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Self-perception of oral health among tertiary-care users: quanti-qualitative analysis with chronic kidney disease patients

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ABSTRACT. Chronic kidney disease (CKD) has become a global public health challenge. The objective of this study was to analyze the relationship between self-perception of oral health and clinical condition among patients with CKD. This is a quanti-qualitative survey conducted in a CKD specialized service. The sample consisted of 60 patients who underwent oral examinations to have their severity of caries (DMFT) and need for dental prosthesis checked. Age, sex, time on dialysis, marital status, skin color, education and pre-existing diseases were also analyzed. Among the kidney patients who agreed to undergo the clinical examinations and showed communication skills, some were selected, and three focus groups were created, with the participation of a moderator and six to 10 kidney patients in each group. Their speeches were processed in the IRAMUTEQ software and analyzed through the similarity analysis and word cloud techniques. As for profile, the patients were aged 60.23 ± 10.87 years old; were male (73.33%); were on dialysis for 41.90 ± 56.57 months; were married (61.67%); were white (76.67%); had incomplete primary education (41.66%); had arterial hypertension (76.67%); had a DMFT index of 22.55 ± 8.39; 43.33% needed an upper complete denture; and 30.00% needed a lower complete denture. The similarity analysis revealed many doubts and uncertainties about current health services, which can be proven by the words 'no' and 'treatment'. The quanti-qualitative analysis showed a high rate of dental loss and the need for complete dentures and suggests inequities in oral health care for chronic kidney disease patients, especially in tertiary care. There was a positive representation regarding oral health, but the lexicographical analyses of the textual *corpus* confirmed the self-perception of lack of dental care.

Keywords: oral health; qualitative research; renal insufficiency, chronic.

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Introduction

Chronic kidney disease (CKD) is considered a public health problem worldwide, as it has a negative impact on the life expectancy and quality of life of kidney patients and demands a significant amount of resources allocated to health (Crestani Filho, & Rodrigues, 2013). In Brazil, this situation is no different, and the prevalence and incidence of dialysis patients rose considerably between 2016 and 2018 (Neves, Sesso, Thomé, Lugon, & Nascimento, 2021).

CKD can cause systemic changes, such as cardiovascular and hemostatic problems, anemia and lymphocytopenia (Stein & Wild, 2002), and can be as well a consequence of these changes in patients with the pathology.

CKD, when affecting systemic functions, also impacts the oral health of these patients, with special action on periodontal tissues. In addition, periodontal disease (PD) is capable of impairing renal function (Sapata, Corrêa, Anjos Neto-Filho, Marson, & Oliveira e Silva, 2014), characterizing a possible bidirectional relationship between CKD and PD (Mana et al., 2013).

The presence of caries, endodontic lesions, abscesses, periodontal disease, pericoronitis, mucositis and peri-implantitis serve as a site for microorganisms to reach the bloodstream and can cause a worse morbidity and mortality potential in chronic kidney patients undergoing hemodialysis (Brunetti, 2004). Therefore, the importance of oral health care in the management of patients with systemic diseases, including CKD, is of great relevance (Oyetola, Owotade, Agbelusi, Fatusi, & Sanusi, 2015).

The few studies in the literature on CKD risk factors and the oral condition of kidney patients present only epidemiological data (Souza et al., 2008; Lacerda, Viana, Dores, Bessa-Nogueira, & Ribeiro, 2015), without assessing the level of knowledge and perceptions that these patients have about the importance of oral health in their lives (Valadares, Oliveira, Parente, & Cavaleiro, 2013).

Epidemiological indicators are important for the planning, organization and monitoring of health services (World Health Organization [WHO], 2013), but they can be restricted to the professional view, as they produce unique, numerical and objective data. They can be assigned other meanings when combined with assessments of perceptions and social representations given by the individuals themselves about their oral conditions, especially when they consider people's behavior and associate quantitative and qualitative approaches (Haikal, Paula, Martins, Moreira, & Ferreira, 2011).

Seeking a better understanding of the factors that permeate the perceptions and meanings of oral health for chronic kidney patients (CKPs), and assuming that qualitative research deals with the subjective level of social reality by appropriating the experiences, motives, beliefs and values externalized by social actors (Minayo, 2013), a quanti-qualitative approach was used in this study.

Given the need to build comprehensive health services that can ensure adequate care for CKPs, studies that assess the relationship between the perceptions and oral condition of these patients are imperative. The objective of this study was to analyze the relationship between self-perception of oral health and clinical condition among patients with CKD.

Material and method

Population

The study sample consisted of 60 users of the Tertiary Care of the Brazilian Unified Health System (kidney patients) aged 38 to 74 years old, of both sexes, and undergoing treatment in a CKD-specialized service in a municipality in the South of Brazil. Kidney patients on dialysis who agreed to participate in the interviews and clinical examinations and who showed communication skills were included in the survey. The exclusion criteria were: having any cognitive impairment that would make it difficult for them to participate in the focus group, and/or being a kidney transplant patient, since, to undergo kidney transplantation, the patient must present an oral condition without foci of dental infections, and dental treatments during the first six months after the transplant are not recommended (Gudapati, Ahmed, & Rada, 2002).

Data collection

Data were collected in 2018 in two moments. First, six to ten patients per focus group were selected, and three groups were created for interviews that lasted 40 to 60 minutes, with the participation of a researcher/moderator, an observer, and the kidney patients distributed in teams (Trad, 2009), so that the interview, through the focus group technique, would not be influenced by clinical examinations.

At the beginning of the meeting with each group of kidney patients, some instructions were adopted for the use and standardization of the focus group technique: presentation of the moderator and observer; explanation of the objectives and importance of the research; request for permission to record the speeches; clarification on the importance of the participation of all members of the group, and in an organized manner; delimitation of the minimum and maximum meeting length; distribution of a sequential number to the participants to preserve their identities and guarantee their anonymity (Moimaz, Amaral, Miotto, Costa, & Garbin, 2016).

To use the technique, the first researcher of the study conducted the interview guided by a script with topics, in order to allow free speech, to provide a structure for the conversation, and to reveal the meanings and perceptions of the CKPs about their oral health. Throughout the meeting, the moderator sought to keep the interview guided by the objectives of the research. The speeches were recorded on an audio recorder and, to end the interviews, the theoretical saturation criterion was used, that is, when the speeches with new participants were collected, and the interviews started to present frequent repetitions as to content (Turato, 2003).

Five guiding questions and several complements were applied to the focus group: 1) Do you have, or have you had dental pain? 1.1) How long ago? 1.2) Where have you get treatment? 1.3) For how long have you

had/have you been with this pain? 1.4) Has dental pain interfered with your life? 2) Do you currently undergo any dental treatment? 2.1) If not, why? 2.2) If yes, how was it? 3) Do you think your oral health is important? 3.1) What about that of your family members? 3.2) How do you think your oral condition is? 4) Do you think kidney disease is related to oral health? 4.1) Does dialysis treatment interfere with your oral condition? 4.2) And the medications you take, do they cause any problems or discomfort? 5) Does your current condition interfere with your access to dental services? 5.1) What would a good treatment be? 5.2) Where would this service be provided? 5.3) Have you ever received this type of treatment in any public or private place? After the end of the meeting of each group, the speeches were transcribed in full, on the day right after the interviews.

At a later date, all 60 patients underwent clinical oral examinations in a spacious environment, in a service room specifically designed for chronic kidney disease, with good natural lighting, complemented, when necessary, with a portable flashlight, and with the examinees seated and the examiner standing. The latter wore a mask and gloves and used a WHO millimeter probe (WHO, 2013) and a flat mouth mirror, previously sterilized, following all biosafety standards.

The examination team was composed of an examiner (the first author) and a note taker (a graduate Dentistry student), in accordance with the classification criteria recommended by the World Health Organization (WHO, 2013) in its fifth version of the Oral Health Surveys, Basics Methods. In this study, data related to severity of caries (DMFT) and need for dental prosthesis were considered.

The DMFT index indicates one's previous and current history of dental caries, and its calculation establishes the average number of decayed, missing or filled teeth.

Data processing and analysis

For qualitative analysis, the textual *corpus* of the focus groups was processed in the IRAMUTEQ software, version 0.7, and analyzed using the similarity analysis and word cloud techniques.

The *Interface de R pour les Analyses Multidimensionnelles de Textes et de Questionnaires* (IRAMUTEQ), free software that is anchored in the R programming language, was used in the research because it allows processing and statistically analyzing several textual corpuses (Ratinaud, 2009).

This software runs different types of analysis in textual sets, from the simplest (frequency, means and word cloud), known as lexical analyses, to the most complex ones, called multivariate analyses (descending hierarchical classification and similarity analysis) (Lebart & Salem, 1994).

To perform classic textual statistics, IRAMUTEQ scales and reformats a set of texts or Initial Context Units (ICUs) into text segments or Elementary Context Units (ECUs).

Word cloud is a type of lexical analysis that uses a graphic representation based on the frequency of words and allows its immediate visual identification through a figure generated by IRAMUTEQ (Camargo & Justo, 2013).

After the textual content of the focus groups was processed, the frequencies of words in the *corpus* of the text were calculated (quantitative approach), and the set of characteristics in a given fragment of the content was considered (qualitative approach) (Bardin, 2011). The interpretive analysis of said *corpus* used content analysis, as the latter is quanti-qualitative.

Ethical aspects

This study was approved by the Research Ethics Committee of Paraná's Cesumar University [*Universidade Cesumar*] (UniCesumar), Paraná, Brazil, in accordance with legal opinion No 1.672.905/2016, and is in compliance with Resolution 466/2012 of the National Health Council.

Results and discussion

In this study on oral health and CKD, out of the 60 kidney patients assessed, 25 (41.67%) were between 50 and 59 years of age, and 44 (73.33%) were male. Dialysis time ranged from two to 386 months, confirming a higher prevalence of patients with up to 48 months on dialysis treatment (75%). Of the total number of patients, 61.67% were married, 41.66% had incomplete primary education and presented as main pre-existing diseases arterial hypertension (76.67%) and diabetes *mellitus* (73.33%) (Table 1).

Table 1. Epidemiological characterization of CKD patients (n=60). South Region, Brazil, 2018.

Variables	Descriptive Statistics
Age (years)	34 - 79
Mean ± Standard Deviation	60.23 ± 10.87
Age range	n (%)
34 - 49 years	08 (13.33)
50 - 59 years	25 (41.67)
60 - 69 years	13 (21.67)
70 - 79 years	14 (23.33)
Sex	n (%)
Female	16 (26.67)
Male	44 (73.33)
Dialysis time (months)	02 - 386
Mean ± Standard Deviation	41.90 ± 56.57
Up to 48 months	45 (75.00)
Over 48 months	15 (25.00)
Marital Status	n (%)
Married	37 (61.67)
Divorced	03 (5.00)
Single	12 (20.00)
Widower	08 (13.33)
Skin Color	n (%)
Yellow	02 (3.33)
White	46 (76.67)
Black	06 (10.00)
Brown	06 (10.00)
Scolarity	n (%)
Unlettered	12 (20.00)
Incomplete Primary	25 (41.66)
Complete Primary	06 (10.00)
Incomplete High School	03 (5.00)
Complete High School	10 (16.67)
University Education	04 (6.67)
Pre-existing Diseases	n (%)
Diabetes M*ellitus*	44 (73.33)
Epilepsy	01 (1.67)
Rheumatic Fever	02 (3.33)
Arterial Hypertension	46 (76.67)
Heart Problems	19 (31.67)
Gastric Problems	06 (10.00)
Breathing Problems	05 (8.33)
Neurological Problems	03 (5.00)
Rheumatism	02 (3.33)

CKD: chronic kidney disease.

In 2019, the Brazilian chronic dialysis survey showed that 58.0% of patients were male and aged between 20 and 64 years old (63.3%). As for the underlying diseases found in kidney patients, hypertensive nephropathy (34.0%) and diabetes (32.0%) were the most common pathologies found in primary kidney disease. This report shows a trend towards a general increase in the number of patients on hemodialysis, and in the incidence and prevalence of treatment, especially considering the last years until 2018 (Neves et al., 2021), which may explain the different rates found in the present research.

A poor dental condition was observed among the kidney patients, with 0.86 ± 1.59 of the component decayed; 18.20 ± 10.99 of the component missing, with 80.71% of representation in the DMFT index, and 17 (28.33%) fully edentulous volunteers; 3.49 ± 4.63 of the component filled; while 28 patients (46.67%) had no restored teeth (Table 2). These findings are consistent with those reported in other national studies with CKD (Souza et al., 2008; Lacerda et al., 2015).

The average number of teeth affected by caries (DMFT) in this study was 22.55 ± 8.39 (Table 2) and corroborates the results of another study carried out in the state of Paraná, with 286 patients, which detected a DMFT of 20.7 (Souza et al., 2008). Another survey conducted in the state of Alagoas showed that the average number of teeth affected by caries was 17.9 (Lacerda et al., 2015). That study included 83 individuals on dialysis, with an average age of 42.9 ± 12.8 years old, which may explain a smaller number of decayed, missing or filled teeth.

Table 2. Characterization of the dental condition of CKD patients (n = 60). South Region, Brazil, 2018.

Variables	Descriptive Statistics
DMFT	Mean ± Standard Deviation
	22.55 ± 8.39
Components	
Decayed	Mean ± Standard Deviation
	0.86 ± 1.59
Missing	Mean ± Standard Deviation
	18.20 ± 10.99
Filled	Mean ± Standard Deviation
	3.49 ±4.63
Upper Prosthesis Need	n (%)
No prosthesis needed	07 (11.67)
Need for one-unit prosthesis	10 (16.67)
Need for multi-unit prosthesis	05 (8.33)
Need for a combination of prostheses	12 (20.00)
Need for full prosthesis	26 (43.33)
Lower Prosthesis Need	n (%)
No prosthesis needed	07 (11.67)
Need for one-unit prosthesis	08 (13.33)
Need for multi-unit prosthesis	10 (16.67)
Need for a combination of prostheses	17 (28.33)
Need for full prosthesis	18 (30.00)

CKD: chronic kidney disease.

The high prevalence of edentulous people and the need for upper and lower complete dentures in patients with CKD (Table 2), 43.33, 30.00%, respectively, correlates with their high rate of illiteracy and incomplete primary education, and may even indicate the absence of adequate dental care for these individuals. Likewise, Lacerda et al. (2015) refute that the high rates of caries in the dialysis population are caused by the little care offered to this group, as only 23% of them sought assistance in 2015. This percentage confirms the results described by Bastos et al. (2011), in which only 30% of nephrology professionals refer their patients to dental treatment.

Few studies have evidenced the relationship between oral conditions and self-perception among kidney patients (Valadares et al., 2013; Andrade et al., 2017). CKPs, in general, present many dental losses and needs for prosthetic rehabilitation, which characterizes an unfavorable oral condition; qualitative methodologies can be used for a greater understanding of this multidimensional process and be complemented by the analysis of the self-perception of patients with CKD.

The analysis of the *corpus* "Chronic kidney patients' view on oral health", from the transcription of the 18 participants of the focus groups, found 1,277 different words, 256 initial context segments, and, of these, 213, that is, 83.2% of the total, were matched by means of descending hierarchical classifications into elementary context units, of different sizes, indicating the degree of similarity and distortions in the vocabulary of the theme assessed. Below is an interpretive analysis in the context of the application of the similarity analysis technique and word cloud to the textual *corpus*.

Similarity analysis

The similarity analysis anchored in the theory of co-occurrences allowed identifying the connection between the words in the graphic representation, and its result shows, through their frequency, a greater prominence and respective contribution to form trees of similarities among the words (Marchand & Ratinaud, 2012).

Figure 1 displays a semantic range among the most frequent words: 'tooth' and 'treatment'.

Analyzing the similarity tree, it is possible to observe the relationship among these words and the relevance of oral health for kidney patients through statements such as:

> [...] the health of the mouth is very important, and our teeth should come first, so if you can't have your teeth, you have to change them or become toothless (CKP 8).
> [...] the teeth are important to all of us, regardless of our health condition, and have many functions in our lives (CKP 6).
> [...] teeth are essential for social interaction and the relationships with the people we live with (CKP 11).
> [...] teeth are necessary for talking, chewing and smiling, and they need treatment for our life, and even when we have other worse diseases (CKP 3).

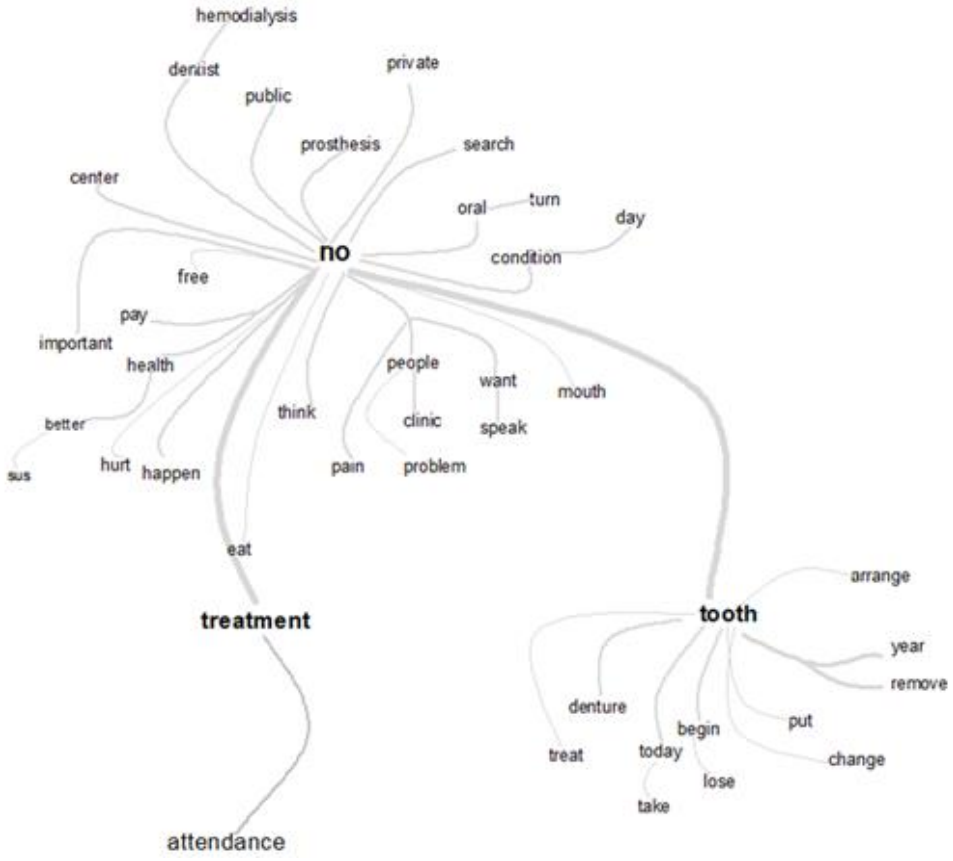

Figure 1. Similarity analysis – "Chronic kidney patients' view on oral health". South region (Brazil, 2018).

Chronic kidney disease remains a prevalent public health problem that disproportionately affects minorities and individuals with worse socioeconomic conditions, despite intense efforts to control traditional risk factors (Grubbs et al., 2017). And from the previous speeches presented, the importance of access to dental care to meet the social needs referred to in this research is considered, which go beyond the biological factor of the dental element.

The relevance of oral health care in the management of patients with systemic diseases, including chronic kidney disease, has been reported in the literature. Many CKD patients have different oral infections, but there has been a lack of attention to oral care, especially in developing countries and those with a large increase in CKD incidence (Oyetola et al., 2015).

The similarity analysis still shows many doubts and uncertainties about public health services, which can be proven by the words 'no' and 'treatment', which emerged 277 and 73 times, respectively, in the research *corpus*.

Lack of access to dental treatment affects the principles of integrality, universality and equity of the Brazilian health system (Mattos, 2006), which coincides with the report "I don't seek dental treatment because of money. This is the biggest problem, a little because I'm afraid of the dentist, and another problem that makes me put it off it's because there is no service for kidney patients" (CKP 4), which reveals an image of inequity in the Brazilian Unified Health System. Similarly, still according to Mattos (2006), a remedial health system must offer answers to the different population groups affected by different chronic diseases.

According to Ordinance No. 1.675 of the Brazilian Ministry of Health (Brasil, 2018), the minimum team for care in a unit specialized in chronic kidney disease is composed of: nephrologist, nurse, nutritionist, psychologist and social worker. It would be important to include a dental surgeon in this multidisciplinary team, as clinical dental examinations, treatments for oral infections, and preventive procedures for many affections could be performed. It should be emphasized that, according to the results of the present study, such addition is essential for the oral health of kidney patients to be valued.

The patients reported that the large amount of time they spend having their kidney disease treated, in many cases, for three or more days a week, is an impediment to them seeking dental treatment, which can be seen in the following reports: "I spend more than eight hours between going to and being in dialysis sessions

every day, so how am I supposed to get my teeth treated? I can't get treatment anywhere" (CKP 14), "Over the week, I don't have any time left to treat my teeth and can't get this treatment in my city either" (CKP 16).

Word cloud

In accordance with the word cloud method, and through a visual representation generated by the software, based on the occurrence of words (Moura et al., 2014), those words that obtained relative frequency were: 'pain', 'health', 'mouth', 'denture' and 'prosthesis', which appeared 54, 38, 27, 25 and 21 times in the transcript of the research *corpus* (Figure 2).

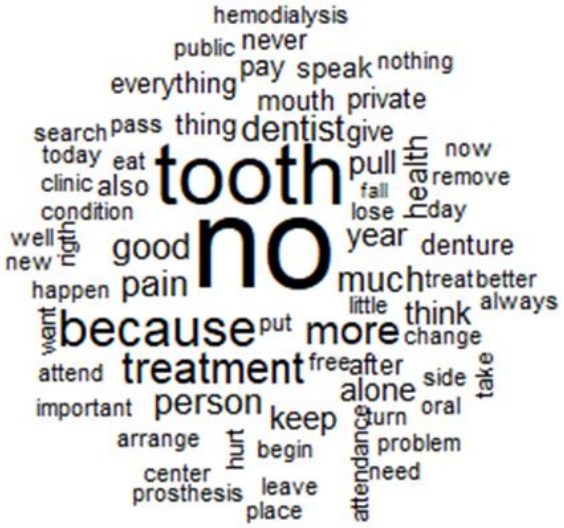

Figure 2. Word cloud – "Chronic kidney patients' view on oral health". South region (Brazil, 2018).

Ferreira, Piuvezam, Werner, & Alves (2006) argue in their study conducted with a low-income population in northeast Brazil that there is a negative perception of oral condition, which is strongly linked to their experience of pain and dental losses. In this context, elderly people aged 80 years or more reported self-perception of dry mouth, difficulties to eat, and seeking less routine dental appointments over the years (Pauli, Figueiredo, Barbosa, Castro, & Mello, 2018). However, this research found a positive representation of oral health, which can be observed in several of the kidney patients' speeches, such as:

> [...] I think that, in the first place, comes the health of the mouth, because what's the use of having a healthy body, if you don't have oral health, so you'll have your teeth all rotten or no teeth at all, and you'll continue to be sick (CKP 5).
> [...] look, I'm going to tell you the truth, what I really value in life is a person who has many teeth, and I want to have my teeth treated and have access to a place to take care of my mouth and smile (CKP 10).
> [...] I'd really like to improve my oral health, and I've already had a lower denture, but it didn't work, it didn't adapt very well, so I'm waiting for another one. I really wish I could afford a treatment with everything I need (CKP 11).

Also according to Ferreira et al. (2006), the social representations of oral health care highlight the negative consequences of dental practice experienced by these individuals and point to the need to restructure the oral health services offered.

Chronic kidney disease is associated with the significant morbidity and mortality of population groups worldwide, and there is a need to identify new risk factors for this disease, be they clinical and/or subjective factors of these patients' self-perception (Sharma et al., 2014). In this context, this study also sought to discuss subjective aspects related to self-perception of CKD concerning oral health.

Thus, it should be recognized that biomedical care actions and those meant for repairing inequalities for chronic kidney patients are as important as their family structure and the individual profile of those who go through this disease. Finally, it is worth stressing that, despite being marked by so many ambiguities and challenges, life with CKD is perceived by patients as being full of possibilities (Santos, Borges, Lima, & Reis, 2018).

Conclusion

The quanti-qualitative analysis showed a high rate of dental loss and the need for complete dentures and suggests inequities in oral health care for chronic kidney disease patients, especially in tertiary care. There

was a positive representation regarding oral health, but the lexicographical analyses of the textual *corpus* confirmed the self-perception of lack of dental care.

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