Original Article

Sociodemographic and clinical characteristics of patients in hemodialysis therapy

Características sociodemográficas e clínicas de pacientes em terapia hemodialítica

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ABSTRACT | OBJECTIVE: To describe the sociodemographic and clinical characteristics of patients with Chronic Kidney Disease (CKD) undergoing hemodialysis and to analyze pain in the application of the Buttonhole technique. **METHOD:** A quantitative descriptive study, carried out in a private nephrology service, using a semi-structured interview for sociodemographic health characterization and self-perception of health about CKD, hemodialysis treatment, and the Buttonhole technique, with a sample selected by convenience. **RESULTS:** The mean age of the 26 study participants was 60 years (±13.5), with a predominance of males (73.1%). Regarding previous diseases, 84.6% had arterial hypertension, and 38.5% had diabetes. As for the assessment of health status, 54.4% reported good or very good, however, 69.2% and 65.4% reported it as worse or much worse when compared to people of the same age group and concerning the previous year, respectively. Among the participants, 23 (88.5%) had an arteriovenous fistula and, among these, 9 (39.1%) underwent the Buttonhole technique, and 55.6% had a score for pain related to AVF puncture of up to 2. **CONCLUSION:** This study presented a predominantly male, hypertensive, and diabetic sample. Patients undergoing the Buttonhole technique had a score of up to 2 for puncture pain, demonstrating that the implementation of the technique in this population can contribute to improvements in treatment.

KEYWORDS: Chronic Kidney Failure. Hemodialysis. Arteriovenous fistula.

RESUMO | OBJETIVO: Descrever as características sociodemográficas e clínicas dos pacientes com Doença Renal Crônica (DRC) em terapia hemodialítica e analisar a dor na aplicação da técnica de *Buttonhole*. **MÉTODO:** estudo descritivo quantitativo, realizado em um serviço de nefrologia privado, utilizando uma entrevista semiestruturada para a caracterização sociodemográfica de saúde e autopercepção de saúde em relação à DRC, tratamento hemodialítico e técnica de *Buttonhole*, com amostra selecionada por conveniência. **RESULTADOS:** a média de idade dos 26 participantes do estudo era 60 anos (±13,5), predominando o sexo masculino (73,1%). Com relação às doenças prévias, 84,6% tinha hipertensão arterial e 38,5% diabetes. Quanto à avaliação do estado de saúde, 54,4% referiam boa ou muito boa, entretanto, 69,2% e 65,4% referiam como pior ou muito pior quando equiparado com pessoas da mesma faixa etária e em relação ao ano anterior, respectivamente. Entre os participantes, 23 (88,5%) possuíam fístula arteriovenosa e, dentre estes, 9 (39,1%) foram submetidos a técnica de *Buttonhole* e 55,6% apresentaram escore para dor relacionada à punção da FAV de até 2. **CONCLUSÃO:** este estudo apresentou amostra prevalentemente masculina, hipertensa e diabética. Os pacientes submetidos à técnica de *Buttonhole* apresentaram escore de até 2 para dor na punção, demonstrando que a implementação da técnica nesta população pode contribuir para melhorias no tratamento.

PALAVRAS-CHAVE: Insuficiência Renal Crônica. Hemodiálise. Fístula Arteriovenosa.

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Introduction

Statistics show that Chronic Noncommunicable Diseases (NCDs) and Chronic Disabling Diseases (CDDs) have gained a significant proportion worldwide and become public health problems. Among the NCDs, Chronic Kidney Disease (CKD) stands out as one of the most incidents in this scenario of epidemiological changes. CKD demands from health professionals a constant search for knowledge to provide quality care due to the increase in morbidity and mortality in this population.[1,2]

In Brazil, approximately 12 million people have some degree of Renal Insufficiency (RI), which can be chronic or acute, and of this total, approximately 130,000 people have chronic kidney disease and depend on dialysis to survive.[3,4] CKD presents glomerular, tubular, and endocrine changes, thus being called a variety of nephropathies, leading to progressive and irreversible loss of kidney function, making the kidneys unable to perform their functions properly. Among the treatments for CKD is Renal Replacement Therapy (RRT), which includes Peritoneal Dialysis (PD) and Hemodialysis (HD), the latter being considered nowadays as the most far-reaching and fast therapy, capable of removing catabolites from the body and correcting changes in the internal environment through a dialyzer called capillary.[4-6]

According to the 2020 Brazilian Dialysis Census, carried out by the Brazilian Society of Nephrology (SBN), there is a tendency for the number of patients with CKD to increase by approximately 3.6%, while the prevalence of this disease is around 2.9%, with an increase in the number of patients on dialysis therapy, with a prevalence rate of 684 per million of the population, suggesting greater ease of access to RRT for patients with CKD.[7]

For hemodialysis treatment, definitive or temporary access is necessary, with the Arteriovenous Fistula (AVF) being the preferred one since it provides adequate blood flow, a long half-life with greater durability, and a lower rate of infections and complications. Despite the advantages presented, several factors can influence the survival of vascular access in hemodialysis, such as inherent characteristics of patients, type of dialysis therapy, and surgical technique, in addition to the cannulation procedure. Therefore, the AVF puncture technique must be safe to maintain the vascular access patent for as long as possible.[8]

There are three distinct AVF puncture methods: regional, Rope Ladder (RL), and Buttonhole. In the regional method, the needles are inserted in the same region; in the RL method, the puncture site is rotated, defining a distance from the anterior puncture along the vascular access; and, in the Buttonhole, the needles are inserted at the same location, angle, and depth, forming a subcutaneous tunnel that will be punctured later with a blunt needle.[8]

The recommendations for performing the Buttonhole technique have still received little attention and, consequently, a lack of knowledge to be applied to those responsible for the punctures. It is noteworthy that puncture failures may contribute to increased morbidity and mortality in dialysis. It can be seen that this technique has the potential to reduce the sensitivity to the pain of patients in AVF punctures since the needle used has a rounded and blunt tip, in addition to not being used in new puncture sites due to the tunnel already formed.[9,10]

The professionals involved in dialysis play a fundamental role with the chronic renal patient undergoing treatment, since they perform different care, being agents that facilitate the adaptation of the individual to this treatment, helping and carrying out the health education that is so necessary for hemodialysis.[9]

Therefore, the present study sought to describe the sociodemographic and clinical characteristics of patients with Chronic Kidney Disease undergoing hemodialysis and to analyze pain in the application of the Buttonhole technique.

Method

This was a descriptive study with a quantitative approach, carried out in a private nephrology service located in the interior of the State of São Paulo, with a capacity to care for 34 patients.

The following inclusion criteria were applied: participants with CKD on hemodialysis for at least six months of treatment, over 18 years of age, and submitted to the Buttonhole puncture technique in AVF. Patients who used other types of vascular access (temporary or permanent) to undergo hemodialysis were excluded.

The selection of the sample was for convenience, with an invitation to participate for all members of the renal replacement treatment program at the research site. Among the 34 patients who underwent hemodialysis at the nephrology service, 26 participated in this study, representing 76.5% of the total. However, among the 26 participants, only 9 (39.1%) underwent AVF puncture using the Buttonhole technique.

Data collection was carried out between July and November 2018, by one of the researchers and a nurse in this nephrology service, which was duly qualified to perform the technique correctly during the hemodialysis session with the stable dialysis procedure. The questionnaires, also applied by her, were handed out in a restricted area of the service before the hemodialysis session and presented an application time of approximately 20 minutes.

A previous contact was made with the patients in the sessions that preceded the collection of information, in which the research was presented and any doubts that might arise were clarified, in addition to obtaining the signature of the Informed Consent Form (ICF). Thus, the research participants were asked to be in the service about 60 minutes before the hemodialysis session to receive the necessary instructions, sign the informed consent, and collect the information inherent to the research, with only one meeting being held in this format.

Data were collected through interviews with the application of a semi-structured questionnaire for sociodemographic, clinical, health, and self-perception of health about CKD, hemodialysis treatment variables, and the Buttonhole technique. The sociodemographic variables were age group (up to 59 years and 60 years or more), sex (male and female), ethnicity (Caucasian, black and mixed race), education (up to 3 years, 4 years or more, and undergraduate), marital status (married, separated/divorced, single and widowed), currently working (no and yes) and religion (Catholic and Evangelical).

The health characterization included self-reported health problems with a previous medical diagnosis in the last year before the interview, such as the presence of arterial hypertension (no and yes), presence of diabetes mellitus (no and yes), presence of depression (no and yes), presence of dyslipidemia (no and yes), presence of heart disease (no and yes), presence of neoplasms (no and yes); the number of self-reported diseases (up to 2 and 3 or more). The self-assessment of general health took place through the three standardized responses (very bad or bad, fair and good or very good), the general health assessment compared to other patients with CKD on hemodialysis (much worse or worse, regular and better or much better) and general health assessment compared to 1 year ago (much worse or worse, fair and better or much better).

The variables related to hemodialysis treatment and Buttonhole technique were: initial diagnosis (hypertensive nephrosclerosis, diabetic nephropathy, and others), admission to the RRT service (Acure Renal Failure - ARF and CKD), type of vascular access (AVF, permcath, and double lumen catheter - CDL), AVF aneurysm (no and yes), applies the Buttonhole technique (no and yes) and pain intensity measurement using the Visual Analogue Scale (VAS) (up to 3, 3 to 5, 6 to 8).[11] Pain assessment at the time of puncture was verified during the tunneling phase with a sharp needle and Buttonhole puncture with a blunt needle. For better understanding and standardization of the response, it was explained to the patient that a score between 0 and < 2 indicated no pain to very little pain; between > 3 and < 5 mild pain; between > 6 and < 8 moderate to severe pain. In the tunneling phase, the scale to assess pain intensity was applied every three HD sessions, and in the buttonhole phase, every five HD sessions.[9]

Application of the Buttonhole technique: during the tunneling phase, the punctures were performed by the same nurse who created this study, using a 16G cutting needle. AVF sites with aneurysmal dilatations were not selected for tunneling. After rigorous antisepsis of the fistula with 0.5% aqueous chlorhexidine, if necessary, the crust from the previous puncture was removed with the tip of the needle, which was then introduced into the fistula, always following the same angle. The average time foreseen in the protocol for creating the tunnel was ten to fifteen hemodialysis sessions, however,

the puncturer could reduce or increase this period according to her impression.[12]

After tunneling, the patients included in this study were punctured with a 16G blunt needle following the same guidelines as in the tunneling phase. During the puncture phase, the puncturer was allowed to puncture the AVF with a cutting needle, according to the resistance observed in the puncture of the fistula in the previous dialysis. These punctures with a cutting needle were performed with the objective of reviving the tunnel with the least possible trauma. The time established in the protocol for the use and evaluation of the buttonhole puncture technique was ten consecutive sessions of HD. All participants underwent three hemodialysis sessions per week lasting four hours. During the dialysis sessions, the blood flow was 400ml/minute and the dialysate flow was 500ml/minute. The concentrations of sodium, potassium, calcium and bicarbonate in the dialysate were 138; 2.0; 3.5 and 36 mEq/L, respectively. The dialysis filter used was high flow polysulfone.

During the study, no changes were made to dialysis prescription.For data storage, was used Office software, Excel version 2013 and for data analysis was used Stata software version 9.0. In data statistics, a descriptive analysis was performed to verify the distribution oh the study variables, in which some of them were dichotomizes according to their distribution of frequencies was presented.

Authorization for data collection was requested for the coordination of the nephrology service, as determined by Resolution 196/96 of the National Health Council for research involving human beings. Authorization for data collection and the project was sent to the Research Ethics Committee of Fundação Hermínio Ometto (FHO) and Plataforma Brasil, presenting CAAE 83217517.0.0000.5385 and approval number 2.541.048.

At the time of the invitation to participate in the research, the ICF was presented to the patient with clear, objective, and simple information about the purpose of the research, a guarantee of secrecy, and the right to withdraw at any time, without any loss. The ICF was prepared in two copies, one was with the researcher and one with the research participant, with the name and telephone numbers of those responsible for the study.

Results

Among the 26 patients who agreed to participate in this study, men represented 73.1% of the total sample. The mean age was 60.1 years (±13.5), with a minimum of 32 years and a maximum of 81 years. According to table 1, the sample of patients surveyed had a higher proportion of Caucasians (92.4%), education over 4 years of study (73.1%), and married (61.5%). Approximately 88% reported not working, while all reported having some religion, of which 84.6% are Catholic.

Table 1. Distribution of sociodemographic characteristics of people undergoing hemodialysis treatment in a nephrology service. Araras, São Paulo, Brazil - 2018. (N=26)

Variables	N	%
Age group		
Up to 59 years	13	50
60 years or older	13	50
Sex		
Male	19	73,1
Female	7	26,9
Ethnicity		
Caucasian	24	92,4
Black	2	7,6
Education		
Up to 3 years	1	3,8
4 years or more	19	73,1
Has graduation	6	23,1
Marital status		
Married	16	61,5
Separated/Divorced	3	11,5
Single	3	11,5
Widower	4	15,5
Currently works		
No	23	88,5
Yes	3	11,5
Religion		
Catholic	22	84,6
Evangelical	4	15,4

Source: The authors (2018).

In the sample, 84.6% had arterial hypertension, and 19 (26.9%) reported having heart disease. There was a greater number of patients who self-reported up to two diseases. Data regarding health assessment when compared to others with CKD undergoing hemodialysis at the same age and health assessment when compared to a year ago was self-perceived by the sample as much worse or worse, corresponding to 69.2% and 65.4 %, respectively. However, the self-perceived general health assessment was considered good or very good by 54.4% of those surveyed (Table 2).

Table 2. Distribution of clinical variables and health perception of people undergoing hemodialysis in a nephrology service. Araras, São Paulo, Brazil - 2018. (N=26)

Variables	N	%
Presence of Arterial Hypertension		
No	4	15,4
Yes	22	84,6
Presence of Diabetes		
No	16	61,5
Yes	10	38,5
Presence of Depression		
No	21	80,8
Yes	5	19,2
Presence of Dyslipidemia		
No	24	92,3
Yes	2	7,7
Presence of Heart disease		
No	19	73,1
Yes	7	26,9
Presence of Neoplasms		
No	22	84,6
Yes	4	15,4
Number of self-reported diseases		
Up to 2	17	65,4
3 or more	9	34,6
General health assessment		
Very bad or bad	2	7,7
Regular	7	26, 9
Good or very good	17	54, 4
Health assessment compared to others of the same age		
Much worse or worse	18	69,2
Equal	3	11,5
Better or much better	5	19,3
Health rating compared to 1 year ago		
Much worse and worse	17	65,4
Equal	1	3, 8
Better and much better	8	30,8

Source: The authors (2018).

Hypertensive nephrosclerosis is the underlying disease existing in half of the research sample (50% n=13), followed by diabetic nephropathy (42.4% n=11). As it is a clinic dedicated to hemodialysis treatment, most patients (65.4%) started treatment with a chronic condition of kidney disease. The AVF was used as vascular access for hemodialysis treatment in 88.5% of the patients, and of this total, 30.4% of the AVFs already had an aneurysm. As for the application of the Buttonhole technique, only 39.1% were submitted to it, with measurement up to 2 points of the most prevalent pain score using the visual scale, demonstrating no pain or very little pain (Table 3).

Table 3. Characterization of hemodialysis treatment and Buttonhole technique of people undergoing hemodialysis in a nephrology service. Araras, São Paulo, Brazil - 2018. (N=26)

Variables	N	%
Initial diagnosis		
Hypertensive Nephrosclerosis	13	50,0
Diabetic nephropathy	11	42,4
Others	2	7,6
Entry into the RRT service		
Acute Kidney Failure	9	34,6
Chronic Kidney Disease	17	65,4
Type of vascular access		
FAV	23	88,5
Permcath	2	7,7
CDL	1	3,8
Presents AVF Aneurysm		
No	16	69,6
Yes	7	30,4
Apply the Buttonhole Technique		
No	14	60,9
Yes	9	39,1
Pain scale measurement		
Up to 2	5	55,6
3 a 5	3	33,3
6 a 8	1	11,1

Source: The authors (2018).

Discussion

Analyzing the sample of this study, a markedly male population was evidenced, with no predominance of age groups, who showed little or no pain when submitted to the Buttonhole puncture technique. According to the literature, adult men are the population that most presents negligible behaviors about health care. The low demand for health services by this population, especially in Primary Care, is related to the belief and values associated with fragility. Culturally, men, as the "stronger sex", do not show fear, signs of weakness, and insecurity, as well as they are not affected by routine health problems for which they should be treated in Basic Health Units.[13,14]

It is worth mentioning that a large part of the etiology of CKD can be prevented by actions related to modifiable lifestyle habits, such as reducing the consumption of sodium, fats, and tobacco, having more water intake, and performing physical activities three times a week for around thirty minutes, reduce harmful alcohol consumption, and, finally, adhere to such lifestyle habits routinely.[14,15]

In addition, the search for care aimed at disease prevention, health promotion, and rehabilitation of the conditions of the individual in the family and community are essential activities practiced in Primary Health Care (PHC), in which they can contribute to health care and education for those more likely to develop CKD. Despite the National Policy for Integral Attention to Men's Health seeking the insertion of men in the most diverse health services, the literature has still reported the invisibility of men in PHC since these services, historically, have developed more actions aimed at the health of women, children, and the elderly.[16]

The absence of men in these services can be explained by the reduced activity and service schedule available to them, who in turn end up using services that respond more quickly and objectively to their demands, such as pharmacy and emergency care. In addition, men's low demand for basic health care is also related to the workload and/or the opening hours of public services, which often only work during business hours. Therefore, the lower understanding regarding the progressive loss of renal function and the negligence in performing basic health care, especially disease prevention and health promotion, leading the male public maintains lifestyle habits that may be responsible for the continued progression of kidney disease and the establishment of CKD.[13-15]

Hypertensive Nephrosclerosis was the most prevalent initial diagnosis in hemodialysis treatment found in this study, which corroborates the already consolidated literature, in which systemic arterial hypertension (SAH) is the main underlying disease in chronic kidney patients. These data are also complemented by a growing number of men who have this comorbidity. According to the Brazilian Society of Nephrology, in the 2020 Dialysis Census, the age group between 45 and 64 years was predominant, male with approximately 58%, and SAH and diabetes mellitus (DM) as the main etiologies of kidney disease.[7] However, Picolli et al.[17], when analyzing the prevalence of CKD through the estimated glomerular filtration rate (GFR) and albuminuria levels in a randomly selected urban population in southern Brazil, found that most of the sample with CKD was female and that arterial hypertension, as well as diabetes, advanced age and obesity were associated with a higher prevalence of CKD.

Diabetes is the second leading cause of CKD, leading individuals to hemodialysis treatment. Responsible for diabetic nephropathy, this disease has presented, over the years, as a growing concern among researchers in the area since the maintenance of high glycemic indexes due to inadequate nutritional therapy in patients with CKD makes dialysis treatment difficult. The present study is strengthened by the work of Santana Dantas et al.[18], who found approximately 91.7% of the sample with capillary blood glucose above 99 mg/dl, of which 18.5% had glycosuria. Regarding the risk of CKD, they found that approximately 25% of individuals had proteinuria, which is an early indicator of kidney damage. The study, therefore, demonstrated that the reported increase in the prevalence of diabetes directly interferes with the course and progression of CKD.

Considering the existing vascular accesses for HD, most CKD patients who were on hemodialysis in this study had AVF as their dialysis access. According to the literature, this type of access is the most suitable since it provides better mobility to the patient and has lower rates of infections when compared to temporary HD catheters. The AVF has the potential to develop aneurysms, the emergence of this complication is associated with numerous punctures in the same site with sharp needles, that is, with the physical and mechanical aggression that the skin suffers at each session, causing injuries that induce the skin to form protective barriers to the body.[9]

That said, the performance of the Buttonhole technique provides the formation of a tunnel in the AVF, preventing the occurrence of aneurysm-forming lesions, in addition to allowing longevity to the access because it is a technique in which a blunt needle is used, that is, without the cut, reducing chances of bruises and edema.[9,10] According to the pain score indicated in this study, it can be observed that the degree of pain is classified as small since the only protection that the body itself makes is removed and the needle is introduced into the already formed tunnel.

Performing the Buttonhole technique can bring several benefits, such as less pain sensation during cannulation; easier insertion of needles into the cannulation site; possibility of self-puncture; and lower probability of hematoma development.[19-20] The nursing team, especially nurses, are the professionals who have greater contact and experience with hemodialysis patients, recognizing their health needs and the treatment of the disease. They are also responsible for promoting health education actions with the patient, in which vascular access care is involved. Thus, nurses trained in the Buttonhole technique promote an environment of behavioral change and prevention of complications.[21]

As positive points of this work, in addition to the positive response of reducing the painful stimulus, the Buttonhole technique can be functional and safe. Once there is a formed path, being able to perform the introduction of the needle in a single puncture, the rates of hematomas or edema are reduced, and access longevity is promoted, thus providing the patient with more comfort and safety during dialysis therapy. The patient submitted to RRT and duly accompanied by his team experiences in his daily hemodialysis treatment numerous situations that influence his psychosocial quality of life, being exposed to stress. In this way, it is noted that the greater comfort/care offered to the patient, the greater the confidence of the same in adhere to the care of the team that assists him.[21]

As limitations of the study, the reduced number of participants submitted to the Buttonhole technique for a reduced period of just two weeks in the three weekly hemodialysis sessions is highlighted. This limitation does not make it less relevant, since it contributes to the dissemination and publication of possible and applicable puncture techniques in vascular accesses in hemodialysis treatments.

Conclusion

Among the population undergoing dialysis therapy analyzed, this study demonstrated the prevalence of the male population, with no predominance of age group, which presents systemic arterial hypertension and diabetes mellitus as the main underlying pathologies. Their health perception, despite being referred to as good or very good, when judged in relation to other patients and the previous period, has become derogatory. With this, it is emphasized that the use of care with vascular access, prevention of aneurysm formation, and application of the Buttonhole Technique can contribute to an improvement in treatment, evidenced by the decrease in puncture pain score when using this technique.

Authors' contributions

Milagres CS participated in the design of the project and research, methodological design, search and statistical analysis of research data, interpretation of results, and writing of the scientific article. Ravagnani JF participated in the collection, interpretation of data, and writing of the scientific article. Scharr AR participated in the methodological design, statistical analysis of research data, and interpretation of the results of the scientific article. All authors have reviewed and approved the final version and are in agreement with its publication.

Conflict of interests

No financial, legal, or political conflicts involving third parties (government, companies and private foundations, etc.) were declared for any aspect of the submitted work (including, but not limited to grants and funding, participation in an advisory board, study design, preparation manuscript, statistical analysis, etc.).

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