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A NEW MEASUREMENT SCALE FOR EVALUATING HEALTH-RELATED QUALITY OF LIFE IN PATIENTS WITH POST STROKE IN AL NAJAF AL ASHRAF GOVERNORATE IN IRAQ

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ABSTRACT

Objectives: This study amid to identify and study most properties of the specific and general health-related quality-of-life (HRQoL) in patients with post stroke, and to find out relationships among distribution of an overall assessment quality of life improvement and socio-demographic characteristics variables, as well as creating a new measurement scale for assessing QoL among post stroke patients. **Methodology:** A cross sectional study (descriptive study) was conducted to evaluate General and specific Quality of life in patients with post stroke. An inconvenient sample (simple random sampling) of 100 adults patient with post stroke, who have been diagnosed and treated by neurologists in Al-Sadr Medical City in Al Najaf Al-Ashraf where they admitted for rehabilitation, or other treatment options. This study applied format of General World Health Organization Quality of Life-BERF Questionnaire. The methods used descriptive statistics (Observed frequencies, percentages, mean of score, standard deviation, relative sufficiency, and Stem–Leaf plot method) to evaluate the General QoL-Improvements, as well as inferential statistical methods are used such that (Wilcoxon Signed Rank, McNemar). **Results:** Patients with post stroke have different assessment concerning general QoL, and have instability of their daily life cycle, within a moderate level. Regarding Specific QoL, overall results shows moderate assessment, but some domains are reported worse assessment than others specially (Ability to participate in the activities that you usually do) domain, other domains accounted moderate responses and those are (Physical Problems, Memory and Thinking, Changes in mood and ability to

control emotions, Ability to communicate with other people, as well as your ability to understand what you read, Activities you might do during a typical day, Ability to be mobile, at home and in the community). Also one of domains are reported low impact on specific QoL than others (Ability to use your hand). **Recommendations:** Establishing of educational program to improve health related quality of life for post stroke patients. As well as initiation of support groups for patients with post stroke, psychosocial care of patients with stroke is an important consideration. Physical rehabilitation principles for persons with chronic illness concerning stroke may prove useful and also providing rehabilitation instruments. Psychological interventions may need to be offered and individualized to patients, regardless of their age or partnership. Governmental commitment by offering all support to improve HRQoL for post stroke patients generally by providing chronic medications and support by their socio-economic state by providing financial donation.

KEYWORDS: Quality of Life, Post stroke, Health related QoL.

INTRODUCTION

Stroke is a major health problem worldwide, and it is a leading cause of death.[1]Furthermore, stroke survivors are often challenged by various degrees of permanent sequelae and dependency. Functional deficits and psychological problems after stroke disrupt the patient's ability to perform activities of daily living, which negatively impacts their health-related quality of life (HRQoL). Several studies have reported that patients with a history of stroke or stroke symptoms have poor HRQoL.[2,3]

Research on stroke commonly focus mainly on mortality caused by stroke and the epidemiology of recurrent stroke and rarely focus on the quality of life of that patients. Issue on quality of life should be the main focus of study because the impact of stroke to the QoL is frustrating because stroke can cause permanent physical, psychological and social disabilities.[4]

HRQOL is define as satisfaction or prosperity of an individual with domain of life as long as it affect or affected by health. According to United State Disease Control and Prevention Centre, HRQOL is perception of physical and mental health, functional status, social support, economy status, health situation and risk.[5] HRQOL is specific and suitable for medical field compared to quality of life because it is referring to measurement or assessment of the patients about their own health compared to what their expected of ideal.[6]

Health related quality of life analysis measure the impact of stroke disease processes on these holistic aspects of person's life. Also quality of life analyses are particularly helpful for; investigating the social, emotional and physical effect of treatments and disease processes on people's daily lives; analyzing the effect of treatment or disease from the patient's perspective; and determining the need for social, emotional and physical support during illness.[7,8]

OBJECTIVES

1. To identify the most properties of the general and specific (HRQoL) in patients with post stroke.
2. To find out the relationship among overall assessment of (HRQoL) in patients with post stroke with some related variables such as (Age, Gender, Residency, and Socio-Economic Status).
3. To create a new measurement scale for assessing (HRQoL) among patients with post stroke by merging general and specific health related quality of life (HRQoL) instruments.

METHODOLOGY

Setting of the study: A cross sectional study design (descriptive study) for patients with post stroke was conducted starting between (December 2017 and February 2018) in Medical and Sports Rehabilitation Center in Al-Sadr Medical City in Al Najaf Al-Ashraf in Iraq.

The sample of the study: An inconvenient sample of 100 adults patient with stroke (simple random sampling) who have been diagnosed and treated by neurologists in Al-Sadr Medical City in Al Najaf Al-Ashraf in Iraq where they admitted for rehabilitation, or other treatment options.

Steps of the Study: For evaluating health related quality of life in patients with post stroke concerning criteria "Specific "quality of life questionnaires. To assess patient's needs, this study use a reliable questionnaire format of Specific QoL Questionnaire which consists (60) developed to measure one or more dimensions of health related QoL in post stroke patients, the specific questionnaire consist of (9) domains: Physical Problems, Memory and Thinking, Changes in mood and ability to control emotions, Ability to communicate with other people, as well as your ability to understand what you read, Activities you might do during a typical day, Ability to be mobile, at home and in the community, Ability to use your hand, Ability to

participate in the activities that you usually do, How recovery, how much have you recovered from your stroke This study take into consideration the significant of patients socio-demographical characteristics variables, as well as some general information such as duration of illness, numbers of strokes, and BMI and Age onset etc. In addition to that, this study take into consideration the complains might be resulted by the studied disease. The researcher interviewed patients, for 30 minutes for each patient to answer all questions. Descriptive data analysis Tables (Frequencies, and Percentages) Summary Statistics tables including: Percentile Grand Mean of score (PGMS) with their Standard Deviation (SD), and assessment by scoring scales throughout three sequential intervals for assessing (PGMS) in light of intervals (0.0 – 33.33), (33.34 – 66.66), 66.67 – 100).

Reliability of pilot study: A convenient sample of (10) individuals were selected among patients concerning with stroke. This preliminary Study was conducted on patients in 20th November – 5th December 2017.

In addition to that table (1) showed the determination of the reliability of the pilot study, this results showed that intra examiner (test & pretest), and inter examiners recorded high and adequate reliability in pilot study.

Table 1: Reliability Coefficients of the Pilot Study for Health Related Stroke's Patients QoL (General and Specific).

QoL	Groups	Reliability Coefficients	Actual values %
General	Expert X Researcher	Inter Examiners	91.9 (21:260)
	Test Retest	Intra Examiner	92.7 (19:260)
Specific	Expert X Researcher	Inter Examiners	96.2 (23:600)
	Test Retest	Intra Examiner	91.2 (53:600)

Reliability of the questionnaire

Reliability of the questionnaire was used to determine the accuracy of the questionnaire, since the results showed excellent level of stability and internal consistency for the studying (QoL), at the level of items of the applied questionnaire, all those were calculated by using the major statistical parameter: Alpha Cronbach, as shown in table (2) through calculated the results that the questionnaire is successful, and that means designed of the questionnaire were valid to study the phenomenon (**Evaluation of Post Stroke Health-Related Quality of Life**) on the same population at any time in the future under assumption of stationary conditions of the studied population.

Table 2: Reliability Coefficients of the Studied Questionnaire's.

Reliability Coefficient of the studied Questionnaire Alpha (Cronbach)	Standard lower bound	Actual values	Assessment
QoL – General	0.70	0.8409	V. good
QoL – Specific	0.70	0.9573	Excellent

Alpha Cronbach (α) for the reliability of questionnaire (Internal consistency).

Where;

$$\alpha = \frac{K}{K-1}\left[1 - \frac{\sum_{i=1}^{K}\sigma_{ii}}{\sum_{i=1}^{K}\sum_{j=1}^{K}\sigma_{ij}}\right]$$

Where K is the number of items (questions) and σ_{ij} is the estimated covariance between items i and j. Note the σ_{ii} is the variance (not standard deviation) of item i.

Statistical Analysis: The following statistical data analysis approaches were used in order to analyze and assess the results of the study under application of the statistical package (SPSS) ver. (16.0):

Descriptive data analysis

a- Tables (Frequencies, and Percentages).

b- Summary Statistics tables including: Mean of score (MS) with their Standard Deviation (SD), Relative Sufficiency (RS%), and evaluated by scoring scales (1, 2, 3, 4, and 5) either for the general or specific health related QoL measurements. In addition to that, for evaluating items of preceding measurements, three sequential intervals for assessing relative sufficiency's estimates in light of preceding scoring scales: [(20.0 – 46.6), (46.7 – 73.3), (73.3 – 100)], are evaluated by (Low, Moderate, and High) respectively.

c- For evaluates main domains of preceding measurements, three sequential intervals for evaluating percentile transforming scoring scales estimates: [(0.0 – 33.33), (33.34 – 66.66), 66.67 – 100)] intervals by (Low, Moderate, and High) respectively.

where Relative Sufficiency (R.S. %) is calculated by:

$$\text{RS\%} = \frac{Mean\ of\ Score}{no.\ of\ Scoring\ Scales} * 100\%$$

d- Redistribution of an overall evaluated all main domains by (under/upper) cutoff point (50) for creating an association table with an overall evaluated concerning (DCv.), and (GIv.).

e- Simple Pearson correlation coefficients.

f- Graphical presentation by using:

- Bar Charts.
- Cluster Bar Charts.
- Screening Plot & Component Plot in rotated Space.

RESULTS

Table 3: Distribution of the studied sample according to (DCv.) Observed Frequencies and Cumulative Percent's.

SDCv.	*Classes*	No.	Cum. %
Gender	**Male**	**70**	**70**
	Female	**30**	**100**
	Total	**100**	**-**
Age Groups (yrs.)	**< 40**	**9**	**9**
	40 - 49	**18**	**27**
	50 - 59	**27**	**54**
	60 - 69	**39**	**93**
	> 70	**7**	**100**
	Total	**100**	**-**
	Mean ± SD	**55.17 ± 12.01**	
Marital State	**Single**	**3**	**3**
	Married	**78**	**81**
	Divorced	**2**	**83**
	Widow	**11**	**94**
	Separated	**6**	**100**
	Total	**100**	**-**
Education state for patient	**Illiterate**	**26**	**26**
	Read & Write	**8**	**34**
	Primary	**23**	**57**
	Intermediate	**15**	**72**
	Secondary	**14**	**86**
	College & More	**14**	**100**
	Total	**100**	**-**
Job of patient	**High professional & managerial jobs**	**10**	**10**
	Lower professionals, skilled and semiskilled	**24**	**34**
	Unskilled workers	**66**	**100**
	Total	**100**	**-**
Residency	**Urban**	**77**	**77**
	Rural	**23**	**100**
	Total	**100**	**-**

Respect to subjects of studied (SDCv.), results shows that no significance differences are accounted at $P>0.05$, except in residency, which represented significant difference at $P<0.05$.

Table 4: Distribution of the studied sample according to (SES) with comparisons significant.

SES	Groups	No.	Cum. %	C.S. (*) P-value
Socio-Economic Status	< 60 (Low)	46	46	χ^2= 31.22 P=0.000 (HS)
	60 - 80 (Moderate)	47	93	
	> 80 (High)	7	100	
	Total	100	-	

(*) HS: Highly Sig. at P<0.01; NS: Non Sig. at P>0.05; Testing based on One-Sample Chi-Square test.

Vast majority of the studied sample had at low, and moderate responding, and they are accounted (93.0%).

Table 5: Distribution of the studied sample according to some related Risk Factors with comparisons significant.

Risk Factors	Response	No.	Cum. %	C.S. (*) P-value
Are you smoking cigarette/or any others types	No	38	38	P=0.000 HS
	Yes	62	100	
If yes, what are duration of smoking?	Non Applicable	38	38	χ^2= 38.16 P=0.000 (HS)
	< 10 yrs.	5	43	
	10 - 19	14	57	
	≥ 20 yrs.	43	100	
Are you drinking alcohol	No	89	89	P=0.000 HS
	Yes	11	100	
If yes, what are duration of drinking alcohol ?	Non Applicable	89	89	χ^2= 5.091 P=0.078 (NS)
	< 10 yrs.	3	92	
	10 - 19	7	99	
	≥ 20 yrs.	1	100	
Are you taking addiction drugs?	No	85	85	P=0.000 HS
	Yes	15	100	
If yes, what are duration of uses	Non Applicable	85	85	χ^2= 5.200 P=0.074 (NS)
	< 5 yrs.	9	94	
	5 - 9	4	98	
	10 - 19	2	100	
Age Onset (1st Stroke)	20 - 29	6	6	χ^2= 61.04 P=0.000 (HS)
	30 - 39	3	9	
	40 - 49	21	30	
	50 - 59	27	57	
	60 - 69	38	95	
	70 - 79	5	100	
	Mean ± SD	54.49 ± 12.19		
Duration of illness	< 5	35	35	χ^2= 15.28 P=0.002
	5 - 9	30	65	

	10 - 19	**26**	**91**	**(HS)**
	≥ 20 yrs.	**9**	**100**	
Numbers of Strokes	**1time**	**74**	**74**	χ^2**= 75.38**
	2 times	**17**	**91**	**P=0.000**
	≥ 3 times	**9**	**100**	**(HS)**

(*) HS: Highly Sig. at P<0.01; NS: Non Sig. at P>0.05; Testing based on One-Sample Chi-Square test, and Binomial test.

Regarding to subject "Smoking Cigarette/or any others types", most respondents were smokers, and they are accounted (62%), as well as mainly of them were a heavy smokers. Only (11%) of studied were drinking alcohol, and (15%) of them having addiction drugs.

Age onset groups for the (1st Stroke) shows that vast majority of studied sample were recorded in (60 - 69) years old, as well as mean value and standard deviation are estimated by 54.49 yrs., and 12.19 yrs. respectively. Most of studied patients had recorded duration of illness less than 10 yrs., and they are accounted (65%). Finally, patients who had one time of stroke registered (74%) among studied patients.

Distribution of Questionnaire's Domains (General QoL)

Table (6) shows summary statistics, such that, percentile score, and standard deviation, as well as different responding levels of assessing main domains for general QoL through percentile transforming scoring scales by three differentiated categories' levels, such that (Low, Moderate, and High) in light of [(0.0 – 33.33), (33.34 – 66.66), 66.67 – 100))] intervals respectively of WHO QoL – BERF questionnaire, which consists (Physical, Psychological, Social, and Environment) main domains.

Regarding to subjects of **physical main domain**, result showed that low assess accounted for patients with post stroke, then followed with a moderate assess concerning **psychological, social, and environmental main domains**.

For summarizes of preceding results it could be conclude that patients with post stroke having a different assess concerning health related general QoL, having instability with daily life cycle, in border a moderate to low level.

Table 6: Summary Statistics of Percentile Score General QoL main domains for the studied patients.

Main Domains	No.	PGMS	PSD	Evaluated
Physical Domain	100	25.57	19.76	Low
Psychological Domain	100	40.50	17.77	Moderate
Social Domain	100	48.58	21.75	Moderate
Environment Domain	100	43.72	15.42	Moderate
General QoL	100	39.59	14.97	Moderate

PGMS: Percentile Grand Mean of Score; PSD: Percentile Standard deviation

Distribution of Questionnaire's Domains (Specific QoL)

Regarding subjects of part 4, table (7) shows summary statistics, such that, percentile grand mean of score, and standard deviation, as well as different responding levels of assessing main domains for specific QoL through percentile transforming scoring scales by three differentiated categories' levels, such that (Low, Moderate, and High) in light of [(0.0 – 33.33), (33.34 – 66.66), 66.67 – 100)] intervals respectively.

Regarding to subjects studied main domains, "Physical Problems", showed moderate assessing for patients with post stroke, then followed with moderate assessing for "Memory and thinking", then followed with moderate assessing for "Changes in mood and ability to control emotions", then followed with moderate assessing for "Ability to communicate with other people, as well as your ability to understand what you read", then followed with moderate assessing for "Activities you might do during a typical day", then followed with moderate assess for "Ability to be mobile, at home and in the community", then followed with low assessing for "Ability to use your hand", then followed with high assessing for "Ability to participate in the activities that you usually do".

For summarizes of preceding results it could be conclude that patients with post stroke having a different assess concerning health related specific QoL, having stability of their daily life cycle, in border a moderate level.

Table 7: Summary Statistics of Percentile Score Specific QoL main domains for the studied patients.

Main Domains	No.	PGMS	PSD	Evaluated
Physical Problems	100	40.38	29.43	Moderate
Memory and Thinking	100	59.93	23.53	Moderate
Changes in mood and ability to control emotions	100	51.36	14.55	Moderate
Ability to communicate with other people, as well as your ability to understand what you read	100	65.86	30.17	Moderate
Activities you might do during a typical day	100	40.35	24.43	Moderate
Ability to be mobile, at home and in the community	100	40.81	26.51	Moderate
Ability to use your hand	100	24.40	30.40	Low
Ability to participate in the activities that you usually do	100	78.13	21.15	High
How recovery, how much have you recovered from your stroke	100	34.66	5.92	Low
Specific Health related QoL	100	51.22	15.85	Moderate

PMS: Percentile Mean of Score; PSD: Percentile Standard Deviation.

General/Specific QoL Relationship

To find out an association among an overall evaluates of general – QoL, and specific – QoL concerning stroke's patients, and as illustrated in table (8), table of redistributed (under/upper) cutoff point according to percentile transformation values of studied measures (General, and Specific) QoL.

Table 8: Redistribution (Under/Upper) Cutoff Point at the two Scores (General and Specific) QoL.

General-Score	No. and %	Specific - Score		Total	P-value
		Under	Upper		
Under	No.	46	31	77	FEPT P=0.000 HS
	%	95.8%	59.6%	77.0%	
Upper	No.	2	21	23	
	%	4.2%	40.4%	23.0%	
Total	No.	48	52	100	
	%	100%	100%	100%	

(*) HS: Highly Sig. at P<0.01 Statistical hypothesis based on Fisher's Exact Prob. test.

Figure (1) of cluster bar chart of (General & Specific) quality of life concerning stroke's patients scoring scale's evaluate (Under/Upper) cutoff point due to percentile transformation for an overall evaluates.

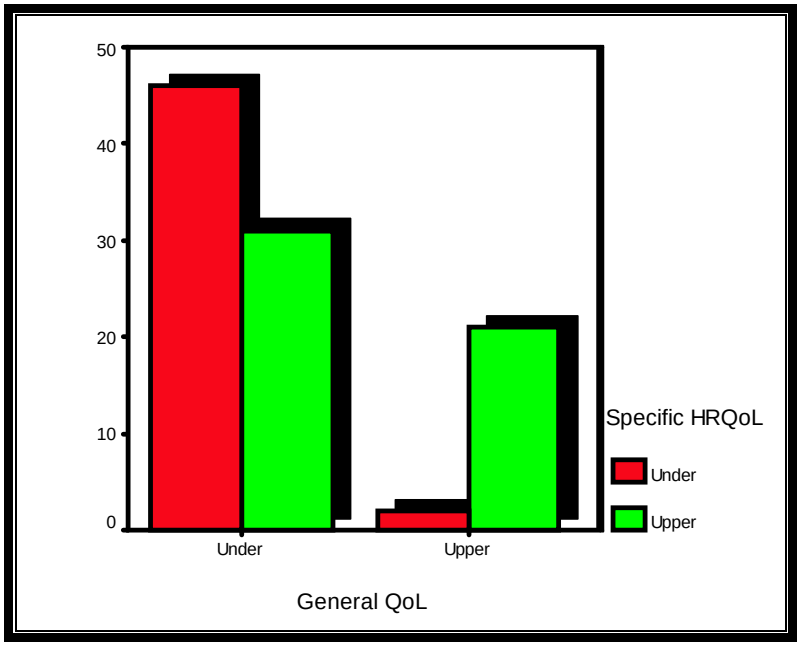

Figure 1: Cluster bar chart of General & Specific QoL Scoring Scale's (Under/Upper) Cutoff Point.

Table (9) deals with studied main domains, which were extracted in three meaningful and significant interactions, and has a suggested named **"Physical Factor, Psycho-Socio Factor, and Communicate Factor"**. That extracted Factors ordered in more powerful significant, with advantage at the first factor in (71.43%) of covariance constructed, then followed by second factor in (16.82%), as well as the fourth factor in (11.75%) of covariance constructed respectively.

Table 9: Extracted Factors matrix in Rotated method with the suggested named for Medication group.

Component Matrix	Components		
	1	2	3
General - Physical	0.830		
General - Psychological		0.784	
General - Social		0.779	
General - Environment		0.826	
Physical Problems	0.827		
Memory and Thinking			0.901
Changes in mood and ability to control emotions		0.656	
Ability to communicate with other people,, as well as your ability to understand what you read			0.853
Activities you might do during a typical day	0.819		
Ability to be mobile, at home and in the	0.874		

community			
Ability to use your hand	**0.868**		
Initial Eigen values	**6.488**	**1.528**	**1.067**
% of covariance	**71.43**	**16.82**	**11.75**
Suggested Named	**Physical Factor**	**Psycho-Socio Factor**	**Communicate Factor**

(*) Cogitation and implementation by Bio-Statistician Prof. (Dr) Abdulkhaleq A ALI Ghalib Al-Naqeeb; **Rotation Method: Varimax with Kaiser Normalization.**[9]

DISCUSSION OF RESULTS

Part one: Distribution of Socio-Demographical Characteristics of Stroke patients (SDCv.) (table 3)

Throughout the course of present study, as shown it has been noticed that (70%) of the study sample are males and the remaining are females, this could be attributed to a higher attendance by males at the "Public Medical Clinics", where the sample was taken. The dominant age group of study sample is within (60-69) years old and accounted for (39%) were more frequent by stroke, This result was agreements with the finding of the study, which is carried out in Bangladesh to study Socio-demographic Status & Associated Risk Factors of the Stroke Patient's in a Tertiary Care Hospital, which stated that the majority of the stroke patients were males (72%) and the higher percentage (29%) were between (51-69)years of age.[10]

Seventy-eight (78%) of the studied sample were married, and this finding agree with finding of another study, which says that, (94.2%) were married for determining quality of life and associated factors in patients with stroke in Turkish. [11]Also this result agreed with Dearborn and McCullough state that the largest proportion are married and they accounted for (57.9%) a many studied sample.[12]

Concerning the level of education, most of them (26%) are illiterates. Such result is an ordinary outcome for our society as a result of the tragedy of the political events, which the country had passed through. This result conflicting with Dearborn and McCullough in their study which is entitled (Perception of Risk and Knowledge of Risk Factors in Women at High Risk for Stroke), whereas their results shows that lowest level of education is some high

school or less, which is accounted for (8%) of the study sample, while highest percentage (28.6%) are graduated or professional school. So poor awareness of low educational may lead to exposure to stroke at any time because they cannot correctly decide when they need counseling or medical help.[12]

Relative to employment the results indicate that more than half of the study sample are non-occupied and retired they account for (66%), this finding was similar to study done by Weltermann, et al in their study, which is, entitled (Stroke Knowledge among Stroke Support Group Members) a cross-sectional questionnaire survey; they find that the highest percentage (72.8%) of their study sample regarding employment in term of current professional status were retired and non-occupied.[13]

Part two: Distribution of Socio-Economic status (SES)

Regarding Socio-Economic status, table (4), the present study revealed that patients with low and moderate income were (cum 93%) of the sample (P<0.000). This finding in agreement with the results of study done in 2015 when they reported that socioeconomic factors are have significant effect on HRQOL in Korean stroke population Hyun et al.[14] Also the finding of current study was agree with the results of study done in Pakistan by Khalid et al.[15]

Part three: General information of patients related to stroke

Present study record (62%) patients with smoking which is agree with the study conducted in India by Wu et al, in their study (53%) patients with smoking. So Smoking increases stroke risk by producing acute effects on the risk of thrombus generation in narrowed arteries and chronic effects related to an increased burden of atherosclerosis.[16]

Most of the studied sample had recorded duration of illness less than 10 months, and they are accounted (65%) with (p<0.05). This result is similar with findings that conducted in Nigeria in 2016 which is entitled (Chronic Pain After Stroke: A Hospital-Based Study of Its Profile and Correlation with Health-Related Quality of Life) Olajide et al, finds in their study that duration of illness less than 10 months were accounted (40.7%) with (p<0.05).[17]

Mary et al., states that majority of the participants in their study (80.5%) had no stroke before, this meaning study sample were suffering from the first stroke. This results is similar

with our study revealed that majority (74%) of the study sample were suffering one time of stroke among studied patients.[18]

Distribution of Questionnaire's items regarding (General QoL)

The results of the present study in table (6) demonstrated that overall assessment of General QoL domains of stroke patients was found to have moderate response. The current study finding agree with previous study done in China 2004. which obtained that there are overall QoL scores facet of the WHO-QOL showed moderate correlation with all four dimensions of GQOL(range 0.33-0.59). [19] Also the current study findings was agree with results of the study conducted in Turkey 2008, which was Overall QOL domain of the WHOQOL-100 correlated particularly moderate in most domains.[20]

Distribution of Specific Health related Quality of Life (Specific QoL)

The findings of the current study in table (7) showed that overall assessment of stroke specific QoL (SS-QoL) domains of stroke patients was found to have moderate response. The current study finding agree with previous study done in 1999 in USA. Which showed also moderately effect on the quality of life of stroke patients.[21]

General/Specific QoL Relationship: Redistribution (Under/Upper) Cutoff Point at the two Scores (General and Specific) QoL

Results shows that overall general/specific QoL redistribution (under/upper) a cutoff point for percentile scoring scales are reported highly significant relationships at $P<0.01$, since off diagonal values, either upper for general assess, and under for specific assess, or under for general assess and upper for specific assess are predominated of studied outcomes, and that indicating the importance of studying phenomena by the two scores (General, and Specific) quality of life concerning stroke's patients. Unfortunately there are no studies found in contrast of those findings to make discussion of such outcomes.

Extracted Factors matrix in Rotated method with the suggested named for Medication group

In current study, a new measurement scale was created for measuring the QoL concerning stroke patient’s by using the factor analysis for both WHOQoL-BREF & HRQoL specific scales. Table (9) shows analysis of factor loading that related to WHOQoL-BREF domains and HRQoL concerning stroke patient’s domains.

In this factor analysis, three components were identified to explain the variation of variables. Which were extracted in three meaningful and significant interactions, and has a suggested named "**Physical Factor, Psycho-Socio Factor, and Communicate Factor**". That extracted Factors ordered in more powerful significant, with advantage at the first factor in (71.43%) of covariance constructed, then followed by second factor in (16.82%), as well as the third factor in (11.75%) of covariance constructed respectively, and these three creating factors (components) will represent the new scale which can be used in the future for further measurement of QoL concerning stroke patient's. Unfortunately there are no studies found in contrast of those findings to make discussion of such outcomes.

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