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Peculiarities of the Course of Chronic Heart Failure in Middle-Aged and Elderly Patients in the Khorezm Region

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Annotation

This article explores the clinical and demographic characteristics of chronic heart failure (CHF) among middle-aged and elderly populations in the Khorezm region of Uzbekistan. The study analyzes the age-related progression, gender differences, and the influence of comorbid conditions such as hypertension, ischemic heart disease, diabetes, and renal dysfunction on the course of CHF. Results indicate that older patients exhibit more severe CHF symptoms, with a higher prevalence of preserved ejection fraction in elderly women and increased renal complications. The findings highlight the need for region-specific approaches to the diagnosis, monitoring, and management of CHF in aging populations.

Key words: Chronic heart failure; aging population; Khorezm region; comorbidities; preserved ejection fraction; renal dysfunction; hypertension; ischemic heart disease; elderly patients; cardiovascular health.

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Introduction:

Chronic heart failure (CHF) remains one of the most pressing public health challenges globally, particularly among the aging population. Characterized by the heart's inability to pump sufficient blood to meet the body's needs, CHF often leads to frequent hospitalizations, reduced quality of life, and increased mortality. Its prevalence sharply increases with age, making middle-aged and elderly individuals especially vulnerable. According to the World Health Organization (WHO), cardiovascular diseases, including CHF, are the leading cause of death among individuals over 60 years old.

In Central Asia, and particularly in Uzbekistan, the epidemiological profile of CHF is shaped by unique socio-economic, environmental, and healthcare system factors. The Khorezm region, located in the northwestern part of the country, presents a distinct demographic and medical landscape. The region is characterized by a growing elderly population, a relatively high burden of non-communicable diseases, and limited access to specialized cardiological care in rural areas.

Previous studies in other regions have documented significant age- and gender-related differences in CHF manifestation. Elderly patients more frequently exhibit CHF with preserved ejection fraction (HFpEF), often in conjunction with comorbidities such as hypertension, diabetes, and chronic kidney disease. However, data specific to the Khorezm region are scarce, limiting the ability of local healthcare providers to tailor prevention and treatment strategies effectively.

This study aims to identify and analyze the peculiarities of CHF progression and clinical presentation among middle-aged and elderly patients in the Khorezm region. By examining age-related differences, gender patterns, and the impact of common comorbidities, we aim to contribute to a more comprehensive understanding of CHF in this specific population and promote more regionally-adapted clinical approaches.

Methods

This observational study was conducted throughout 2023 in the Khorezm region of Uzbekistan and involved middle-aged (45–59 years) and elderly (60 years and older) patients diagnosed with chronic heart failure (CHF). Patients were selected from regional hospitals, outpatient cardiology clinics, and rural healthcare centers. Inclusion criteria required patients to be aged 45 or older, have a clinically confirmed diagnosis of chronic heart failure according to European Society of Cardiology (ESC) guidelines, and be in a stable condition for at least six months prior to enrollment. Patients experiencing acute decompensated heart failure, recent myocardial infarction (within three months), or severe cognitive impairment were excluded from the study.

Data collection involved structured patient interviews, physical examinations, and review of medical records. The collected data included demographic characteristics such as age, gender, and place of residence (urban or rural), as well as clinical indicators like NYHA functional class, duration of heart failure, blood pressure, heart rate, and body mass index (BMI). Comorbid conditions including hypertension, diabetes mellitus, ischemic heart disease, chronic kidney disease, and anemia were also documented. Diagnostic evaluation included echocardiography to assess left ventricular ejection fraction (LVEF) and structural heart abnormalities. Laboratory tests measured hemoglobin, serum creatinine, blood glucose, and NT-proBNP levels where available.

The gathered data were processed using statistical software. Descriptive statistics were employed to analyze the prevalence of clinical features and comorbidities, with comparative analysis performed to evaluate differences between middle-aged and elderly groups.

A total of 142 patients with chronic heart failure were included in the study, comprising 68 middle-aged patients (45–59 years) and 74 elderly patients (60 years and older). The overall mean age of participants was 62.7 ± 8.9 years, with a slight predominance of female patients (56.3%). Urban residents accounted for 58.5% of the study population, while 41.5% were from rural areas. The majority of patients in both age groups presented with NYHA class II or III symptoms, with elderly patients showing a significantly higher frequency of class III heart failure compared to middle-aged patients (47.3% vs. 32.4%, $p < 0.05$).

The mean left ventricular ejection fraction (LVEF) was $42.1\% \pm 10.3\%$ across the sample, with preserved ejection fraction (LVEF $\geq$50%) being more common in elderly patients (28.4%) than in the middle-aged group (14.7%). Conversely, reduced ejection fraction (LVEF <40%) was more prevalent among middle-aged patients. Comorbid conditions were widespread: hypertension was found in 76.8% of patients, ischemic heart disease in 64.1%, diabetes mellitus in 39.4%, and chronic kidney disease in 23.2%. Elderly patients showed a significantly higher prevalence of hypertension (81.1% vs. 72.1%) and renal

dysfunction (29.7% vs. 16.2%) compared to middle-aged patients.

Anemia, defined by WHO standards (hemoglobin <130 g/L for men and <120 g/L for women), was present in 35.2% of the total cohort, and was slightly more common in the elderly group, although this difference did not reach statistical significance. NT-proBNP levels, where measured, were consistently higher in patients with more severe CHF symptoms and in those with preserved ejection fraction, reflecting increased myocardial wall stress.

Overall, the results indicated that the clinical course of chronic heart failure in elderly patients is characterized by a greater burden of comorbidities, higher NYHA class, and a greater likelihood of preserved ejection fraction. In contrast, middle-aged patients more frequently exhibited reduced ejection fraction and were more likely to have ischemic etiologies.

The findings of this study provide important insights into the age-related differences in the clinical presentation and progression of chronic heart failure (CHF) among middle-aged and elderly patients in the Khorezm region. Consistent with global trends, the data demonstrate that CHF in elderly patients tends to present with a higher functional class (more advanced NYHA classification), a greater prevalence of comorbidities, and a higher rate of preserved ejection fraction (HFpEF). This pattern aligns with the pathophysiological changes associated with aging, including increased arterial stiffness, diastolic dysfunction, and the cumulative effects of long-standing hypertension and metabolic disorders.

One of the notable findings in this study is the significantly higher proportion of elderly patients with HFpEF. While traditionally CHF was associated with reduced ejection fraction (HFrEF), there is growing recognition that HFpEF is particularly prevalent among older women, especially those with hypertension, diabetes, and obesity—all of which were observed at higher rates in this cohort. The management of HFpEF poses unique challenges, as there is no universally effective pharmacological therapy for improving mortality in these patients, unlike in HFrEF where ACE inhibitors, beta-blockers, and mineralocorticoid receptor antagonists have proven benefit. Thus, the predominance of HFpEF in the elderly group suggests an urgent need for region-specific treatment guidelines and preventive strategies that emphasize comorbidity management, particularly blood pressure control and glycemic regulation.

The higher prevalence of chronic kidney disease and anemia among the elderly group further compounds the complexity of CHF management. These conditions are known to exacerbate fluid overload, reduce exercise tolerance, and increase hospitalization and mortality rates. In the Khorezm region, where access to specialized diagnostic tools and nephrology services may be limited, the early detection and integrated care of such comorbidities is especially critical. Moreover, elevated NT-proBNP levels observed in patients with more severe symptoms and those with preserved ejection fraction suggest that even in HFpEF, neurohormonal activation plays a role, which could guide therapy and monitoring.

Another key observation from this study is the higher prevalence of ischemic heart disease in the middle-aged group, often associated with HFrEF. This may reflect earlier onset of atherosclerotic disease, potentially driven by lifestyle factors such as smoking, sedentary behavior, and poor dietary patterns, which are increasingly observed in middle-aged populations in post-Soviet regions, including Uzbekistan. These findings emphasize the importance of primary prevention strategies—targeting modifiable cardiovascular risk factors—at earlier stages of life to delay or prevent the onset of CHF.

The demographic differences between rural and urban residents also warrant attention. While this study did not show statistically significant differences in CHF severity based on residence, rural patients generally had fewer follow-up visits and limited access to echocardiography and laboratory testing, suggesting that healthcare disparities may influence outcomes. As Uzbekistan continues to modernize its healthcare system, targeted resource allocation to underserved rural areas, particularly for chronic disease management, will be essential.

In conclusion, this study underscores the need for age-specific, comorbidity-aware approaches to managing chronic heart failure in the Khorezm region. Elderly patients require careful monitoring for

renal function, blood pressure, and anemia, along with lifestyle interventions and functional support. Meanwhile, middle-aged individuals should be the focus of aggressive primary and secondary prevention strategies to reduce the burden of ischemic heart disease and its complications. Further prospective, multi-center studies will be valuable to validate these findings and inform regional health policy and clinical guidelines.

Conclusion

This study provides a comprehensive understanding of the clinical course of chronic heart failure in middle-aged and elderly patients in the Khorezm region, revealing important age-related differences in presentation, progression, and associated comorbidities. Elderly patients in this cohort demonstrated a higher prevalence of preserved ejection fraction (HFpEF), which is consistent with the known pathophysiology of heart failure in older individuals, where diastolic dysfunction plays a significant role. This age group also exhibited a greater burden of comorbidities such as hypertension, chronic kidney disease, and anemia, which further complicates the management of heart failure and emphasizes the importance of a multifaceted approach to care.

In contrast, middle-aged patients were more frequently diagnosed with reduced ejection fraction (HFrEF), often linked to ischemic heart disease. This highlights the need for early detection and management of cardiovascular risk factors, particularly in middle-aged populations. The higher rates of ischemic heart disease in this group underscore the relevance of secondary prevention strategies, including the management of hypertension, diabetes, and hyperlipidemia, in reducing the incidence of heart failure in younger cohorts.

The findings also draw attention to the disparities in healthcare access between urban and rural residents. Although no significant differences in CHF severity were observed based on geographical location, rural residents often have limited access to specialized diagnostics and follow-up care. These findings suggest that improving healthcare infrastructure in rural areas, particularly with regard to heart failure management, could significantly enhance patient outcomes.

In terms of clinical practice, this study emphasizes the need for age-specific treatment strategies. For elderly patients, careful management of comorbidities, regular monitoring of renal function, and appropriate management of anemia are critical for improving quality of life and preventing hospitalizations. Middle-aged individuals, on the other hand, should benefit from aggressive risk factor management and early intervention to prevent the progression to heart failure. The findings suggest that a tailored, individualized approach is essential for optimizing the care of patients with chronic heart failure, considering both their age and the unique characteristics of their heart failure phenotype.

Moreover, the results of this study highlight the importance of regional studies in understanding the specific epidemiological and clinical features of chronic heart failure in different populations. The findings from the Khorezm region contribute valuable data for the development of localized treatment protocols and health policy, which can be adapted to address the specific needs of patients in this region and other similar areas.

Further research, especially prospective cohort studies and randomized controlled trials, is necessary to validate these findings and to explore more targeted therapeutic strategies for chronic heart failure in both middle-aged and elderly populations. Additionally, investigating the role of emerging biomarkers and advanced imaging techniques in early diagnosis and monitoring of chronic heart failure could provide valuable insights for improving patient management and outcomes.

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