Original Article

Quality of Life and Nutritional Status in diabetic patients on hemodialysis

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ABSTRACT

Aims: The quality of life (QoL) of patients with diabetes and in hemodialysis is affected by their nutritional status. We aimed to determine the correlation between QoL and nutritional status of patients in hemodialysis.

Methods: We conducted a study with people with diabetes and in hemodialysis. We used Kidney Disease and Quality of Life-Short form (KDQOL-SFTM) scale to evaluate QoL and the Subjective Global Assessment (SGA) questionnaire for nutritional evaluation.

Results: The studied patients, 71.43% were over 55 years old and 81% of participants were male. The domain of QoL must impaired were cognitive function ($\bar{x}$ = 26.35, SD = 20.81) and interaction of social quality ($\bar{x}$ = 19.32, SD = 17.24). The characteristics that most favorably impacted QoL were dialysis equipment support ($\bar{x}$ = 83.93, SD = 20.59) and patient satisfaction ($\bar{x}$ = 86.51, SD = 17.17). The undernourished patients were 56.6% (n = 14). There was a strong lineal relationship between the Physical and Mental Health Composite and nutritional status, Spearman rank (rho = 0.935, p = <0.001), (rho = 0.926, p = <0.001) respectively.

Conclusion: There is a strong relationship between QoL and nutritional status, ensuring that a good nutritional status could positively influence QoL.

1. Introduction

In patients with diabetes and on hemodialysis (HD) poor nutritional status and reduced quality of life (QoL) related to health have been reported [1]. Protein-energy depletion and muscle wasting in patients undergoing hemodialysis (HD) is very frequent [2] and a very poor nutritional status can lead to malnutrition [3] and can worse quality of life [4,5].

Some studies have shown that most patients with diabetes on hemodialysis are men and they are more than 65 years old [6]. The burden of renal impairment is a significant risk factor for depression and can be seen in 20–25% of end-stage renal disease (ESRD) patients [7] and is strongly linked to quality of life and mortality [8,9]. Some studies have described that the domain of QoL most affected were the burden of kidney disease are the mental health composite, work status, physical limitations, physical, health composite and cognitive function domain, corresponding with the cognitive decline of chronic renal patients in hemodialysis, values that did not exceed 50 [1,6,8], [10–16]. In most of QoL studies, the domains that have obtained the highest scores were role limitations-emotional, patient satisfaction, social support and dialysis staff encouragement [6,17,18].

The relationship of patients with malnutrition on hemodialysis and low levels of quality of life has been demonstrated in domains such as physical and mental health composite. While more malnutrition status is established, less values in these two domains are reached, demonstrating a lineal correlation [1,19]. There is a strong correlation between the different aspects of subjective nutritional evaluation as the impact of changes in food intake and the direct relation to weight loss and the emotional that can be a factor that leads to malnutrition [19] and some studies had reported that the complications associated with malnutrition can worsen the renal patient in hemodialysis [20]. Others strong correlations have been analyzed as physical health composite with domains as energy/fatigue, physical functioning and role, pain and

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general health directly affecting the physical performance of patients in hemodialysis [4], mental health composite in association with physical role, emotional well-being and emotional role [10].

The relationship between QoL and malnutrition in patients with diabetes in hemodialysis in our geographical area is largely unknown. The main objectives of this research were to determine the quality of life of patients with diabetes who receive hemodialysis, and how this correlates with their nutritional status in order to improve strategies focused in the well-being of patients.

2. Materials and methods

An observational study was conducted with patients with chronic renal failure and periodic hemodialysis treatment in the hemodialysis service during the period from May to June of 2017.

A non-probabilistic, purposive sampling strategy was used. We sampled from the total number of patients receiving regular hemodialysis treatment at the hemodialysis service of the hospital. Only those who agreed to participate and met inclusion criteria were given the assessment tools. Inclusion criteria included: being 18 years old or older, and patients with at least 3 months of substitution treatment. Exclusion criteria were persons who did not decide to participate after explaining all procedures or who did not signed the informed consent, aging younger than 18 years, less than 3 months of treatment. Study was approved by ethical committee of the Hospital. Data were analyzed using the SPSS for windows, 25th version.

2.1. Instruments

The QoL questionnaire was self-administered prior to start of the hemodialysis session and the Subjective Global Assessment (SGA)was performed by a nutrition specialist.

2.1.1. Quality of life evaluation
We used the Kidney Disease Quality of Life questionnaire −24 item Short form (KDQOL-24 SF) [21,22] which is based on the Spanish version of KDQOL-SF [21,22].

The KDQOL-SF contains 24 items focus in individuals with kidney disease on hemodialysis: symptom/problems, effects of kidney disease on daily life, burden of kidney disease, work status, sleep, social support, dialysis staff encouragement and patient satisfaction. The 24 items are summarized in two groups: First group (1−12 items) refer physical and mental components. The other group (items 13−24), allows obtaining the scores of the specific subscales, scales of symptoms/problems, and effects of kidney disease. In general, KDQOL-SF items higher numbers reflects a more favorable health state. However, some items are reverse (item 6, for example). The scores for each dimension range from 0 to 100, so that higher scores represent better quality of life, and this type of scale provides averages and standard deviations for each component. Each item is put on 0 to 100 range so that the lowest and highest possible score are set at 0 and 100, respectively. Scores represent the percentage of total possible scores achieved [21,22,42]. Some authors usually refer to the QoL items do not reach the metric or values of "50" to notice the reduced values in such domains [1,6,8]· [10−16].

2.1.2. Subjective global assessment (SGA) [23].
The instrument identifies malnutrition through a combination of subjective parameters of nutritional assessment. In this study was applied the subjective global assessment form [23,26] for diagnosis of nutritional status in all patients with diabetes in hemodialysis that consists of evaluating various aspects such as the nutritional history: weight loss [41], food intake, gastrointestinal

symptoms, functional disability, comorbidity and time on hemodialysis.

The classification of this form classified nutritional status as A or well nourished (normal), B or moderate malnutrition and C or severe malnutrition. Patients were assigned a B rank if there was at least a 5% weight loss in the few weeks prior to study without stabilization or weight gain, reduction in dietary intake, and mild subcutaneous tissue loss. If the patient had considerable edema, ascites, or any mass, we consider dry weight. If the patient had a recent weight gain that did not appear to be merely fluid retention, we assign an A rank, even if the net loss was between 5% and 10%, and the patient had mild loss of subcutaneous tissue, especially if the patient noted an improvement in the other historical features of the SGA (e.g., improvement in appetite). In order to receive a C rank, the patient had to demonstrate obvious physical signs of malnutrition (severe loss of subcutaneous tissue, muscle wasting, and often some edema) in the presence of a clear and convincing pattern of ongoing weight loss. The three main aspects to consider in malnourished patients are: weight loss, loss of muscle mass and fat reduction [23][33,34].

3. Results

Overall, 81% of patients were men (n = 17) and 19% were women (n = 4). Most participants were over 55 years old, (71.4%, n = 15).

The results shows that the aspects that most affect the quality of life (see Fig. 1) are the burden of kidney disease ($\bar{x} = 47.62$, $SD = 19.17$), work status ($\bar{x} = 30.95$, $SD = 37$), cognitive function ($\bar{x} = 26.35$, $SD = 20.80$), the quality of social interaction ($\bar{x} = 19.40$, $SD = 17.2$), physical functions ($\bar{x} = 46.44$, $SD = 29.70$), physical limitations ($\bar{x} = 44.05$, $SD = 42.5$ and general health ($\bar{x} = 45.24$, $SD\ 16.92$) that did not reach the value 50 of the metric of the scales of quality of life. The characteristics that most favorably impacted the quality of life were the social support ($\bar{x} = 80.16$, $SD = 17.97$), the support of the dialysis equipment ($\bar{x} = 83.93$, $SD\ 20.59$) and the patient satisfaction ($\bar{x} = 86.51$, $SD\ 17.17$). In general, the aspects that most affected the quality of life of the patients analyzed were physical health ($\bar{x} = 36.85$, $SD\ 9.63$) in similarity with the results obtained by others similar studies that shows values below the metric of 50 as presented.

In the nutritional evaluation with SGA, we found that 66.6% (n = 14) of the patients were malnourished. In the stratification of malnutrition, we find 33.3% (n = 7) were in well-nourished or normal range (A), 47.6% (n = 10) patients classified as moderately malnourished (B) and 9% (n = 4) patients as severely malnourished (C) as presented in Fig. 2.

In the subjective nutritional assessment applied of all the patients (n: 21) and considering the three main characteristics that most affect malnourished patients, was evaluated separated weight loss, loss of muscle mass and fat reduction, finding that the percentage of severe weight loss ≥ 5% was 19.1%, of the patients, the percentage of loss of mild muscle mass corresponded to 47.62%, and the percentage of patients with reduction of the reserve of mild to moderate fat was 42.86% (see supplemental graphics 1-3).

We found the analysis of all patients in hemodialysis and the time in the substitute renal therapy (n = 21), resulted that 81% (n = 17) had less than 2 years in hemodialysis program (see Fig. 3).

Considering the analysis of the correlation of Pearson for the SF-12 physical and SF-12 mental health composites shows in Table 1, related with malnutrition was found a lineal relationship ascending from a strong positive (0.953, $p < 0.001$; 0.926, $p < 0,001$ respectively).

In this study the correlation of Pearson (see Table 1) between some variables related to quality of life and some items of nutritional status was analyzed, demonstrating a strong relationship
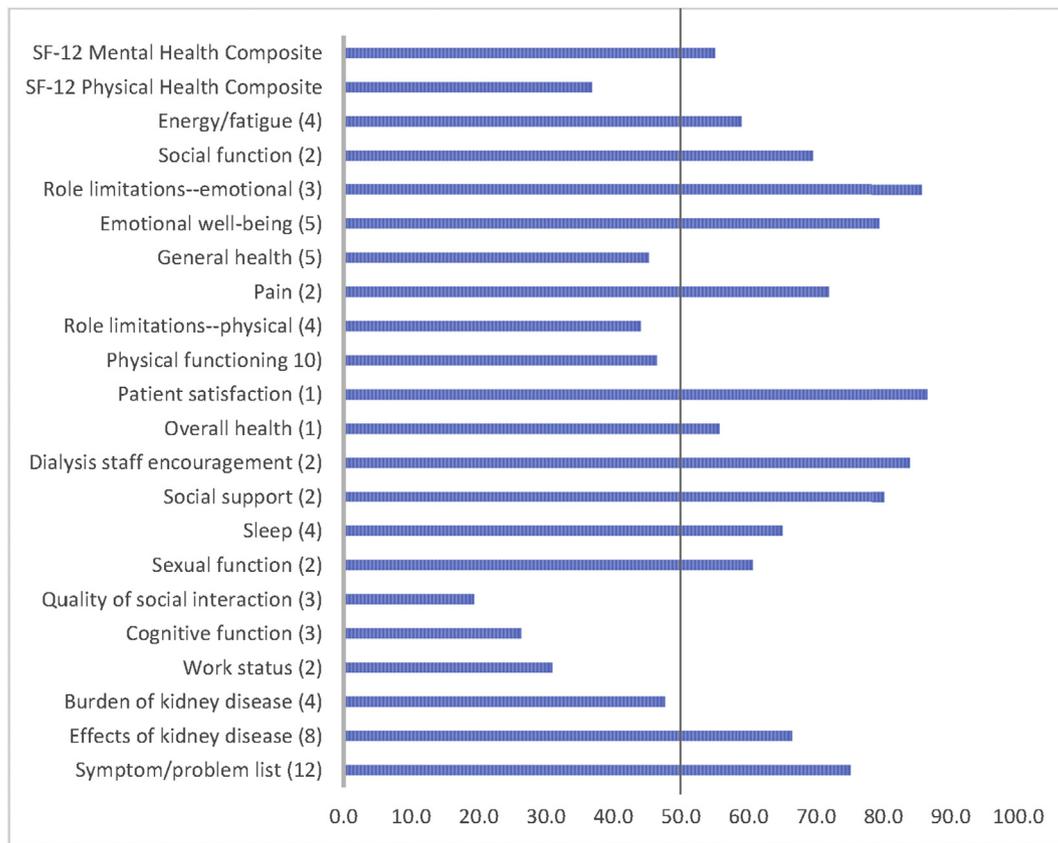
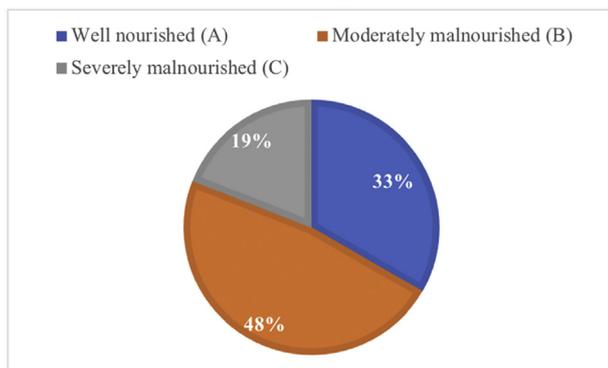**Fig. 1.** Domains of Quality of life in patients with diabetes and hemodialysis.

Fig. 2. Nutrition diagnosis in patients with diabetes and hemodialysis.

4. Discussion

The Chronic kidney disease in patients with diabetes in hemodialysis is a condition that in most of the cases has no cure and consider the quality of life in these patients is important contemplate other common factors that used to be associated such as malnutrition [25,27–29,32]. The approach of considering the domains that affect the QoL of these patients could help to obtain a more human enjoyment of life.

In the Hemodialysis department of INDEN the diabetic patients enrolled in the study and similar to others authors [6,24], 81% (n = 17) of the evaluated patients were male and the 71.34% were more than 55 years old.

In this study, in similarity with others studies [1,10,35–40], the domain of quality of life most affected were the burden of kidney disease and the mental health composite This burden is a significant risk factor for depression as we present in the background. In concordance with similar results [6] the other domains that most affected were work status, physical limitations, physical and health Composite that did not exceed the metric of 50 as others authors [14,15,24]. In contrast with some authors, we found less values of cognitive function domain, corresponding with the cognitive decline of chronic renal patients in hemodialysis [16].

The domains that obtained the highest scores were role limitations-emotional, patient satisfaction, social support as and dialysis staff encouragement, where the importance of these domains focused on feeling, the support of the family environment and the medical personnel that surrounds them, being this a column in the emotional field that favors the quality of life of these patients with chronic diseases. In concordance with others author who obtained similar results in these domains [6,17].

between weight loss correlated with comorbidities (−0.447, $p = 0.042$), dietary intake (0.539, $p = 0.012$), and emotional role (−0.573, $p = 0.007$). As well as the pain correlated with dialysis staff encouragement (0.464, $p = 0.064$), patient satisfaction (0.591, $p = 0.005$) and physical functioning (0.547, $p = 0.010$). Another analysis shows a strong correlation with energy/fatigue with physical function (0.855, $p = 0.001$), emotional wellbeing (0.460, $p = 0.036$), social function (0.606, $p = 0.031$) and overall health (0.461, $p = 0.035$). The analysis shows a strong correlation between the summary of physical health composite and energy/fatigue (0.781, $p = 0.001$), physical functioning (0.855, $p = 0.001$) and pain (0.753, $p = 0.001$).

The strongest correlations between the summary of mental health composite and emotional well-being (0.896, $p = 0.001$).
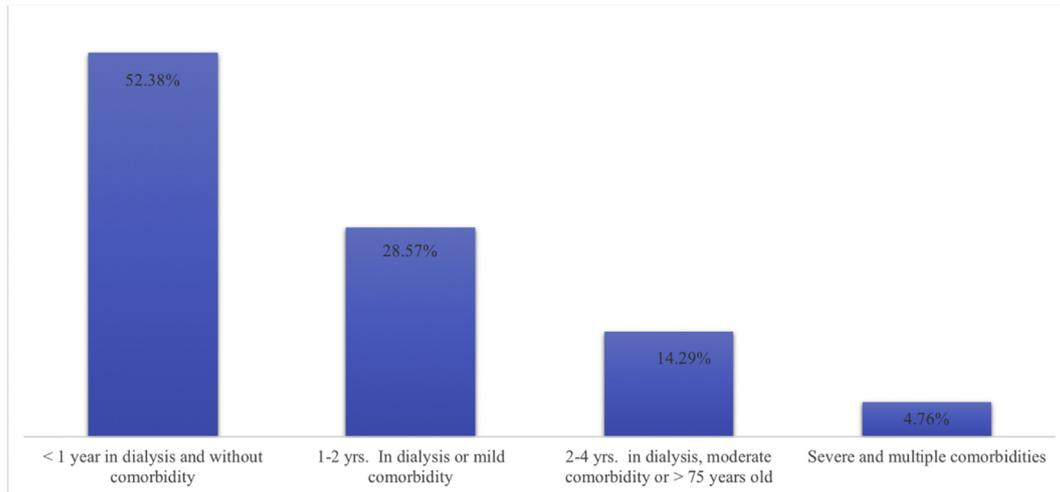
Fig. 3. Comorbidity and time on hemodialysis in diabetic patients.

Table 1
Spearman matrix correlations of Quality of Life dimensions and Nutritional Status.

	SS	DSE	OH	PS	PhF	R-Ph	P	GH	EW-B	R-E	SF	E/F	SF-12 PC
SS	.087												
DSE	.012	.037											
OH	.105	.375	.109										
PS	.019	-.051	.311	.062									
PhF	.035	.071	.111	.191	.213								
R-Ph	.549**	.320	.025	.558**	.499*	.299							
P	.059	-.022	.582**	.094	.557**	.259	.349						
GH	.269	.089	.201	.315	.271	.218	.446*	.326					
EW-B	.105	.119	-.358	-.066	-.280	.432	.080	-.014	.488*				
R-E	.036	.195	.220	.319	.389	.429	.313	.375	.505*	.165			
SF	.081	-.042	.426	.046	.873**	.271	.441*	.696**	.517*	-.043	.618**		
E/F	.221	.072	.325	.152	.864**	.496*	.636**	.584**	.224	-.112	.425	.789**	
SF-12 MC	.234	.039	.239	.137	.046	.329	.263	.387	.880**	.633**	.568**	.384	.106

Notes: *<0.05; **<0.01; *** < 0.001.
SS = Social Support; DSE = Dialysis Staff Encouragement; OH = Overall Health; PS = Patient Satisfaction; Phf = Physical Functioning; R-Ph = Role—Physical; P = Pain; GH = General Health; EW-B = Emotional Well-Being; R-E = Role—Emotional; SF = Social Function; E/F = Energy/Fatigue; SF-12 PC = Physical Composite; SF-12 MC = Mental Composite.

The evaluated patients, we observed as others reports [1,19] that malnourished patients obtained less values in the domains of physical health and mental health composite and while more is the state of malnutrition, less values in the quality of life had in the summary of these two main domains. It was evidenced in our research that they are related, determining this the importance of the initial and constant nutritional assessment of the patient with chronic kidney disease in hemodialysis and pointed that these patients evaluated had less than 2 years in the substitution of renal function program.

When we evaluate the correlation between the different aspects of subjective nutritional evaluation, we find the impact of changes in food intake in relation to weight loss and comorbidities associated with this pathology. We see the close relationship between the emotional role and the weight loss that can be a factor that leads to malnutrition, in accordance with some similar findings [19] and when it is already known that the complications associated with malnutrition can worsen the renal patient in hemodialysis as was described in similar results [20]. And also the inflammation related to malnutrition [3].

When we evaluated in a separate view the relation with physical health composite, we see how the domains of energy/fatigue, physical functioning and role, pain and general health had a linear correlation directly affecting the physical performance of patients in hemodialysis in accordance with others authors findings [4]. The correlation evaluated of the mental health composite present a linear association with physical role, emotional well-being and emotional role, what guides us is the emotional state that most affects the mental status of patients in hemodialysis with the impact on their quality of life, which guides us to focus our efforts on an improvement of these domains in the emotional sphere of the patients with this type of terminal condition [10].

Disclosures

None.

Acknowledgements

Appendix A. Supplementary data

Supplementary data to this article can be found online at https://doi.org/10.1016/j.dsx.2018.11.020.

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