RESULTS

The study was carried out on 35 patients with diabetic foot wound admitted to the General Surgery Department in Benha University Hospital .They were 19 males and 16 females .Their ages ranged from 50 to 70 years.

The control group consisted of 10 healthy persons , their ages ranged from 50 to 70 years .

Blood samples were collected from healthy persons of control group and from studied patients at the beginning of the study and the phagocytic index was determined for each case.

Pus aspirates were collected from the foot wound and cultured to isolate and identify the causative bacteria and antibiotic susceptibility pattern was done for all bacterial isolates .

All patients received a standered therapy of (insulin , antibiotics as determined from antibiotic susceptibility tests , surgical debridement).

Another blood sample was collected from each of the studied patient after two weeks of the previously mentioned therapy , and the pahagocytic index was determined by phagocytic test which revealed an increase in phagocytic index in all patients after therapy.

The results of this study are represented in tables 3-24 and figures 13-37.

Table (3): Distribution of control group (10 patients) according to age:

	Number of subjects	Minimum age	Maximum age	Mean ± SD
Age (years)	10	50	70	60.50±7.906

SD: standard deviation.

Table (4): Distribution of study group (35 patients) according to age:

	Number of patients	Minimum age	Maximum age	Mean ± SD
Age (years)	35	50	70	61.17±6.66

SD: standard deviation.

Table (5): Distribution of control group according to sex:

	Number of subjects	%
Male	6	60
Female	4	40
Total	10	100.0

Table (6): Distribution of study group according to sex:

	Number of patients	%
Male	19	54.29
Female	16	45.71
Total	35	100.0

Figure (13): Distribution of control group according to sex:

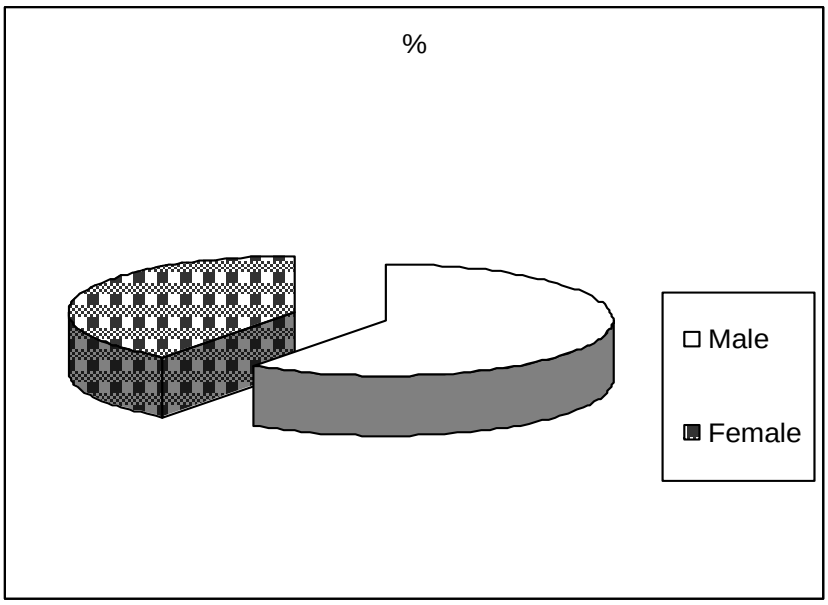


Figure (14): Distribution of study group according to sex:

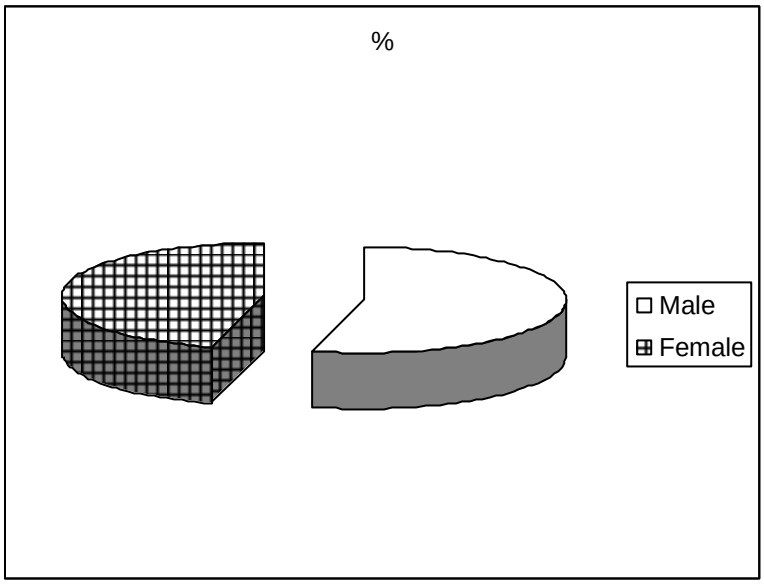


Table (7): Distribution of study group according to previous hospitalization :

	Number of patients	%
Without previous hospitalization	15	42.86
With previous hospitalization	20	57.14
Total	35	100.0

Figure (15): Distribution of study group according to previous hospitalization :

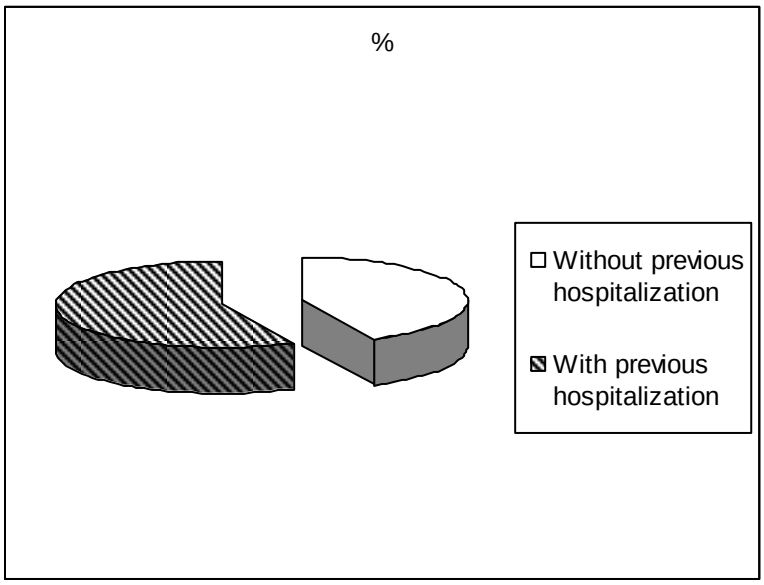
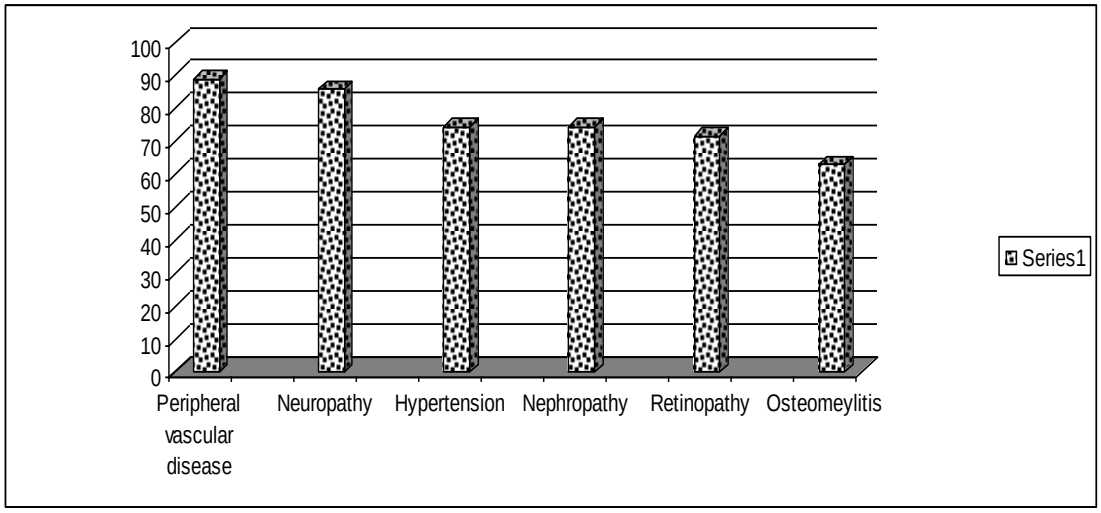


Table (8): Distribution of study group according to associated diseases:

Disaese	Number of patients	%
Peripheral vascular disease	31	88.57
Neuropathy	30	85.71
Hypertension	26	74.29
Nephropathy	26	74.29
Retinopathy	25	71.43
Osteomeylitis	22	62.86
Total	35	100

Figure(16): Distribution of study group according to associated diseases:



A) Bacteriologic study

Table (9): Distribution of bacterial isolates from diabetic foot as regard gram staining:

	Number of isolates	%
Gram positive cocci	25	41.67
Gram negative bacilli	35	58.33
Toal	60	100

Figure (17): Distribution of bacterial isolates from diabetic foot as regard gram staining:

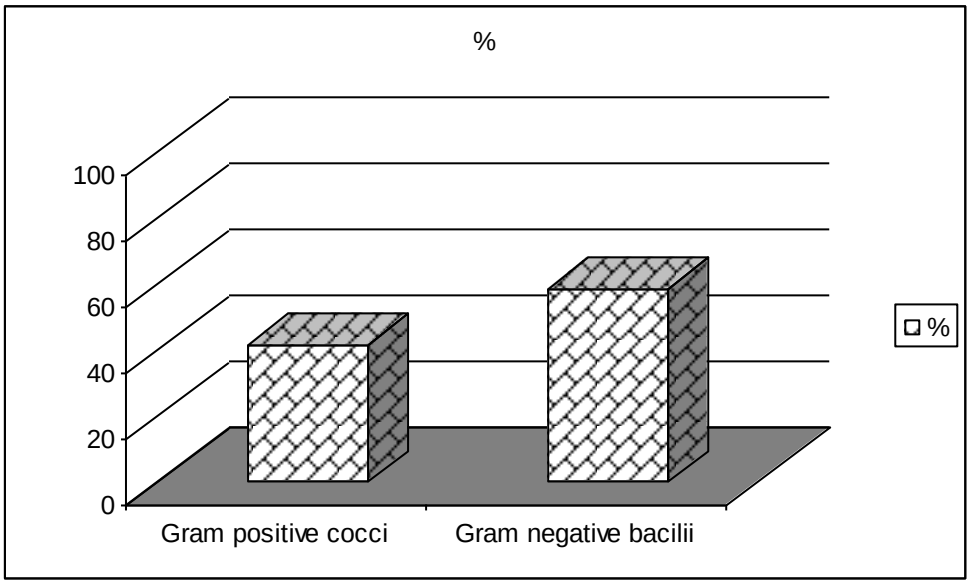
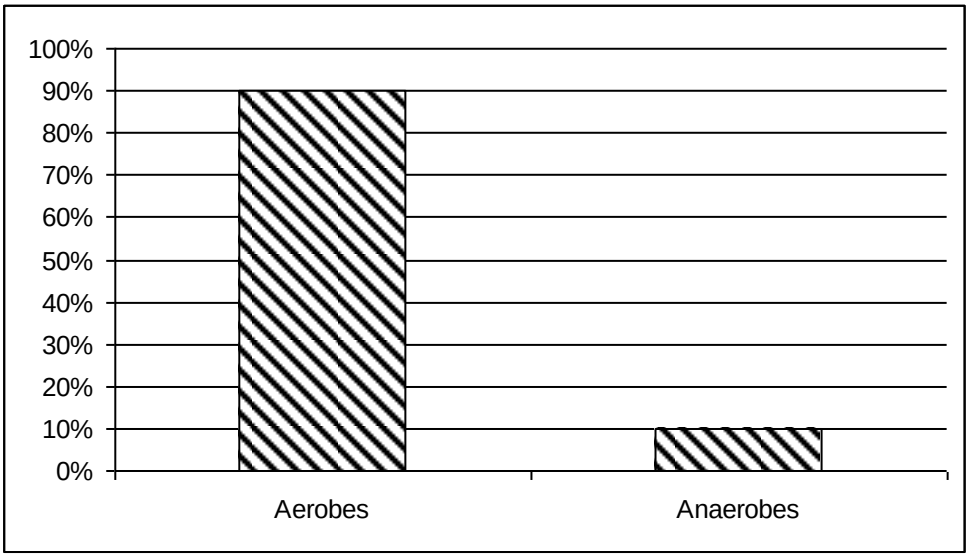


Table (10): Distribution of bacterial isolates from diabetic foot as regard type of respiration:

	Number of isolates	%
Aerobes	54	90
Anaerobes	6	10
Total	60	100

Figure (18): Distribution of bacterial isolates from diabetic foot as regard type of respiration:



Table(11): Bacterial isolates from diabetic foot in the study group:

Frequency / Organism	Number of isolates	%
Staphylococcus aureus	15	25
Pseudomonas aeruginosa	11	18.33
Proteus mirabilis	9	15
Enterococci	6	10
Gram negative Anaerobes	6	10
E. coli	4	6.67
Klebsiella	3	5
Citrobacter	2	3.33
Coagulase negative staph	2	3.33
Sterptococcus pyogens	2	3.33
Total	60	100

Table (11) shows the organisms that were isolated from the diabetic foot infections . They were 60 bacterial isolates. Staph aureus and Pseudomonas aeruginosa were the bacterial species most commonly isolated from diabetic foot wounds.

Figure(19): Bacterial isolates from diabetic foot in the study group:

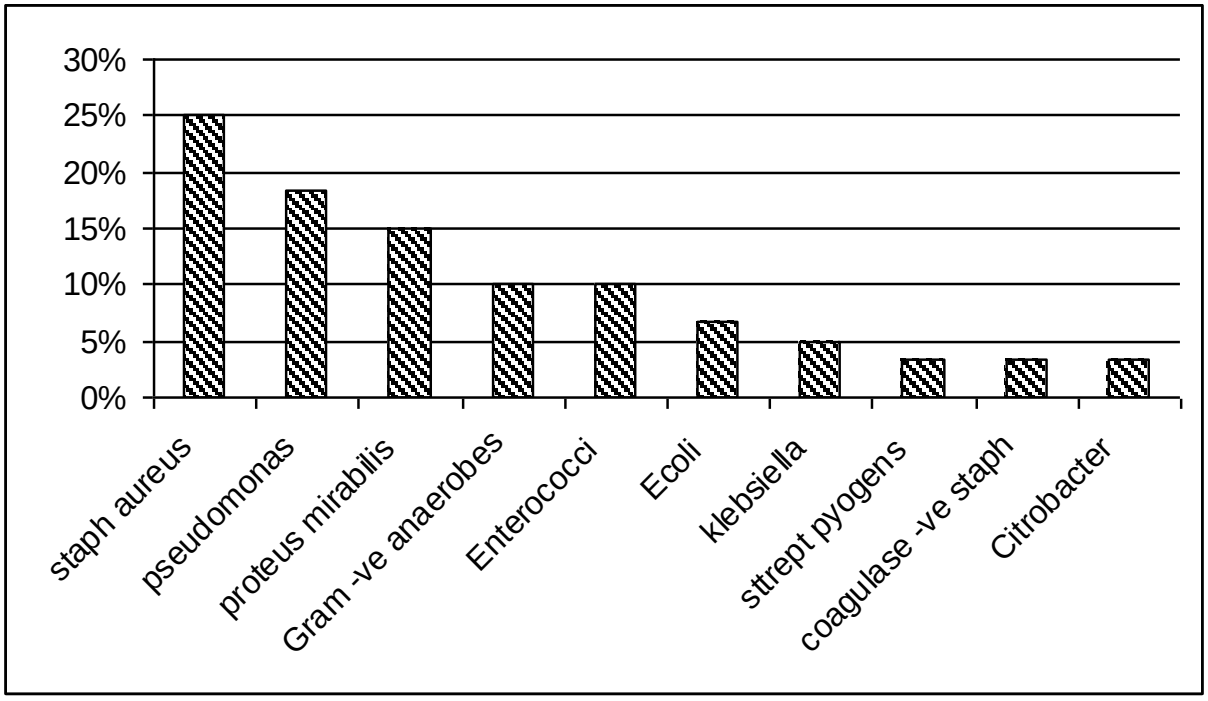


Table (12): Distribution of study group as regard etiology : polymicrobial or unimicrobial.

	Number of patients	%
One type of bacteria	12	34.29
Mixed infection	23	65.71
Total	35	100

Figure(20): Distribution of study group as regard etiology : polymicrobial or unimicrobial.

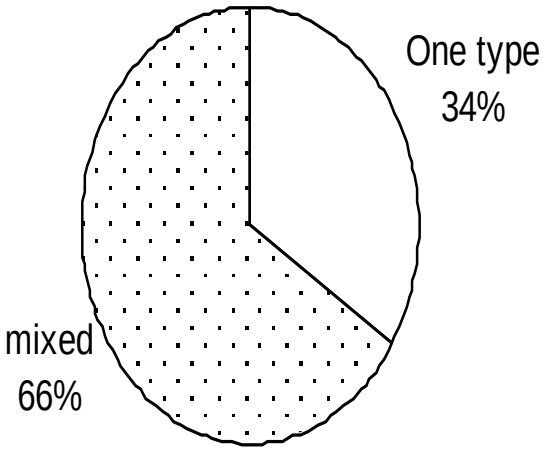


Table (13) : Bacterial isolates in the (12) patients with one type of bacteria:

	Number of patients	%
Pseudomonas aeruginosa	5	41.67
Staphylococcus aureus	4	33.33
Coagulase negative staph	2	16.67
Proteus mirabilis	1	8.33
Total	12	100

Figure (21):Bacterial isolates in the (12) patients with one type of bacteria:

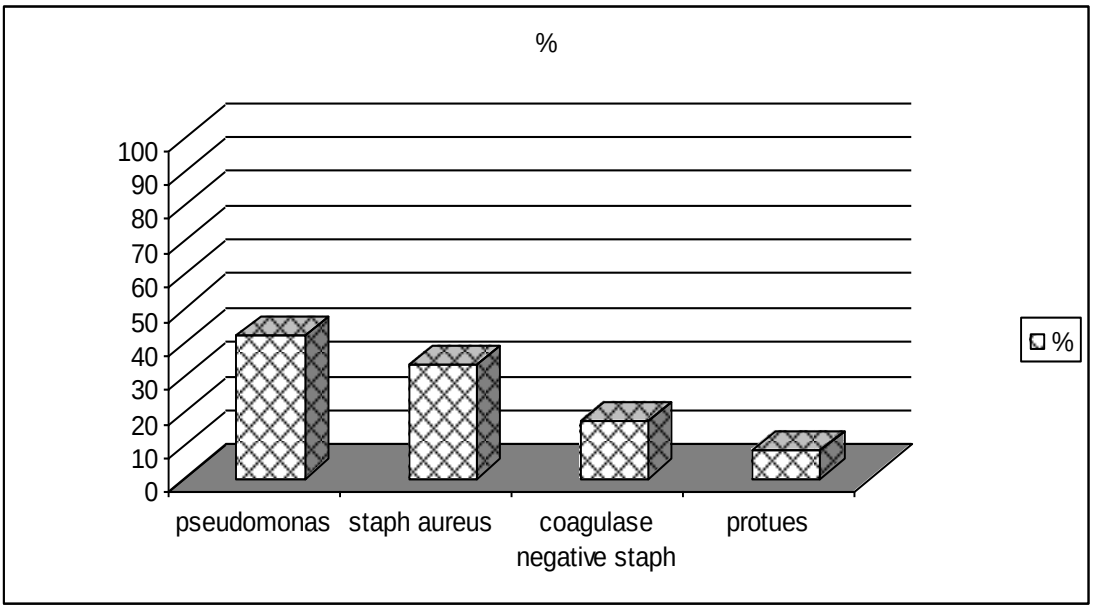


Table (14): Bacterial isolates in the (23) patients with mixed infection:

	No. Of patients	%
A- Staph aureus + Gram –ve anaerobes	3	13.04
B- Proteus mirabilis + Gram –ve anaerobes	2	8.7
C- Proteus mirabilis + Klebsiella	2	8.7
D- Staph aureus + Enterococci	2	8.7
E- Staph aureus + E- coli	2	8.7
F- Pseudomonas aeruginosa + Enterococci	2	8.7
G- Proteus mirabilis + Citrobacter	1	4.35
H- Proteus mirabilis + Enterococci	1	4.35
I- Proteus mirabilis + E- coli	1	4.35
J- Pseudomonas aeruginosa + E coli	1	4.35
K- Pseudomonas aeruginosa + Sterptococcus pyogens	1	4.35
L- Pseudomonas aeruginosa +Enterococci+ Klebsiella	1	4.35
M- Staph aureus + Pseudomonas aeruginosa	1	4.35
N- Staph aureus + Sterptococcus pyogens	1	4.35
O- Staph aureus + Proteus mirabilis + Gram –ve anaerobes	1	4.35
P- Staph aureus + Citrobacter	1	4.35
Total	23	100

Figure(22): Bacterial isolates in the (23) patients with mixed infection:

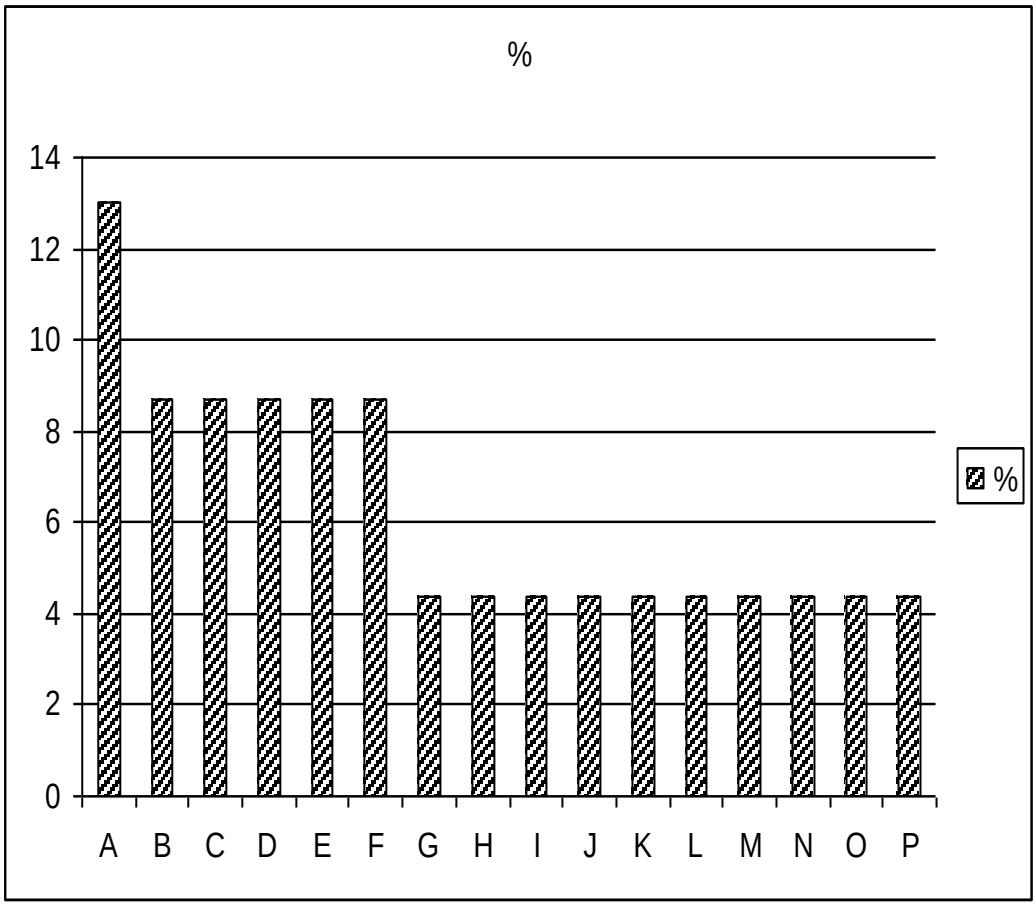


Table (15): Antimicrobial resistance pattern of gram positive organisms in the study group:

Organism / Antibiotic	Staph. aureus (n=15)		Sterpt. pyogens (n=2)		Enterococci (n=6)		Coagulase -ve Staph (n=2)	
	No	%	No	%	No	%	No	%
Ampicillin	--	--	0	0	1	16.67	--	--
Vancomycin	0	0	0	0	0	0	2	100
Azithromycin	7	46.67	0	0	1	16.67	2	100
Methicillin	7	46.67	--	--	--	--	--	--
Cefazolin	2	13.33	--	--	--	--	--	--
Ciprofloxacin	1	6.67	--	--	--	--	0	0

No: number of isolates .

Table (15) shows the antimicrobial susceptibility pattern of the gram-positive organisms . (46.67 %) of Staph aureus isolates were resistant to Methicillin and all were susceptible to Vancomycin . Vancomycin was the most effective antimicrobial agent against all the gram positive isolated species .

Figure (23): Percentage of Resistance pattern of Staph aureus to different antibiotics:

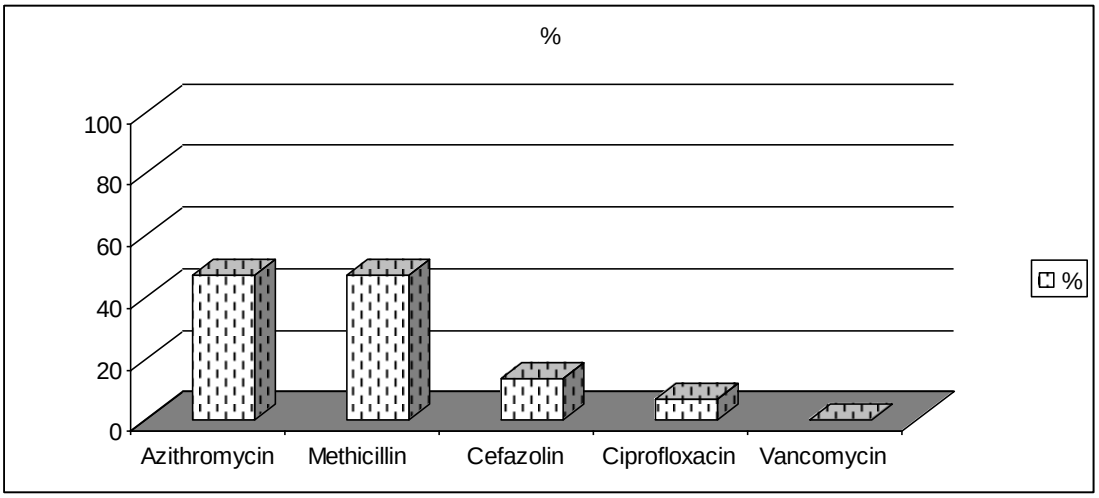


Figure (24): Antimicrobial resistance pattern of gram positive organisms to Azithromycin :

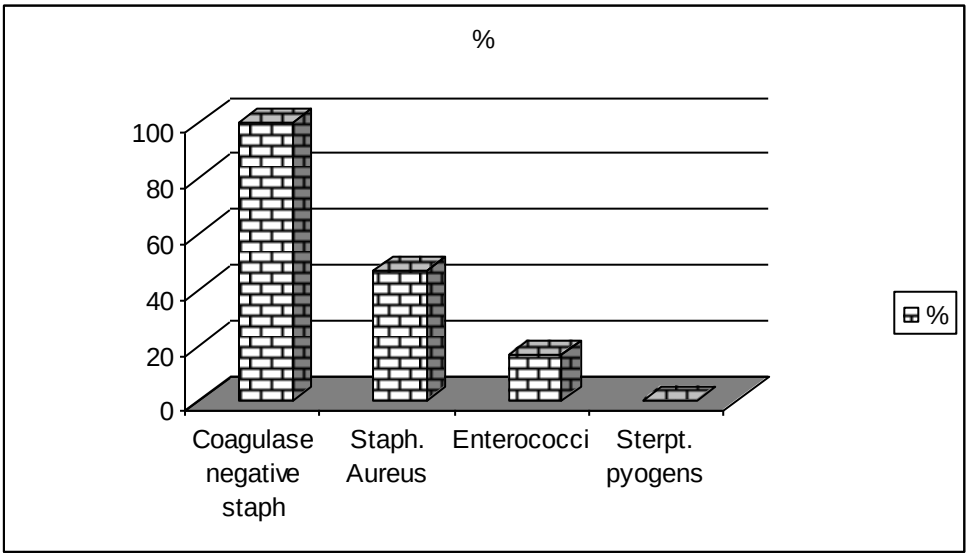


Figure (25): Antimicrobial resistance pattern of gram positive organisms to Vancomycin :

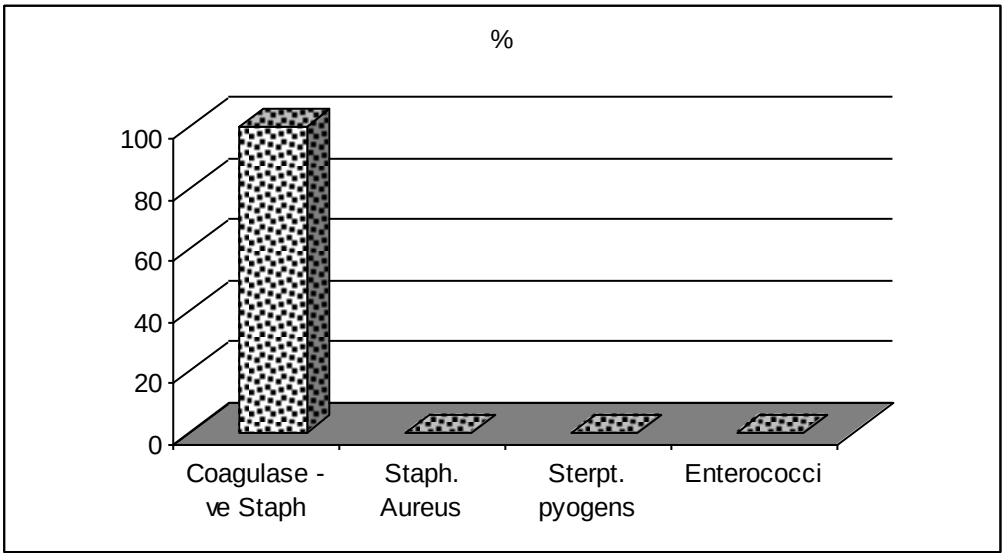


Table (16) : Antimicrobial resistance pattern of gram negative organisms in the study group:

Organism / Antibiotic	Pseudomonas aeruginosa (n=11)		Proteus mirabilis (n=9)		E. coli (n=4)		Klebsiella (n=3)		Citrobacter (n=2)	
	No	%	No	%	No	%	No	%	No	%
Ampicillin	0	0	6	66.67	2	50	3	100	0	0
Gentamycin	1	9.09	1	11.11	0	0	3	100	0	0
Cefotaxime	9	81.81	0	0	0	0	3	100	0	0
Ciprofloxacin	1	9.09	0	0	0	0	0	0	0	0

No: number of isolates .

Table(16) shows the antimicrobial susceptibility pattern of the gram-negative organisms is shown in Ciprofloxacin was the most effective antimicrobial agent against all the gram negative isolated species .

Figure (26) : Percentage of Resistance pattern of Pseudomonas aeruginosa to different antibiotics:

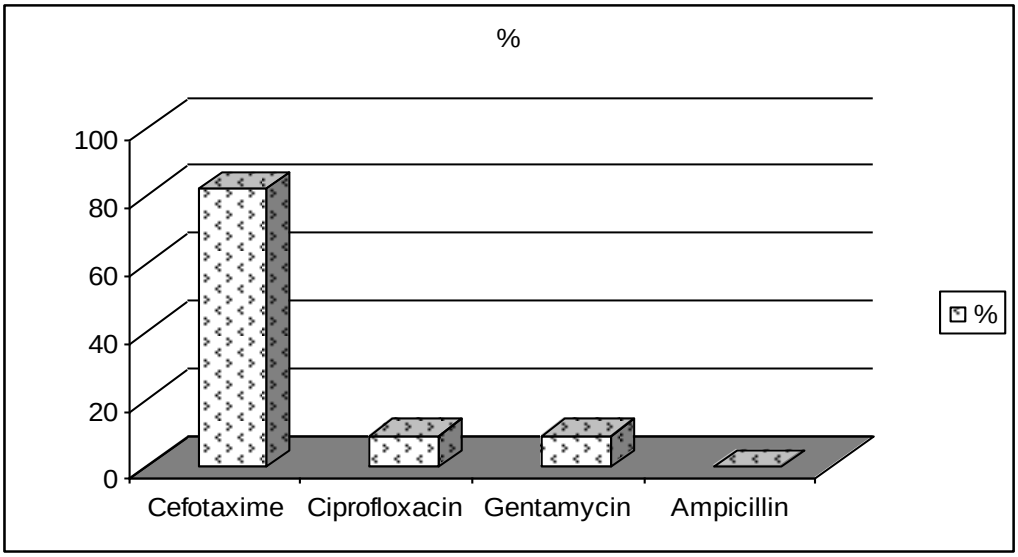
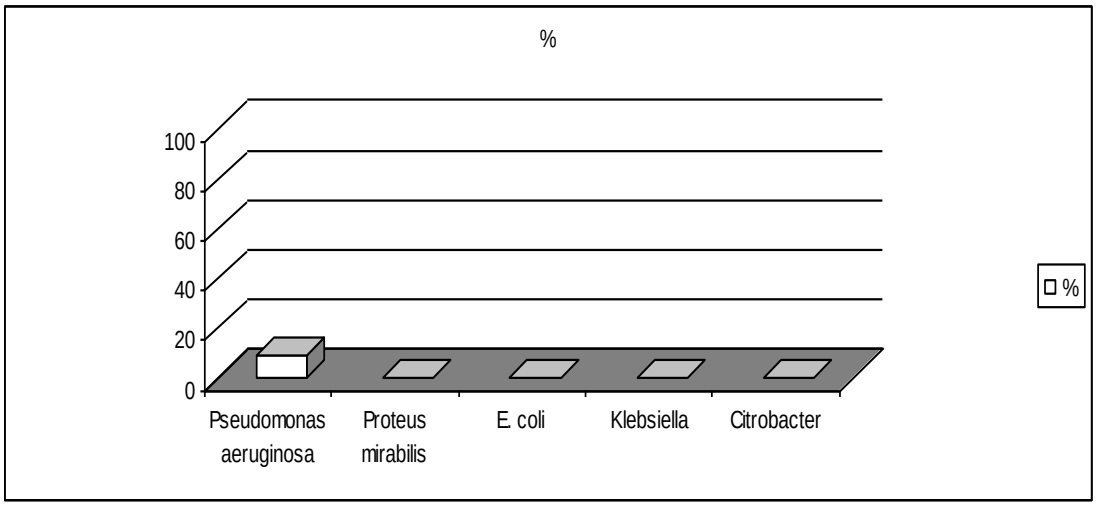


Figure (27): Antimicrobial resistance pattern of gram negative organisms to Ciprofloxacin:

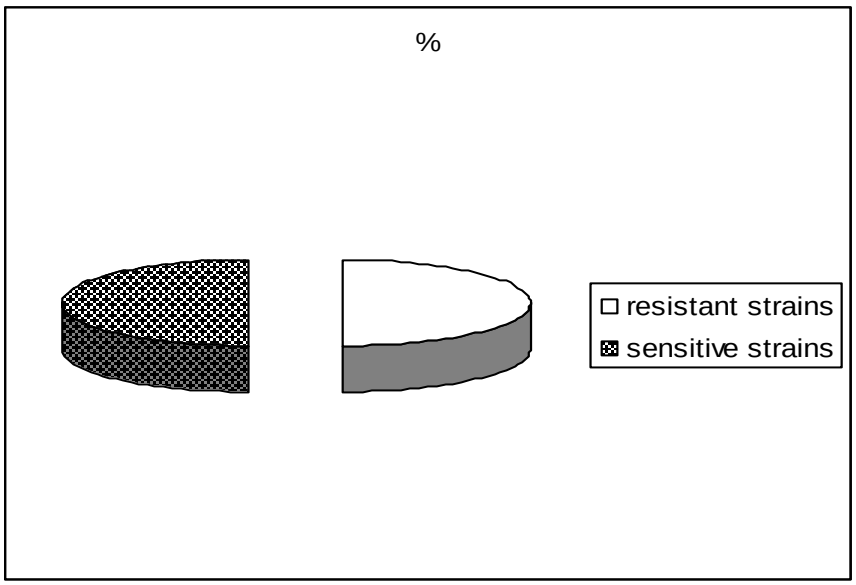


Table(17) : Antimicrobial resistance pattern of gram negative anaerobic organisms in the study group:

Organism / Antibiotic	Gram –ve anaerobes (n=6)	
	No	%
Clindamycin	3	50

No: number of isolates .

Figure (28): Antimicrobial resistance pattern of gram negative anaerobic organisms in the study group :



B) Immunologic study:

Phagocytic index :

Table (18) : Phagocytic index (PI) values of control group:

	Number of subjects	Mean ± SD
Phagocytic index (PI)	10	5.130±1.8494

SD: standard deviation

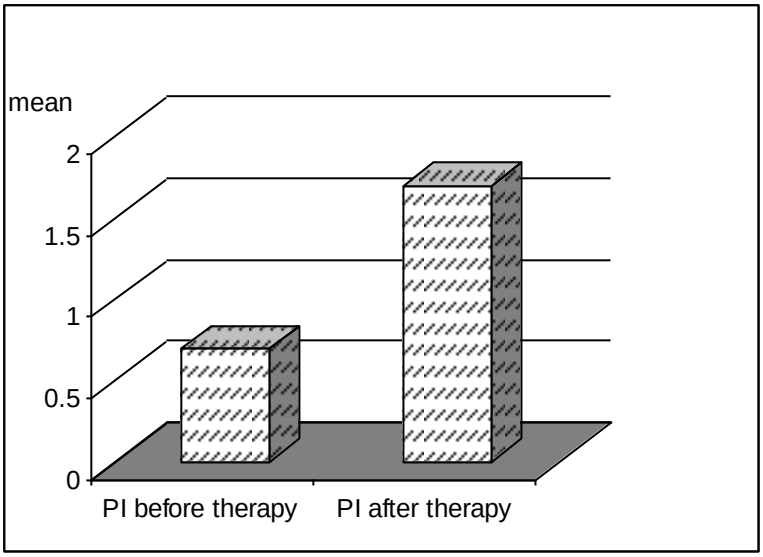
Table (19) : Comparison of phgocytic index (PI)values of study group before and after therapy:

		Number of patients	Mean ± SD	t	p*
Phagocytic index (PI)	***before therapy***	35	0.697 ± 0.3417	16.2	<0.001 (HS) *
	after therapy	35	1.694 ± 0.2531		

SD: standard deviation
*P = <0.001 is highly significant(HS)

Table (19) shows changes in phagocytic index over the treatment course**,** a significant difference was observed in phagocytic index before and after the 2 weeks therapy .

Figure (29) : Comparison of phgocytic index (PI) values of study group before and after therapy:



C) Clinical study

Blood glucose values:

Table (20) : Blood glucose values of control group:

	Number of subjects	Mean ± SD
Fasting blood sugar (FBS)	10	112.40±8.758
2h post prandial (2HPP)	10	124.30±41.567

Table (21) : Comparison of blood glucose values of study group before and after therapy :

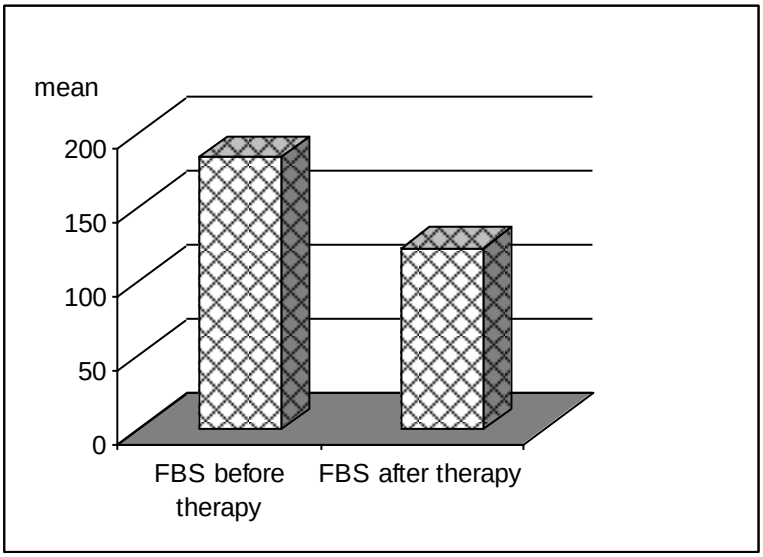
		Number of patients	Mean ± SD	t	p
Fasting blood sugar (FBS)	***before therapy***	35	183.69±12.192	23.6	<0.001* (HS)
	after therapy	35	122.37±9.091		
2h post prandial (2HPP)	***after therapy***	35	277.40±29.153	17.6	<0.001* (HS)
	after therapy	35	175.69±15.431		

SD: standard deviation

* p = <0.001 is highy significant (HS)

Table (21) shows changes in blood glucose values over the treatment course is shown in the mean values of fasting and 2 hour postprandial blood sugar were significantly decreased after the course of treatment.

Figure(30) : Comparison of Fasting blood sugar (FBS) values of study group before and after therapy:



Figure(31) : Comparison of 2h post prandial (2HPP) values of blood glucose of study group before and after therapy:

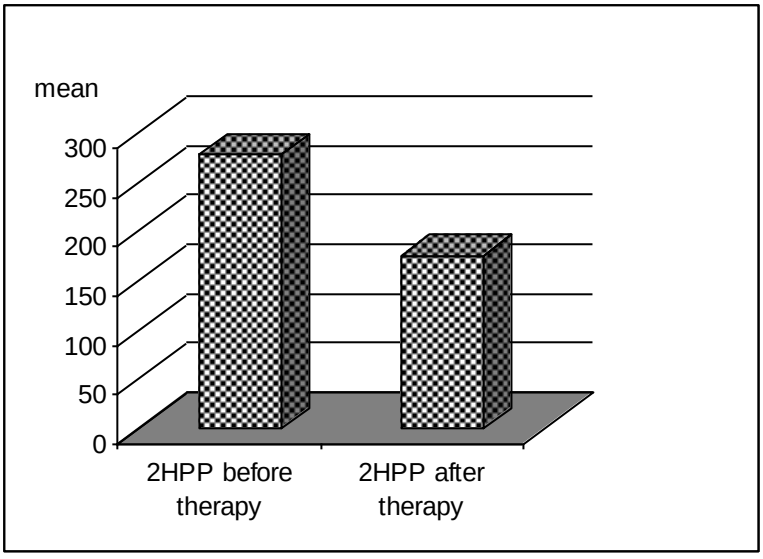


Table (22) : Correlation between phagocytic index (PI) & blood sugar values of control group:

	PI		
	Number of subjects	P*	r
FBS	10	< 0.001*	-0.969
2HPP	10	< 0.05*	-0.103

*P = <0.05 is significant(S).

*P = <0.001 is highly significant(S).

Figure (32) : Correlation between phagocytic index (PI) & fasting blood sugar values of control group:

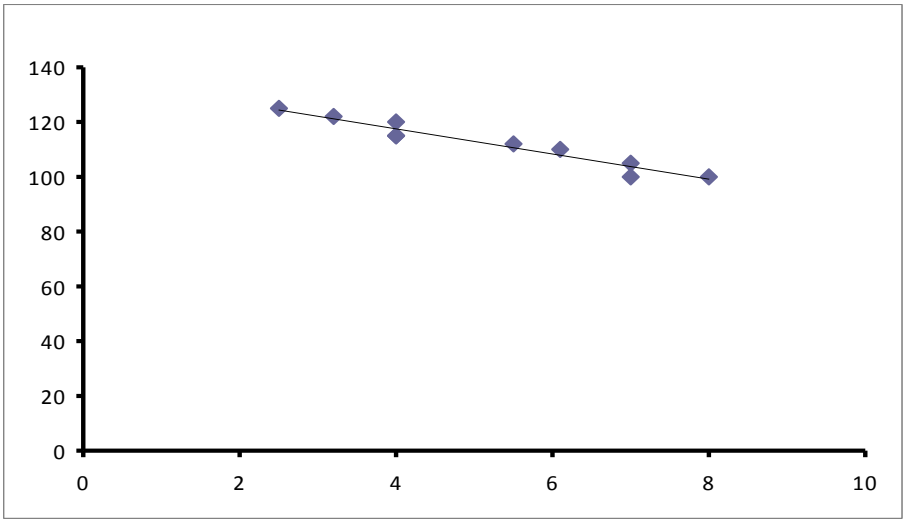


Figure (33) : Correlation between phagocytic index (PI) & 2HPP blood sugar values of control group:

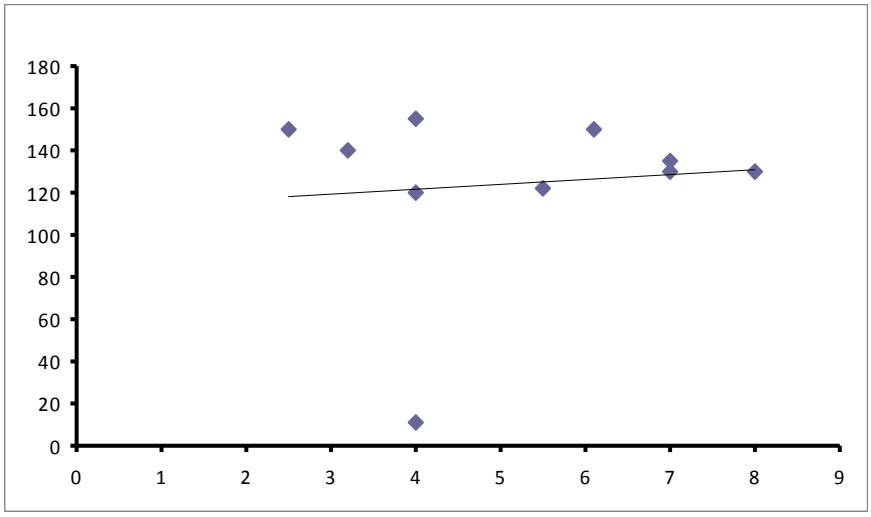


Table (23) : Correlation between phagocytic index (PI) & blood sugar values of study group before therapy:

	PI before therapy		
	Number of patients	P*	r
FBS before therapy	35	0.031*	-0.364
2HPP before therapy	35	0.041*	-0.347

*****P = <0.05 is significant(S).

Figure (34): Correlation between phagocytic index(PI) & fasting blood sugar values of study group before therapy:

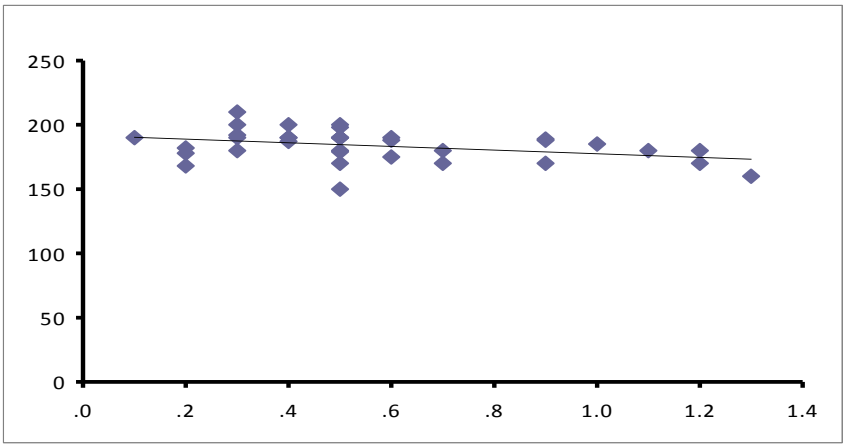


Figure (35): Correlation between phagocytic index & 2HPP blood sugar values of study group before therapy:

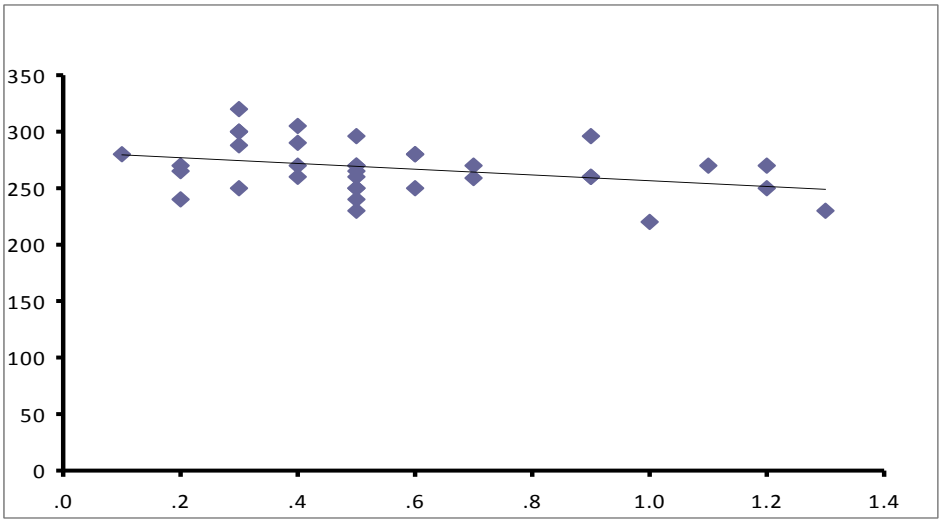


Table (24): Correlation between phagocytic index & blood sugar values of study group after therapy:

	PI after therapy		
	Number of patients	P*	r
FBS after therapy	35	0.001*	-0.553
2HPP after thrapy	35	0.031*	- 0.364

***P= <0.05 is significant(S).

Figure (36): Correlation between phagocytic index & FBS blood sugar values of study group after therapy:

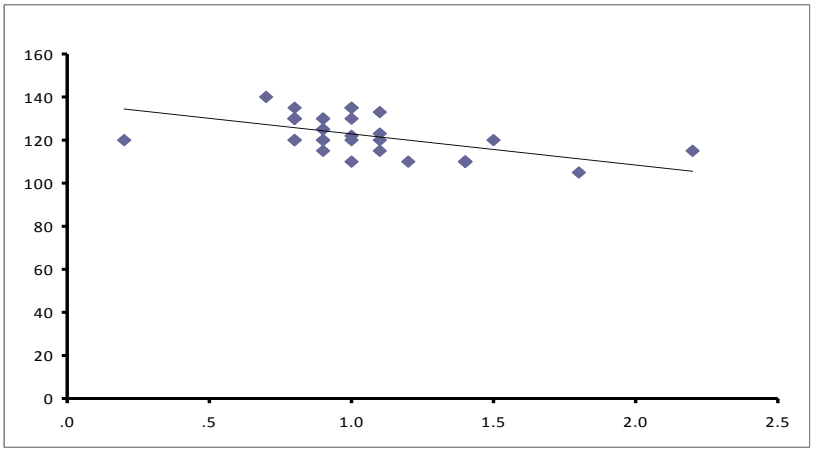
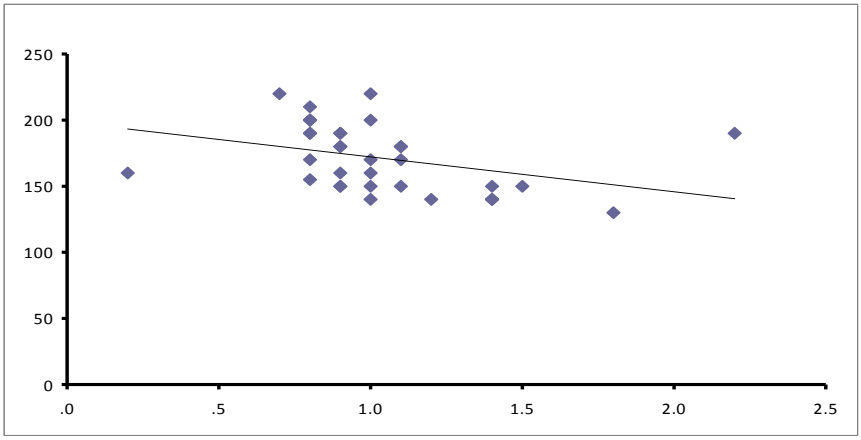


Figure (37): Correlation between phagocytic index & 2HPP blood sugar values of study group after therapy:



Tables (22,23,24) and figures (32,33,34,35,36,37) show a statistically significant negative correlation between phagocytic index and the mean value of blood glucose .