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Heart Failure in Lebanon: A Review of the Literature

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Abstract

This research aimed to provide a comprehensive overview of the current literature on heart failure (HF) management in Lebanon and identify the implications for policy, practice, education, and research. The design of this research was a systematic review following preferred reporting items for systematic reviews and meta-analyses (PRISMA) guidelines. Databases were searched using the search terms "heart failure" and "Lebanon" and associated MeSH terms. The abstracts of the selected articles were examined independently by two researchers; the sample characteristics, HF indices, and results of the included studies were extracted. Key findings and trends were synthesized. Eleven papers were reviewed with 2,774 participants (mean age = 57.98, SD = 13.09 years, and the majority [n = 1,494, 53.85%] were male). Over one-third reported having coronary artery disease, and half had hypertension. The mean ejection fraction was 47.28% (SD = 10.44), and the mean length of hospital stay was 7.97 days (SD = 10.28). Self-care was a common theme showing varying but low scores, especially in the self-management subscale. The findings of this study outline the unique characteristics of the population with HF in a Middle Eastern country. These characteristics should be considered when planning interventions in countries facing geopolitical instability in the context of population aging and the rise of noncommunicable diseases.

Keywords: heart failure, Lebanon, literacy, MENA region, nursing, self-care

Abstrak

***Tinjauan Pustaka tentang Gagal Jantung di* Lebanon**. *Penelitian ini bertujuan untuk menyajikan rangkuman kajian pustaka terkait manajemen gagal jantung di* Lebanon *dan mengidentifikasi implikasinya terhadap kebijakan, praktik, pendidikan, dan riset di bidang tersebut. Metode tinjauan sistematis digunakan pada penelitian ini dengan mengacu pada* preferred reporting items for systematic reviews and meta-analyses (PRISMA). *Beberapa istilah, seperti "gagal jantung" dan "*Lebanon*" serta istilah dalam* medical subject headings *(MeHS) lainnya digunakan dalam pencarian pada basis data. Kumpulan abstrak terpilih ditinjau dan diteliti dalam hal: karakteristik sampelnya, indeks gagal jantung, dan hasil penelitiannya. Poin utama temuan dan tren dipadukan. Pada sebelas manuskrip yang telah ditelaah, terdapat 2.774 partisipan (rerata umur = 57,98, SD = 13,09 tahun, dan mayoritas partisipan adalah laki-laki (n = 1.494, 53,85%). Lebih dari sepertiganya mengalami jantung coroner dan setengahnya mengalami hipertensi. Nilai mean untuk pecahan ejeksi sebesar 47,28% (SD = 10,44), dan nilai* mean *untuk lama rawat inap yang dijalani ialah 7,97 hari (SD = 10,28). Perawa-tan mandiri adalah tema yang paling sering muncul tetapi dengan variasi skor rendah, khususnya pada subskala ma-najemen mandiri. Temuan pada penelitian ini menggarisbawahi karakteristik unik pada populasi gagal jantung di negara-negara Timur Tengah. Karakteristik ini diharapkan dapat menjadi acuan dalam merencanakan intervensi pada negara yang menghadapi ketidakstabilan geopolitik, khususnya dalam konteks populasi lansia dan meningkatnya kasus penyakit tidak menular.*

Kata Kunci: *gagal jantung, keperawatan,* Lebanon*, literasi,* MENA region*, perawatan mandiri*

Introduction

Heart failure (HF) is a global pandemic affecting at least 26 million people worldwide (Savarese & Lund, 2017). This prevalence is expected to rise globally in the next 20 years regardless of trends in coronary disease morbidity and mortality due to improved survival after cardi-

ovascular events, rising HF incidence, and/or an increasingly aging population (Heidenreich et al., 2013). Consequently, HF is a global clinical and public health problem associated with substantial mortality and morbidity and subsequent increased healthcare expenditure. This phenomenon is an increasing concern in low- and middle-income countries, particularly when models of care do not follow a traditional Western paradigm (Koirala et al., 2019). Epidemiological studies evaluating the prevalence of HF and associated mortality in the Middle East and North Africa (MENA) region, including Lebanon, are lacking. A range of factors, including climate change, civil unrest, and increased refugee populations, have placed additional pressures on an already stretched healthcare system (Anholt, 2020).

Lebanon, previously known as the pearl of the Middle East, is a small country located on the eastern shore of the Mediterranean Sea. Despite its size, Lebanon is home to more than 5.8 million people due to the high growth rate and the soaring migration rates to the country (United States Central Intelligence Agency, 2014). The continuous geopolitical conflicts have put the country in a state of political, social, and financial instability, causing burden on all sectors, including the health sector (World Health Organization-Regional Office for the Eastern Mediterranean, 2010). The burden on the healthcare sector is manifested through the high annual expenditure on the Lebanese Ministry of Public Health (MoPH) for more than 40% of the Lebanese population (United States Central Intelligence Agency, 2014).

Lebanon remains in a state of epidemiological transition where communicable diseases remain endemic and is paired with an increase in the prevalence of noncommunicable and degenerative diseases (Bassatne et al., 2020). Noncommunicable diseases are a rising healthcare problem in Lebanon and are projected to increase markedly over the coming few decades. This situation is exacerbated by geopolitical instability, economic disruption, and, more recently, the impact of the COVID-19 pandemic (Deek, 2020). In view of the current changes in Lebanon to be comparable to those of the surrounding countries, understanding the current state on HF will enable researchers in Lebanon and the MENA region to set priorities for research and health systems planning. Therefore, this review aimed to provide a comprehensive overview of the current literature on HF from Lebanon.

Methods

This research used the design of a literature search that was conducted for studies on HF in Lebanon, following the PRISMA statement criteria (Sarkis-Onofre et al., 2021). The search was conducted independently by two researchers (HD and AM), and any conflict was resolved by a third researcher (PMD). A bibliographic search of English language publications indexed in Medline, CINAHL, Academic Search Complete, and Scopus computerized databases was conducted. The search strategy adopted for this review with all the MeSH terms is presented in Table 1. The search was also complemented by a search via Google Scholar for further references that were identified through tracking citations from key articles. Further search was conducted for published works in the following websites: MoPH, Google Search, World Health Organization, Central Intelligence Agency of Lebanon, and Statista, in addition to the gray literature websites: Agency for Healthcare Research and Quality, Gray Literature Report, and Open Gray using the search term "HF in Lebanon." The search was completed in August 2020. The following MeSH terms were used: HF, cardiac failure, CHF, chronic HF, congestive HF, or cardiomyopathy, and Lebanon or Lebanese. The terms were used in all possible combinations with mappings to headings wherever possible. Limits were set for English language and availability of full text. Sociodemographic, medical, and clinical data of the study participants were retrieved using a data extraction tool. Descriptive statistics were undertaken. Standard deviations were calculated for unavailable data using the following formula: SD

= range/6 (Hozo et al., 2005).

All abstracts were reviewed independently, and papers were included for full review if the authors reported data on the incidence, treatment modalities, readmission rates, interventions, and cost related to HF. Studies that reported findings on cardiovascular diseases without referring to HF in specific were excluded. The PRISMA flowchart of the search strategy is shown in Figure 1.

The abstracts of the selected articles were examined independently by two researchers. The study characteristics (author, year, study title, study design, setting, sample size, and study outcome), sample characteristics (age, gender, level of education, employment, social status, and comorbidities), HF indices (length of stay, New York Heart Association (NYHA) functional class, medications, cause of HF, and ejection fraction), and results of the included studies were extracted. Next, data were assembled from the sources and arranged to identify themes and their relationships. The final sample of 11 articles for this review comprised cross-sectional, correlational, interventional, and descriptive quantitative designs.

Results

Description of Studies. All the eleven studies on HF in Lebanon reported sociodemographic characteristics of the study participants; eight studies reported select clinical and medical characteristics. Excluded papers reported the development of a culturally appropriate intervention in the Lebanese context (Deek & Noureddine et al., 2016), a suggestion for an HF toolbox (Kabbani et al., 2019), and an article that discussed electrocardiogram determinants (Khalil et al., 2016) without details on HF. Matta et al.'s (2016) study reported a single case with limited findings and was thus excluded.

All the studies were conducted in the capital city of Beirut, with the exception of one study conducted in the North Lebanese (Kossaify & Nicolas, 2013). Nine of the eleven studies were descriptive, four used a retrospective chart review design (Abou Dagher et al., 2018; Deek & Skouri et al., 2016; Mansour et al., 2020; Moukarbel & Arnaout, 2003), and two studies used a randomized controlled intervention design (Deek et al., 2017; Sadek et al., 2020). Two studies measured self-care in patients living with HF (Deek et al., 2017; Massouh et al., 2020). Two studies addressed quality of life using the Minnesota Living with Heart Failure (MLW HF) questionnaire (Sadek et al., 2020; Zahwe et al., 2020). The same study by Sadek et al. (2020) linked inspiratory muscle function to exercise capacity and quality of life. Three studies addressed diastolic dysfunction. Mansour et al. (2020) studied the link between diastolic dysfunction and coronary artery calcium scoring, whereas another study addressed the effect of physical inactivity on diastolic dysfunction (Matta et al., 2016). One study adressed the effect of body mass index and waist circumference on diastolic dysfunction (Kossaify & Nicolas, 2013). One study reported the mortality rates of acute HF complicated by sepsis (Abou Dagher et al., 2018). Tatari et al. (2015) studied the economic impact of HF care and its associated costs in Lebanon. Along the same lines, two other studies addressed readmission rates with HF (Deek et al., 2016, 2017). Finally, one study looked at peripartum cardiomyopathy (Moukarbel & Arnaout, 2003).

The findings of the 11 included studies, along with their quality assessment, are reported in Table 2. The Joanna Briggs Critical Appraisal Tool was used for quality assessment of the included studies (Munn et al., 2020). The review included 2,774 individuals with HF in inpatient and outpatient settings. The mean age of the sample was 57.98 (SD = 13.09) years. The majority were males (n = 1,494; 53.8%). Six studies reported the smoking status of their participants (n = 1,015), with a mean percentage of 46.8. Only three studies reported the level of education of their participants. A minimum of high school education was present in 247 participants (49.66%), with a variance among the

Table 1. Search Strategy with Mesh Terms Conducted in CINAHL

S1	(MH "Heart Failure+") M
S2	TI ((((ventricular or atrial or systolic* or diastolic* or congestive or chronic or myocardial or cardiac or heart or ((high or low) N1 output*) or ((right or left) N1 sided)) N1 fail*) or CHF or ((cardiac or heart) N1 decompensation) or ((cardiac or myocardial or heart or systolic or diastolic or atrial or ventricular) N1 d#sfunction*) or ((cardiac or myocardial) N1 (insufficien* or in-sufficien*)) or ((heart or cardiac) N1 edema) or HFpEF or HFrEF *)) OR AB ((((ventricular or atrial or systolic* or diastolic* or congestive or chronic or myocardial or cardiac or heart or ((high or low) N1 output*) or ((right or left) N1 sided)) N1 fail*) or CHF or ((cardiac or heart) N1 decompensation) or ((cardiac or myocardial or heart or systolic or diastolic or atria# or ventricular) N1 d#sfunction*) or ((cardiac or myocardial) N1 (insufficien* or in-sufficien*)) or ((heart or cardiac) N1 edema) or HFpEF or HFrEF *)) OR MW ((((ventricular or atrial or systolic* or diastolic* or congestive or chronic or myocardial or cardiac or heart or ((high or low) N1 output*) or ((right or left) N1 sided)) N1 fail*) or CHF or ((cardiac or heart) N1 decompensation) or ((cardiac or myocardial or heart or systolic or diastolic or atria# or ventricular) N1 d#sfunction*) or ((cardiac or myocardial) N1 (insufficien* or in-sufficien*)) or ((heart or cardiac) N1 edema) or HFpEF or HFrEF*))
S3	TI (((renocardia* or reno-cardia* or cardiorenal or cardio-renal) N1 (syndrome# or insufficien* or in-sufficien* or d#sfunction*))) OR AB (((renocardia* or reno-cardia* or cardiorenal or cardio-renal) N1 (syndrome# or insufficien* or in-sufficien* or d#sfunction*))) OR MW (((renocardia* or reno-cardia* or cardiorenal or cardio-renal) N1 (syndrome# or insufficien* or in-sufficien* or d#sfunction*)))
S4	TI (((parox#sm#l N2 (dyspnea* or dyspnae*)) or (asmtha* N2 cardia*)).mp.) OR AB (((parox#sm#l N2 (dyspnea* or dyspnae*)) or (asmtha* N2 cardia*))) OR MW (((parox#sm#l N2 (dyspnea* or dyspnae*)) or (asmtha* N2 cardia*)))
S5	TI cardia* N1 edema* OR AB cardia* N1 edema* OR MW cardia* N1 edema*
S6	TI ((((s#stolic or s#s-tolic or diastolic or dia-stolic or ventric*) N2 (fail* or d#sfunction* or insufficien* or in-sufficien*)) or HFpEF or HFrEF)) OR AB ((((s#stolic or s#s-tolic or diastolic or dia-stolic or or ventric*) N2 (fail* or d#sfunction* or insufficien* or in-sufficien*)) or HFpEF or HFrEF)) OR MW ((((s#stolic or s#s-tolic or diastolic or dia-stolic or ventric*) N2 (fail* or d#sfunction* or insufficien* or in-sufficien*)) or HFpEF or HFrEF))
S7	TI ((((primary or secondary or myocardia*) N1 (cardiomyopath* or disease*)) or (myocardiomyopath* or myo-cardiomyopath*))) OR AB ((((primary or secondary or myocardia*) N1 (cardiomyopath* or disease*)) or (myocardiomyopath* or myo-cardiomyopath*))) OR MW ((((primary or secondary or myocardia*) N1 (cardiomyopath* or disease*)) or (myocardiomyopath* or myo-cardiomyopath*)))
S8	TI ((cardiomyopath* N4 (familial or alcoholic or congestive or dilate* or idiopath* or idio-path* or 1a# or recessive or autosom* or auto-som* or cmd1a or lmna or defect1 or defect-1 or restrict*))) OR AB ((cardiomyopath* N4 (familial or alcoholic or congestive or dilate* or idiopath* or idio-path* or 1a# or recessive or autosom* or auto-som* or cmd1a or lmna or defect1 or defect-1 or restrict*))) OR MW ((cardiomyopath* N4 (familial or alcoholic or congestive or dilate* or idiopath* or idio-path* or 1a# or recessive or autosom* or auto-som* or cmd1a or lmna or defect1 or defect-1 or restrict*)))
S9	(MH "Cardiomyopathy, Dilated+") OR (MH "Cardiomyopathy, Alcoholic+") OR (MH "Cardiomyopathy, Hypertrophic+")
S10	TI ((Cardiomegal* or ((enlarge* or en-large* or hyper-troph* or hypertrophy*) N1 heart))) OR AB ((Cardiomegal* or ((enlarge* or en-large* or hyper-troph* or hypertrophy*) N1 heart))) OR MW ((Cardiomegal* or ((enlarge* or en-large* or hyper-troph* or hypertrophy*) N1 heart)))
S11	TI (((cardiomyopath* or obstruct* or heredit* or idiopath* or idio-path* or ventric* or asymetr* or a-symmetr* or familial or subaort* or sub-aort*) N4 (hypertroph* or hyper-troph* or gene*))) OR AB (((cardiomyopath* or obstruct* or heredit* or idiopath* or idio-path* or ventric* or asymetr* or a-symmetr* or familial or subaort* or sub-aort*) N4 (hypertroph* or hyper-troph* or gene*))) OR MW (((cardiomyopath* or obstruct* or heredit* or idiopath* or idio-path* or ventric* or asymetr* or a-symmetr* or familial or subaort* or sub-aort*) N4 (hypertroph* or hyper-troph* or gene*)))
S12	(MH "Heart Hypertrophy+")
S13	TI (((left or right) N1 (hypertroph* or hyper-troph*))) OR AB (((left or right) N1 (hypertroph* or hyper-troph*))) OR MW (((left or right) N1 (hypertroph* or hyper-troph*)))
S14	TI (((athlete* N1 syndrome*) or ((exercise-induce* or exerciseinduce*) N1 cardiomegal*))) OR AB (((athlete* N1 syndrome*) or ((exercise-induce* or exerciseinduce*) N1 cardiomegal*))) OR MW (((athlete* N1 syndrome*) or ((exercise-induce* or exerciseinduce*) N1 cardiomegal*)))

Table 1. Search Strategy with Mesh Terms Conducted in CINAHL (cont)

S15	TI ((Low N2 (cardia* or output* or out-put* or syndrome*))) OR AB ((Low N2 (cardia* or output* or out-put* or syndrome*))) OR MW ((Low N2 (cardia* or output* or out-put* or syndrome*)))
S16	(MH "Cardiac Output+") OR (MH "Cardiac Output, Decreased") OR (MH "Decreased Cardiac Output (NANDA)")
S17	(MH "Ventricular Dysfunction+") OR (MH "Ventricular Dysfunction, Right") OR (MH "Ventricular Dysfunction, Left+")
S18	(MH "Takotsubo Cardiomyopathy+")
S19	TI (((apical or a-pical or broke* or tako-tsubo or takotsubo or stress) N2 (syndrome* or cardiomyopath*))) OR AB (((apical or a-pical or broke* or tako-tsubo or takotsubo or stress) N2 (syndrome* or cardiomyopath*))) OR MW (((apical or a-pical or broke* or tako-tsubo or takotsubo or stress) N2 (syndrome* or cardiomyopath*)))
S20	(MH "Myocardial Diseases+")
S21	TI myocardia* N1 disease* OR AB myocardia* N1 disease* OR MW myocardia* N1 disease*
S22	S1 OR S2 OR S3 OR S4 OR S5 OR S6 OR S7 OR S8 OR S9 OR S10 OR S11 OR S12 OR S13 OR S14 OR S15 OR S16 OR S17 OR S18 OR S19 OR S20 OR S21
S23	(MH "Lebanon+")
S24	TI ((leban* or liban* or lubnan* or lobnan* or byblos or tyre or sidon or tripoli or beyrouth or beirut or mount-lebanon or b#qaa or b#kaa or b'qaa or b#'qaa or jnoub or janoub or daheya or akkar or batroun or j#b#il or j#b#yl or sho#eif#t or cho#eif#t or nabatey#eh or nabatey#a# or hasbay#eh or hasbay#a#).) OR AB ((leban* or liban* or lubnan* or lobnan* or byblos or tyre or sidon or tripoli or beyrouth or beirut or mount-lebanon or b#qaa or b#kaa or b'qaa or b#'qaa or jnoub or janoub or daheya or akkar or batroun or j#b#il or j#b#yl or sho#eif#t or cho#eif#t or nabatey#eh or nabatey#a# or hasbay#eh or hasbay#a#).) OR MW ((leban* or liban* or lubnan* or lobnan* or byblos or tyre or sidon or tripoli or beyrouth or beirut or mount-lebanon or b#qaa or b#kaa or b'qaa or b#'qaa or jnoub or janoub or daheya or akkar or batroun or j#b#il or j#b#yl or sho#eif#t or cho#eif#t or nabatey#eh or nabatey#a# or hasbay#eh or hasbay#a#).
S25	S22 AND (S23 OR S24)

Legend: CINAHL (Cumulated Index to Nursing and Allied Health Literature)

three studies (65%, 57%, versus 25%). Only two studies reported employment status of 18% (Deek et al., 2017) and 35% (Mansour et al., 2020). In addition to these same studies, Moukarbel and Arnaout (2003) reported the participants' marital status as married with 63%, 78%, and 100%. Atrial fibrillation, reported in five studies, was present in 220 participants (22.49%). A total of 734 participants (33.02%) had coronary artery disease, 1,169 participants (50.32%) had hypertension, 499 (27.47%) had dyslipidemia, 535 (24.07%) had diabetes, 90 (14.59%) had chronic obstructive pulmonary disease, and 251 (11.81%) had renal disease. EF was reported in six studies, with a mean of 47.28% (SD = 10.44). Five studies reported the length of hospital stay with a combined mean of 10.28 days (SD = 7.97). Table 3 includes sample characteristics and associated comorbidities.

Synthesis of Results

Sociodemographic Burden. The differences in the samples were evident with the varying sociodemographic characteristics in different studies. Age ranged between 33.7 and 73 years. This wide range is due to the youngest sample of women with peripartum cardiomyopathy. In 7 out of 11 studies, most of the sample were males. Cardiac comorbidities were prevalent with the varying rates of atrial fibrillation, coronary artery disease, and hypertension. The mean EF was middle ranged given that three of the studies presenting their participants' EF ranged around 30%, whereas the other three were over 60%.

Self-care and Symptom Management. Promoting self-care and engagement in symptom management is a key recommendation of best practice

Table 2. Detailed Summary of the Included Studies

Authors	Design	Sample Size	Primary Outcomes	Results	Quality Assessment*
Massouh et al. (2020)	Cross-sectional correlational design	Patients with HF[1]: 100	Self-care behaviors and their determinants	Self-care was suboptimal in Lebanese patients with HF. Common self-care maintenance behaviors performed by Lebanese patients with HF included using a system to help remember medicines, keeping doctor or nurse appointments, checking for ankle swelling, and eating a low salt diet. Self-care behaviors predominantly low in this population were weighing oneself and exercising for 30 minutes. Higher HF specific knowledge, higher self-care confidence, and lower NYHA[2] Class II predicted better self-care maintenance. HF specific knowledge score, higher self-care maintenance, no recent hospitalization, and being unemployed predicted better self-care confidence. Self-care management was predicted by self-care confidence alone.	Q1: Yes Q2: Yes Q3: Yes Q4: Yes Q5: Yes Q6: Yes Q7: Yes Q8: Yes
Zahwe et al. (2020)	Psychometric evaluation of Arabic version of MLHFQ[3]	Patients with HF: 210	Psychometric properties of Arabic version of MLWHF questionnaire	The Arabic version of MLHF questionnaire is valid and reliable and can be used in Arabic-speaking Lebanese population with HF. The confirmatory factor analysis yielded three factors: physical, emotional, and social. Three items (4, 8, and 15) had low loadings. The overall Cronbach's alpha coefficient was 0.92. Higher scores on the MLHFQ questionnaire (lower quality of life) were associated with depression, evaluated using the PHQ-9[4], higher NYHA class, and HF-hospitalization in the past 6 months.	Q1: Yes Q2: Yes Q3: Yes Q4: Yes Q5: Unclear Q6: Unclear Q7: Yes Q8: Yes
Sadek et al. (2020)	Randomized controlled trial	Patients with HF: 40	Inspiratory muscle function, exercise capacity, and quality of life (measured by MLWHF)	The combined intervention of HI-AIT[5] and IMT[6] showed significant improvement over the single intervention (HI-AIT or IMT) in terms of maximal inspiratory training (62%, 24%, 25%), exercise time (62%, 29%, 12%), the 6-minute walk test (23%, 15%, 18%), and the MLWHF questionnaire (56%, 47%, 36%).	Q1: Yes Q2: Yes Q3: Yes Q4: Yes Q5: Yes Q6: Yes Q7: Yes Q8: Yes

Table 2. Detailed Summary of the Included Studies (cont)

Authors	Design	Sample Size	Primary Outcomes	Results	Quality Assessment*
Mansour et al. (2020)	Retrospecti-ve database review	In-patients with HF: 191	DD[7] and coronary artery calcium score	Patients with higher CAC[8] score were older, had more comorbidities, lower e′, and were more likely to have DD. DD was associated with increased OR[9] for subclinical CAC; OR = 3.66, 95% CI[10] = 1.54–8.72, p = 0.03. In the multivariate analysis, DD alone, age > 65 years, or both were associated with almost threefold increase of subclinical atherosclerosis. Compared with patients' age < 65 years and normal diastolic function, those age > 65 years or DD had OR = 3.49, 95% CI = 1.45–8.35, and p = 0.005 for subclinical coronary atherosclerosis (CAC > 0), whereas those age > 65 and DD had OR = 9.30, 95% CI = 2.00–42, and p = 0.004.	Q1: Yes Q2: Yes Q3: Yes Q4: Yes Q5: Yes Q6: Unclear Q7: Yes Q8: Yes
Abou Dagher et al. (2018)	Single-center; retrospective; cohort design	Patients with sepsis: 174 Patients with HF: 87	In-hospital mortality of patients with HF and sepsis compared with patients without HF.	Patients with HF and sepsis were at a higher risk of in-hospital mortality than patients who are not diagnosed with HF. Mortality: OR = 2.45, 95% CI = 1.22–2.48, p = 0.01 Prevalence of severe sepsis or septic shock was higher in patients with HF compared with those without HF. Diagnosis of sepsis or septic shock: OR = 4.45, 95% CI = 2.218.98, p < 0.0001	Q1: Yes Q2: Yes Q3: Yes Q4: Yes Q5: Yes Q6: Yes Q7: Yes Q8: Yes
Deek et al. (2017)	Multicenter; randomized control trial	Patients with HF: 259 Control: 130 Intervention: 126	All caused readmission	A single educational intervention showed improved outcomes. The intervention lowered readmission rates [OR = 0.40, 95% CI = 0.17–0.91, p = 0.02], showed fewer major vascular events [OR = 0.47, 95% CI = 0.40–0.54, p = 0.01], enhanced self-care maintenance [OR = −8.93, 95% CI = 13.37–4.49, p < 0.0001], and confidence [OR = −8.95, 95% CI = −14.6 to −13.32, p < 0.0001], and showed less healthcare utilization [OR = 0.39, 95% CI = 0.18–0.83, p = 0.01] when compared with no intervention. Education did not improve the quality of life after 30 days.	Q1: Yes Q2: Yes Q3: Yes Q4: Yes Q5: Yes Q6: Yes Q7: Yes Q8: Yes

Table 2. Detailed Summary of the Included Studies (cont)

Authors	Design	Sample Size	Primary Outcomes	Results	Quality Assessment*
Deek et al. (2016)	Retrospective; descriptive design	Patients with HF: 187	Readmission rates at 30, 60, and 90 days	72 patients with HF were readmitted. Readmission rates were 15%, 22.2%, and 27.8% at 30, 60, and 90 days respectively. DM[11] [OR = 2.681, 95% CI = 1.176–6.110, p = 0.09], CAD[12] [OR = 3.3, 95% CI = 1.462–7.449, p = 0.004], elevated gamma GT7 [OR = 2.675, 95% CI = 1.016–7.068, p = 0.046], and prolonged LOS[13] [OR = 7.842, 95% CI = 1.819–33.809, p = 0.006] were significant predictors of readmission.	Q1: Yes Q2: Yes Q3: Yes Q4: Yes Q5: Yes Q6: Unclear Q7: Yes Q8: Yes
Matta et al. (2016)	Single-center prospective cohort design	1,356 patients presenting for echocardiography	Effect of physical inactivity on DD	Physically inactive patients who had a higher than median LVMI[14] had higher risk of having DD [OR = 2.82, 95% CI = 1.58–5.05, p < 0.001]. Age [OR = 1.13, 95% CI = 1.11–1.14, p < 0.001], higher BMI[15] [OR = 1.04, 95% CI = 1.004–1.07, p = 0.029] and SBP[16] [OR = 1.011, 95% CI = 1.001–1.02, p = 0.033], DM [OR = 1.85, 95% CI = 1.14–2.98, p = 0.012], use of anticoagulants [OR = 3.55, 95% CI = 1.26–10.0, p = 0.017], and a smaller LVEDD[17] [OR = 0.91, 95% CI = 0.85–0.97, p = 0.03] were all associated with an increased odds of having DD.	Q1: Yes Q2: Yes Q3: Yes Q4: Yes Q5: Yes Q6: Unclear Q7: Yes Q8: Yes
Tatari et al. (2015)	Cross-sectional study	All healthcare providers reported costs on HF hospitalization in 600 outpatient visits.	Annual cost of HF care.	A total of 72,000 individuals suffered from HF. The actual average cost of HF care in Lebanon for an average of 11 days of hospitalization is $3,769. The annual total cost of HF care was estimated at $103,673,535 with $38,081,535 in direct cost for HF hospitalizations. The cost of outpatient HF care was estimated at $65,592,000 with $911 spent for each patient per year. The true cost was estimated at $104 million dollars.	Q1: Yes Q2: Yes Q3: Yes Q4: Yes Q5: Yes Q6: Unclear Q7: Yes Q8: Yes
Kossaify and Nicolas (2013)	Single-center observational design	132 outpatients presenting for echocardiography	Effects of BMI and WC[18] on LVEDD	Overweight and obese participants had higher diastolic dysfunction (abnormal BMI, p = 0.037; abnormal WC, p = 0.035) compared with participants with a normal BMI and WC. BMI [OR = 2.75, 95% CI = 1.34–5.67, p = 0.006] and age [OR = 1.08, 95% CI = 1.04–1.12, p < 0.0001] appeared to be significant independent risk factors for LVEDD.	Q1: Yes Q2: Yes Q3: Yes Q4: Yes Q5: Yes Q6: Yes Q7: Yes Q8: Yes

Table 2. Detailed Summary of the Included Studies (cont)

Authors	Design	Sample Size	Primary Outcomes	Results	Quality Assessment*
Moukarbel and Arnaout (2003)	Single-center cohort design	10 patients with LVD[19]	Acute and long-term outcomes of PPCM[20]	Approximately 60% of the patients in this sample had severe LVD, whereas the remaining 40% had moderate LVD. After clinical and echocardiographic follow-ups, all included patients showed improvement in their ejection fraction. About 70% of the patients went back to NYHA Class I, whereas the remaining 30% improved to NYHA Class II.	Q1: Yes Q2: Yes Q3: Yes Q4: Yes Q5: Yes Q6: Yes Q7: Yes Q8: Yes

Abbreviations: [1]HF (Heart failure); [2]NYHA (New York Heart Association); [3]MLWHF (Minnesota Living with Heart Failure); [4]PHQ-9 (Patient Health Questionnaire); [5]HI-AIT (High-intensity Aerobic Interval Training); [6]IMT (Inspiratory Muscle Training); [7]DD (Diastolic dysfunction); [8]CAC (Coronary artery calcium); [9]OR (Odds ratio); [10]CI (Confidence interval); [11]DM (Diabetes mellitus); [12]CAD (Coronary artery disease); [13]LOS (Length of stay); [14]LVMI (Left ventricular mass index); [15]BMI (Body mass index); [16]SBP (Systolic blood pressure); [17]LVEDD (Left Ventricular end diastolic diameter); [18]WC (Waist circumference); [19]LVD (Left ventricular dysfunction); [20]PPCM (Peripartum cardiomyopathy);
*Joanna Briggs Institute Critical Appraisal Checklist: Q1: Clearly defined criteria for inclusion, Q2: Detailed description of study subjects and setting, Q3: Valid and reliable measurement of exposure, Q4: Standard criteria used for measurement of condition, Q5: Confounding variables identified, Q6: Strategies to deal with confounding variables, Q7: Valid and reliable measurement of outcomes, Q8: Appropriate statistical analysis used.

guidelines. Two studies reported self-care (Deek et al., 2017; Massouh et al., 2020). A common scale called the Arabic version of the Self-Care in HF Index (SCHFI) was used. The scale reports self-care through three subscales: maintenance, management, and confidence (Deek & Chang et al., 2016).

Self-care scores in both studies were low. However, the mean scores varied significantly between the two samples. One sample had mean self-care scores of 67.26 on self-care maintenance, 66.96 on management, and 69.5 on self-care confidence (Massouh et al., 2020). In the other sample, lower scores were reported as 35 on self-care maintenance, 16 on management, and 41 on self-care confidence (Deek et al., 2017). An important note was that participants in both samples scored lowest on the self-care management subscale. In addition, Lebanese females generally scored higher than men (maintenance: 70.55 ± 14.20 versus 66.22 ± 14.40; confidence: 73.44 ± 4.20 versus 68.26 ± 19.97; and management: 70.71 ± 24.64 versus 65.54 ± 20.06) in Massouh's sample (Massouh et al., 2020), whereas males scored higher than females on maintenance (35.22 ± 14.11 versus 34.22 ± 14.93) and confidence (42.31 ± 13.35 versus 39.11 ± 17.01) scores in Deek's sample (Deek et al., 2017).

Employment status was a significant determinant of self-care in both studies. Those employed reported higher scores in maintenance (67.33 ± 13.45) and management (68.33 ± 22.49) and lower scores in confidence (64.02 ± 18.21) in Massouh et al.'s (2020) sample; however, these findings were reversed in Deek et al.'s (2017) sample [in employed versus unemployed on maintenance (32.07 ± 14.46 versus 35.35 ± 14.44), management (13.55 ± 14.04 versus 16.16 ± 15. 09), and confidence (42.37 ± 13.93 versus 40. 55 ± 15.42) subscales]. Moreover, hospitalized patients had justifiably lower self-care maintenance and management scores and significantly lower self-care confidence scores (Massouh et al., 2020). Conversely, higher self-care maintenance and management scores were reported for those with previous hospitalization (Deek et al., 2017).

Marital status also seemed to affect the subscales

of self-care (Massouh et al., 2020). Participants who were not married had higher self-care maintenance (67.27 ± 13.48), confidence (70.76 ± 14.4), and management (72.69 ± 14.4) than married participants. Patients who were currently hospitalized scored lower on all three scales (self-care maintenance: 64.99 ± 13.35; self-care confidence: 60.76 ± 16.98; and self-care management: 65.65 ± 21.23) than those who were not hospitalized (Massouh et al., 2020). HF severity was a predictor of self-care in both samples. Better functional status (lower NYHA score)

Table 3. List of Sociodemographic Characteristics and Comorbidities of the Participants in the Included Studies

Author (year)	Sociodemographic						EF	Comorbidities n (%)					
	Sample Size	Age (Mean ± SD)	Gender (Male; n (%)	High School n (%)	Smoking Status	Married		AFib	CAD	HTN	DLM	DM	COPD
Massouh et al. (2020)	100	67.59 ± 12.09	76 (76)	65 (65)	NA	78 (78)		NA	NA	83 (83)	NA	NA	NA
Zahwe et al. (2020)	210	64.26 ± 15.18	157 (74.8)	119 (59)	40 (19)	156 (74.3)		45 (21.4)	NA	NA	NA	NA	NA
Sadek et al. (2020)	40	52.12 ± 11.75	20 (50)	NA	NA	NA		NA	NA	NA	NA	NA	NA
Mansour et al. (2020)	191	52 ± 12	158 (83)	NA	123 (64)	NA	65+7	NA	NA	NA	NA	NA	NA
Abou Dagher et al. (2018)	174	73 ± 14.68	55 (63.2)	NA	27 (31)	NA		29 (33.3)	66 (75.9)	70 (80.5)	32 (36.8)	44 (50.6)	22 (11.80)
Deek et al. (2017)	256	67 + 8	141 (55)	63 (25)	119 (78)	162 (63)	36+12	82 (32)	165 (65)	185 (72)		118 (46)	46 (18)
Deek et al. (2016)	187	63.71+12.87	111 (59.4)	NA	71 (42)	NA	33.09+13.1	32 (17)	95 (50.8)	114 (61)	28 (15)	78 (41.70)	22 (11.80)
Matta et al. (2016)	1,356	52.9 ± 17.4	660 (48.7)	NA	635 (46.8)	NA	60.5+4.1	NA	278 (20.5)	577 (42.6)	411 (30.3)	225 (16.6)	
Tatari et al. (2015)	151	65 (28 – 93) 10.7*	62 (41)	NA	NA	NA		32 (21)	71%	66%		40%	
Kossaify et al. (2013)	99	61.59 ± 13.9	54 (54.5)	NA	NA	NA	61.64	NA	23 (82.1)	40 (80)	24 (88.9)	9 (90)	
Moukarbel et al. (2003)	10	33.7	0 (0)	NA	NA	NA	27.5	NA	NA	NA	NA	NA	NA
Total	2,774	57.98	1,494	247	1,015	250	47.27	220	734	1,169	499	535	90

Legend: AFib (Atrial fibrillation); CAD (Coronary artery disease); HTN (Hypertension); DLM (Dyslipidemia); DM (Diabetes mellitus); COPD (Chronic obstructive pulmonary disease).

was associated with better self-care (self-care maintenance: 63.87 ± 14.21; self-care confidence: 65.47 ± 19.86; and self-care management: 66.43 ± 21.37; Massouh et al., 2020). The same was true for Deek et al.'s (2017) sample for maintenance but reversed for management and confidence. Participants with NYHA Classes I and II had significantly lower scores on management compared with those with Classes III and IV.

***Diastolic Dysfunction and HF*.** Physical inactivity, higher body mass index, increased age, and multiple comorbidities were significantly associated with diastolic dysfunction (Matta et al., 2016). Diastolic dysfunction or age was found to be significantly associated with subclinical atherosclerosis. However, when the diastolic dysfunction and age were combined, the risk of developing atherosclerosis was 9 times higher (Mansour et al., 2020). Conversely, physical activity, specifically high-intensity aerobic interval training and inspiratory muscle training, improved exercise time, 6-minute walk test, and quality of life (Sadek et al., 2020). The latter was decreased with readmission, depression, and higher NYHA class (Zahwe et al., 2020) but was not changed with education (Deek et al., 2017).

Discussion

This review aimed to gather and analyze the available literature on HF in Lebanon and subsequently highlight the gaps in knowledge, which will help guide future research and practice improvements in Lebanon and surrounding countries of similar sociopolitical and economic conditions. The unique features of collectivist cultures make strategies for improvement challenging, whereas many self-management strategies are based on Western cultures where there exists a strong emphasis on individuals. By contrast, in collectivist cultures, there exists an increased importance of family involvement. In many countries such as Lebanon, the rapidly changing political and economic circumstances challenge the ability to plan strategically. This phenomenon, along with the high rates of illiteracy that were established in the older adult population with HF, render regular educational strategies to be ineffective. The variance in samples in this review showed varying results in terms of sociodemographic characteristics and self-care practices. The latter significantly varied with educational status, marital status, and clinical profile. This result was evident with the great difference in the level of education among the study samples. This variance could be explained by the availability of a multidisciplinary disease management program at one of the data collection sites (Massouh et al., 2020) and the lack of such advanced service at the other. Other variables that could contribute to self-care practices included motivation, experience, and skills, in addition to cultural beliefs and values (Jaarsma et al., 2017). Cultural beliefs and values may be key aspects to consider when evaluating or planning interventions related to self-care in collectivist cultures (Jaarsma et al., 2017) as was evaluated with patients with HF to show improved self-care and read-mission outcomes (Deek & Noureddine et al., 2016).

Other factors to consider are the support and access to healthcare (Jaarsma et al., 2017). These factors were evidently a challenge in the Lebanese setting due to the dire financial situation in the country and the resultant lack of medical supplies and medications. These common faces of instability challenge the countries of the MENA region (Dhaoui, 2019). Changes in the healthcare system and, consequently, care and follow-up tailored to the needs of these patients are inevitable.

The low scores on the self-management subscale were similar to findings of a study conducted in 15 countries (Jaarsma et al., 2013), as well as other developing countries such as Taiwan (Tung et al., 2012) and Iran (Zamanzadeh et al., 2012). However, the improved self-care scores on the three subscales of the SCHFI, in one study, with better functional status could be attributed to higher levels of energy in participants with better functional status to devote to

self-care. They may also believe that being less symptomatic is a consequence of them managing their HF well. However, participants with lower NYHA classification had lower scores on management compared with those with NYHA Classes III and IV. This result was consistent with studies that reported that patients with HF engage in self-care when their cases are worsened, reflected by lower ejection fraction (Seto et al., 2011). An interesting finding was the higher scores across the three subscales of the SCHFI in single patients with HF compared with those who were married. This finding contradicted the previous literature, which presents the importance of family involvement and the importance of a caregiver, in general, in collectivist cultures. However, this finding was retrieved from a sample that was considered well-educated and of higher sociodemographic status (Massouh et al., 2020) than that of the study showing contradicting findings (Deek et al., 2017). These findings should be further investigated in a study with a larger sample size that would allow generalizability to people with HF.

The Arabic-translated version of the SCHFI was previously validated in the Lebanese setting with good psychometric properties. The findings of the validation study showed that the modified version of this tool indicated favorable outcomes. Such outcomes include dropping items from three subscales, which should be considered when evaluating self-care in future studies and allowing larger samples for better judgment on the psychometric properties of this Arabic-translated version of the SCHFI (Deek & Chang et al., 2016). Such evaluation could be performed across different countries of the region to allow for cross-cultural comparison and enhance better understanding of the different, and possibly similar, needs of patients with HF.

More national descriptive studies should be conducted to outline the needs of the Lebanese population with HF in light of all the rapid sociopolitical and economic changes in the country. Moreover, a national registry may assist in monitoring health outcomes. The challenges facing HF care in low-and middle-income countries are vast. These challenges include but not limited to economic, political, health system, and social issues. Fortunately, these modifiable variables, when and if amended, can allow for stability and security in terms of chronic disease management and the ability of the population with HF to maintain a minimum level of wellbeing. Addressing the educational needs of people living with HF while considering their educational level and health literacy is pivotal. The differences in regions are many but the culture of the country is somehow unified and can be targeted through personalized and flexible educational interventions.

This review can be investigated within the context of the current times in Lebanon and the MENA region. In the midst of the COVID-19 pandemic, on August 4, 2020, Beirut, the capital of Lebanon, witnessed one of the biggest explosions in history, causing further devastation (Farha & Abi Jaoude, 2020). Isolating the cumulative experience of trauma for patients and healthcare workers alike is not valid. As scholars seek to develop interventions for HF in Lebanon and the region, these factors should be considered. Nurses can have a powerful voice to lead systems change and address critical social issues (Dhaini et al., 2020). This notion has been proven once and again through nurse-led multidisciplinary interventions aimed at improving HF outcomes (Rice et al., 2018). In addition, education is one of the main and pivotal roles of the nursing profession, which should be tailored to meet the needs of people with low literacy levels, as seen in the countries of this region (Asbu et al., 2017).

Conclusion

Research on HF remains highly limited in Lebanon and the MENA region and is considerably needed to inform healthcare practitioners regarding the needs of the population. Therefore, national and regional studies should be conducted to assess the current trends in patterns of care and health utilization and healthcare inter-

ventions developed that are culturally appropriate. Scholars should also consider the many changes and challenges facing the nursing profession and the healthcare system in general in delivering the optimal care it is aiming for. Future studies should address the limitations of this work, such as the lack of generalizability considering the heterogeneity of the samples' clinical and sociodemographic characteristics from different locations of the country. In addition, the limited number of intervention studies did not allow for a rigorous analysis to yield accurate results. Despite these limitations, these data are useful in developing future interventions. The design of interventions should be tailored to meet the continuously changing needs of people with HF with the rapid changes in the country. This factor should be initially addressed through continuous evaluation of the financial and sociopolitical changes and their effects on the healthcare system and patients. Following the understanding of these implications, these factors should be adapted to practice while aiming to improve patient outcome.

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