Quality of life and physical functioning of the diabetic middle aged and older adults

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Abstract— ***Objective:*** *To compare the physical functioning and quality of life for the diabetic middle aged and older adults.*

Methodology: *A descriptive study design was used, the study was conducted at the outpatient clinics of two hospitals in Alexandria, Egypt. A total number of 118 diabetic patients diagnosed with diabetes at least for one year, aged 20-59 for the middle aged adults group & ≥60 for the elderly group, had no current physical disabilities or mental impairments were included. Four measures were used in this study; the socio-demographic and clinical data structured interview questionnaire, the Katz Activities of Daily Living (ADL) Scale, the International Physical Activity Questionnaire-Short version (IPAQ), and the Short Form 36 General Health questionnaire (SF-36).*

Results: *A statistical difference was observed between the two groups in all domains of generic health related quality of life except role limitations due to emotional problems, and social functioning. Adults' group with normal fasting blood sugar test had better quality of life and physical functioning than the elderly group.*

Conclusion& recommendations: *The elderly patients with diabetes had poorer quality of life and functional status in comparison with the adults. These findings suggest that, health education programs that stress a balanced diet and increased activity should be a public health priority for all ages to control diabetes mellitus and its complications.*

Keywords- ***Diabetes mellitus, Middle aged, Older adults, Physical functioning, Quality of life***

Introduction

Diabetes mellitus (DM) is a group of metabolic disorders characterized by hyperglycemia resulting from defects in insulin secretion and/or insulin resistance[1]. It is considered one of the most common non-communicable diseases and the fourth or fifth leading cause of death in most high-income countries and there is substantial evidence that it is epidemic in many low and middle-income countries[2],[3]. The prevalence of DM is rising in tandem with the increase in population growth rate and urbanization all over the world [4]. Globally, as of 2010, an estimated 285 million people had DM, with type 2 making up about 90% of the cases [5]. In 2013, an estimated 381 million people had DM [1], and the number of DM cases is estimated to almost be doubled by 2025 in the developing world compared to a 41% increase in the developed countries[6].

Diabetes mellitus is the eleventh most common cause of premature mortality in Egypt, and is responsible for 2.4% of all years of life lost, also, it is the six most important cause of disability burden in Egypt and is associated with impaired quality of life with serious long-term consequences and escalating health care costs [7],[8]. The literature revealed that, DM is associated with increased mortality, cancer, coronary artery disease, renal failure, vision impairment, ulcer and lower extremities amputation risk [9],[10]. Also, DM might foster disability through its complications which may impede the normal performance of everyday activities; work, sexual activity, and leisure as well as social and family life[11].

The burden of complex and expensive disease management, dietary regimens, and the need to inject insulin and test blood and urine drastically impair quality of life of diabetic patients, which impacts self-management, the adherence to therapeutic regimen and treatment success[12]. Health related quality of life (HRQoL) is a fundamental measure used to understand the health status of a population, it includes aspects of life that affect perceived physical or mental health [13], in which those aspects are used as an outcome measure to monitor the burden of diabetes on the population. HRQoL is an important factor for self-management behaviors of diabetic patients; these behaviors have special importance in preventing diabetic complications [14]. Physical functioning is a core element of HRQoL and predicts further functional decline, morbidity, health services use, and death[15]. Studies using generic HRQoL measures have shown greater functional impairments including problems with mobility, balance, housework, and self-care in diabetic patients compared to the same age controls [16],[17].

Evaluating consequences of DM is critical to understand population's needs for health care, and evaluate the effectiveness of different interventions. Nurses are often the first health care team members to interact with patients and are being called on to apply their specialized knowledge, training, and skills to educate and motivate patients with DM about

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treatment regimens and practical ways to achieve treatment goals and to assess diabetes-related complications as they arise in younger and older age groups [18].

Although, many studies have examined the relationship between DM, physical functioning and HRQoL among elderly population, few have compared the HRQoL of elderly persons with DM to that of younger age. Up to our knowledge till the current date, no studies regarding quality of life and physical functioning of the diabetic middle aged and older adults have been done in Alexandria, Egypt. So this study was carried out to compare the physical functioning and quality of life for the diabetic middle aged and older adults.

II- Research Question

Is there a difference between quality of life and physical functioning of the diabetic middle aged and older adults?

III- Methodology

Design, setting, and participants: This descriptive study was conducted at the outpatient clinics of two hospitals in Alexandria, Egypt, namely; the Main University Hospital and Sharq El-Madina Hospital. Data collection was accomplished from June to September 2012 after seeking the permission of the hospitals' administration, and the study protocol being approved by the Ethical Research Committee at the Faculty of Nursing, Alexandria University. Written consent was taken from the participants and those who were not interested in participating in the study were excluded. Diabetic patients who were diagnosed for diabetes mellitus at least for one year, age more than 20 years (20-59 for the middle aged adults group & ≥60 for the elderly group), had no current physical disabilities or mental impairment were included in this study. A total number of 118 (51 adults & 67 elders) out of 147 diabetic patients visited the outpatient clinic during the period of the study agreed voluntary to participate in the study, and allowed using their anonymous data for the purpose of this research (the response rate was 80.3%).

Outcome measures: four measures were used in this study; the first one was socio-demographic and clinical data of diabetic middle aged and elderly structured interview questionnaire. This tool was developed by the researchers based on the relevant literature. It included information about socio-demographic data such as age, sex, marital status, etc., and the medical health history. The second measure was the Katz Activities of Daily Living (ADL) Scale developed by (Katz *et al*, 1963)[19]. It was used to assess the independent living skills. The total score of this scale was 18 points and was categorized in three levels of dependence; fully independent (6 points), partially dependent (7-12 points), and totally dependent (13-18 points).The third measure in this study was the International Physical Activity Questionnaire-Short version (IPAQ) developed by (Craig *et al*, 2003)[20]. This scale was used to assess the level of physical activity in three specific types of activity, namely walking, moderate intensity activity, and vigorous-intensity activity. The fourth measure was the Short Form 36 general health questionnaire (SF-36)[21]. This instrument was constructed to survey health status in the Medical Outcomes Study (Ware & Sherbourne, 1992). The SF-36 measures general health and quality of life with 36 items in eight dimensions, four pertaining to mental and four to physical health. The scores ranged from zero (maximal symptom / maximal limitation / poor health) to 100 (no symptoms / no limitations / excellent health). From the medical records, the patients' drug treatment and the most recently recorded blood glucose concentration were recorded.

Procedure: Prior to starting of the study, official letters were issued from the Faculty of Nursing – Alexandria University and forwarded to the directors of the two hospitals. Each of the directors was informed about the purpose of the study, the date and time of data collection. Validity of the study tools were tested by a jury to ensure the content validity of the translated version of the scales with the original one. Reliability of the measurement tools was tested. Coefficient factor (r) was calculated using Pearson's coefficient of correlation. The reliability of the Short Form 36 general health questionnaire (SF-36) ranged from 0.8 up to 1, while the reliability of The International Physical Activity Questionnaire (IPAQ) ranged from 0.76 up to 0.94, the coefficient factor was not tested for the Katz Activities of Daily Living scale because it was already tested before in many Egyptian studies. Pilot study was carried out on twenty adult and elderly patients at Sharq El-Madina hospital (those patients were not included in the study participants). Each patient was assured that the collected data will be used only for the purpose of the study and confidentiality was maintained. The researchers approached the patients on admission, introduced themselves and the purpose of the study, and asked them to participate in the study. Then a written consent was obtained from those who agreed to participate in the study.

Statistical analysis: statistical analysis was performed using Statistical Package for the Social Sciences Version 16.0 for windows (SPSS Inc. UK Ltd, Working). Continuous variables were described using means and standard deviation. Comparison between the two groups was undertaken using t test. A *P* value of .05 was considered statistically significant.

IV- Results

Table (I) showed age of the adult group ranged between 20 and 59 years with a mean of 42.75±12.83 year, and the elderly group ranged between 60 and 85 years with a mean of 65.30±5.03 year. Females constituted almost equally more than half the adults' and elderly groups (56.9% & 56.7%, respectively). Approximately two thirds of the studied adults and elderly were married (64.7% & 70.1%, respectively), and it is interesting to note that none of the elderly group was divorced or single with a high statistically significant difference observed (P= 0.000). On the other hand, one quarter (25.0%) of the adult group were illiterate compared to more than one third (37.3%) of the elderly group, and the majority of both adult and elderly groups were housewives (51.0% & 44.8%, respectively). It seemed that more than one half of both adults and elderly groups reported having enough

monthly income (56.9.7% &52.2%, respectively), with no statistical difference.

Table II demonstrated statistical significant differences observed between the two groups in all domains of generic health related quality of life except for role limitation due to emotional problems, and social functioning. The adults' group reported having higher mean score (better quality of life) in all domains of quality of life than the elderly group except in emotional wellbeing domain.

Table III revealed that adults group had better ability to perform ADL than the elderly group. The table also revealed a significant relationship between independent adult and elderly groups (P= 0.03) in physical functioning domain. Moreover, statistical significant relations were found equally (P=0.01) in both groups independent and partially dependent adults and elders concerning role limitation due to physical health domain. On the other hand, the table revealed no statistically significant relation between independent adult and elders and partially dependent adult and elders in role limitation due to emotional health domain (P=0.10 & P=0.980, respectively). However, statistical significant relations were found between independent adults and elderly groups in the following domains; energy, pain, general health, and changes in health domains (p= 0.00, 0.01, 0.02, 0.00, respectively).

Table (IV) illustrated higher mean score of quality of life found in the study subjects who had normal fasting blood sugar level, moreover, adults' group who had normal fasting blood sugar test had better quality of life than elderly group. For those with normal fasting blood sugar, significant differences were found between both groups regarding role limitation due to physical health, energy, social wellbeing, pain, and changes in health domains (P = 0.003, 0.023, 0.043, 0.005 & 0.004, respectively). On the other hand, those with abnormal fasting blood sugar revealed statistical significant relations between both groups regarding role limitation due to physical functioning, role limitation due to physical health, energy, general health, and changes in health domains (P= 0.022, 0.009, 0.006, 0.00 & 0.001, respectively).

Table (V) revealed that, exercise had a great effect on the quality of life among both groups. Higher score of quality of life was found in the study participants who practiced exercise. Moreover, adults' group who practiced exercise had better quality of life than elderly group. Significant differences were found between both groups who practiced exercise and the following; physical functioning, role limitation due to physical health, energy, pain, and changes in health domains (p= 0.007, 0.000, 0.043, 0.002, 0.001, 0.000, respectively).

Table (VI) revealed that the vast majority of the adults' group had no hearing problems with different activity levels. Few percent(7.7%) of adults who reported difficulty in hearing compared to more than two thirds (68.3%) of the elders had low activity score, with a statistical significant difference (p=0.046), and three fifth (60%, 30%) of adults and elders respectively who reported difficulty in hearing while using a hearing aid had moderate activity score (p=0.006). Regarding vision status, three quarters (75%) of adult participants who reported moderate activity level showed no problem compared to elders who had difficulty in vision while using eye glasses or not (45% & 20%, respectively), these results showed high statistically significant association (p=0.0.001). Interestingly, slightly less than one half (46.2%) of the adults compared to less than one fifth (14.6%) of the elders who had low activity score reported weight gain (P=0.001). The table also revealed statistically significant differences for both the adults and elders groups with low, moderate and high activity (P = 0.003, 0.026 & 0.056, respectively) concerning changes in health status.

Table (VII) showed health problems and medication consumed by the studied subjects depict highly significant impact on their ability to perform ADL. The table also revealed that elderly group had higher percentage of chronic diseases and medication consumed, however, cardiovascular problems were the most prevailing among all groups, but it is interesting to note that independent adults were more affected than partially dependent (12 & 1, respectively).

Concerning medication; hypoglycemic and cardiovascular drugs were the most commonly consumed and statistically significant differences were detected between both groups whether independent or partially dependent (p= 0.003 & 0.051, respectively). It seemed that two fifth (40%) of independent adults and one fifth (21%) of independent elders reported compliance with hypoglycemic drugs and these percents dropped to 5% & 30% among partially dependent adults and elders respectively, but the differences were not statistically significant.

Table (VIII) presented adult's group had better quality of life and higher score of IPAQ when compared with the elderly group except for low and moderate activity with emotional wellbeing (221.5±58.6, 273.7±70.2 & 257.0±71.8, 281.0±104.3, respectively). The table also presented statistically significant relations between the low activity domain and role limitation due to physical health, energy, emotional wellbeing, and changes in health (0.034, 0.023, 0.019 & 0.004, respectively). Mean score of moderate activity showed significant relations with physical functioning, role limitation due to physical health and energy (0.008, 0.025 & 0.046, respectively). However, high activity was found to be significantly associated with the mean score of the general health domain only (P=0.032).

V- Discussion

Health related quality of life is an important factor for self-management behaviors of diabetic patients; these behaviors have special importance in preventing diabetic complications[22],[23].

Results of this study revealed that DM has an impact on all health related quality of life domains, and this came in accordance with the findings of previous studies[24],[25]. However, our results showed that the adults' group had better generic health related quality of life in all domains except for role limitations due to emotional problems and social function, supporting the findings of Trief *et al* [26] that hypothesized quality of life of elder diabetics to differ of those younger adults, and contradicting the classic well-being research which often assumed that aging is associated with more distress and pessimism due to physical, social and emotional losses[27].

In this study, the relatively lower scores for the elderly group may indicate the impact of aging on different quality of life dimensions. This finding can be explained by the following, the higher complication rate in the diabetic elders, and the long-term treatment of diabetes and its complications brought elders and their families' great economic burdens. Moreover, the higher prevalence of other chronic diseases, all those factors negatively impacted their quality of life. Regarding the difference between the elders and adults in the emotional and social functioning, this finding in harmony with a new study conducted by Derek Isaacowitz 2012[28] who found that older adults may be better at regulating emotion than younger adults because they tend to direct their eyes away from negative events or toward positive events. In addition, younger age might have been more affected by daily life stressors as work-related, financial, child-rearing or pear and family relations, than the elderly group. Adding to the fact that elders had free time to interact socially with the family members, grandchildren, and continue to maintain friendships. All of these factors make the elders socially active, making older people happier, regulating their emotions more effectively, and gear their lives towards negative emotions while maximizing positive ones [29].

Adults' group showed better ability to perform activities of daily living than the elderly group, revealing negative association between age and physical functioning, and supporting previous studies that viewed age as having a synergistic effect on the physical functioning of diabetic patients[30], also, proved reduction in physical function and health status of diabetic patients compared with age [31]. On the other hand, Sayer *et al*[32] mentioned that diabetic status and higher glucose levels with normal glucose tolerance were associated with poor physical function, supporting our results that showed lower physical functioning abilities associated with higher blood sugar level in the study population, despite that adults' group whether had normal or abnormal fasting blood sugar level showed better quality of life and physical function than elder's.

Higher score of quality of life was found in the study participants who practiced exercise. Significant differences were found between adult and elderly groups who practiced exercise and physical functioning; role limitation due to physical health, energy, pain, and changes in health domains. There is a growing body of evidence demonstrating that physical activity in particular resistance training is a key component in the management of diabetes in older people, and it is likely that exercise will have benefits both in terms of metabolic control and improving daily function, especially mobility [33],[34].

Hearing impairment, especially hearing loss and tinnitus is considered one of the known complications of DM [35]. Previous study showed age of onset and duration of DM were associated with the occurrence of hearing problems[36], supporting the findings of this study that presented statistical significant differences between adult and elderly groups concerning hearing problems with different activity levels, and contradicting the findings of Mozaffari *et al* [37] who found the age of diabetic patients had only a borderline association with severity of hearing problems suggesting that ageing was not a factor and that the role of disease progression should be investigated more precisely.

Diabetic retinopathy is one of the most serious complications of DM. It is the number one cause of new cases of blindness among adults aged between 20-74 years old[38]. In this study, significant association was found between activity level and visual problems in the elderly group whether using eye glasses or not, compared with no effect on most adults' group. This result confirms the findings of previous studies that mentioned age of the patient, demographic changes, duration of the diabetes and other co-existing ocular pathology might have contributed to the high prevalence of blindness [39],[40].

Health problems and medication consumed by these study participants depict highly significant impact on their ability to perform ADL. The elderly group had higher percentage of chronic diseases and medication consumed, however, cardiovascular problems were the most prevailing among all groups. De-Visser *et al* [41]. also documented cardiovascular disease increased with duration of diabetes and those with prevalent diabetes and cardiovascular disease had lower levels of health related quality of life. However, Obesity has been strongly associated with insulin resistance in normoglycemic and diabetic persons [42],[43].

VI- Conclusion and Recommendations

It can be concluded from this study that, diabetes mellitus affects the quality of life of both adults and elders to a varying degrees. The elderly patients with diabetes had poorer quality of life in almost all domains of quality of life except for emotional problems and social functioning in comparison with the adults. Glycemic control, practice of exercise, and the level of physical activity are all factors that affect quality of life for both adults and elders. Moreover, the study revealed significant differences between the two groups regarding the

functional status, in which the adult group had higher ability to perform activities of daily living.

The findings suggest that, studies where HRQoL for each patient performed at diagnosis of DM, and during follow-up would be valuable for further illustration of HRQoL in this population. Population based health related strategies are recommended to reduce glucose level and comorbidities as well as promoting healthy life style across the whole range in later life to improve the physical function for diabetic patients. It is essential for public health professionals to develop and implement programs to address the quality of life and physical needs of the elders, especially those with chronic diseases. In addition, health education programs that stress a balanced diet and increased activity should be a public health priority for all ages to control DM and its complications. Education of the diabetic patients and their families on the value of independent functioning and the consequences of functional decline should be considered. Finally, community survey is needed for early case finding and management of diabetic cases, and wide scale prevention of complications.

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Tables:

Table (I): Socio-demographic characteristics of the study participants

Socio-Demographic Characteristics	Adult group			Elderly group			Test of significance
		No (51)	%		No (67)	%	
Age:							
	20-	14	27.45	***60-***	62	92.5	
	35-	13	25.49	***75-***	4	6.0	
	50 ≥ 60	24	47.06	***85+***	1	1.5	
Sex:							
Male	22		43.1	29		43.3	
Female	29		56.9	38		56.7	
Marital status:							FET= 34.97 P=.000*
Married	33		64.7	47		70.1	
Single	15		29.4	0		.0	
Divorced	1		2.0	0		.0	
Widow	2		3.9	20		29.9	
Education:							
Illiterate	13		25.0	25		37.3	
Read & write	7		13.7	13		19.4	X^2=7.014 P=.140
Basic education	11		21.6	14		20.9	
Secondary education	8		15.7	10		14.9	
High education	12		23.5	5		7.5	
Work:	Current work			Work before retirement			
Housewife	26		51.0	30		44.8	X^2=6.420 P=.099
Skilled work	10		19.6	11		16.4	
Employee	6		11.8	20		29.9	
Private business	9		17.6	6		9.0	
Income:							X^2=.249 P=.617
Enough	29		56.9	35		52.2	
Not enough	22		43.1	32		47.8	

Table (II): Mean score of generic health related quality of life domains of the study participants

Subscale of SF-36	Adult group (N=51)	Elderly group (N=67)	Z (P)
	Mean ± SD	**Mean ± SD**	
Physical functioning	555.3±246.5	414.1±216.3	3.365(.001)*
Role limitations due to physical health problems	253.1±167.7	128.3 ±143.3	3.991(.000)*
Role limitations due to emotional problems	160.9 ±135.6	132.8 ±131.8	1.242(.214)
Energy/ fatigue	183.1± 68.746	130.4±69.6	3.615(.000)*
Emotional wellbeing	254.9± 74.0	272.8±80.1	1.88(.059)*
Social functioning	113.7± 41.3	107.8±43.1	.982(.326)
Pain	119.4± 52.0	94.4±46.0	2.91(.004)*
General health perception	231.3± 76.1	182.1±70.8	3.28(.001)*
Changes in health	52.9± 22.7	32.0±23.3	4.47(.000)*

Table (III): Relationship between quality of life of the studied participants and their ability to perform activities of daily living

Quality of Life Domains	Independent		Partially dependent	
	Adult group (N=46)	**Elderly group** (N=28)	**Adult group** (N=5)	**Elderly group** (N=39)
Physical functioning Mean ± SD	575±229	459±204	370±353	382±222
t test (P)	2.21(0.03)*		0.107(0.91)	
Role limitation due to physical health Mean ± SD	250±168	150±164	280±179	113±126
t test (P)	2.505(0.01)*		2.66(0.01)*	
Role limitation due to emotional health Mean± SD	170±135	118±125	80±130	144±137
t test(P)	1.65(0.10)		0.980(0.333)	
Energy Mean ±SD	191±65	147±57	112±70	118±76
t test(P)	2.943(0.00)*		0.181(0.85)	
Emotional well being Mean ± SD	263±73	259±78	184±41	283±81
t test (P)	0.225(0.82)		2.668(0.01)*	
Social well being Mean ±SD	117±37	109±48	80±65	107±40
t test(P)	0.851(0.39)		1.322(0.19)	
Pain Mean ±SD	123±49	92±49	82±69	96±45
t test(P)	2.657(0.01)*		0.616(0.54)	
General health Mean ±SD	232±75	192±75	225±95	175±68
t test(P)	2.235(0.02)*		1.474(0.14)	
Changes in health Mean ±SD	54±23	31±24	45±21	33±23
t test(P)	4.018(0.000)*		1.134(0.26)	

- All middle – aged and older adult participants were independents and/ or partially dependents

Table (IV): Relationship between quality of life of the studied participants and their mean score of fasting blood sugar level

Quality of Life Domains	Fasting blood sugar level			
	Normal		**Abnormal**	
	Adult group (N=25)	**Elderly group** (N=22)	**Adult group** (N=26)	**Elderly group** (N=45)
Physical functioning Mean ± SD	590±213	471±241	522±272	387±200
t test (P)	1.804(0.074)		2.388(0.022)*	
Role limitation due to physical health Mean ± SD	284±165	136±165	223±168	124±133
t test (P)	3.068(0.003)*		2.728(0.009)*	

Role limitation due to emotional health Mean± SD	200±132	145±137	123±130	127±130
t test(P)	1.387(0.169)		0.103(0.918)	
Energy Mean ±SD	197±63	154±65	170±72	119±70
t test (P)	2.304(0.023)*		2.922(0.006)*	
Emotional well being Mean ± SD	265±68	264±63	246±80	277±87
t test (P)	0.060(0.952)		1.532(0.133)	
Social well being Mean ±SD	127±33	105±42	101±45	109±44
t test(P)	2.050(0.043)*		0.776(0.442)	
Pain Mean ±SD	133±45	96±42	106±56	94±48
t test(P)	2.903(0.005)*		1.008(0.319)	
General health Mean ±SD	220±79	205±65	242±73	171±72
t test(P)	0.723(0.472)		4.007(0.000)*	
Changes in health Mean ±SD	55±22	36±21	51±24	30±24
t test(P)	2.958(0.004)*		3.530(0.001)*	

*Normal fasting blood sugar level in adults is 70-110 while in elders is 126

Table (V): Relationship between quality of life of the studied participants and their practice of exercise

Quality of Life Domains	**Practice of Exercise**			
	Yes		**No**	
	Adult group (N=20)	**Elderly group** (N=23)	**Adult group** (N=31)	**Elderly group** (N=44)
Physical functioning Mean ± SD	665.0±219.5	480.4±209.2	484.5±239.9	379.5±214.1
t test (P)	2.820 (0.007)*		1.989 (0.050)*	
Role limitation due to physical health Mean ± SD	305.3±142.9	126.1±157.3	219.5±175.9	129.5±137.3
t test (P)	3.886 (0.000)*		2.483(0.015)*	
Role limitation due to emotional health Mean± SD	195.4±131.1	126.1±138.8	138.7±135.8	136.4±129.5
t test(P)	1.674 (0.102)		0.076 (0.940)	
Energy Mean ±SD	213.0±54.4	147.0±75.7	163.9±70.8	121.8±65.5
t test (P)	3.239 (0.002)*		2.646 (0.010)*	
Emotional well being Mean ± SD	271.0±67.2	290.4±68.4	244.5±77.4	263.6±84.8
t test (P)	0.936 (0.355)		0.996 (0.323)	

Social well being Mean ±SD	125.0±125.0	114.1±40.4	106.5±44.7	104.5±44.5
t test(P)	0.951 (0.347)		0.182 (0.856)	
Pain Mean ±SD	142.5±42.1	93.9±47.7	104.5±52.9	94.7±45.6
t test(P)	3.517 (0.001)*		0.861 (0.392)	
General health Mean ±SD	245.0±77.6	188.0±70.6	222.6±75.1	179.1±71.5
t test(P)	2.518 (0.016)		2.538 (0.013)*	
Changes in health Mean ±SD	61.3±17.1	33.7±20.7	47.6±24.4	31.3±24.7
t test(P)	4.695 (0.000)*		2.826 (0.006)*	

Table (VI): Relationship between health status of the studied participants and their IPAQ* scores

Health status	**IPAQ Score**											
	Low activity				**Moderate activity**				**High activity**			
	Adult		**Elderly**		**Adult**		**Elderly**		**Adult**		**Elderly**	
	No	**%**	**No**	**%**	**No**	**%**	**No**	**%**	**No**	**%**	**No**	**%**
Hearing: No problem	12	92.3	10	24.4	18	90.0	2	10.0	16	88.9	5	83.3
Difficulty in hearing and using hearing aid	0	0.0	3	7.3	1	5.0	12	60.0	0	0.0	0	0.0
Difficulty in hearing but not using hearing aid	1	7.7	28	68.3	1	5.0	6	30.0	2	11.1	1	16.7
X^2 (p)	6.141(0.046)*				10.21(0.006)*				0.254(0.614)			
Vision: No problem	5	38.5	11	26.8	15	75.0	7	35.0	13	72.2	1	16.7
Difficulty in vision and uses eye glasses	5	38.5	19	46.3	4	20.0	9	45.0	5	27.8	3	50.0
Difficulty in vision but not using eye glasses	3	23.1	11	26.8	1	5.0	4	20.0	0	0.0	2	33.3
X^2 (p)	1.285(0.526)				13.264(0.001)*				18.095(0.000)*			
Weight change: No	4	30.8	12	29.3	12	60.0	4	20.0	10	55.6	2	33.3
Increased	6	46.2	6	14.6	3	15.0	1	5.0	4	22.2	1	16.7
Decreased	3	23.1	10	24.4	5	25.0	6	30.0	3	16.7	2	33.3
Don't know	0	0.0	13	31.7	0	0.0	9	45.0	1	5.6	1	16.7
X^2 (p)	17.099(0.001)*				28.182(0.000)*				3.656(0.314)			
Changes in health: Much better than one year ago	0	0.0	6	14.6	1	5.0	6	30.0	1	5.6	2	33.3
Somewhat better	3	23.1	21	51.2	4	20.0	6	30.0	2	11.1	1	16.7
The same	6	46.2	10	24.4	8	40.0	6	30.0	10	55.6	1	16.7
Somewhat worse	4	30.8	4	9.8	5	25.0	2	10.0	4	22.2	2	33.3

Much worse now	0	0.0	0	0.0	2	10.0	0	0.0	1	5.6	0	0.0
X^2 (p)	16.362(0.003)*				11.086(0.026)*				9.192(0.056)*			

*IPAQ (International Physical Activity Questionnaire

Table (VII): Relationship between the ability of the study participants to perform activities of daily living and presence of medical problems and medications taken

Health problems/ medication taken	Independent		Partially dependent	
	Adult group (N=46)	**Elderly group** (N=28)	**Adult group** (N=5)	**Elderly group** (N=39)
Health problems:*				
No	33	9	3	4
Cardiovascular	12	15	1	28
Respiratory	0	1	0	1
GIT	1	4	0	9
Musculoskeletal	0	3	0	4
Neurologic	1	0	2	0
Genitourinary	0	2	0	4
Sensory impairment	0	0	0	2
Others	0	1	0	3
FET (P)	33.307(0.000)*		33.223(0.000)*	
Medication:*				
Hypoglycemic drugs	46	28	5	37
Cardiovascular drugs	11	14	1	26
NSAIDs	0	3	0	6
Vitamins & minerals	0	4	0	5
GIT medications	1	4	0	8
Eye drops	1	1	0	2
Others	1	1	2	3
FET (P)	21.690(0.003)*		14.034(0.051)*	
Compliance with medication				
Yes	40	21	5	30
No	6	7	0	9
FET (P)	1.718(0.191)		1.451(0.228)	

Table (VIII): Relationship between quality of life of the studied participants and their mean score of IPAQ

Quality of life Domains	**IPAQ Scores**					
	Low activity		**Moderate activity**		**High activity**	
	Adult group (N=13)	**Elderly group** (N=41)	**Adult group** (N=20)	**Elderly group** (N=20)	**Adult group** (N=18)	**Elderly group** (N=6)
Physical functioning subscale: Mean ± SD	488.5 ±270.9	418.3±201.4	583.6±197.0	405.0±208.9	572.2±280.9	416.7±276.9
t test (P)	0.958(0.343)		2.781(0.008)*		1.179(0.251)	
Role limitation due to physical health Mean ± SD	238.9±170.9	131.7±149.1	230.0±175.0	115.0±134.8	289.1±160.5	150.0±151.7
t test (P)	2.182(0.034)*		2.328(0.025)*		1.861(0.076)	

Role limitation due to emotional health Mean± SD	192.3±132.0	136.6±135.6	115.4±126.5	120.0±128.1	188.9±141.0	150.0±137.8
t test(P)	1.299(0.200)		0.115(0.909)		0.588(0.562)	
Energy Mean ±SD	170.8±70.5	119.0±68.7	176.0±46.2	137.0±70.9	200.0±86.8	186.7±46.8
t test (P)	2.352(0.023)*		2.062(0.046)*		0.356(0.725)	
Emotional wellbeing Mean ± SD	221.5±58.6	273.7±70.2	257.0±71.8	281.0±104.3	276.7±81.2	240.0±49.0
t test (P)	2.419(0.019)*		0.848(0.402)		1.035(0.312)	
Social well being Mean ±SD	109.6±50.6	108.5±39.8	111.3±36.7	111.3±43.3	119.4±40.7	91.7±66.5
t test(P)	0.080(0.937)		0.000(1.000)		1.233(0.231)	
Pain Mean ±SD	111.5±61.8	90.4±41.0	122.0±40.4	104.3±51.3	122.2±58.2	89.2±62.6
t test(P)	1.426(0.160)		1.216(0.232)		1.184(0.249)	
General health Mean ±SD	205.8±69.3	181.2±63.7	223.8±72.3	186.3±86.9	258.3±80.4	175.0±65.2
t test(P)	1.184(0.242)		1.473(0.149)		2.289(0.032)*	
Changes in health Mean ±SD	51.9±19.0	32.3±21.1	53.8±26.0	30.0±25.1	52.8±22.5	37.5±34.5
t test(P)	2.986(0.004)*		2.937(0.006)*		1.260(0.221)	