

Expert Recommendations to Bridge Gaps in Heart Failure Patient Support in the Middle East and Africa Region

ABSTRACT

Heart failure (HF) remains a serious health and socioeconomic problem in the Middle East and Africa (MEA). The age-standardized prevalence rate for HF in the MEA region is higher compared to countries in Eastern Europe, Latin America, and Southeast Asia. Also cardiovascular-related deaths remain high compared to their global counterparts. Moreover, in MEA, 66% of HF readmissions are elicited by potentially preventable factors, including delay in seeking medical attention, nonadherence to HF medication, suboptimal discharge planning, inadequate follow-up, and poor social support. Patient support in the form of activation, counseling, and caregiver education has been shown to improve outcomes in patients with HF. A multidisciplinary meeting with experts from different countries across the MEA region was convened to identify the current gaps and unmet needs for patient support for HF in the region. The panel provided insights into the real-world challenges in HF patient support and contributed strategic recommendations for optimizing HF care.

Keywords: Heart failure, HF patient support, Middle East and Africa

INTRODUCTION

Heart failure (HF) remains a serious public health problem in the world, affecting 64.3 million individuals, and this number is expected to increase during the next few decades.¹ The age-standardized prevalence rate (per 100 000) of HF in the Middle East and Africa (MEA) region is relatively high (972.3) compared to Latin America (709.8-870.7), Eastern Europe (703.8), and Southeast Asia (655.0).¹ According to the Gulf CARE registry study, 59% of the patients had reduced ejection fraction (EF), 21% had midrange EF, and 20% had preserved EF.² In MEA, the increasing prevalence rate of HF is driven by the increase in risk factors such as hypertension, diabetes mellitus, hyperlipidemia, coronary artery disease, obesity, smoking, and a sedentary lifestyle.^{2,3}

Despite significant advances in HF prevention and therapeutic armamentarium, mortality rates remain high, with 17% to 45% of deaths occurring within 1 year of diagnosis—the majority of deaths occur within 5 years of admission.^{4,5} Compared to their global counterparts, cardiovascular-related deaths remain high in MEA (308.9 per 100 000 versus 264.3 per 100 000).⁶ In the last 30 years in the MEA region, the total number of cardiovascular-related deaths has risen by 48%.⁷ This reflects gaps in early detection and control of risk factors, alongside the health systems-related challenges for the management of HF.

Similar to developed countries (North America, Latin America, Australia, and Japan) in MEA, particularly in the Middle East, HF accounts for up to 1.31% of all hospitalizations.^{5,8} Also, recurrent admissions for HF are common in MEA, with nearly 1 in 5 readmitted within 3 months and 2 in 5 within 12 months following admission for acute HF. In Gulf countries (2012), in-hospital mortality was 6.3%, doubled at 3 months following discharge, and reached 20.2% at 1 year following discharge.² The Gulf CARE study reported hospital readmission rates of 18% and 40% at 3 and 12 months, respectively,² highlighting an urgent need to address this

REVIEW

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Received: May 22, 2023

Accepted: October 18, 2023

Available Online Date: January 01, 2024

Cite this article as: Skouri HN, Çavuşoğlu Y, Bennis A, et al. Expert recommendations to bridge gaps in heart failure patient support in the Middle East and Africa region. *Anatol J Cardiol*. 2024;28(1):2-18.

DOI:10.14744/AnatolJCardiol.2023.3517



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major public health burden. Moreover, the MEA region has one of the youngest populations of patients with HF across the globe; the age of affected individuals on average is 10 years younger compared to the Western counterparts,² yet patients have similar mortality rates, hospitalization rates, and rehospitalization rates, highlighting significant deficits in HF care. Literature indicates that up to 66% of HF readmissions are elicited by potentially preventable factors, including nonadherence to HF medication, suboptimal discharge planning, inadequate follow-up, poor social support, delays in seeking medical attention, and a lack of affordability of newer, more effective, but more expensive medications.⁹

In MEA countries, there are some variations in the use of essential medications for HF.^{2,10-12} The HEARTS study conducted in Saudi Arabia reported that angiotensin-converting enzyme inhibitors (ACEIs)/angiotensin receptor blockers (ARBs) and beta-blocker usage were high in patients with HF (86% and 94%), and mineralocorticoid receptor antagonist use was modest (42%).¹¹ The Gulf CARE study found that 81% of the patients with HF used ACEIs/ARBs and 57% used beta-blockers.² However, a multinational study from the Africa region found that 74% of patients with HF used ACEIs/ARBs, 66.5% used beta-blockers, and 48% used mineralocorticoids.¹³ Similarly, the use of cardiac resynchronization therapy (CRT) and implantable cardioverter-defibrillator (ICD) varied greatly among MEA countries, with Saudi Arabia having the highest rate.¹⁴ In the Gulf nations, use of ICD and CRT are documented in 10%-20% and 3%-8%, respectively, among eligible patients.¹⁴ Whereas in countries like Egypt, ICD/CRT devices were used in less than 1% of patients with HF.¹⁵ Heart failure causes a substantial economic burden on the health-care system, including hospitalizations, drug treatment, monitoring systems, CRT, ICD, left ventricular assist devices, emergency visits, and heart transplantation.¹⁶ In 2012, the estimated total HF cost in the United States (US) was 30.7 billion US dollars, and projections suggest that by 2030, the total cost of HF will increase to \$69.8 billion.¹⁷ Hospitalizations account for most HF-associated costs. Very recently published data showed that the total annual national direct and indirect costs of HF are estimated to be \$1 billion in 2021 in Türkiye, which is a very important amount for middle-income countries.¹⁶

Appropriate patient support in HF seems to reduce the risk of rehospitalization and prolong survival relative to

standard care. Hence, to identify the current gaps and unmet needs for patient support for HF in the MEA region, a multidisciplinary meeting with experts from different countries across the region was convened. The panel aimed to gain insights into the real-world challenges in HF patient support and contribute strategic recommendations for optimizing HF care.

METHODOLOGY

An expert panel of 14 members with expertise in the management of HF across the MEA region [2 experts from Egypt, 2 from Saudi Arabia, 2 from Türkiye, and 1 each from Iraq, Jordan, Kenya, Kuwait, Lebanon, Morocco, South Africa, and the United Arab Emirates (UAE)] provided insights on practical challenges and recommendations to overcome the gaps in HF patient support. This article is an outcome of the literature review, expert group discussion, and consensus recommendations for bridging gaps in HF patient support in the MEA region.

PATIENT JOURNEY IN HEART FAILURE

Patient journeys in HF differ from individual to individual, varying from symptoms of HF, mode of onset, etiology, comorbidities, and social/financial factors. Heart failure may present as a gradual functional decline with recurrent episodes of acute deterioration, frequent hospitalizations, recovery, and seemingly unexpected or sudden death.⁴ Patients are distressed when HF is diagnosed. Figure 1 summarizes the journey that a patient with HF experiences over time.

Despite their younger age, most patients presenting with acute HF from the MEA region have 1 or more comorbid conditions, particularly hypertension, diabetes mellitus, hyperlipidemia, and coronary artery disease.² At initial presentation, although most patients exhibit classic symptoms and signs of HF, the disease often remains undiagnosed at the primary care physician (PCP) level.² In most cases, the diagnosis is made during an emergency hospital admission,² and is associated with prolonged hospital stays¹⁸ and subsequent frequent hospitalizations.^{2,3} In MEA, almost 56%-75% of the patients present with New York Heart Association (NYHA) class III and IV disease.^{2,3} Timely diagnosis and treatment remain critical for the survival and improved prognosis of patients with HF.

Approximately 22%-52% of patients in MEA receive suboptimal treatment (deviation from guideline-directed medical therapy),¹⁹⁻²¹ which limits their quality of life (QOL). According to real-world data from Türkiye, patients with a prior diagnosed HF were admitted; now, with deteriorating HF, guideline-recommended drugs were less likely to be used (<73%) before admission.¹⁸

In MEA, most patients lack awareness about the disease, and to overcome low awareness, patients diagnosed with HF need explanations regarding their condition and the methods used to treat it, the lifestyle factors that need attention, a support system, and guidance in preparing them to resume their normal activities.

HIGHLIGHTS

- Nearly three-fourths of patients with HF are diagnosed with New York Heart Association class III and IV disease, emphasizing the high unmet need for patient support in HF in the MEA.
- Delay in seeking medical attention, nonadherence to HF medication, suboptimal discharge planning, inadequate follow-up, and poor social support are the potentially preventable factors for HF readmissions.
- The expert panel provided insight on practical challenges and recommendations to overcome the gaps in HF patient support.

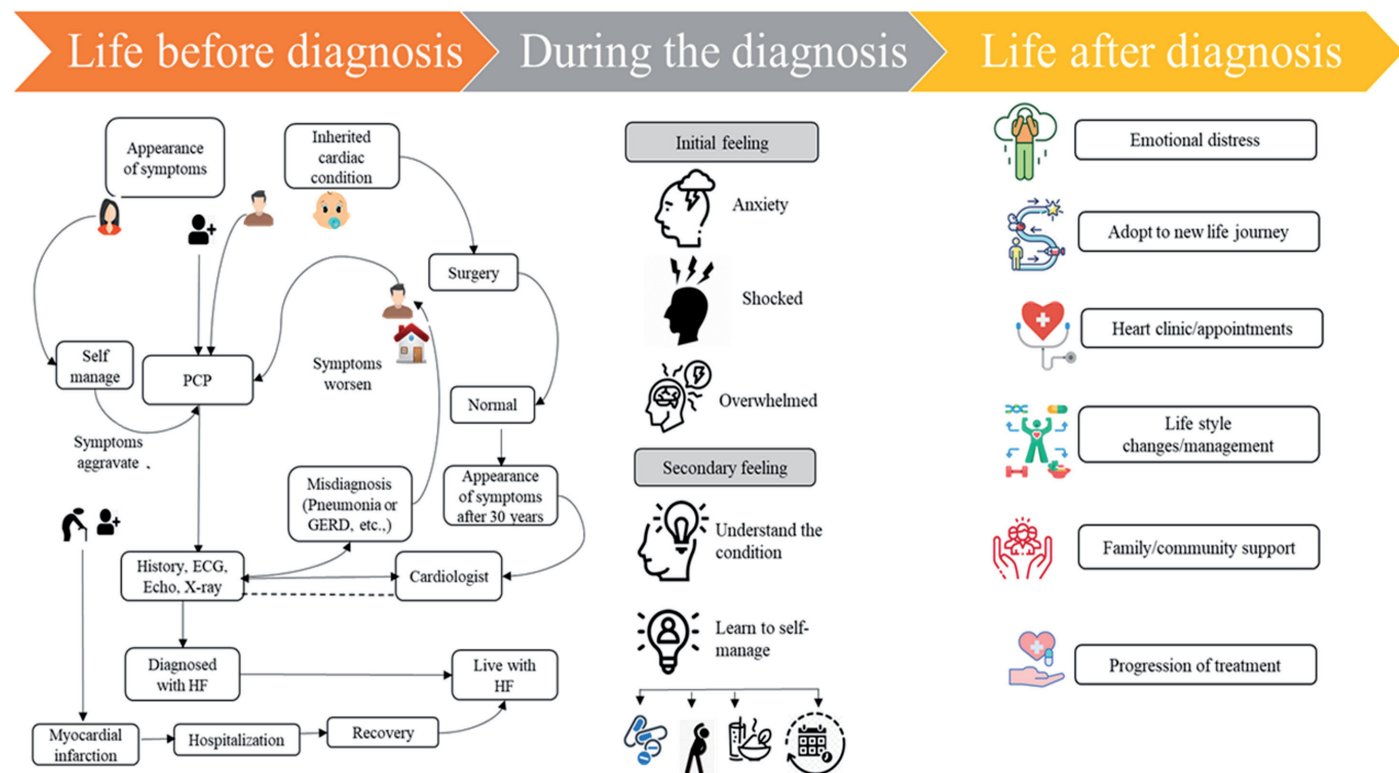


Figure 1. Patient journey in heart failure. ECG, electrocardiogram; HF, heart failure; PCP, primary care physician; GERD, gastroesophageal reflux disease.

ROLE OF PCP TO DIAGNOSE AND LEVERAGE EARLY REFERRAL TO CARDIOLOGISTS

Most patients with HF will initially present themselves to general physicians (GPs) or PCPs. Therefore, the role of GPs or PCPs is crucial for diagnosing HF and the early referral of patients with HF to the cardiologist.

The condition poses a major diagnostic challenge for PCPs²² because, in the early stages of the disease, the symptoms and signs may be less obvious; therefore, they are particularly difficult to diagnose with the limited availability of the necessary investigative modalities, especially in low-middle income countries (LMICs). Accurate and early diagnosis is important since early treatment can delay or reverse disease progression. Lack of awareness among PCPs and GPs regarding the identification of risk factors for HF symptoms, and specialist referral remains a crucial challenge in the MEA. Clinical inertia about HF among PCPs is another big challenge. In the MEA region, non-HF specialists are treating the majority of the patients with HF, and only very few countries have developed structured HF programs with specialized HF clinics run by certified cardiologists and other disciplines.¹⁴ Figure 2 presents expert recommendations to bridge gaps in MEA at the PCP level to diagnose and leverage early referral to cardiologists.

INTERVENTION PROGRAMS FOR IMPROVING HEART FAILURE CARE

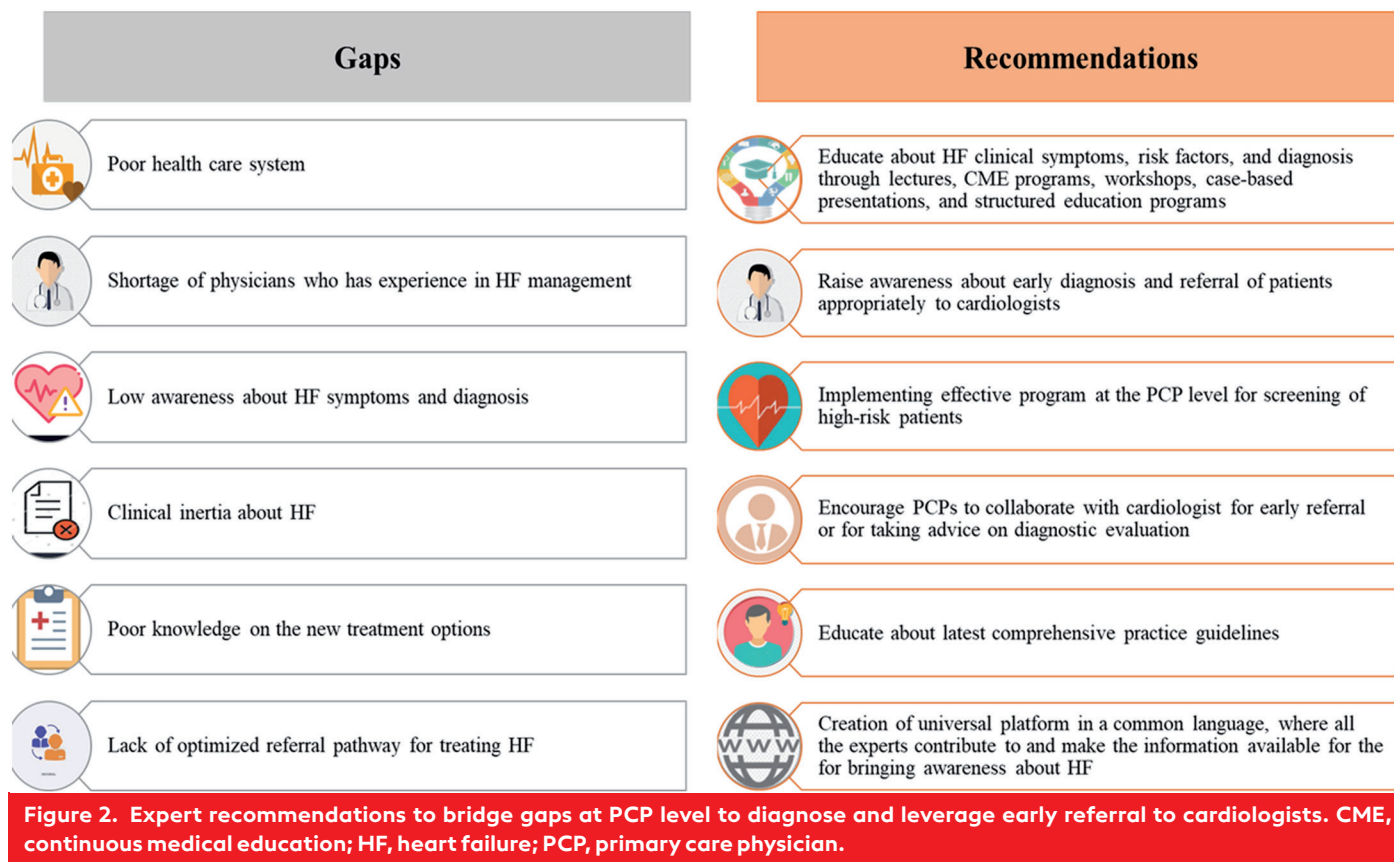
The experts recommended different intervention programs for improving patient care in HF management.

Figure 3 demonstrates an intervention framework for these programs.

PATIENT SUPPORT PROGRAMS IN HEART FAILURE MANAGEMENT

Patient support programs (PSPs) are enhanced self-management programs designed for direct patient or patient-caregiver engagement to support patients in managing their disease and complex medication regimens, improve medication adherence, and reduce potential complications and related costs.^{23,24} Activities included in PSPs are demonstrated in Figure 3.

A meta-analysis revealed that medication adherence, clinical, and humanistic outcomes were positively impacted by PSPs.²³ A study by Lorig et al revealed that implementing PSPs can improve communication between patients and their physicians.²⁵ In MEA countries like Lebanon and Saudi Arabia, self-care management is poor in patients with HF.^{26,27} Besides, approximately 50% of the patients have poor medication adherence,^{24,27} which could lead to increased complications of the disease, reduced QOL, and increased overall health-care costs related to readmissions. Hence, to improve medication adherence, QOL, and clinical outcomes among patients with HF in the MEA region, several pharmaceutical companies facilitate PSPs, including medication management and counseling, across many health-care facilities free of charge. However, there is a severe lack of awareness about PSPs in MEA countries.²⁴ Given the important role that PSPs play in creating value for patients in terms of



health-care follow-up practices, improved adherence habits, and potential cost savings, concerted efforts are imperative from cross-functional entities such as the government, pharmaceutical companies, and health-care organizations to expand PSPs in the MEA.

PSYCHOLOGICAL COUNSELING IN PATIENTS WITH HEART FAILURE

Heart failure is a chronic condition that affects not only the physical health but also the psychological well-being of the patient, because patients with HF often cope with numerous changes, including the consequences of the disease or its treatment on their QOL and functioning. Heart failure decreases the opportunities to participate in social life, leading to a deterioration of social interaction, social isolation, and a possible lack of social support.²⁸ In addition, patients have to deal with adherence to a new lifestyle (exercise, smoking cessation, healthy eating, weight loss, and alcohol cessation).²⁸ Among patients attending a chronic HF clinic, symptoms of anxiety and depression were found in more than 50% of the patients.²⁹ A meta-analysis conducted on patients with HF reported clinically significant depression and anxiety in 21.5% and 28.79% of patients, respectively.^{30,31} There is considerable evidence that these psychological health conditions are associated with reduced adherence to treatment, poor function, increased hospitalizations, and poor cardiac outcomes.³²⁻³⁵ However, health-care professionals often pay less attention to psychological health. Most people in the world, including in MEA countries, who

have mental illnesses such as anxiety, mood, etc., receive no treatment.³⁶

Studies reveal that counseling can improve patients' psychological condition³⁷ (reduction in anxiety and depression),³⁸ decrease HF-related hospitalizations^{39,40} morbidity, and mortality.⁴¹ Dracup et al emphasized that health-care professionals should have discussions with patients regarding the seriousness of their disease and effective treatment options that are available for HF, and they also emphasized that the majority of patients do very well on guideline-directed medical therapy.³⁹

Experts have also stated that patient counseling is a key component in the HF intervention, as counseling can help the patient to cope with or adjust to their current health situation (poor mental health, upsetting physical health condition, and difficult emotions). Studies have reported that nurse-led counseling is beneficial for the improvement of mental health status and QOL for patients with HF.⁴² Experts have unanimously suggested encouraging nurses to be involved in HF care, since they are an integral part of the patient journey in HF management; moreover, they are skilled at navigating both the emotional and physical needs of their patients.

IMPROVING QUALITY OF LIFE IN PATIENTS WITH HEART FAILURE BASED ON OUTCOMES FROM EVIDENCE-BASED ASSESSMENT

Maintaining QOL is a robust and independent predictor of all-cause death and HF hospitalization across all regions of

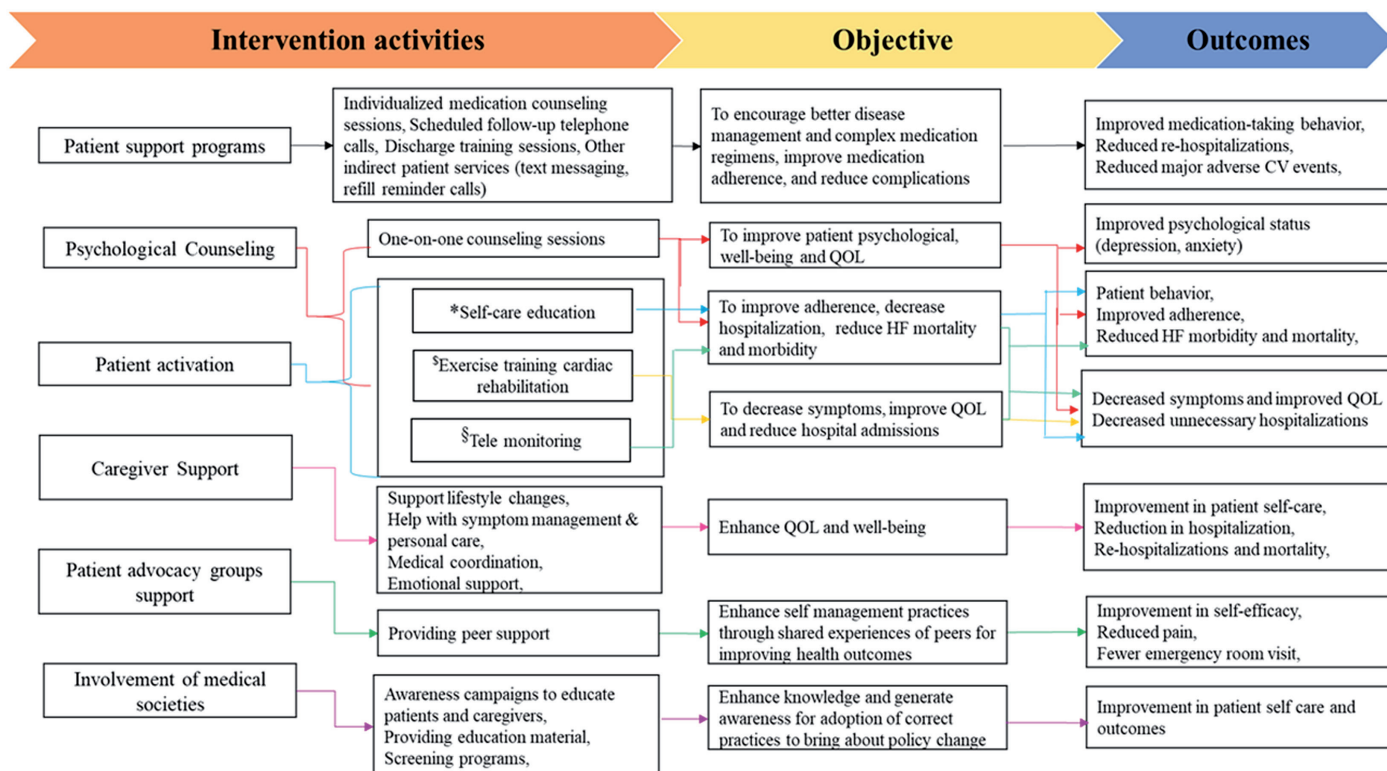


Figure 3. Intervention framework for improving HF care. *Self-care education: educating patients about disease, risk factors, complications, medication, exercise regimens, the importance of adherence to diet, implementing lifestyle changes, and daily weight measurement habit. §Cardiac rehabilitation: exercise training and physical activity, health education, disease risk management, and psychological support. §Telemonitoring: patient education and follow-up through telephone call-based remote assessment by a physician or nurse, mobile phone-based monitoring, and videoconferencing. CV, cardiovascular; QOL, quality of life.

the world in mildly and severely symptomatic HF.⁴³ In MEA, particularly in Africa, compared to their western counterparts, health-related QOL is markedly lower among patients with HF.⁴³ A good QOL is as imperative, if not more, as survival for most patients living with HF.⁴⁴ Guideline-recommended medical and behavioral interventions for HF, including self-care interventions, exercise training, and cardiac rehabilitation, can help to improve QOL.⁴⁵

Self-Care Management (Maintenance and Management)

Growing evidence suggests that patients with HF who demonstrate self-care deficits in activities such as treatment compliance, maintaining fluid restrictions, and not identifying the warning symptoms of worsening HF early have frequent hospitalizations and decreased QOL.⁴⁶ Most HF management programs emphasize that improved self-care is the key to success in order to improve adherence, QOL, and reduce mortality, morbidity, and ultimately health-care costs^{47,48} (Table 1).^{37,49–56}

A longer duration of self-management interventions was found to be more effective in improving several outcomes.⁵⁷ Promoting effective self-care practices by all clinicians in patients with HF could improve QOL and reduce the economic and personal burden of recurrent hospitalizations. Hence, the concept of self-care is supported by international guidelines.⁵⁸ Interventions using face-to-face communication⁵⁹

and a multidisciplinary team of interventionists⁶⁰ were found to be more effective than interventions without these strategies. However, in MEA countries like Lebanon, self-care remains suboptimal and warrants the development of novel strategies to improve it.²⁶

Exercise Training Cardiac Rehabilitation

Research has repeatedly reinforced the usefulness of exercise training cardiac rehabilitation interventions in patients with stabilized HF in decreasing symptoms, improving QOL, reducing hospital admissions, and consequently reducing financial burden (Table 1).^{61–64}

It was found to be a clinically effective and economical intervention for patients with HF.⁶² Additionally, providing group exercise training would allow patients to meet individuals who are experiencing similar life challenges and thus offer an additional network of support.

In MEA countries, currently, there are no national strategies regarding cardiac rehabilitation; however, very few health-care institutions have implemented this program.

Remote Health Monitoring

Technological advances have allowed increasingly sophisticated attempts to remotely monitor and manage HF.⁶⁵ A meta-analysis has concluded that remote patient monitoring (RPM) programs for HF patients can reduce hospital

Table 1. Studies Reporting Improved Quality of Life in Patients with Heart Failure

Author	Study Design, Population and Sample Size			Objective	Intervention	Findings
	Approach	Approach	Sample Size			
Abbasi et al, 2018 ⁵¹	Self-care	Non RCT, chronic HF (n = 111)	To compare the effects of the self-management education program using the multimethod approach and multimedia on QOL among patients with chronic HF.	Control group (n = 38): received routine education consisting of face-to-face education by staff nurses and an educational pamphlet that was offered at discharge. Multimedia group (n = 37): Received routine education using multimedia, including photos, PPTs, animations, video clips, and texts. The session lasted for 15-20 minutes, and the patients and 1 of their family members were taught how to use multimedia. All are requested to use what they were taught at home for 3 months after discharge from the hospital. Multimethod group (n = 36): Received routine education and were invited to take part in 3 education sessions using a combination of education methods (face-to-face, PPT, photos, video clips, problem solving, and tutorials were used to provide education regarding self-management interventions) scheduled on 3 consecutive days with the presence of one of their family members. Each session lasted for 45-60 minutes at the time of admission and before discharge from the hospital.	The education program improved QOL in patients with chronic HF. There were statistically significant differences in the mean score of changes in the psychological ($P = .035$), self-efficacy and knowledge ($P < .001$), and life satisfaction ($P = .047$) domains between the groups. The multimethod approach was more effective compared to other methods.	
Jovicic et al, 2006 ⁴⁹	Self-care	Systematic review: 6 RCTs, HF (n = 857)	To determine the effectiveness of self-management interventions on hospital readmission rates, mortality, and HR QOL in patients diagnosed with HF.	Self-management interventions.	Self-management reduced all-cause hospital readmissions (OR = 0.59; 95% CI, 0.44-0.80, $P = .001$) and HF-related readmissions (OR = 0.44; 95% CI, 0.27-0.71, $P = .001$). There was no significant effect on mortality, functional capabilities, symptom status, or QOL.	
Dewalt et al, 2012 ⁵⁵	Self-care	RCT, HF (n = 605)	To determine the effectiveness of a single session versus a more intensive multisection education program.	Single-session group: a 40-minute in-person, literacy-sensitive training. Multisection group: 40-minutes of in-person, literacy-sensitive training plus ongoing telephone-based support.	Intensive multisection intervention did not change all-cause hospitalization or death (0.75 vs. 0.73 incidence rate per year; unadjusted IRR: 1.01), HF-related hospitalization (0.30 vs. 0.27 incidence rate; unadjusted IRR: 0.92) or HF-related QOL (after 12 months) compared with a single session intervention ($P = .082$).	

(Continued)

Table 1. Studies Reporting Improved Quality of Life in Patients with Heart Failure (Continued)

Author	Approach	Study Design, Population and Sample Size		Objective	Intervention	Findings
		Approach	Sample Size			
Otsu and Moriyama, 2011 ⁵⁶	Self-care	RCT	Chronic HF (n = 102)	To provide an educational self-management program to Japanese outpatients with chronic HF in order to improve their clinical outcomes.	Control group (n = 52): medical treatment and standard care. Intervention group (n = 50): An educational program for 6 months (6 nurse-directed sessions).	In either group, there was no fatality or hospitalization due to chronic HF during the program. After 12 months, the QOL (6.20 ± 0.60 vs. 5.65 ± 0.85; <i>P</i> = .002) and compliance behavior with regard to sodium restriction (2.47 ± 0.69; 1.73 ± 0.96; <i>P</i> = .000) and activities/exercises (2.36 ± 0.67 vs. 0.73 ± 0.86; <i>P</i> = .000) are significantly better in the intervention group compared to the control group.
Wang et al, 2011 ⁵²	Self-care	Quasiexperimental design	Congestive HF (n = 27)	To determine if participants with HF who were managed under the HF self-care program had fewer distressing symptoms, better functional status, improved QOL, and reduced hospital and emergency readmission rates compared with control group participants.	Control group (n = 13): routine care during hospitalization. Intervention group (n = 14): intensive education. Before discharge, an informal meeting was conducted with patients and their families to remind them of their medication and the date of their next clinical follow-up. In addition, an education brochure was provided. Telephone call was initiated 3 or 4 days after discharge (out-of-hospital care). Home visits were arranged to assess the self-care performance of patients. The education content included the pathophysiology of disease, risk factors, signs, and symptoms; stressing medication and exercise regimens; importance of adherence to diet; implementing lifestyle changes; and daily weight measurement habit.	A significant improvement in symptom distress (<i>P</i> < .01) and QOL (SF36 score: 118.75 ± 11.20 vs. 89.00 ± 28.47; <i>P</i> < .05) was observed among patients who received self-care education compared to the control group. However, there were no significant differences in emergency department visits (<i>P</i> = .26) and hospital readmissions (<i>P</i> = .06).
Donner Alves et al, 2012 ⁵³	Self-care (Nutritional guidance)	RCT	HF (n = 46)	To evaluate if a global nutritional orientation could affect nutritional knowledge, adherence to food guidelines, anthropometrics, and QOL in HF patients.	Control group (n = 23): usual care with medical and nursing staff. Intervention group (n = 23): usual care plus additional nutritional guidance about diet and its relationship with disease, sources of nutrients, and reduction of dietary sodium and fats.	After 6 months of follow-up, the nutritional knowledge of the intervention group increased. Also, caloric, fat, and sodium intake decreased in the intervention group compared to the control (<i>P</i> < .05). No significant difference in QOL was found between the control and the intervention group.

(Continued)

Table 1. Studies Reporting Improved Quality of Life in Patients with Heart Failure (Continued)

Author	Approach	Study Design, Population and Sample Size		Objective	Intervention	Findings
		Approach	Sample Size			
Kutzleb et al, 2006 ⁵⁰	Self-care	Prospective quasiexperimental study	HF (n = 23)	To evaluate the impact of a nurse-directed approach to patient education focused on lifestyle modification, diet, daily weight management, and medication compliance to improve the QOL and functional capacity in people with HF.	Routine care group (n = 10): Protocol-driven medical management along with smoking cessation, medications, diet, and nutritional counseling provided with each 3-month visit. Nurse-directed care group (n = 13): Routine care plus comprehensive disease management education over 12 months, and weekly telephone follow-up between monthly follow-ups. The patient education included daily weight charting and an education booklet for patients and their family. Medication compliance counseling consisted of the development of an individualized medication grid sheet listing each medication, dosage strength, administration schedule, etc. Diet and nutrition counseling incorporated a food exchange list, food preparation tips, and a 4-step approach to managing a low-salt diet. Individualized counseling concentrated on exercise, smoking cessation, and the elimination of alcohol intake.	There was statistically significant improvement in QOL in the nurse-directed patient education group compared to routine care group (F = 3.569, P = .000; social and economic: F = 14.109, P = .000; health and function: F = 3.995, P = .003; psychological and spiritual: F = 13.212, P = .000; and family: F = 2.384, P = .048).
Doughty et al, 2002 ⁵⁴	Self-care education and integrated HF management	RCT	HF (n = 197)	To determine the effect of an integrated HF management program involving patient and family, primary and secondary care, on QOL and death or hospital readmissions in patients with chronic HF.	Control group (n = 97): usual care. Intervention group (n = 100): individual and group education sessions (each lasting 1.5-2 hours, 2 within 6 weeks of hospital discharge, and another after 6 months). All these patients are provided with a personal diary to record medication and body weight, information booklets, and regular clinical follow-up alternating between the general practitioner and HF clinic.	Integrated management program for patients with chronic HF improved QOL, reduced total hospital admissions, and reduced total bed days as well. However, for mortality or hospital readmission, there is no significant difference between the intervention and control groups (68 vs. 61, respectively, $\chi^2 = 0.95, P = .33$).
Smeulders et al, 2010 ³⁷	Self-care	RCT, Congestive HF	(n = 317)	To evaluate the effects of the Chronic Disease Self-Management Program on psychosocial attributes, self-care behavior, and QOL among congestive HF patients who experienced a slight to marked limitation of physical activity.	Control group patients (n = 131): usual care, consisting of regular outpatient checkups. Intervention group patients (n = 186): usual care and participated in the 6-week self-management program.	Self-management program resulted in statistically significant effects on cognitive symptom management (P < .001), self-care behavior (P = .008), and cardiac-specific QOL (P = .005).

(Continued)

Table 1. Studies Reporting Improved Quality of Life in Patients with Heart Failure (Continued)

Author	Approach	Study Design, Population and Sample Size		Objective	Intervention	Findings
		Approach	Sample Size			
Piotrowicz et al, 2015 ⁶⁴	Exercise-based cardiac rehabilitation	RCT HF (n = 131)		To assess QOL changes in HF patients after HTCR vs. outpatient based SCR.	Control group (n = 56): SCR. Intervention group (n = 75): HTCR.	Both groups achieved a significant improvement in QOL [69.2 ± 26.4 (before rehabilitation) vs. 70.5 ± 25.4, P = .0074 (after rehabilitation completion)]. However, patients who underwent HTCR showed an improvement mainly in the mental categories [21.68 ± 12.46 (before rehabilitation) vs. 18.56 ± 9.18 (after rehabilitation completion)]. Patients in the SCR group showed improvement in their general physical well-being (23.20 ± 10.71 vs. 21.60 ± 9.65).
Long et al, 2019 ⁶¹	Exercise-based cardiac rehabilitation	Meta-analysis 44 trials; HF (n = 5,783)		To determine the effects of exercise-based cardiac rehabilitation on mortality, hospital admission, and health-related QOL of people with HF.	Control group: usual medical care. Intervention group: exercise-based interventions given alone or as a component of comprehensive cardiac rehabilitation.	A clinically important improvement in short-term disease-specific health-related QOL is evident [SMD 0.60, 95% CI, 0.82-(-0.3)9; I ² = 87%; χ^2 = 215.03]. Cardiac rehabilitation improved all-cause mortality in the long term (RR 0.88, 95% CI, 0.75-1.02), reduced overall hospital admissions (RR 0.70, 95% CI, 0.60-0.83), and HF-specific hospitalization in the short term (RR 0.59, 95% CI, 0.42-0.84). There was a statistically significant difference in favor of exercise-based cardiac rehabilitation for QOL [Minnesota Living with HF Questionnaire mean score -5.94, 95% CI, -1.0-(-10.9)]. However, no significant difference in pooled time-to-event estimates in favor of exercise-based cardiac rehabilitation was found for mortality or hospitalization [All-cause mortality (HR = 0.83, 95% CI, 0.67-1.04); HF-related mortality (HR = 0.84, 95% CI, 0.49-1.46); all-cause hospitalization (HR = 0.90, 95% CI, 0.76-1.06); and HF-related hospitalization (HR = 0.98, 95% CI, 0.72-1.35)].
Taylor et al, 2019 ⁶²	Exercise-based cardiac rehabilitation	Meta-analysis 19 RCTs chronic HF (n = 3990)		To obtain definitive estimates of the impact of exercise-based cardiac rehabilitation interventions compared with no exercise intervention (control) on mortality, hospitalization, exercise capacity, and health-related QOL in HF patients.	Control group: usual medical care. Intervention group: exercise-based cardiac rehabilitation for at least 3 weeks with 6 months' follow-up.	

(Continued)

Table 1. Studies Reporting Improved Quality of Life in Patients with Heart Failure (Continued)

Author	Study Design, Population and Sample Size			Objective	Intervention	Findings
	Approach	Population and Sample Size	Approach			
Davies et al, 2010 ⁶³	Exercise-based cardiac rehabilitation	Meta-analysis 19 RCTs; Systolic HF (n = 3647)	Exercise-based cardiac rehabilitation	To determine the effect of exercise training on clinical events and health-related QOL of patients with systolic HF.	Control group: usual medical care. Intervention group: exercise-based cardiac rehabilitation with 6 months' follow-up.	Compared with usual care, in selected HF patients, exercise training reduces HF-related hospitalizations (RR = 0.72, 95% CI, 0.52-0.99) and results in clinically important improvements in health-related QOL [mean difference: -0.63, 95% CI, (-0.80) - (-0.37)]. With respect to all-cause mortality or overall hospital admissions there was no significant difference between the groups.

HF: heart failure, HR: hazards ratio, HTCR: home-based telemonitored cardiac rehabilitation, IRR: incidence rate ratio, OR: odds ratio, PPT: PowerPoint presentation, QOL: quality of life, RCT: randomized controlled trial, RR: relative ratio, SCR: standard cardiac rehabilitation, SF36: 36-item Short Form Survey, SMD: standardized mean difference.

admissions and mortality and simultaneously improve health-related QOL.^{66,67} Prior studies have demonstrated that the RPM of homebound HF patients significantly reduced home visits by trained nurses and reduced hospital readmissions.⁶⁸ A recently updated Cochrane review that investigated the use of structured telephone support or noninvasive telemonitoring has demonstrated a modest beneficial effect of remote monitoring on all-cause mortality and HF-related hospitalizations compared with standard HF care.⁶⁹ In another meta-analysis, a structured telephone support program delivered through human-to-human contact or human-to-machine interface showed beneficial trends, particularly in reducing all-cause mortality for recently discharged patients with HF.⁷⁰ Remote monitoring is often done in patients with HF who have an implantable device (resynchronization pacing and/or defibrillator), and feedback given to them after alerts are noted after transmissions.

Patient Activation in Heart Failure

Patient activation or active engagement in their health management is critical for those with HF to improve their condition, given the complex and potentially progressive nature of the disease, the high presence of comorbidities, and the financial and emotional stress the disease places on patients and their families. Growing evidence suggests that patient education and activation in understanding their disease and imparting the knowledge, skills, and confidence to engage in managing one's health favorably impact patient behaviors and health outcomes among patients with HF.^{46,49,71} Low activation has been associated with depression, anxiety, and worse clinical course,⁷² and high activation has been associated with better self-care behaviors and more favorable outcomes.^{73,74}

Educational interventions may hold promise for improving patient activation.⁷⁵ A randomized clinical trial (RCT) conducted on patients with HF to determine the efficacy of a patient activation intervention (a 6-month program delivered by advanced practice nurses) compared with usual care on activation, self-care management, hospitalizations, and emergency department visits demonstrated a significant increase in patient activation with the targeted interventions compared to usual care.⁷⁶ A systematic review indicated strategies such as patient education to enhance self-care, follow-up monitoring by specially trained staff, and access to specialized HF clinics as the most efficacious approaches for the management of patients with HF to reduce HF hospitalization.⁶⁰

The literature has revealed a variety of choices for self-management education interventions, including face-to-face education, multimedia-based education, telemonitoring, education accompanied by telephone support, nurse case management, and telemonitoring for activating or improving self-care among patients with HF (Supplementary Table 1).⁷⁷⁻⁸⁵

In MEA, patient activation programs are conducted in some countries like Lebanon, Kuwait, Morocco, Egypt, Türkiye, and Saudi Arabia. In Lebanon and Türkiye, a program, named "Heart Failure Awareness Days" was conducted regularly

before the coronavirus disease 2019 pandemic. As a part of the program activities such as lectures to patients, their relatives, and the general population about HF, workshops about "HF diets," "open house" in HF clinics, panel debates with HF cardiologists, etc., were organized. In Kuwait, a monthlong program named "strengthen your heart" was conducted by visiting hospitals to educate patients and caregivers about different HF symptoms, self-care maintenance, etc. In Saudi Arabia, campaigns were conducted during special occasions like Ramadan, Women's Day, etc. via social media through social media influencers (Supplementary Table 2).

Some of the real-world initiatives to leverage patient activation in HF recommended by experts are described in Box 1.

BOX 1. PRACTICAL INITIATIVES TO LEVERAGE PATIENT ACTIVATION

- Campaigns through lectures and discussions, visiting hospitals and primary care centers, and organizing programs for educating the patients and caregivers
- Campaigns through a newspaper, social media influencers (Twitter and Instagram), radio, and television
- Collaborate with the cardiology societies and pharmaceutical companies to create awareness among patients, caregivers, and PCPs.
- Individual patient care and education via presentations, counseling, lectures, and individual sessions with the patient and caregivers with the support of health-care workers (2-3 HF nurses, physical therapists, nutritionist pharmacists, and psychologists).
- Utilize specific occasions (Ramadan period) to leverage patient activation by inviting a group of experts (cardiologists, physicians, dietitians, nurses, educationists, and psychologists) to a discussion.
- Conduct awareness campaign in local language by inviting groups of patients and caregivers on 1 platform by a group of PCPs, internists, and cardiologists to discuss about HF-related issues
- Introduce centers of excellence in different regions for helping patients manage their disease condition, discuss HF-related treatment issues, and promote patient-physician communication.
- Maintain a scorecard with the help of a pharmacist to track the performance of patient. The scorecard may comprise all the details, including the diagnosis, the medication details, the doses suggested, etc.

HF, heart failure, PCP, primary care physician.

ROLE OF CAREGIVERS AND EDUCATORS IN PATIENT SUPPORT

Role of Caregivers

Caregivers play an important part in improving patient outcomes since the majority of patients with HF depend on caregivers' support for successful HF self-care, which is essential for optimal patient outcomes.^{86,87} Caregivers not only support lifestyle changes that go along with a diagnosis of HF and personal care but also help with symptom management,

medical coordination, and treatment decision-making, in addition to emotional support.⁸⁸ Clinical practice guidelines from the American Heart Association recommend the inclusion of caregivers along with the patient for individualized education and counseling on self-care.⁸⁹ Studies reported significant improvement in patient self-care, reductions in hospitalization, readmission, and mortality rate in HF with the involvement of caregivers in patient care.^{90,91} The experts also recommended the involvement and empowerment of caregivers and collaboration with health-care workers (PCPs, cardiologists, nurses, and psychologists) through an open discussion that may help in improving patient outcomes.

Heart Failure Educators

Patient education is an essential component in HF management; hence, an HF educator who has knowledge and skills in the medical sciences, pedagogy, communication, and counseling plays a major role in empowering patients to manage their disease. A narrative review has identified patient educators as a potential option for improving patient health and well-being.⁹²

In many Western countries, nurses experienced in HF management are playing an educator role to create awareness among patients, similar to certified diabetes educators. These education programs provided by nurses on the self-care behavior of HF patients were very effective in improving patient outcomes.^{48,93} Studies demonstrated a significant improvement in the mortality rate among patients who received HF education through a certified nurse practitioner.⁴⁸ In MEA, there is a scarcity of trained HF educators. Most of the time, the clinicians are playing the educator role as well, due to the shortage of nurses who have experience in HF management. The need for training qualified HF educators is ever-increasing in MEA due to the upsurge in disease burden. Incorporating HF educators into practice settings adds significantly to HF care and will improve communication between patients and health-care providers. It will serve to improve clinical and QOL outcomes for people with HF.

In South Africa, nurses provide support to the patients in HF education and medication adherence, giving more insights to the insurance companies about medications because, in South Africa, HF medication costs are not always covered by the funder. The nurse practitioners in this country are trying to extend their support to the patients by providing insights to the insurance companies about the critical need for these medications.

ROLE OF PATIENT ADVOCACY GROUPS AND HEART FAILURE SOCIETIES IN PATIENT SUPPORT

Role of Patient Advocacy Groups

Patient advocacy groups (PAGs) are nonprofit groups that represent patients with a health condition or their caregivers. Patient advocacy groups are playing a crucial role in providing peer support for patients and families, reducing stigma, raising awareness, educating, raising funds for non-affording patients, influencing policymakers, and impacting national research agendas by bringing the public's concerns

about the disease to policymakers and the medical community.⁹⁴ In addition, they also help patients manage their finances by assisting them in understanding medical bills and insurance coverage.⁹⁴ Studies have also demonstrated positive effects of peer support on self-efficacy, activity, reducing pain, and decreasing emergency room visits.⁹⁵

In Western countries, several PAGs, such as European Patient Advocacy Groups, Heart Failure Society of America, The Mended Hearts and the Mended *Little* Hearts Advocacy, and Global Heart Hub, are providing peer support for patients and families of those affected by cardiovascular disease. However, in MEA, PAGs were established only in countries like Egypt, Lebanon, and Israel [the Egyptian Association for Care of Heart Failure Patients, the Israeli Heart Association, and Heart Failure in Lebanon, a nongovernmental organization (NGO)].

Despite a significant body of evidence that reinforced HF self-management is key for improving patient outcomes and decreasing hospitalizations, to date, there are major gaps in representing the voice of the HF patient in the MEA region. Though NGOs and medical societies from MEA are performing many activities in the health-care sector, the activities are still at a nascent stage in many countries. There is a need to have a separate group of people who will advocate the cause of patient support, and will work explicitly in these areas to increase transparency and credibility. The World Heart Federation also emphasized the need to involve PAGs, raise the HF profile on national agendas, raise awareness among patients, and influence decisions and policymakers.⁴

In Egypt, a few NGOs (the Egyptian Friends of National Heart Foundation of National Heart Institute and the Egyptian Society for Patients with HF) are supporting patients by promoting and facilitating health and educational activities (healthy living, medication adherence, lifestyle modifications, and using home monitoring devices) to improve adherence to therapy and clinical outcomes. Besides, they are also strengthening health systems by influencing policymakers. For example, in Egypt, with the support of PAGs, an NGO was able to procure HF medications free of cost for financially challenged patients by reaching out to the Egyptian Health Ministry and insurance providers.

Heart Failure Societies

Heart failure societies play a key role in the development and implementation of guidelines, increasing public and physicians' awareness regarding prevention, investment in research, support in continuous medical education, organization of cardiology symposia and congresses, and achievement of national registries regarding main cardiac conditions to decrease the burden of cardiovascular diseases. Besides, the organizations can also enhance awareness among lawmakers and policymakers while advocating for changes to protect and improve the health of people. Globally, the European Society of Cardiology (ESC) is actively conducting several programs or campaigns in different countries to create awareness at the community, patient, and PCP levels.

In MEA countries like Lebanon, Jordan, Morocco, and Türkiye, the cardiology societies (members of ESC) are actively conducting programs or campaigns to create awareness at the patient level, community level and PCP level. The "Heart Failure Awareness Days" campaign organized by the HF Working Group of the Lebanese Society of Cardiology (LSC) in collaboration with the Lebanese Ministry of Health and Lebanese Nursing Order is an example of such a program designed to create awareness among patients and caregivers.⁹⁶ This has been initiated in 2011 by the HF Working Group of LSC and has been awarded by HFA-ESC 5 times up to date (best overall campaign, best poster, best social media activities, etc.). Further, case-based clinical presentations and lectures are organized by medical societies for physicians' internists, pulmonologists, endocrinologists, and other specialists to increase awareness at the primary care level. Since 2012, the Turkish Society of Cardiology has actively participated in the initiative "HF Awareness Day" activities, organized press conferences, printed and distributed posters and booklets for patients, and arranged webinars for physicians. This significant event is now included in the regular activity program of the HF Working Group. Also, the Turkish HF Working Group has published national guidelines on specific HF topics in order to improve the implementation of optimal HF therapy.⁹⁷⁻¹⁰⁰

The experts recommend all the HF societies in MEA collaborate with international medical societies to organize activities at the local and national levels to improve patient care in HF management.

HEART FAILURE PROGRAMS AND CLINICS

In the MEA region, mostly the Gulf countries like Saudi Arabia, Qatar, and the UAE have established structured HF programs with specialized clinics run by cardiologists who work with professionals like nurses, pharmacists, physiotherapists, and others certified in treating HF.¹⁴ For example, Saudi Arabia has at least 10 HF clinics dispersed throughout the country, and they have had a significant impact on the way patients with HF are treated and the patient outcomes.^{10,14} HF clinics are endorsed by international recommendations; other nations in the region are yet to establish them.¹⁴

In most MEA countries, nongovernmental organizations like cardiac medical societies have conducted several campaigns to increase awareness among the general population, HF patients, and GPs. In some countries, like Jordan, the UAE, Türkiye, and Saudi Arabia, governments have launched some programs to increase awareness and control cardiovascular disease. For example, in Türkiye, in 2017, the Turkish Ministry of Health (MoH), in collaboration with Turkish Society of Cardiology, has established a national heart health policy to decrease the burden of cardiovascular disease and its risk factors. The MoH leads the main public awareness campaigns, projects, and educational activities.¹⁰¹ Similar programs were conducted in countries like the UAE, Lebanon,¹⁰² Egypt,¹⁰³ and Jordan.¹⁰⁴

Additionally, in many countries, workshops and seminars on heart health and HF prevention are conducted in

collaboration with health-care professionals and medical organizations. Some countries have dedicated national or regional heart health days during which various activities and events are organized to focus on heart health and HF prevention. In addition to public awareness initiatives, some governments in Gulf countries are offering training and continuing education programs for health-care professionals to improve HF management.

CONCLUSION

Heart failure remains a major public health problem in the MEA. Despite the continued impressive advances in the therapeutic management of HF, there is a high unmet need for patient support for HF in the MEA. In this region, up to three-fourths of patients with HF were diagnosed with NYHA class III and IV disease. There is low awareness about HF at the patient as well as PCP levels; thus, the probability of an early diagnosis is limited. Effective strategies at the patient and PCP levels are essential to bridge the gaps in HF patient support. Patient education is a crucial component in HF care and should be provided through effective and well-evaluated strategies through the adoption of digital health technologies. Patient support programs have been considered a promising approach in reducing rehospitalizations and even major adverse cardiovascular events. Incorporating HF educators into routine practice settings can add significantly to HF care and can improve communication between patients and the health-care provider. Patient advocacy groups can play a vital role in easing the burden by providing peer support for patients and their families. Given the important role that PSPs play in creating value for patients in terms of patient support, comprehensive efforts should be made to expand and endorse PSPs in the MEA.

Although some MEA nations have taken measures to increase public awareness and offer HF care, these initiatives have not been evaluated for their effectiveness, and the lack of literature on the outcomes of public awareness remains a significant gap. Monitoring and evaluating the effectiveness of these programs are essential to gauge their impact on public health and to identifying areas for improvement. By prioritizing the assessment of public awareness programs, MEA countries can strengthen their efforts to combat HF.

The recommendations by the experts for improved patient support for patients with HF in the MEA region are presented in the box below:

- Run national awareness campaigns.
- Develop clear region- or country-specific referral protocols.
- Facilitate interaction between primary-level health-care workers and specialists.
- Establish HF clinics and specialist nurse follow-up.
- Improve communication between the different health-care sectors and through education.
- Establish formal pathways for patient education.
- Promote patient-driven HF associations and family and community engagement.

- Implement health-care worker outreach programs.
- Develop industry-related initiatives to reduce the cost of devices and equipment.
- Encourage private fundraising initiatives.
- Collaborate with nongovernmental organizations and the government.

HF: Heart failure.

Availability of data material: All data generated or analyzed during this study are included in this published article and its supplementary data file.

Peer-review: Externally peer-reviewed.

Author Contributions: Concept – H.N.S., Y.Ç., A.B., E.K., E.N.O., F.B., H.B.A.S., H.R., K.A.A., M.A., M.B.Y., R.T.; Design – H.N.S., Y.Ç., A.B., E.K., E.N.O., F.B., H.B.A.S., H.R., K.A.A., M.A., M.B.Y., R.T.; Supervision – H.N.S., Y.Ç., A.B., E.K., E.N.O., F.B., H.B.A.S., H.R., K.A.A., M.A., M.B.Y., R.T.; Resources – H.N.S., Y.Ç., A.B., E.K., E.N.O., F.B., H.B.A.S., H.R., K.A.A., M.A., M.B.Y., R.T.; Materials – H.N.S., Y.Ç., A.B., E.K., E.N.O., F.B., H.B.A.S., H.R., K.A.A., M.A., M.B.Y., R.T.; Data Collection and/or Processing – H.N.S., Y.Ç., A.B., E.K., E.N.O., F.B., H.B.A.S., H.R., K.A.A., M.A., M.B.Y., R.T.; Analysis and/or Interpretation – H.N.S., Y.Ç., A.B., E.K., E.N.O., F.B., H.B.A.S., H.R., K.A.A., M.A., M.B.Y., R.T.; Literature Search – H.N.S., Y.Ç., A.B., E.K., E.N.O., F.B., H.B.A.S., H.R., K.A.A., M.A., M.B.Y., R.T.; Writing – H.N.S., Y.Ç., A.B., E.K., E.N.O., F.B., H.B.A.S., H.R., K.A.A., M.A., M.B.Y., R.T.; Critical Review – H.N.S., Y.Ç., A.B., E.K., E.N.O., F.B., H.B.A.S., H.R., K.A.A., M.A., M.B.Y., R.T.

Acknowledgments: The authors acknowledge Dr. Kamal Waheeb AlGhalayini for his contributions to this manuscript. The authors would also like to thank Dr. Sasikala Somara of Fortrea Scientific Pvt. Ltd. (formerly Labcorp Scientific Services & Solutions Pvt. Ltd.) for medical writing support, which is done in accordance with Good Publication Practice 2022 guidelines.

Declaration of Interests: H.N.S. received speaker honorarium from Novartis, AstraZeneca, Boehringer Ingelheim, Abbott, Bayer and Vifor. Y.Ç. received a speaker honorarium or consultation fee from AstraZeneca, Novartis, Servier, Boehringer Ingelheim and Roche Diagnostics. A.B. received institutional fee from Novartis, Bayer, Amgen, AstraZeneca, Boehringer Ingelheim, Servier and Merck. E.K. received honoraria from AstraZeneca, Bayer, Boehringer-Ingelheim, Novartis, Novo-Nordisk, Pfizer, Roche, Sanofi and Servier. E.N.O. received research grants from AstraZeneca and Novartis; also received speaker fees from AstraZeneca, Servier, Novartis, Boehringer Ingelheim, Pfizer and Merck. F.B. declares no conflict of interest. H.B.A.S. received honoraria from AstraZeneca and Merck for congress presentations and advisory boards. H.R. received honoraria from Novartis and AstraZeneca and Menarini for congress presentations and advisory boards. K.A.A. as advisor received honorarium from Boehringer Ingelheim, AstraZeneca, Pfizer, Vifor, Novartis, Janssen, Merck, Bayer, Abbott (Heartmate3, CardioMEMS), Medtronic (Heartware) and Syncardia TAH. M.A. received speaker honoraria from Bayer, AstraZeneca, Novartis and Boehringer Ingelheim. M.B.Y. received institutional fee from Novartis, Bayer, Amgen, AstraZeneca, Boehringer Ingelheim, Servier, Roche Diagnostics and Albert Health. R.T. received honoraria as a speaker and advisory board member from AstraZeneca, BI, Pfizer, Merck, Novartis, Hikma, MSPharma. Grant recipient from Pfizer.

Funding: This is funded by AstraZeneca, Middle East and Africa.

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Supplementary Table 1. Studies reporting improved outcomes with patient activation

Author	Approach	Study Design, Population and sample size		Objective	Intervention	Findings
		Approach	Population and sample size			
Young et al, 2016 ⁷⁹	Self-care education	RCT chronic HF (n = 105)	To evaluate the mechanism of the patient activation intervention, comparing the intervention and usual care (UC) groups on self-management knowledge, self-efficacy for selfmanagement, patient activation at the end of intervention (3 months).	<p>UC group (n = 51): UC, the standard discharge teaching for HF that includes written and verbal information about HF self-care and scheduled follow-up doctor appointments.</p> <p>Intervention group (n = 54): Usual care and the 12-week PATCH intervention, ie, a oneon-one in-hospital self-management training session and postdischarge reinforcement sessions (twice a week for the first 2 weeks, once a week for weeks 3 to 6, and every other week for weeks 7 to 12) delivered by telephone.</p>	PATCH intervention showed significantly greater improvement in self-efficacy in for self-management (taking prescribed medication, a lowsodium diet, and exercising daily, weighing themselves) ($P = 0.034$), selfmanagement strategies ($P < 0.0005$), and patient activation scores ($P = 0.0693$). compared to usual care. However, the 30-day hospital readmission rate was significantly higher in the PATCH group (n = 10 vs. 3; χ^2 with continuity correction = 2.914, $P = 0.088$) than in the UC group.	
González et al, 2005 ⁷⁸	Nurse-guided self-care education	Prospective study HF (n = 298)	To evaluate nurse education programme in an outpatient HF population.	Face to face education with printed leaflets for patients and their families, and with posters in the waiting room reminding them of signs of worsening HF. At every visit, to reinforce self-care behavior, patients are restructured about the disease. Patients were instructed to do daily activities to improve the respiratory work, and they were involved in a 4-month exercise programme.	Nurse-guided education has changed self-care behavior of patients with HF in several important aspects, as weight and blood controls, and has increased their knowledge and understanding of the disease and treatment.	
Boyd et al, 2018 ⁸⁰	Self-care	RCT, HF (n = 200)	To determine the effectiveness of a multimedia educational intervention for patients with heart failure in reducing unplanned hospital readmissions.	<p>Control group (n = 100): Usual education</p> <p>Intervention group (n = 100): Multimedia educational intervention (viewing a DVD, and verbal discussion supported by a written manual with a teach-back evaluation strategy).</p>	The self-care educational intervention reduced the risk of readmission at 12 months by 30% (relative risk: 0.703; 95% CI, 0.548 to 0.903).	
Sherwood et al, 2017 ⁸¹	Self-care and telephone monitoring	RCT, HF (n = 180)	To evaluate efficacy of a coping skill training intervention, delivered over the telephone to HF patients, on 3 outcomes: postintervention QOL, HF disease biomarkers, and longerterm clinical outcomes defined by hospitalisation or death.	<p>Control group (n = 90): HF education delivered by a Physician's Assistant plus weekly individual phone calls of up to 30minutes (16 calls).</p> <p>Intervention group (N = 90): Coping skills training delivered by a clinical psychologist and was comprised of 16 weekly 30-minute individual phone calls. Initial 4 sessions were on health behaviors diet and salt restriction, daily weighing, physical activity, medication adherence. The remaining 12 sessions were on specific coping techniques.</p>	Both the groups showed improvements in HF self-management scores postintervention. Coping skills training resulted in greater improvements in QOL compared to routine HF education ($P < 0.01$) also lowered risk of HF hospitalisations (HR = 0.65, 95% CI, 0.44 to 0.98, $P = 0.040$) and mortality (HR = 0.84, 95% CI, 0.59 to 1.21) in patients.	

(Continued)

Supplementary Table 1. Studies reporting improved outcomes with patient activation (Continued)

		Study Design, Population and sample size			Objective	Intervention	Findings
Author	Approach	Population and sample size	Objective	Intervention	Findings		
Baker et al, 2011 ⁷⁷	Self-care and telephone monitoring	RCT HF (n = 605)	To examine the effect of 2 different levels of self-care training on the adoption of key self-care behaviors and on QOL: A single educational session delivered by a health educator vs A single educational session and a series of follow-up phone calls.	Control group (n = 302): Brief (1 hour) educational intervention. Intervention group (n = 303): More intensive educational intervention group plus reinforcing telephone education (5 to 8 follow-up phone calls from the educator with each call lasting about 10 minutes over 4 weeks).	The intervention group had greater improvements in general and salt knowledge ($P < .001$) and greater increases in self-care behaviors (from mean of 4.8 to 7.6 for the intervention group vs. 5.2-6.7 for the control group; $P < .001$). QOL improved from 58.5 to 64.6 for the intervention group but did not change for the control group (64.7-63.9; $P < .001$ for the difference in change scores). Telephone reinforcement of learning goals and self-care behaviors improved knowledge, health behaviors, and HF-related QOL compared to a single education session.		
Ong et al, 2016 ⁸²	Combination of telephone support and telemonitoring	RCT Older adults hospitalised with HF (n = 1437)	To evaluate the effectiveness of a care transition intervention using RPM in reducing 180-day all-cause readmissions.	UC group: (n = 722). Intervention group (health coaching telephone calls and telemonitoring): (n = 715).	No significant difference in 30-day readmission or 180-day mortality between the intervention and usual care group. But there was a significant difference in 180-day QOL.		
Yu et al, 2015 ⁸³	Combination of nurse home visits and telephone support	RCT Chronic HF (n = 178)	To determine the effect of nurse-implemented transitional care on readmission and mortality rates in Chinese individuals with chronic HF in Hong Kong.	UC group (Controls): (n = 88). TC group: (n = 90).	No significant differences in eventfree survival, hospital readmission, or mortality between the TC and UC groups, although the TC group had a lower hospital readmission rate at 6 weeks (8.1% vs. 16.3%, $P = 0.048$) and lower mortality at 9 months (4.1% vs. 13.8%, $P = 0.03$). The TC group also had a shorter hospital stay ($P = 0.006$) and significantly better self-care and QOL.		
Kalter-Leibovici et al, 2017 ⁸⁴	Disease management programs	Open-label trial, Chronic HF (n = 1,360)	This evaluated whether a countrywide disease management program is superior to usual care in reducing adverse health outcomes and improving well-being among community-dwelling adult patients with moderate to severe chronic HF who have universal access to advanced healthcare services and technologies.	UC group (n = 678). Intervention group (n = 682): Disease management, delivered by multidisciplinary team.	The disease management intervention was not superior to usual care with respect to the primary composite endpoint, but it improved QOL and depression.		

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Supplementary Table 1. Studies reporting improved outcomes with patient activation (Continued)

Author	Approach	Study Design, Population and sample size			Intervention	Findings
		Approach	Objective	Intervention		
Bekelman et al, 2015 ⁸⁵	Disease management clinics	RCT HF (n = 392)	To determine the effectiveness of a collaborative care patient-centered disease management (PCDM) intervention to improve the health status of patients with HF.	PCDM intervention group: (n = 187). UC group: (n = 197).	Multifaceted PCDM intervention demonstrated improved patient health status compared with usual care; however, the improvement observed was nonsignificant.	

RCT: Randomized controlled trial, HF: Heart failure, CI: Confidence interval, QOL: Quality of life, HR: Hazards ratio, PATCH: Patient ACTivated Care at Home, PCDM: Patient-centered disease management, RPM: remote patient monitoring, TC: Transitional care, UC: Usual care group.

Supplementary Table 2. Patient activation programmes conducted in MEA to motivate patient with HF

- **Lebanon**
 - A programme "Heart Failure Awareness Days" was conducted regularly, before the Covid19 pandemic. As a part of the programme following activities are organised during these days.
 - Lectures to patients, their relatives and the general population about HF including epidemiology, symptoms, diagnosis, treatments, the role of education, etc,
 - Workshops on HF diets
 - 'Open house' in HF clinics
 - Panel debates with cardiologists
 - Participation of patient representatives to share their experiences.
 - A film with patient testimonials
 - Distribution of educational material on HF.
 - Targeted at-risk populations, such as patients who had, hypertension, diabetes, etc, who may develop HF (Patients at stage A).
 - News about the campaign has been released in newspapers, television, radio, social media, etc.
 - To educate the general population, patients, and caregivers, a website (heartfailurematters.org) has been developed and made available in the Arabic language.
- **Kuwait**
 - A multidisciplinary approach is established for HF wellness which includes a specialized HF physical rehabilitation, dietitian, social worker and psychological support (Cardiac Mental Health Clinic set up within the cardiac center).
 - Regular campaigns directed towards PHC and the community including social and mainstream media are conducted.
 - Telehealth services are provided via a well-established video meeting protocol to provide a maximum health benefit for patients who have difficulty of coming or only need minor follow-up and medication up-titration.
 - Many printed materials are provided to patients and relatives as well as measuring cups to help in monitoring the fluid intake.
 - Patients who cannot afford the cost of medications or investigations are helped through social service and various charity organizations we closely collaborate with to insure provided therapies such as entresto, forxiga, and jardiance.
 - A month-long programme named "strengthen your heart" was conducted by visiting hospitals, to educate the patients and caregivers about different HF symptoms, self-care maintenance, etc.
 - Campaigns were also conducted through a newspaper, social media (twitter and Instagram), radio, and television to motivate patients and caregivers.
 - The patient and their families were encouraged to ask questions so that information can help them better understand the disease.
 - The patients were motivated to become responsible about their journey to get better care from the PCP by asking different questions such as does your doctor maximize your doses, whether the doctor checks the kidney function all the time, etc.
- **Morocco**
 - In Morocco, a national registry has been established by the Moroccan Society of Cardiology to generate real-world data on HF.
 - The Moroccan Society has recently initiated programmes to create awareness among patients about risk factors (ischemic stroke, hypertension, diabetes, and cholesterol) for HF and the importance of adherence to treatment.
- **Egypt**
 - Various platforms are developed and made available for patients in collaboration with the Egyptian Society of Cardiology and pharmaceutical companies for creating awareness.
 - These platforms provide the information that is required for patients or caregivers including symptoms, treatments, indications for early presentation to hospital for worsening of symptoms, etc., to decrease hospitalisation or avoid recurrent hospitalisation, and also share guideline recommended doses of medications.
 - Caregivers were also encouraged to participate in the activities.
- **Saudi Arabia**
 - Campaigns were conducted during special occasions like Women's Day etc, via social media through social media influencers.
 - Ramadan period is used as an opportunity to leverage patient activation since it is a special occasion.
 - Before Ramadan, a group of patients and caregivers convened to discuss about HF and changes in patient diet patterns, exercise, and sleeping patterns of the patients during this period that can affect the condition.
 - Patients or caregivers are invited for a discussion with a group of experts (cardiologist, physician, dietitian, nurse, educationist, and psychologist).
 - An opportunity is given for patients or caregivers to discuss their queries with the experts.
- **Türkiye**
 - Regular HF Awareness Day campaigns in collaboration with HFA.
 - A website about lifestyle and diet on HF of TSC.
 - Interviews on national TV channels.
 - Newspaper articles encouraging a healthy lifestyle, diet, exercise and controlling risk factors of HF.
 - Heart failure information brochure for patients.
 - Continuous medical education for cardiologists and other physicians provided by HFWG of TSC.
 - HF Certification programmes for Cardiologists.
 - Multicenter, national, population-based studies supported by TSC.
 - Publications of national guidelines for specific topics of HF.
 - Heart Failure E-newsletter by HFWG every 2 months to keep physicians up-to-date on the latest advances in heart failure.