

Factors Associated with Health-related Quality of Life of Ambulatory Stroke Survivors in Jamaica

CD Gordon¹, R Wilks², A McCaw-Binns³

ABSTRACT

Objective: The study aimed to determine the factors associated with health-related quality of life (HRQL) in ambulatory chronic stroke survivors.

Methods: Baseline data from a randomized controlled trial (RCT) done to determine the effects of aerobic exercise on HRQL were analysed. The Medical Outcomes 36-Item Short Form Health Survey (SF-36) was used to assess HRQL. Other measures included: functional status (the Barthel Index) and the Older American Resource and Services Questionnaire (OARS), grip strength measured with a dynamometer; lower extremity strength (the Motricity Index), depression (the Geriatric Depression Scale-GDS) and endurance assessed through the six-minute walk test. Data were analysed using the t-test, correlation coefficient and multiple linear regression.

Results: One hundred and twenty-eight persons participated (mean age: 64 years, mean time post stroke: 12 months). The Physical Component of the SF-36 was associated with distance walked in six minutes ($r = 0.395$; $p < 0.000$), grip strength on the affected side ($r = 0.309$; $p < 0.000$) lower limb strength on the affected side ($r = 0.287$; $p = 0.001$), Barthel Index ($r = 0.253$; $p = 0.004$), OARS ($r = 0.378$; $p < 0.000$) and depressive symptoms ($p = -0.353$; $p = 0.000$). The independent predictors were: distance walked in six minutes and depressive symptoms. The mental component was significantly related to GDS ($r = -0.391$; $p = 0.000$) and unaffected side lower limb strength ($r = 0.251$; $p = 0.004$). Male gender and less depressive symptoms were independently associated with this component.

Conclusion: In Jamaican stroke survivors, motor impairment, activity limitation, depression and female gender are associated with poor health-related quality of life long after stroke onset.

Keywords: Ambulatory stroke survivors, health-related quality of life, Jamaica

Factores Asociados con la Calidad de Vida Relacionada con la Salud de los Sobrevivientes de Apoplejía en Jamaica

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RESUMEN

Objetivo: El presente estudio estuvo dirigido a determinar los factores asociados con la calidad de vida relacionada con la salud (CVRS) en sobrevivientes de apoplejía crónicos ambulatorios.

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Métodos: Se analizaron los datos de base de un ensayo controlado aleatorio (ECA) para determinar los efectos del ejercicio aeróbico en la CVRS. La calidad de vida relacionada con la salud se evaluó utilizando los resultados médicos del Cuestionario de Salud de Formulario Breve de 36 Preguntas (SF-36). Otras mediciones incluyeron: el estado funcional (índice de Barthel) y el Cuestionario de Recursos y Servicios para Personas de Edad Avanzada (OARS, en inglés), la fuerza de prensión medida con un dinamómetro, la fuerza de las extremidades inferiores (índice de motricidad), la depresión (Escala de Depresión Geriátrica - EDG), y la resistencia evaluada mediante la prueba de una caminata de seis minutos. Los datos fueron analizados mediante la Prueba t, el coeficiente de correlación, y la regresión lineal múltiple.

Resultados: Ciento veintiocho personas participaron (edad promedio: 64 años; tiempo promedio después del accidente cerebrovascular: 12 meses). El componente físico del Cuestionario SF-36 se asoció con la distancia recorrida en seis minutos ($r = 0.395$; $p < 0.000$), fuerza de prensión en el lado afectado ($r = 0.309$; $p < 0.000$), la fuerza de la extremidad inferior en el lado afectado ($r = 0.287$; $p = 0.001$), el índice de Barthel ($r = 0.253$; $p = 0.004$), la escala de OARS ($r = 0.378$; $p < 0.000$), y los síntomas depresivos ($r = -0.353$; $p = 0.000$). Los predictores independientes fueron: la distancia recorrida en seis minutos y los síntomas depresivos. El componente mental estuvo relacionado significativamente con la EDG ($r = -0.391$; $p = 0.000$) y la fuerza del miembro inferior del lado no afectado ($r = 0.251$; $p = 0.004$). El género masculino y síntomas menos depresivos estuvieron independientemente asociados con este componente.

Conclusión: En los sobrevivientes jamaicanos de apoplejía, el deterioro motor, la limitación de la actividad, la depresión, y el género femenino están asociados con una pobre calidad de vida mucho después del inicio del accidente cerebrovascular.

Palabras clave: Sobrevivientes de apoplejía ambulatorios, calidad de vida relacionada con la salud, Jamaica

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INTRODUCTION

Stroke is the third leading cause of death and an important cause of long-term disability in most industrialized nations (1, 2). In Jamaica, a middle-income, island state, it is also one of the leading causes of adult death (3). The resulting disability can affect the function, activity level and quality of life (QOL) of stroke survivors. Health-related quality of life (HRQL) is a multi-dimensional construct and an important outcome which should be measured after stroke. It provides a comprehensive perspective of post-stroke recovery (4) and can guide the planning and provision of health services for this segment of the population.

In many countries, HRQL is reduced in persons with stroke, in the acute, sub-acute and chronic stages. A few studies, however, report good QOL for persons with chronic stroke attributed in part to the development of coping strategies over time (5, 6). Depression (7), paresis (8), dependence in activities of daily living (9) and lack of social support (10) are some of the factors associated with poor quality of life. Reports on the influence of age and gender have been inconclusive (8, 11).

The desire to walk again is a high priority for many stroke survivors and reports suggest that 60% or more of those who have a stroke regain the ability to walk independently though not necessarily in the same way as before (12). Independent walking may be associated with a change in gait pattern, slower walking speed, increased energy expenditure and reduced endurance (13–15). These changes affect functional capacity, community participation and ultimately HRQL. So, though persons may be able to walk independently, HRQL may be affected. Few studies (16) have examined HRQL in ambulatory stroke survivors.

Health-related quality of life is self-perceived and therefore may be affected by not only physical factors but socio-cultural factors including personal beliefs and expectations. It is therefore, important to measure the impact of disease in a particular socio-cultural context to determine strategies that can be implemented to effect improvement. Our study sought to determine the HRQL of chronic ambulatory stroke survivors in a middle-income developing country setting and factors associated with it.

SUBJECTS AND METHODS

This study utilized baseline data collected on 128 persons involved in a randomized controlled trial (RCT) on the effect of aerobic exercise training on functional status and HRQL among stroke survivors (17). The study was approved by the University Hospital of the West Indies/The University of the West Indies, Faculty of Medical Sciences, Ethics Committee, Mona, Jamaica.

For the parent study, subjects were recruited from among those treated at public and private institutions (the University Hospital of the West Indies, the Kingston Public Hospital and Andrews Memorial Hospital) in Kingston and St Andrew, Jamaica.

Persons were eligible for inclusion if they were: forty years of age and over, living in the community 6–24 months post stroke, able to walk with or without an assistive device, not in a rehabilitation programme and did not have any disorder, such as unstable cardiovascular or pulmonary disease, that would prevent exercise training. Excluded were those with stroke secondary to metastatic disease or subarachnoid haemorrhage, cognitive deficits (< 24 on the Mini Mental Status Examination (18) or involved in a regular aerobic exercise programme.

Procedure

All eligible candidates were identified from chart review and contacted. Those who were eligible and agreed to participate were screened and provided written informed consent. Baseline examination included assessment of HRQL and functional status, estimation of walking endurance from a six-minute walk test, and assessment for any motor impairment and depression. These outcomes were selected to reflect the spectrum of impairment, activity limitation and participation restriction according to the World Health Organization (WHO) International Classification of Functioning, Disability and Health (WHO 2001) [19].

Health-related quality of life measures were the physical and mental component summary (PCS and MCS) scores of the Medical Outcomes Survey (MOS) 36-Item Short Form Health Survey [SF-36] (20). Higher SF-36 scores indicate better quality of life. It is a valid measure of HRQL in the stroke population (21) and has been used in Jamaicans (22).

Functional status was measured using the Barthel Index (23) and the instrumental activities of daily living (IADL) dimension of the Older Americans Resources and Services (OARS) Multidimensional Functional Assessment Questionnaire (24).

Lower extremity strength was assessed using the Motricity Index (25) which grades subjects on hip flexion, knee extension and ankle dorsiflexion. The grades are summed to give a single score. Grip strength (maximum force developed when gripping) was determined using the Jamar hand dynamometer (Sammons Preston, Inc). Walking endurance was estimated from a six-minute walk test (26). The distance covered was measured in meters (27).

The Geriatric Depression Scale (GDS) was used to measure depression (28). Higher scores suggest more depressive symptoms. Clinical and demographic data were also collected.

Data Analysis

The mean SF-36 PCS and MCS scores by gender, marital status, employment, rehabilitation, educational level and living arrangement were analysed using independent samples *t*-test and one-way ANOVA. Pearson's correlation coefficient was used to determine the relationship between SF-36 scores and variables measured on a continuous scale (GDS, age, six-minute walk distance, Motricity Index, grip strength, Barthel Index and OARS). Multiple stepwise linear regression analysis was performed to ascertain the independent determinants of HRQL. Potential predictors were variables significantly correlated with the PCS and MCS scales of the SF-36, controlling for age and gender. An alpha level of 0.05 was used to determine statistical significance. Analyses were performed with SPSS 18.0 for Windows.

RESULTS

One hundred and twenty-eight persons (45% male) participated in the study. Table 1 shows the characteristics of the subjects. Mean age was 64.1 years and the mean time post stroke was 12 months.

Sociodemographic variables and quality of life

The mean SF-36 PCS and MCS scores were 32.6 and 43.02, respectively and did not vary significantly across categories of sociodemographic variables (Table 2). On the MCS however, those who had received rehabilitation post discharge from hospital had significantly higher scores (45.3) than those who had not (40.7), as did men compared to women, but this was just short of statistical significance.

Table 3 shows the correlation between impairment, activity-related variables and HRQL. Distance walked in six minutes was the strongest correlate ($r = 0.395$,

Table 1: Sociodemographic and clinical characteristics of subjects

Variable	Mean (SD) or % (number)
Age (years)	
Mean (SD)	64.1(10.27)
Range	42-92
Time post stroke (months)	
Mean (SD)	12.3(3.59)
Gender	
Male	45.3(58)
Female	54.7(70)
Education	
Primary	72.7(93)
Secondary/tertiary	27.3(35)
Employment	
Employed	15.6(20)
Unemployed	84.4(108)
Marital status	
Married	31.2(40)
Single	68.8(88)
Living arrangement	
Lives with child	32(41)
Lives alone	20.3(26)
Lives with spouse	26.6(34)
Lives with relative	21.1(27)
Type of stroke	
Ischaemic	71.1(91)
Haemorrhagic/other	14.2(15)
Side of lesion	
Right	60.9(78)
Left	39.1(50)
Co-morbidities at time of screening	
1 or more	95.5(121)
None	5.5(7)
Rehabilitation post-hospital discharge	
Yes	62(48.4)
No	66(51.6)

$p < 0.001$) of the physical component QOL. Significantly higher PCS scores were seen in those who walked longer distances. The Barthel Index and OARS, as well as strength, were positively related to PCS. The geriatric depression score was significantly and negatively related to PCS scores; with more depressive symptoms (higher scores) associated with worse quality of life.

The geriatric depression score was the only variable significantly and negatively related with the mental component QOL so those with more depressive symptoms had lower mental health QOL ($r = -0.391$, $p < 0.001$).

From the multivariable analysis, the only significant independent determinants of the physical component QOL were distance walked in six minutes (endurance)

Table 2: Sociodemographic variables and health-related quality of life

Variables	Physical component	<i>p</i> -value	Mental component	<i>p</i> -value
Gender				
Male	32.03(10.09)	0.608	45.37(12.86)	0.052
Female	33.0(11.19)		41.00(12.25)	
Marital status				
Married	32.93(10.93)	0.559	43.52(12.84)	0.471
S/W/D	31.76(10.18)		41.79(12.35)	
Employment				
Employed	32.51(10.85)	0.883	42.68(12.39)	0.578
Unemployed or Retired	32.87(9.96)		44.61(14.32)	
Education				
Primary	32.13(10.68)	0.46	43.93(12.94)	0.15
Secondary/tertiary	33.71(10.75)		40.45(11.71)	
Rehabilitation				
Yes	32.89(8.83)	0.739	45.34(12.84)	0.041
No	32.26(12.22)		40.77(12.18)	
Living arrangement				
Lives alone	30.31(9.72)	0.306	45.98(12.18)	0.238
Lives with relatives	30.92(9.67)		41.10(13.22)	
Lives with spouse	32.89(11.08)		44.96(11.84)	
Lives with child	34.81(11.42)		40.68(13.05)	
Side of lesion				
Left	31.56(10.72)	0.396	41.43(12.73)	0.270
Right	33.21(10.67)		43.94(12.61)	
Type of stroke				
Ischaemic	32.12(10.92)	0.803	42.49(12.11)	0.693
Haemorrhagic	32.89(10.84)		44.10(14.73)	
Co-morbidity				
None	31.24(14.76)	0.812	47.94(9.97)	0.224
1 or more	32.64(10.67)		42.69(12.78)	

S/W/D = Single, widowed or divorced

and the geriatric depression scores. Longer distance walked and less depressive symptoms were associated with better quality of life accounting for 22.6% of the variance in the physical component. The mental component QOL was independently associated with gender and depressive symptoms with male gender and less depressive symptoms associated with better mental component QOL, explaining 17.3% of the variance (Table 4).

DISCUSSION

The study aimed to examine the HRQL of ambulatory stroke survivors and the related factors. Both mental and physical components of HRQL were affected (overall scores less than 50/100). The impairment in QOL among these persons who were able to walk independently, emphasises the inevitably worse situation in non-ambulant stroke survivors. Their mean PCS (32.6)

Table 3: Correlates of physical and mental component health-related quality of life

	Physical component	Mental component
Distance walked in six minutes	0.395 (< 0.001)	0.105 (0.236)
Barthel index	0.253 (0.004)	0.076 (0.394)
OARS	0.378 (< 0.001)	0.090 (0.311)
Grip strength (lbf)	0.309 (< 0.001)	0.027 (0.764)
Motricity index	0.287 (0.001)	0.086 (0.337)
Geriatric depression scale	-0.353 (< 0.001)	-0.391 (< 0.001)
Age (years)	-0.140 (0.115)	-0.099 (0.267)
Time post stroke (months)	-0.130 (0.150)	-0.032 (0.728)

OARS: Older American Resource and Services Questionnaire

Table 4: Determinants of health-related quality of life

	Variable	B(SE)	Beta	Adjusted R ²	95% CI for B	p-value
Physical Component Summary	Six minute walk distance	0.020 (0.006)	0.336	0.226	.013, 0.38	0.000
	Geriatric depression scale	-0.508 (0.156)	0.336		0.817, -0.199	0.001
Mental Component Summary	Gender	-4.731 (2.061)	-0.186	0.173	-8.810, -0.652	0.023
	Geriatric depression scale	-0.909 (0.185)	-0.397		-1.276, -0.542	0.000

Variables entered in model for Physical Component Summary: Age, gender, six-minute walk distance, GDS, OARS, Barthel, grip strength, Motricity Index.

Variables entered in the model for Mental Component Summary: Age, gender, GDS, rehabilitation post-stroke.

was lower (52.9) than that of ambulatory stroke survivors in Canada (29) and may be reflecting differences in health infrastructure or access to post-discharge rehabilitation services.

Correlates of HRQL

None of the sociodemographic factors were significantly related to HRQL in this sample, suggesting that in this community more social support may have been available. This was in contrast to other studies which reported lower HRQL in older persons (30), women (31), those who lived alone (10) and those with lower educational level (32).

Not all persons in Jamaica who suffer a stroke receive rehabilitation, partly due to associated costs and the absence of services in some areas. Those who had not received rehabilitation post-discharge had worse mental health QOL than those who had. Others have observed where even in the post-acute stage, rehabilitation influenced HRQL positively (33).

Functional status, strength, endurance and depression were significantly and positively associated with the physical component of HRQL. The strongest correlate was distance walked in six minutes with those walking longer distances having better HRQL. The physical component summary reflects an individual’s ability to perform physical tasks such as walking, climbing stairs and self-care activities. The six-minute walk distance is a measure of functional exercise capacity which is important in the performance of many daily tasks. Muren and colleagues (16) documented that five domains on the Stroke Impact Scale (measure of quality of life) correlated significantly with endurance assessed with a six-minute walk test.

Four of those domains related to physical demands met by the individual throughout the day.

The positive association between the ability to perform activities of daily living and the physical component HRQL is consistent with the findings of others (7, 9, 34). Mahran *et al* (34) observed that among Saudi Arabian chronic stroke survivors, quality of life (SF-36 PCS) was significantly better in persons with greater functional independence.

Depression post-stroke has consistently been shown to negatively affect QOL (7, 11, 35). It can occur from stroke-related factors such as physical

disability which limits independence and reduces social interaction, both of which will influence perception of well-being. Almost 65% of individuals in the study scored greater than nine points on the Geriatric Depression Scale indicating some amount of depression. We however, were not able to document whether any of these persons had suffered from depression before their stroke. While most were only mildly depressed, 7% scored greater than 20 categorizing them as severely depressed (28). This highlights the need for initial and periodic screening for depression in all stroke survivors so that appropriate treatment can be instituted. Recognising and treating depression is necessary to enhance quality of life.

Determinants of HRQL

Longer distance walked in six minutes and less depressive symptoms explained almost 23% of the variance in the PCS score. These findings suggest that efforts to improve endurance and relieve depressive symptoms could impact positively on aspects of quality of life of community-dwelling stroke survivors. Strategies to improve endurance include accessible, community-based exercise programmes which could be delivered by appropriately trained community health-workers. Expanding primary healthcare services to include rehabilitation, as the population ages and more persons can be expected to survive cerebrovascular accidents, would be of value in middle-income countries like Jamaica.

Less depressive symptoms and being male were independently associated with the MCS score. Men have been shown to have higher scores on the MCS compared to women (8) as was found in this study. While men may have been less inclined to report feelings of sadness or admit to having low energy levels they may also have been more willing to fight to overcome physical challenges than women.

Limitations

The independent determinants explained 23% of the variance in HRQL, so much remains unexplained. Further research is needed to explore other factors such as socio-economic status, religious beliefs and social support outside and within the family that may impact on HRQL in ambulatory stroke survivors in Jamaica.

The study was not powered for all the analyses. The findings must, therefore, be corroborated in future studies.

While this sample of stroke survivors may not be entirely representative of the population of stroke survivors in Jamaica as these were only mild-to-moderately affected, findings are indicative of the need for future studies to examine HRQL in those who are more severely affected.

CONCLUSION

Health-related quality of life in chronic ambulatory stroke survivors in Jamaica is relatively low and it is influenced negatively by the presence of depressive symptoms and low physical endurance. Strategies to address these could impact HRQL positively. Improved access to rehabilitation professionals at the primary healthcare level in Jamaica should be examined as a means of maximising recovery and optimising quality of life of persons who suffer a stroke annually.

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AUTHORS' CONTRIBUTIONS

CDG: Concept, design, procedures, data acquisition, analysis and interpretation, preparation of manuscript.

RW: Procedures, analysis and interpretation, preparation of manuscript.

AMcB: Procedures, analysis and interpretation, preparation of manuscript.

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