ejpmr, 2025, 12(5), 67-71

SJIF Impact Factor 7.065

EUROPEAN JOURNAL OF PHARMACEUTICAL AND MEDICAL RESEARCH

www.ejpmr.com

Research Article

ISSN 2394-3211

EJPMR

PREVALENCE AND CHARACTERISTICS OF COMORBID CONDITIONS IN PATIENTS WITH CARDIOVASCULAR DISEASES

Urinov O. U.*, Fozilov Kh. G., Abidova D. E., and Boboev R. R.

Republican Specialized Scientific and Practical Medical Center of Cardiology, Tashkent, Uzbekistan.

***Corresponding Author: Dr. Urinov O. U.**

Republican Specialized Scientific and Practical Medical Center of Cardiology, Tashkent, Uzbekistan.

Article Received on 08/03/2025 **Article Revised on 28/03/2025** **Article Accepted on 18/04/2025**

ABSTRACT

Objective: To determine the prevalence, structure, and clinical characteristics of comorbid conditions in patients with cardiovascular diseases (CVD) in order to optimize diagnostic and treatment strategies. **Materials and Methods:** A prospective cohort study was conducted among 1,220 patients (705 men [57.8%], 515 women [42.2%]) at the Republican Specialized Scientific-Practical Medical Center of Cardiology (Tashkent). • Mean age: 62.01 ± 9.83 years (men: 60.50 ± 10.04, women: 64.08 ± 9.14). • Age range: 18 to 90 years. • Inclusion criteria: confirmed CVD (stable angina, hypertension, CHF) and comorbidities (T2DM, CKD, COPD, previous COVID-19), with informed consent. • Control group: 214 patients (17.5%) with isolated CVD. • Study group: 1,006 patients (82.5%) with comorbidities. • Diagnoses were established according to clinical guidelines. **Results:** • Comorbidity was found in 82.5% of patients with CVD. • The most frequent combinations were: o CVD + COPD (18.0%)—especially in age groups 45–59 (18.6%, p = 0.029) and 60–74 (18.7%, p = 0.026) o CVD + T2DM (15.2% in ages 45–59), declining to 10.2% in those over 75 o CVD + CKD peaked in ages 60–74 (13.8%, p = 0.048). **Conclusion:** Comorbid conditions in CVD patients demonstrate clear age and sex differences. The combinations of CVD with COPD and T2DM are most prevalent among middle-aged and elderly individuals, while CKD is more common in those aged 60–74. Men are more susceptible to CVD + COPD + CKD, whereas women more often suffer from CVD + T2DM + CKD.

KEYWORD:- Cardiovascular diseases, Comorbidity, Chronic obstructive pulmonary disease, Type 2 diabetes mellitus, Chronic kidney disease, Arterial hypertension.

INTRODUCTION

According to WHO, over 41 million people die annually from noncommunicable diseases (NCDs), accounting for 71% of global mortality. Of these, more than 15 million die between the ages of 30 and 69. Major contributors include:

- Cardiovascular diseases, mainly atherosclerosis-related (hypertension, coronary artery disease, cerebrovascular disease) – 17.9 million deaths/year
- Malignant neoplasms – 9.3 million deaths
- Chronic respiratory diseases (especially COPD and asthma) – 4.1 million deaths
- Diabetes – 1.5 million deaths

While developed countries have seen steady declines in mortality and increased life expectancy (LE) over the past 20 years, Uzbekistan has also seen similar trends, though its LE remains lower than in Japan, Norway, or the USA. In 2023, the average LE in Uzbekistan was 74.7 years (women – 76.9, men – 72.5).

However, increased LE does not equate to more years of healthy life. There is a rapid increase in patients with multiple conditions – comorbidity. In the US, comorbidities among Medicare-insured patients increase from 62% (aged 65–74) to 82% (≥85 years). Comorbidity is defined as the co-existence of two or more conditions in the same individual. While some may occur independently, more often diseases share common pathophysiological mechanisms.

MATERIALS AND METHODS

A prospective cohort study was conducted among 1,220 patients (705 men [57.8%] and 515 women [42.2%]) at the Republican Specialized Scientific and Practical Medical Center of Cardiology (Tashkent). The mean age was 62.01±9.83 years (men – 60.50±10.04, women – 64.08±9.14). Patients aged 18–90 years with confirmed CVD (stable angina, hypertension, chronic heart failure) and comorbid diseases (type 2 diabetes, chronic kidney disease [CKD], chronic obstructive pulmonary disease [COPD], and past COVID-19 infection) were included based on informed consent. The control group included

214 (17.5%) patients with isolated CVD; the comorbidity group comprised 1,006 (82.5%) patients.

Statistical analysis: Data were processed using STATISTICA 10.0 (StatSoft Inc., USA). Quantitative indicators are presented as M±SE; categorical data are presented in absolute (n) and relative (%) values. Mann–Whitney U test, chi-square (χ^2), and the test for difference in proportions were used to compare groups. Significance level: $P<0.05$.

RESULTS SUMMARY

Table 1: Age-related prevalence of comorbid conditions in CVD patients.

Morbidity in comorbid condition	Age groups of the examined persons										*P*
	≤ 44 years old n= 49 (4.0 %) (1)		45-59 years old n=402 (32.9%) (2)		60-74 years old n= 661 (54.2%) (3)		75 ≥ n=108 (8,9 %) (4)		Всего n= 1220 (100%)		
	n	%	n	%	n	%	n	%	n	%	
CVD + COPD (n=219)	3	6,1	75	18,6	124	18,7	17	15,7	219	18,0	*P* 1-2=0,029 *P* 1-3 =0,026 *P* 1-4=0,09 *P* 2-3= 0,002 *P* 2-4= 0,48 *P* 3-4= 0,42
CVD + T2DM (n=172)	6	12,2	61	15,2	94	14,2	11	10,2	172	14,1	*P* 1-2=0,50 *P* 1-3 =0,70 *P* 1-4=0,71 *P* 2-3= 0,06 *P* 2-4= 0,18 *P* 3-4= 0,25
CVD + CKD (n=153)	5	10,2	47	11,7	91	13,8	10	9,3	153	12,5	*P* 1-2=0,75 *P* 1-3 =0,048 *P* 1-4=0,85 *P* 2-3= 0,32 *P* 2-4= 0,47 *P* 3-4= 0,019
CVD + ≥2 comorbidities (n=462)	24	50,0	130	32,3	250	37,8	58	53,7	462	37,9	*P* 1-2=0,020 *P* 1-3 =0,12 *P* 1-4=0,58 *P* 2-3= 0,07 *P* 2-4= 0,001 *P* 3-4= 0,002
Control group (n = 214)	10	20,4	89	22,1	102	15,4	12	11,1	214	17,5	*P* 1-2=0,076 *P* 1-3 =0,035 *P* 1-4=0,12 *P* 2-3= 0,006 *P* 2-4= 0,011 *P* 3-4= 0,024

- CVD + T2DM: evenly distributed across age groups.
- CVD + CKD: peaks in the 60–74 group.
- Triple comorbidity more common in elderly (≥75) and young (≤44) groups.
- Control group (CVD only): 17.5% of total patients.

The analysis showed that the comorbid condition of cardiovascular disease and type 2 diabetes mellitus was relatively evenly distributed across age categories. The highest prevalence was observed in the 45–59 age group (15.2%), followed by a slight decline in individuals older than 75 years (10.2%).

The frequency of comorbid CVD and CKD increased with age, peaking in the 60–74 age group (13.8%), which was statistically significantly higher than in the ≤44 age group (10.2%) ($p=0.048$). However, among patients aged ≥75 years, a decrease in this indicator was recorded (9.3%), likely due to natural selection and high mortality in individuals with this pathology.

The combination of CVD with two or more comorbid conditions showed a pronounced age-related dynamic. In the youngest group (≤44 years), the prevalence reached 50.0%, then decreased in the 45–59 group (32.3%), followed by an increase in the ≥75 age group (53.7%) ($p<0.001$). In the 60–74 group, the frequency of patients with CVD and two or more comorbidities was 1.4 times lower ($p=0.002$). These results support the hypothesis

that the likelihood of having multiple chronic diseases increases significantly with age.

An analysis of disease prevalence in the control group revealed that the proportion of individuals aged 45–59 was 1.4 times higher than in the 60–74 group (p=0.006), and twice as high compared to patients over 75 years of age (p=0.024).

Comorbidity in CVD worsens prognosis and reduces the effectiveness of treatment, especially in the context of multiple chronic conditions. It is important to consider gender differences in the structure of comorbidities, as men and women demonstrate differing predispositions to specific disease combinations. The control group included patients without identified comorbidities, accounting for 17.5% (214 cases) of the total sample. The proportion of men was 17.3% (122) and women 17.9% (92), showing no significant difference and confirming a comparable prevalence of isolated CVD in both sexes.

Table 2: Gender-specific comorbidity structure.

Condition	Men N= 705 (100%)		Women N = 515 (100%)		Both sexes N = 1220 (100%)		χ^2, p
	n	%	n	%	n	%	
CVD only (control)	122	17,3	92	17,9	214	17,5	χ^2 = 0,064, p= 0,80
CVD + 1 comorbidity	326	46,2	218	42,3	544	44,6	χ^2=1,84, p= 0,17
CVD + 2 comorbidity							
T2DM + COPD	78	11,1	36	7,0	114	9, 3	χ^2 = 5,83, p= 0,016
T2DM + CKD	65	9,2	86	15,7	151	12,4	χ^2 =15,35, p= 0,001
2DM + CKD	85	12,0	41	8,0	125	10,2	χ^2 = 5,39, p= 0,020
CVD + all 3 comorbidities (T2DM + COPD + CKD)	29	4,1	43	8,3	72	5,9	χ^2 = 9,61, p= 0,002

As shown in Table 2, among patients with cardiovascular disease combined with one comorbid condition (T2DM, COPD, or CKD), the prevalence was 44.6% (544 patients). This rate was higher among men (46.2%) compared to women (42.3%).

In our study, CVD combined with two comorbid diseases showed that the frequency of CVD + COPD + CKD and CVD + T2DM + COPD was 1.6 and 1.5 times higher in men (11.1% and 12.0%, respectively) than in women (7.0% and 8.0%, respectively) (χ^2 = 5.83, p = 0.016 and χ^2 = 5.39, p = 0.020).

Meanwhile, for the CVD + T2DM + CKD combination, the frequency was 1.7 times higher in women than in men (15.7% vs. 9.2%, respectively) (χ^2 = 15.35, p = 0.001). A likely reason for this is a greater predisposition among women to chronic kidney disease in the context of diabetes, as well as hormonal and metabolic differences that affect renal hemodynamics.

In the subgroup of patients with CVD in combination with three comorbid diseases (T2DM + COPD + CKD), the frequency was higher among women—8.3% (72)—compared to men—4.1% (29) (χ^2 = 9.61, p = 0.002).

Our study conducted a comparative analysis of clinical characteristics and the prevalence of comorbid conditions in patients with CVD suffering from various associated pathologies. The average age of patients in the study groups ranged from 60.27 ± 10.24 years in the control group to 62.77 ± 10.55 years in the group with CVD and two or more comorbidities. These findings indicate that patients with multiple comorbid conditions tend to be older.

The analysis showed that the highest prevalence of post-infarction cardiosclerosis (PICS) was observed among patients with CVD and CKD (43.8%) and in the control group (45.3%). In the group with COPD, this figure was 25.1% (p = 0.000).

Arterial hypertension (AH) was present in nearly all groups at a high rate (ranging from 93.4% to 99.4%). The highest prevalence of AH was recorded among patients with CVD and T2DM (99.4%) and in the control group (94.4%) (p = 0.007).

In our cohort, chronic heart failure (CHF) was more common in patients with CVD and T2DM (56.4%) and in those with two or more comorbidities (56.5%), which was significantly higher compared to the control group (45.8%) (p = 0.01).

The frequency of angina pectoris was high in all groups, ranging from 79.6% (131 patients with CVD and T2DM) to 90.0% (197 patients with CVD and COPD). In the control group, this figure was 83.6% (179 patients). Significant differences were identified in the COPD group (p = 0.05) (Table 3).

Table 3: Clinical characteristics by group.

Indicator	CVD+COPD n = 219 (1)		CVD+T2DM n =172 (2)		CVD+CKD n =153 (3)		≥2 Comorbid n = 462 (4)		Control n =214 (5)		*P*
	n	%	n	%	n	%	n	%	n	%	
Mean Age	**62,38±9,75**		**61,70±8,62**		**62,01±8,24**		**62,77±10,55**		**60,27±10,24**		
Prior MI	55	25,1	67	38,9	67	43,8	140	30,3	97	45,3	*P* 1-5=0,000 *P* 2-5=0,20 *P* 3-5=0,77 *P* 4-5=0,000
Hypertension	206	94,0	171	99,4	143	93,4	439	95,0	202	94,4	*P* 1-5=0,88 *P* 2-5=0,007 *P* 3-5=0,71 *P* 4-5=0,73
Chronic HF	105	48,0	97	56,4	71	46,4	261	56,5	98	45,8	*P* 1-5=0,65 *P* 2-5=0,03 *P* 3-5=0,90 *P* 4-5=0,01
Angina	197	90,0	137	79,6	131	85,6	410	88,7	179	83,6	*P* 1-5=0,05 *P* 2-5=0,31 *P* 3-5=0,60 *P* 4-5=0,05
COVID-19 history	178	81,3	112	65,1	35	22,9	59	12,8	24	11,2	*P* 1-5=0,000 *P* 2-5=0,000 *P* 3-5=0,003 *P* 4-5=0,56
Atrial Fibrillation	22	10,0	21	12,2	11	7,2	66	14,3	5	2,3	*P* 1-5=0,001 *P* 2-5=0,000 *P* 3-5=0,025 *P* 4-5=0,000

It was found that the incidence of previous COVID-19 infection was highest among patients with CVD and COPD (81.3%) and lowest in the control group (11.2%). The differences between the groups were statistically significant ($p = 0.000$). These findings underscore the increased susceptibility of COPD patients to COVID-19 and the need for enhanced monitoring of this patient population.

According to our data, the prevalence of atrial fibrillation (AF) across the total population was 125 cases (10.2%). Statistical data from the study show that the percentage of patients with AF in the group with two or more comorbidities was 14.3%, which is significantly higher than in the control group, where it was only 2.3% ($P_{4-5} = 0.000$). This group typically has multiple chronic conditions, which may contribute to an increased risk of developing atrial fibrillation.

CONCLUSION

Comorbid conditions in cardiovascular diseases show distinct age and gender differences. The frequency of combined CVD with COPD and type 2 diabetes (T2DM) is significantly higher among the 45–74 age group, while chronic kidney disease (CKD) is more commonly seen in the 60–74 age group. Men are more prone to the combination of CVD with COPD and CKD, whereas women more often suffer from CVD in combination with T2DM and CKD.

The high prevalence of atrial fibrillation (14.3% with ≥2 comorbidities vs. 2.3% in the control group) and the significant impact of previous COVID-19 infection (81.3% in COPD patients) emphasize the necessity for enhanced clinical monitoring.

REFERENCES

1. WHO. Non-communicable diseases: mortality, 2019. https:// www.who.int/gho/ncd/mortality_morbidity/en/.
2. Ford E.S., Capewell S. The proportion of mortality reduction from cardiovascular diseases compared with prevention versus treatment: public health versus clinical care. Public Health, 2011; 21, 32: 5-22.
3. Aspelund T., Gudnason V., Magnusdottir B.T. and others. Analysis of a significant decrease in mortality from coronary heart disease among the Icelandic population aged 25-74 years in the period from 1981 to 2006. Just one, 2010; 12, 5(11): e13957.
4. Palmieri L., Bennett K., Giampaoli S. et al. Explaining the decrease in mortality from coronary heart disease in Italy between 1980 and 2000. I am public health, 2010; 100(4): 684-92. Epub, 2009, July 16.
5. Andreev E. M., Kvasha E. A., Harkov T. L. Life expectancy in Russia: regenerative growth. http://demoscope.ru/weekly/2014/0621/tema01.php)

6. https://upl.uz/obshestvo/40962-news.html
7. Treat ME to saliva. Multiple pathology in the elderly. Epidemiol, 2013; 35: 75-83.
8. Ward B.W., Schiller J.S. Prevalence of multiple chronic diseases among the adult population of the United States: data from the National Health Survey, 2010. Previous chronic disease, 2013; 10: E65.
9. Barnett K., Mercer S.U., Norbury M. et al. Epidemiology of multiple pathology and its impact on healthcare, scientific research, and medical education: a comprehensive study. Lancet, 2012; 380: 37-43.
10. St. Sauveur D.L., Boyd S.M., Grossardt B.R. et al. The risk of developing multiple pathology in people of all ages in a historical cohort study: differences by gender and ethnicity. BMJ Open, 2015; 5: e006413. doi:10.1136/bmjopen-2014-006413.
11. AIHW: Tong B. and Stevenson K., Concomitant pathology of cardiovascular diseases, diabetes mellitus and chronic kidney disease in Australia. A series of studies on cardiovascular diseases No, 2007; 28: 37. Cardiovascular diseases.
12. Oganov R. G. Vascular comorbidity: general approaches to prevention and treatment. Rational Pharmacotherapy in Cardiology, 2015; 11(1): 4-7.
13. Targer G., Day K.P., Bonora E. The risk of cardiovascular diseases in patients with non-alcoholic fatty liver disease. New English J Med, 2010; 363(14): 1341-5.
14. Hamaguchi M., Kojima T., Takeda N. et al. Non-alcoholic fatty liver disease is a new predictor of cardiovascular diseases. World Gastroenterology Day, 2007; 13: 1579-84.