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# Dietary Habits and Lifestyle of Patients with Chronic Renal Disease at the Yalgado Ouedraogo University Hospital in Burkina Faso

**Lengani Toyadala Hortense[1], Sanou Gaoussou[2], Ba-Fatoumata Hama[3], Bougma Sibiri[1], Sawadogo Yamkaye Aicha[1], Coulibaly Gérard[2], Savadogo Aly[1,*]**

[1]Department of Biochemistry and Microbiology, Laboratory of Applied Biochemistry and Immunology, University Joseph KI-ZERBO, Burkina Faso, 03 BP 7021, Ouagadougou, Burkina-Faso
[2]Department of Medicine and Medical Specialties, Laboratory of Non-communicable diseases, Nephrology and Hemodialysis Service, Yalgado Ouedraogo University Hospital Center, 01 BP 7022 Ouagadougou 03, Burkina Faso
[3]Department of Food Technology, Institute for Research in Applied Sciences and Technologies, 03 BP 7047 Ouagadougou, Burkina Faso
*Corresponding author: alysavadogo@gmail.com

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**Abstract** In Burkina Faso, chronic kidney disease (CKD) is a major public health problem due to its increasing prevalence and the high cost of its treatment. The objective of the present study was to describe the dietary habits (DA) and lifestyle of patients with severe and moderate chronic kidney disease (CKD) in the nephrology and hemodialysis department of the Yalgado OUEDRAOGO University Hospital (CHU-YO). This was a prospective study conducted for six months. Data were collected on a collection form using a semi-structured questionnaire. A total of 75 patients with stage 3 and 4 chronic kidney diseases participated in the study. The patients were asked about their lifestyle such as tobacco and alcohol consumption, level of physical activity and self-medication also their dietary habits using the 24-hour recall method. The nutritional status of the patients was assessed by the anthropometric method. The data were entered into Sphinx version 4.5 software. They were exported to IBM SPSS version 21 for statistical testing. Student's t test and 1-factor ANOVA were used to calculate and compare the means between the different variables. The Chi2 test was considered significant at the 5% level. Results showed a predominance of males (54.70%) over females (45.30%), giving a sex ratio (M/F) of 1.20. Patients' dietary habits were largely based on whole grains or pasta (100%), followed by vegetables (97.15%), condiments (85.75%), spices (61.65%), fats (51.65%), sugars and beverages (51.65%). According to the stage of CKD, 77.10% (3/4) of the patients had abandoned the consumption of fruit in their weekly diet. Nearly 25.58% and 21.88% of the patients in stages 3 and 4, respectively, had not consumed meat since the change to diagnosis of their disease. Alcohol consumption and smoking of patients before the onset of their CKD were significantly associated with 14.67% and 41% of patients respectively ($p < 0.05$). Low level of sporting activity (61.31%) and self-medication (37.77%) were significantly associated with patients' lifestyle ($p < 0.05$). Nutritional counseling should be an integral part of the management of patients with CKD in order to effectively evaluate the implementation of dietary management measures.

***Keywords:*** *dietary habits, lifestyle, chronic kidney disease patients, Burkina Faso*

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## 1. Introduction

Chronic kidney disease (CKD) is now a global public health problem because of its increasing prevalence, severity and the high cost of its management [1]. In 2019, more than one (01) in ten (10) adults had a kidney disease, or nearly 850 million worldwide [2]. The prevalence varies from one country to another. In the case of France, it is estimated that approximately 5.7 million adults have chronic kidney disease in 2016 [3]. Very little data exists on the prevalence of chronic kidney disease (CKD) in Africa. However, in all through Morocco, the prevalence was 257 cases per million inhabitants in 2010 [4]. As for Burkina Faso, there is only a hospital prevalence estimated at 27.1% in 2011 [5].

When renal function deteriorates, nutrition plays a key role in the management of the disease, from the early stages of the disease. Adaptation of the diet will allow the

maintenance of a stable metabolic state. This is a contribution to nephroprotection [6]. Diet should be the subject of particular attention in chronic renal failure [7]. However, to our knowledge, no study has yet been conducted on the dietary habits of patients with pre-terminal chronic kidney disease in Burina Faso. The lifestyle adopted by each patient could also have a positive or negative impact on their health, and therefore their quality of life. It is in the light of the importance of diet in CKD that the present study was conducted. The objective of this study was to describe the dietary habits and to evaluate the lifestyle of subjects with moderate and severe CKD admitted for nephrological consultation at thesss Yalgado OUEDRAOGO University Hospital (CHU-YO) in Burkina Faso. It specifically describes the socio-demographic characteristics; then describes the dietary habits and lifestyles of patients in relation to the stage of CKD.

# 2. Materials and Methods

## 2.1. Study Population

The study population consisted of patients diagnosed with chronic renal failure at the Yalgado OUEDRAOGO University Hospital. The inclusion criteria concerned all voluntary patients admitted for consultation in the Nephrology-Hemodialysis Service (SNH) during the study period and diagnosed with moderate or severe chronic renal failure. Non-inclusion criteria were any patient unable to answer the questions or did not give informed consent.

## 2.2. Authorisation and Ethical Aspects

The realization of this study was possible thanks to the granting of a favorable opinion of the Ethics Committee for Health Research (CERS) and the authorization of research on behalf of the General Management of the CHU-YO and the Service of Nephrology-Hemodialysis under the number: (N°2017-022/MS/SG/CHUY-O/Néphro-Dialysis). Written and signed informed consent was obtained from participants.

## 2.3. Data Collection Technique and Analysis

Data were collected on a collection form using a semi-structured, validated questionnaire. The questionnaire was developed according to the recommendations of the WHO STEPWise approach for monitoring risk factors for chronic diseases [8]. All patients were interviewed for an average of 15 minutes upon admission to the department for their primary consultation or consultation by appointment with their docteur. First, the patient concludes his consultation with the doctor, and then is taken to another room for the interview, after he or she has given consent.

### 2.3.1. Socio Demographics Informations

Data on socio-demographic parameters are first collected on a standardized collection form, which we later check with the clinical records of each patient for confirmation. These data are collected on age, gender, socio-professional, and family history of CKD.

### 2.3.2. Dietary Habits

The administration of the questionnaire on dietary habits in a three-month recall interval and on the lifestyle of each patient was then carried out, in order to compare the data. As part of the data processing, all foods consumed during the 24-hour recall were then assigned to the different food groups listed in the West African food composition table, FAO [9]. For food categorisation, it was considered that any food reported consumed should be assigned to one of the food groups.

### 2.3.3. Anthropometrics Parameters

Anthropometric parameters such as weight, height, waist and hip circumference were also measured on each patient at the end of the interview.

### 2.3.4. Biochemical Parameters

Some biochemical data of the patients were recorded, notably the creatinine value in order to diagnose the stage of CKD according to the K/DOQI guidelines in 2002 which stipulates the adoption of glomerular filtration rate (GFR) thresholds or stages of CKD classified in five stages of increasing severity [10].

### 2.3.5. Patients' Lifestyle

For the patients' lifestyle, physical activity, smoking status, self-medication and alcohol consumption were recorded on the basis of the participating patients' self-reports. The assessment of the patients' physical activity level was based on walking or cycling from one place to another for 30 minutes at least 03 times a week.

## 2.4. Statistical Analysis

The data were entered into Sphinx software version 4.5. These were exported to IBM SPSS version 21 for frequency calculations and statistical tests. Student's t test and 1-factor ANOVA were used to calculate and compare the means between the variables. The results were considered significant at the 5% Chi2 test. Excel version 2013 was used to produce the diagrams and histograms.

# 3. Results and Discussion

## 3.1. Sociodemographic Parameters

### 3.1.1. Distribution of Patients by Gender and Age Group

The study included 75 patients, 41 men and 34 women. The sample was predominantly male with a sex ratio (M/F) of 1.20. Guissou and al in 2009 with Skalli and al in 2011 noted the same sex ratio as in our study [11,12]. Bah et al also noted the predominance of male sex in nephrology in 60.23% of cases [13]. According to Pouteil-Noble, the high frequency of kidney disease in men and its rapid progression to CKD is related to gender [14].

The average age of the patients interviewed was 60.80 ± 12.21 years with extremes ranging from 32 to 85 years. The mean age of the men was 60.68 ± 13.30 years, that of the women 60.94 ± 10.95 years, with no significant difference between the two sexes ($p = 0.89$). These results

are slightly higher than those found by Traoré who found a mean age of 50.4 ± 15.4 years [15]. The most represented age groups were 60-69 years (33.33%) and 70-85 years (26.67%) respectively, while the 30-39 years age group (5.33%) was the least represented. The results of the distribution of patients by age group are presented in Figure 1 below.

#### 3.1.2. Professional Activity of Patients

Most of the patients in the study population had a profession. The vast majority were those who were self-employed (26.67%), followed by pensioners (18.67%) and housewives (18.67%). This was followed by the group of civil servants (10.67%) and the group of unemployed (10.67%). Only the group of students had the lowest percentage (1.33%). This result is similar to the value of Kabore [16]. Who also found a low percentage for the student group (1.2%). The age range of this group could reflect this low prevalence. These results are presented in Figure 2.

### 3.2. Patients' Dietary Habits

The summary of the percentages of food groups consumed by the respondents at the 24-hour recalls is shown in Figure 3.

#### 3.2.1. Cereal Intake

At the 1st 24-hour recall, all respondents claimed to have eaten cereals the day before the interview. This trend did not vary significantly during the 2nd 24-hour recall, which recorded almost the same frequency (100%). This frequency is slightly higher than those found by authors Kaboré and Djoufouna who found 97.7% and 98.03% respectively [17,18]. Indeed, a study on food consumption in West Africa carried out by ReSAKSS in 2011 showed that in Burkina Faso, cereals predominated in the diet and represented 65.1% of calorific consumption [19]. These cereals were mostly boiled rice, tô or couscous made from maize, sorghum, millet and rarely wheat pasta and fonio. The results of consumption cerals of patients are presented in Figure 3.

#### 3.2.2. Vegetable Consumption

The proportion of patients who consumed vegetables was 97.3% and 97.0% at the 1st and 2nd 24-hour recalls, respectively. These results corroborate those of Djoufouna who recorded a vegetable consumption of 96.71% [18]. These vegetables were reduced in sauce to accompany cereal preparations and cooking. The types of vegetables most frequently consumed were: fresh or dried baobab, cortea and amaranth leaves, and fresh or dried okra.

#### 3.2.3. Consumption of Condiments and/or Spices

Digestive complications may appear earlier in some patients with chronic kidney disease, notably anorexia [20]. Condiments and spices are used as a seasoning in meals. They increase the flavour of meals by stimulating the appetite. As a result, our study recorded fairly high proportions of patients who consumed spices and condiments at the first and second 24-hour recalls, respectively 86.7 and 84.8%. Commonly used spices and condiments include salt, potash, bouillon cubes, soumbala, spices such as peppers, chillies, garlic and more or less parsley and celery. The rest of the patients who did not consume all these condiments and spices were those who claimed to be on a low-salt diet in most cases (13.3%) The results of consumption of condiments of patients are presented in Figure 3.

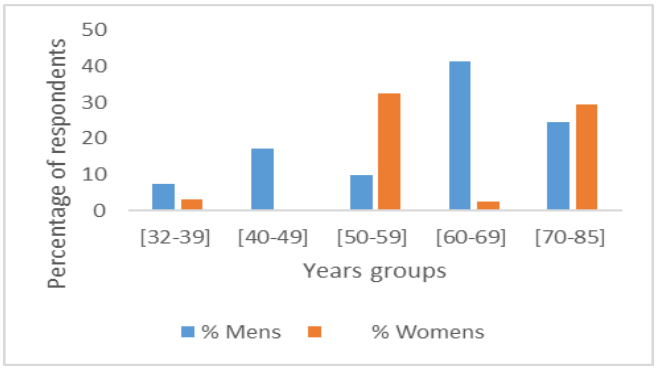


**Figure 1.** Distribution of patients by age group

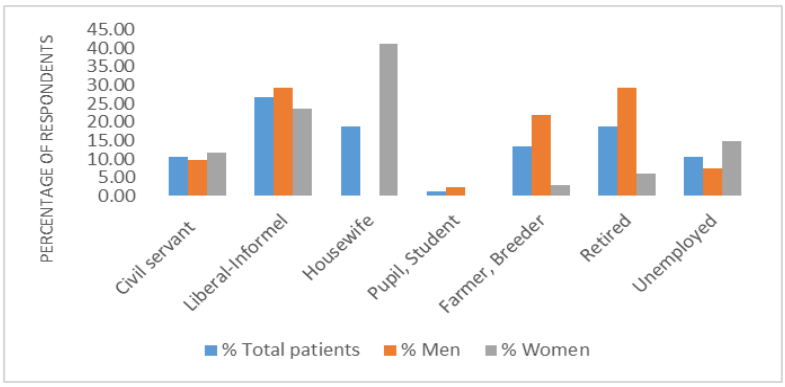


**Figure 2.** Distribution of patients by employment status

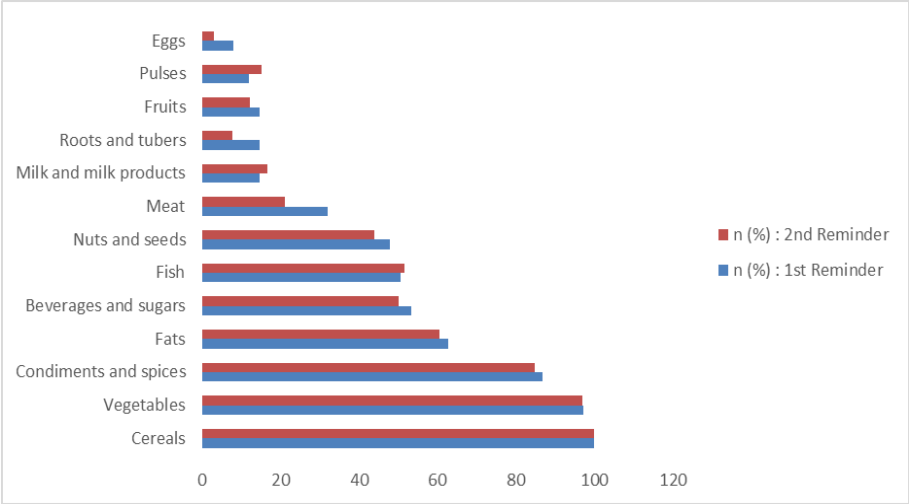


**Figure 3.** Comparison of the percentages of respondents who consumed the food groups at the 02, 24-hour recalls

### 3.2.4. Fat Consumption

The rates of patients who consumed oils and fats during the 1st and 2nd 24-hour recall were 62.7% and 60.6% respectively. These rates are lower than those of Djoufouna [18]. These results can be explained by the low consumption of fat-rich foods as age advances. The results of fats consumption of patients are presented in Figure 3.

### 3.2.5. Consumption of Beverages and Sugars

In patients with renal failure, sugars have no known harmful effects on kidney function. The usual recommendations are the same as for the normal population, i.e. 50% of energy intake. However, as with every component of our diet, excesses can be detrimental in some cases. In the case of diabetes, for example, sweets should be avoided between meals except in the case of a sudden lack of sugar (hypoglycaemia). Consumption of drinks and sugars was observed in 53.3% and 51.5% of patients at the 1st and 2nd 24-hour recall. This abstinence from consumption in the rest of the patients is explained by cases of diabetes or hyperglycaemia and also by advanced age which tends to reject sweet-tasting foods. The results of consumption of beverages and sugars of patients are presented in Figure 3.

### 3.2.6. Consumption of Animal and Vegetable Proteins

The average proportion of patients who consumed fish after the two 24-hour recalls was higher (51.10%) than those who consumed meat (26.60%). This is explained by the diets recommended to the patients during the consultations. This advice advocated a reduction in the consumption of meat (especially red meat) and, to a lesser extent, legumes, which represented an average of only 13.6%. These recommendations during consultations are based on the abnormal levels observed during biochemical examinations (uric acid, proteinuria) of patients. Indeed, protein restriction decreases glomerular hyperfiltration, and renal histological lesions and consequently contributes to slowing down the progression of renal failure [21]. The higher consumption of fish compared to meat could be explained by the fact that fish is more accessible. The average rate of patients who consumed both animal and vegetable proteins were 91.30%. As for eggs, only 8% consumed them at the 1st 24-hour recall, and 3% at the 2nd 24-hour recall. This food group was the least consumed by the patients in this study Figure 3.

### 3.2.7. Consumption of Nuts and Seeds

The average consumption rate of nuts and seeds (peanuts) from the two 24-hour recalls was 45.95%. The consumption of these nuts and seeds by these patients was most pronounced for peanut kernels made into peanut paste for sauces. Restriction of consumption of these foods was also sometimes pronounced for certain patients in view of their biochemical examination table during consultations. The results of consumption nuts and seeds of patients are presented in Figure 3.

### 3.2.8. Consumption of Milk and Milk Products - Roots and Tubers - Fruit

Similar consumption rates of these three food groups were observed in patients at the first 24-hour recall (14.7%). At the second recall, there was a slight increase for milk and tubers (16.7%) but a decrease by half (7.6%) for roots and tubers. A decrease was also observed for fruit (12.10%). The low consumption of these food groups could be explained by their low availability and high cost for low-income patients. The summary of the percentages of food groups consumed by the respondents at the 24-hour recalls is shown in Figure 3.

## 3.3. Frequency of Fruit and Vegetable Consumption per Week

### 3.3.1. Average Number of Days and Portion of Fruit Consumption

Potassium is naturally abundant in fruit. Thus, fruit consumption should be moderate or limited because of hyperkalaemia in late-stage renal failure, but this may be earlier in diabetic patients and patients treated with angiotensin-converting enzyme inhibitors, angiotensin II receptor antagonists or antikaliuretic diuretics [22]. The average frequency of fruit consumption was 2.03 ± 2.32 days per week. The number of fruits consumed was almost zero in 37.33% of the patients of both sexes surveyed. Also, there was a significant difference between gender and frequency of fruit consumption per week ($p$=0.0419).

14.67% of patients had a weekly consumption of 01 to 03 fruits on average. Only 18.66% of patients said they consumed an average of 4 to 7 fruits per week. This low consumption can be explained by the fact that some patients, in addition to chronic renal failure, also suffered from diabetes, so they identified fruit as a portion of food with too much sugar and therefore should be abandoned, not limited. On the other hand, the lack of means and unavailability according to the seasons could also explain this. According to age group, patients in the 60-69 and 70-85 age groups had the lowest frequency of fruit consumption in the week (1.64 ± 2.32 and 1.80 ± 1.76 fruits; $p<0.05$). This low consumption of fruit by these age groups of patients could be explained by the fact that most of them have other comorbidities associated with their CKD, notably diabetes. This requires them to restrict sweetened fruit for their health and well-being. The 30-40 age group had a low average frequency of fruit consumption (1.25 ± 1.50). This can be explained by the low number of patients in this age group (02 out of 75 patients). Patients in the 40-49 and 50-59 age groups had the highest average day of fruit consumption: 3.45 ± 3.07 and 2.13 ± 2.38 respectively. A rate of 36.36% of respondents aged 40-49 consumed fruit daily compared to 5% of those aged 70-85 and even 0% for the 30-39 age group. There was a significant difference between age group and frequency of fruit consumption ($p=0.030$). The distribution of respondents by gender, by age group and average days of fruit consumption/week is shown in Table 1.

Statistical tests are not applicable for the gender and age distribution of the respondents consuming portions of fruit per day (n = 26 or 34.67% of the patients had given a considerable statement. The remaining 65.33% of the study population claimed to have excluded fruit consumption from their dietary habits for the past 2 years). Of this 34.67% of the respondents, fruit consumption was at least one portion per day. A small percentage of respondents (06.66%) had consumed 5 or more portions of fruit. A rate of 34.67% of respondents consumed less than one portion of fruit per week compared to 40.00% who consumed 2 to 4 portions. The percentages of men and women who consumed 2 to 4 portions of fruit per day were very similar (39.02 and 41.17% respectively). The 50-59 age group consumed 2 to 4 portions of fruit per day most often, 53.33%. It should be noted that fruit is consumed more during the fruit season. Indeed, fruit consumption is closely linked to seasonal production and social status [23]. The distribution by sex and age group of respondents consuming portions of fruit per day is presented in Table 2.

### 3.3.2. The Average Number of Days and Types of Vegetables Consumed per Day

Of the total of 75 patients, the average day of vegetable consumption was 5.05 ± 1.17 (5.02 ± 1.15 in men and 5.09 ± 1.21 in women). The percentages of 30.37% and 28.00% of patients were respectively the highest frequencies of weekly vegetable consumption (4 and 5 times a week). The distribution of respondents by gender and average days of vegetable cosumption/week is shown in Table 3.

**Table 1. Distribution of respondents by gender, by age group and average days of fruit consumption/week**

| Frequency Days/week | 0 | 1 | 2 | 3 | 4 | 7 | Average day | *P*-value |
|---|---|---|---|---|---|---|---|---|
| | n (%) | n (%) | n (%) | n (%) | n (%) | n (%) | | |
| Men | 17 (41.46) | 06 (14.63) | 06 (14.63) | 04 (09.76) | 01 (2.44) | 07 (17.08) | **2.02± 2.53** | |
| Women | 11 (32.35) | 05 (14.71) | 05 (14.71) | 07 (20.59) | 03 (08.82) | 03 (08.82) | **2.08 ± 2.08** | $p$ = 0,0419 |
| **Total** | 28 (37.33) | 11 (14.67) | 11 (14.67) | 11 (14.67) | 04 (05.33) | 10 (13.33) | **2.03± 2.32** | |
| **Age group** | | | | | | | | |
| 30-39 | 00 (00.00) | 00 (00.00) | 01 (25.00) | 01 (25.00) | 00 (00.00) | 00 (00.00) | **1.25 ± 1.50** | |
| 40-49 | 03 (27.27) | 01 (09.09) | 01 (09.09) | 01 (09.09) | 01 (09.09) | 04 (36.36) | **3.45 ± 3.07** | |
| 50-59 | 05 (33.33) | 03 (20.00) | 01 (06.67) | 03 (20.00) | 01 (06.67) | 02 (13.33) | **2.13 ± 2.38** | $p$ = 0,0306 |
| 60-69 | 12 (48.00) | 04 (16.00) | 03 (12.00) | 02 (08.00) | 01 (04.00) | 03 (12.00) | **1.6 ± 2.32** | |
| 70-85 | 06 (30.00) | 03 (15.00) | 05 (25.00) | 04 (20.00) | 01 (05.00) | 01 (05.00) | **1.80 ± 1.76** | |

The means are expressed as m ± SD.

**Table 2. Distribution by gender and age group of respondents consuming portions of fruit per day**

| | <1 portion | 1 portion | 2 to 4 portions | ≥ 5 portions |
|---|---|---|---|---|
| | n(%) | n(%) | n(%) | n(%) |
| **Sexe** | | | | |
| Hommes | 15 (36.59) | 07 (17.07) | 16 (39.02) | 03 (07.31) |
| Femmes | 11 (32.35) | 07 (20.59) | 14 (41.17) | 02 (05.88) |
| Total | 26 (34.67) | 14 (18.67) | 30 (40.00) | 05 (06.66) |
| **Tranche d'âge** | | | | |
| 30-39 | 02 (50.00) | 00 (00.00) | 01 (25.00) | 01 (25.00) |
| 40-49 | 02 (18.18) | 04 (36.36) | 03 (27.27) | 02 (50.00) |
| 50-59 | 05 (33.33) | 01 (06.67) | 08 (53.33) | 01 (06.67) |
| 60-69 | 10 (40.00) | 05 (20.00) | 09 (36.00) | 01 (04.00) |
| 70-85 | 05 (35.00) | 04 (20.00) | 09 (45.00) | 00 (00.00) |

A serving of fruit in this study corresponds to an average whole fruit.

**Table 3. Distribution of respondents by gender and average days of vegetable consumption/week**

| Number of days | Men (n= 41) | Women (n= 34) | Total (n= 75) |
|---|---|---|---|
| | n(%) | n(%) | n(%) |
| **3** | 02 (4.88) | 03 (08.82) | 05 (06.67) |
| **4** | 14 (34.15) | 09 (26.47) | 23 (30.37) |
| **5** | 12 (29.27) | 09 (26.47) | 21 (28.00) |
| **6** | 07 (17.07) | 08 (23.53) | 15 (20.00) |
| **7** | 06 (14.63) | 05(14.71) | 11 (14.67) |
| **Average day** | **5.02 ± 1.15** | **5.09 ± 1.21** | **5.05 ± 1.17** |

The means are expressed as m ± SD.

According to the types of vegetables consumed, more than half of the respondents (n=57, i.e., 76%) consumed 3 to 4 types of vegetables every day. The age group that consumed the most vegetables was 40-49. In each age group, more than half of the respondents consumed between 3 and 4 types of vegetables per day, but the 40-49 age group consumed the most (90.9%). The distribution of respondents consuming types of vegetables daily by gender and age group is shown in Table 4. Overall, all patients have an acceptable level of vegetable consumption in their diet. This analysis does not allow us to conclude on the influence of the level of vegetable consumption on the evolution of the CKD stage (p = 0.74).

**Table 4. Distribution of patients according to the number of types of vegetables consumed**

| | ≤ to 2 types | 3 to 4 types | ≥ 5 types |
|---|---|---|---|
| | n(%) | n(%) | n(%) |
| **By gender** | | | |
| Hommes | 06 (14.63) | 28 (68.29) | 07 (17.07) |
| Femmes | 02 (05.88) | 29 (85.29) | 03 (08.82) |
| **Total** | **08 (10.67)** | **57 (76.00)** | **10 (13.33)** |
| **By age group** | | | |
| 30-39 | 01 (25.00) | 03 (75.00) | 00 (00.00) |
| 40-49 | 01 (09.09) | 10 (90.90) | 00 (00.00) |
| 50-59 | 00 (00.00) | 11 (73.33) | 04 (26.66) |
| 60-69 | 01 (04.00) | 21 (84.00) | 03 (12.00) |

Type of vegetable : corresponds to a characteristic vegetable.

## 3.4. Eating Habits According to CKD Stage

### 3.4.1. CKD Stage and Fruit Consumption during the Week

More than three-quarters of the patients (77.10%) had not consumed any fruit in the week before the survey, of which 46.7% were in stage 4 CKD and 30.2% in stage 3. Of these, 46.7% of patients were in CKD stage 4 and 30.2% in stage 3. Fruit consumption varied from two to seven portions per week for the rest of the patients surveyed, but at low proportions, especially for patients in stage 4 (Graph 3). This low consumption can be explained by the recommendations of the nursing staff during the consultations to reduce their consumption of fruit given the biochemical examinations which showed hyperkalaemia in some patients. Hyperkalaemia appears in the late stage of renal failure, but it may be earlier in diabetic patients [24]. However, this reduction was significant in 77.10% of patients who did not consume even one fruit in a week because, the WHO recommends adults to consume at least 3510 mg of potassium per day, the normal intake being about 5 g/day or 5000 mg/day, [25]. And for patients with renal failure, the reduction should be at least half, 2 - 2.5g of potassium per day, to achieve a kalaemia below 5 mmol/L. Indeed, potassium has an exciting role in muscular contraction in all muscles, including the heart; its deficiency would therefore lead to excitation and contraction disorders. Foods's rich in potassium also help to reduce blood pressure. Naturally, potassium is abundant in fruits (such as bananas, papayas and dates) and vegetables, and also in chocolate. This near absence of fruit consumption among these patients is explained by the unavailability of fruit and/or the low purchasing power of these patients. Figure 4 summarises the stage of CKD according to fruit consumption during the week.

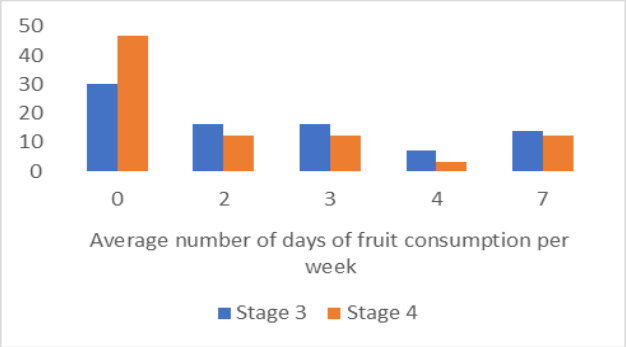


**Figure 4.** Prevalence of CKD stage and to fruit consumption in the week

### 3.4.2. CKD Stage by Frequency of Vegetable Consumption during the Week

Vegetable consumption was on average 5.05 ± 1.17 days per week for all patients in both stages combined. The proportion of stage 4 patients (31.25%) who consumed vegetables 4-5 times per week was higher than that of stage 3 patients (27.90%). In contrast, the proportion of stage 3 CKD patients who consumed 7 times a day of vegetables in a week was twice as high as those in stage 4 (Figure 4). Vegetables are consumed regularly by all patients and at all meals, even though their consumption remains fairly closely linked to seasonal production. Some vegetables also contain a very high percentage of potassium, such as spinach, cabbage, and parsley (about 550 mg/100 g), whose very high consumption exposes the risk of hyperkalaemia. Thus, the hyperkalaemia observed among some patients in this study can be explained by the high consumption of these potassium-rich vegetables. The stage of CKD according to vegetable consumption during the week is shown in Figure 5.

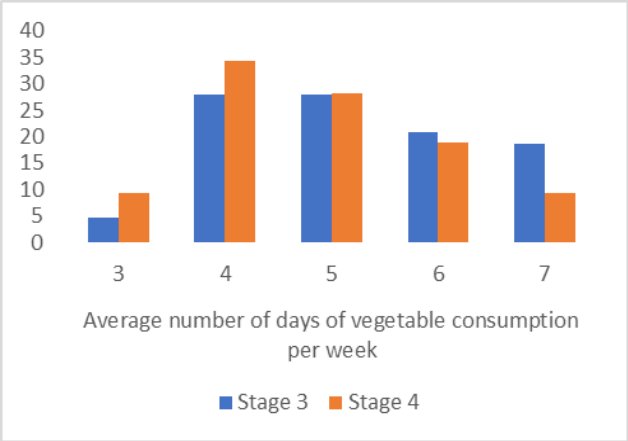


**Figure 5.** CKD stage and vegetable consumption during the week

### 3.4.3. CKD Stage and Meat and Fish Consumption in a Week

If protein is consumed in excess, a person with chronic renal failure will have kidneys that have difficulty eliminating waste products, hence the risk of worsening CKD. On the other hand, the lack of dietary protein intake will promote a condition that develops insidiously when appetite is not present: this is malnutrition or undernutrition in renal failure, [24]. Percentages of 25.58% and 21.88% of stage 3 and 4 patients no longer ate meat since the discovery of their renal failure, in addition to the dietary advice received during consultations. This could be explained by the confusion or misunderstanding of the patients about the terms "meat restriction" and "total abandonment". Meat consumption varied from 1 to 7 days for the rest of the patients with a high percentage (28.13%) of consumption of one day per week for stage 4 patients. Only 18.75% to 20.93% of patients consumed meat regularly. Those who did not eat meat at all compensated for their protein intake by eating fish. According to the Kidney Disease Outcomes Quality Initiative (K/DOQI) and the ANAES, patients with stage 1-3 renal failure should restrict their dietary protein intake by 0.75 to 0.8 g/kg/d, [26,27]. However, protein requirements will be increased, particularly in the case of infections. The CKD stages according to meat and fish consumption are shown in Figure 6 and Figure 7.

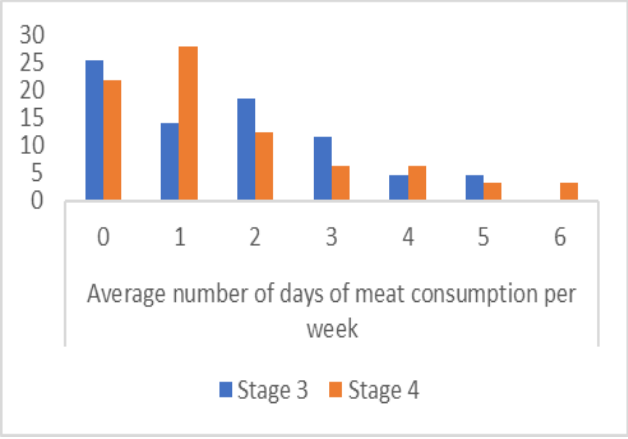


**Figure 6.** CKD stage and meat consumption in the week

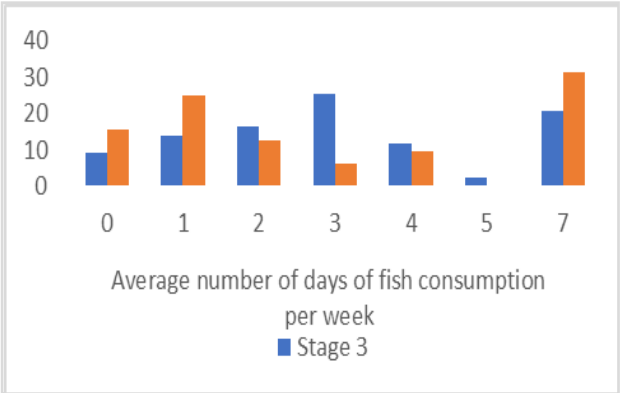


**Figure 7.** Sage of CKD and fish consumption in the week

## 3.5. Lifestyle of Patients

### 3.5.1. Alcohol Consumption by Age Group and Gender

In our study population, 28% of the patients claimed to consume alcoholic beverages up to the last 30 days of the questionnaire administration. The age group 60-69 years was the most represented, i.e., 40% (of which 41.18% were men and 37.50% were women, with no significant difference in alcohol consumption p = 0.085). The distribution of respondents consuming alcohol by age group and sex are presented in Table 8. The distribution of respondents consuming alcohol by age group and sex are presented in Table 5. This reduction in tobacco and alcohol consumption can be explained by the advice received by patients during consultations.

**Table 5. Distribution of respondents who drink alcohol by age group and sex**

| Usual alcohol consumption | Total | Men | Women | Significance |
|---|---|---|---|---|
| | n (%) | n (%) | n (%) | |
| | **Age group** | | | |
| 30-39 | 00 (00.00) | 00 (00.00) | 00 (00.00) | ND |
| 40-49 | 02 (18.18) | 01 (14.29) | 01 (25.00) | ND |
| 50-59 | 04 (26.67) | 02 (50.00) | 02 (18.18) | ND |
| 60-69 | 10 (40.00) | 07 (41.18) | 03 (37.50) | 0.085 |
| 70-85 | 05 (25.00) | 02 (20.00) | 03 (30.00) | ND |
| **30-85** | **21 (28.00)** | **12 (29.27)** | **09 (26.47)** | **0.513** |

ND: Not determined.

### 3.5.2. Tobacco and Alcohol Use among Patients

A total of 14.67% and 41.33% of the patients claimed to have a history of smoking and drinking respectively. Of these percentages, men were significantly higher than women ($p<0.05$). This could explain the high frequency of men being more exposed to cardiovascular and chronic diseases compared to women, especially CKD, [14]. Patients who continued to consume despite their health status were 5.33% for tobacco consumption, especially cigarette consumption, and 28.00% for alcohol consumption. This reduction in tobacco and alcohol consumption can be explained by the advice received by patients during consultations (Table 6).

**Table 6. The lifestyle of patients (smoking and drinking; practicing sport) by age group and sex**

| | Total (n=75) | Men (n=41) | Women (n=34) | *p*-value |
|---|---|---|---|---|
| | n (%) | n (%) | n (%) | |
| **Lifestyle** | | | | |
| Smoking before CKD | 11(14.67) | 10 (24.39) | 1(2.94) | 0.007 |
| Tobacco during CKD | 4 (533) | 3 (732) | 1 (2.94) | 0.317 |
| Alcohol before CKD | 31(41.33) | 16 (39.02) | 15 (44.12) | 0.057 |
| Alcohol during CKD | 21(28.00) | 12 (29.27) | 9 (26.47) | 0.313 |
| Sporting activity | 29 (38.67) | 15 (36.59) | 14 (41.18) | 0.253 |

### 3.5.3. Level of Physical Activity

According to the French High Authority for Health, sport is beneficial to health when it is repeated at least three times a week, [28]. In this study, 38.67% of the patients (n = 29) practised regular physical activity, compared to 61.33% of the patients who did not. There was no significant association between the practice of sport and the stage of renal failure (p = 0.47). Of those who did participate, 34.48% of patients claimed to have at least 3 to 4 sessions per week and only 31.03% spent more than 30 minutes per session practising sports. This number of patients (31.03%) meeting the HAS standard was very small in this study. This could be explained by the fact that a large number of patients were unaware of the benefits of sporting activity. Table 7 summarises the distribution of respondents by stage of CKD and by physical activity.

**Table 7. Distribution of respondents by stage of CKD and physical activity**

| | Stage 3 | Stage 4 | Total | *p*-value |
|---|---|---|---|---|
| | n(%) | n(%) | n(%) | |
| **Physical Activity** | | | | |
| Yes | 16 (37.21) | 13 (40.63) | 29 (38.67) | $p = 0.047$ |
| No | 27 (62.79) | 19 (59.38) | 46 (61.33) | |
| **Nomber of time spent by praticipants** | | | | |
| 1-2 times/week | 06 (37.50) | 08 (61.54) | 14 (48.28) | |
| 3 to 4 times/week | 06 (37.50) | 04 (30.77) | 10 (34.48) | $p = 0.033$ |
| More than 04 times/week | 04 (27.00) | 01 (07.69) | 05 (17.24) | |
| **Number of time spent by participants** | | | | |
| 15 to 30 minutes | 11 (68.75) | 09 (69.23) | 20 (68.97) | |
| More than 30 minutes | 05 (31.25) | 04 (30.77) | 09 (31.03) | $p = 0.064$ |

### 3.5.4. Self-medication of Patients before CKD

According to the WHO, self-medication is when an individual uses a medicine on his or her initiative to treat a self-identified condition or symptom, without consulting a health professional, [29,30]. A percentage of 69.33% of the patients surveyed claimed to be self-medicating before they knew they had kidney failure. In 64% of patients, the use of anti-inflammatory drugs was observed at (37.77%), followed by traditional products at (32.69%), and analgesics at (28.85%). The distribution according to the therapeutic classes of drugs is shown in Table 8.

**Table 8. Therapeutic class distribution of drugs**

| Drugs | Number | Percentage | *p*-value |
|---|---|---|---|
| Anti-inflammatories | 16 | 37.77 | $p < 0.01$ |
| Analgesics | 15 | 28.85 | $p = 0.065$ |
| Anti-malarials | 4 | 7.69 | $p = 0.158$ |
| Traditional products | 17 | 32.69 | $p < 0.01$ |

## 4. Conclusion

Chronic kidney disease (CKD) is a serious, progressive and long-silent disease. Understanding the dietary habits and lifestyle of patients is a crucial step in the management of this disease. Our results revealed a predominance of men over women. The dietary habits (HA) of patients of both sexes were largely based on whole grains or pasta cereals, followed by vegetables, condiments and spices, fats, sugars and drinks. According to the severe or moderate stage of CKD, many patients had cut out fruit and meat from their dietary habits since the diagnosis of their disease. The study also revealed significant alcohol and tobacco consumption in some patients before the onset of their disease. Lifestyle was significantly associated with a low level of physical activity and self-medication. In sum, it should be noted that most patients have difficulty understanding the concept of "restriction" and "exclusion" of a given food. Nutritional support should be an integral part of the management of patients suffering from CKD for an effective evaluation of the implementation of hygienic and dietary measures by patients.

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## Conflicts of Interest

The authors do not declare any conflict of interest.

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