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Assessment of Health Promoting Behaviors AmongElderly Diabeticsatoutpatient Diabetic Clinic Helwan General Hospital

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Abstract:
Background:*Health promoting behaviors is positively associated with diabetic control among elderly diabetics; this study indicated that practicing health promoting behaviors led to better control of diabetes.*
Aim: *of the current study was to assess the health promoting behavior among elderly diabetics at outpatient diabetic clinic at Helwan general hospital*
Design: *of the present study was a descriptiveresearch design.*
Setting:*at the outpatient diabetic clinic at General Helwan Hospitals, Egypt, where 285 elderly diabetic were purposively selected.*
Tools: *two tools were used for data collection; Tool I: Consisted of three parts; Socio-demographic data, the current and past medical history of the elderly diabetics and Elderly diabetic's knowledge about diabetes mellitus. Tool II: Consisted of three parts; Rating scale health promoting life style profile, Home safety health promoting behaviors and the second part were the predisposing factors of elderly diabetics environmental safety and the third part reinforcing persons whosupporting the health promoting behaviors of elderly diabetics.*
Results: *of the present study revealed that around thirds of the elderly diabetics had adequate knowledge about diabetes and approximately less than third had right health promoting behaviors (28% for each), additionally, (82.5%, 70.5% and 72.3%) of elderly diabetics had wrong health promoting behaviors in nutrition, physical activity and stress management.*
Conclusion:*The elderly diabetics had inadequate knowledge about diabetes and poor health promoting behaviors due to low level of education and low income. There was statistical significance positive correlation between knowledge and heath promoting behaviors score.*
Recommendations: *Elderly diabetics should be provided withan intensive training and education in the health promoting behaviors of their diabetes by Health educator nurse in the diabetic clinic. Designing and developing a health promoting behaviors program regarding the elderly diabetics to guide them to better control of diabetes mellitus.*
Keywords: *Diabetes mellitus, Elderly diabeticsand Health promoting behaviors.*

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I. Introduction

Population ageing is one of the most significant trends of the 21st century. One in eight people in the world is aged 60 or over. As long as life expectancy continues to rise, older people will steadily increase as a proportion of the population. The world is ageing rapidly. People aged 60 and older make up 12.3 % of the global population, and by 2050, that number will rise to almost 22 % about 2 billion, up from 900 million in 2015 according to the report of United Nations population fund.[1]On the other hand, the statistics of the Central Agency for Public Mobilization and Statistics, Egypt[2] revealed that older persons in Egypt reached 5.9 million (2.9 million male, 3 million female) in 2012, 7.1% of total population and is expected to increase to 11.5% in 2030.

Diabetes is a chronic disease, which occurs when the pancreas does not produce enough insulin, or when the body cannot effectively use the insulin it produces. This leads to an increased concentration

of glucose in the blood (hyper glycaemia). [3]Diabetes is an important health condition for the aging population; at least 20% of patients over the age of 65 years have diabetes, and this number is expected to grow rapidly in the coming decades. In 2013, it was estimated that 382 million people globally had diabetes, and this number is predicted to increase to 592 million by 2035. Older individuals with diabetes have higher rates of premature death, functional disability, and coexisting illnesses, such as hypertension, coronary heart disease, and stroke, than those without diabetes. [4]

Type II diabetes mellitus is the most common form and is common among elderly with family history of diabetes, elderly, obesity and lack of exercise. There are two main forms of type II diabetes: late onset associated with obesity and late onset not associated with obesity. Overweight individuals may be treated at the onset with dietary control alone, or with tablets, but may eventually have to progress onto insulin in the end when the tablets fail to work.[5]

Health promoting behavior is the art and science of helping people discover the synergies between their core passions and optimal health, enhancing their motivation to strive for optimal health, and supporting them in changing their lifestyle to move toward a state of optimal health. Optimal health is a dynamic balance of physical, emotional, social, spiritual, and intellectual health. [6]

Nutrition and physical activity are cornerstones of diabetes management. Decisions relating to food intake are considered as one of the most challenging aspects of diabetes control. Dietary recommendations for diabetes emphasize an individualized approach to optimizing food and nutrient intakes. These guidelines focus on eating patterns, portion control, and carbohydrate quality, quantity, and distribution, to optimize glycemic control, in addition to weight status, blood pressure, and plasma lipid profile.[7]

According to Pender's health promotion model and previous studies, health-promoting behaviors are influenced by individual characteristics and experiences, health status, behavior-specific cognitions and affect, such as self-efficacy, perceived benefits and barriers, and interpersonal and situational influences e.g., social support.[8]

Gerontological nurses assume a variety of roles in their activities with elderly diabetics to enable them to adapt with diabetes and live without complication, most of which fall under the categories. Caregiver uses gerontological theory in the application of the nursing process to the care of elderly diabetics and promotion of highest degree independence and of self-care in elderly. Educator shares knowledge, skills related to raise elderly diabetics health awareness. Advocate aids elderly diabetics in asserting their rights and obtaining required services.[9]

1.1 Significance of the Study

Diabetes mellitus a blend of various knowledge and skills is required when caring for elderly diabetics. Type 2 diabetes, the 7th leading cause of death among older adults, affects 20% of the older population and has a particularly high prevalence among black people and people 65 to 74 years of age. Consequently, nurses must be adequately informed of how the detection and management of diabetes in older adults differs from that in other age groups[10] pointed out that the elderly diabetics have low health promoting behaviors to cope with diabetes. Therefore, the current study will be conducted to assess the health promoting behavior among elderly diabetics at the outpatient diabetic clinic at Helwan general hospital

1.2 Aim of the study

The aim of the study was to assess the health promoting behavior among elderly diabetics at the outpatient diabetic clinic at Helwan general hospital.

1.3 Research Question:

- What is the knowledge of elderly diabetics about diabetes mellitus?
- What are the health promoting behaviors among elderly diabetics?

II. Subjects and methods

2.1 Research design:

A descriptive research design was used to conduct the present study.

2.2 Research setting:

The study was conducted at the outpatient diabetic clinic at General Helwan Hospitals. The clinic provides service to elderly diabetics every day in the week from 8:00 am to 1.00 pm except Friday and from the 26th till the end of the month, this is the period of inventorying the diabetic medications". There are two old diploma nurses and one head nurse responsible for delivering care and services at this clinic. The diabetic clinic including two physicians the first physician responsible to the general diabetic people the second physician responsible for the social insurance diabetics.

2.3 Subjects:

The subjects of the existing study were 285 elderly diabetics at the outpatient diabetic clinic at General Helwan Hospital who were purposivelyselected according to the following inclusion criteria: suffering from diabetes mellitus, both sexes, and free from any communication problems.Exclusion criteria: Unable to participate due to a severe physical disorder. Also, a known history of major psychiatric illness.

2.4 Sampling technique:

Apurposivesample consisted of 285 elderly diabetics;the sample sizewasselected 8:9 elderly diabetics 2 days weekly for four months. By the first of March 2016 to the end of June 2016 the number of the elderly diabeticswas 285.

2.5 Tools of data collection

Two tools were be used to collect the study data

Tool I: Consisted of three parts:

Part I:Socio-demographic characteristics of the elderly diabetics: It included: age, sex, level of education, social class, occupation, marital status, residence…etc.

Scoring system:

The socio- economic scoring in this study sample consisted of the score of occupation, education, and social class, the latter included the income, crowding index, and sanitation score. All these data were scored for a total socioeconomic score modified after **Fahmy and El Sherbini (1983)**[11]

- Total socioeconomic score = 23
- Scores 19+ are considered of high socioeconomic standard
- Scores 15-<19 are considered of middle socioeconomic standard
- Scores <15 are considered of low socioeconomic standard

Part IIPrevious and current medical history of diabetes mellitus elderly which includes 7 items. It included time of having diabetes, family history of diabetes, discovering diabetes and types of physical illness.

Part IIIConcerned with elderly diabetics' knowledge aboutDiabetes mellitus which includes 22 items. It includes questions about the meaning of diabetes mellitus, risk factors, signs and symptoms ….. Etc.

Scoring system:

Items were scored 1 for the response "adequate," and Zero for "inadequate." For each source, the scores of the items were summed-up and the total divided by the number of the items, giving a mean score for the part. These scores were converted into percent scores. The elderly diabetics was considered to have adequate knowledge about diabetes if the percent score was 60% or more and inadequate if less than 60%.

Tool II:Rating scale which includes threeparts[12]

Part I: Health promotion life styles profile II (HPLP) factors II. The HPLP-II questionnaire was developed by **Walker etal (1995)** based on Pender's health promotion model to measure health-promoting behaviors translated to Arabic and modified by researcher to meet the Egyptian culture. This questionnaire consists of the six aspects of health-promoting behaviors, including

a- Nutritional behaviors includes 14 items
b- Physical activity "exercise behaviors includes 5 items
c- Spiritual growth behaviors includes 10 items
d- Health responsibility behaviors includes 11 items
e- Interpersonal relations "social support" includes 8 items
f- Stress management includes 13 items

The health promotion model represents a theoretical viewpoint that explores the factors contributing to health-promoting behaviors, the improvement of health and quality of life.

Scoring system:

Question with rating scale were scored along 3 points according the following score; regular took 3 points, sometimes took 2 points and never took 1 point. The scores of the items were summed up and converted into percentage. The elderly diabetics was considered to have a right health promoting behaviors if the percent score was 60% or more and wrong if less than 60%.

Part II Predisposing factors to promote health behaviors of elderly diabetics includes 5 items e.g. environmental safety [adequate lighting- lighting during night – waking carefully-House furniture- dry house grounds]

Part IIIReinforcing persons to promote health behavior of elderly diabeticsincludes 6 items e.g[Family, Friends and Medical team]

Scoring system:

Question with rating scale were scored along 3 points according the following score; regular took 3 points, sometimes took 2 points and never took 1 point. The scores of the items were summed up and converted into percentage. The elderly diabetics was considered to have a right behaviors environmental safety if the percent score was 60% or more and wrong behaviors if less than 60%.

2.6 validity of tool

It was be ascertained by 5experts from community health nursing and medical staff who were reviewed the tools content for clarity, relevance, comprehensiveness, and understandable.

2.7Pilot study

A pilot study was carried out on a sample of 31elderly diabetics (10% of the calculated sample) they were selected randomly from the outpatient diabetic clinic Helwan General Hospital, and were later excluded from the sample. The purpose of the pilot study was to test the clarity and applicability of the study tools and to determine the time needed to fill out the questionnaire sheet.

2.8Fieldwork

Before starting any step in the study, an official letter was issued from post graduate department, Faculty of Nursing, HelwanUniversity to the General Secretary of the Medical Director of Helwan General Hospital to request permission and cooperation to conduct the study, and to provide the researcher with a list of all elderly diabetics in Helwan General Hospital 2016.

Once permission was granted to proceed with the study, the researcher started to prepare a list for collecting the data by determining the expected number of daily elderly diabetics come to the diabetic clinic. Then, Participants were interviewed by the researcher while they were ending the pension papers. The researcher introduced himself and explained the aim of the study briefly; the nature of tool used for data collection, and reassured them that information obtained is strictly confidential and would not be used for any purposes other than research. The self-administered questionnaire was filled out in 15 to 25 minutes. The fieldwork was executed over four months (it extended from the beginning of March 2016 to the end of June 2016),two days weakly Sunday and Monday approximately 8:10 diabetic elderly each day.

2.9 Ethical considerations:

Firstly, the study protocol was approved by the pertinent committee (Research Ethics Committee) at Faculty of Nursing, Helwan University. Then at the time of data collection participants were informed that by filling out the questionnaire they accept to participate in the study. Participants were given the opportunity to refuse participation, and they were notified that they could withdraw at any time of filling the questionnaire, and also to withdraw it after participation. They were assured that the information would be confidential and used for research purpose only.

2.10 Data management:

After data were collected, they were coded and transferred into a specially designed format so as to be suitable for Statistical program feeding. Following data entry and statistical analysis were done using SPSS version 20 Statistical software package. Data were presented using descriptive statistics in the form of frequencies and percentage for qualitative variables and means and stander deviations for quantitative variables. Differences in the score of different items and total score of health promoting were tested among subgroups using chi square when chi square was not valid for testing due to small expected observations more than 25of total observations , Monte Carlo exact test (MCET) was used. The level of significance was adopted at p 0.05.The collected date will be organized, analyzed and tabulated using appropriate statistical significant tests.

III Results

The elderly diabetics enrolled in the current study were mainly females (58%), belonged to rural areas (62%), and had illiterate or read &write (58%). In addition, 74% of them occupied, 67% of them were married, and 88% of them lived with their family. Considering income source, it came from Social affair and was insufficient 52% and 65% respectively.

Table 1 Percentage distribution of the elderly diabetics according to current and past medical history of diabetes mellitus in the study sample. As the table illustrates, the duration of disease among the studied group ranged from 1 - 50 years with mean 12.51 ± 10.87 years. Regarding family history 54.4% had positive family history most common were father and mother (25.6%). Also 52.6% diagnosed with diabetes mellitus by feeling symptoms and going to doctors, 74% know their medication and 81.8% had physical symptoms most common were leg pain (44.2%) followed by hypertension (39.6%) and neuropathy (22.1%). Finally 91.9% had no definition cards for diabetes mellitus.

Regarding percentage distribution of the elderly diabetics according to knowledge about diabetes mellitus complication and follow up in the study sample, **Table 2** clarifies that 14.7% of the studied group had adequate knowledge about complication of DM, 4.9% about eye complication, 11.6% about mouth and teeth complication, 8.4% about circulatory complication, 27.4% about urinary complication and 15.4% about foot complication. Regarding mouth and teeth care 18.6% had adequate knowledge about it and 31.2% had adequate knowledge about foot care. Only 1.8% knew the right action in Diabetic foot and 17.2% knew about regular checkup.

Considering Total Health promoting behaviors among the elderly diabetics in the study sample,**Figure 1**(82.5%, 70.5% and 72.3%) of elderly diabetics had wrong health promoting behaviors in nutrition physical activity and stress management. On the other hand, 53.7% of elderly diabetics had spiritual growth.

Table 3 clarifies Percentage distribution of elderly diabetics according to total knowledge and health promoting behaviorsin the study sample. As the table shows, 28.8% of the elderly diabetics had adequate knowledge about DM and 25.3% had right health promoting behaviors.

Total Knowledge & health promoting behaviors about diabetes mellitus among the elderly diabetics in the study sample, **Figure 2** sketches that indicates that the most supported persons in nutrition and physical activity health promoting behaviors was the medical team (84.6%, 70.5%) and While in spiritual behaviors, social support behaviors and stress management behaviors it was family(72.6%, 83.2, 81%).

Table 4 clarifies the correlation matrix of elderly diabetics' scores of knowledge about diabetes mellitus and health promoting behaviors. The table indicates a statistically significant positive correlation between knowledge about diabetes mellitus and health promoting behaviors. ($p<0.01$).

IV Discussion

In the matter of fact**,** Diabetes mellitus (DM) is a common chronic disease with rising prevalence so that by 2030, the global estimate is expected to rise to 9.9% of the adult population.[13]The rates of diabetes in Egypt has significantly increased exceeding international rates. Egypt is now ranked eighth highest in the world in terms of the disease. The incidence of diabetes in Egypt rose to 16.5 million people, half of which do not know they suffer from this disease, while the other half receives treatment. The disease has risen 83 percent over the past 15 years, which is a very large increase compared to international rates [13], the current study aimed to assessment of health promoting behaviors among elderly diabetics at outpatient diabetic clinic Helwan General Hospital

It is clear from the findings of the current study that the mean age of elderly diabetics was 67.34 ± 10.3 more than two thirds of the elderly diabetics. This result in accordance with **Srinivas**[14] study which conducted in India and illustrated the mean age of male was 59.56 ± 9.64 years and female was 60.90 +7.51 years. And nearly consistent with **Ahmed**[15] study which conducted at outpatient clinic in kafr el zayat general hospital, represented that mean age of patient group was 53.2 +10.8 years.The study finding revealed that females recorded a higher incidence of Diabetes mellitus than males nearly two third in female and one third in male. This study finding is in agreement with some study in Nigeria Chukwu**,** by **Bernice**[16]who found that Incidence of Diabetes mellitus was more on female than the male, also **Arafa and Amin**[17]study which done at Ain Shams University. From the resident point of view this can be attributed to the fact that the female are in charge of the kitchen and food. Some women eat while they cook the food and some eat junk starchy food in between meals combined with the starchy food that is more stable in the home. The combined effect of greater number of elderly females than men in the most populations and increase prevalence of diabetes with age.

Concerning the duration of disease among the studied elderly diabetics regarding family history was more than half had positive family history. This in agreement with **Hamed**[18] in Saudi Arabia who found that more than two thirds of diabetic patient had appositive family history for diabetes, in addition to **El-Khawaga and Abdel-Wahab**[19]who found in here study in In Dakahlia, Egypt that patient Positive family history of diabetes was reported more than half of diabetic patients. This might due to relatives' marriage which is common in rural Egypt.

Regarding to the present study findings nearly three quarter of elderly diabetics in current study discovered disease by present of symptoms and chance, this similar to the result of study done by**Yousef [20]**inZagazig, Egypt, who found that more than two thirds of diabetics discovered diabetes by symptoms and chance.

In the same context, the results of study conducted in Egypt by**El-KhawagaandAbdel-Wahab[19]**revealed that hypoglycemia is a serious complication, yet in the current study only one third of the participants know the normal fasting blood glucose level and approximately half of them were aware about symptoms of hypoglycemia and less than quarter of them were knowledgeable about causes of hypoglycemia.Similarly,the current study which found that less than one third of the elderly diabetics had in adequate knowledge about causes, symptoms, and right action of hypoglycemia.On the other hand, more than three quarter of the elderly diabetics had inadequate knowledge about diabetes'eye complication this similar to the result of study done by **VanStaden[21].** It has been found that more than two thirds of the participants in this study had fairly good knowledge about ocular complications of diabetes mellitus.

Concerning elderly diabetics' knowledge about foot care, the study findings, show that about more than three quarter of elderly diabetics had inadequate knowledge about foot complication and two thirds of them had inadequate care this finding come in consistence with some studies conducted in Egypt by **Saleh[22].**

. In addition elderly diabetics 'Health promoting behaviors about nutrition behaviors, the study findings, show that three quarter of the studied elderly group had wrong nutrition behaviors this finding nearly the same finding by **hentinen[23]** who found the poor dietary regimen adherence could be related to loss of appetite among elders which leads to skipping meals, dental problem which affect quality of food consumption especially the absence of fiber and incidence of constipation besides economic problems and psychological problems especially loneliness which affect food intake among elderly diabetic. In the same way , the study conducted by **Neeland[24]**that revealed that There was a close association between obesity elderly who have poor dietary practice and type 2 diabetes as seven times greater risk of diabetes in obese people compared to those of healthy weight.

Concerning elderly diabetics 'Health promoting behaviors about physical exercise, the study findings, show that more than two thirds of the studied elderly diabetics group had wrong physical promoting behaviors this finding nearly come in consistence with the studies conducted with **Sanjay[25]** who found that 39.2 per cent of the elderly with type 2 diabetes mellitus were engaged in walking as physical exercise and **El Abaasy[26]**who found that Non- adherence to diet and exercise recommendations amongst type two diabetes patients is far more prevalent and no particular single reason could be attributed to poor adherence to either diet or exercise recommendations, rather a combination of many factors.

The study findings, concerning with elderly diabetics 'health responsibility promoting behaviors, shows that two thirds of the studied elderly diabetics had wrong responsibility promoting behaviors as they poorly read the food label, fairly control their body weight, fairly making physical examination and health discussion with medical staff. Most of the respondents in this study did not check their glucose level periodically. This study is similar to **Malanda[27]and Mahfouz[28]**who found that the study on blood glucose level monitoring was poor among elderly diabetes because of some respondents stated that elderly diabetic thought Blood glucose level testing was one of the most expensive aspects of diabetes care. While the study conducted with **Saad[29]**who found that two third of the study elderly sample had good health responsibility as they reported they maintain their body weight before and after every meal, read food labels in each purchase to insure their validity and determine the new trends, fat and sodium content in canned food, search in heath information that will help them to maintain their health status, read books that can help them to improve their health and seek guidance or advice to anything related to health.

The study finding shows that there were statistical significance increase in frequency of wrong behaviors among elderly diabetics and gender (female), divorced, low level educated, non-working, hadn't enough income and low and moderate social classes. This findings are consistent with the previous study done by **Chen[30]**who found that older adults with higher education and economic status, better physical function and MH, and positive behavior-specific cognitions and affect including perceived benefits, self-efficacy, and social support reported higher levels of health-promoting behaviors. The study findings, shows that less than one third of the elderly diabetics had adequate knowledge about DM and less than one third had right health promoting behaviors. This finding is consistent with the previous study done by **Balla[31]**who found that Diabetic population with adequate knowledge was 27.5%

compared 13.4% of non-diabetic population in the study of Prevalence of diabetes, knowledge and attitude of rural population towards diabetes and hypoglycemic event.

V Conclusion

Based on the results of the present study and answers of the research questions it could be concluded that, More than one fifth of the studied elderly diabetics had adequate knowledge about diabetes mellitus meaning and more than quarter of them have right health promoting behaviors. The elderly diabetics with inadequate knowledge about diabetes had statistical significance increase in frequency of wrong health promoting behaviors. Ultimately, a statistically significant positive correlation was found between knowledge and health promoting behaviors of the elderly diabetics.

VI Recommendations

On the basis of the current study findings, the following recommendations are suggested; The elderly diabetics need more intensive training and education in the health promoting behaviors of their diabetes, provide health educator nurse in the diabetic clinic to assess the needs and the education that the elderly diabetics needs, developing and disseminating medical posters or pamphlets to raise the health awareness among the elderly diabetics, developing a health promoting behaviors program regarding the elderly diabetics and Further researches are proposed to examine the efficacy of applying health promoting behaviors program among the elderly diabetics.

Table 1: Percentage distribution of the elderly diabetics according to current and past medical history of diabetes mellitusin the study sample (n=285)

Variable	**(n=285)**	
Duration of DM: (years)		
• Mean ± SD	12.51 ± 10.87	
• Range	1 – 50	
Variable	**No**	**%**
Family history:		
• Yes	155	54.4
• No	130	45.6
Who (N=155)		
• Brother or sister	37	12.9
• Father or mother	82	28.7
• Uncle	11	3.8
• Aunt	14	4.9
• Other	11	3.8
How to diagnose:		
• Feel symptoms and ask Doctors	150	52.6
• Periodic medical examination	60	21.1
• Chance	75	26.3
Know medication:		
• No	74	26
• Yes	211	74
Types of medication:		
• Insulin	125	59.2
• Oral hypoglycemic	86	40.8
Diabetes Physical complications symptoms:		
• No	52	18.2
• Yes	233	81.8
Type of physical complication:		
• Neuropathy	63	22.1
• Retinopathy	47	16.5
• Renal complication	45	15.8
• Skin complication	18	6.3
• Bladder inflammation	35	12.3
• Leg pain	126	44.2
• Heart problems	43	15.1
• Hypertension	113	39.6
• Liver disease	43	15.1
• Delay wound healing	63	22.1
• Recurrent infection	31	10.9
Definition card:		
• Yes	23	8.1
• No	262	91.9

Table 2: percentage distribution of the elderly diabetics according to knowledge about diabetes mellitus complication and follow up in the study sample (n=285)

Variable	(n=285)	
	No	%
Complication:		
• Inadequate Knowledge	243	85.3
• Adequate Knowledge	42	14.7
Eye complication:		
• Inadequate Knowledge	271	95.1
• Adequate Knowledge	14	4.9
Mouth & teeth complication:		
• Inadequate Knowledge	252	88.4
• Adequate Knowledge	33	11.6
Mouth and teeth care:		
• Inadequate Knowledge	232	81.4
• Adequate Knowledge	53	18.6
Circulatory complication:		
• Inadequate Knowledge	261	91.6
• Adequate Knowledge	24	8.4
Urinary complication:		
• Inadequate Knowledge	207	72.6
• Adequate Knowledge	78	27.4
Foot complication:		
• Inadequate Knowledge	241	84.6
• Adequate Knowledge	44	15.4
Right action in foot complication:		
• Inadequate Knowledge	280	98.2
• Adequate Knowledge	5	1.8
Foot care:		
• Inadequate Knowledge	196	68.8
• Adequate Knowledge	89	31.2
Regular check:		
• Inadequate Knowledge	236	82.8
• Adequate Knowledge	49	17.2
Total Knowledge:		
• Inadequate Knowledge	203	71.2
• Adequate Knowledge	82	28.8

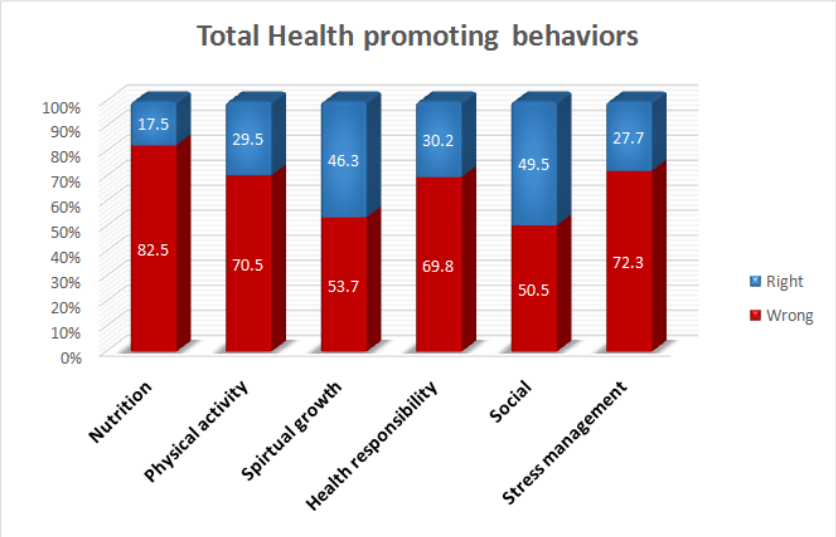

Figure1: Total Health promoting behaviors among the elderly diabetics. (n=285)

Table 3: Percentage distribution of elderly diabetics according to total knowledge and health promoting behaviors in the study sample (n=285).

Variable	(n=285)	
	No	%
Total Knowledge:		
• Inadequate Knowledge	203	71.2
• Adequate Knowledge	82	28.8
Score:		
• Mean ± SD	11.9 ± 3.16	
• Range	7 - 22	
Total health promoting behaviors:		
• Wrong behaviors	213	74.7
• Right behaviors	72	25.3
Score:		
• Mean ± SD	110.23 ± 15.66	
• Range	68 - 152	

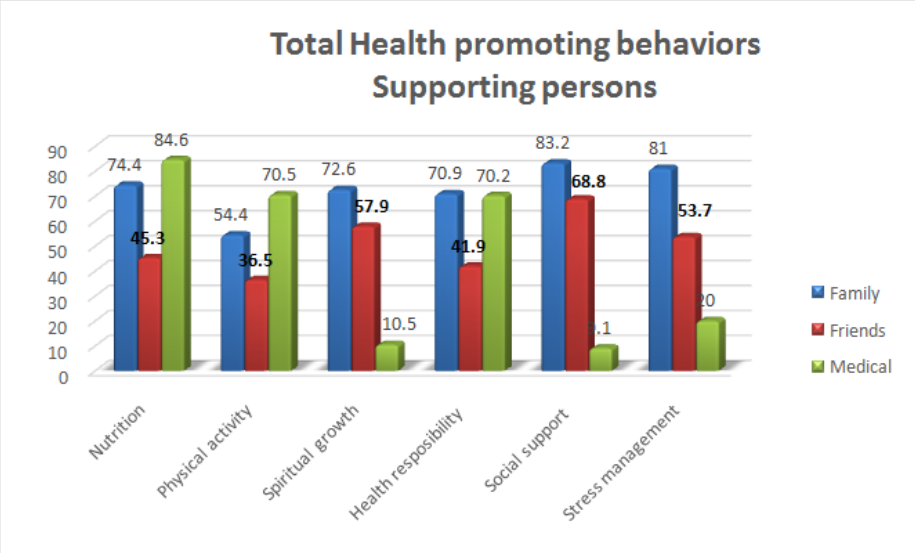

Figure 2: Percentage of the supporting persons for health promoting behaviors among the elderly diabetics. (n=285).

Table 4: Correlation matrix between knowledge about diabetes score of the elderly diabetics and their health promoting behaviors score (n=285)

Variable	Elderly diabetics Knowledge about diabetes disease (n=285)	
	R	P
Health promoting Behaviors	0.38	<0.001**

r-square=0.56 Model ANOVA: F=42.22, p<0.001

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