

IMPACT OF DIABETIC FOOT ULCERS: HEALTH-RELATED QUALITY OF LIFE AND ASSOCIATED FACTORS

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This study was aimed to examine the impact of foot ulcers on health-related quality of life (HRQoL) and its' association in patients with diabetes. In this study, Short Form 36 (SF-36) questionnaire was administered among hospitalized adult diabetic foot ulcer patients. SF-36 total HRQoL score, physical component score (PCS) and mental component score (MCS) were measured and associations were determined.

Of the total of 253 patients were studied, 58.1% of patients (n=147) were females. The total HRQoL mean score (46.21), PCS (37.64) and MCS (54.73) were low. Female gender, unemployment and depending on others for the living, the presence of hypertension, PVD and neuropathy, ulcers site being the midfoot, hindfoot and high-grade ulcers were significantly influenced to lower HRQoL in either PCS or MCS or both in patients. In conclusion, diabetic foot ulcers impose significant negative effects on patients' HRQoL, both physically and mentally.

Key words: Health-related quality of life, diabetic foot ulcers, co-morbidities, SF-36

Introduction

Diabetes mellitus (DM) is known to be the most vital disease-specific determinant of health related quality of life (HRQoL). Presence of complications which includes foot ulcerations, neuropathy, nephropathy, cardiac complications, hypertension, and

retinopathy has a negative impact on quality of life (QoL). When compared to diabetic foot ulcer (DFU) patients, both with the general population and those with DM, DFU patients have lower HRQoL (Ribu et al. 2007). Presence of DFUs has an enormous emotional burden on the patients and the caregivers by restricting physical activity, mobility, employment and leisure activities of them (Goodridge et al, 2005). In addition, numerous factors have shown to be lower HRQoL include financial dependence, low educational level and presence having at least one complication of DM (Kossioris & Karousi, 2015).

In Sri Lanka, limited studies have reported HRQoL on patients with diabetic ulcers. A recent study which was conducted to establish population norms for HRQoL in normal individuals in four districts reported lower HRQoL in socioeconomically disadvantaged people (Kularatna et al., 2014). In another small-scale study, poor HRQoL was reported in patients with both diabetic leg and foot ulcers (Sriyani et al, 2015). Since evidence exists on HRQoL of patients with DFUs is lacking, this present study was aimed to examine the impact of foot ulcers on HRQoL and its' association in patients with diabetes.

Methodology

This was a part of a large descriptive cross-sectional study carried out at the National Hospital of Sri Lanka during the period from December 2014 to April 2015. Adult diabetic foot ulcer patients admitted to the 10 male and female surgical wards with wound duration more than two weeks were recruited. Acutely ill and those with cognitive impairment were excluded from the study. Data were collected from voluntarily participated 253 patients who gave written informed consent. This study was approved by the Ethics Review Committee of the University of Sri Jayewardenepura and permission to conduct the study was obtained by hospital authorities.

Socio-demographic, co-morbidities and ulcer characteristics

Data on age, gender, marital status, educational level, occupation, duration and family history of DM, duration of ulcer and site of ulcer were collected obtained through interviewing the patients. Data on the presence of comorbidities [hypertension, heart disease, kidney disease, peripheral vascular disease (PVD), and neuropathy] were

obtained from medical records. Impaired vision of patients (due to retinopathy and self-reported poor vision) was also recorded. In addition ulcer site and ulcer grade were recorded.

HRQoL

Medical outcomes study 36-item short form health survey (SF-36) was used to measure HRQoL of patients with diabetic leg and foot ulcers. This instrument consists of 36 questions that grouped into eight conceptual domains (physical functioning, role limitation due to physical health, bodily pain, general health perceptions, vitality, social functioning, role limitation due to emotional problems and mental health). Two factored model has been developed by aggregating first four domains into the physical component score (PCS) and latter four domains into the mental component score (MCS). Each question is scored on a scale of a zero to 100 and aggregate percentage scores are calculated for each domain. A high score denotes the high quality of life (QoL) and low score denotes low QoL. Validity and reliability of the instrument had been well established and used in assessing QoL in patients with wide variety of medical conditions and validated in Sri Lankan setting. The data were collected through an interviewer-administered approach. In this study, QoL was measured according to two factored model; MCS and PCS, and aggregated MCS and PCS to count total quality of life.

Statistical analysis

Demographic and clinical characteristics of the patients were presented using descriptive statistics. Associations between variables were determined using independent t-test. Significance was accepted at alpha <0.05. Data were analyzed using SPSS version 21.

Results, interpretation, and discussion

Of the total of 253 patients were studied, 58.1% of patients (n=147) were females. Mean age of the patients was 58±85 (range 35-84) years. The mean duration of diabetes mellitus was 11.44±8.23 (0.1-37) years. Their socio-demographic and co-morbidities disease conditions are shown in Table 1. Of the total, 178 (70.4 %) patients had ulcers with duration more than one month. Most of the patients (n=166, 65 %) had history of an ulcer. Fifty-eight percent of patients had forefoot ulcers (n=147) and remaining had

ulcers in the midfoot, hindfoot and the ankle. Sixty percent (n=153) of patients had low-grade ulcers (Wagner scale ≤ 2) while remaining had high-grade ulcers (n=29, 15.9%).

Table 1: Socio-demographic and co-morbidities of patients (n=253)

Characteristic	Category	n	%
Education	Not gone to school	18	7.1
	Grade < 5	51	20.3
	Grade 6-10	87	34.38
	Grade >10	97	38.33
Family history of DM	Yes	103	42.4
Hypertension	Yes	107	42.3
Heart disease	Yes	36	14.2
Kidney disease	Yes	15	5.9
Neuropathy	Yes	133	52.6
PVD	Yes	25	9.9

HRQoL

According to the present findings, HRQoL measured using SF-36 questionnaire is low in the study cohort. The total HRQoL score was 46.21 ± 20.61 and 53.8% (n=136) patients had total score less than 50%. Similarly, the scores were low for PCS (37.64 ± 21.40) and MCS (54.73 ± 22.36). In agreeable with present findings, previous studies in France (Valensi et al., 2005) and Iran (Yekta et al., 2011) have shown poor HRQoL in patients with diabetic ulcers.

Socio-demographic characteristics associated with HRQoL Table 2. The PCS and MCS were significantly lower in females than males ($p < 0.023$). In accordance with present findings, Yekta et al., (2011) have shown significantly higher HRQoL scores in diabetic men compared to diabetic women with no foot ulcers. The MCS score was significantly low in employed than unemployed ($p = 0.043$) and those dependent on others ($p = 0.004$). An Iranian study (Javanbakht et al., 2012) reporting similar findings has shown an association between HRQoL and unemployment.

As shown in Table 3, HRQoL was found to be poorer in patients with hypertension with indicating significantly lower scores for both PCS ($p = 0.006$) and MCS ($p = 0.007$). Similarly, significantly poorer HRQoL was found in patients with PVD in both PCS and MCS ($p = 0.001$). Moreover, the presence of neuropathy was affected to reduce HRQoL

significantly in MCS. Significant associations between the presence of comorbidities and poorer HRQoL were consistent with studies elsewhere (García-Morales *et al.*, 2011; Sanjari *et al.*, 2011; Siersma *et al.*, 2013; Vukojević *et al.*, 2014).

Table 2: Socio-demographic characteristics associated with HRQoL

Character	Category	PCS		MCS	
		Mean	p-value	Mean	p-value
Gender	Men	41.44	0.018*	58.53	0.023*
	Women	34.86		51.91	
Age (in years)	≤60	37.26	0.748	54.43	0.804
	>60	38.19		55.17	
Educational level	≤10 grade	37.35	0.779	53.47	0.269
	>10 grade	38.11		56.69	
Financial dependence	No	40.51	0.060	51.04	0.004*
	Yes	35.30		59.30	
Employment	Employed & Retired	40.26	0.071	57.80	0.043*
	Unemployed	35.29		51.94	

PCS, physical component score MCS, mental component score Significance at p <0.05.

Table 3: Ulcer-related factors and co-morbidities associated with HRQoL

Character	Category	PCS		MCS	
		Mean	p-value	Mean	p-value
Hypertension	Yes	33.28	0.006*	50.15	0.007*
	No	40.88		58.09	
Heart disease	Yes	32.32	0.111	47.43	0.062
	No	38.49		55.90	
Neuropathy	Yes	34.97	0.058	50.47	0.003*
	No	40.17		59.06	
PVD	Yes	24.83	0.001*	42.28	0.001*
	No	39.00		56.12	

Foot ulcer site	Forefoot	41.16	0.002*	57.15	0.053*
	Other sites	32.49		51.26	
Ulcer grade	Wagner scale ≤ 2	38.61	0.021*	55.54	0.159
	Wagner scale ≥ 3	28.52		48.19	

Other sites; midfoot, hindfoot and ankle Significance at $p < 0.05$.

When the ulcer site was considered, significantly poorer HRQoL was found in patients with mid foot, hind foot, and ankle ulcers compared to the once with forefoot ulcers across PCS ($p=0.002$). Consistent with previous findings, HRoL of patients with high-grade ulcers found to be poorer (Valensi et al., 2005; Yekta et al., 2011), especially in the aspect of MCS. However, HRQoL scores of the present study were not associated with patients' age, educational level and whether they were suffering from heart disease. Irrespectively of those, almost all patients had poor QoL. In agreement to our findings, Yekta et al., (2011) also did not reveal any association between age and HRQoL in DM patients with ulcers and without foot ulcers.

Conclusions

Findings of this study may provide useful information to health care workers and researchers to assess HRQoL of patients with diabetic foot ulcers. Diabetic foot ulcers have a negative impact on HRQoL with affecting both physical health and mental health. Scores PCS and MCS were consistently lower in the study cohort. Health-related quality of life is worse in women, unemployed and financially dependent on others. Presence co-morbidities such as hypertension, PVD, neuropathy and ulcer site and its severity were significantly associated with poor HRQoL. Age, educational level and whether they were suffering from heart disease have no impact on HRQoL.

Recommendations

- To consider the patients' physical and mental health status is recommended when planning, evaluating and managing diabetic ulcer patients.
- To use of a holistic approach will help to assess the overall impact of diabetic foot ulcers on patients' life and support in improving HRQoL.

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