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Original Research

Comorbidities Associated with Hospitalized Heart Failure in Libya

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ABSTRACT

Education about different comorbidities among heart failure patients is crucial for optimizing care and outcomes. This work is aimed to correlate age and sex to comorbidities of patients diagnosed with heart failure and to estimate the relation between commonest comorbidities to other comorbidities. A cross-sectional study was performed from 1st April 2024 to 1st October 2024. Data were collected data from Cardiology Department at Tripoli University Hospital (TUH). 40 patients were admitted and diagnosed with many health difficulties including heart failure, arterial

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hypertension, diabetes, hypothyroidism, Ischemic heart disease (IHD), atrial fibrillation, chronic obstructive airway disease (COPD), bronchial Asthma, cerebrovascular accident (CVA), anemia, chronic kidney disease (CKD), valvular heart disease (VHD), obstructive sleep apnea (OSA). Data showed that the most common comorbidity (>90%), was a primary risk factor for HF development (especially HFpEF). Chronic Kidney Disease (CKD) considered as a powerful independent predictor of mortality and readmission and represented about 40-50% of hospitalized HF patients. While, diabetes mellitus (DM) represented 30-45% of hospitalized HF patients. This might accelerate atherosclerosis, promote myocardial dysfunction (diabetic cardiomyopathy), complicates fluid/electrolyte management, and increase infection risk. Also, SGLT2 inhibitors had revolutionized the care for HF patients with diabetes mellitus. Moreover, 30-50% of hospitalized HF patients were diagnosed with anemia which contributed to reduced oxygen delivery, worsening symptoms (fatigue, dyspnea), and associated with increased mortality and readmissions. A strong healthy management is required to enhance health of patients with heart failure.

KEYWORDS: Heart Failure, Cardiovascular, Comorbidity, Tripoli University Hospital.

INTRODUCTION

Myocardial structural and functional abnormalities that impair ventricular filling or blood ejection make heart failure (HF) a scientific syndrome. Reduced left ventricular myocardial function is the most common cause of heart failure (HF); however, HF is also associated with disorders of the pericardium, myocardium, endocardium, coronary heart valves, or remarkable vessels, either separately or in combination. Ventricular remodelling, ischemia-associated dysfunction, and prolonged haemodynamic overload are some of the basic pathogenic mechanisms that underlie heart failure.(Dassanayaka ,et al., 2015) With high incidence and prevalence rates across the globe, heart failure (HF) is a serious and expanding medical and economic issue. (Davidge et al., 2023) Almost 75% of all patients with HF are 75 years of age or older, indicating that the disease primarily affects the elderly. The most common diagnosis for hospitalised elderly patients over 65 in high-income nations is heart failure.(Scholten et al.,2022)risk factors that raise the incidence of heart failure (HF), such as obesity, chemotherapy, heritability, physical inactivity, and hyperlipidaemia; the incidence also varies according to the patient's socioeconomic status (SES).(Van Deursen et al., 2014)Patients with COPD are at high risk for heart failure. (Lesyuk et al., 2018) Ischaemic coronary heart disease, atrial traumatic inflammation, and valve dysfunctions are the main cardiovascular comorbidities that cause HF, which is a chronic condition. The age-adjusted incidence and occurrence of heart failure are declining as a result of improved clinical management, and those who suffer from heart failure are expected to live longer. (Roger et al., 2013)HF is related to multimorbidity, the superiority of HF and MM will increase with age and the price of care and remedy constitutes a sizable burden on number one healthcare and on healthcare as a whole. (Roger et al., 2013)The comorbidities taken into consideration blanketed CKD, anemia, hyper- and hypothyroidism, COPD, sleep

apnea and diabetes mellitus. These comorbidities have been independently related to better age, NYHA practical class, coronary heart rate, ischemic etiology of HF, hypertension, and atrial fibrillation. One of the factors contributing to the increased incidence of heart failure may be the rise in co-morbid conditions and risk factors, such as cigarette smoking, metabolic syndrome, elevated apolipoprotein B/apolipoprotein ratio, and accelerated body mass index (BMI), in populations with significantly higher life expectancy.(Ni,H,Xu et al., 2000)The primary objectives of heart failure treatment are (1) to improve prognosis and lower mortality, (2) to alleviate symptoms and lower morbidity by reversing or slowing cardiac and peripheral dysfunction, (3) to shorten hospital stays and subsequent readmissions, (4) to avoid damage to organ systems, and (5) to effectively manage co-morbidities that may contribute to a poor prognosis. (Tamargo et al., 2011). The objectives of the study are to study different comorbidities among heart failure patients, to correlate age and sex to the comorbidities, and to estimate the relation between commonest comorbidities to other comorbidities.

MATERIALS AND METHODS

A cross-sectional study was used to collected data from Cardiology Department at Tripoli University Hospital (TUH). Forty patients were admitted and diagnostic with heart failure and comorbid diagnosis with Arterial hypertension, Diabetes, Hypothyroidism, Ischemic heart disease (IHD), Atrial fibrillation, Chronic obstructive airway disease (COPD), Bronchial Asthma, Cerebrovascular accident (CVA), Anemia, Chronic kidney disease (CKD), Valvular heart disease (VHD), Obstructive sleep apnea (OSA), from 1st April 2024 to 1st October 2024. At baseline, data on scientific, laboratory, and sociodemographic factors are recorded. The New York Heart Association (NYHA) Classification is used to determine the severity of HF.

Statistical Analysis

The data presented in this study was analysed using the Statistical Package for Social Sciences (SPSS version 22.0). Participants' sociodemographic characteristics were explained using descriptive data. Using the χ^2 test, the differences between the dichotomous variables were examined; a p-value of less than 0.05 indicated statistical significance.

RESULTS AND DISCUSSION

Thirty percent of the patients were men and seventy percent were women (Figure 1). 30% of patients were between the ages of 55 and 60, 15% were between the ages of 66 and 70, and 5% were over the age of 80 (figure 2). The most common comorbidity is hypertension (75%), which is followed by diabetes mellitus 70%, atrial fibrillation 55%, IHD 40%, hypothyroidism 25%, VHD 20%, anaemia 15%, CKD and CVA 10%, COPD 5%, bronchial asthma, and obstructive sleep apnoea (Table 1). There are regional variations in the comorbidities of heart failure patients; for example, heart failure patients have a lower prevalence of anaemia and less chronic kidney disease (CKD) than patients in other regions.(Hunt SA et al., 2009).

Similar to our study, other research revealed that hypertension was the most common comorbidity. The mutal relation of HF & most frequent comorbidities is Dual directional the HF may enhance appearance of multi comorbidities such as atrial fibrillation & DM while the comorbidities may promot developing of heart failure.(V.M et al., 2014)

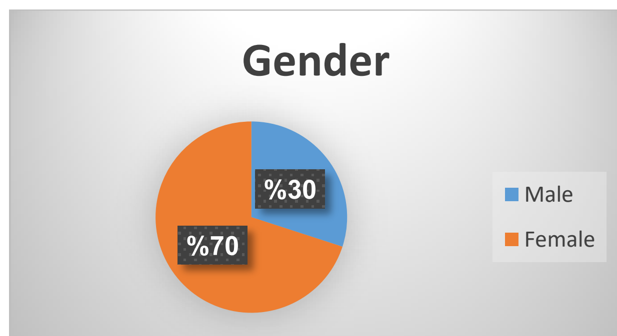

Figure1: Represent % of Males and Females,

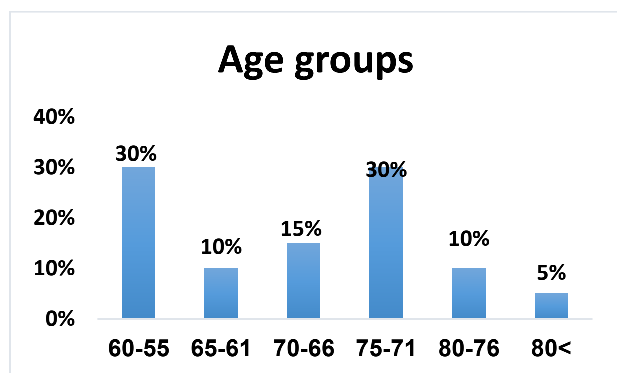

Figure 2: Represent % of Different Age Group.

Tables 1: Comorbidities among Heart Failure Patients

	No	%
DM	28	70.0
HTN	30	75.0
Atrial fibrillation	22	55
IHD	16	40
HYPOTHYROIDISM	10	25
VHD	8	20
Anemia	6	15
Bronchial asthma	2	5
COPD	2	5
CKD	4	10
Obstructive sleep apnea (OSA)	2	5
CVA	4	10

22(73.3%) of patients have hypertension had DM, 12(40.0%) had IHD, 18(60.0%) had fibrillation, 4(13.3%) had Hypothyroidism, 2(6.7%) had VHD, 6(20.0%) had anemia, 4(13.3%) had CVA and 4(13.3%).

Table 2: The Relationship between Hypertensive and other Comorbidities among Heart Failure Patients.

	hypertension in patient		P-value
	YES	NO	
DM	22(73.3)	6(60.0)	>0.05
IHD	12(40.0)	4(40.0)	>0.05
A fibrillation	18(60.0)	4(40.0)	>0.05
Hypothyriodism	4(13.3)	6(60.0)	< 0.05
VHD	2(6.7)	6(60.0)	< 0.05
Anemia	6(20.0)	0(0.0)	>0.05
CVA	4(13.3)	0(0.0)	>0.05
CKD	4(13.3)	0(0.0)	>0.05

had CKD. However, there were no statistically significant different between hypertension and DM, IHD, fibrillation, anemia, CVA and CKD. But there were statistically significant different between hypertension and Hypothyroidism and VHD ($P < 0.05$).

There were statistically significant different between hypertension and gender ($p=0.0038$) (Table 3).

In our study results suggest presence of comorbidities is association with older age such as Atrial fibrillation.

Moreover, several differences observed in comorbidities regarding by sex, firstly high prevalence of CHD in male & DM in female, in reported in multi registry-based-study worldwide(Oikonomou et al., 2018). Finally no HF-registry based study for coexstant comorbidity by sex.

In our study the comorbidity patterns present may turn allowing to generate new information to increase knowledge on complex interplay of comorbidity in heart failure.

	Age						X^2	P-value
	55-60	**61-65**	**66-70**	**71-75**	**76-80**	**>80**		
Hypertension	8	4	4	8	4	2	12.470	0.89
DM	8	4	6	6	2	2		
A fibrillation	6	2	2	8	2	2		
Anemia	4	0	2	0	0	0		
IHD	6	2	2	4	2	0		

Table 3: The Relationship between Comorbidities among Heart Failure Patient and Gender.

There were statistically significant different between hypertension and age(P=0.89) (Table 4). The Significant association between anemia and high mortality in multiple study and association between comorbidities and prognosis in heart failure patient. Moreover, the DM & heart failure may enhance myocardial infarction and insulin resistance as both coexist, leading to more sever status of disease and more complication. Finally, CHD is one major diagnosed sharing to heart failure, existence MI one of major cause of HF & CHD worse prognosis in patient with HF_ non-ischemic cause, also due to chronic hypoperfusion to myocardium (Scholten et al., 2022).

Table 4: The Relationship between Comorbidities among Heart Failure Patient and Age

	Gender		X^2	P-value
	Male	Female		
Hypertension	12	18	20.93	0.0038
DM	8	20		
Hypothyriodism	0	10		
CKD	2	2		
A fibrillation	8	14		
Anemia	6	0		
IHD	8	8		
CVA	0	4		

Males between the ages of sixty and seventy are most likely to have hypertension, diabetes mellitus, atrial fibrillation, and IHD, with the exception of AF in all patients over the age of eighty. DM, atrial fibrillation, and IHD are frequently linked to hypertension. This condition must be monitored and managed. In order to provide more effective treatment, it is also necessary to understand the pattern of various comorbidities by sex in heart failure patients.

Suggestion

We need a large sample of studies on this topic and the necessary patient awareness because comorbidities can be linked to poor prognosis and mortality in heart failure patients, so it is important to learn more about them and control them.

CONCLUSION

This study found that heart failure frequently has a number of comorbidities, both cardiac and non-cardiac. It also provides new information to increase knowledge on complex interplay of comorbidity in heart failure.

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ETHICS

The Research Ethics Committees at Derna University in Libya gave their approval for the stud.

REFERENCES

1- Agunbiade TA, Zaghlol RY, Barac A. 2019. Heart failure in relation to anthracyclines and other

chemotherapies. Methodist *Debakey Cardiovasc J,* 15:243–9.

2. Braunwald E. 2015, The war against heart failure: the Lancet lecture. *Lancet* ; 385:812–24.

3. Campbell-Quintero S, Cheverria L.E.E, Gomez-Mesa J.E. , A.Rivera-Toquica,C.A.Renteria-Asprilla, N.A. Lopez-Garzon, et al., 2023. Comorbidity profile and outcome in patient with chronic heart failure in Latin American country. *Ingistry (RECOLFACA)", International journal of cardiology*, 5: 123 – 129.

4. Chandramouli C, T.-H.K. Teng, W.T. Tay, J. Yap, M.R, 2019, MacDonald Impact of diabetes and sex in heart failure with reduced ejection fraction
Eur. J. Heart Fail., 21 (3) : 297–307,

5. Dassanayaka, S.; Jones, S.P. 2015. Recent Developments in Heart Failure. *Circ. Res.* , 117, e58–e63.

6. Davidge J, Halling A, Ashfaq A, Etminani K, Agvall B. 2023. Clinical characteristics at hospital discharge that predict cardiovascular readmission within 100 days in heart failure patients—An observational study. *Int J Cardiol Cardiovasc Risk Prev*, 2: 16- 76.

7. Kaszuba E, Odeberg H, Råstam L. 2018. Halling A: Impact of heart failure and other comorbidities on mortality in patients with chronic obstructive pulmonary disease: a register-based, prospective cohort study. *BMC Fam Pract* , 19(1):178.

8. Lainˇsˇcak M. , I. Milinkoviˊc, M. Polovina, M.G. Crespo-Leiro, L.H. Lund, S.D. Anker et al. 2020. Sex- and age-related differences in the management and outcomes of chronic heart failure: an analysis of patients from the ESC HFA EORP heart failure long -term registry. *Eur. J. Heart Fail*., 22 (1) : 92–102.

9. Lesyuk W., Kriza C., Kolominsky- Rabas P. 2018. Cost-of-illness studies in heart failure: a systematic review 2004-2016. *BMC Cardiovasc. Disord*., 18: 74.

10. Oikonomou, E K. Mourouzis, P. Fountoulakis, G.A. Papamikroulis, G. Siasos A. Antonopoulos, et al. 2018. Interrelationship between diabetes mellitus and heartfailure: the role of peroxisome proliferator-activated receptors in left ventricle performance, Heart Fail. *Rev*., 23 (3) :389–408,

11. Roger V.L. 2013. Epidemiology of heart failure. *Circ. Res.* 113: 646–659.

12. Rosano G. M, Vitale C, Seferovic P. 2017. Heart failure in patients with diabetes mellitus, Card Fail. *Rev*. 3 (1): 52–55,

13. Scholten M, Midlöv P, Halling A. 2022. Disparities in prevalence of heart failure according to age, multimorbidity level and socioeconomic status in southern Sweden: a cross-sectional study. *BMJ Open* , 12(3):e051997.

14. Velagaleti R. ,. Vasan R.S. 2007. Heart failure in the 21st century: is it a coronary arterydisease problem or hypertension problem?. *Cardiol. Clin*., 25 (4) : 487–v.

15. Veldhuisen J. van et al. 2008. Anemia and mortality in heart failure patients systematic review and meta-analysis. *J. Am. Coll. Cardiol.,* 52 (10) : 818–827.

الملخص

يعد التثقيف حول الأمراض المصاحبة المختلفة بين مرضى قصور القلب أمرًا بالغ الأهمية لتحسين الرعاية والنتائج. يهدف هذا العمل إلى ربط العمر والجنس بالأمراض المصاحبة للمرضى الذين تم تشخيص إصابتهم بقصور القلب وتقدير العلاقة بين الأمراض المصاحبة الأكثر شيوعًا والأمراض

المصاحبة الأخرى. أجريت دراسة مقطعية من 1 أبريل 2024 إلى 1 أكتوبر 2024. تم جمع البيانات من قسم أمراض القلب في مستشفى طرابلس الجامعي تم إدخال 40 مريضًا وتشخيصهم بالعديد من الصعوبات الصحية بما في ذلك قصور القلب وارتفاع ضغط الدم الشرياني والسكري وقصور الغدة الدرقية ومرض القلب الإقفاري والرجفان الأذيني ومرض الانسداد الرئوي المزمن والربو القصبي والسكتة الدماغية الوعائية وفقر الدم وأمراض الكلى المزمنة وأمراض صمامات القلب وانقطاع النفس الانسدادي أثناء النوم أظهرت البيانات أن أكثر الأمراض المصاحبة شيوعًا (أكثر من 90%) كانت عامل خطر رئيسيًا للإصابة بقصور القلب (وخاصةً قصور القلب مع الحفاظ على الجزء المقذوف). يُعتبر مرض الكلى المزمن مؤشرًا مستقلًا قويًا للوفيات وإعادة الدخول إلى المستشفى، ويمثل حوالي 40-50% من مرضى قصور القلب المقيمين في المستشفى. بينما يمثل داء السكري 30-45% من مرضى قصور القلب المقيمين في المستشفى. قد يؤدي هذا إلى تسريع تصلب الشرايين، وتعزيز ضعف عضلة القلب (اعتلال عضلة القلب السكري)، وتعقيد إدارة السوائل/الإلكتروليت، وزيادة خطر العدوى. كما أحدثت مثبطات SGLT2 ثورة في رعاية مرضى قصور القلب المصابين بداء السكري. علاوة على ذلك، تم تشخيص 30-50% من مرضى قصور القلب المقيمين في المستشفى بفقر الدم، مما ساهم في انخفاض توصيل الأكسجين، وتفاقم الأعراض (التعب، ضيق التنفس)، وارتبط بزيادة الوفيات وإعادة الدخول إلى المستشفى. يتطلب تحسين صحة مرضى قصور القلب إدارة صحية قوية.

الكلمات المفتاحية: قصور القلب، أمراض القلب والأوعية الدموية، الأمراض المصاحبة، مستشفى طرابلس الجامعي.