

Characteristics of Saudi patients with congestive heart failure and adherence to management guidelines in a tertiary hospital in Riyadh

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BACKGROUND AND OBJECTIVES: There is limited data available on the characteristics of local Saudi patients diagnosed with congestive heart failure (CHF) and on their adherence to guidelines for managing the disease. This study aimed to fill this gap.

DESIGN AND SETTING: Retrospective study of patients treated at King Abdulaziz Medical City from 2002-2008.

SUBJECTS AND METHODS: The records were reviewed of subjects admitted secondary to heart failure (defined as systolic heart failure [ejection fraction <55%] and/or heart failure with preserved ejection fraction diagnosed either clinically and/or by echocardiogram and/or cardiac catheterization) or who visited the outpatient department for the same complaint.

RESULTS: Of 392 CHF cases, the mean age was 67.8 (12.8) years and the majority were males (53.1%). Hypertension was the predominant comorbid illness, accounting for 84.9% of cases, followed by diabetes mellitus type 2 and hyperlipidemia. Almost three-fourths (73.7%) of the subjects had mild to severe left ventricular dysfunction, with 68.5% of the cases having right ischemic cardiomyopathy. Spironolactone, exercise and vaccination were the least least adhered to recommendations (30.0%, 20.5% and 15.2%, respectively).

CONCLUSIONS: The study highlights the need for proper education of patients and caregivers to increase compliance to medications. Physicians are also encouraged to undergo continuing medical education and training courses to properly implement current recommendations in the management of heart failure. Further studies are needed on a larger scale in order to formulate an effective management scheme that will address the current challenges faced by both clinicians and CHF patients.

One of the mostly affected human organs in terms of rapid industrialization and urbanization is the heart.¹ While the industrialized Western and European nations' prevalence of heart diseases begin to taper off,² the prevalence in developing nations is strikingly increasing, accounting for more than 80% of the cause of death in these nations.³ These vascular diseases are widely known not only as public health threats and economic burdens, but more so because these diseases increase morbidity and mortality, not to mention the over-all quality of life of the individual. To further complicate management of these

diseases are the modifiable and non-modifiable cardiovascular risk factors (ie, age, family history, obesity, dyslipidemia, smoking). The presence of one risk factor alone can cause the disease, but the presence of other risk factors combined increases the likelihood of harboring these diseases. In Saudi Arabia alone, the recent epidemiologic study done by Al-Daghri and colleagues highlighted the worsening prevalence of diabetes mellitus, hypertension and coronary artery disease in the capital Riyadh as compared only to the previous decade.⁴ Furthermore, the prevalence of metabolic syndrome (the clustering of cardiometabolic risk factors)

is still alarmingly high in the country in both children⁵ and adults.⁶

Among the roster of chronic non-communicable diseases involving the heart is congestive heart failure (CHF). CHF, or heart failure, in general, is the weakening of the heart's ability to effectively pump blood. Recent epidemiologic studies observed a declining trend in heart failure hospitalizations in US,⁷ but not in European nations such as England and Wales,⁸ indicating discrepancies in trends and management even in developed nations. While epidemiologic data in Saudi Arabia and the Middle East and North Africa are limited, the recent study of Magaña-Serrano and colleagues observed a lower incidence of heart failure with preserved systolic function in the Middle East as compared to Latin America and North Africa, where the prevalence of coronary artery disease and hypertension was observed to be greater.⁹ Furthermore, Arab patients presenting with acute coronary syndrome (ACS) with prior coronary artery bypass graft (CABG) were observed to have more severe left ventricular dysfunction but with a less prominent surge of cardiac biomarkers as compared to patients from other regions.¹⁰ In Saudi Arabia, hypertension is present in more than 80% of patients with heart failure, making it the single strongest predictor of CHF.¹¹ This was later confirmed from a recent study by Assiri, indicating that both hypertension and ischemic heart disease are the major causes of heart failure among elderly Saudis.¹² Despite these observations, little has been mentioned as to the adherence of Saudi CHF patients to current management guidelines. This single-center study, done at a major tertiary hospital in Riyadh aimed to fill this gap.

SUBJECTS AND METHODS

In this retrospective study done at King Abdulaziz Medical City, Riyadh, Saudi Arabia, we reviewed and screened the medical records of 500 patients admitted secondary to heart failure (defined as systolic heart failure [ejection fraction <55%] and/or heart failure with preserved ejection fraction diagnosed either clinically and/or by echocardiogram and/or cardiac catheterization) or who visited the outpatient department for the same complaint between the years 2002-2008. Cases were excluded if the heart failure was congenital in origin, end-stage renal disease (ESRD) was present, and if the patient was older than 90 years of age. From the roster of cases, a total of 392 cases met the criterion for this study. Information gathered included demographics, medical history, including functional classification of heart failure based on the recommendations of the New York Heart Association (NYHA)¹² (Table 1)

Table 1. The New York Heart Association Classification System.¹²

Class	NYHA Functional Classification
I	Patients have cardiac disease but without the resulting limitations of physical activity. Ordinary physical activity does not cause undue fatigue, palpitation, dyspnea or anginal pain
II	Patients have cardiac disease resulting in slight limitation of physical activity. They are comfortable at rest. Ordinary physical activity results in fatigue, palpitation, dyspnea or anginal pain
III	Patients have cardiac disease resulting in marked limitation of physical activity. They are comfortable at rest. Less than ordinary physical activity causes fatigue, palpitation, dyspnea or anginal pain
IV	Patients have cardiac disease resulting in inability to carry on any physical activity without discomfort. Symptoms of cardiac insufficiency or of the anginal syndrome may be present even at rest. If any physical activity is undertaken, discomfort is increased

Table 2. Patient characteristics (n=392).

Males	208 (53.1)
Age (years)	67.8 (12.8)
NYHA Class (mean, SD)	2.7 (0.9)
NYHA 1	53 (13.6)
NYHA 2	67 (17.1)
NYHA 3	203 (51.9)
NYHA 4	68 (17.4)
Mortality	205 (52.3)
Hypertension	333 (84.9)
Smokers	60 (15.3)
Hyperlipidemia	233 (59.4)
Diabetes mellitus type 2	242 (61.7)
Left ventricular dysfunction (EF <55%)	289 (73.7)
Normal ejection fraction (EF ≥55%)	101 (25.8)
Valvular disease	45 (11.5)
Ischemic cardiomyopathy	268 (68.5)
Chronic atrial fibrillation	103 (26.3)
PTCA/CABG	91 (23.2)
Stroke/transient ischemic attack	89 (22.7)

Data presented as N (%) or mean (SD). PTCA: percutaneous transluminal coronary angioplasty, CABG: coronary artery bypass graft

Table 3. Medications taken by study subjects.

Angiotensin-converting enzyme inhibitors	175 (45.1)
Angiotensin receptor blocker	135 (34.8)
β -blockers	269 (69.3)
Diuretics	298 (76.8)
Spironolactone	88 (22.7)
Statins	273 (70.7)
Nitrates	52 (17.7)
Anti-arrhythmic	22 (5.7)
Digitalis	55 (14.2)
Aspirin	241 (62.3)
Warfarin	70 (18.1)
Plavix	85 (22.0)
CRT, ICD, Combined	35 (9.0)

Data are n (%). CRT: cardiac resynchronization therapy, ICD: intracardiac defibrillator.

Table 4. Metabolic characteristics of subjects.

Hemoglobin (g%)	117.3 (23.0)
Creatinine (mg/dL)	150.9 (126.2)
Blood urea nitrogen (mmol/L)	13.3 (9.4)
Glucose (mmol/L)	10.0 (5.5)
Total cholesterol (mmol/L)	3.6 (1.2)
HDL-cholesterol (mmol/L)	1.0 (0.3)
LDL-cholesterol (mmol/L)	2.3 (0.9)
Triglycerides (mmol/L)	1.6 (0.9)
Albumin (g/L)	34.8 (7.0)
Potassium (mEq/L)	4.4 (0.7)
Sodium (mEq/L)	137.4 (32.2)

Data are mean (SD).

and medications taken. Laboratory results obtained during admission/evaluation were also obtained and included fasting plasma glucose, lipid and renal profiles as well as electrolytes. Raw data were encoded in a Microsoft Excel spreadsheet. Data was analyzed using SPSS, (IBM Corp, Armonk, New York, United States). Frequencies were presented as percentage (%) and continuous variables were presented as mean (standard deviation). The chi-square test was used for the comparison of frequencies. Significance was set at $P < .05$.

RESULTS

The majority of the subjects were elderly and more than half were male (Table 2). More than half (51.9%) had marked limitation in their physical activity (NYHA Class III), and 52.3% of the cases eventually died. Hypertension was the predominant comorbid illness, accounting for 84.9% of cases, followed by diabetes mellitus type 2 and hyperlipidemia. Consequently, almost three-fourths (73.7%) of the subjects suffered from mild-to-severe left ventricular dysfunction, with 68.5% of the cases having ischemic cardiomyopathy (Table 2). The majority of the subjects were taking diuretics (76.8%), statins (70.7%), β -blockers (69.3%) and aspirin (62.3%) (Table 3). Table 4 shows the metabolic profile of the subjects. Table 5 compares the subjects according to type of ventricular dysfunction. Those with reduced ejection fraction ($EF < 55$) had a higher incidence of coronary artery disease, but more were taking angiotensin-converting enzyme inhibitors, β -blockers, spironolactone and digitalis ($P < .01$) as compared to those with preserved EF ($EF \geq 55$). The rest of the parameters were comparable. Figure 1 shows the number of percentage of subjects complying with the recommendations set by the American College of Cardiology and American Heart Association. Exercise and vaccination were the least complied with recommendations (20.5% and 15.2%, respectively), with barely one-fifth of the subjects adherent.

DISCUSSION

The major findings of this study highlight similarities done previously in the same ethnic group in terms of dominating risk factors (hypertension and diabetes mellitus) as well as the presentation of subjects (ie. elderly, male gender).^{13,14} What the present study adds to the literature is adherence to current recommendations. In the present study, the majority of subjects were compliant in terms of salt and fluid restriction, as well as intake of vasodilators. What was apparent was the decreased compliance to spironolactone, as well as exercise and vaccination. Current recommendations in both European and American cardiology societies are in agreement in terms of management of heart failure,¹⁵ and these consensus are applied universally, including the tertiary hospital where this study was conducted. The difference therefore lies in the adherence of patients involved, as well as the dominant risk factors, which vary regionally. Both diabetes mellitus and hypertension are common in Saudi Arabia,⁴ and in the Middle East in general.¹⁶ Furthermore, dyslipidemia is extremely common in both adults and children,^{5,6} which means that CHF risk factors in the country start to

Table 5. Comparison between subjects with heart failure and reduced ejection fraction versus heart failure and preserved ejection fraction.

	EF <55%	EF ≥55%	P
Hypertension	245	88	.51
Diabetes mellitus	173	69	.11
Coronary artery disease	230	59	< .001
Atrial fibrillation	67	24	.54
Stroke/transient ischemic attack	64	25	.38
Dyslipidemia	175	88	.26
Mortality	143	44	.14
Angiotensin-converting enzyme inhibitors	147	28	< .001
β-blockers	223	46	< .001
Digitalis	240	94	.001
Spirolonactone	79	9	< .001
Diuretics	219	79	.40
Angiotensin receptor blocker	102	33	.35

manifest as early as childhood. Subjects included in this study also had a sedentary lifestyle, which is also very common in Saudi Arabia,¹⁷ and probably explains the lack of adherence to exercise. As for less compliance to medications, perhaps one of the issues that predispose heart failure patients not to adhere to current recommendations is polypharmacy. Patients harboring more than one disease are subject to multiple management schemes, making them prone to polypharmacy while at the same time increasing their risk of nonadherence. Regardless, polypharmacy by itself is rampant in different primary care centers in the country.^{18,19} Lastly, physicians themselves need to be educated about the standard recommendations for management of CHF. In one study done in Aseer, it was observed that only one-fifth of the physicians prescribed a diuretic as the preferred initial anti-hypertensive medication.²⁰ This could have huge implications in the overall implementation of standard treatment.

Patients and their respective care takers should be educated properly about the disease they harbor to increase compliance to medications. Physicians are also encouraged to undergo continuing medical education and training courses to properly implement current recommendations in the management of heart failure. Further studies are needed on a larger scale to formulate an effective management scheme that will address the current challenges faced by both clinicians and patients harboring heart failure.

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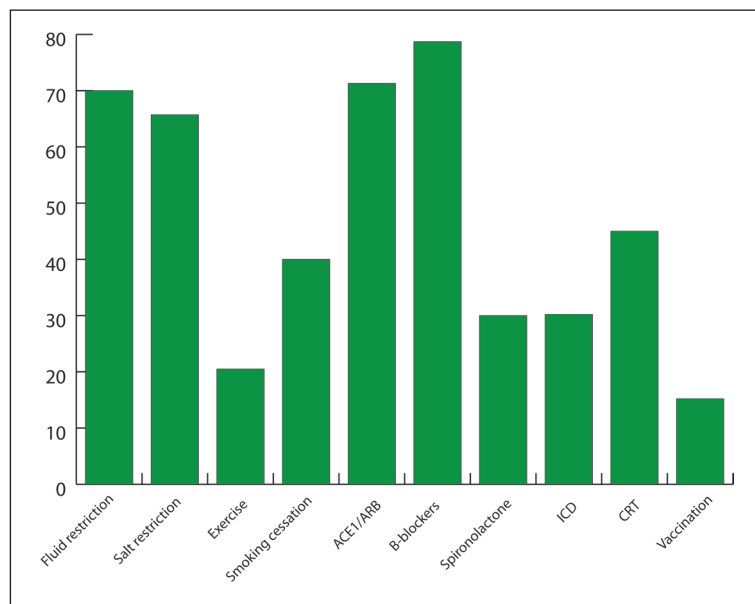


Figure 1. Percentage (%) Adherence to ACC/AHA guidelines in managing CHF patients with reduced EF.

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