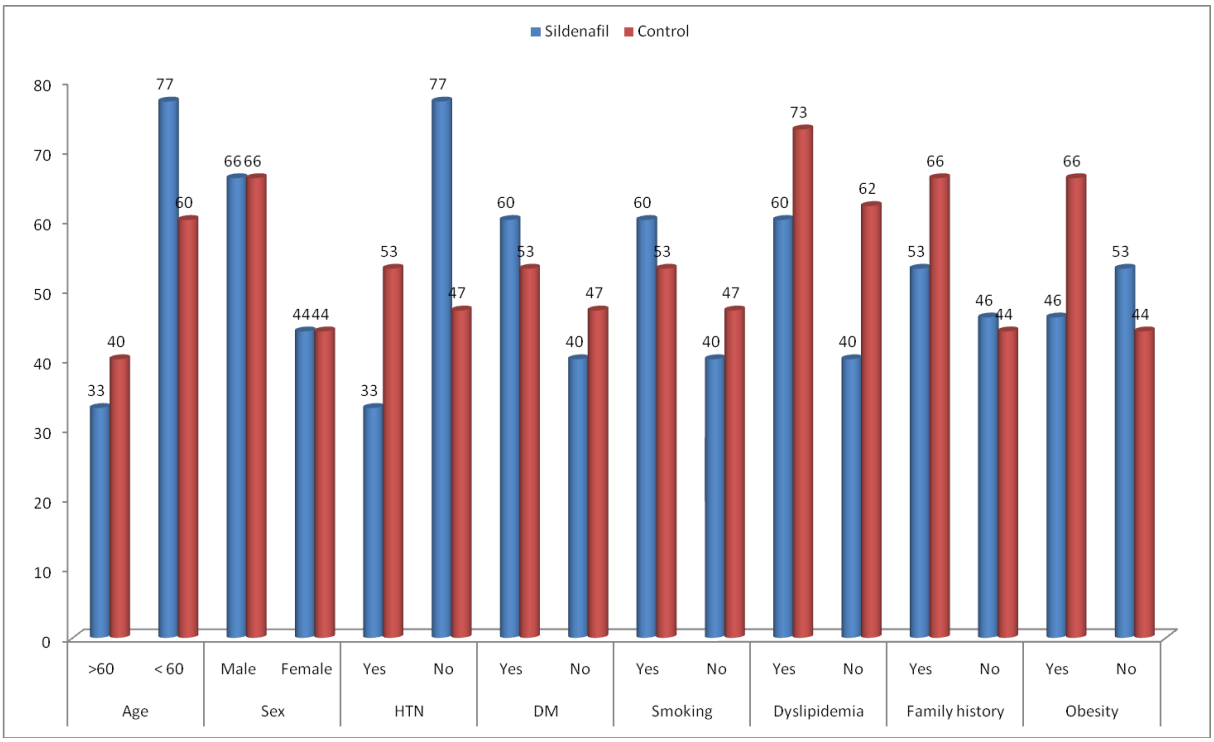
Results

Table (I) Baseline characters of studied patients

		Sildenafil		Control		All patients	
		No	**%**	**No**	**%**	**No**	**%**
Age	>60	5	33	6	40	11	36
	< 60	10	77	9	60	19	64
Sex	Male	10	66	10	66	20	66
	Female	5	44	5	44	10	33
HTN	Yes	5	33	8	53	13	43
	No	10	77	7	47	17	57
DM	Yes	9	60	8	53	17	56
	No	6	40	7	47	13	44
Smoking	Yes	9	60	8	53	17	56
	No	6	40	7	47	13	44
Dyslipidemia	Yes	9	60	11	73	20	66
	No	6	40	4	62	10	33
Family history	Yes	8	53	10	66	18	60
	No	7	46	5	44	12	40
Obesity	Yes	7	46	10	66	17	56
	No	8	53	5	44	13	43

Figure(8) Baseline characters of studied patients



The ages of the patients ranged from 36 to 72 years, with mean age (54± 18) year, of whom 19 patients were younger than 60 years (64%),11 patients were older than 60 years (36%). As regard control group,The ages of the patients ranged from 35 to 65 years, with mean age (49± 16) year, of whom 9 patients were younger than 60 years (60%),6 patients were older than 60 years (40%) while in active group, The ages of the patients ranged from 37to 75 years, with mean age (56± 20) year, of whom 10 patients were younger than 60 years (77%), 5 patients were older than 60 years (33%).

in the current study there were 17 patients who were classified as an obese (BMI > 30), while the remaining 13 patients were within average body weight.as regard control group, there were 10 patients classified as an obese

(BMI> 30), while the remaining 5 patients were within average body weight while in active group, 7 patients were classified as an obese (BMI> 30), while the remaining 8 patients were within average body weight.

Of the index study, 17 patients were current smokers and 13 patients had never smoked. As regard control group, 8 patients were current smokers and 7 patients had never smoked while in active group, 9 patients were current smokers and 6 patients had never smoked.

Of our study population, 13 patients (44%) were non-diabetic and 17 patients(56%) were diabetic, As regard control group, 7 patients (47%) were non-diabetic and 8 (53%) patients were diabetic while in active group, 6 patients (40%) were non-diabetic and 9 patients (60%) were diabetic.

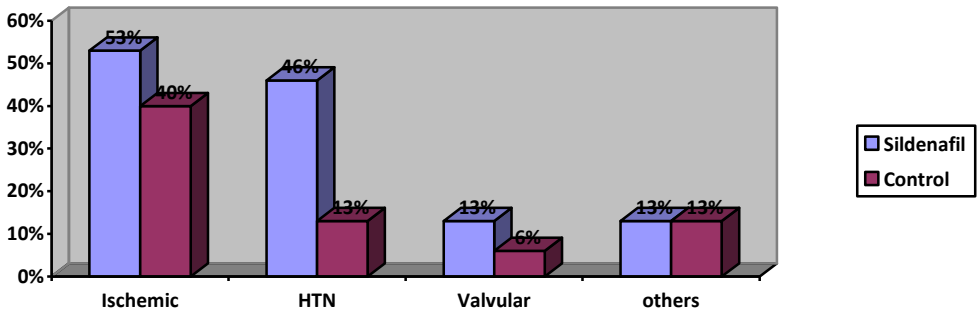
Dyslipidemia presented in 20 patients (66 %). As regard control group, dyslipidemia presented in 11 patients (73%) while in active group, dyslipidemia presented in 9 patients (60%).

Thirteen patients (43 %) were hypertensive and remaining 16 patients (57 %) were normotensive. As regard control group, 8 patients (53 %) were hypertensive and remaining 7 patients (47 %) were normotensive while in active group, 5 patients (33 %) were hypertensive and remaining 10 patients (77 %) were normotensive.

Table (2) Aetiology of heart failure of studied patients

Aetiology	Sildenafil		Control		P value
	No.	%	No.	%	
Ischemic	4	26%	8	53%	>**0.05**
HTN	7	46%	3	20%	<**0.05**
Valvular	2	13%	2	13%	>**0.05**
Others	2	13%	2	13%	>**0.05**

Figure (9); Aetiology of heart failure of studied patients



As regard sildenafil group, 4 patients (26%) ischemic, 7 patients(46%)hypertensive,2 patients(13%)valvular,2 patients(13%)others.

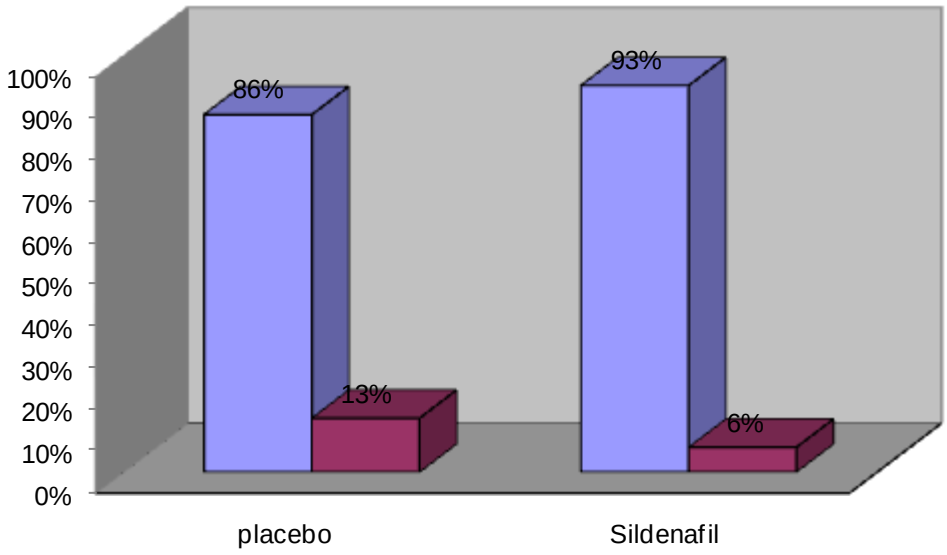
While in control group, 8 patients (53%) ischemic, 3 patients(20%)hypertensive,2 patients (13%)valvular,2 patients(13%)others

Table (3) functional class of studied patients

NYHA class	Sildenafil		Control		P Value
	No.	%	No.	%	
I-II	14	93%	13	86%	> **0.05**
III	1	6%	2	13%	> **0.05**

Figure(10); functional class of studied patients

Regarding functional class of studied patients:

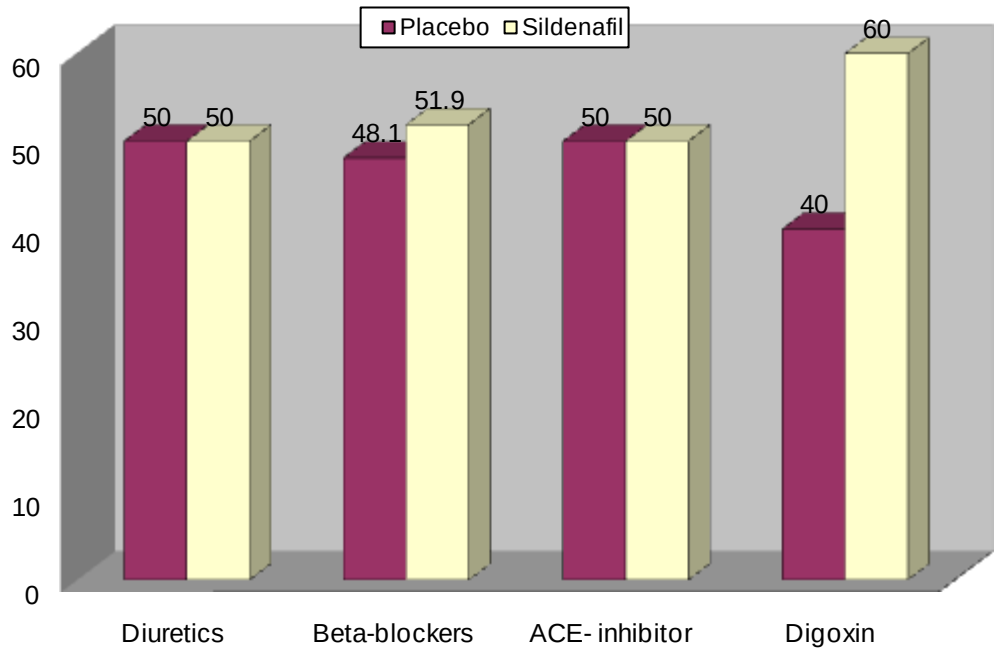


In the current study there were 14 patients (93%) of active group& 13 patients (86%)of control group in NYHA (I-II), while 1 patient(6%)of active group & 2 patients (13%)of control group in NYHA (III). There is no statistically significant difference between sildenafil and control groups.

Table (4) Medications used by studied patients

	All patients	Control	Sildenafil	P value
Diuretics	30	15	15	> 0.05
Beta-blockers	27	13	14	> 0.05
ACE- inhibitor	30	15	15	> 0.05
Digoxin	25	10	15	> 0.05

Figure(11); Medications used by studied patients

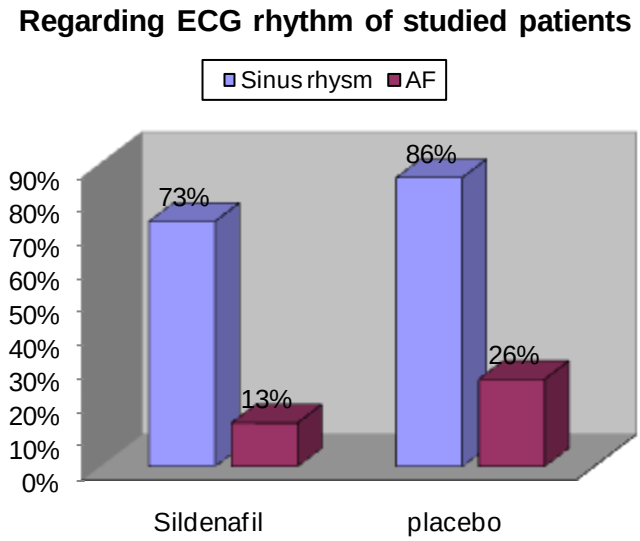


Among study population, all patients received diuretics &ACE-inhibitor.27 patients(90%) received Beta-blockers,25 patients (83%) received digoxin**.**There is no statistically significant difference between sildenafil and control groups.

Table (5); ECG rhythm of studied patients

	Sildenafil		Control		P value
	No.	%	No.	%	
Sinus rhythm	11	73%	13	86%	> **0.05**
AF	4	26%	2	13%	> **0.05**

Figure(12); ECG rhythm of studied patients

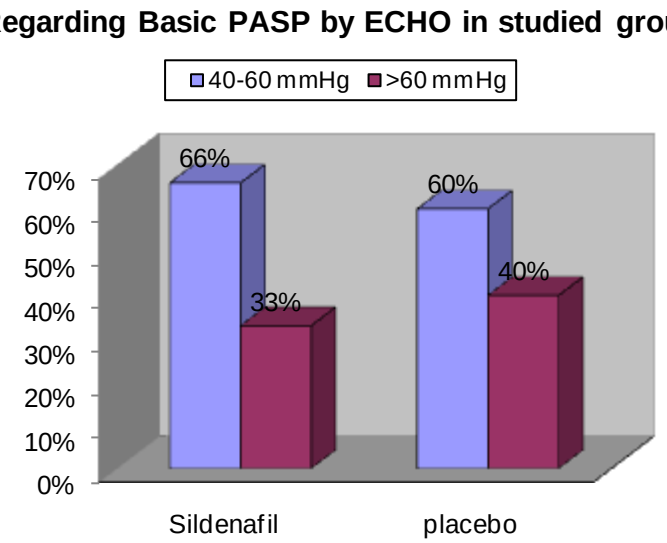


As regard active group,11 patients (73%) had sinus rhythm in ECG ,4 Patients (26%) had AF,while in control group,13patients (86%) had sinus rhythm,2 patients(13%) had AF .There is no statistically significant difference between sildenafil and control groups.

Table (6) Basic PASP by Echo in studied group.

PASP	Control		Sildenafil		P Value
	No.	%	No.	%	
25-40mmHg	-	-		-	
40-60 mmHg	10	66%	9	60%	> **0.05**
>60 mmHg	5	33%	6	40%	> **0.05**

Figure(13); Basic PASP by ECHO in studied group

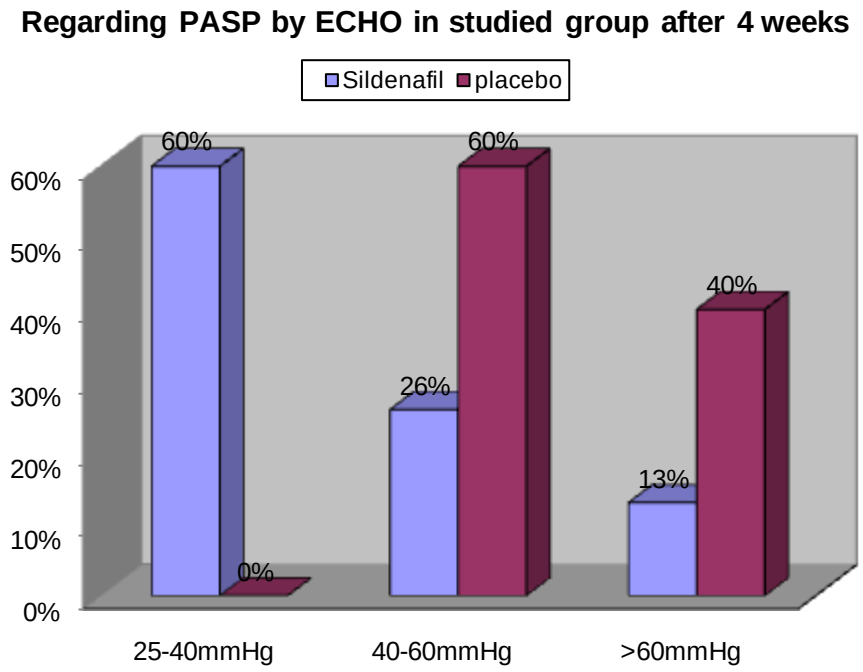


As regard active group, 9 patients(60%)had moderate pulmonary hypertension,6 patients (40%) had sever pulmonary hypertension,while in control group,10 patients (66%) had moderate pulmonary hypertension,5patients (33%)had sever pulmonary hypertension. There is no statistically significant difference between sildenafil and control groups.

Table (7); PASP by ECHO in studied group after 4 weeks

PASP	Sildenafil		Control		P Value
	No.	%	No.	%	
25-40mmHg	9	60%	-		
40-60mmHg	4	26%	9	60%	< **0.05**
>60mmHg	2	13%	6	40%	< **0.05**

Figure(14); PASP by ECHO in studied group after 4 weeks

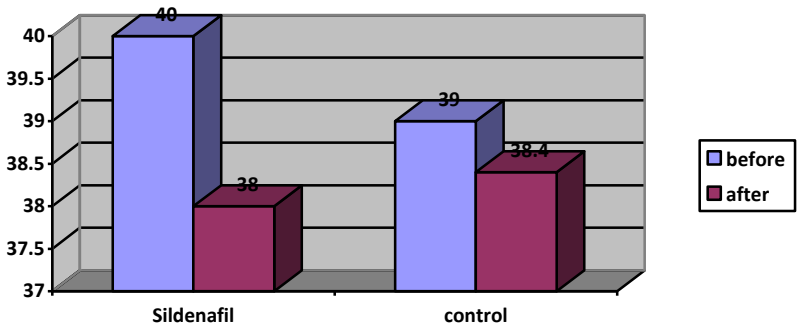


As regard active group,9 patients (60%) had mild pulmonary hypertension,4 patients(26%)had moderate pulmonary hypertension,2 patient (13%) had sever pulmonary hypertension,while in control group,9 patients (60%) had moderate pulmonary hypertension,6 patients (40%)had sever pulmonary hypertension which is statistically significant .

Table (8); Ejection Fraction in studied group

EF	Sildenafil		P Value	Control		P Value
	before	After		before	After	
Mean Value (%)	40±1.0	38± 2.0	> 0.05	39 ± 1.0	38.4± 0.5	> 0.05

Figure(15) Ejection Fraction in studied group



There is no statistically significant decrease in EF in sildenafil and control groups after 4 weeks follow up.

Table (9) Effect of Sildenafil or Placebo on Maximal Cardiopulmonary Exercise Test Parameters after 4 weeks

	Control		Sildenafil	
	Before	**After**	**Before**	**After**
Peak Exercise				
VE peak, L/min^{-1}	49± 11	50 ± 10	50 ± 11	55 ± 12
VO_2 peak, $mL/kg^{-1}/min^{-1}$	16.4 ± 3	17 ± 2	17.2 ± 2	20 ± 2.5
VCO_2 peak, L/min^{-1}	20 ± 7	20 ± 6	18 ± 3	19 ± 3
R peak	1.04 ± 0.1	1.o5 ± 0.1	1.03 ± 0.1	1 ± 0.1
Ventilatory efficiency				
VE/VCO_2 slope	44.7 ± 6	44.9 ± 6	39.1 ± 6	42.1 ± 5
Recovery gas exchange				
$T_{1/2}$ VE (min)	2.6 ± 1	2.7 ± 1	2.3 ± 0.5	2 ± 0.6
$T_{1/2}$ VO_2 (min)	2.6 ± 0.7	2.66 ± 0.8	2 .0 ± 0.5	1.9 ± 0.7
$T_{1/2}$ VCO_2 (min)	2.5 ± 1	2.6 ± 0.9	2.0 ± 0.4	1.8 ± 0.2

Figure (16a); comparison between Control group and sildenafil groups in R peak

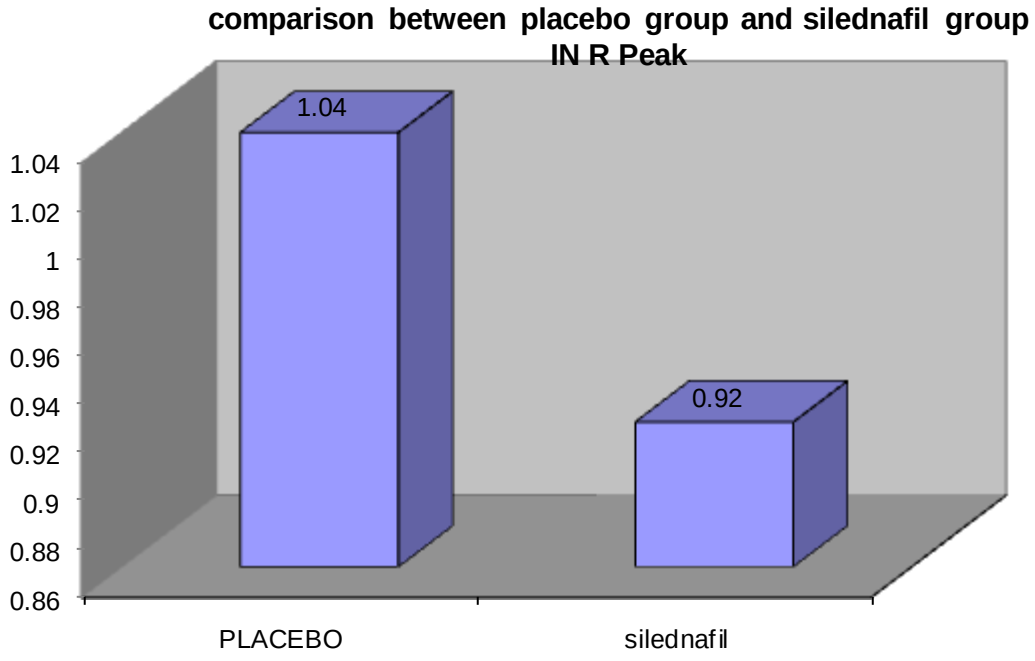


Figure (16b); comparison between Control group and sildenafil groups in VE/VCO_2 slope

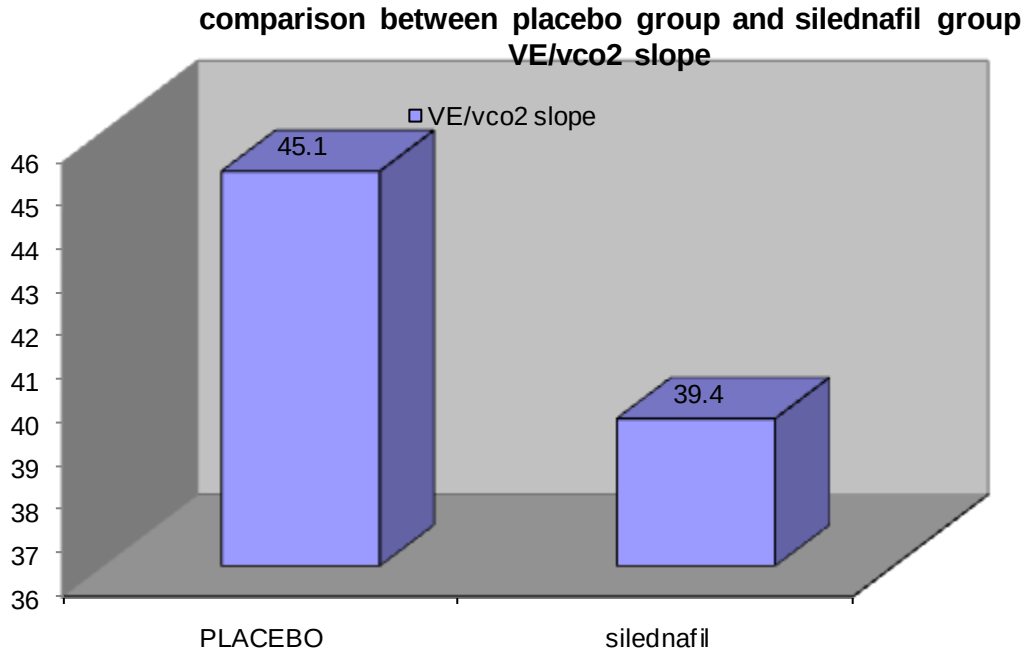


Figure (16c); comparison between Control group and sildenafil groups in T1/2 VO2

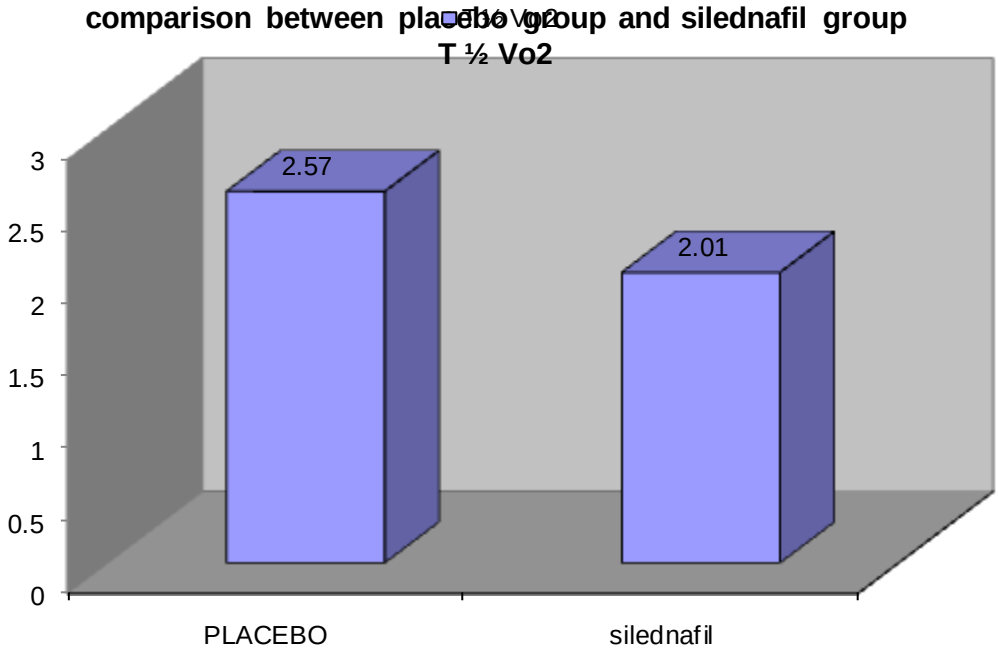
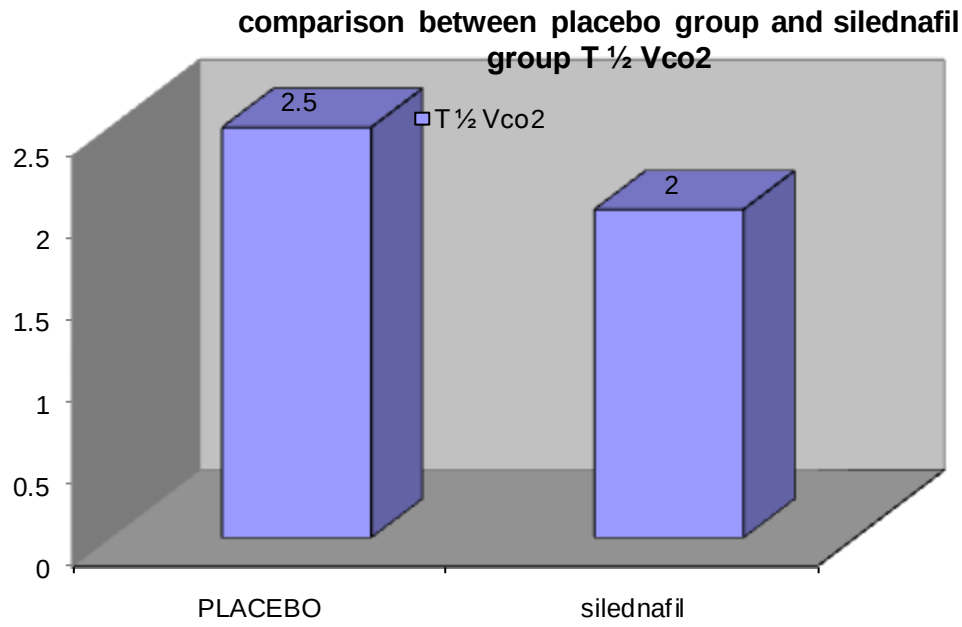


Figure (16d); comparison between Control group and sildenafil groups in T1/2 VCO2

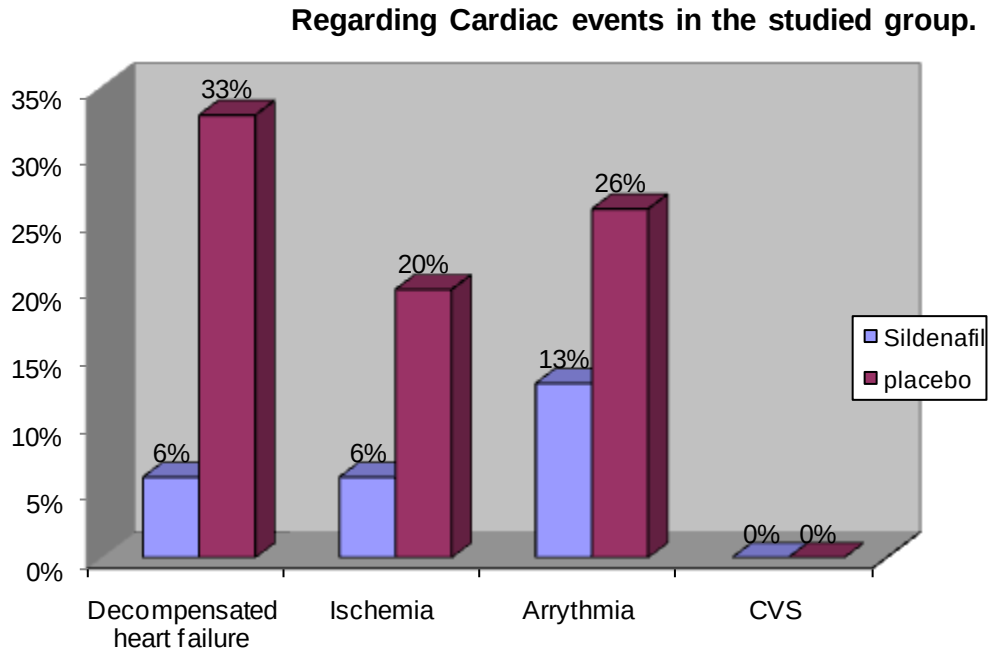


As regard active group, a significant improvement in VO_2 Peak, VE/VCO_2 slope, T-1/2 Vo_2 (min) and T-1/2 VCO_2 (min) occurred, from 17.2 $\pm$ 2, 39.1 $\pm$ 6, 2.0 $\pm$ 0.5 and 2.0 $\pm$ 0.4 to 20 $\pm$ 2.5, 42.1 $\pm$ 5, 1.9 + 0.7 and 1.8 + 0.2 respectively ($p < 0.05$), while in control group, there were no significant improvement in all parameters

Table (10); Cardiac events in the studied group.

PASP	Sildenafil		Control		P Value
	No.	%	No.	%	
Decompensated heart failure	1	6%	5	33%	**<0.05**
Ischemia	1	6%	3	20%	**< 0.05**
Arrhythmias	2	13%	4	26%	**< 0.05**
CVS	NIL		NIL		

Figure (18); Cardiac events in the studied group



As regard active group, Decompensated heart failure occurred in 1 patient (6%), Ischemia occurred in 1 patient (6%), Arrhythmias occurred in 2 patients (13%), while in control group, Decompensated heart failure occurred in 5 patient (33%), Ischemia occurred in 3 patient (20%), Arrhythmias occurred in 4 patients (26%) which is statistically significant ,there was no CVS occurred in both groups during follow up period.

Regarding Mortality in studied patients after 4 weeks:

Concerning Mortality during follow up period, there was no mortality cases in the two groups.