RESULTS

Results of the present study will be demonstrated according to the following parts:

Part 1: Characteristics of diabetic elderly and their caregivers (Tables 1-9):

Sociodemographic characteristics of diabetic elderly (Table 1)

Sociodemographic characteristics of caregivers (Table 2)

Personal characteritisc of diabetic elderly (Tables 3-7)

Lifestyle of diabetic elderly (Table 8)

Part 2: Knowledge of diabetic elderly and caregivers as regard diabetes mellitus (Tables 9-15)

Part 3: Attitude of diabetic elderly and their caregivers (Tables 16-18)

Attitude of diabetic elderly toward themselves (Table 16)

Attitude of caregivers due to care of diabetic elderly (Table 17)

Burden scale of caregivers toward care of diabetic elderly (Table 18)

Part 4: Practice of diabetic elderly and their caregivers (Table 19 and Figures 1,2)

Part 5: Assessment of daily living activities and home environment (Tables 20-21)

Daily living activities of diabetic elderly (Table 20)

Home environment of diabetic elderly (Table 21)

Part 6: Relation of knowledge, attitude and practice total scores of diabetic elderly and their caregivers with their sociodemographic variables (Tables 22-32).

Relation of knowledge, attitude and practice total scores of diabetic elderly (Tables 22-26)

Relation of knowledge, attitude and practice total scores of caregivers (Tables 27-32)

Part 1: Characteristics of diabetic elderly and their caregivers

Table (1): Sociodemographic characteristics of diabetic elderly (n=100)

Variable	%
Sex	
• Male	27.0
• Female	73.0
Age group	
• 60-	37.0
• 65-	46.0
• 70-	17.0
Marital status	
• Single	6.0
• Divorced	10.0
• Widow	28.0
• Married	56.0
Educational status	
• Illiterate	82.0
• Read and write	18.0
• Primary/preparatory	0.0
• Secondary	0.0
• University	0.0
Occupation	
• Professional	0.0
• Private	0.0
• Retired	17.0
• Housewife	73.0
• Not working	10.0
Duration of diabetes (in years)	
• 1-	7.0
• 5-	18.0
• 10-	47.0
• 15-	28.0

Table (1) shows that less than three-fourths of the diabetic elderly (73%) were females. Less than half of the sample (46%) aged 65- years. As regard marital status, more than half of the sample (56%) were married. As regard educational status, the majority of the sample (82%) were illiterate. As regard employment, less than three-fourths (73%) were housewieves.

Duration of diabetes in three-fourths (75%) of patients was 10 years or more.

Table (2): Sociodemographic characteristics of caregivers (n=100)

Variable	%
Sex	
• Male	9.0
• Female	91.0
Age group	
• 15-	36.0
• 30-	39.0
• 45-	25.0
Marital status	
• Single	36.0
• Married	58.0
• Widow	3.0
• Divorced	3.0
Educational status	
• Illiterate	37.0
• Read and write	23.0
• Primary/preparatory	20.0
• Secondary	18.0
• University	2.0
Occupation	
• Employed	18.0
• Private	9.0
• Student	5.0
• Housewife	46.0
• Not working	22.0
Residence (in relation to elderly)	
• With elderly	89.0
• Nearby house	11.0
• Separate and far house	0
Relation to diabetic elderly	
• Spouse	25.0
• Daughter	33.0
• Daughter-in-law	37.0

• Grandchildren	5.0

Table (2) shows that most of the sample of caregivers (91%) were females, while 9% were males. One third of the sample (36%) aged 15-years, while more than one-third (39%) aged 30- years and one-fourth (25%) aged 45 years or more. As regard marital status, more than half of the sample (58%) were married. As regard educational status, more than one third (37%) were illiterate. As regard employment, about half of them (46%) were housewives. Most of caregivers (89%) were living with the elderly. As regard relation with diabetic elderly, one-third of the sample (33%) were daughters, more than one third (37%) were daughters-in-law.

Table (3): Distribution of comorbidity among diabetic elderly (n=100)

Associated chronic diseases	%
No associated diseases	18.0
Associated diseases:	82.0
- Coronary heart diseases	32.0
- Respiratory diseases	31.0
- Arthritis	30.0
- Hypertension	28.0
- Kidney diseases	17.0
- Liver diseases	10.0
- Others (malignancy)	2.0

Table (3) shows that the majority of diabetic elderly (82%) had other associated diseases. Coronary heart disease followed by respiratory diseases and arthritis were in less than one-third of cases (32%, 31% and 30%, respectively), and hypertention in more than one-fourth of cases (28%).

Table (4): Characteristics of diabetic elderly as regard follow up, prescribed treatment, diabetic coma and number of hospitalizations (n=100)

Variable	%
Schedule for follow up visits to Diabetes Clinic	
- Every 2 weeks	13.0
- Every 3 weeks	68.0
- Every month	19.0
Type of currently prescribed treatment	
- Insulin	38.0
- Oral hypoglycemic tablets	62.0
Type of diabetic coma during the last year	
- None	76.0
- Hypoglycemic	14.0
- Hyperglycemic	10.0
Number of hospitalizations for diabetes during the last year	
- None	71.0
- Once	20.0
- Twice	9.0

Table (4) shows that more than two-thirds of patients attend the Diabetes Clinic every three weeks (68%). As regard currently prescribed treatment for diabetes, more than one third of patients (38%) received insulin, while less than two-thirds (62%) received oral hypoglycemic tablets. During the last year, less than one-fourth of patients (24%) had past history of diabetic coma, 14% patients had hypoglycemic coma while one tenth (10%) had hyperglycemic coma. During the last year, one fifth of patients (20%) were hospitalized once while less than one tenth (9%) were hospitalized twice.

Table (5): Assessment of diabetic elderly as regard insulin injection at home and urine testing before and after application of health promotion program (n=100)

	Before program	After program		P
	%	%	$\chi 2$	Value
Urine testing for sugar at home	10.0	100.0	163.6	<0.001
Who performs urine testing				
• Elderly	0.0	18.0		
• Caregiver	10.0	82.0	44.0	<0.001
Who injects insulin to patient				
• Elderly	0.0	5.0		
• Caregiver	28.0	33.0		
• Others	10.0	0.0	15.4	<0.001
Who taught insulin injection				
• Physician	0.0	0		
• Nurse	16.0	16.0		
• Watching others	12.0	12.0		
• The researcher	0.0	10.0	8.7	<0.05

Table (5) shows that before the program, urine testing for sugar was performed at home for one-tenth (10%) of the patients. However, after the program, urine testing for sugar was performed for all patients at home. Before program, all elderly did not know how to inject the insulin, while more than one fourth of caregivers (28%) used to inject the elderly with insulin and 10% were injected by others. However, after the program, few elderly patients (5%) learned how to inject insulin to themselves, in addition to one third (33%) who are ready to inject their diabetic elderly patients. As regard the person who taught insulin injection, by the end of the program, the researcher could teach one-tenth (10%) of the elderly patients/caregivers.

Table (6): Assessment of diabetic elderly as regard reason(s) for dependence on caregivers before and after the application of health promotion program (n=100)

Reason(s) for dependence	%
Associated comorbidity impairing physical activity	
- Hypertension	28.0
- Coronary heart disease	32.0
- Kidney disease	17.0
- Liver disease	10.0
- Respiratory disease	31.0
- Arthritis	30.0
Sensory impairment	
- Visual	16.0
- Auditory	5.0
Diabetic foot	9.0
Motor impairment	
- Lower limb amputation	2.0
Psychological problems	7.0

Table (6) shows that, as regard reasons for dependence of elderly on their caregivers, more than one-fourth of elderly (28%) had hypertension, less than one third (32%) had coronary heart disease, less than one fifth (17%) suffered from renal diseases, one tenth (10%) had liver impairment, less than one third (31%) suffered from chronic respiratory problems, while less than one third (30%) had arthritis. Sensory impairment was in the form of visual impairment in more than one sixth (16%) or auditory impairment (5%). Diabetic foot affected less than one tenth of elderly patients (9%). As regard motor impairment, two patients had lower limb amputation. In addition, 7 patients had psychological troubles (e.g., amnesia, depression, etc.).

Table (7): Assessement of diabetic elderly as regard compliance toward medication before and after the application of health promotion program (n=100)

	Pre-Program	Post-Program	$\chi 2$	P Value
Compliance to medication Intake				
• Compliant	65.0	88.0		
• Non-compliaent	35.0	12.0	14.71	<0.001
Reasons for noncompliance				
• Lack of money	9.0	9.0		
• Lack of medication	3.0	3.0		
• Fear of side effects	23.0	0.0	15.44	<0.001

Table (7) shows that, before the program, more than one-third of diabetic elderly (35%) were non-compliant to their medication intake, while after the program more than one-tenth (12%) remained noncompliant. Reasons for noncompliance before the program included lack of money in less than one tenth (9%), lack of medication (3%) and fear of side effects in less than one fourth (23%). However, after the program, reasons for noncompliance included lack of money in less than one tenth (9%) and lack of medication (3%).

Table (8a): Life style of diabetic elderly as regard food intake patterns, and main action during constipation before and after the application of health promotion program (n=100)

Variables	Pre-program %	Post-program %	$\chi 2$	P Value
Number of meals/day				
2	50.0	0.0		
3	32.0	0.0		
4	18.0	27.0		
5	0.0	73.0	156.8	<0.001
Following a specific diet:				
- Following	24.0	68.0		
- Not following	76.0	32.0	38.97	<0.001
Reasons for missing diet therapy				
- unaware of importance of diet therapy	13.0	0.0		
- Prefers overeating	19.0	3.0		
- Poverty	29.0	29.0		
- Being under medication	15.0	0.0	26.03	<0.001
No. of glasses of water intake/day				
<6	5.0	0.0		
6-8	70.0	19.0		
>8	25.0	81.0	63.81	<0.001
Main action during constipation*				
- Consulting a physician	11.0	14.0		
- Self medication by laxatives	67.0	0.0		
- Drinking milk	26.0	41.0		
- Eating vegetables	36.0	65.0	77.97	<0.001

** Options are not mutually exclusive*

Table (8b): Life style of diabetic elderly as regard practice of exercise, smoking, frequency of bathing and changing clothes before and after the application of health promotion program (n=100)

Variables	Pre-program %	Post-program %	$\chi 2$	P Value
Practicing walk				
- Practicing	28.0	72.0		
- Not practicing	53.0	47.0	12.97	<0.001
Reasons for being sedentary*				
- Diabetes necessitates rest	31.0	17.0		
- Walking may complicate diabetes	18.0	2.0		
- Inability to walk	37.0	31.0	8.48	0.014
No. of Cigarettes smoked per day				
0	86 .0	88.0		
1-20	10.0	12.0		
21+	4.0	0.0	4.205	0.122
Frequency of bathing				
Daily	20	75		
Twice weekly	15	10		
Once weekly	5	15		
Others	60	--	15.51	<0.001
Frequency of changing clothes				
Daily	21	75		
Twice weekly	14	25		
Once weekly	53	0		
Others	12	0	98.48	<0.001

** Options are not mutually exclusive*

Tables (8a,b) show that before the program, the number of meals/day was 2 meals/day in half of the patients (50%). However, after the program, about three-fourths (73%) had 5 meals/day. Before the program, more than three-fourths of patients (76%) do not follow a specific diet. However, after the program, the number of patients who do not follow that specific decreased to 32%. As regard number of glasses of water intake/day, before the program, less than three-fourths of patients (70%) used to drink 6-8 glasses of water daily, while the majority of patients (81%) used to drink more than 8 glasses daily after the program. The main actions that were performed in case of constipation before the program included self-medication by laxatives by two-thirds of patients (67%). However, after the program, self-medication decreased to 0%. Walking was practiced by about fourth of patients (28%) before the program, while it was practiced by more than half of patients (53%) after the program. Before the program, 14 diabetic elderly were smokers, for whom 10 smoked 1-20 cigarettes/day and 4 used to smoke 21 cigarettes or more. However, after the program, 2 patients stopped smoking, and the 12 smokers used to smoke 1-20 cigarettes/day. As regard frequency of bathing, one fifith of diabetic elderly (20%) used to bathe daily while after the program three fourths of them (75%) used to bathe daily. As regard frequency of changing clothes, more than one fifth of diabetic elderly (21%) used to change clothes daily, compared to three fourths of the sample (75%) after the application of the program. Differences were statistically significant ($p<0.001$).

Part 2: Knowledge of diabetic elderly and their caregivers as regard diabetes mellitus

Table (9): Knowledge scores (mean±SD) of diabetic elderly and their caregivers about 'basic knowledge about diabetes' before and after the application of health promotion program (n=100)

Basic Knowledge items	Pre-program		Post-program		t value	P p-value
	Mean	SD	Mean	SD		
Diabetic elderly:						
Meaning of DM	0.33	0.47	0.89	0.31	11.225	<0.001
Types of DM	0.25	0.44	0.89	0.31	13.266	<0.001
Causes of DM	0.32	0.47	0.89	0.31	11.015	<0.001
Symptoms of DM	0.29	0.46	0.90	0.30	12.444	<0.001
Blood glucose level among elderly	0.32	0.47	0.92	0.27	12.186	<0.001
Regularity of medication	0.32	0.47	0.91	0.29	11.471	<0.001
Caregivers:						
Meaning of DM	0.30	0.46	0.92	0.27	11.346	<0.001
Types of DM	0.27	0.45	0.93	0.26	12.771	<0.001
Causes of DM	0.33	0.47	0.94	0.24	11.120	<0.001
Symptoms of DM	0.29	0.46	0.95	0.22	12.771	<0.001
Blood glucose level among elderly	0.32	0.47	0.96	0.20	12.726	<0.001
Regularity of medication	0.32	0.47	0.90	0.30	9.570	<0.001

Table (9) shows that knowledge scores of diabetic elderly and their caregivers as regard 'basic knowledge' items about diabetes mellitus (meaning, types, causes, symptoms of diabetes, blood glucose level among elderly, and regularity of medication) improved significantly after the application of the program ($p<0.001$).

Table (10): Knowledge scores (mean±SD) of diabetic elderly and their caregivers about 'complications of diabetes' before and after the application of health promotion program (n=100)

Items of Complications	Pre-program		Post-program			
	Mean	SD	Mean	SD	t-value	p-value
Diabetic elderly:						
Complications of DM	0.29	0.46	0.90	0.30	12.444	<0.001
Types of diabetic coma	0.25	0.44	0.90	0.30	13.559	<0.001
Causes of hypoglycemia	0.36	0.48	0.91	0.29	11.00	<0.001
Symptoms and signs of hypoglycemia	0.25	0.44	0.93	0.26	14.504	<0.001
Causes of hyperglycemic coma	0.33	0.47	0.95	0.22	12.709	<0.001
Symptoms and signs of hyperglycemic coma	0.28	0.45	0.94	0.24	13.863	<0.001
Caregivers:						
Complications of DM	0.28	0.45	0.93	0.26	12.505	<0.001
Types of diabetic coma	0.27	0.45	0.95	0.22	13.331	<0.001
Causes of hypoglycemia	0.35	0.48	0.95	0.22	11.282	<0.001
Symptoms and signs of hypoglycemia	0.26	0.44	0.96	0.20	15.199	<0.001
Causes of hyperglycemic coma	0.35	0.48	0.95	0.22	11.282	<0.001
Symptoms and signs of hyperglycemic coma	0.26	0.44	0.96	0.20	15.199	<0.001

Table (10) shows that knowledge scores of diabetic elderly and their caregivers as regard 'complications of diabetes' improved significantly after the application of the program ($p<0.001$).

Table (11): Knowledge scores (mean±SD) of diabetic elderly and their caregivers about 'prevention and management of diabetes' before and after the application of health promotion program (n=100)

	Pre-program		Post-program			
	Mean	SD	Mean	SD	t-value	p-value
Diabetic elderly:						
Prevention of DM	0.30	0.46	0.90	0.30	12.186	<0.001
Prevention of hypoglycemia	0.23	0.42	0.93	0.26	15.199	<0.001
Prevention of hyperglycemia	0.33	0.47	0.93	0.26	12.186	<0.001
Management of diabetic coma	0.24	0.43	0.92	0.27	14.504	<0.001
Caregivers:						
Prevention of DM	0.28	0.45	0.93	0.26	12.062	<0.001
Prevention of hypoglycemia	0.24	0.43	0.98	0.14	16.786	<0.001
Prevention of hyperglycemia	0.30	0.46	0.93	0.26	11.578	<0.001
Management of diabetic coma	0.25	0.44	0.95	0.22	13.404	<0.001

Table (11) shows that knowledge scores of diabetic elderly and their caregivers as regard 'prevention and management of diabetes' improved significantly after the application of the program ($p<0.001$).

Table (12): Knowledge scores (mean±SD) of diabetic elderly and their caregivers about 'diabetes monitoring' before and after the application of health promotion program (n=100)

DM Monitoring	Pre-program		Post-program			
	Mean	SD	Mean	SD	t-value	p-value
Diabetic elderly:						
Follow up visits	0.31	0.47	0.92	0.27	12.444	<0.001
Methods for monitoring	0.32	0.47	0.94	0.24	12.709	<0.001
Methods for urine testing	0.33	0.47	0.88	0.33	10.206	<0.001
Caregivers:						
Follow up visits	0.33	0.47	0.95	0.22	12.202	<0.001
Methods for monitoring	0.32	0.47	0.95	0.22	12.460	<0.001
Methods for urine testing	0.34	0.48	0.93	0.26	11.057	<0.001

Table (12) shows that knowledge scores of diabetic elderly and their caregivers as regard 'diabetes monitoring' improved significantly after the application of the program ($p<0.001$).

Table (13): Knowledge scores (mean±SD) of diabetic elderly and their caregivers about 'insulin' before and after the application of health promotion program (n=100)

	Pre-program		Post-program			
	Mean	SD	Mean	SD	t-value	p-value
Diabetic elderly:						
Effect of insulin	0.30	0.46	0.91	0.29	12.444	<0.001
Site of insulin injection	0.28	0.45	0.91	0.29	12.983	<0.001
Storage of insulin	0.34	0.48	0.89	0.31	10.581	<0.001
Side effects of insulin injection	0.25	0.44	0.87	0.34	11.751	<0.001
Caregivers:						
Effect of insulin	0.30	0.46	0.92	0.27	12.202	<0.001
Site of insulin injection	0.29	0.46	0.94	0.24	12.505	<0.001
Storage of insulin	0.35	0.48	0.90	0.30	9.869	<0.001
Side effects of insulin injection	0.26	0.44	0.89	0.31	12.460	<0.001

Table (13) shows that knowledge scores of diabetic elderly and their caregivers as regard 'insulin' improved significantly after the application of the program ($p<0.001$).

Table (14): Knowledge scores (mean±SD) of diabetic elderly about 'daily meals' before and after the application of health promotion program (n=100)

Daily meals	Preprogram		Postprogram		t-value	p-value
	Mean	SD	Mean	SD		
Diabetic elderly:						
Breakfast	0.25	0.44	0.92	0.27	14.177	<0.001
Lunch	0.33	0.47	0.93	0.26	12.186	<0.001
Dinner	0.27	0.45	0.88	0.33	11.951	<0.001
Snacks	0.10	0.30	0.92	0.27	21.237	<0.001
Caregivers:						
Breakfast	0.36	0.48	0.95	0.22	11.936	<0.001
Lunch	0.38	0.49	0.96	0.20	11.240	<0.001
Dinner	0.32	0.47	0.91	0.29	11.471	<0.001
Snacks	0.17	0.38	0.95	0.22	18.735	<0.001

Table (14) shows that knowledge scores of diabetic elderly and their caregivers as regard 'daily meals' improved significantly after the application of the program ($p<0.001$).

Table (15): Knowledge scores (mean±SD) of diabetic elderly about 'self-hygiene and exercise' before and after the application of health promotion program (n=100)

	Pre program		Post program		t	P
	Mean	SD	Mean	SD	Value	value
Diabetic elderly:						
Importance of self-hygiene	0.33	0.47	0.90	0.30	11.456	<0.001
Importance of foot care	0.30	0.46	0.96	0.20	13.283	<0.001
Importance of walking	0.31	0.47	0.90	0.30	11.936	<0.001
Precautions during walking	0.25	0.44	0.89	0.31	13.266	<0.001
Caregivers:						
Importance of self-hygiene	0.29	0.46	0.91	0.29	12.202	<0.001
Impotance of foot care	0.31	0.47	0.96	0.20	13.000	<0.001
Importance of walking to elderly	0.24	0.43	0.91	0.29	13.046	<0.001
Precautins during walking	0.31	0.47	0.91	0.29	10.900	<0.001

Table (15) shows that knowledge scores of diabetic elderly and their caregivers as regard 'self-hygiene and exercise' improved significantly after the application of the program ($p<0.001$).

Part 3: Attitude of diabetic elderly and their caregivers

Table (16): Attitude of diabetic elderly toward themselves before and after the application of health promotion program (n=100)

Attitude Items	Before program			After program			$\chi 2$	P Value
	Always	Sometimes	Never	Always	Sometimes	Never		
Compliance to doctors' orders	73	27	0	95	5	0	18.01	<0.001
Care toward general health	77	23	0	96	4	0	15.46	<0.001
Listening to health education programs	75	25	0	95	5	0	15.69	<0.001
Importance of periodic checkup	54	29	17	72	28	1	16.81	<0.001
Prevention of infectious diseases	20	32	48	65	35	0	71.96	<0.001
Prevention of taking self-medication	47	30	23	82	18	1	32.66	<0.001
Prevention of taking tonics without prescription	33	29	38	80	20	0	59.20	<0.001
Importance of coping at old age	52	25	23	77	23	0	27.93	<0.001
Importance of being productive at old age	56	23	21	81	19	0	25.94	<0.001
Importance of being social	53	25	22	54	44	2	21.91	<0.001

Table (16) shows that prior to program, most attitude items of diabetic elderly toward themselves were generally negative. However after the program, significant changes occurred in all attitude items which became more positive ($p<0.001$).

Table (17): Attitude of caregivers toward diabetic elderly (n=100)

Attitude Items	Before program			After program			$\chi 2$	P Value
	Always	Sometimes	Never	Always	Sometimes	Never		
We should take care of health of the elderly	100	0	0	100	0	0	0.0	1.00
Elderly people need assistance to help themselves	73	27	0	97	3	0	22.6	<0.001
Elderly need special health care	67	33	0	95	5	0	25.5	<0.001
Elderly need passion	73	27	0	98	2	0	25.2	<0.001
Elderly should be always assisted	100	0	0	100	0	0	0.0	1.00
We should deeply understand the elderly	41	59	0	95	5	0	67.0	<0.001
We should consider that elderly may suffer from affected senses	67	33	0	92	8	0	19.2	<0.001
Health of the elderly is the responsibility of all members of the community	71	29	0	97	3	0	25.1	<0.001
Changes that occur due to aging necessitate special social care	68	32	0	96	4	0	26.6	<0.001
It is possible to promote the health of elderly by education	64	30	6	97	3	0	34.9	<0.001

Table (17) shows that apart from the attitude items of "we should take care of health of the elderly" and "Elderly should be always assisted", which were totally agreed upon by caregivers before and after the health promotion program, the attitude of caregivers toward the diabetic elderly improved significantly in all attitude items after the program ($p<0.001$).

Table (18): Scores of caregivers for Burden Scale due to caring for diabetic elderly before and after the program (n=100)

	Before program		After program		t	P
	Mean	SD	Mean	SD	Value	Value
Asking for more help than needed	1.22	0.81	0.81	0.73	4.117	<0.001
Busy with patient to the extent that having no time for self	1.16	0.81	0.73	0.68	3.717	<0.001
Care giving is stressful	1.14	0.80	0.72	0.68	4.396	<0.001
Patient is dependent on caregiver	1.34	0.77	0.70	0.66	6.905	<0.001
Strained due to care giving	0.72	0.75	0.32	0.47	4.757	<0.001
Caregiver is the only source for care to diabetic elderly	0.92	0.83	0.52	0.63	4.062	<0.001
Lack of money to give proper care	1.28	0.81	0.71	0.67	5.897	<0.001
Affected health due to care giving	1.18	0.82	0.71	0.67	4.610	<0.001
Wishing to transfer care toward others	1.14	0.80	0.73	0.68	3.785	<0.001
Being unable to give any more care to diabetic elderly	1.20	0.80	0.72	0.67	4.342	<0.001

Table (18) shows that the burden by the caregivers before the application of health promotion program significantly decreased after its application in all items.

Part 4: Practice of diabetic elderly and their caregivers

Table (19): Practice scores for diabetic elderly and their caregivers (mean±SD) as regard urine analysis for sugar, insulin injection and foot care

Variables	Before program		After program		t	P
	Mean	SD	Mean	SD	Value	Value
Diabetic elderly:						
Urine examination	0.0	0.0	8.9	2.7	32.57	<0.001
Insulin injection	0.0	0.0	15.5	3.7	55.39	<0.001
Foot care	0.0	0.0	9.1	2.7	41.15	<0.001
Caregivers:						
Urine examination	5.0	2.6	10.0	2.7	13.34	<0.001
Insulin injection	11.0	3.4	16.3	3.5	10.86	<0.001
Foot care	5.1	2.6	10.0	2.7	13.07	<0.001

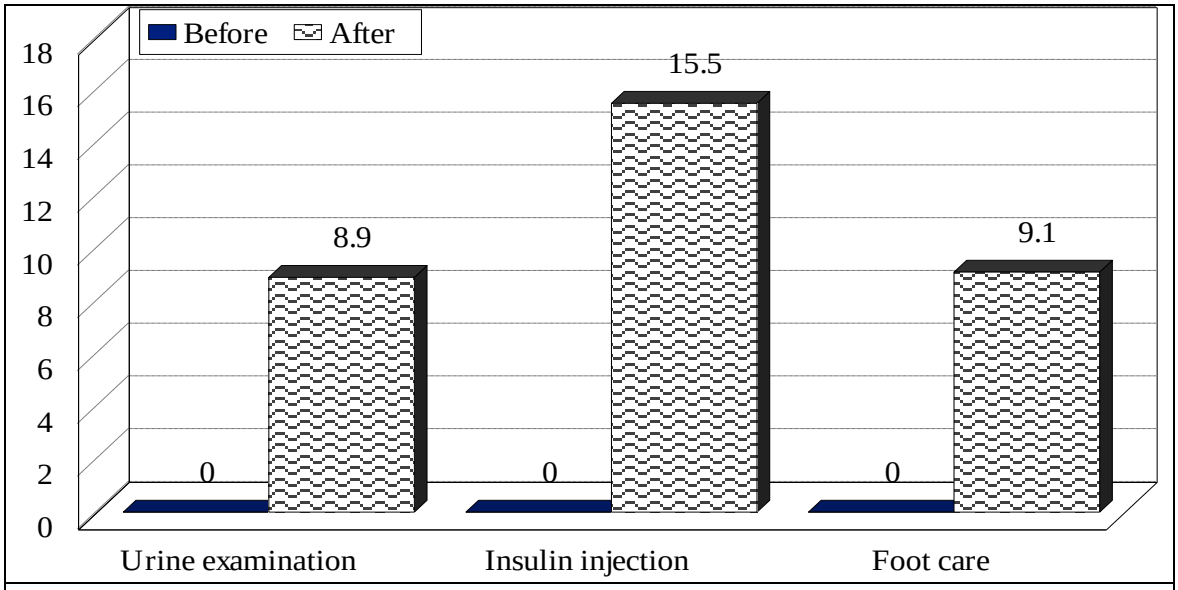

Figure (1): Practice scores for diabetic elderly as regard urine analysis for sugar, insulin injection and foot care

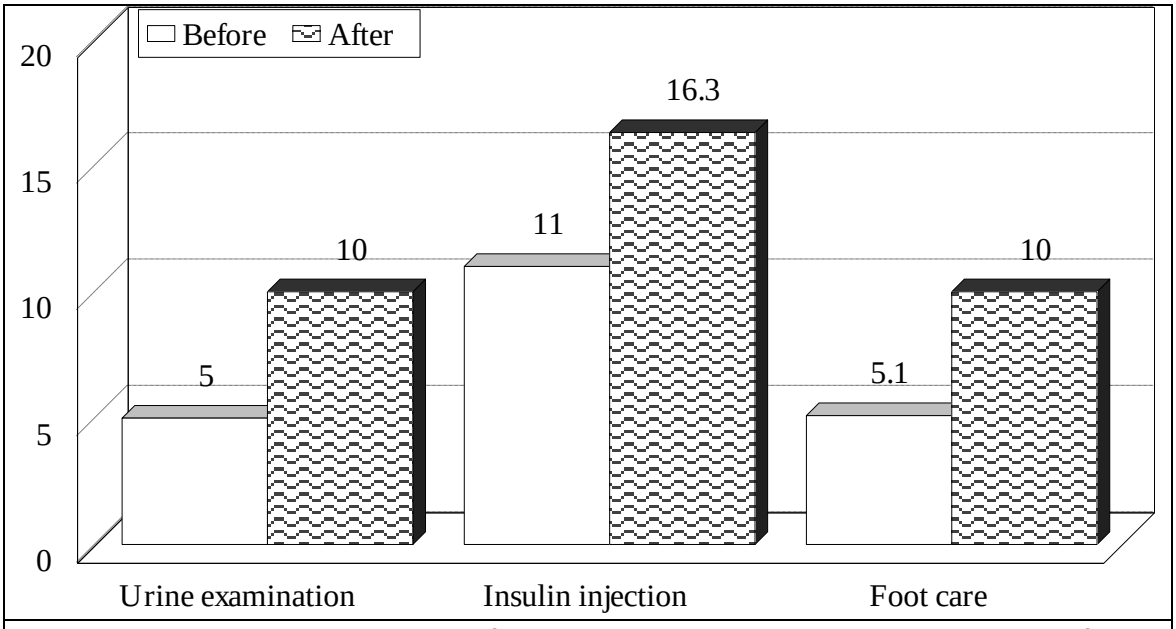

Figure (2): Practice scores for caregivers as regard urine analysis for sugar, insulin injection and foot care

Table (19) and Figures (1,2) show that before the program, none of the diabetic elderly performed urine examination, insulin injection and foot care. However, after the program, significant improvements took place in these 3 observation items ($p<0.001$ for each). As regard caregivers, performance scores of caregivers as regard urine examination, insulin injection and foot care improved significantly after the application of the program ($p<0.001$ for each).

Part 5: Assessment of daily living activities and home environment

Table (20): Assessment of activities of daily living of diabetic elderly (n=100)

Variable	Good %	Moderate %	Poor %
Bathing	58.0	42.0	0.0
Transfer	30.0	70.0	0.0
Dressing	48.0	45.0	7.0
Mobility	45.0	39.0	16.0
Visiting the toilet	38.0	62.0	0.0
Feeding	56.0	44.0	0.0
Elimination	44.0	56.0	0.0
Exercise	11.0	52.0	37.0

Table (20) shows that poorly performed activities of daily living were exercise in more than one third of cases (37%), mobility in more than one-sixth of cases (16%) and dressing in less than one-tenth of cases (7%). On the other hand, good performance was observed for more than half of diabetic elderly in bathing (58%) and feeding (56%).

Table (21): Assessment of home environment of diabetic elderly (n=100)

Variable	Good %	Moderate %	Poor %
Ventilation	49.0	34.0	17.0
Water supply	38.0	35.0	27.0
Indoor illumination	2.0	52.0	46.0
Corridor/toilet illumination	27.0	32.0	41.0
Indoor noise	6.0	16.0	78.0
Outdoor noise	51.0	30.0	19.0
Home cleanliness	20.0	33.0	47.0
Sewage disposal	36.0	52.0	12.0
Cover of floor	23.0	60.0	17.0
Furniture	27.0	31.0	42.0
Toilet	7.0	54.0	39.0
Stairs/corridors	17.0	27.0	56.0

Table (21) shows that home environment was generally poor in all items. The worst items were indoor noise in more than three-fourths of homes (78%), stairs and corridors in more than half of homes (56%), home cleanliness in less than half of homes (47%), and indoor illumination in less than half of homes (46%).

Part 6: Relation between knowledge, attitude and practice total scores of diabetic elderly and their caregivers and sociodemographic variables

Table (22): Relation of knowledge, attitude and practice scores of diabetic elderly with their age group (in years) (n=100)

	60- (n=37)		65- (n=46)		70 + (n=17)		F	P
	Mean	SD	Mean	SD	Mean	SD	Value	value
Pre-program								
- Knowledge	9.49	2.30	10.02	2.08	9.24	1.95	1.096	.338
- Attitude	12.41	2.40	12.83	2.60	11.76	2.25	1.179	.312
- Practice	35.95	4.69	35.96	4.38	37.41	4.40	.742	.479
Post-program								
- Knowledge	29.92	5.62	30.15	5.52	30.00	6.50	.017	.983
- Attitude	18.38	1.50	18.67	1.61	17.88	1.22	1.744	.180
- Practice	43.40	3.82	42.08	4.65	43.23	4.42	1.072	.346

Table (22) shows that before the program, knowledge, attitude and practice scores did not differ significantly according to age of diabetic elderly. Similarly, after the program, knowledge, attitude and practice scores did not differ significantly according to age of diabetic elderly.

Table (23): Relation of knowledge, attitude and practice scores of diabetic elderly according with their gender (n=100)

	Males (n=27)		Females (n=73)			
	Mean	SD	Mean	SD	t-value	p-value
Before program						
- Knowledge	9.52	2.24	9.75	2.13	-.483	.630
- Attitude	12.59	2.58	12.45	2.46	.251	.803
- Practice	36.81	4.61	35.97	4.46	.831	.408
After program						
- Knowledge	31.52	3.91	29.49	6.13	1.597	.113
- Attitude	18.48	1.55	18.41	1.52	.205	.838
- Practice	43.07	4.30	42.66	4.36	.426	.671

Table (23) shows that before the program, knowledge, attitude and practice scores did not differ significantly according to gender of diabetic elderly. Similarly, after the program, knowledge, attitude and practice scores did not differ significantly according to gender of diabetic elderly.

Table (24): Relation of knowledge, attitude and practice scores of diabetic elderly with their education (n=100)

	Illiterate (n=82)		Read & write (n=18)		t value	P value
	Mean	SD	Mean	SD		
Before program						
- Knowledge	9.24	2.07	11.72	1.07	-4.922	<0.001
- Attitude	12.62	2.44	11.89	2.63	1.139	0.257
- Practice	36.60	4.45	34.39	4.34	1.915	0.058
After program						
- Knowledge	30.22	5.63	29.22	5.96	0.674	0.502
- Attitude	18.39	1.53	18.61	1.50	0.557	0.579
- Practice	42.85	4.09	42.39	5.39	0.411	0.682

Table (24) shows that before the program, knowledge scores were significantly higher among diabetic elderly who were able to read and write than those who were illiterate ($p<0.001$). However, attitude and practice scores did not differ significantly according to educational status of diabetic elderly. After the program, knowledge, attitude and practice scores did not differ significantly according to education of diabetic elderly.

Table (25): Relation of knowledge, attitude and practice scores of diabetic elderly with their occupation (n=100)

	Housewife (n=73)		Retired (n=17)		Not working (n=10)		F Value	P value
	Mean	SD	Mean	SD	Mean	SD		
Pre-program								
- Knowledge	9.75	2.13	10.12	2.20	8.50	2.01	1.937	.150
- Attitude	12.45	2.46	12.71	2.78	12.40	2.32	.078	.925
- Practice	35.97	4.46	37.65	4.73	35.40	4.25	1.138	.325
Post-program								
- Knowledge	29.49	6.13	32.24	1.39	30.30	6.17	1.644	.199
- Attitude	18.41	1.52	18.82	1.47	17.90	1.60	1.189	.309
- Practice	42.66	4.36	44.06	4.02	41.40	4.45	1.287	.281

Table (25) shows that before the program, knowledge, attitude and practice scores did not differ significantly according to occupation of diabetic elderly. Similarly, after the program, knowledge, attitude and practice scores did not differ significantly according to occupation of diabetic elderly.

Table (26): Relation of knowledge, attitude and practice scores of diabetic elderly with their marital status (n=100)

Variables	Single (n=6)		Married (n=56)		Divorced (n=10)		Widow (n=28)		F	P
	Mean	SD	Mean	SD	Mean	SD	Mean	SD	Value	value
Pre-program										
- Knowledge	10.33	2.94	9.69	1.83	9.60	2.31	9.57	2.55	.208	.890
- Attitude	13.17	1.72	12.59	2.64	13.00	1.56	11.96	2.51	.736	.533
- Practice	37.00	4.89	36.57	4.25	35.30	5.77	35.60	4.52	.480	.697
Post-program										
- Knowledge	29.67	7.68	30.62	4.68	27.80	8.25	29.75	6.07	.746	.528
- Attitude	18.50	1.38	18.55	1.62	18.60	0.84	18.11	1.55	.584	.627
- Practice	42.33	3.88	42.39	4.15	42.70	6.14	43.64	4.12	.535	.659

Table (26) shows that before the program, knowledge, attitude and practice scores did not differ significantly according to marital status of diabetic elderly. Similarly, after the program, knowledge, attitude and practice scores did not differ significantly according to marital status of diabetic elderly.

Table (27): Relation of knowledge, attitude and practice scores of caregivers with their age group (in years) (n=100)

	15- (n=36)		30- (n=39)		45- (n=25)		F	P
	Mean	SD	Mean	SD	Mean	SD	Value	value
Pre-program								
- Knowledge	9.3	2.7	9.2	2.0	9.2	1.8	.063	.939
- Attitude	18.6	3.7	18.5	3.6	18.8	3.2	.055	.947
- Practice	22.2	4.6	20.5	4.8	20.4	3.1	1.986	.143
Post-program								
- Knowledge	28.4	4.5	29.4	3.3	29.5	2.6	.881	.418
- Attitude	27.4	2.0	27.0	2.3	27.3	1.8	.310	.734
- Practice	41.7	6.0	38.8	6.1	39.3	3.4	2.689	.073

Table (27) shows that before the program, knowledge, attitude and practice scores did not differ significantly according to age of caregivers. Similarly, after the program, knowledge, attitude and practice scores did not differ significantly according to age of diabetic elderly.

Table (28): Relation of knowledge, attitude and practice scores of caregivers with their gender (n=100)

	Males (n=9)		Females (n=91)		t	P
	Mean	SD	Mean	SD	Value	Value
Before program						
- Knowledge	8.33	1.50	9.32	2.26	-1.277	0.205
- Attitude	17.67	3.16	18.68	3.56	-.824	.412
- Practice	20.78	4.24	21.10	4.42	-.209	.835
After program						
- Knowledge	30.33	1.00	28.93	3.81	1.095	.276
- Attitude	26.78	1.79	27.24	2.08	-.644	.521
- Practice	40.56	5.88	39.91	5.65	.325	.746

Table (28) shows that before the program, knowledge, attitude and practice scores did not differ significantly according to gender of caregivers. Similarly, after the program, knowledge, attitude and practice scores did not differ significantly according to gender of caregivers.

Table (29): Relation of knowledge, attitude and practice scores of caregivers with their education (n=100)

	Illiterate (n=37)		Read and write (n=23)		Primary/Prep (n=20)		Secondary (n=18)		University (n=2)		F Value	P value
	Mean	SD	Mean	SD	Mean	SD	Mean	SD	Mean	SD		
Pre-program												
- Knowledge	8.00	2.00	9.78	2.07	10.10	1.59	9.56	2.09	14.00	0.00	8.28	<0.001
- Attitude	18.76	3.49	19.09	3.85	18.15	3.30	18.39	3.66	16.00	1.41	0.49	.744
- Practice	20.65	4.27	22.09	4.36	21.20	4.94	20.89	4.25	17.50	0.71	0.73	.573
Post-program												
- Knowledge	29.76	2.48	29.48	2.48	27.05	5.88	29.17	3.49	30.50	0.71	2.09	.089
- Attitude	27.24	2.06	27.65	1.97	26.90	1.65	27.06	2.55	25.50	2.12	0.75	.563
- Practice	39.78	5.72	41.39	4.40	39.65	6.54	39.33	6.17	36.00	1.41	0.69	.603

Table (29) shows that before the program, knowledge scores of caregivers were significantly higher among more educated ($p<0.001$). However, attitude and practice scores did not differ significantly according to educational status of caregivers. After the program, knowledge, attitude and practice scores did not differ significantly according to education of caregivers.

Table (30): Relation of knowledge, attitude and practice scores of caregivers with their occupation (n=100)

	Employed		Private		Student		Housewife		Not working		F	P
	Mean	SD	Mean	SD	Mean	SD	Mean	SD	Mean	SD	Value	value
Pre-program												
- Knowledge	9.33	2.69	9.23	2.12	8.89	1.54	9.44	1.54	7.00	2.83	0.61	0.66
- Attitude	18.61	3.67	18.14	3.61	19.89	4.20	19.00	2.72	16.50	3.54	0.68	0.61
- Practice	22.22	4.57	20.14	4.90	23.22	1.86	19.83	3.07	18.00	1.41	2.27	0.07
Post-program												
- Knowledge	28.42	4.53	29.17	3.45	30.67	0.71	29.11	3.01	31.00	0.00	0.86	0.49
- Attitude	27.36	1.99	26.91	2.27	28.00	2.18	27.17	1.76	26.00	1.41	0.73	0.57
- Practice	41.67	6.03	38.54	6.40	41.44	3.09	38.61	3.24	40.00	2.83	1.85	0.13

Table (30) shows that before the program, knowledge, attitude and practice scores did not differ significantly according to occupation of caregivers. Similarly, after the program, knowledge, attitude and practice scores did not differ significantly according to occupation of caregivers.

Table (31): Relation of knowledge, attitude and practice scores of caregivers with their marital status (n=100)

	Single (n=36)		Married (n=58)		Divorced (n=3)		Widow (n=3)		F	P
	Mean	SD	Mean	SD	Mean	SD	Mean	SD	Value	value
Pre-program										
- Knowledge	9.33	2.69	9.18	2.04	8.50	2.14	9.44	1.54	.370	.775
- Attitude	18.61	3.67	18.37	3.64	18.63	4.37	19.00	2.72	.129	.943
- Practice	22.22	4.57	20.34	4.76	22.13	3.14	19.83	3.07	1.857	.142
Post-program										
- Knowledge	28.42	4.53	29.32	3.35	30.63	0.74	29.11	3.01	.918	.435
- Attitude	27.36	1.99	27.05	2.28	27.25	2.19	27.17	1.76	.138	.937
- Practice	41.67	6.03	38.68	6.17	41.50	3.30	38.61	3.24	2.380	.074

Table (31) shows that before the program, knowledge, attitude and practice scores did not differ significantly according to marital status of caregivers. Similarly, after the program, knowledge, attitude and practice scores did not differ significantly according to marital status of caregivers.

Table (32): Relation of knowledge, attitude and practice scores of caregivers with their relation to the diabetic elderly (n=100)

	Spouse (n=25)		Son/Daughter (n=33)		Daughter-in-law (n=37)		Grandchildren (n=5)		F	P
	Mean	SD	Mean	SD	Mean	SD	Mean	SD	Value	value
Pre-program										
- Knowledge	9.60	1.94	9.03	2.53	9.19	2.17	9.00	2.00	.337	.798
- Attitude	18.88	4.03	18.42	2.93	18.73	3.70	17.20	3.70	.353	.787
- Practice	19.96	5.47	21.27	3.83	21.92	4.07	19.00	3.08	1.409	.245
Post-program										
- Knowledge	28.28	4.74	29.67	2.52	29.00	3.87	29.40	2.07	.691	.560
- Attitude	27.72	2.09	27.06	1.69	27.22	2.00	25.40	3.65	1.916	.132
- Practice	38.72	7.14	40.52	5.46	40.38	4.87	39.60	4.04	.575	.633

Table (32) shows that before the program, knowledge, attitude and practice scores of caregivers did not differ significantly according to their relation to the diabetic elderly. Similarly, after the program, their knowledge, attitude and practice scores did not differ significantly according to relation of caregivers to diabetic elderly.