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### INDIVIDUAL FACTORS AFFECTING THE SURVIVAL OF PATIENTS UNDERGOING HEMODIALYSIS

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#### Abstract

During follow-up, it was observed that not all studied parameters were available for every patient undergoing maintenance hemodialysis. Considering this limitation, receiver operating characteristic (ROC) analysis was performed to evaluate the impact of individual demographic and clinical factors—such as age, sex, comorbid conditions, dialysis-related characteristics, and vascular access type—on patient survival. ROC curves for individual predictors are presented in Figure 1.

The analysis demonstrated that missed dialysis sessions, chronic heart failure, and the use of a central venous catheter were the strongest negative predictors of survival, showing the highest prognostic performance. Several other factors exhibited moderate predictive ability. These findings are consistent with previously published data on survival determinants in hemodialysis populations [3, 9].

**Keywords:** hemodialysis; survival; ROC analysis; comorbidities; dialysis adherence; vascular access; prognosis.

#### Objective

To evaluate the prognostic value of individual demographic and clinical factors influencing survival in maintenance hemodialysis patients using ROC analysis.



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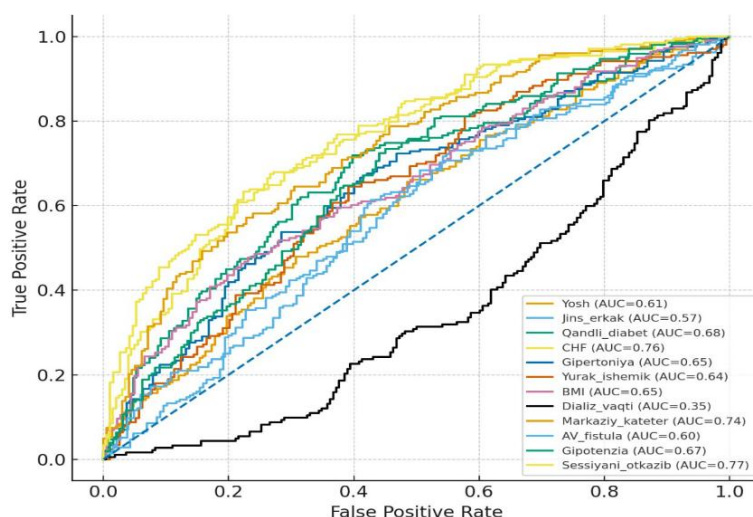
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### Materials and Methods

Due to incomplete availability of all studied parameters in every patient during the observation period, an individual-factor analytical approach was applied. ROC analysis was performed to assess the prognostic performance of age, sex, diabetes mellitus, arterial hypertension, ischemic heart disease, chronic heart failure, missed dialysis sessions, dialysis duration, body mass index (BMI), and vascular access type (arteriovenous fistula or central venous catheter). Predictive accuracy was assessed by calculating the area under the ROC curve (AUC). Statistical significance was defined as  $p < 0.05$ . ROC methodology was applied in accordance with established recommendations for prognostic research in nephrology [9].

### Results

As shown in Figure 1, missed dialysis sessions (AUC = 0.77), chronic heart failure (AUC = 0.76), and the presence of a central venous catheter (AUC = 0.74) were identified as the strongest negative predictors of survival in patients undergoing maintenance hemodialysis ( $p < 0.001$ ).





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Diabetes mellitus, arterial hypertension, ischemic heart disease, BMI, patient age, and arteriovenous fistula demonstrated moderate prognostic value ( $p < 0.05$ ).

In contrast, dialysis treatment duration showed a protective effect on survival (AUC = 0.35), indicating an inverse association with mortality risk. Similar associations have been reported in large dialysis registries and observational cohort studies [3].

### Conclusions

1. Individual demographic and clinical factors demonstrate heterogeneous prognostic value for survival in maintenance hemodialysis patients.
2. Missed dialysis sessions, chronic heart failure, and central venous catheter use are the most significant negative predictors of survival.
3. Dialysis treatment duration appears to act as a protective factor.
4. Careful monitoring and correction of modifiable risk factors may contribute to improved life expectancy in patients receiving long-term hemodialysis, consistent with current international evidence [9].

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