Original article

# Employment in Patients With Renal Replacement Therapy

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## Abstract

**Aim:** To determine the prevalence and rate of employment of patients on renal replacement therapy (RRT) for end-stage renal disease (ESRD), to study the difference in the rate of employment between patients on hemodialysis (HD) and those with functioning kidney transplant (FKT) and to compare the rate of employment with patients' opinions about their working ability and determine the possible reasons for the presumed disproportion..

**Methods:** 220 RRT patients (126 on HD and 94 with FKT) at the University Hospital Centre Osijek were surveyed. We created and used a questionnaire about the level of education, occupation, employment, professional timeline during the course of RRT, personal opinion about working ability and potential reasons for unemployment. Research was conducted during April and May 2017. The data were analyzed using SPSS (version 16.0. Inc., Chicago, IL, USA).

**Results:** At the time of our research, 13.7% of patients on RRT were employed. Employment of FKT patients prevailed, without significant difference compared with dialyzed patients of working age (15 to 65 years old). 38.3% of patients in that age group felt capable of working. Transplantation did not improve access to employment. Highly educated people were employed more frequently. The main reasons for unemployment were poor health caused by CKD, advanced age, and employers' unwillingness to hire chronically ill persons because of the potential need to adjust working hours.

**Conclusion:** CKD reduced working ability and employment opportunities. Only a minority of patients on RRT were employed. Kidney transplantation did not increase the rate of employment. Patients should therefore be provided with education, appropriate guidelines and support for finding employment.

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## Introduction

Chronic kidney disease (CKD) often develops slowly and without specific symptoms. Consequently, many patients are diagnosed in the advanced stages of the disease (1). CKD is accompanied by numerous complications: anemia, mineral and bone disorders, inflammation-induced progression of atherosclerosis, malnutrition, dyslipidemia, cardiovascular disease (CVD), infections, immune system disorders, gastrointestinal disorders, neurological disorders, etc. (2). Patients with end-stage renal disease (ESRD) are treated by renal replacement therapy (RRT) (1). RRT is performed by dialysis or renal transplantation (TX). Today, more than a million patients with CKD worldwide are treated by hemodialysis (HD). During and after the HD procedure, numerous complications such as hypotension, cramps, nausea, vomiting, headache, tingling, sweating or hypoglycemia may occur (3). Hypotension is one of the most common complications (4). TX is the best protocol for treating ESRD (5). Successful kidney TX improves quality of life (QoL) and reduces the risk of death for most patients, when compared with the risk present for patients on dialysis (6, 7, 8). The term "health-associated QoL" has been in use (HRQOL, Health-Related Quality of Life) for several decades. This term encompasses the effect of health, i.e., of the illness and of treatment for the illness on the patient's physical, cognitive and social functioning. CKD significantly affects QoL. HD is a complex procedure that requires frequent visits to the dialysis center, usually 3 times per week, which takes time and necessitates changes in the lifestyle. Therefore, HD patients have impaired QoL, both from symptoms of ESRD and from the psychological and physical burdens of HD. Patients who develop ESRD are in poor physical condition, they develop anemia, get tired quickly, often have sleep disorders, and develop depression (9, 10). Although QoL cannot be measured directly, QoL questionnaires are designed according to determinants that are important to the patients. QoL questionnaires survey the physical and mental condition and the characteristics of the primary renal disease which affect QoL. Studies using such or similar questionnaires have shown that QOL of HD patients is significantly worse than that of the general population, especially in regard to the physical component of HRQOL (9). TX, the best form of RRT, improves QoL, but it could be hard to find a suitable graft and to have the graft successfully accepted (11, 12). Likewise, lifelong immunosuppressive therapy after TX carries risks of infection, malignancy, and CVD. Working ability is considered a significant indicator of well-being and health (13). Although patients have significantly improved health after TX, in practice, transplanted patients frequently face unemployment. We thus presumed that treatment of CKD with dialysis or TX prevents patients from gaining employment and that kidney TX, as the best form of RRT, does not improve employment access for patients. The aims of the study were to determine the prevalence of employment of patients on and during the course of RRT, to evaluate whether there was a difference between the prevalence of employment for patients on HD and those after TX, to compare employment with patients' opinions about their working ability, and to establish the possible reasons for the presumed disproportion.

## Patients and Methods

The research was conducted at the Department of Nephrology of the Clinic for Internal Medicine at the University Hospital Centre Osijek during April and May 2017, with approval of the Ethics Committee for Research at the Faculty of Medicine, Josip Juraj Strossmayer University in Osijek, Croatia. 220 patients were selected as the subjects of our study: 126 were treated by HD and 94 by functioning kidney transplant (FKT). At the time of our research, the sample included cooperative patients that could and did fill in the questionnaire (the initial eligible group consisted of 150 HD and 200 FKT patients). Out of 126 patients who were treated by HD during the research period, 12 had undergone a kidney transplant. 133 (60.5%) of all participants were male and 87 (39.5%) were female. The median age was 63, ranging from 31 to 88 (IQR 52 – 71). 80 (63.5%) of the 126 participants treated by

dialysis were male and 46 (46.5%) were female. The median age of patients on HD was 69, ranging from 32 to 88 (IQR 59 – 76). Of 94 patients with FKT, 53 (56.4%) were male and 41 (43.6%) female. The median age of patients with FKT was 57, ranging from 31 to 78 (IQR 50 – 63). 120 patients were of working age (15 – 65 years old). Chronic glomerulonephritis and diabetic nephropathy were the two most common causes of renal failure in patients on RRT. The third most common basic renal disease was arterial hypertension, followed by interstitial nephritis and autosomal dominant polycystic kidney disease. Patients were asked to fill in a questionnaire about their formal education, occupation, employment, professional timeline during the course of RRT and possible reasons for unemployment. The questionnaire was specifically created for our study by the researcher and it included data on finding employment and carrying out work along the following timeline: before CKD diagnosis, after CKD diagnosis, prior to starting dialysis, a year subsequent to starting dialysis, before TX, a year after TX and at the time of the research (Figure 1).

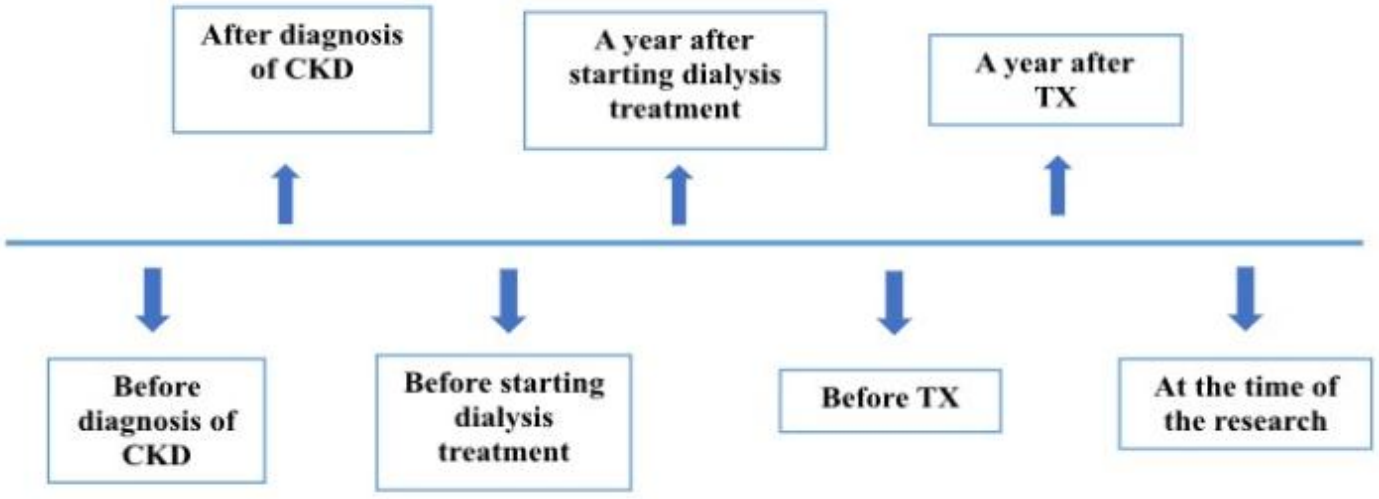
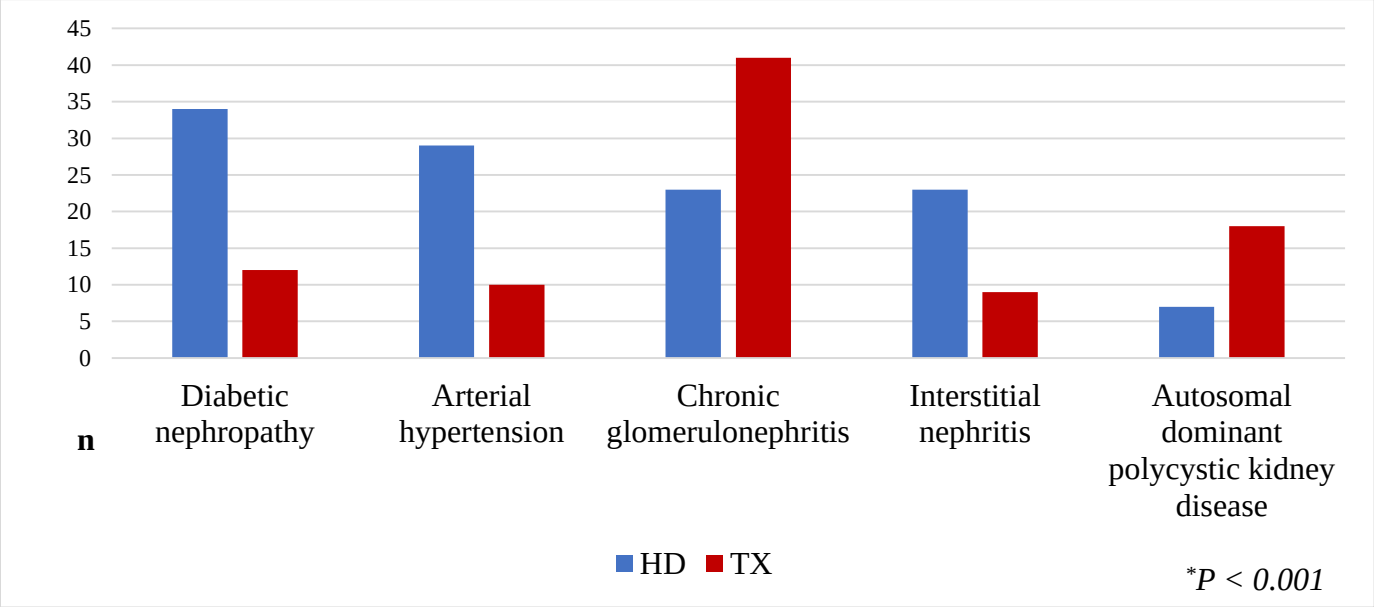



**Figure 1. Time points for which the participants were asked about their employment**

Demographic data, time data about the dialysis and TX, as well as data about the primary renal disease and concomitant morbidity were taken from medical records. Data were statistically analyzed using SPSS (version 16.0. SPSS Inc., Chicago, IL, USA). Descriptive statistics included the median with interquartile range (IQR) for numeric data. Absolute and relative frequencies were used for nominal data. Differences between two unrelated groups were obtained by the Chi-Square or Mann-Whitney Test, depending on the data type. Marginal Homogeneity was used for the difference between two related samples. Statistical significance was accepted if P was < 0.05.

## Results

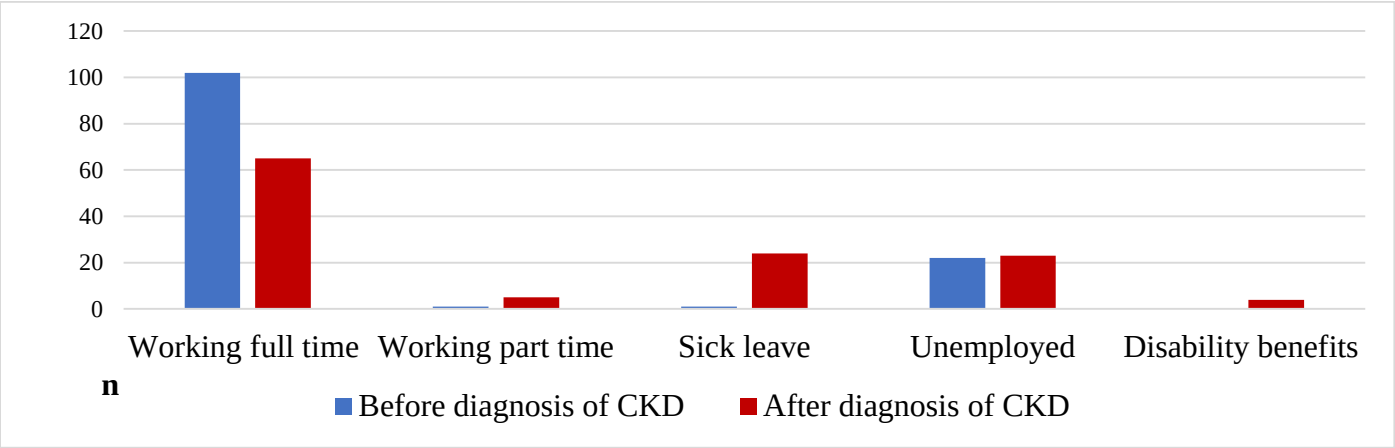
220 patients were included in the research, 126 of which were treated with HD and 94 with FKT. FKT patients were significantly younger than patients on dialysis at the time of the research ($P < 0.01$; Mann-Whitney test). Diabetic nephropathy (27%) and arterial hypertension (23%) were two of the most common causes of renal failure in patients on HD. Chronic glomerulonephritis (43.6%) and autosomal dominant polycystic kidney disease (19.1%) were two of the most common causes of renal failure in patients with FKT (Figure 2).




*Chi-Square Test

**Figure 2. Causes of renal failure in patients on hemodialysis (HD), n = 126, and with functioning kidney transplant (FKT), n = 94**

Of the 220 participants, 71 completed only primary education or less (32.3%), 118 finished high school (53.6%), and 31 had a higher education qualification or a university degree (14.1%). After receiving the diagnosis of CKD, employment among the working patients decreased by 32.7% (103 were working before the diagnosis, 70 after). Overall employment decreased by 4.7% (47.4% before the diagnosis, 42.7% thereafter). The number of subjects on sick leave (for more than a month) increased 24 times (1 before the diagnosis, 24 immediately thereafter) and 4 people started receiving disability benefits because of CKD immediately after the diagnosis (Figure 3).




*The marginal homogeneity test

**Figure 3. Employment before and after diagnosis of chronic kidney disease (CKD)**

Immediately after the diagnosis of CKD and before the beginning of HD, the number of working patients decreased by 22.9%, and overall employment decreased by 9.6% (42.7% after the diagnosis of CKD, 33.1% before HD). The number of recipients of disability benefits increased by 4.5% (4 after the diagnosis of CKD, 18 before the start of HD). The proportion of employees decreased by 50% after the start of HD treatment when compared to the period before HD (54 employed before HD, 27 a year after the start of HD). Overall employment decreased by 8.1% (33.1% were employed before HD, 25% a year after starting HD). Out of all employed patients, 50.1% were on sick leave for more than a month after the beginning of HD. The number of recipients of disability benefits increased by 7.7% compared to the period before dialysis (Figure 4).

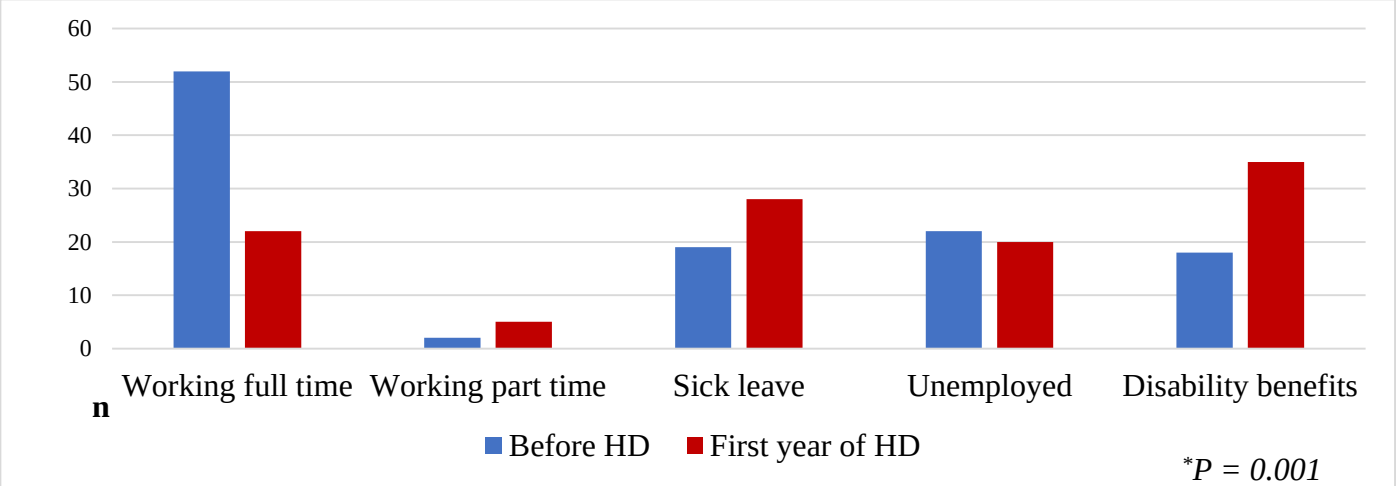



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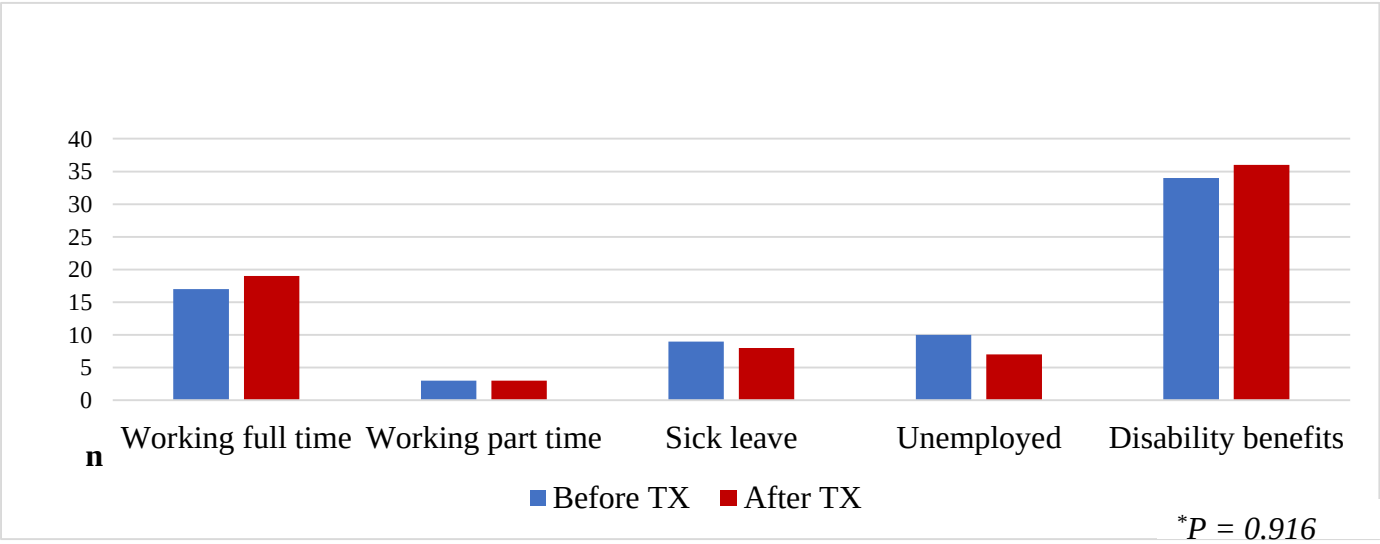
**Figure 4. Employment before starting dialysis treatment and within the first year of dialysis**

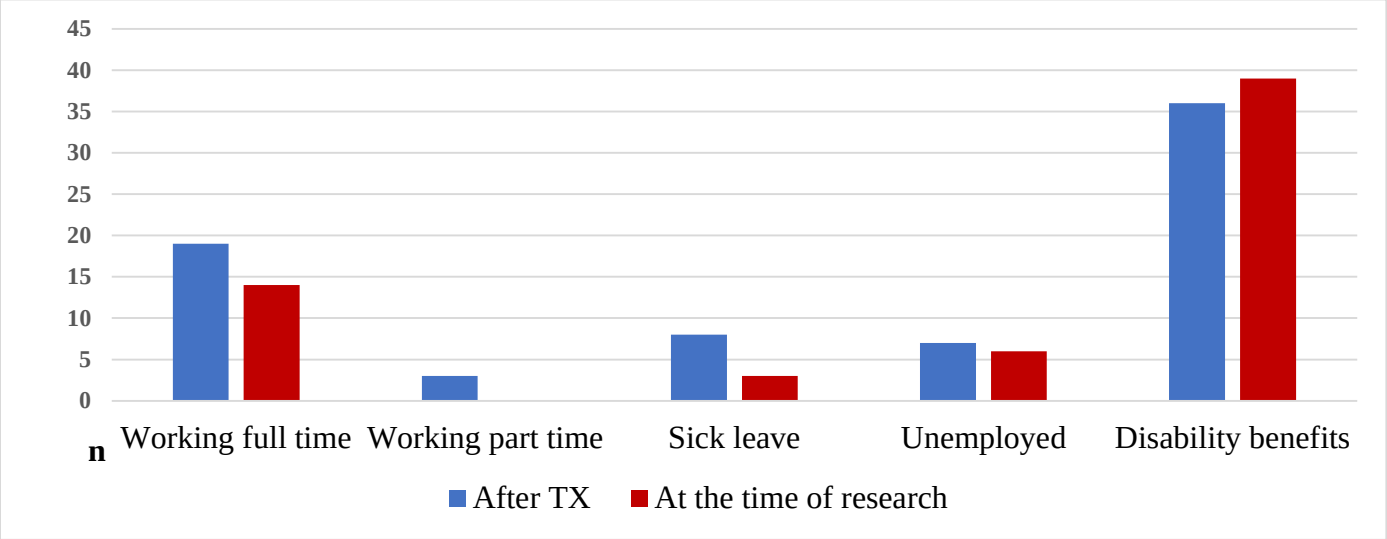
The number of patients who were working a year after TX increased by 9.1% compared to the period before TX (20 before TX, 22 after TX). Overall employment increased by 0.9% (27.3% were employed before TX, 28.2% a year after TX; Figure 5).




*The marginal homogeneity test

**Figure 5. Employment before and a year after kidney transplantation (TX, n = 94)**

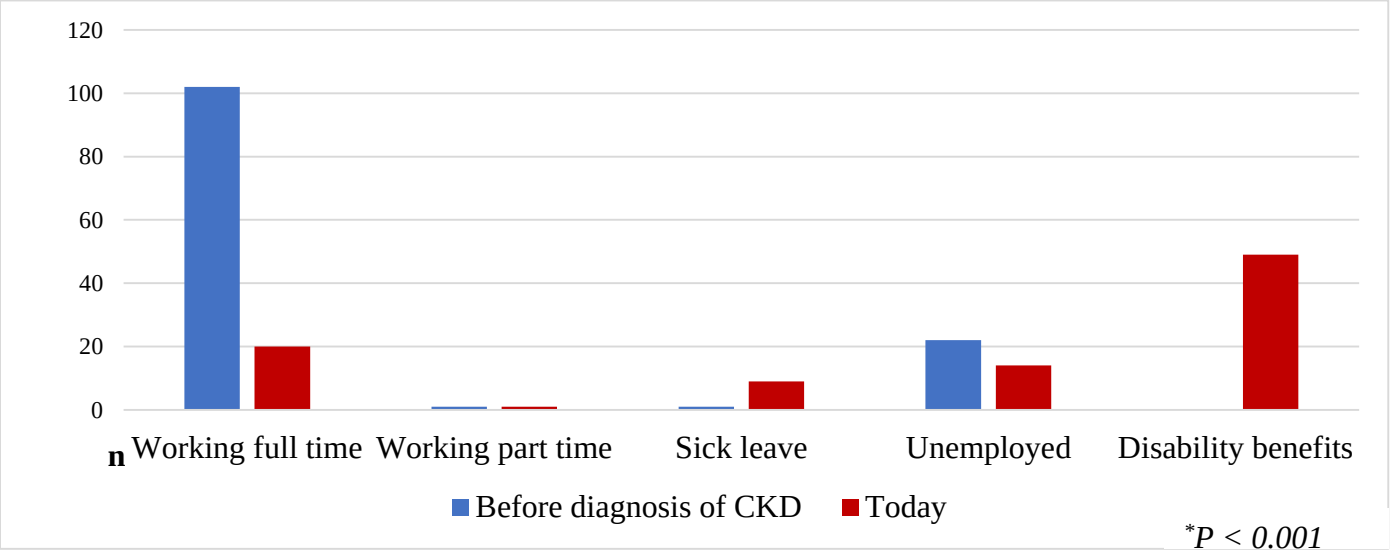
At the time of the research, the number of employed participants had decreased by 36.4% compared to the time point a year after TX (22 after TX, 14 at the time of the research; Figure 6).




*The marginal homogeneity test

**Figure 6. Employment a year after transplantation (TX) and at the time of research (n = 94)**

Overall employment decreased by 13.8% (31.9% after TX, 18.1% at the time of the research). The number of subjects using sick leave decreased by 5.3% in the same period and the number of disability benefits increased by 3.2%. At the time of the research, overall employment of all patients had decreased by 33.7% compared to the period before the diagnosis of CKD (47.4% of the participants had been employed before the diagnosis, 13.7% were employed at the time of the research). Out of all patients who were employed at the time of the research, 31% had been on sick leave for more than a month (Figure 7).




*The marginal homogeneity test

**Figure 7. Employment before diagnosis of chronic kidney disease (CKD) and at the time of the research (N = 220)**

The number of working patients on dialysis at the time of the research decreased by 82.5% compared to the period before CKD diagnosis and overall employment decreased by 21.3% (31.7% before diagnosis, 10.4% at the time of the research). Out of all patients on HD who were employed at the time of the research, 6 were on sick leave for more than a month (46.2%). Ten participants (7.9%) were receiving disability benefits because of CKD, 94 (74.6%) were retired due to age, disability caused by another illness or were military retirees. The number of working patients with FKT at the time of the research decreased by 77.8% compared to the period before the diagnosis of CKD and overall employment decreased by 50.1% (68.2% before the diagnosis, 18.1% at the time of the research). Out of all FKT patients who were employed at the time of the research, 3 were on sick leave for more than a month (17.6%). 39 (41.4%) were receiving disability benefits, 23 (24.5%) were retired due to age, disability caused by another illness or were military retirees. Of all participants of working age (15–65 ), 30 were employed (25%) while 46 felt capable of working (38.3%) at the time of the research (Figure 8).

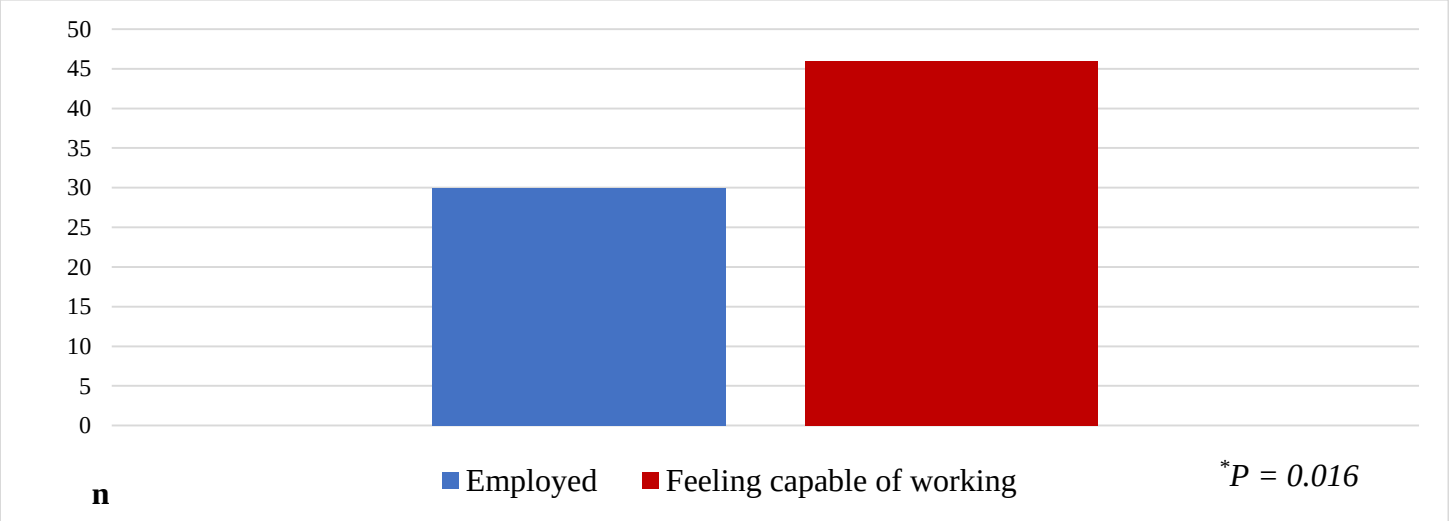



**Figure 8. Employment and feeling capable of working in patients of working age (15 to 65, n = 120)**

Thirty percent of all employees in that age group were on sick leave for more than a month at the time of the research. 17 FKT patients aged 15 to 65 (22.3%) were employed, while 32 of them (47.9%) felt capable of working. Out of the 17 patients employed at the time, 3 had been on sick leave for more than a month. 12 patients on HD aged 15 to 65 (26.1%) were employed at the time while 14 felt capable of working (30.4%). Out of 12 employed patients, 6 had been on sick leave for more than a month. Almost a quarter (24.2%, n = 22) of the unemployed patients aged 15 to 65 on RRT felt capable of working at the time of the research. 18.2% of those patients were retired, 4.6% were housewives, 36.4% were unemployed and 40.9% were receiving disability benefits because of CKD. As the main reason for their unemployment, the majority of respondents, 45.8%, reported poor health due to CKD, followed by advanced age (44.2%). The third main reason for unemployment was that employers did not want to hire someone with CKD because of the potential need to adjust working hours (5.8%). Only 2.8% of patients with completed primary education were employed at the time of the research, in comparison with 14.4% of those with high school education and 35.5% of those with a university degree.

## Discussion

Employment of patients on RRT worsened with the progression of CKD. Overall employment decreased by 4.7% after diagnosis of CKD, and the number of persons on sick leave increased from 1 to 24. Four people started receiving disability benefits immediately after the diagnosis. HD takes time, leads to a certain degree of disability, and often threatens

employment within a particular profession. Accordingly, as patients started with HD, the number of employed patients decreased. Within the first year of HD treatment, overall employment decreased by 8.1% when compared with the period before HD. 25% of patients were employed, and 50.1% of patients were on sick leave for more than a month after starting HD. The number of recipients of disability benefits continued to increase. Within the first year after TX, the rate of employment of patients did not change significantly. If we compare the prevalence of employment after TX and at the time of the research, we see that overall employment decreased by 13.8%, although it would be logical to expect an increase in the number of people employed after TX, especially a year after TX, when patients have recovered from the kidney transplant procedure, since TX improves QoL and working ability (14). Patients with FKT have better health than those on HD, but overall employment of patients with FKT exhibited a twofold decrease in comparison with the period when they were on dialysis, during the RRT timeline from diagnosis of the disease to the present. Despite that, at the time of the research, the cross-sectional prevalence of employment for FKT patients (18.1%) was higher than for those on HD (10.4%). This can be explained by the fact that current FKT patients were younger and more of them were employed at the beginning of CKD. This was also confirmed by the prevalence of employment of FKT and dialyzed patients of working age, 15 to 65. Prevalence of employment was almost the same in both groups, but there was significant disproportion in the personal opinion about working ability between FKT and dialyzed patients: 30.4% of patients on HD and 47.9% of FKT patients felt capable of working. The number of FKT patients receiving disability benefits because of CKD was five times greater than that of dialyzed patients at the time of the research. Almost three quarters (74.6%) of dialyzed patients had retired due to age, disability caused by another illness, or were military retirees. The ratio of disability- and age-related retirement between FKT and dialyzed patients was in accordance with the age differences between those groups. A large number of disability benefits can be the result of availability of disability benefits and lack of support for patients on RRT who are willing to work. Today, 13.7% of RRT patients are employed, which is a third (33.7%) less than was the case before they received the diagnosis of CKD. Out of the total number of unemployed patients, almost a quarter felt capable of working. At the time of the research, a quarter of all patients aged 15 to 65 were employed, and almost 40% of the patients felt capable of working. 30% of the total number of employees in the group were on sick leave for more than a month, which means that the number of people working at that time was even smaller. We wondered what caused the disproportion between employment and feeling capable of working. As the main reason for unemployment, the majority of respondents reported poor health due to CKD, followed by advancing age and the fact that employers did not want to hire someone with CKD because of the potential need to adjust working hours. Higher level of education had a favorable impact on the employment of our respondents. A similar research had been conducted in the Rijeka University Hospital, where the working ability of patients on HD was surveyed. That research showed that 22.4% of the patients had been employed at the beginning of HD. During the first year of HD, 36.1% of patients who had jobs at the beginning of dialysis were forced to retire, and there was also a disproportion between the number of employed patients and those who felt capable of working (15). Based on our research and on the research conducted in Rijeka, we can conclude that the number of working patients in the Republic of Croatia significantly decreases with the start of HD treatment. There is a large number of publications devoted to this topic – QoL, working ability and possibility of employment of patients with CKD (14, 16, 17, 18). A study from the Netherlands showed that TX significantly increased the employment rate of patients, which reverted to almost the same rate as prior to diagnosis of CKD. At the time of the study, 67% of FKT patients aged 15 to 65 were employed, as opposed to the situation in Osijek, where only 22.3% of FKT patients from the same age group

were employed. It is important to note that 45% of patients employed after TX in the Netherlands had part-time jobs, while none of the transplanted respondents in Osijek had a part-time job (14). The question is: are patients in Croatia given the opportunity to work after TX or is retirement the only option? Nowadays, the goal of medical treatment is not just survival, but also improvement in QoL. Important determinants of QoL are the ability to work and access to employment. CKD disrupts QoL, but patients who accept RRT do not give up on life; in fact, they do just the opposite – they choose to live. Many patients with ESRD, faced with limitations of health status and requirements of their treatment, reasonably decide to quit their jobs. This decision is made easier by the availability of disability benefits due to CKD. However, other patients who have the desire and opportunity to work find that guidance and support for employment are limited (19). These patients should be involved in public life and motivated to continue with their normal lives. A potential method for achieving higher employment of patients on RRT could be motivating the employers with financial incentives or other rewards.

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**Competing interests.** None to declare

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