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ASPECTS REGARDING THE INCIDENCE OF CHRONIC KIDNEY DISEASE

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KEYWORDS

Chronic kidney disease (CKD)
Chronic renal failure (CKD)
Concentration capacity
Terminal uremia
Glomerular filtration rate (eGFR)
Risk factors

ABSTRACT

Chronic renal failure (CKD) affects approx. 10% of the global population, being a serious public health problem. To detect chronic kidney disease (CKD), it is necessary to evaluate the glomerular filtration rate, because the disease is asymptomatic until the kidneys fail. Evaluation of the glomerular filtration rate based on the determination of the creatinine level is useful for the detection of kidney disease in the early stage. Therapeutic interventions can limit the progression of BCR and the occurrence of complications.

INTRODUCTION

Chronic Renal Insufficiency is a public health problem in Romania due to its high prevalence of 10%, among the highest in Europe. About 20% of BCR patients fall into the moderate and high risk classes (Ambarkar et al., 2015; Arulkumaran et al., 2010; Banerjee et al., 2009; Bone et al., 1997; Borundel, 1994).
Chronic kidney disease, also called chronic renal failure, involves a progressive decrease in the functional capacity of the kidneys, with the retention in the body of toxic substances resulting from metabolism and with evolution towards terminal uremia. From an etiological point of view, chronic kidney disease represents the final stage of bilateral kidney diseases, especially chronic glomerulonephritis, glomerulonephritis and chronic pyelonephritis, malignant arterial hypertension, urinary tract obstructions (Burdun et al., 2005; Coresh et al., 2007; Lim et al., 2012; Zoccali et al., 2010).
The efficiency of blood filtering by the kidneys is shown by the eGFR- Estimated glomerular filtration rate test. Through the determined serum creatine level, the glomerular filtration function of the kidneys (eGFR) is estimated by specific formulas. eGFR is a good indicator of kidney function because it decreases in the same way as GFR decreases. In this way, estimated glomerular filtration rate (eGFR) is good for identifying kidney damage earlier (Fischbach, 2002; Raportul anual al registrului renal roman, 2012; Stevens et al., 2007; Tonelli et al., 2006).
The treatment of chronic kidney disease (CKD)point to slow down the progression of kidney damage, usually by controlling the cause (the disease that caused the kidney failure). Even if the underlying condition is controlled, this may not prevent the progression of kidney damage. Chronic kidney disease (CKD) can progress to the terminal stage, which is fatal if the replacement therapy of renal function is not initiated through dialysis or renal transplantation (Ortiz et al., 2014; Parving et al., 2006; Raportul anual al registrului renal roman, 2012).
The present work aims to study the incidence of chronic kidney disease in patients who presented themselves in the UPU during a week, who underwent a set of analyzes in order to confirm the diagnosis.

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MATERIALS AND METHODS

The study group included a number of 312 patients whose blood was collected for examination. The collected specimen was venous blood; the vacutainer with/without separating gel was used as the collection container. The vacutainers were centrifuged for 15 minutes at 3500 – 4000 rpm to separate the serum which was worked on immediately. Intensely lipemic or intensely hemolyzed specimens were rejected.
Creatinine dosage was carried out by the enzymatic-colorimetric method (Jaffe), the reagents used were provided by Roche and Siemens (Switzerland, Germany), and the analyzers on which the analyzes were performed were Cobas Integra 400 plus and Atellica; the following data are required to estimate eGFR: serum creatinine value, patient age, sex, race (white/black), weight and height.

RESULTS AND DISCUSSION

The measurement of creatinine and eGFR was carried out on a number of 312 blood samples, 160 samples came from women and 152 samples from men, the gender ratio being F/M=1.05 (Figure 1).

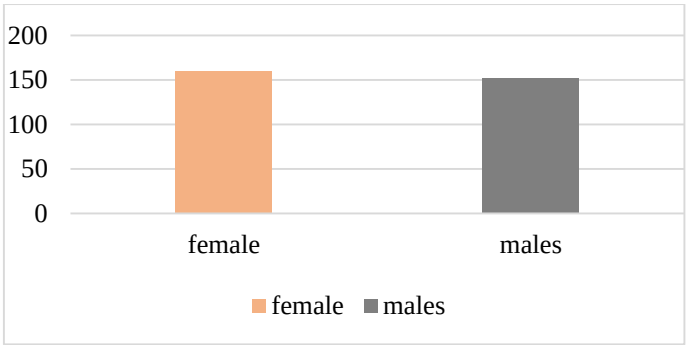

Figure 1. Gender distribution of investigated patients

The breakdown by age group of the investigated persons was as follows (Figure 2).
From the analysis of Figure 2, it can be seen that the largest number of investigated cases for both female and male patients were in the 61-70 age group, and the lowest number of cases was registered in the 21-30 age group, followed by the 31-40 age group.

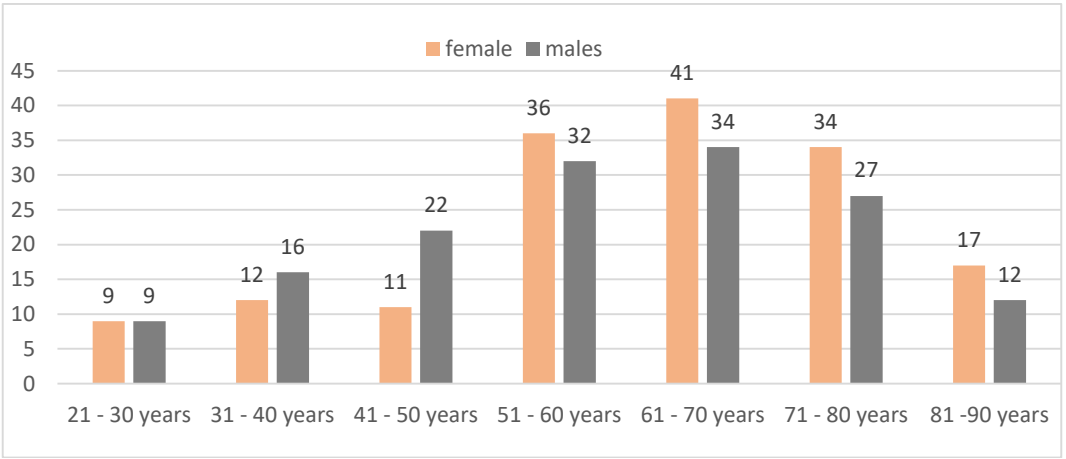

Figure 2. Distribution by age groups of the investigated patients

The analysis of the environment of origin led to the following results:

Table 1. The environment of origin

	Rural		Urban	
	Number	Percent (%)	Number	Percent (%)
Female	89	28,52	71	22,75
Males	55	17,62	97	31,09

From the analysis of Table 1, the environment of origin, a higher percentage of female patients from the rural area and a higher percentage of male patients from the urban area can be observed (Figure 3). From the data published in the specialized literature, it seems that the risk for BCR is higher among female patients from rural areas, but the mortality risk for patients with BCR is higher in male patients from urban areas, which indicates the existence of two distinct vulnerable social groups that require adapted prevention programs.

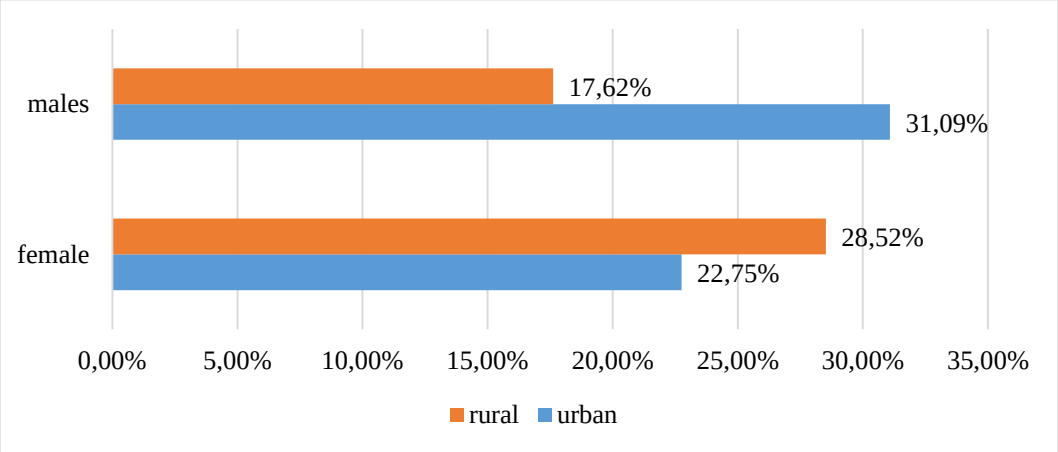

Figure 3. Graphic representation of patients depending on the environment of origin

According to the guidelines, estimation of eGFR based on serum creatinine is useful for screening patients with risk factors for chronic kidney disease: type I and II diabetes; heart conditions; family history of kidney disease, but also for monitoring patients with chronic kidney disease in order to stage the disease and establish the prognosis. The reference values for eGFR are included in the following ranges (Parving et al., 2006; Raportul anual al registrului renal roman, 2012; Stevens et al., 2007):

• eGFR ≥ 89 is in the reference range;
• eGFR = [60 -89] may mean kidney disease in early stage;
• eGFR = [15 -59] may mean kidney disease;
• eGFR < 15 may mean kidney failure.

Following the determination of eGFR in female patients, the following results were obtained (Table 2).

Table 2. Distribution of female patients according to the eGFR value

Age groups	Number of patients			
	eGFR > 90	eGFR: 60 - 89	eGFR: 15 - 59	eGFR < 15
21 – 30 years	8	0	0	1
31 – 40 years	11	0	1	0
41 – 50 years	7	3	0	1
51 – 60 years	18	12	4	2
61 – 70 years	13	12	14	2
71 – 80years	12	8	14	0
81 – 90years	1	8	7	1

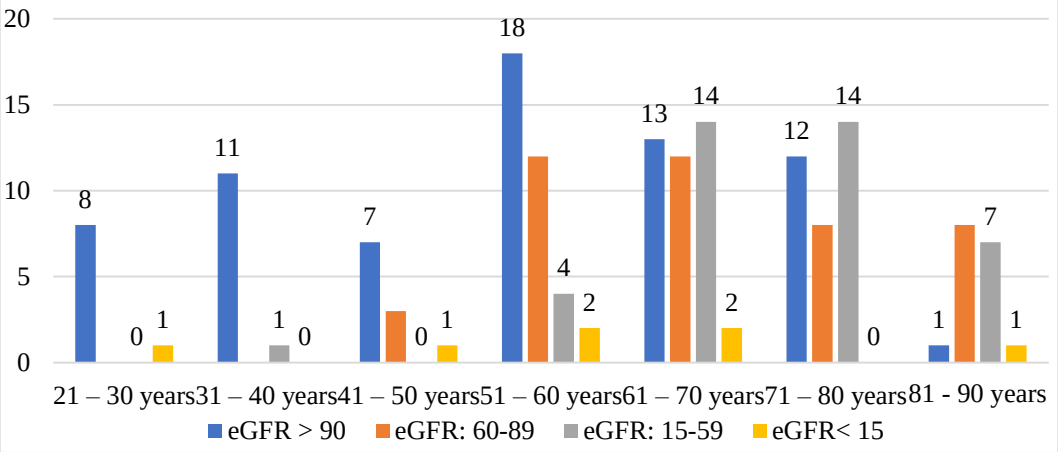

Figure 4. Distribution of female patients according to the eGFR value

Analyzing the values in Table 2 and Figure 4, it is found that most cases with patients suspected of kidney disease in the incipient stage were registered in the age groups 51-60 years, respectively 61-70 years. Most female patients with chronic kidney disease were registered in the age groups 61-70 years, respectively 71-80 years, and eGFR values lower than 15, which may mean kidney failure, were registered in the following patients: a 30-year-old patient (eGFR=10.48), a 42-year-old patient (eGFR=5.82), 2 patients belonging to the age group 51-60 years, a 55-year-old patient (eGFR=8.02), respectively, a 59-year-old patient (eGFR = 13.9), 2 65-year-old patients belonging to the age group 61-70 years (eGFR = 8.15, eGFR = 9.29).
According to data from specialized literature, BCR has 5 stages (1-5), stages determined by the glomerular filtration rate (eGFR). BCR stage 3 is often divided into 3a and 3b. BCR stages from 1 to 3a represent the early stage, and those from 3b to 5, the terminal stage.
The evolution of the chronic condition is very variable, sometimes fast (in a few months), sometimes slow (years or decades). Rigorous supervision, with the maintenance of hydroelectrolytic and metabolic balance, allows a long evolution. The complications that can occur are numerous, the most dangerous being pulmonary or cerebral edema, infections etc.
Following eGFR determinations in male patients, the following results were obtained (Table 3).

Table 3. Distribution of male patients according to the eGFR value

Age groups	Number of patients			
	eGFR > 90	eGFR: 60 - 89	eGFR: 15 - 59	eGFR < 15
21 – 30 years	9	0	0	0
31 – 40 years	13	1	2	0
41 – 50 years	17	4	1	0
51 – 60 years	23	4	4	1
61 – 70 years	14	11	6	3
71 – 80 years	6	14	6	1
81 – 90 years	0	3	9	0

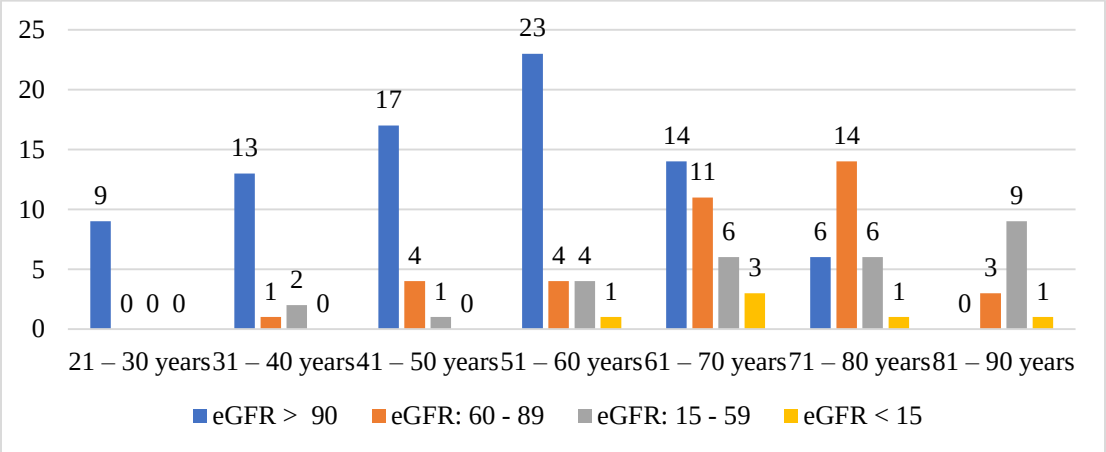

Figure 5. Distribution of male patients according to the eGFR value

From the analysis of Table 3 and Figure 5 it is found that the largest number of patients suspected of kidney disease, in the incipient stage, was in the age groups 71-80 years, respectively 61-70 years. Regarding patients suspected of chronic kidney disease, most cases were registered in the age group 81-90 years (9 cases), an equal number of patients in the age groups 61-70 years, respectively 71-80 years (6 cases), and the lowest number of patients were in the 41-50 age group. If in female patients there were 7 cases of patients suspected of renal insufficiency, in male patients only 5 cases of patients suspected of renal insufficiency were recorded: a 54-year-old patient (eGFR = 6.33), 3 patients belonging to the age group 61-70 years - a 68-year-old patient (eGFR = 11.23), a 69-year-old patient (eGFR = 7.73), a 70-year-old patient (eGFR = 10.43) and a single patient belonging to the age group 71-80 years old, aged 73 (eGFR = 11.2). In men, with age, due to the reduction in muscle mass, a physiological decrease in eGFR is recorded, the interference that must be taken into account in the evaluation of health status.
From a percentage point of view (Table 2, 3), 25% of the female patients, respectively 18, 42% of the male patients were suspected of chronic kidney disease and 4.37% of the patients of female, respectively 3.28% of male patients were suspected of renal failure. Of the 312 patients investigated, during one week, 21.79% are suspected of chronic kidney disease and 3.28% of the patients are suspected of renal failure. According to specialist guidelines, the diagnosis of chronic kidney disease is made when the glomerular filtration rate remains below 60 mL/min/1.73m^2 for 3 months in a row. Patients with BCR suffer more frequently from diabetes,

hypertension, cardiovascular diseases; and mortality is twice as high in these patients, which indicates the need for multidisciplinary care of patients with BCR.
All patients suspected of chronic kidney disease were directed to the nephrology service for investigation and specialized treatment.

CONCLUSION

Estimation of the glomerular filtration rate based on the creatinine level is useful for detecting kidney disease in the early stage.
The evaluation of the glomerular filtration rate must be done at least annually in people with a high risk of developing chronic kidney disease or with confirmed disease.
People at high risk of BCR must be made aware of the potential risks.
The preventive attitude must be adopted urgently, before the appearance of signs of renal failure.
Renal failure cannot be cured, but its complications can be reduced under the conditions of applying some preventive measures.

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