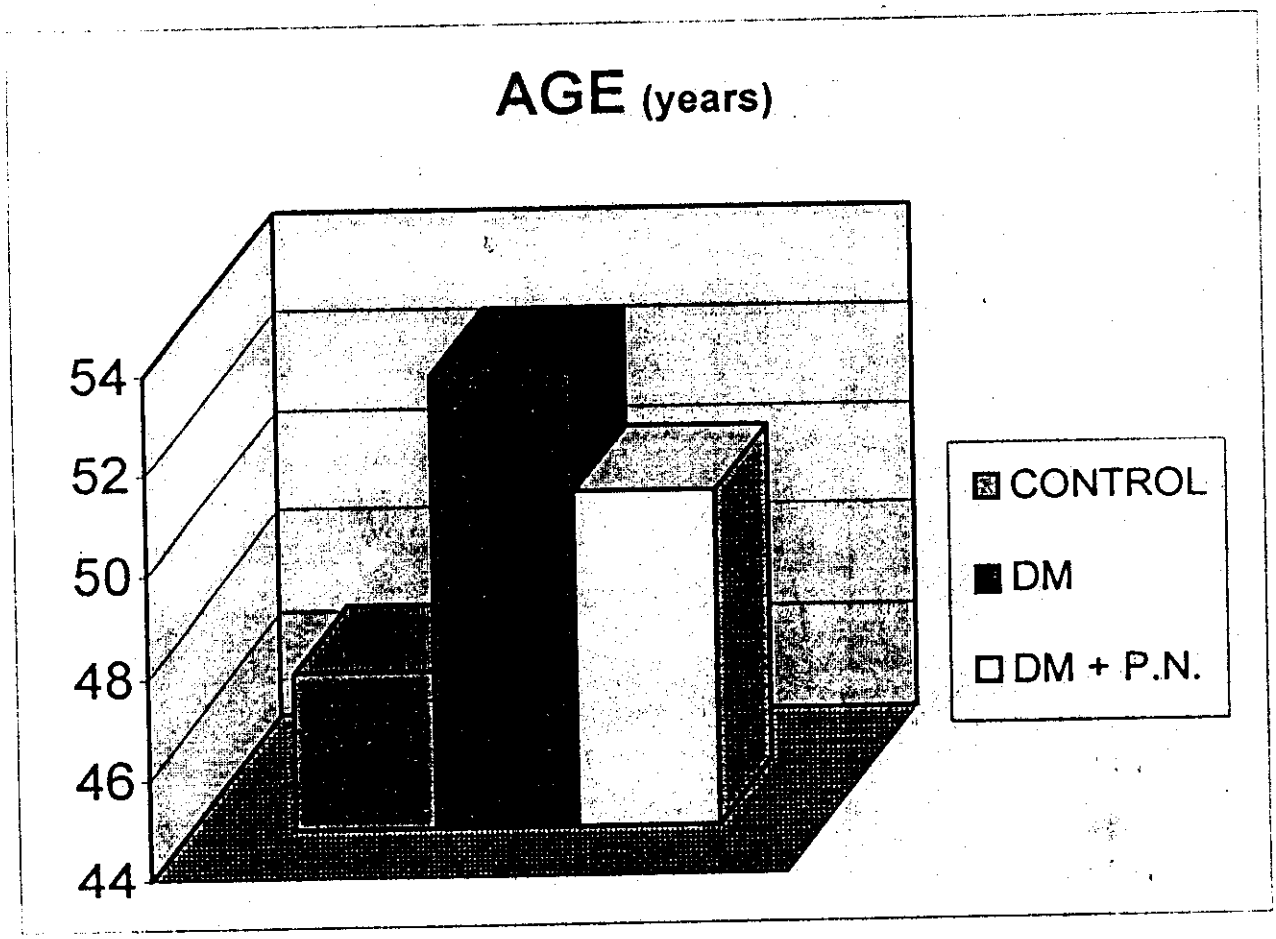
Results

The results of the present work show that there is no significant difference between the studied groups regarding to the age and sex distribution (P > 0.05) .**Table " 1-2 " Fig (1 - 2)**

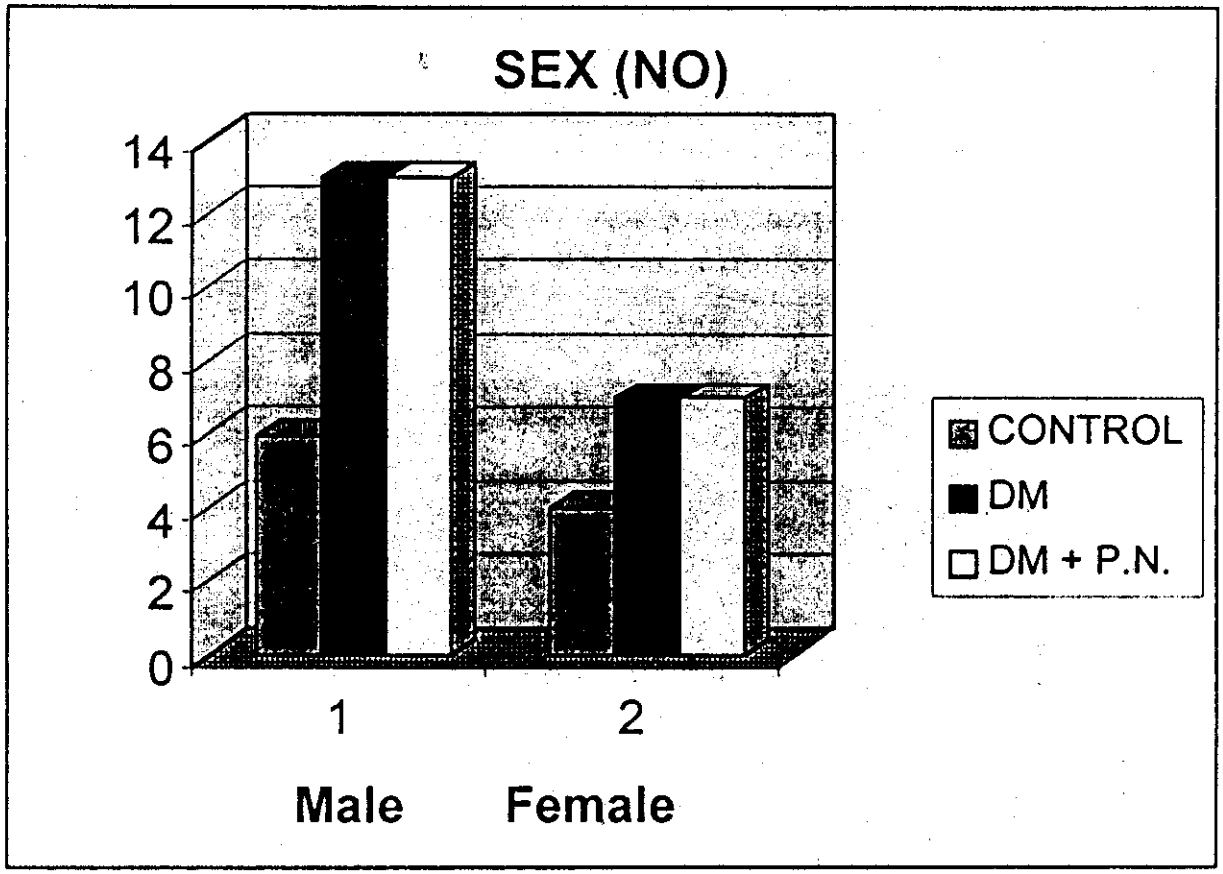
Moreover , there is no significant difference after comparison between male and female patients regarding to the age (P > 0.05) **Table " 3 " Fig.(3)** i.e . there are insignificant correlation between the somatic peripheral neuropathy (P. N.) and the age or sex .

Table (1) Mean and ± SD of age among the studied groups

Age (years) / Groups	$\bar{X}$	± SD	Range		Test of significance	
			Min.	Max .	t	p.
I Control	47.1	9.62	30	62	-	-
II Diabetic without P.N.	53.0	10.28	26	68	1.51	> 0.05
III Diabetic With P.N.	50.6	9.43	29	67	0.95	> 0.05



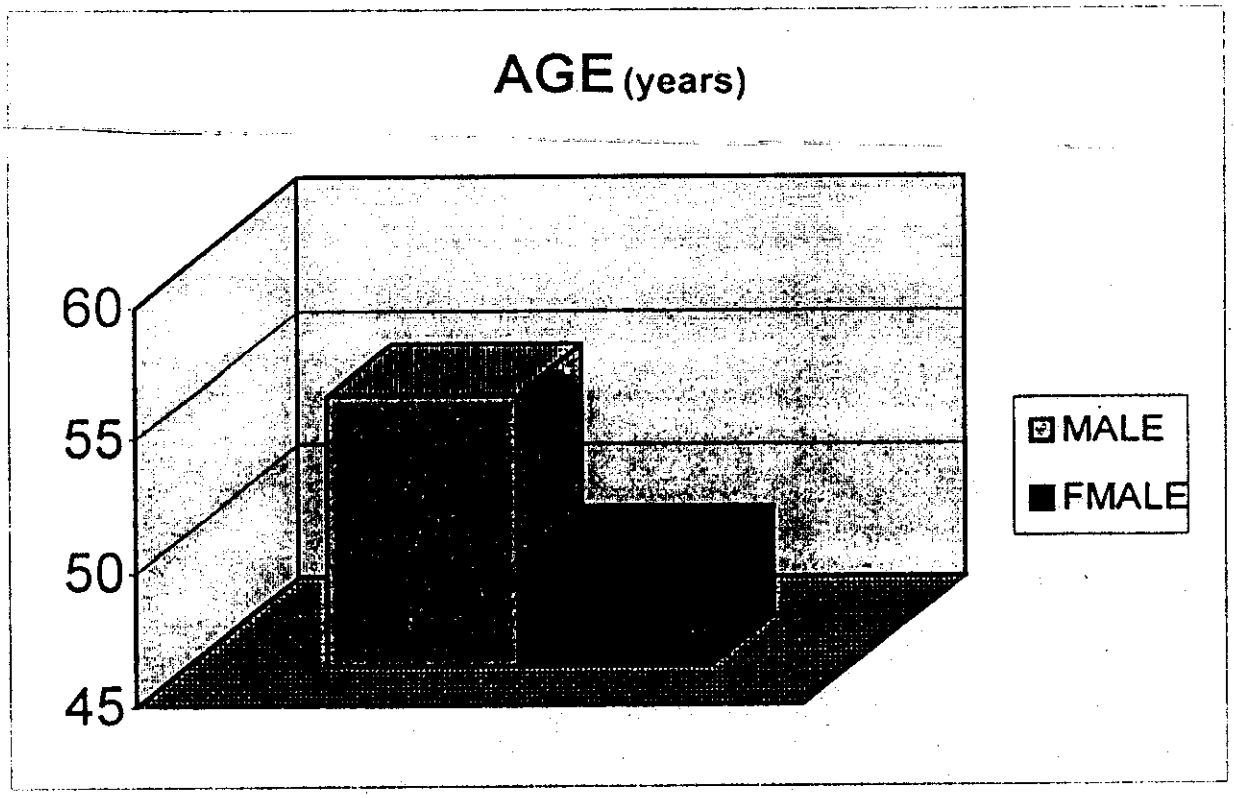
(Fig.1) Age distribution of the studied groups



(Fig.2) Sex distribution of the studied groups

Table(3) Comparison between male and female patients regarding age.

Age (years) / Groups	X̄	± SD	Range		Test of significance	
			Min.	Max	t	p.
Male ♂ (n = 26)	53.23	9.25	29	67	-	-
Female ♀ (n = 14)	49.14	10.63	26	68	1.266	> 0.05

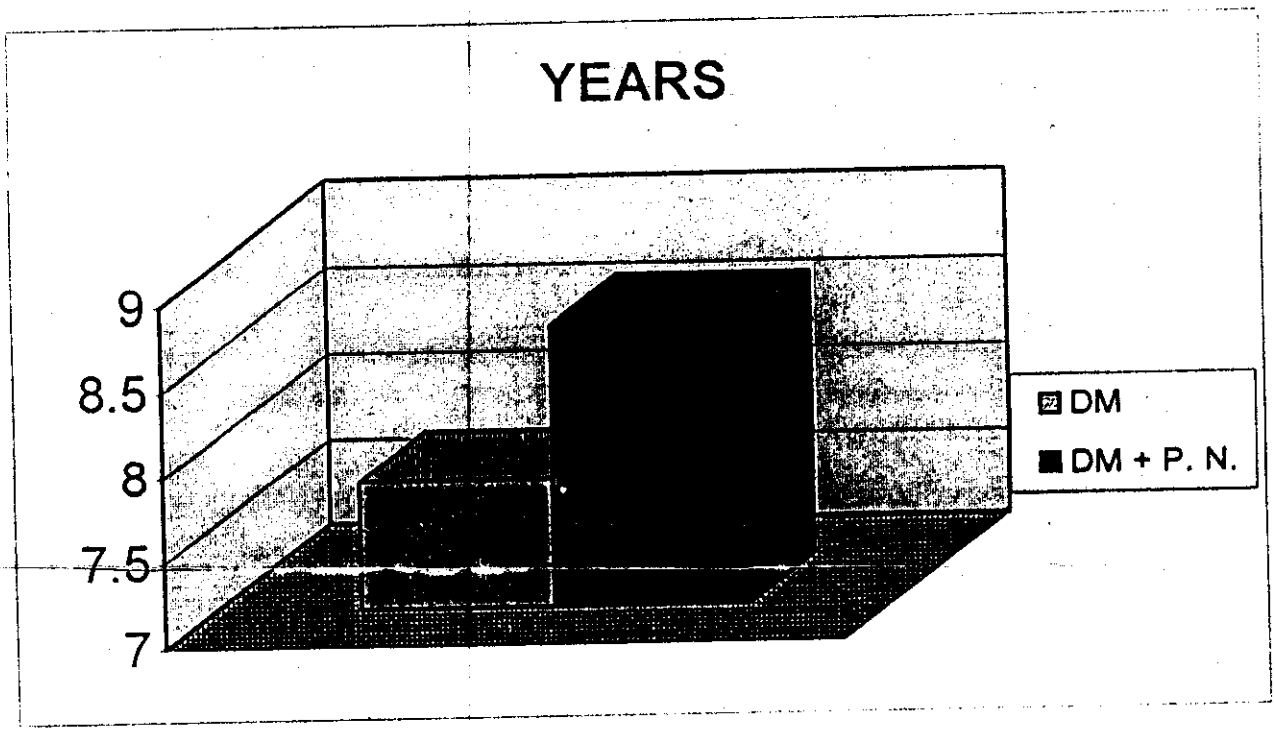


(Fig.3) Male & Female patients regarding to the age

The results show that there is no significant difference between the duration of diabetes mellitus and the diabetic patient groups with or without somatic peripheral neuropathy, i.e. there is no significant correlation between the duration of diabetes mellitus and somatic peripheral neuropathy (P. N.) ($P > 0.05$) **Table (4) Fig. (4).**

Table (4) Mean and ± SD of duration of diabetes mellitus among the studied patients.

Age (years) / Groups	$\bar{X}$	± SD	Range		Test of significance	
			Min.	Max.	t	p.
II D.M. without P.N.	7.75	±5.59	1	21	-	-
III D.M. with P.N.	8.65	± 5.36	1	20	0.514	≥ 0.05



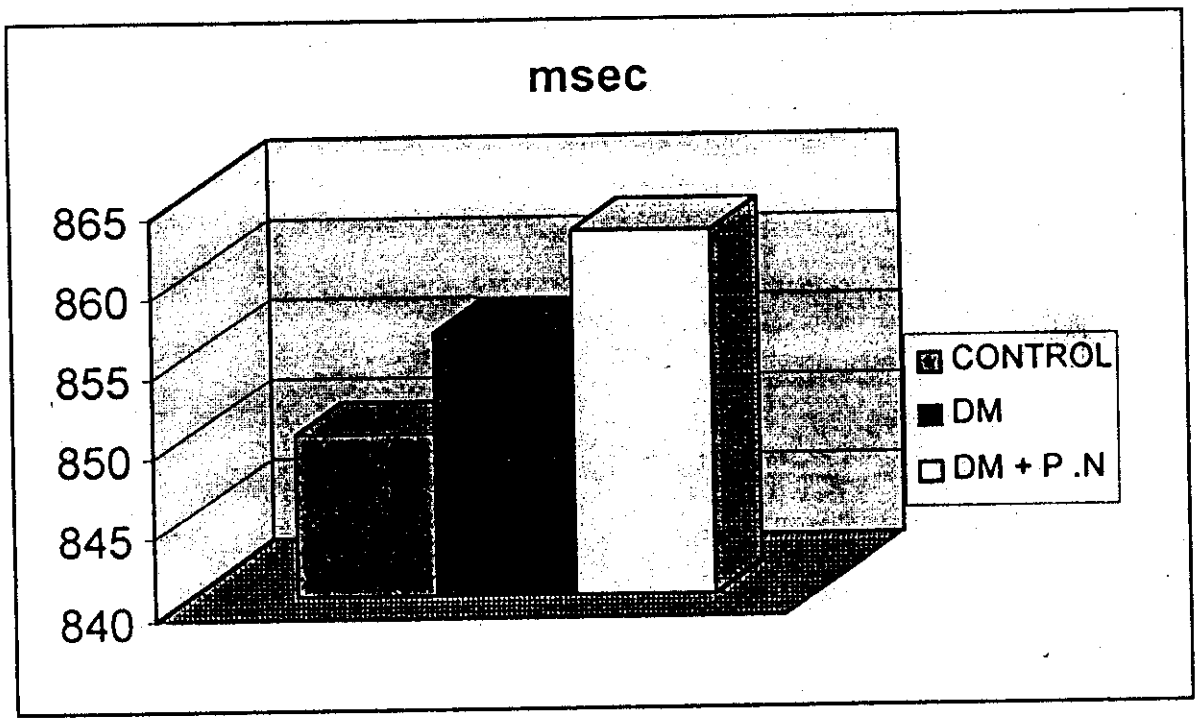
(Fig.4) Mean of the diabetes mellitus duration

Table (5) Comparison between the studied groups regarding the mean R-R intervals.

R-R interval / Studied groups	X̄	± SD	Range	
			Min.	Max .
I) Control	850.1	± 46.48	786	920
II) D.M. without P.N.	856.25	± 47.27	789	956
III) D.M. with P.N.	862.45	± 54.37	785	953

Test of significance

groups	t.	p.
I Vs II	0.338	> 0.05
I Vs III	1.138	> 0.05
II Vs III	0.385	> 0.05



(Fig.5) Mean R-R intervals of the studied groups

Table (6) Mean and ± SD of heart rate variability among the studied groups .

HR.V. / groups	$\bar{X}$	± SD	Range	
			Min.	Max .
I) control	107.20	± 13.72	92	138
II) D. M > without P.N.	72.85	± 27.39	37	122
III) D . M . with P.N.	62.40	± 18.93	40	105

Test of significance

groups	t.	p.
I Vs II	3.71	≤ 0.001
I Vs III	6.63	≤ 0.001
II Vs III	1.40	> 0.05

By comparison of the diastolic and systolic dysfunctions among the studied diabetic groups with or without peripheral neuropathy , the results of the present work shows that there is no significant difference between those diastolic and systolic dysfunctions and somatic peripheral neuropathy ($p > 0.05$) . **Table (7, 8) , Fig. (7,8)**

Table (7) Comparison of the diastolic dysfunction among the diabetic group with and without peripheral neuropathy (P. N.)

Diastolic dysfunction / groups	+ ve		- ve		Total	
	No	%	No	%	No	%
II without P.N	11	55	9	45	20	100
III with P.N	16	80	4	20	20	100
Total	27	67.5	13	32.5	40	100

$X^2 = 2.8$

$P > 0.05$

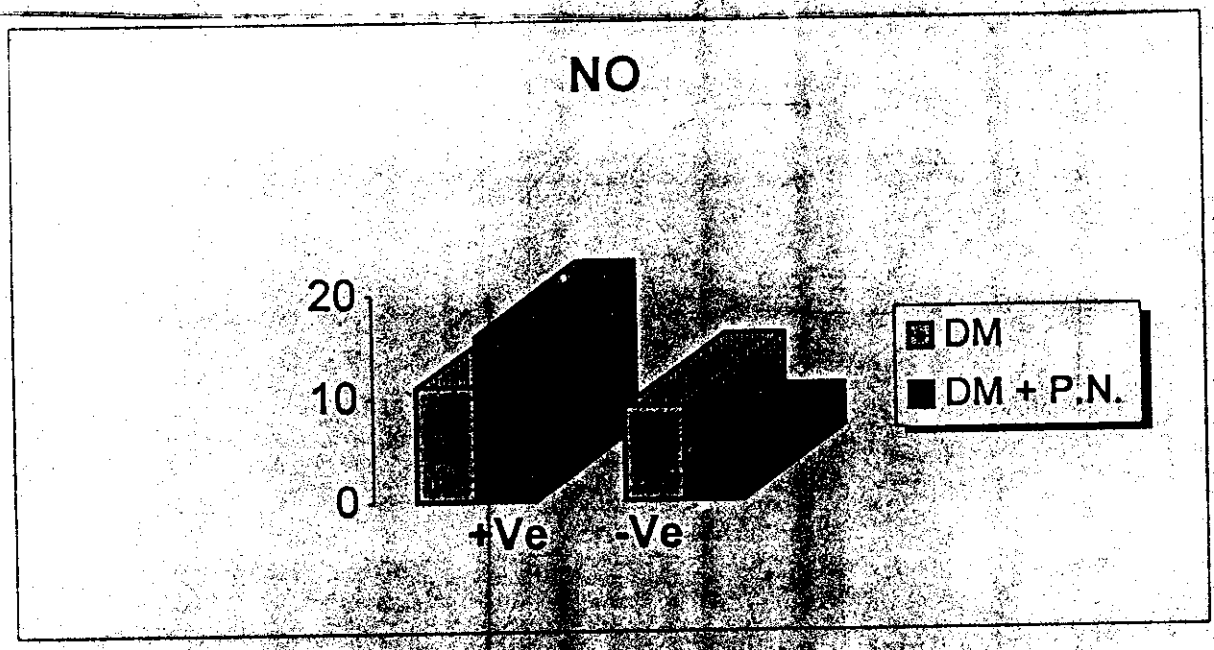


Fig (7) Diastolic dysfunction among the diabetic patients

Table (8) Comparison of the systolic dysfunction among the diabetic groups with and without peripheral neuropathy (P. N.)

systolic Dysfunction / groups	+ ve		- ve		Total	
	No	%	No	%	No	%
II Diabetic without P.N	5	25	15	75	20	100.0
III Diabetic with P.N	9	45	11	55	20	100.0
Total	14	35	26	65	40	100.0

$X^2 = 1.758$

$P > 0.05$

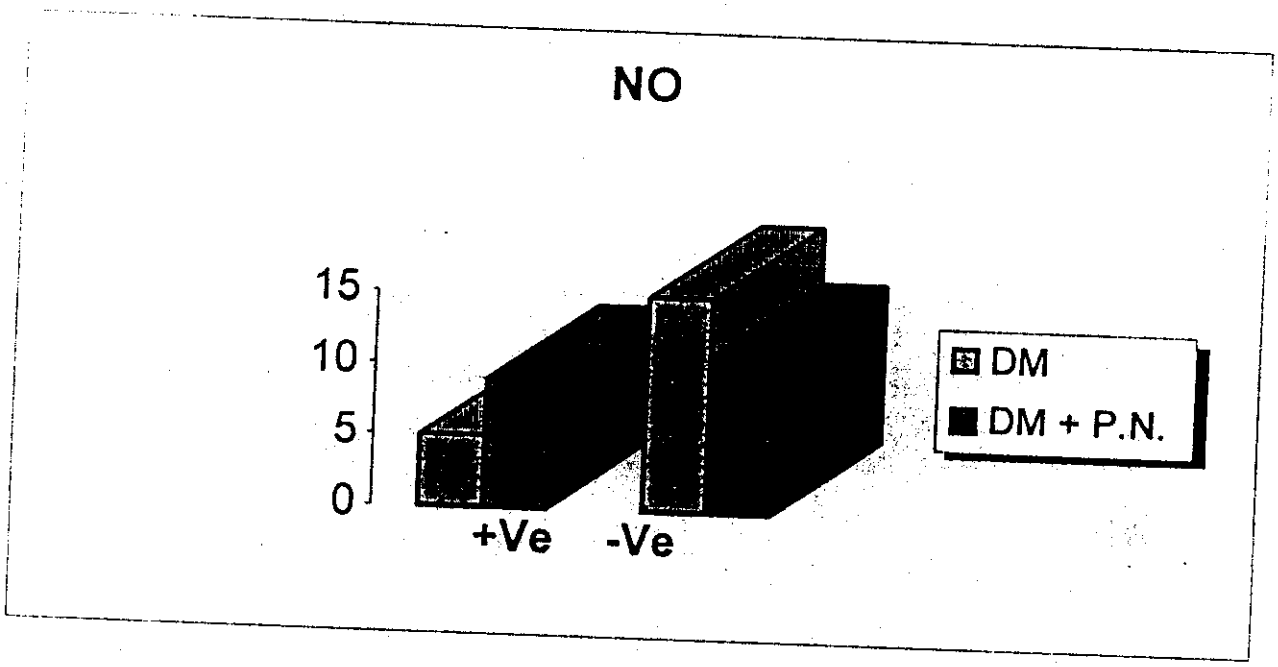


Fig (8) Systolic dysfunction among the diabetic patients

Table (11) Regression variables related to heart rate variability (HRV) among the studied groups .

H R V / Variable	regression coefficient	S E	F.	P.
Duration of D M (years)	- 2.597	0.497	27.312	< 0.01
Diastolic dysfunction	-20.565	5.794	12.599	< 0.01
control	103.682			

R= 0.8881

variables not in equation

variables	partial r^2	Tolerance	F	P.
Age (years)	0.0001	0.7387	0.005	> 0.05
Mean R-R interval	0.0000	0.8672	0.001	> 0.05
systolic Dysfunction	0.0007	0.4678	0.032	> 0.05

As the duration of diabetes mellitus is the most important variable in relation to heart rate variability (autonomic neuropathy) , thus duration of diabetes mellitus is classified into 3 groups for more statistical study :

Group I : < 5 years .

Group II : 5 - 10 years .

Group III : > 10 years .

Then student " T " test and analysis of variance between these groups and H R V , the results show that there is highly significant difference of H R V between these groups ($P < 0.01$) **Table (12), Fig. (9)** .

Also , there is significant difference of R-R intervals between groups I Vs II and between groups I Vs III ($P < 0.05$) but there is no significant difference between groups II Vs III ($P > 0.05$) **Table (13) , Fig. (10)** .

Moreover , there is significant difference of diastolic dysfunction between the groups ($P < 0.01$) **Table (14), Fig(11)** but there is no significant difference of systolic dysfunction between the groups ($P > 0.05$) **Table (15) , Fig. (12)** .

Table (13) Mean ± SD and analysis of variance of R-R interval among the studied patients in relation to the duration of D.M.

R - R interval / Duration of DM	X̄	± SD	Test of significance		
			groups	t	p
I (< 5Y)	830.92	± 40.44	I Vs II	2.221	< 0.05
II (5- 10Y)	862.94	± 35.66	I Vs III	2.378	< 0.05
III (> 10Y)	883.0	± 64.19	II Vs III	1.056	> 0.05

F = 3.731

P < 0 . 05

Table (14) Comparison of diastolic dysfunction among the studied patients in relation to the duration of D.M.

Diastolic Dysfunction / Duration of D M groups	+ ve		- ve		Total	
	No	%	No	%	No	%
I (< 5Y)	1	8.83	11	91.67	12	100
II (5- 10Y)	14	87.5	2	12.5	16	100
III (>10 Y)	12	100	0.0	0.0	12	100
Total	27	67.5	13	32.5	40	100

$X^2 = 27.847$

$P < 0.01$

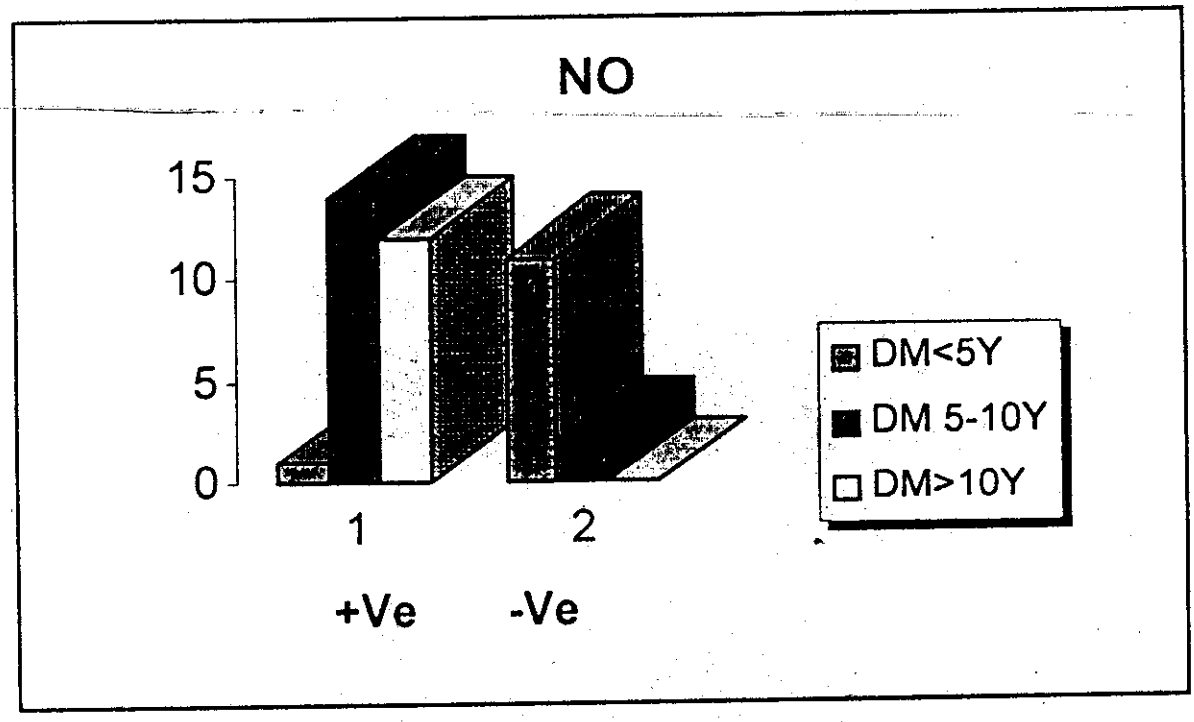


Fig (11) Diastolic dysfunction in relation to duration of diabetes mellitus

Table (15) Comparison of systolic dysfunction among the studied patients in relation to the Duration of D.M.

systolic Dysfunction / Duration of D M group	+ve		- ve		Total	
	No	%	No	%	No	%
I (> 5 Y)	o	00	12	100	12	100
II (5- 10 Y)	4	25	12	75	16	100
III (> 10 Y)	2	16.67	10	83.33	12	100
Total	6	15	34	85	40	100

$X^2 = 3.99$

$P < 0.05$

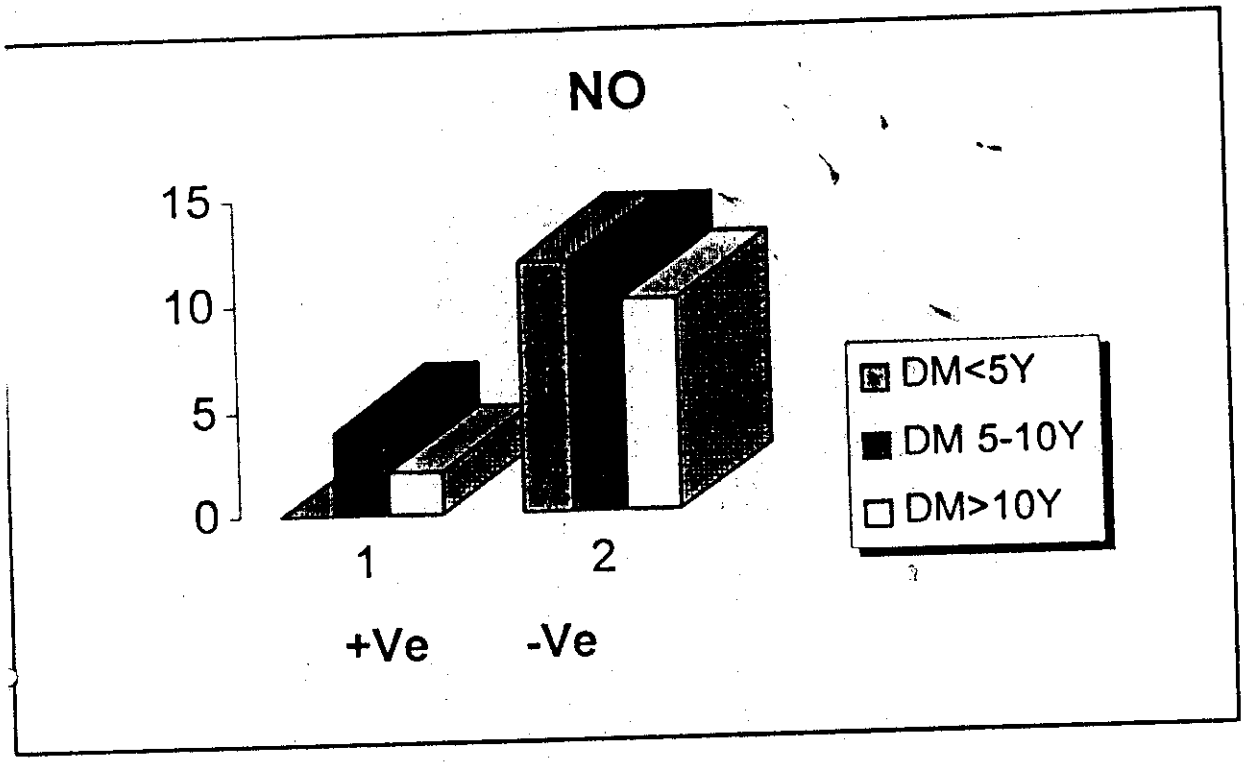


Fig (12) Systolic dysfunction in relation to duration of diabetes mellitus