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SPECIFIC FEATURES OF CHRONIC HEART FAILURE IN MIDDLE-AGED AND ELDERLY PATIENTS IN THE KHOREZM REGION

Sultonnazarova Gulira'no Shuxratbek qizi
2nd year student of the master's degree in cardiology at the
Urgench State Medical Institute

Abstract

Chronic heart failure (CHF) remains a significant public health concern worldwide, particularly in low- and middle-income countries. In Uzbekistan, and specifically in the Khorezm region, the prevalence of CHF among middle-aged and elderly populations has been steadily rising. This study aims to investigate the clinical characteristics, progression, and outcomes of CHF in these age groups, focusing on regional specificities. Data were collected from clinical observations, patient records, and structured questionnaires. Findings suggest that elderly patients experience more severe manifestations of CHF, with higher hospitalization rates and comorbidities compared to middle-aged patients. Regional lifestyle factors, limited access to advanced medical care, and delayed diagnosis contribute to the worsening disease profile. The study highlights the urgent need for improved diagnostic strategies, preventive measures, and tailored management approaches for CHF in the Khorezm region.

Keywords

chronic heart failure, Khorezm, middle-aged, elderly, cardiovascular disease

Introduction

According to scientific observations over the past decade, the increase in risk factors among patients with chronic heart failure (CHF), including arterial hypertension, diabetes mellitus, and obesity, which are becoming more prevalent at a younger age, remains one of the most pressing issues. Globally, it is considered the leading cause of disability and mortality. According to data from the World Health Organization (WHO), in 2016, 17.9 million people worldwide died from cardiovascular diseases, accounting for 31% of all deaths. Particularly alarming is the fact that the mortality rate caused by cardiovascular diseases in Central Asia is higher compared to that of the European population. For instance, according to the State Committee on Statistics, in the Republic of Uzbekistan, 57.9% of deaths recorded between January and March 2024 were attributed to circulatory system diseases.

Heart failure is the result of several systemic reactions, and its development is etiologically associated with cardiovascular diseases arising from arterial hypertension, diabetes mellitus, obesity, and dyslipidemia, representing a complex and progressive process. In particular, the pathogenesis of CHF involves both cardiac and extracardiac compensatory mechanisms. These mechanisms are activated to maintain adequate blood supply to tissues and organs when the pumping function of the heart is impaired. However, they eventually transform into pathological processes. This is related to the activation of the sympathoadrenergic system, which initially allows the heart to maintain cardiac output for a certain period. Nevertheless, the prolonged activity of this system in CHF patients leads to an increase in both preload and afterload (due to vasoconstriction and fluid and sodium retention in the body), an increase in myocardial oxygen demand, enhanced direct cardiotoxic effects of catecholamines, and ultimately ventricular arrhythmias.

The progression of this pathological mechanism differs significantly between middle-aged (45–59 years) and elderly (60–74 years) patients. Specifically, in the Khorezm region, age-specific

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etiological factors, differences in the clinical course of the disease, and the challenges of individualized treatment in such patients have not been fully studied, and finding optimal solutions remains a difficulty.

Materials and methods

This study was conducted in several healthcare institutions in the Khorezm region between 2022 and 2024. A total of 240 patients diagnosed with CHF were included: 120 middle-aged (40–59 years) and 120 elderly (≥60 years). Data sources included patient medical histories, echocardiographic assessments, and structured interviews. Parameters such as New York Heart Association (NYHA) functional classification, hospitalization frequency, and comorbidity profiles were analyzed. Statistical analysis was performed using SPSS software, with significance set at $p<0.05$.

Diagnostic Methods:

To comprehensively assess patients with chronic heart failure, a combination of laboratory and instrumental investigations was applied. The following diagnostic methods were utilized:

1. Blood Biochemical Analysis

Biochemical blood tests were performed to evaluate renal and hepatic function, electrolyte balance, and markers of myocardial damage. Parameters such as serum creatinine, urea, electrolytes (sodium, potassium, calcium), glucose, lipid profile, and liver enzymes (ALT, AST) were assessed. In addition, levels of cardiac biomarkers, including NT-proBNP, were analyzed to confirm the presence and severity of heart failure.

2. Electrocardiography (ECG)

Resting 12-lead ECG was conducted to detect cardiac rhythm disturbances, conduction abnormalities, left ventricular hypertrophy, ischemic changes, and signs of previous myocardial infarction. ECG findings provided essential information for differentiating the etiology of heart failure and monitoring disease progression.

3. Echocardiography (EchoCG)

Transthoracic echocardiography was the primary imaging method for structural and functional assessment of the heart. Measurements included left ventricular ejection fraction (LVEF), chamber sizes, wall thickness, valvular function, and pulmonary artery pressure. This method was crucial for distinguishing between heart failure with reduced ejection fraction (HFrEF) and preserved ejection fraction (HFpEF).

4. Urinalysis

General urinalysis was carried out to detect proteinuria, hematuria, or other abnormalities that may indicate renal involvement. Since kidney dysfunction is a common comorbidity in patients with chronic heart failure, urinalysis helped in the early identification of cardiorenal syndrome and guided further management.

The analysis revealed marked differences in CHF progression between middle-aged and elderly patients. Elderly patients were more likely to present with NYHA class III–IV symptoms (68%) compared to middle-aged patients (39%). Hospitalization rates were nearly twice as high in the elderly group, with an average of 2.4 admissions per year compared to 1.3 in middle-aged patients. Common comorbidities included hypertension (72%), type 2 diabetes mellitus (41%), and chronic kidney disease (29%), with significantly higher prevalence among the elderly cohort. Middle-aged patients were more frequently associated with lifestyle-related risk factors such as smoking and obesity.

Results

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Chronic Heart Failure: Age-Related Clinical Features and Recent Statistics (Last 5 Years)

This document provides an overview of the last five years' statistics on chronic heart failure (CHF) and cardiovascular diseases globally and regionally, with a special emphasis on age-related clinical differences in disease progression and outcomes.

Key Statistical Indicators (2020–2025)

Indicator	Trend / Data	Age-Related Implications
Cardiovascular disease mortality	Uzbekistan (2021): ~97,390 deaths attributed to CVD.	Represents a major burden on healthcare; heart failure is a significant component.
CHF prevalence	Prevalence <1% under 55 years, ~10% in 70+ years.	Demonstrates steep rise with aging; elderly more affected.
Incidence in younger patients	Increase in diagnoses <50 years (3% in 1995 → 6% in 2012, trend continues).	Suggests earlier onset, reflecting lifestyle and metabolic risk factors.
Mortality trends	25-year global decline in CHF mortality, but slower in elderly.	Younger patients benefit more from prevention and treatment advances.
Asian patient demographics	Mean age ~68 ± 12 years; ~37% younger than 65 years.	Indicates substantial disease burden before old age.

Clinical Course: Age-Related Differences

1. Symptom Onset:
Younger patients often develop symptoms more gradually, while older patients experience more rapid deterioration and complications such as arrhythmias and renal impairment.
2. Comorbidities:
Hypertension, diabetes, kidney disease, and COPD are more prevalent in older patients, complicating the clinical picture.
3. Therapy Response:
Older patients face challenges such as polypharmacy, drug intolerance, and reduced organ reserve, while younger patients tolerate intensive regimens better.
4. Prognosis:
Mortality and complications are higher in elderly patients due to limited compensatory capacity, while younger patients have greater potential for long-term stabilization.
5. Prevention:

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Early detection and management of risk factors (hypertension, diabetes, obesity, dyslipidemia) in middle-aged patients is crucial to prevent progression.

Recommendations

Implement age-specific statistical monitoring of CHF in Uzbekistan and the Khorezm region.
Strengthen early identification and management of risk factors in middle-aged populations.
Expand subgroup analyses in clinical research to capture age-related differences.
Adapt treatment algorithms to patient age, comorbidities, and drug tolerance.

Discussion
The findings of this study underscore the age-dependent clinical heterogeneity of CHF in the Khorezm region. Elderly patients face worse outcomes due to multiple comorbidities, polypharmacy, and delayed access to advanced treatments. In contrast, middle-aged patients often have earlier-stage CHF with modifiable risk factors, representing an opportunity for preventive interventions.

These results align with international literature emphasizing the importance of age-specific management strategies in CHF. However, regional factors such as limited healthcare resources, cultural practices, and socioeconomic barriers exacerbate disease burden in Khorezm. Addressing these challenges requires coordinated public health initiatives, increased community awareness, and investments in regional healthcare infrastructure.

Conclusion

Chronic Heart Failure and Age-Related Clinical Course
1. General Overview and Key Findings
In recent years, the burden of chronic heart failure (CHF) and cardiovascular diseases has remained significantly high at both global and regional levels. CHF is a multisystemic, progressive disorder whose clinical manifestations and prognosis vary considerably depending on age, comorbidities, genetic background, and social-environmental determinants. Neglecting age-related differences often results in delayed diagnosis, suboptimal therapy, and adverse outcomes.
Outlined below are the main age-related tendencies and their practical implications.

2. Clinical and Pathophysiological Features: Age-Related Differences
Compensatory mechanisms and structural remodeling: In older patients, myocardial and vascular changes, upregulated renin–angiotensin–aldosterone system (RAAS) activity, and negative remodeling accelerate functional decline. In younger patients, metabolic factors (diabetes, obesity), hereditary predispositions, or subclinical structural abnormalities often play a more prominent role.
Symptomatology: Younger patients may present with subtle or atypical symptoms (fatigue, reduced exercise tolerance), leading to delayed diagnosis. In the elderly, more evident symptoms and rapid complications (congestion, arrhythmia, renal impairment) are common.
Comorbidities: Older groups have a higher prevalence of hypertension, diabetes, chronic kidney disease, COPD, and polypharmacy, all of which complicate CHF progression and management.
Pharmacokinetics and pharmacodynamics: Reduced organ reserve, impaired hepatic/renal clearance, and altered drug tolerance in elderly patients necessitate individualized pharmacotherapy.

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Prognosis: Mortality and morbidity risks are markedly higher in older patients. However, younger patients—though often underdiagnosed—may achieve better long-term outcomes if treated promptly.

3. Age-Oriented Clinical Management Strategies:
1. Age-stratified screening and early detection:
Routine monitoring of blood pressure, glucose, lipid profile, BMI, and NT-proBNP (where available) is crucial in middle-aged groups (45–59) and even earlier in high-risk individuals (35–44).
2. Adapted diagnostic algorithms:
For the elderly, atypical symptoms, comorbidity, and cognitive decline must be considered, with emphasis on ambulatory and home-based monitoring.
3. Pharmacotherapy optimization:
Younger patients should receive guideline-directed therapy at target doses (ARNI, beta-blockers, MRAs, SGLT2 inhibitors).
In elderly patients, dose titration should be gradual, with close attention to drug–drug interactions and tolerance.
4. Device therapy and interventional approaches:
ICD or CRT should be considered for younger patients at risk of arrhythmia or ventricular dysfunction; in the elderly, careful risk–benefit analysis is essential.
5. Rehabilitation and physical activity:
Cardiac rehabilitation is beneficial across all ages, but programs must be adapted to individual capacity and comorbidities.
6. Palliative and transitional care:
For elderly patients with advanced CHF, palliative care should prioritize symptom relief and quality of life.

4. Policy and Health System Implications
Implementation of age-stratified registries: National and regional (e.g., Khorezm region) CHF registries should systematically collect data on incidence, hospitalizations, readmissions, and mortality, stratified by age groups.
Preventive programs: Large-scale campaigns to address lifestyle risk factors (diet, physical activity, smoking cessation, metabolic control) are especially important for younger and middle-aged groups.
Healthcare infrastructure: Expansion of cardiac rehabilitation centers, telemedicine, and home-monitoring services, especially in rural areas, is crucial.
Capacity building: Training healthcare professionals on age-specific CHF management protocols is essential for better outcomes.

5. Research and Data Priorities
- Prospective regional registries:
Collect demographics, etiology, ejection fraction (HFrEF, HFmrEF, HFpEF), comorbidities, therapy, hospitalizations, and outcomes by age group.

- Subgroup analyses and age-specific RCTs:
  Evaluate safety and efficacy of therapies (e.g., ARNI, SGLT2 inhibitors) in elderly populations, while exploring aggressive therapy in younger patients.
- Implementation science:
  Identify the most effective intervention packages (screening + early therapy + rehabilitation) for different age groups in local settings.
- Health economics:

Assess the economic burden of CHF by age, and the cost-effectiveness of prevention and early management.

- Suggested Key Performance Indicators (KPIs)
  Prevalence and incidence per 1,000 population (by age group).
  Hospitalization and average length of stay.
  30-day readmission and 1-year mortality rates.
  Proportion of patients on guideline-directed therapy at target dose.
  Referral rates to cardiac rehabilitation.
  Control of risk factors (BP <140/90, HbA1c <7%, LDL within targets).
- Implementation Roadmap
  Short-term (1–2 years): Establish registries, launch screening protocols, initiate training, pilot telemedicine services.
  Medium-term (3–5 years): Expand rehabilitation networks, develop age-specific drug protocols, initiate RCTs.
  Long-term (>5 years): Reduce CHF burden significantly through earlier diagnosis, prevention, and tailored therapy.
- Final Remarks
  1. Age is a central determinant of CHF progression, treatment response, and prognosis.
  2. Age-specific approaches—including screening, individualized therapy, rehabilitation, and palliative care—are critical to reducing adverse outcomes.
  3. Regional data and research (e.g., in Khorezm and Uzbekistan) are urgently needed to guide evidence-based policy and clinical decisions.
  4. Practical priorities include early detection, aggressive risk factor management in younger groups, and individualized supportive care in the elderly.

Chronic heart failure remains a pressing health issue in the Khorezm region, particularly among the elderly. While middle-aged patients often present with modifiable risk factors, elderly patients experience more severe disease courses and higher hospitalization rates. Tailored diagnostic, preventive, and therapeutic strategies are essential to improving outcomes. Future studies should focus on community-based interventions and the development of region-specific clinical guidelines.

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