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Sexual Health of Patients on Maintenance Hemodialysis. Where are we?

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Abstract

Background: The drop in quality of live in patients on chronic hemodialysis is multifactorial including functional limitation, alteration of social well-being, physical and emotional symptoms as well as sexual dysfunctions. Cross sectional studies in America and Europe have found that the prevalence of sexual dysfunctions amount patients in dialysis is high and varies between 80 to 100%. In Sub Saharan Africa no data is available. The aim of our study was to evaluate the sexual health of patient on chronic hemodialysis in Cameroon.

Methods: In this cross sectional study, one hundred and thirty nine patients on maintenance hemodialysis in three government dialysis facilities in Cameroon were interviewed in 2014 and their medical records were investigated. It was census sampling. The instruments used included: demographic data form, the Beck depression Index (BDI), the Female Sexual Function Index (FSFI), the erectile function evaluation index (EFEI) and the short form (SF-36) of World Health Organization life quality questionnaire. Data was analyzed by EPI INFO 7 software. A P value less than 0.05 was considered statistically significant.

Results: The mean age of patient was 45 ± 13. The sex ratio was 3:1 in favor of male patients. Thirty-three percent of patients were not sexually active. Older patients experienced less sexual activity (P =0.0004). No association was found between sexual activity and duration in dialysis.

Seventy five percent of women had score of female sexual function index lower than 28. All domains of sexual response were involved. 56% Sexual desire decrease, 39% sexual arousal decrease, 48% vaginal lubrication decrease, 46% failure to orgasm, 51% sexual dissatisfaction and 35% dyspareunia were experienced. There was positive correlation with hemoglobin level (P=0.0000). The presence of diabetes (P=0.0000), low level of education, congestive heart failure (P=0.0000) and old age (P=0.0004) showed significant relationship with low score of female sexual function.

Eighty four percent of men were discovered with erectile dysfunction of varied degree. One third of the patients presented severe erectile dysfunction. Age above 40 (P=0.0000) was significantly associated with the erectile dysfunction and its severity. With reference to the diabetes (P=0.0056), anemia (P=0.019), there was a significant statistic association to the erectile dysfunction.

There were significant inverse correlation between sexual dysfunction regardless to the sex, depression and quality of live and all aspects of quality of live were involved except for pain.

Concerning menstrual cycle, one third of patients experienced irregular menses. Menopause was early with the mean age of 40 ± 12. Child desire was present in 43% of female patient and 23% of male patient. Four women (7.84%) declared pregnancy since the beginning of dialysis and 100% of them had early spontaneous abortion.

Conclusion: The prevalence of sexual function disorders is high amount patient undergoing chronic hemodialysis. Age, diabetes, congestive heart failure, anemia contribute or aggravate the dysfunctions.

Introduction

Despite the increased life expectancy associated with advanced dialysis techniques, maintenance hemodialysis (HD) is associated with a substantial impairment of quality of life [1]. The decline in the quality of life of chronic hemodialysis patients is multifactorial, including functional limitation, occupational disturbances, impaired social well-being, and the heavy burden of physical and emotional symptoms. It is often associated with clinical manifestations mainly fatigue, cramps, pain and dyspnea and also by the disorders of the sexual function [2]. Sexual health, even though neglected by the patient as well as the care givers, remains a priority for patients with end stage renal failure (ESRF). It has a significant impact on the couple's health, mental health and quality of life. Disorders of sexual function are frequent in the CKD and for good reasons considered by some authors as an underappreciated epidemic [3].

Several cross-sectional studies have attempted to determine the prevalence of sexual dysfunction in patients on maintenance hemodialysis. In sub-Sahalian Africa, these data are almost non-existent and the number of patients requiring dialysis is constantly increasing. Knowing that Western data cannot reflect the situation of our population, we started this study with the goal of assessing the sexual health of male and female patients undergoing maintenance hemodialysis in Cameroon.

Patients and Methods

Study Setting

The study took place in three HD facilities in Cameroon. All were subsidized by the government, and offering two dialysis sessions per week.

- The HD Unit of General Hospital of Yaoundé which is considered as the reference centre for the country has 18 functional dialysis

machines and provides dialysis care to about 120 patients. The staffs include nephrologists and qualified support staffs.

- The Bamenda and Buea HD units are both regional centres, with 08 machines each and provide ongoing care to about 40 to 50 patients. These units were headed by trained general practitioners.

Study Population

Patients aged 18 years and above on maintenance HD for at least three months at any of the three participating units were eligible for the study. After information and explanation of the aims of the study, a consent form was signed by all patients willing to participate. Participants were enrolled consecutively between August and October 2014. Those with active psychiatric disease, infection, uncontrolled congestive heart failure were excluded. Biochemical and hematologic data used were the average results of measurements within the preceding six months. Relevant socio-demographic and clinical data were extracted from the patients' records.

Procedure

Patients were approached in the participating centres during HD sessions. Ethics approval was obtained from local ethics committees and the administration of the different hospitals. Three questionnaires were self-administered with when needed the assistance of the investigator. (1) The index of erectile function in male to assess sexual function (IIEF5); (2) the Index of Female Sexual Function (FSFI); (3) the Beck Depression Inventory (BDI) to rate the severity of depressive symptoms; and (4) the 36-item Short Form Health Survey Questionnaire (SF-36, Taiwan Standard Version1.0) to assess the quality of life.

All the questionnaires were made available in their validated French and English version.

- The index of erectile function in male. We used the short version IIEF5, simplified version of the International Index of the Erectile Function which is a self-questionnaire in 5 questions whose answer is rated from 0 to 4 or 5 per question. The IIEF5 allows semi-quantified evaluation of erectile dysfunction. It was developed in the United States by Rosen et al and has since been translated and validated in many languages, including French and English. The different domains of the sexual response can also be analyzed using this questionnaire [4]. The rating was as follows: Severe Erectile Dysfunction: 1-7, Moderate Erectile Dysfunction: 8-16, Erectile Dysfunction: 17-21, No Dysfunction: 22-25.
- The Index of Female Sexual Function (IFSF) The FSFI is a 19-item questionnaire that assesses 6 distinct domains of sexual function including desire, arousal, lubrication, orgasm, satisfaction, and pain. Scores on the individual domains are computed by summing responses on specific groups of questions and multiplying by a domain factor. The responses were graded on a scale of 1 (almost never or never) to 5 (almost always or always). The highest possible total score was 45 (range 5 to 45), and the lower scores represented lower sexual function [5]. We used a total FSFI score of 28 or lower to indicate the presence of sexual dysfunction.
- The BDI is a standard self-administered questionnaire used to screen patients for depression. It is a valid and reliable international questionnaire for measuring depression and has been used in the assessment of depression in End Stage Renal diseases (ESRD) [6]. In the present study the version with 20 questions was used. Achieving higher score meant more depression. Scores less than 15 were considered normal.
- The SF-36 is an instrument commonly utilized to measure the quality of life in the general [1] and uremic populations [7]. It includes eight scales: physical functioning, role physical, bodily pain, general health, vitality, social functioning, and role emotional and mental health. Low scores in the eight domains indicate lower quality of life.

Operational Definition of Terms

- Disorders of sexual function were used to characterize difficulties or abnormal sexual functioning.
- Sexual dysfunction was used to refer to a difficulty experienced by one or more individuals during a certain stage of sexual activity involving desire, arousal or orgasm.
- The level of education was evaluated according to the number of years spent in school without repeating class and participants were classified as learned if more than 10 years schooling and not learned if less.
- Anaemia was defined as an average of the past four week haemoglobin below 9 g/dL.
- The nutritional state was evaluated using the level of albuminemia and the BMI. Malnutrition was defined for a level of albuminemia < 25g/l with no other clinical explanation (proteinuria, liver diseases) and or a BMI< 17.
- The use of erythropoietin was considered effective if the patient received a minimal dose of 8000 IU per month for the past three months.
- Hypertension was considered controlled if the average blood pressure for the last two dialysis sessions was less than 140 mm Hg for the systolic and 90 mm Hg for the diastolic.

Statistical Analyses

Baseline variables are summarized as mean and standard deviation (SD) or median and 25th -75th percentiles for continuous variables. The Pearson chi square test and Mann-Whitney U test were used to compare groups of participants for qualitative variables. Simple Linear regression was used to test for associations between sexual function scores as the outcome variable and various characteristics. A two-tailed P value < 0.05 was considered statistically significant. All analysis was performed using Epi info version 7 software.

Results

A total of 197 patients were eligible. Fifty-eight were excluded. The reasons for exclusion were: refusal to participate in the study (36 cases), uncontrolled heart failure (3 cases), dementia (1 case), and incomplete records (18). The response rate was 72%. The study population consisted of 139 patients, 62.55% was male. The mean age was 45 ± 13 years old varying from 18 to 77. Seventy-five percent of the patients had a lucrative activity. Diabetes (15%), uncontrolled hypertension (40%), anemia (51%) and HCV (28%) were the most common co morbidities. One quarter of the patients was obese and only 27.4% received erythropoietin for anemia prevention. Malnutrition was present in 34 patients (26%) (Table 1).

Prevalence and Type of Abnormalities

Sexual function disorders were present in 94% of patients. Women were more affected (100%) than men (92%). The main disorders recorded were in order of frequency: sexual dysfunction (81.5%), menstrual irregularities (55%) and absence of sexual activity (33%) (Figure 1).

Description of the Abnormalities, Depression and Quality of Life

In male, the types of problems included: erectile dysfunction (84%), premature ejaculation (40%), decreased libido (29%) and pain (14%). Eighty-eight percent of the patients had varying degrees of sexual dysfunction. Twenty-seven patients (31.4%) had severe erectile dysfunction and only 11 patients (12.7%) had normal function.

Table 1: Demographic and clinical data patients

Parameters	Numbers (%)	Means ± SD	Median, IQI
Demographic data			
Age in years	45 ± 13		
Duration in dialysis in months	36, 16-60		
Sex - Male - Female	 87 (63%) 52 (37%)		
Matrimonial status - Single - Married - Others	 35 (25%) 92 (67%) 11 (08%)		
Level of instruction - Learned - Not learned	 110 (79%) 28 (21%)		
Baseline nephropathy - Chronic Glomerulonephritis - Hypertension related - Chronic Interstitial Nephritis - Unknown	 55 (41%) 34(26%) 21 (16%) 23 (17%)		
Age of Menopause	36 years ± 7.		
Some Clinical data			
Anaemia	69 (51%)		
Use of Erythropoietin	37 (27%)		
Uncontrolled HTN	56 (40%)		
Obesity	34 (24%)		
HCV Positive	39 (20%)		
HVB positive	06 (05%)		
Malnutrition (BMI < 17 and/or Hypoalbuminemia<25g/l)	34 (66%)		

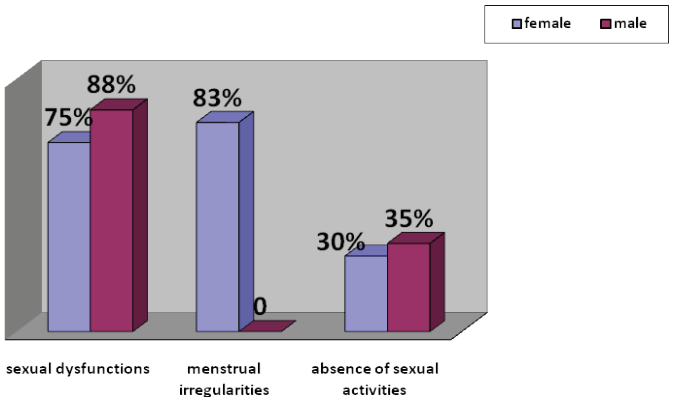

Figure 1: Main disorders observed

All domains of sexual dysfunction in women were affected. Sexual satisfaction and desire were more affected. In detail, these disorders included: decreased sexual desire (56%), decreased sexual arousal (39%), decreased vaginal lubrication (49%), and failure to achieve orgasm (46%), sexual dissatisfaction (51%), and dyspareunia (36%).

Thirty-three percent of patients surveyed declared no sexual activity, of which 35% were men and 30% were women but with no statistical difference (OR: 1.237, 95 CI (0.59, 2.5), P=0.5018).

Disorders of menstruations were present in 83% of the women of child-bearing age and were varied. Irregular menses and non-gravid amenorrhea were more frequent (45% and 40% respectively). Ten women (32%) had more than one menstrual disorder. Depression was present in 12% of patients; women were more affected (10% *Vs* 8%) but the difference was not statistically significant (p: 0.921). In both male and female patients, lll aspects of the quality of live were affected with social aspect being more implicated and found in 70% of patients (Table 2).

Reproductive Health and Contraception

- Overall, only 12% of sexually active patients used a contraceptive method. More than 93% of women, sexually active and at the child bearing age agreed not using any contraception. Condom was preferred contraceptive method at 87% and the IUD at 10%.
- Two-third of patients reported not using any means of preventing sexually transmitted infections, and the notion of multiple partners was present in 27% of patients.
- Only 31% of patients over the age of 40 admit to have been screened for cervical/prostate cancer at least once.
- The desire for parenthood was significantly more present in women (43% *vs* 23%, OR=0.44, P=0.0311), inversely proportional to the number of children. (r^2= 0.08, P=0.0009) and higher (OR=0.1583, P=0.0002) in single compared to the others.
- Six male patients (4.72%) report having had a child since the beginning of dialysis. Four women (7.84%) report dialysis pregnancy and 100% have completed early spontaneous abortions.

The Clinical Characteristics Associated with Sexual Activity and Sexual Dysfunction

Sexual activity: The absence Sexual activity is strongly correlated the increased age (p= 0.0004), the non married patients (p=0.0045), the

Table 2: Description of the disorders observed

Type of abnormalities		Numbers	Frequency
1. Sexual dysfunctions n=139		**147**	**94%**
Male N= 87	Erectile Dysfunction	70	84%
	Early ejaculation	35	40%
	Low libido	25	29%
	Pains	12	14%
	Global	**76**	**88%**
Female N= 52	Decrease desire	28	56%
	Decrease arousal	15	39%
	Decrease lubrication	19	49%
	Orgasm failure	18	46%
	Sexual dissatisfaction	25	51%
	Dyspareunia	14	36%
	Global	**39**	**75%**
2. Absence of Sexual Activities (n=139)		**46**	**33%**
Male		30	35%
Female		16	30%
3. Abnormality of menses (n= 31)		**26**	**83%**
Irregular Menses		14	45%
Non gravid amenorrhea		12	40%
Polymenorrhea		08	25%
Oligomenorrhea		08	25%
Metrorragia		02	6.2%
Menorragia		01	3.1%
4. Depression (n=138)		**17**	**12%**
5. Poor Quality of life (n=139) Somatic aspect Social aspect Environmental aspect Psychological aspect Global		 40 97 39 42 **50**	 29% 70% 28% 30% **36%**

presence of erectile dysfunction (p=0.0000), the presence of diabetes (p=0.0411), Malnutrition (p=0.0025) and heart failure (p=0.0196). Hypoalbuminemia (taking alone), Anemia, uncontrolled hypertension and smoking were not associated.

Male sexual dysfunction (erectile dysfunction): Erectile dysfunction was significantly associated with age ≥ 40 years, diabetes the presence of anemia and malnutrition. The different aspects of quality of life are also associated except for the social aspect and the overall quality of life. Depression was significantly more present in patient with erectile dysfunction. No association was found with taking any medication.

Female sexual dysfunction: Several parameters were significantly associated with overall sexual dysfunction. Only the duration of dialysis, menopause and some aspects of quality of life was not associated with sexual dysfunction. Less than 6% of patients report having consulted medical staff for this problem and 4% of patients take any treatment (Table 3 and 4).

Discussion

This multicentre study has shown that disorders of sexual function are frequent and varied in patients on maintenance hemodialysis. The most common are sexual dysfunction, lack of sexual activity and menstrual disorders. Age, anemia, diabetes and heart failure are associated with these disorders. We found that these disorders had an impact on quality of life and depression. He had no association with tobacco, hypertension and obesity. Dialysis duration has no impact on disorders of sexual function.

We need here to highlight some limitations.

- Research on sex and its functions are all characterized by a bias of participation because conditioned by the will of the patient.
- Sexual issues involve the intimacy of the patient and require a certain degree of trust between the patient and the interviewer.
- The technical survey material used for the collection of data is not validated in the African and Cameroonian population. As a result, the values used as thresholds may not be appropriate for the study population.

Table 3: Relationship of male sexual dysfunction with selected characteristics

Variable	Coefficient of correlation	P
Depression	0.02	0.0019
Quality of life:		
Global	0.03	0.1346
Energy	0.15	0.0004
General health	0.02	0.2336
Psychological aspect	0.11	0.0021
Somatic aspect	0.06	0.0287
Environmental aspect	0.07	0.0151
Social aspect	0.02	0.2665
Anaemia	0.01	0.0195
Age ≥ 40 years	0.28	0.0000
Diabetes	0.09	0.0056
Heart failure	0.03	0.1213
Stroke	0.02	0.2204
TABAC	0.00	0.8878
Malnutrition	0.35	0.0261
Use of Erythropoietin	0.00	0.9575
Level of Education Learned Not learned		0.0000
Treatment		
B blockers	0.00	0.5771
Central acting	0.01	0.2800
ACE i	0.00	0.7732
Sedative	0.00	0.7365
Duration in dialysis	0.15	0.0001

Table 4: Relationship of female sexual dysfunction with selected characteristics

Parameters	Coefficient	P
Quality of life		
global	1.6970	0.0000
Energy	6.5455	0.0324
Social aspect	1.5115	0.0543
psychological aspect	1.8788	0.2001
Somatic aspect	0.8974	0.8801
General health.	0.0953	0.8821
Environmental aspect	1.6667	0.5290
Depression	0.0909	0.0000
Age	0.0443	0.0004
Menstrual cycle		
Menopause	0.4464	0.2029
No menopause	0.7143	
Level of education		
Learned	174891.4381	
Not learned	Reference	0.0000
Co morbidities		
Anaemia	1.2857	0.0000
Diabetes	235865.9171	0.0000
Stroke	----------	
heart failure	2.5000	0.0000
Malnutrition	1.0833	0.7819
Use of Erythropoietin	0.1208	0.4250
Duration in dialysis	-0.0082	0.4040

- The size of the female population was not very large and could influence statistical analysis.
- The nutritional state evaluated only with the level of albumin may not reflect the actual situation.

But we believe that these limits do not detract from the relevance of the problem or the value of our work.

Prevalence and types of disorder of sexual functions

Disorders of sexual functions are common in hemodialysis patients [8,9]. There are few studies on the frequency of these disorders and the quality of disorders and none to our knowledge in Africa under Sahel. We found a prevalence of 94%. This percentage is in the intervals described in the literature 41-100%. It is similar to that of Assadifard, et al. [10] in 2012 in Iran, which found a prevalence of 100% in a population of women on chronic hemodialysis. Glass, et al. [11] in 1987 had found a rate of only 47% among men in dialysis. The prevalence of disorders of sexual functions regardless to the gender in this study is higher than what is described in other studies [12-18]. The difference can be explain by the simple fact that in our study, the patients were receiving 08 hours of dialysis per week which is less than 12 hours in the other studies. As shown by Locatelli, et al. [19] and Golden, et al. [20], sufficient dialysis was found to be main factor that influences sexual function in patient on maintenance hemodialysis by either reducing the prevalence or the severity.

With respect to sexual activity in both sexes, our study shows that 33% of patients are not sexually active with a slight predominance of the male sex (35% in men versus 30% in women). Data on sexual dysfunction and sexual activity in hemodialysis are rare. Nevertheless, it is reported that 33% of hemodialysis patients are sexually inactive [21,22]. Higher prevalence of sexual inactivity was noted by Mor, et al. [23] 81% of women in his study reported that they were not sexually active. But in this study the mean age was greater than ours (64 *vs* 43). The reasons given for this lack of sexual activity are many: the fragile state of health, erectile dysfunction in men and lack of desire (43%) in women, lack of a Partner (39%) [23]. Many myths exist about sexuality in hemodialysis and one of

the most prevalent states that sexual activity causes weakness of the body and the patients are already weakened by the disease and the technique of dialysis and the fear of aggravating asthenia removes them from sexual activity [21].

Menstrual irregularities and early menopause are common during chronic renal failure. We found a prevalence of menstrual irregularities of 49% in the population of childbearing age with a mean age of menopause of 36 ± 7 years in accordance with the value found by Manish, et al. [24] in 2012 in India. Holley, et al. [21] in 1997 had, in a USA hemodialysis patient of comparable age, a prevalence of 42% and a mean age of menopause of 47 years. This difference in percentage could be explained by the fact that in its population there was a high rate of erythropoietin use and a quality of dialysis superior to ours. Indeed Kim, et al. [25] in a work published in 2014 showed that the quality of dialysis combined with other measures such as the use of erythropoietin appears to improve the sexual function of women on chronic hemodialysis.

The desire for pregnancy is present in hemodialysis patients with a prevalence of up to 43%. This desire is positively associated with the female sex, the number of children under 2 and celibacy. No study in the literature has addressed this aspect of the sexual life of hemodialysis. This desire for pregnancy may partly explain the low rate of contraceptive use in hemodialysis patients. Indeed more than 93% of patients of childbearing age and sexually active confessed not to use contraception. Holley, et al. [21] reported that only 36% of them used contraception.

The poor outcome of pregnancies in hemodialysis is well known. Hou, et al. in 1987 found a rate of abortion, prematurity and perinatal death of 88% [26]. Despite progress in care, spontaneous abortions are frequent and early. In our study we recorded 100% spontaneous abortions in the first four months after amenorrhea. Early abortions can be overestimated because of menstrual irregularities and pregnancy often occurs on amenorrhea.

Sexual risk behaviors are common in the general population and according to Ministry of Health figures in 2011, 60% of sexually active people do not use any means of preventing sexually transmitted infections. We found a higher rate (67%) in our study. This high prevalence could be explained by the high desire rate of pregnancy or paternity that would cause patients to have unprotected sex. The most commonly reported method of prevention was the condom. Twenty-seven percent of sexually active patients admitted to having multiple partners.

The cervical/prostate cancer screening rate was 31% in patients over 40 years old. Holley, et al. [21] showed that 66% of the patients in his study had already performed a Pap smear. This difference just reflects the disparity between the two regions of the world. In the United States of America screening policies are more advanced than in our settings.

Sexual dysfunctions and associated factors

The prevalence of Sexual dysfunction is high amount patient on maintenance hemodialysis. We found a prevalence of 81.5%. In Togo, Amekoudi, et al. [27] reported prevalence of 74.3% (unpublished data) but on the smaller size of patient (58 patients).

In male, we showed that erectile dysfunction is a common problem in hemodialysis. Previous studies have shown that the prevalence of erectile dysfunction in uremic patients varied between 41 and 93% [11,12]. In our study the prevalence was 88%. In 2002, Arslan, et al. [14] in a study of a population of 187 hemodialysis patients in Turkey found a prevalence of 80.7% with a middle-aged population close to ours. In 2007 in Brasil, Leonardo, et al. [28] found a lower prevalence of 60% but a population smaller than ours (58 patients). This difference in prevalence is explained by the low rate of diabetic patients, the high rate of use of erythropoietin and the low prevalence of anemia. The three factors are independently associated with erectile dysfunction [28]. Also all our patient were receiving fewer dialysis treatment time and the quality of dialysis has been shown to be directly associated with prevalence and the severity of erectile dysfunction [11]. Sexual dysfunction in male was significantly more common and more severe after 40 years. Rosas, et al. [29] in 2001 in Turkey had the same observations but for an age greater than 50 years. This difference could be due to the different hemodialysis techniques, the associated co morbidities: more diabetics and patients with anemia in our study. Several studies such as ours have found a significant association between erectile dysfunction, anemia, diabetes, heart failure and malnutrition. Unlike in some studies carried on patient with coronary risk factors [30] and general population [31], we did not find any association with hypertension and tobacco. The increased incidence of ED among hypertensive patients is not a universal finding. In six randomized, blinded, prospective trials in which 1251 men received placebo, 5 mg qd to 20 mg bid enalapril, 2.5 to 10 mg qd amilodipine, and 6.25 to 25 mg of hydrochlorothiazide (HCTZ), bisoprolol 5 mg qd or a combination of 2.5 to 10 mg qd bisoprolol/HCTZ for an average exposure duration of 6 to 14 weeks, adverse effects and symptoms were spontaneously volunteered by each subject. There was no difference between treatment modalities with respect to self-reported ED (P=0.69), decrease in libido (P=0.97), or overall sexual dysfunction (P=0.71) for 1251 men [32]. We may have not been able to find a deleterious effect of the use of β blockers or diuretics due to a small subgroup sample size. Sexual activity in our work was significantly associated with the degree of erectile dysfunction. Leonardo, et al. [28] found this same association in his work with sexual activity evaluated as the frequency of sexual intercourse.

In women, 75% reported sexual dysfunction. All areas were affected with predominance in the areas of desire and satisfaction. Several studies worldwide have recently focused on female sexual dysfunction in hemodialysis and they all agree that the frequency of sexual dysfunction can be as high as 100% [3,9,13,17,21,33,34]. We obtained a percentage that is certainly high but remains below the average prevalence of previous studies. Amekoudi, et al. in 2013 in Togo found a prevalence of 89.5%. We did not integrate non-sexually active women in the assessment of sexual dysfunction that could explain this difference in prevalence. Similarly, the chosen threshold of 28 could be low for the Cameroonian population and then this difference would only reflect cultural differences and sexual habits. We found a significant association between anemia and a low sexual dysfunction score. This association was described by Resic, et al. [35] who showed that EPO injections associated with increased hemoglobin levels improved the sexual function of hemodialysis women. The same observations were made by Lawrence, et al. [36]. It is understandable that anemia causes fatigue and a decrease in activity tolerance and thus limits attempts at sexual activity. Diabetic patients had significantly more sexual problems similar to the Basok [37] and Asadifard [10] studies. Diabetes has a negative impact on sexual function through the psychological, hormonal, vascular and neurological disorders it causes. Diabetes lowers vaginal hydration, lowers lubrication and increases pain. In addition, it causes vascular changes in the reproductive system and disrupts the excitation phase. Diabetes finally leads to a loss of confidence and neuropathies interfere with the transmission of the stimulus and the sexual response.

Conclusion

Disorders of sexual function are common in patients on chronic hemodialysis. The main disorders are sexual inactivity, menstrual cycle disorders and conception and sexual dysfunction. Sexual dysfunction is a major problem under diagnosed in chronic hemodialysis patients. The risk factors include age, diabetes, heart failure, anemia, malnutrition, low level of education and probably poor quality of dialysis. The negative

impacts on mental health and quality of life were demonstrated in this multicentre study. Dialysis does not improve most of the disorders. The diagnosis and management of these disorders should be integrated into the daily monitoring of hemodialysis patients.

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Competing interest: The authors declare that they have no competing interest.

Availability of data and material: The datasets used and/or analysed during the current study are available from the corresponding author on reasonable request.

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