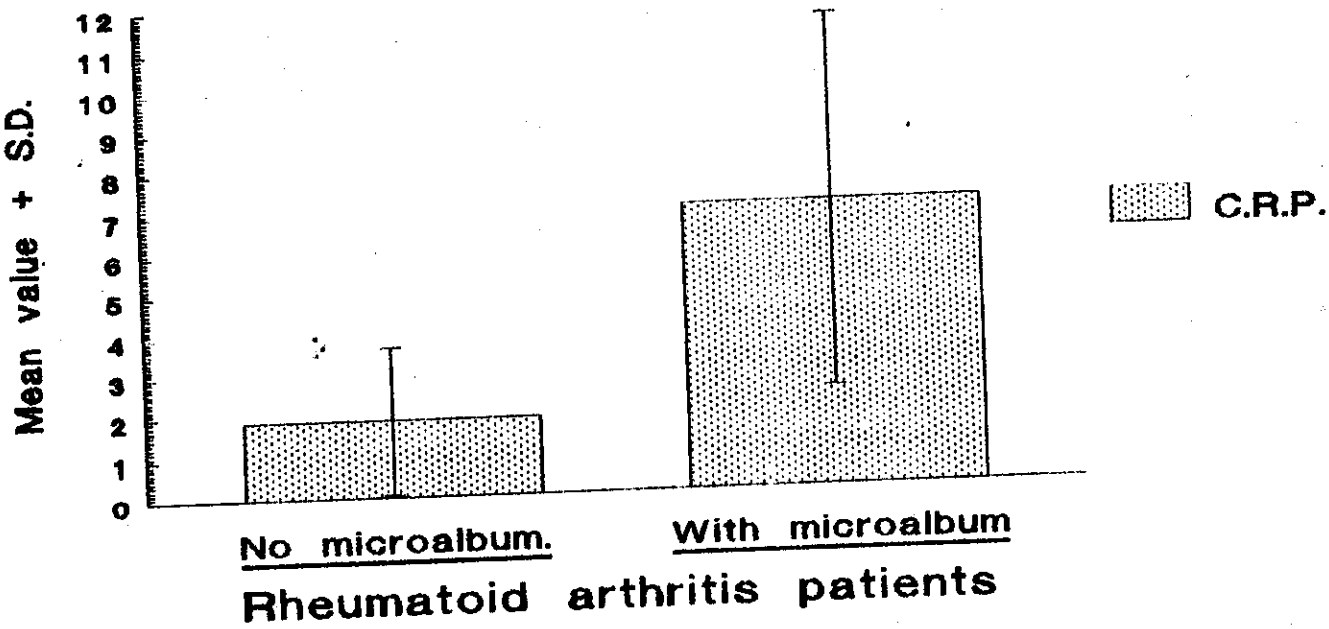


Fig . (9) Correlation between albumin / creatinine ratio and CRP in RA Patients .

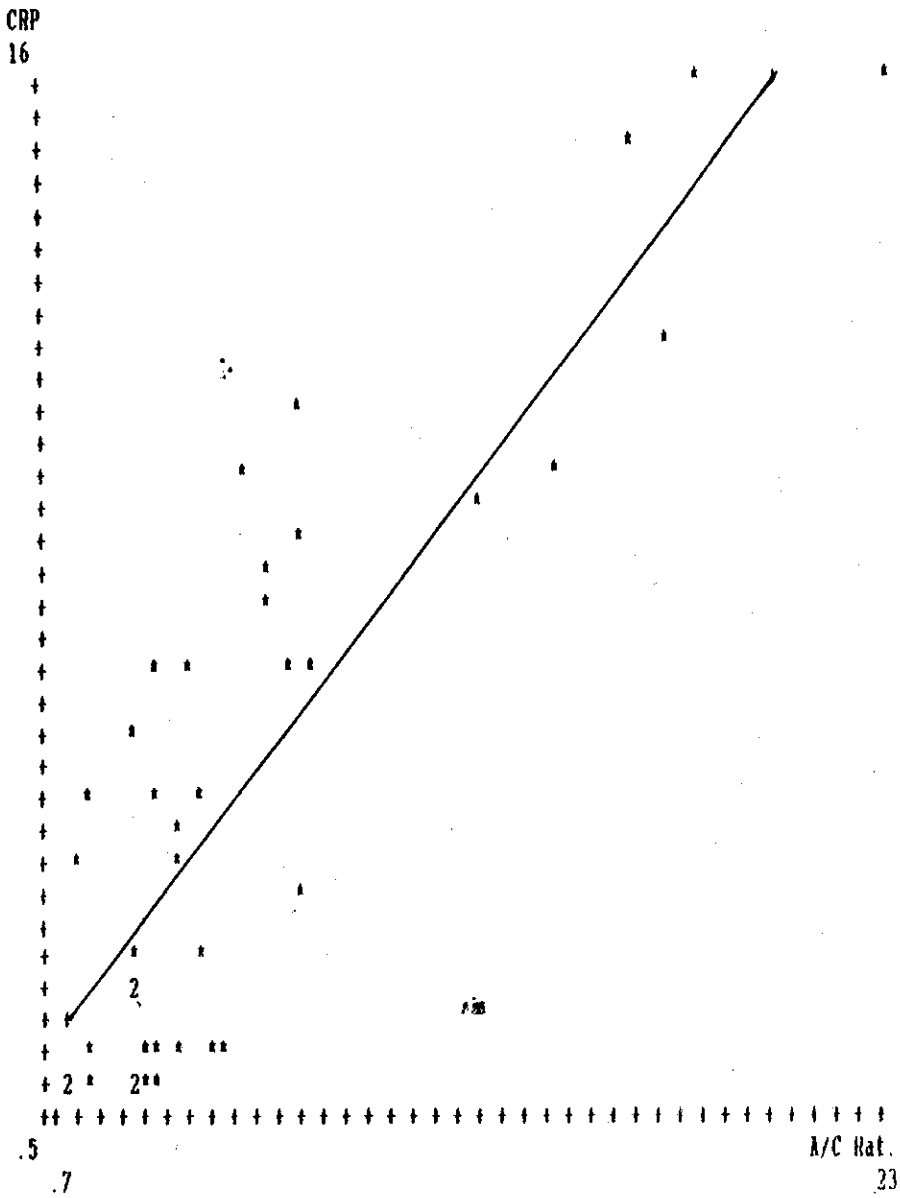


Fig.(10): Rheumatoid factor among cases of R.A. according to microalbuminuria

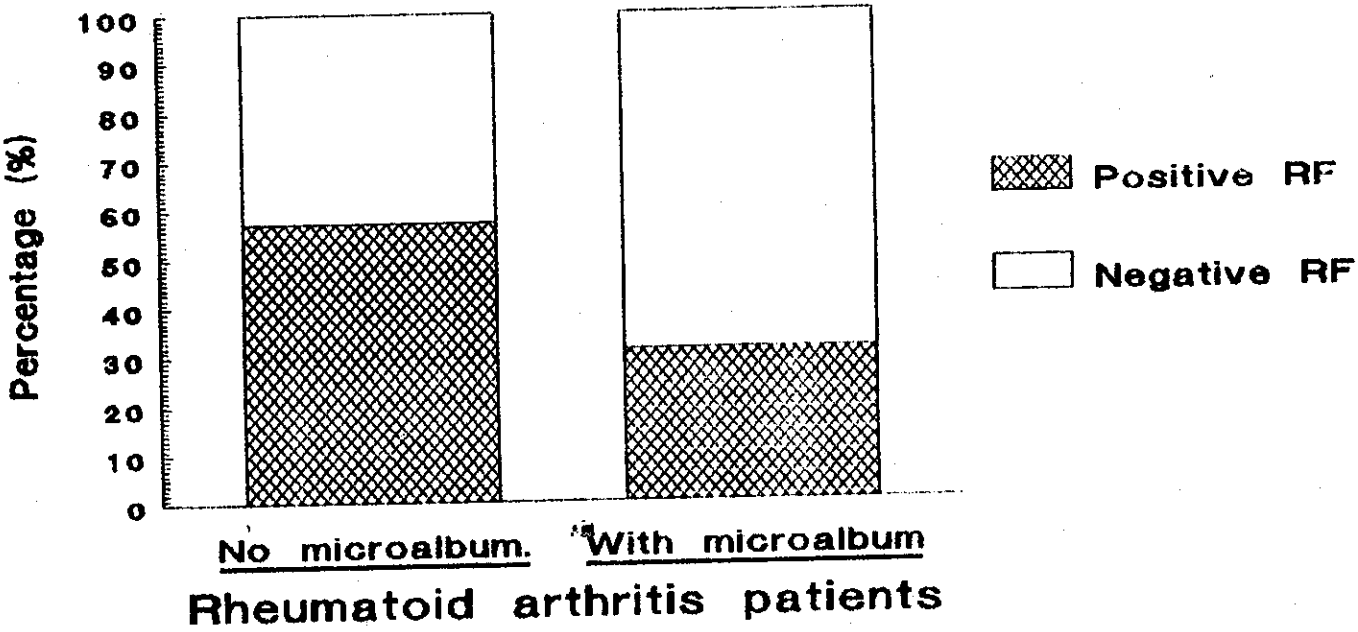


Table (12) : Haemoglubine level between the studied patients with rheumatoid arthritis as regards microalbuminuria

HB(g%) / Patients	$\bar{X}$	±SD	Range	
			minimum	maximum
Without microalbuminuria (n=14)	11.89	± 1.0	10	13.5
With microalbuminuria (n=26)	11.67	± 2.1	2.5	14
t	0.366			
p	> 0.05 (NS)			

HB : Haemoglobin

NS : Non Significant

Table (13) : Rheumatoid factor in rhaumatoid arthritis patients with and without microalbuminuria

RF / Patients	+ve		-ve		Total	
	No.	%	No.	%	No.	%
Without microalbuminuria (n=14)	8	57.1	6	42.9	14	100.0
With microalbuminuria (n=26)	8	30.8	18	69.2	26	100.0
Z	1.624		1.624		-	
P	> 0.05 (NS)		>0.05 (NS)		-	

RF : Rheumatoid factor

NS : Non Significant.

Table (14) : Correlation coefficient between microalbuminuria and laboratory parameters

Parameter	Microalbuminuria	
	r	P
CRP (mg%)	+ 0.852	< 0.01 (S^{**})
ESR (mm/h)	+ 0.204	> 0.05 (NS)
HB (g%)	- 0.483	> 0.05 (NS)
RF	- 0.81	> 0.05 (NS)

CRP : C-reactive protein.

ESR : Erythrocyte sedimentation rate.

HB : Haemoglubin value.

RF : Rheumatoid factor.

NS : Non significant

S^{**} : Highly significant

Table (15) : Correlation coefficient between microalbuminuria and clinical parameters

Parameter	Microalbuminuria	
	r	P
Duration of disease (Years)	+ 0.372	< 0.05 (S^*)
Duration of morning stiffness (Hours)	+ 909	< 0.01 (S^{**})

S^* : Significant

S^{**} : Highly significant.