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Determinants of Health-Related Quality of Life among Middle-Aged and Older Stroke Patients

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Abstract: Stroke is a major health problem with a significant impact on the health-related quality of life. It is considered the main factor of disability in middle-aged and elderly population. Living with the consequences of stroke can greatly affect the quality of life in most patients. Quality of life after stroke can be influenced by several factors in term of patient and disease-related characteristics. The aim of this study was to identify the determinants of quality of life among middle-aged and older stroke patients. A descriptive research design with an analytic component was followed in the study. This study was conducted in the neurological outpatient clinic at Mansoura University Hospital. A purposive sample of 128 patients with stroke was enrolled in the study. Data was collected using; Demographic and health related data interview sheet, Stoke-Specific Quality of Life-12 (SS-QoL-12), Mental Adjustment to Stroke Scale (MASS), Center for Epidemiological Studies-Depression Scale (CES-D), Barthel Index (BI) and family support subscale. Results displayed that according to SS-QoL-12, quality of life was decreased in a significant way among patients in the older group compared with those in the middle-aged group with respect to physical and total health-related quality of life ($p \leq 0.05$) with no difference regarding psychological aspect ($p>0.05$). Mobility, self-care and energy were the most affected domains in the two groups. No significant differences were noticed in coping strategies, depression, functional ability and family support between the two patients' group ($p>0.05$). According to regression analysis, it was noticed that the main determinants of quality of life in the older group were depression, comorbidities, family support, functional status, fighting spirit and age. While, family support, functional status, received rehabilitation, fighting spirit and duration of stroke were the most powerful determinants for the middle aged group. Conclusion: Older stroke patients had a significant lower score in the QoL especially with respect to physical aspect. Family support, functional status and coping strategies are consistent determinants of health-related quality of life in stroke patients with different age.

Key words: Health-Related Quality Of Life · Stroke · Determinants · Older Patients

INTRODUCTION

Stroke is a major health problem with a significant impact on the health-related quality of life. Despite new advances in the field of medicine, quality of care and health promotion, stroke imposes a major mortality and morbidity risk to the middle aged and older adults [1]. Globally, stroke is the second leading cause of death after ischemic heart disease, with approximately 6.7 million stroke deaths in 2015 [2]. According to the world health organization [3], 15 million people suffer stroke worldwide each year. Of these 5 million die and another 5 million are permanently disabled. In Egypt, the diseases of the circulatory system, including stroke, are the primary cause of death and account for one third of all deaths [4].

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The epidemiology of stroke is increasing rapidly and the global stroke burden continues to rise worldwide especially in less developed and lower income countries. The world health organization estimates that 85% of stroke deaths occur in those countries [5]. Stroke is a major health problem in the Egyptian population. In 2018, five epidemiological studies conducted in southern Egypt reported that the incidence and prevalence of stroke are high and the mean crude prevalence rates across the five studies were 721.6/100.000 [6].

Stroke is defined as sudden death of brain cells due to lack of oxygen when the blood flow to the brain is lost by blockage or rupture of an artery to the brain [7]. Stroke affects patients' lives in many different ways, not only physically but also through a range of emotional, cognitive and social aspects. The seriousness of post-stroke complications affects the quality of life. As stroke mortality decreases, more patients have to live with multiple impairments. So, paying greater attention to quality of life and rehabilitation is increasingly important [8].

Quality of Life (QoL) assessment has been an important part in evaluation of stroke patients and their treatment. It is a multi-dimensional constructs involving physical, mental and social issues [9]. Researchers and physicians have often used the term of the health-related quality of life (HRQoL) in the field of medicine that usually reflects the patients' subjective and personal evaluation of their own health status. Therefore, HRQoL refers to the difference between normal functions and the functions that emerged because of the illness [10].

Despite the remarkable progression in the treatment of stroke, most of studies have shown that patients with stroke have a significantly poor QoL [10-13]. HRQoL after stroke is predicted by several factors in term of patients' characteristics, disease related characteristics, functional constraints, depression and coping strategies [14]. Identifying factors that greatly affect quality of life among stroke patients can provide insight into the design of rehabilitation interventions [11].

Increasing quality of life has become the main nursing target because it is the most important evaluation criteria before, during and after the implementation of the rehabilitation program to restore functional independence of stroke survivors and improve health outcomes [15]. Hence, the purpose of this study was to determine the quality of life and to identify the different factors that most greatly influence the quality of life of stroke patients.

Aim of the Study: The aim of this study was to identify the determinants of health-related quality of life among middle-aged and older stroke patients.

This Aim Was Achieved Through the Following:

- Assess the health-related quality of life among middle-aged and older stroke patients.
- Assess different factors that may influence the quality of life as demographic characteristics of stroke patients, coping strategies, depression, functional ability and family support.
- Investigate the determinants that greatly influence the quality of life among stroke patients.

Research Question: What are the determinants of quality of life among middle-aged and older stroke patients?

MATERIALS AND METHODS

Design: A descriptive research design with an analytic component was follow in this study.

Setting: The study was conducted in the neurological outpatient clinic at Mansoura University Hospital.

Subjects: The study included 128 middle-aged and older stroke patients attending the previous study setting within a period of six months. Participants were selected according certain criteria; diagnosed with stroke for the first time from at least three months, able to communicate, free from any cognitive impairment, accept to participate in the study and available at the selected setting during the period of data collection. Participants were stratified into two groups according to their age; middle-aged group (aged 18 to 59 years) and older stroke patients group (aged 60 years and more).

Tools:

Demographic and Health Related Data Structured Interview Sheet: This tool was developed by the researchers after reviewing relevant literature and included two parts:

- Demographic data such as age, sex, social status, level of education, residence, living condition and income.
- Health related data such as comorbidities, etiology of stroke and its onset, affected side and received rehabilitation or not.

Stroke-Specific Quality of Life Scale-12 (SS-QoL-12): The Stroke-Specific Quality of Life Scale-12 was developed by Post *et al.* [16] as a well validated measure of health-related quality of life in patients with stroke. It consists of 12 questions encompassing 12 domains. Each item is ranked on 5-points Likert scale. It provides a total score and two sub scores; physical and psychosocial HRQOL. The total score and sub scores are calculated as the mean scores of the items in the scale and ranged from 1 to 5 with higher scores indicate better quality of life.

Mental Adjustment to Stroke Scale (MASS): It was developed by Lewis *et al.* [17] to measure coping strategies among stroke patients. It includes 40 items arranged in5 subscales; 16 questions for fighting spirit, 6 questions for helplessness/hopelessness, 9 questions for anxious preoccupation, 8 questions for fatalism and one for denial/avoidance. Each item is rated on a 4-point Likert. For fighting spirit, a high score indicates a more positive attitude, but for the other subscales, a high score indicates a more negative attitude.

Center for Epidemiological Studies-Depression Scale (CES-D): The Center for Epidemiological Studies-Depression Scale was developed by Radloff [18]. It consists of 20 items; each item is scored from 0 to 3 on a Likert type scale. The scoring of positive items is reversed. Possible range of total score is 0 to 60, with the higher scores indicating the presence of more symptomatology. A score of 16 is considered the cutoff value of the high depression.

Barthel Index (BI): The Barthel Index (modified version) was developed by Malhoney and Barthel [19]. It is the most used measure to indicate the level of performance of activities of daily living or the limitations in performing such activities. There are 10 questions in the BI including; mobility, transfer, feeding, bathing, grooming, dressing, toilet use, bladder, bowels and stairs. The total score ranged from 0 to 20. A high score indicates greater independence in activities of daily living. This scale was translated into Arabic by Hallaj [20] and reliability was assured by spearman's correlation coefficient (r=0.971). The Arabic version was used in the present study.

Family Support: Family support is a subscale from the multidimensional scale of perceived social support which was developed by Zimet *et al*. [21]. It consists of 12 questions, designed to measure perceived social support in three subscales namely, family, friends and significant others, 4 items for each. It was translated into Arabic and tested for its reliability (r=0.87) by El-Hazmy [22]. In the present study, we used only *family support* subscale (4 items) as believed that it is the most subscale which greatly influences on the quality of life. Each item responses arranged in 7 points Likert scale from very strongly disagree to very strongly agree. A higher score means high family support. Total mean score ranging from 1 to 2.9 is low support, a score of 3 to 5 is moderate support, while a score from 5.1 to 7 is high level of support. The Arabic version was used in the present study.

Method:

- Official permission was issued from the responsible authorities of Faculty of Nursing, Mansoura University.
- Permission to conduct the study was obtained from the director of the hospital after being informed about the purpose of the study and the time of data collection.
- The study tool; Demographic and health related data structured interview sheet was developed by the researchers after reviewing the relevant literatures.
- The study tools; Stroke-Specific Quality of Life Scale-12 (SS-QoL-12), Mental Adjustment to Stroke Scale (MASS) and Center for Epidemiological Studies-Depression Scale (CES-D) were translated into Arabic by the researchers. Back translation was used by an expert in English language from Faculty of Education, English Department, Mansoura University to ensure the validity of tools translation.
- The study tools were tested for content validity by five experts in the related fields of the study and the required modifications were done accordingly.
- Reliability of Stroke-Specific Quality of Life Scale-12 (SS-QoL-12), Mental Adjustment to Stroke Scale (MASS) and Center for Epidemiological Studies-Depression Scale (CES-D) were tested by determining the extent to which the scores of the tools were stable over repeated administration. It was assured by means of r coefficient (r=0.91, 0.81, 0.86 respectively).
- A pilot study was conducted on 10% of stroke patients at the neurological outpatient clinic at Mansoura University Hospital before starting the data collection to ascertain the clarity and applicability of the study tools and the necessary modifications were done. These patients were not included in the study sample.

- Based on the schedule of the study setting, the researchers visited the clinic three days/week.
- Each study subject was interviewed individually by the researcher to collect the necessary data using all study tools in the waiting room in neurological outpatient clinic.
- The researchers started the interview by introducing themselves to the study participants and giving them a brief idea about the aim of the study. Time taken for each interview ranged from 30 to 45 minutes.
- Data collection covered a period of six months from the first of October 2018 till the end of March 2019.

Ethical Considerations: Ethical approval was obtained from Mansoura University, Faculty of Nursing Ethic Committee. Verbal consent was obtained from the study participants after explanation of the nature of the study. The participants were informed that their participation is voluntary and they can withdraw from the study at any time. Confidentiality and anonymity of the collected data were assured.

Statistical Analysis: Data was analyzed using SPSS (Statistical Package for Social Sciences) version 16. Qualitative variables were presented as number and percent. A descriptive statistics were done in the form of frequencies mean, and standard deviation. The independent sample t test, Chi-Square test were used to evaluate the differences between the groups and one way ANOVA test for more than two groups' comparison. Pearson's correlation coefficient was used to explore the association between the different studied variables. The multiple regression analysis (stepwise) was used to determine determinants of the health related quality of life. In this model, the HRQoL was taken as dependent variable and all of other variables were selected as independent variables. The level of significance was set as $p \leq 0.05$.

RESULTS

Table 1 shows, this study included 128 participants; seventy eight (60.9%) of those were older patients and fifty patients (39.1%) were middle-aged patients. The study participants' age ranged from 60 to 77 years with a mean age of 68.038±5.07 in older group. While, ranged from 33 to 58 years with a mean age of 50.42±5.97 in middle-aged group. Males constituted 73.1% and 64.0% of older and middle-aged group respectively. Illiteracy was prevailing among half of the two groups and most of them were residing in rural areas with their families. Also, 94.9 and 84.0% of older and middle-aged group respectively presented with a history of chronic diseases (comorbidities). Majority of the studied patients were presented with ischemic stroke with a mean duration of 7.35±3.32 in older group and 9.58±3.61 in middle-aged group. 41.1 and 58.0% of the older and middle-aged group respectively reported that they received rehabilitation. With regard to demographic and disease related characteristics, there was not a statistically significant difference between two groups (p>0.05).

Table 2 shows, stroke patients in the older group showed lower mean scores for all quality of life domains compared with those in the middle-aged group with significant difference between the two groups with respect to the physical aspect (p= .014) and total QoL mean scores (p=.031). Whereas, no differences regarding psychosocial domains (p>0.05). Mobility, self-care, energy and social role are the greatly affected domains in the group of older patients, whereas mobility, self-care, energy and personality in the other group.

Table 3 shows that, the mean score of fighting spirit (positive adjustment) was high among patients in middle-aged group than patients in older group with no significant difference between them (p>0.05). While, helplessness, anxious preoccupation, fatalism and denial (negative adjustment) was high in the older group. Fatalism attitude was significantly different between the two groups ($p \leq 0.05$). For depression, the level of depression was high among stroke patients in the older group with no significant variation between the two groups (p>0.05). 32.1and 22% in the older and middle-aged group have symptoms of depression respectively. With regard to functional ability (measured by BI), the mean score of BI was 11.97±1.81 and 12.58±1.95 for patients in the older and middle-aged group respectively with no difference between two groups (p=.076). No difference between the two groups in relation to family support, 74.4% of older patients and 70.0% of middle-aged patients had high level of family support.

Table 4 shows that, a statistically significant relation between gender and quality of life total score among the middle-aged patients (p=.020) as female had lower score than male. Also, level of education affects significantly on quality of life of older patients (p=.013). Moreover, there was a statistically significant relation between quality of life and disease related characteristics in terms of comorbidities, duration of the disease, affected side and received rehabilitation or not ($p \leq 0.05$). Whereas, no statistically significant relation was observed between quality of life and social status, living condition, income, etiology of stroke in both groups (p>0.05).

Table 1: Demographic and disease related characteristics of the middle-aged and older stroke patients (n=128)

Items	Older group N=78 (%)	Middle-aged group N=50 (%)	Chi-Square (p)
Age (years)	68.038±5.077	50.42±5.976	-
Sex			
Male/Female	57/21 (73.1/26.9)	32/18 (64.0/36.0)	1.185 (.327)
Social status			
Single	2 (2.6)	1 (2.0)	2.512 (.473)
Married	52 (66.7)	40 (80.0)	
Widow	20 (25.6)	7 (14.0)	
Divorced	4 (5.1)	2 (4.0)	
Education			
Illiterate	38 (48.7)	20 (40.0)	8.702 (.069)
Read and write	19 (24.4)	7 (14.0)	
Primary	12 (15.4)	7 (14.0)	
Secondary	6 (7.7)	11 (22.0)	
University	3 (3.8)	5 (10.0)	
Residence			
Urban/Rural	23/55 (29.5/70.5)	12/38 (24.0/76.0)	1.004 (.552)
Living condition			
Alone/With family	12/66 (15.4/84.6)	6/44 (12.0/88.0)	0.289 (.795)
Income			
Enough/Not-enough	19/59 (24.4/75.6)	17/33 (34.0/66.0)	1.401 (.314)
Comorbidities			
Yes/No	74/4 (94.9/5.1)	42/8 (84.0/16.0)	4.239 (.060)
Affected side of body			
Right/left	47/31 (60.3/39.7)	23/27 (46.0/54.0)	2.499 (.146)
Etiology			
Ischemic/Hemorrhagic	61/17 (78.2/21.8)	41/9 (82.0/18.0)	0.271 (.658)
Duration (mean±SD)	7.35±3.32	9.58±3.61	4.014 (.134)
<6months	30 (38.5)	12 (24.0)	
6-12months	33 (42.3)	22 (44.0)	
>12months	15 (19.2)	16 (32.0)	
Received rehabilitation /not	32/46 (41.1/58.9)	29/21 (58.0/42)	3.519 (.071)

Table 2: Descriptive statistics of the different domains of health related quality of life of stroke patients and its variation in both groups (n=128)

SS-QoL	Older group mean ± SD	Middle-aged group mean ± SD	t (p)
Self-care	3.025±.0738[a]	3.260±0.828[b]	1.670 (.097)
Mobility	2.756±0.648[a]	3.100±0.863[b]	2.565 (.011)*
Upper extremities	4.038±0.653	4.240±0.716	1.640 (.104)
Language	4.294±0.774	4.500±0.677	1.533 (.128)
Vision	4.564±0.571	4.780±0.418	2.302 (.023)*
Work/productivity	3.359±0.738	3.540±0.613	1.444 (.151)
Overall physical HRQoL	3.673±0.526	3.903±0.486	2.484 (.014)*
Thinking	3.859±0.476	3.960±0.532	1.118 (.266)
Family role	3.692±0.491	3.840±0.421	1.750 (.083)
Social role	3.333±0.474[a]	3.460±0.503	1.143 (.153)
Personality	3.525±0.502	3.440±0.511[b]	0.720 (.473)
Mood	3.602±0.518	3.720±0.496	1.271 (.206)
Energy	3.102±0.765[a]	3.320±0.843[b]	1.506 (.135)
Overall psychosocial HRQoL	3.519±.406	3.626±0.399	1.469 (.144)
Overall SS-QoL	3.596±.0435	3.765±0.403	2.201 (.031)*

[a]most affected domains in the older patients

[b]most affected domains in the middle-aged patients

* Significant at $p \leq 0.05$, SS-QoL, Stroke-Specific Quality of Life

Table 3: Distribution of studied stroke patients on different domains of mental adjustment to stroke, depression, function ability and family support (n=128)

	Possible score (min-max)	Older group mean ± SD	Middle-aged group mean ± SD	*P* value
MASS:				
Fighting spirit	(16-64)	44.74±4.11	45.44±4.37	(.364)
Helplessness/hopelessness	(6-24)	13.55±2.023	12.65±1.28	(.154)
Anxious preoccupation	(9-36)	20.14±3.39	19.64±2.67	(.379)
Fatalism	(8-32)	19.78±1.85	18.84±1.75	(.005)*
Denial/avoidance	(1-4)	2.051±0.77	1.80±0.83	(.084)
Depression	(0-60)	15.58±3.31	14.401±3.63	(.059)
Barthel Index	(0-20)	11.97±1.81	12.58±1.95	(.076)
Family support	(1-7)	5.57±0.538	5.41±0.602	(.128)

MASS, Mental Adjustment to Stroke Scale

* Significant at p≤0.05

Table 4: Relation between demographic and disease related characteristics and health related quality of life among the studied patients (n=128)

	SS-QoL		
Items	Older group mean ± SD	Middle-aged group mean ± SD	p
Sex:			
Male vs. female	3.59±.43/3.58±.45	3.93±.37/3.66±.26	.953[a]/.020*[b]
Social status:			
Single	3.55±.45	3.58±.94	.495[a]/.297[b]
Married	3.97±.31	3.73±.41	
Divorced	3.58±.42	4.02±.23	
Widow	3.61±.67	3.62±.17	
Education:			
Illiterate/read &write	3.63±.44	3.73±.34	.013*[a]/.803[b]
Primary	3.56±.31	3.75±.45	
Secondary	3.77±.17	3.72±.39	
University	3.78±.26	3.73±.67	
Living condition:			
Alone / with family	3.56±.41/3.75±.53	3.75±.42/3.86±.35	.185[a]/.540[b]
Income:			
Enough / not-enough	3.71±.35/3.55±.45	3.83±..34/3.62±.48	.173[a]/.073[b]
Comorbidities:			
One disease	4.02±.±.15	3.92±.13	.000*[a]/.000*[b]
Two	3.62±.17	3.53±.28	
Three +	2.91±.22	2.90±.12	
Duration:			
<6months	3.23±.37	3.24±.36	.000*[a]/.000*[b]
6-12	3.66±.24	3.79±.201	
>12	4.15±.18	4.11±.14	
Etiology:			
Ischemic/hemorrhagic	3.71±.42/3.56±.43	3.77±.41/3.72±.24	.222[a]/.729[b]
Affected side:			
Right vs. left	3.46±.43/3.79±.35	3.62±.39/3.89±.41	.001*[a]/.032*[b]
Received rehabilitation /not	3.96±.22/3.34±.35	4.03±.17/3.39±.33	.003*[a]/.000*[b]

[a] p-value for the older group

[b] p-value for the middle-aged group

* Significant at p≤0.05

Table 5: Correlation coefficient (r) between the different study variables

	SS-QoL	Positive adjustment	Negative adjustment	Depression	Barthel Index	Family support
SS-QoL	-					
Positive adjustment	.788**	-				
Negative adjustment	-.792**	-.744**	-			
Depression	-.931**	-.723**	.829**	-		
Barthel Index	.811**	.692**	-.802**	-.812**	-	
Family support	.929**	.741**	-.758**	-.908**	.856**	-
Age	-.227**	-.147	.266**	.244**	-.212*	-.215*
Educational level	.127	.017	-.109	-.093	.096	.082
Duration	.827**	.696**	-.672**	-.724**	.770**	.743**
Comorbidities (number of diseases)	-.891**	-.722**	.741**	.818**	-.817**	-.792**

** Significant at $p \leq 0.001$

* Significant at $p \leq 0.01$

Table 6: Multiple regression analysis (stepwise) of the health related quality of life as a dependent variable in middle aged and older stroke patients

	Un standardized Coefficients		Standardized Coefficients			
	B	SE	β	R^2/ Adjusted R^2	F	*p*
Older patients						
Depression	-.122	.006	-.831	.766/.765	492.95	$p \leq 0.001$
Comorbidities	-.223	.032	-.389	.819/.817	427.51	
Family support	.318	.053	.393	.846/.844	429.64	
Barthel Index	.161	.023	.280	.849/.845	378.12	
Fighting spirit	.011	.004	.104	.850/.847	348.06	
Age	-.007	.003	-.078	.839/.835	223.23	
Middle-aged patients						
Family support	.627	.034	.835	.774/771	332.94	$p \leq 0.001$
Barthel Index	.211	.031	.453	.837/.834	346.91	
Received rehab.	.129	.048	.159	.851/.847	218.45	
Fighting spirit	.023	.005	.254	.855/.852	324.97	
Duration	.020	.006	.178	.864/.860	297.86	

R^2 Coefficient of determination

Table 5 reveals strong positive correlation between quality of life and all of positive adjustment, Barthel index, family support and duration of stroke. This means, higher quality of life being among patients who adjust positively (fighting spirit), had good functional status, had high level of family support and had stroke form a long period ($p \leq 0.001$). Whereas, quality of life was negatively correlated with negative adjustment, depression, age and comorbidities which indicating that patients with high level of depression, who adjust negatively, with advanced age and comorbidities had poor quality of life ($p \leq 0.001$). While it is noticed from the table that, there is no association between educational level and any of the study variables ($p > 0.001$).

Table 6, it was noticed that the main determinants of the QoL in older group were depression, comorbidities, family support, functional status, fighting spirit (positive adjustment) and age of the study participants. For patients in the other group, it was noticed that the predictors of the QoL were the family support, functional status, received rehabilitation, fighting spirit and duration of stroke. The adjusted R^2 values were significant and relatively high, so the different independent measured factors had a relatively large influence on the variability of the quality of life among the participants.

DISCUSSION

The impact of stroke could be destructive, leaving the patients with residual impairment of physical, mental and social functions. Living with the consequences of stroke could greatly affect the health related quality of life in most patients. HRQoL after stroke could be influenced by several factors including age, sex, functional status, depression and coping strategies [14, 23]. So, the present study was conducted to determine the quality of life and identify the different factors that most greatly influence the quality of life of stroke patients.

The age of the participants showed, stroke occurs frequently in middle-aged and older age. The present study revealed that, stroke occurs commonly among older adults as 60.9% of the studied patients were aged 60 years and more. Also, men were predominant among patients with stroke in both groups. This might be attributed to the protective effect of estrogen in women and adopting risk behaviors as smoking and stress which are more encountered among men than women (Table 1). This finding agrees with previous studies in Egypt by Mahmoud & Abd-Elaziz [24], in Taiwan by Chou [11] and in Brazil by Ramos-Lima *et al* [23]. The present study also revealed that the majority of the studied patients were presented with ischemic stroke. This is supported by other studies in Egypt by Mahmoud & Abd-Elaziz [24] in Netherlands by Visser *et al.* [14] and in Taiwan by Peng *et al*. [15] who revealed the prevailing of ischemic stroke among middle aged and older adults.

The quality of life in stroke patients has been studied in many studies using different QoL scales on populations with different age groups [12, 15, 23, 25]. In the present study, we used stroke-specific quality of life scale, it was noticed that stroke patients in the older group had lower mean scores for all quality of life domains compared with those in the middle-aged group with significant difference between two groups with respect to the physical aspect and total QoL mean scores ($p \leq 0.05$). Whereas, no difference regarding psychosocial domains between the two groups ($p>0.05$) was noticed (table 2). This is attributed to the fact that the QoL of younger stroke survivors was higher than those of older ones which implies that age has a negative influence on the QoL of stroke survivors especially on the physical aspect. This result is in accordance with other studies in Sweden by Jonsson *et al*. [26], in Nigeria by Gbiri & Akinpelu [12], in Korea by Kwon *et al*. [13] and in Taiwan by Peng *et al.* [15] which revealed that age of the participants was an important predictor of quality of life post stroke. In contrast, a study done in Turkey by Gunaydin *et al*. [25] reported no differences between the older and younger stroke patients in the quality of life assessed by the SS-QoL and revealed that age does not influence the QoL of stroke patients. Also, Isaac *et al*. [27] in India stated no association between stroke patients' age and QoL score.

In the present study, the most affected QoL domains were mobility, self-care, energy and social role among older patients, whereas mobility, self-care, energy and personality were among middle-aged patients. These findings revealed that the domains related physical functions were the most affected in both age groups. Similarly, Gunaydin *et al*. [25] supported this result. Also, a study done in Brazil by Ramos-Lima *et al.* [23] revealed that work/productivity, social role, personality, energy and family role were the most affected domains. Alternatively, the least affected domain was vision. Chou [11] in Taiwan supported these findings. While, Visser *et al.* [14] in Netherlands contradict the present study findings and reported that psychological aspect was the most affected domain in the quality of life among stroke patients.

In the present study, quality of life was found to be influenced by other variables in term of demographic and stroke related characteristics. The present study revealed gender difference regarding the quality of life among patients in the middle-aged patients as women had worse QoL than men. The probable hypothesis might be that women were more sensitive and apprehensive than men after stroke which consequently affect on their QoL. This is in agreement with other studies in Spain by Espuelo *et al*. [28] and in India by Parikh *et al*. [29] who reported that female had poor QoL than male stroke patients in different age groups. While, Kwon *et al*. [13] in Korea showed that male had higher problems related to QoL than female patients. Further, we found participants with higher level of education had higher QoL with a significant difference in older patients and this might be attributed to knowledge that might be translated to compliance with the treatment regimen and also influence expectation of recovery from illness which contribute to better quality of life. Gbiri & Akinpelu [12] in Nigeria and Kwon *et al.* [13] in Korea supported the study findings. Moreover, the present study revealed worse QoL in patients with affected right side than those with affected left side. This significant difference might be justified by the fact that individuals with affected right side of the body often have problems in speech and cognitive function that greatly affect on the quality of life. The same finding was reported by Ramos-Lima *et al.* [23] in Brazil. On the other hand, Parikh *et al*. [29] found no such difference.

According to Rachpukdee *et al*. [30] the quality of life of stroke patients was improved significantly from stroke onset by the time post stroke. This is in accordance with the results of the present study as revealed a significant relation between the duration of stroke and QoL in the study participants ($p \leq 0.05$). One possible explanation of this finding is that, by the time after stroke recovery might be associated with by improvement in function that might affect the quality of life. This is extended to Gbiri & Akinpelu [12] in Nigeria and Sayed *et al*. [8] in Egypt.

Stroke is a sudden and often traumatic major life event that usually causes a wider range of physical and cognitive disabilities. Adjustment strategy with stroke is important in order to improve the quality of life [31]. The finding of the present study indicates that adjustment to stroke have two categories; positive adjustment in term of fighting spirit and negative adjustment in term of helplessness, anxious preoccupation, fatalism and denial. Positive adjustment (fighting spirit) was high among middle-aged patients than older patients with no significant difference between them (p>0.05). This is might be due to that they have a strong need to return to the previous level of activity, so they adopt active process to over their disabilities. Also, this study revealed no differences between the two groups with regard to negative adjustment except in the fatalism attitude. This might be attributed to the effect of advanced age as they put themselves in the hand of god and consider the religious believes give meaning for life. This result is in the same line with a study conducted in Egypt by Mahmoud & Abd-Elaziz [24].

Depression after stroke is considered the most frequent neuropsychiatric consequence of stroke as about one-third of stroke survivors experience depression. Consequently, it is associated with reduction in rehabilitation efficacy and poor quality of life [32]. In the present study, 32.1 and 22% in the older and middle-aged patients respectively had symptoms of depression with no statistically significant difference between them (p>0.05). The high percentage among elderly patients might be attributed to the feeling of worthlessness and being burden on their family. This is in agreement with Gunaydin *et al.* [25] in Turkey who found no association between younger and older adults stroke patients in respect to the frequency of depression with high mean score among elderly patients. Moreover, Chandran *et al*. [33] in India stated that 32.5% were suffering from extreme depression and older patients were found to be more depressed. Similarly, Harris *et al*. [34] in USA concluded that 15% of the stroke patients had documentation of post stroke depression without difference regarding age. Also, this is in accordance with that reported by Kwon *et al*. [13]. While, Visser *et al*. [14] in Netherlands contradict the present result and revealed that the level of depression was higher among younger patients ($p\leq$0.05).

In terms of functional abilities, the current study found no statistical difference between the two groups but middle-aged patients had higher score than older stroke patients. This could be attributed to the fact that older adults are exposed more to health problems due to advanced age which might affect on their abilities to carry out activities of daily living. This is consistent with Gunaydin *et al*. [25] in Turkey who reported no statistical difference in functional status and ambulation level in relation to different age groups. On the contrary, Harris *et al*. [34] in USA concluded that age was significantly associated with functional independence in stroke patients.

In stroke patients, family support is believed to affect on patients' quality of life and disease outcome. The present study revealed that, 74.4.7% of older patients and 70.0% of middle-aged patients had high level of family support. The highest percentage of family support could be justified by the fact that, in Egypt especially in rural areas, elders are more likely to live with the extended family with intimate relationship and support. This is in line with Gbiri & Akinpelu [12] in Nigeria.

In the present study, quality of life, coping or adjustment strategies, depression, functional status, family support, age, educational level, duration from stroke onset and comorbidities among stroke survivors were studied as interrelated variables. The correlation coefficients showed that, quality of life was correlated positively with positive adjustment, independence level, family support and duration of stroke. Patients with high level of positive adjustment, high independence level, high family support and long period of stroke had higher level of quality of life ($p\leq$0.001). Also, correlation coefficients revealed negative correlations between quality of life and all of negative adjustment, depression, age and comorbidities, indicating that patients who adjust negatively, with higher depression score, with advanced age and comorbidities had lower quality of life ($p\leq$0.001). But, the present study revealed no association between educational level and the quality of life (p>0.001) (table 5). This might be attributed to the fact that, illiteracy was prevailing among the study subjects. The previous finding agrees with Sayed *et al*. [8] in Egypt who reported a significant negative correlation between participants' age, comorbidities and total quality of life score. Also, this finding conforms to that reported by Visser *et al*. [35] in Netherlands who found that depression and accommodative coping are related to HRQoL. Moreover, Oros *et al*. [32] involving elderly patients in Romania showed negative correlation between depression and QoL and patient who are non-depressed had higher level of daily activity. Meanwhile, Dabrowska-Bender *et al*. [36] in Poland revealed a strong negative correlation between depression and QoL. Also, they found that, QoL was correlated with level of disability.

With regard to independent predictors of the quality of life among stroke patients, the present study revealed that, the quality of life was found to be related with the depression, comorbidities, family support, functional status, fighting spirit (positive adjustment), age, received rehabilitation and duration of stroke for all stroke patients. It was noticed that the main determinants of QoL in the older patients were depression, comorbidities, family support, functional status, fighting spirit and age. While, family support, functional status, received rehabilitation, fighting spirit and duration of stroke were the most powerful determinants for the middle-aged patients (Table 6). In this respect, there are few studies conducted in the determinants of quality of life on older adults. Nevertheless, it was noticed that stroke patients who were included in the studies of the QoL were usually older adults. In most of previous studies concerning the quality of life of stroke patients, it was observed that the main determinants of QoL were age, depression and level of functional disability. In a study performed in Egypt by Sayed *et al*. [8] on elderly stroke patients, it was found that age was the main factor influencing the quality of life. Kwok *et al*. [37] in China revealed that, both depression and functional status were important determinants of HRQOL among elders. Also, a study involving elderly stroke patients in Brazil showed that depression and disability are consistent determinants of QoL [38]. Moreover, Gunaydin *et al*. [25] in turkey reported that the main determinant of the QoL was functional status for older patients, but functional status and depression level had influence on the QoL for young patients. While, Gbiri & Akinpelu [12] in Nigeria stated, the determinants of positive QoL were high occupational status, being married, presence of spousal support and high level of education. The determinants of negative QoL were increase in age and severity of depression. Another study performed with the elders in Thailand reported that social support was a significant predictor of some specific dimensions of QoL [30]. Additionally, Visser *et al.* [14] in Netherlands supports the hypothesized relation between coping strategy, depression and QoL in patients receiving outpatient rehabilitation after stroke. Kwon *et al*. [13] in Korea revealed that old age, less physical activity, low income and depression are associated with worse general QoL or more problems in the specific domains among stroke survivors. Finally, a study with elders in Taiwan by Peng *et al*. [15] showed that age, patients' activity of daily living and duration of stroke as strong predictors of QoL.

CONCLUSIONS

Older stroke patients had a significant low score in the HRQoL especially with respect to physical aspect. No statistical differences were detected between the two groups regarding coping strategy, level of depression, functional disabilities and family support. Quality of life was found to be influenced by other variables in term of demographic and stroke related characteristics. Family support, functional status and coping strategies are consistent determinants of health-related quality of life in stroke patients in the two groups. Whereas, depression, comorbidities and age also had a great influence in the QoL for the older patients group. In the middle-aged group, stroke duration and received rehabilitation are among the main predictors of QoL in most patients. So, assessment of HRQoL in stroke patients is important for better outcomes.

Based on the findings of the present study, the following recommendations are suggested:

- Continuous development of rehabilitative interventions should be planned and implemented by nurses in different care settings immediately post stroke. This might be helpful to have a better quality of life.
- Future researches with larger study samples over long periods are needed to further evaluation of other determinants of HRQoL. The early identification of these factors could promote better intervention for patients with stroke, minimizing disabilities and improving quality of life.

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REFERENCES

1. Lui, S.K. and M.H. Nguyen, 2018. Elderly Stroke Rehabilitation: overcoming the Complications and Its Associated Challenges. Current gerontology and geriatrics research, 2018. doi.org/ 10.1155/ 2018/ 9853837
2. Benjamin, E.J., M.J. Blaha and S.E. Chiuve, 2017. Heart Disease and Stroke Statistics. Update: A Report from the American Heart Association. Circulation, 135(10): 146-603.

3. World Health Organization. World Health Report, 2007. Cited in The Internet Stroke Center. Stroke Statistics. 2009. Available at: http:// www.strokecenter.org.
4. Annual Bulletin of Mortality Statistics. Central Agency for Public Mobilization and Statistics (CAPMAS), 2013. Available at http:// www.capmas.gov.eg.
5. World Health Organization. Global Health Observatory Data Repository. Available at http:// apps.who.int/gho/data/node.country (accessed 28 December 2018).
6. Abd-Allah, F., E. Khedr, M. Oraby, A.S. Bedair, S.S. Georgy and R.R. Moustafa, 2018. Stroke burden in Egypt: data from five epidemiological studies. International Journal of Neuroscience, 2018. doi.org/ 10.1080/ 00207454.2017.1420068
7. Johnson, W., A. Onuma, M. Owolabic and S. Sachdeva, 2016. Stroke: a global response is needed Bull World Health Organization, 94: 634-634A. doi.org/10.2471/BLT.16.181636
8. Sayed, S.A., A.H. El-Sudany, H.Y. Kamel, M.M. Adel, A. Sarah and S.A. Hamza, 2015. Quality of Life and its Determinants after Stroke in Elderly Patients. EJGG, 2(2): 33-37.
9. Opara, J.A. and A. Jaracz, 2010. Quality of life of post-stroke patients and their caregivers. Journal of Medicine and Life, 3(3): 216-20.
10. Em, S., M. Bozkurt, M. Karakoc, M. Caglayan, D. Akdeniz, P. Oktayoglu, S. Varol and K. Nas, 2015. Determining of Life Quality and Associated Factors in Stroke Patients. Turk. J. Phys. Med. Rehab., 61: 148-54. DOI: 10.5152/tftrd.2015.80090.
11. Chou, C.Y., 2015. Determinants of the Health-related Quality of Life for Stroke Survivors. Journal of Stroke and Cerebrovascular Diseases, 24(3): 655-662.
12. Gbiri, C.A. and A.O. Akinpelu, 2012. Quality of life of Nigerian stroke survivors during first 12 months post-stroke. Hong Kong Physiotherapy Journal, 30: 18-24. doi:10.1016/j.hkpj.2012.01.004
13. Kwon, S., J.H. Park, W.S. Kim, K. Han, Y. Lee and N.J. Paik, 2018. Health-related quality of life and related factors in stroke survivors: Data from Korea National Health and Nutrition Examination Survey (KNHANES) 2008 to 2014. PloS ONE, 13(4): https://doi.org/10.1371/journal. pone.0195713
14. Visser, M.M., M.H. Heijenbrok-Kal, A.V. Spijker, K.M. Oostra, J.J. Busschbach and G.M. Ribbers, 2015. Coping, Problem Solving, Depression and Health-Related Quality of Life in Patients Receiving Outpatient Stroke Rehabilitation. Archives of Physical Medicine and Rehabilitation, pp: 1-7.
15. Peng, L.N., L.J. Chend, W.H. Lue, S.L. Tsaig, L.K. Chena and F.Y. Hsiaoe, 2019. Post-acute care regains quality of life among middle-aged and older stroke patients in Taiwan. Archives of Gerontology and Geriatrics, 83: 271-276.
16. Post, M.W., H. Boosman, M.M.V. Zandvoort, P.E. Passier, G.J. Rinkel and J.M.A. Visser-Meily, 2010. Development and validation of a short version of the Stroke-Specific Quality of Life Scale. Journal of Neurology, Neurosurgery and Psychiatry, BMJ Publishing Group, 82 (3): 283.
17. Lewis, S.C., M.S. Dennis, S.J. O'Rourke and M. Sharpe, 2001. Negative Attitudes among Short-Term Stroke Survivors Predict Worse Long-Term Survival. Stroke, 32: 1640-1645.
18. Radloff, L.S., 1977. The CES-D Scale: a self-report depression scale for research in the general population. Applied Psychological Measurement, 1(3): 385-401.
19. Mahoney, F.I. and D.W. Barthel, 1965. Functional evaluation: the Barthel Index. Md. State Medical Journal, 14: 61-65.
20. Hallaj, F., 2007. Activity pattern of residents in elderly homes. Published master thesis. Faculty of Nursing. Alexandria University.
21. Zimet, G.D., N.W. Dahlem, S.G. Zimet and G.K. Farley, 1988. The Multidimensional Scale of Perceived Social Support. Journal of Personality Assessment, 52(1): 30- 41.
22. El Hazmy, M., 2016. The use of the Internet and emotional relations and social support perceived as the predictors of the psychological isolation. Published master thesis. Nayef University, Riyadh, Saudi Arabia.
23. Ramos-Lima, M.J.M., I.C. Brasileiro, T.L. Lima and P. Braga-Neto, 2018. Quality of life after stroke: impact of clinical and sociodemographic factors. Clinics, 73: e418.
24. Mahmoud, S. and N.A. Abd Elaziz, 2016. Impact of Stroke on Life Satisfaction and Psychological Adjustment among Stroke patients during Rehabilitation. Life Science Journal, 13(3): 7-17.
25. Gunaydin, R., A.G. Karatepe, T. Kaya and O. Ulutas, 2011. Determinants of quality of life (QoL) in elderly stroke patients: A short-term follow-up study. Archives of Gerontology and Geriatrics, 53: 19-23. doi:10.1016/j.archger.2010.06.004
26. Jonsson, A.C., I. Lindgren, B. Hallstrom, P. Norrving and A. Lindgren, 2005. Determinants of Quality of Life in Stroke Survivors and Their Informal Caregivers. Stroke, 36: 803-808.

27. Isaac, V., R. Stewart and E.S. Krishnamoorthy, 2011. Caregiver Burden and Quality of Life of Older Persons with Stroke: A Community Hospital Study in South India. Journal of Applied Gerontology, 30(5): 643-654. DOI: 10.1177/0733464810369340
28. Espuela, F.L, J.C.P. Cuenca, C.L. Diaz, J.M.P. Sanchez, G. Gamez-Leyva and I.C. Naranjo, 2017. Sex differences in long-term quality of life after stroke: influence of mood and functional status. Neurologia, 1-9. https://doi.org/10.1016/j.nrl.2017.10.002
29. Parikh, S., S. Parekh and N. Vaghela, 2018. Impact of stroke on quality of life and functional independence. National Journal of Physiology, Pharmacy and Pharmacology, 8(12): 1595-98.
30. Rachpukdee, S., N. Howteerakul, N. Suwannapong and S. Tang-aroonsin, 2013. Quality of Life of Stroke Survivors: A 3-Month Follow-up Study. Journal of Stroke and Cerebrovascular Diseases, 22(7): 70-78.
31. Donnellan, C., D. Hevey, A. Hickey and D. O'Neill, 2006. Defining and quantifying coping strategies after stroke: a review. Journal of Neurology, Neurosurgery and Psychiatry, 77: 1208-1218. doi: 10.1136/jnnp.2005.085670
32. Oros, R.I., C.A. Popescu, S.O. Iova, P. Mihancea, C.A. Claudia and A. Iova, 2016. Depression, activities of daily living and quality of life in elderly stroke patients. International Journal of the Bioflux Society, 8(1): 24-28.
33. Chandran, P., D. Shenoy, J. Thavody and M.P. Lilabi, 2017. Assessment of quality of life of stroke survivors in a rural area of North Kerala, India. International Journal of Community Medicine and Public Health, 4(3):841-846. DOI: http:// dx.doi.org/ 10.18203/ 2394-6040.ijcmph20170769
34. Harris, G.M., J. Collins-McNeil, Q. Yang, V. Nguyen, M.A. Hirsch, C.F. Rhoads, T. Guerrier, J.G. Thomas, T.M. Pugh, D. Hamm, C. Pereira and J.P. Bettger, 2017. Depression and Functional Status among African American Stroke Survivors in Inpatient Rehabilitation. Journal of Stroke and Cerebrovascular Diseases, 26(1): 116-124.
35. Visser, M.M., L. Aben, M.H. Heijenbrok-Kal, J.J.V. Busschbach and G.M. Ribbers, 2014. The relative effect of coping strategy and depression on health related quality of life in patients in the chronic phase after stroke. Journal Rehabil. Medicine, 46: 514-519.
36. Dabrowska-Bender, M., M. Milewska, A.G. Golabek, A. Duda-Zalewska and A. Staniszewska, 2017. The Impact of Ischemic Cerebral Stroke on the Quality of Life of Patients Based on Clinical, Social and Psychoemotional Factors. Journal of Stroke and Cerebrovascular Diseases, 26(1): 101-107.
37. Kwok, T., R.S. Lo, E. Wong, T. Wai-Kwong, V. Mok and W. Kai-Sing, 2006. Quality of life of stroke survivors: a 1-year follow-up study. Arch. Phys. Med. Rehabil., 87: 1177-82. doi:10.1016/ j.apmr.2006.05.015
38. Carod-Artal, F.J., D.S. Trizotto, L.F. Coral and C.M. Moreira, 2009. Determinants of quality of life in Brazilian stroke survivors. Journal of Neurological Science, 284: 63-68.