Brazilian Journal of Development

Evaluation of the impact of oral health on the quality of life of patients with chronic kidney disease (CKD)

Avaliação do impacto da saúde bucal na qualidade de vida de pacientes com doença renal crônica (DRC)

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Brazilian Journal of Development

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ABSTRACT

Quality of Life (QoL) is defined by the World Health Organization (WHO) as subjective and multidimensional in nature. Studies have shown that oral condition may be a modifying factor for individuals QoL. **Objective:** To assess the impact of oral health on the QoL of patients with chronic kidney disease (CKD) in hemodialysis. **Methods:** The present control-case study selected one hundred patients with CKD in hemodialysis, who were paired with one hundred control patients. General QoL and the impact of the oral health on QoL were evaluated through the Short Form Health Survey (SF-36) and the Oral Health Impact Profile-14 (OHIP-14), respectively. **Results:** The mean OHIP-14 for the control group was 6.06 (± 7.44) and 4.67 (± 6.52) for the CKD group. No statistically significant difference was observed between groups. **Conclusions:** Oral health had a low impact on the QoL of patients in the CKD group. A conception of multidisciplinary care in this group of patients may represent an increase not only in the treatment of the primary disease, but also in the general QoL of these patients.

Keywords: Quality of life. Oral health impact. Chronic Kidney Disease.

RESUMO

Qualidade de Vida (QV) é definida pela Organização Mundial da Saúde (OMS) como de natureza subjetiva e multidimensional. Estudos demonstraram que a condição bucal pode ser um fator modificador para a QV dos indivíduos. Objetivo: Avaliar o impacto da saúde bucal na QV de pacientes com doença renal crônica (DRC) em hemodiálise. Métodos: O presente estudo de caso de controle selecionou cem pacientes com DRC em hemodiálise, que foram pareados com cem pacientes controle. A QV geral e o impacto da saúde bucal na QV foram avaliados por meio do Short Form Health Survey (SF-36) e do Oral Health Impact Profile-14 (OHIP-14), respectivamente. Resultados: A OHIP-14 média para o grupo controle foi de 6,06 (± 7,44) e 4,67 (± 6,52) para o grupo com DRC. Não houve diferença estatisticamente significante entre os grupos. Conclusões: A saúde bucal teve baixo impacto na QV dos pacientes do grupo com DRC. Uma concepção de atendimento multidisciplinar nesse grupo de pacientes pode representar um aumento não apenas no tratamento da doença primária, mas também na QV geral desses pacientes.

Brazilian Journal of Development

1 INTRODUCTION

Quality of Life (QoL) is defined by the World Health Organization (WHO) as subjective and multidimensional in nature because it is influenced by several factors, such as individual perception of social, psychological and physical aspects, including the general health condition of the individual.

Studies have shown that being a carrier of a chronic disease may be enough to cause a significant deficit in QoL. Among the chronic disorders that may influence the QoL, there is chronic kidney disease (CKD), which is characterized by injury to the renal parenchyma and / or progressive reduction in renal function over a period greater than or equal to 3 months. Most forms of CKD are irreversible, progressive and composed of five stages which characterize its evolution (I, II, III, IV and V). The last stage of CKD (Stage V) corresponds to the terminal stage, in which there is a need for renal replacement therapy (hemodialysis). According to Khalil et al. (2017), this disease has become a global health problem affecting 10% of the adult population.

In addition, QoL can be influenced by oral health conditions. In this sense, in recent years the impact of oral health has been much studied and has gained importance in the literature. Oral condition can affect the communication, feeding, self-esteem, aesthetic and daily activities of individuals. Recent studies show that oral health can also act as a modifying factor for systemic conditions. Among the systemic conditions associated with oral health are chronic diseases such as diabetes, respiratory diseases, neurodegenerative diseases and CKD. In this way, instruments on QoL have been used for clinical evaluation in several diseases as a way to predict the progression of the disabilities they generate. The assessment of health-related QoL is essential for an assessment of the influence of health conditions and the impact of different treatments.

Currently, few studies assess QoL in patients with CKD on hemodialysis, and there is a shortage of studies that assess the direct influence of the impact (self-perception) of the oral condition on QoL in this specific population. Thus, the present study aims to evaluate the impact of oral health on QoL in patients with CKD in the terminal stage (Stage V) in dialysis treatment.

2 METHODS

This research was conducted in Hemodialysis Service of Hospital Santa Casa de Misericordia of Ponta Grossa (SCMPG) and was approved by the Research Ethics Committee of the State University of Ponta Grossa – UEPG (Ponta Grossa/Paraná – Brazil) under the number 1.616.409. The project was authorized by the core education and research of the SCMPG under the number 481/2015.

Brazilian Journal of Development

2.1 EXPERIMENTAL DESIGN, PAIRING, INCLUSION AND EXCLUSION CRITERIA

This was an observational and cross-sectional study conducted in 2017 for 3 months (January, February and March) with two paired groups: 1) the CKD group (n = 100 participants) and 2) the control group (n = 100 participants). The inclusion criteria for the participants were age $\geq$ 18 years, both genders and diagnosis of CKD. Exclusion criteria included cognitive impairment that impaired understanding, severe motor incapacity and clinical instability.

The control group was formed of individuals without a diagnosis of CKD and respecting all other inclusion and exclusion criteria.

Both groups were paired by gender, age and number of teeth.

2.2 QUESTIONNAIRES USED IN THE STUDY

Demographic and educational data were obtained in a form specifically designed for the research and included name, age, sex, address and education level (classified as Illiterate/incomplete primary, complete primary/elementary incomplete, complete elementary/incomplete high school, complete high school/incomplete college, undergraduate degree). The classification of socioeconomic condition followed the criteria of the Brazilian Association of Research Companies, resulting in the assignment of the following economic classes: A1, A2, B1, B2, C, D and E.

The evaluation of the general QoL was performed using the SF-36 questionnaire (Medical Outcomes Study 36-Item Short Form Health Survey). The evaluation of the impact of oral health on QoL was assessed using the OHIP-14 questionnaire (Oral Health Impact Profile-Short Form).

2.3 DATA ANALYSIS

The results were submitted to an exploratory analysis using BIOESTAT 5.01 software to determine the best statistical analysis of the data, adopting a significance level of 5% (α = 0.05). The groups were matched by t-student and chi-square tests. To compare the groups with respect to OHIP-14 and SF-36, the Mann–Whitney statistical test was used. Spearman's correlation was used to analyze OHIP-14 and dental characteristics (brushing, number of teeth and time of last visit to the dentist). The Cronbach's alpha coefficient (α) was used to evaluate the internal consistency of the questionnaires through the MedCalc software (version 16.8.4).

3 RESULTS

Two hundred subjects, of which 100 were assigned to the control group and 100 were assigned to the CKD group, underwent structured interviews. The groups were paired according to age, gender and number of teeth. The mean age of the volunteers in the control group was 54.93 ± 12.91 and in the disease group was 55.18 ± 13.02. In both groups, 51% were women and 49% were men. The

Brazilian Journal of Development

mean number of teeth for the control and disease groups was 12.03 ± 10.60 and 14.03 ± 10.76, respectively.

The education level of both groups was mainly "primary school level incomplete," with a predominance of socioeconomic "C". Most of the sample group had fewer than 20 teeth: 73% in the control group and 61% of the CKD group, respectively. Evaluation of dental habits indicated that more than half of the volunteers went more than one year without visiting a dentist (69% in the control group and 54% in the CKD group). The vast majority reported a tooth-brushing frequency of three times per day. A complete description of the demographic data and dental habits can be found in Table 1.

TABLE 01 – GENERAL CHARACTERISTICS OF THE STUDY POPULATION

	CONTROL GROUP n (%)	CKD GROUP n (%)
Demografic Data		
Age		
≤ 60 years	61 (61%)	62 (62%)
> 60 years	39 (39%)	38 (38%)
Gender		
Female	51 (51%)	51 (51%)
Male	49 (49%)	49 (49%)
Educacional Level		
Illiterate/ Incomplete primary	26 (26%)	29 (29%)
Complete primary/ Incomplete elementary	34 (34%)	28 (28%)
Complete elementary/Incomplete high school	12 (12%)	15 (15%)
Complete high school/ Incomplete college	23 (23%)	19 (19%)
Undergraduate degree	5 (5%)	9 (%)
Socioeconomic condition		
A1	0 (0%)	(0%)
A2	1 (1%)	3 (3%)
B1	0 (0%)	5 (5%)
B2	13 (13%)	16 (16%)
C	57 (57%)	55 (55%)
D	26 (26%)	21 (21%)

	CONTROL GROUP	CKD GROUP
E	3 (3%)	0 (0%)
Dental habits		
Last visit to the dentist		
< 1 years	31 (31%)	46 (46%)
> 1 years	69 (69%)	54 (54%)
Number of teeth		
< 20 teeth	73 (73%)	61 (61%)
≥ 20 teeth	27 (27%)	39 (39%)
Toothbrushes/ day		
0	3 (3%)	1 (1%)
1	10 (10%)	9 (9%)
2	25 (25%)	23 (23%)
3	50 (50%)	59 (59%)
4	11 (11%)	5 (5%)
5	1 (1%)	2 (2%)

The analysis of the OHIP-14 scores between the control and CKD groups did not show statistically significant differences between groups (Table 2). Analysis of the SF-36 questionnaire showed lower general QoL was observed in the CKD group in the internal domains "functional barrier" and "physically limited." On the other hand, lower general QoL was observed in the control group in the internal domain "limitation by emotional aspects" (Table 2).

TABLE 02 – COMPARISION OF OHIP-14 AND SF-36 QUESTIONNAIRES BETWEEN CKD AND CONTROL GROUPS

		CONTROL GROUP ($\overline{x} \pm$ sd)	CKD GROUP ($\overline{x} \pm$ sd)	*Valor de p*
OHIP-14				
Total Sum		6,06 (± 7,44)	4,67 (± 6,52)	0,2209
OHIP-14 Domains	FL	0,98 (± 1,63)	0,72 (± 1,42)	0,2726
	PP	1,72 (± 1,84)	1,30 (± 1,80)	0,0515
	PDF	1,30 (± 1,88)	1,19 (± 1,95)	0,5470
	PDT	0,56 (± 1,22)	0,37 (± 1,05)	0,3831
	MD	0,97 (± 1,86)	0,76 (± 1,37)	0,9571
	SD	0,16 (± 0,58)	0,02 (±0,20)	0,3296
	H	0,37 (± 1,09)	0,31 (± 0,84)	0,9854

Brazilian Journal of Development

SF-36				
	PF	73,52 (± 23,02)	55,60 (± 30,15)	0,0001*
	RF	65,75 (± 39,03)	52,00 (± 41,23)	0,0194*
	BP	57,15 (± 28,81)	58,25 (± 29,93)	0,8863
SF-36 Domains	GH	48,86 (± 19,59)	52,22 (± 21,02)	0,2168
	VIT	64,91 (± 21,86)	61,40 (± 25,43)	0,4473
	SF	84,68 (±25,73)	79,62 (± 27,15)	0,1317
	RE	70,03 (±39,41)	80,00 (± 37,90)	0,0428*
	MH	66,40 (± 22,53)	68,36 (± 20,81)	0,6036

* indicates statistically significant difference, p< 0,05. Mann-Whitney test.
$\bar{x}$ *:: mean; sd: standart deviation; FL: functional limitation; PP: phyical pain; PDF: psycological discomfort; PDT: physical disability; MD: mental disability; SD: social disability; H: handicap; PF: physical functioning; RF: role physical; BP: bodility pain; GH: general health; VIT: Vitality; SF: social functioning; RE: role emotional; MH: mental health.*

The degree of relationship between dental characteristics (tooth brushing, number of teeth and visits to the dentist) and OHIP-14 questionnaire values (total and domain) (Table 3) showed a weak negative correlation between the total OHIP-14 mean, brushing and dentist visits. Was found a weak negative correlation in domains of psychological incapacity and disability and the number of brushings. Also, a weak negative correlation the physical disability and psychological incapacity domains and the time of the last visit to the dentist.

TABLE 03 – SPEARMAN´S CORRELATION BETWEEN DENTAL HABITS AND OHIP-14 QUESTIONNAIRE

		TOOTHBRUSHES (r^2 / *p value*)	NUMBER OF TEETH (r^2 / *p value*)	VISITS TO THE DENTIST (r^2 / *p value*)
OHIP-14				
	TOTAL SUM	-0,2063/ 0,0393*	0,0297/0,7695	-0,2572 / 0,0097*
OHIP-14 Domains	FL	-0,1644/ 0,1020	-0,0315/ 0,7553	-0,1028 / 0,3087
	PP	- 0,1463/ 0,1463	-0,1115/ 0,2692	-0,1939 / 0,0531
	PDF	-0,0907/ 0,3696	0,1134/0,2610	-0,1899 / 0,0583
	PDT	-0,1195/ 0,2364	-0,0895/0,3760	-0,2040 / 0,0417*

Brazilian Journal of Development

MD	-0,2179/ 0,0294*	0,0729/ 0,4707	-0,3023 / 0,0022*
SD	-0,1122/ 0,2662	-0,0368/ 0,7162	-0,0928 / 0,3586
H	-0,2063/ 0,0393*	-0,0935/ 0,3547	-0,1646 / 0,1017

Spearman´s Correlation.
r^2*: Coefficient od Spearman Correlation; FL: functional limitation; PP: phyical pain; PDF: psycological discomfort; PDT: physical disability; MD: mental disability; SD: social disability; H: handicap.*

The internal reliability of the questionnaires was evaluated using Cronbach's coefficient alpha (α). The minimum acceptable value to consider a reliable questionnaire is 0.70. In the present study, all α had results ≥ 0.80. All, therefore, were considered to have high internal consistency.

4 DISCUSSION

CKD is an irreversible and progressive condition and is considered a global health problem. The objective of treatment is to replace renal function and improve QoL. The authors demonstrated that oral condition can influence the QoL of patients with chronic diseases once communication, self-esteem and daily life activities are affected.

In the present study, when comparing the control and CKD groups paired by age, gender and number of teeth, the results showed a low impact of oral health on QoL. The results of the present study were contrary to findings in the literature, which pointed to a high impact of oral condition on the QoL of individuals with chronic diseases (e.g., diabetes mellitus, respiratory diseases, neurodegenerative diseases and CKD).

Our results, different from those found in the literature and what we expected, can be explained by the presence of a multidisciplinary team in the HSCMPG hemodialysis service. This was not mentioned in previous studies. The multidisciplinary team, comprising a social worker, nurse, psychologist, physician and nutritionist, is responsible for assessing patients' needs, including self-reported dental complaints, and conducting referrals to specialized services. This is an interesting accidental discovery that the number of participants reporting that their last visit to the dentist was less than 1 year ago was higher in the CKD group (46%) than in the control group (31%). This data can also be a reflection of multidisciplinary care.

The relationship between dental characteristics (tooth brushing, number of teeth and visits to the dentist) and the values of the OHIP-14 questionnaire (total sum and domain) showed a weak negative correlation between the total OHIP-14 mean and brushing and visits to the dentist. This is

Brazilian Journal of Development

similar to the correlation proposed by Pakpour et al. (2016), who observed that irregular tooth brushing habits had lower values of QoL related to oral health.

In addition, the present study evaluated the general QoL of patients with CKD using the SF-36 questionnaire. In this study, the CKD group had the worst scores for the two domains "functional capacity" and "limitation by physical aspects." These results corroborate findings in the literature, which observed that CKD causes changes in the individual's daily life and creates limitations, impacting poor scores in the domains related to functional capacity and limitation by physical aspects.

As a limitation of the present study, we highlight the non-accomplishment of a clinical examination to obtain dental parameters, which could be used as additional data the self-perception of oral health in the discussion of the present results. This limitation occurred because the study site did not have the infrastructure and professionals to perform this dental care during the project execution period. However, the implementation of this project guided the implementation of new public policies on oral health at the study site and influenced the addition of a dentist to the active multidisciplinary team, implying the improvement of intervention actions and prevention of the pathological condition of the individual.

Based on the results described, it can be concluded that, in patients with CKD on hemodialysis, oral health has a low impact on QoL. In addition, it was observed that the lower the number of toothbrushes and the fewer visits to the dentist, the greater the value of OHIP-14 and, consequently, the greater the impact of oral health on QoL. In addition, our results indicate that CKD patients have worse QoL in the internal domains of functional capacity and limitation by physical aspects.

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Brazilian Journal of Development

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