The Lebanese Heart Failure Snapshot: A National Presentation of Acute Heart Failure Admissions

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Abstract

Purpose: The purpose of this prospective evaluation is to document in-hospital management and discharge trends of patients presented for acute heart failure.

Design: A prospective evaluation of the patients presented for heart failure exacerbation at eight sites over 1 month using the method of the New South Wales Heart Failure Snapshot.

Methods: Trained personnel situated at each of the study sites recruited eligible patients to the study and collected data on their sociodemographic characteristics, clinical presentation, self-care, frailty, and depression.

Findings: Eight sites, out of the 27 contacted, agreed to participate in this study. A total of 137 admissions were reported in the 1-month time window. Mean age was 72 ($SD = 13$) years and the majority were female (52%). More than half ($n = 60\%$) had heart failure reduced ejection fraction with a mean ejection fraction of 41%. The mean Charlson Comorbidity Index score was four with hypertension (80%) and diabetes (56%) being the most frequent. The majority were frail (86%), self-care mean scores were low; self-care maintenance (29), self-care management (48) and self-care confidence (42). The mean depression score was 14 indicating major depression. In reference to international guidelines recommendations, hospital administered medications and discharge medications were suboptimal. Some items of the discharge education recommended by the international guidelines were provided to 84% of the patients but none of the patients received the complete items of the discharge education.

Conclusions: The snapshot revealed that patients admitted for acute heart failure were frail with high levels of illiteracy and low self-care scores. Despite these findings, these patients were not provided with complete discharge education in reference to the international guidelines. Additionally, when provided, discharge education was inconsistent across the study sites. This study highlights the need for enlisting complete education as part of the discharge process, in addition to abidance to the guidelines in prescribing medication. The study draws major implications for nursing practice, research and policy.

Clinical Relevance: Literacy among patients with heart failure is low and should be addressed in educational intervention to improve outcomes. Discharge education is under practiced across the country and should be implemented in accordance with the international guidelines.

Heart failure (HF) is a syndrome representing the final common pathway of many cardiovascular conditions (Ponikowski et al., 2016). Acute HF is characterized by acute and rapid onset of a range of clinical presentations reflecting fluid overload. Such presentations include pulmonary edema, cardiogenic shock, and hypertensive HF, thus requiring immediate management (Chioncel et al., 2017). It entails frequent hospital admissions, high symptom burden, and mortality (Kurmani & Squire, 2017). The global annual cost of HF care reached $US64 billion in 2012, accounting for direct costs, as well as hospitalization, medication, and physician costs (Cook, Cole, Asaria, Jabbour, & Francis, 2014), for both acute and chronic HF. Similarly, in Lebanon the burden is immense, with an estimated direct annual cost of over $US100 million (Tatari, Soubra, Tamim, Akhras, & Kabbani, 2015). These numbers represent the cost of acute in-hospital HF management only; little is known about the cost of outpatient chronic care, although this group of patients is subjected to many comorbidities that also require continuous management (Mentz et al., 2014). Among those comorbidities is depression, which was reported to occur in 1 in 5 patients with HF, and this subgroup had even higher rates of emergency department presentations, readmissions, and mortality (Rutledge, Reis, Linke, Greenberg, & Mills, 2006) when compared to their nondepressed counterparts. Additionally, more than half of the patients diagnosed with HF are reported to be frail, which poses additional burdens on the families and communities (Denfeld et al., 2017). Frailty is a syndrome encompassing biological and psychological aspects manifested by changes in activity, weight, and appetite, and weakened grip strength (Romero-Ortuno, Walsh, Lawlor, & Kenny, 2010). Many intervention studies have been undertaken to improve the outcomes of this selected patient group; such interventions center around education, structured follow-up, medication trials, or a combination of all of these, and including different disciplines of the healthcare team (Feltner et al., 2014; Kitsiou, Paré, & Jaana, 2015).

Heart Failure in Lebanon

Lebanon is an upper middle-income country located in the Middle East. Its geographical location and the war in and around it make it easily accessible for people from the surrounding countries. This, in addition to the declining death rates and the increasing life expectancy to 79 years, led to a population growth of 2.6% in 2016 (Statista, 2017). This older aged group, however, has high morbidity rates of cardiovascular diseases (47%), diabetes (15%), and hypercholesterolemia (10%), among other noncommunicable diseases. Health care is mainly delivered in hospitals, since there is a lack of the primary healthcare settings. This limitation is largely due to the lack of financial coverage by paying parties in Lebanon. More than 70% of the Ministry of Public Health (MoPH) funds is paid in hospital services, and the majority of primary healthcare centers are owned by nongovernmental organizations. Financial coverage is provided to those hospitalized, in various percentages, but no coverage is provided for outpatient services. The MoPH covers more than 52% of the Lebanese population's hospitalizations, while National Social Security funds cover 30% and the rest are covered by the army (9%), insurance (8%), and other funds (Ammar, 2016). These data are mainly culled from reports assembled by the MoPH (2016) and the World Health Organization (2015).

Before 2013, limited data were available on the demographics and biosocial factors of patients with HF. Moreover, no data were available on the interventions carried out to improve HF outcomes. The education provided to patients was scarce and was only briefly provided in hospitals before patient discharge, with limited documentation and standardization (Deek, Skouri, & Noureddine, 2016). In 2015, Tatari et al. reported that the estimated cost of every admission was almost $US4,000, reflecting the average cost of a single admission in a governmental hospital in Beirut. It included all therapies provided during an average stay of 7 days as reported. A retrospective chart review of HF presentations at one governmental hospital presented the readmission rates at 30, 60, and 90 days to be 15%, 22%, and 28%, respectively (Deek, Skouri, & Noureddine, 2016). Interventions conducted to improve HF outcomes included an educational family intervention on self-care and symptom management (Deek et al., 2017) through a multisite randomized controlled trial. Readmission and mortality were significantly reduced, and self-care, poor at baseline, was significantly improved 30 days following the intervention (Deek et al., 2017; Deek, Chang, et al., 2016). These findings showed the importance of structuring caregiving by involving the family members. Family involvement in self-care is a typical scenario in Arab countries as well as in Arab and non-Arab communities that are collectivists in culture in Western countries.

HF awareness campaigns have become an annual event conducted by the Lebanese Society of Cardiology (Heart Failure in Lebanon, 2016). These initiatives, research, and campaigns were all performed over a 5-year period, and provided some information on HF admission and management trends in Lebanon. However, findings from existing studies have limited

generalizability. Moreover, there are no national records of the prevalence of acute and chronic HF, HF admission trends, costs of hospitalization, or care provided in the hospitals for these selected patients. Therefore, the aim of the Lebanese HF Snapshot was to capture the trend of HF presentations, in-hospital management, and discharge trends in Lebanon through a prospective audit of the HF cases conducted at the eight study sites geographically scattered all over the country over a 1-month period.

Methods

The Lebanese HF Snapshot was a prospective evaluation of patients presenting with HF exacerbation during the 1-month study period (June 1 to July 1, 2019). It followed the same approach as that of the New South Wales HF Snapshot (Newton et al., 2016) since its findings had implications on practice.

Subjects

Patients presenting to one of the study sites with symptoms of HF exacerbation, whether newly diagnosed or chronic, were included in this study. Inclusion criteria were adult patients (age >18 years) with HF-reduced ejection fraction (HFrEF), defined here as an ejection fraction (EF) of <50%, or HF-preserved ejection fraction (HFpEF), defined here as an EF of ≥50%. Admission diagnosis was validated according to the Framingham Criteria (Mahmood, Levy, Vasan, & Wang, 2014) and confirmed by the treating physician. Participants were included based on the clinical characteristics regardless of their financial coverage.

Settings

The participating hospitals were chosen from all parts of the country to allow for geographical distribution. All the participating hospitals had a cardiology unit that was prepared for patients presenting with HF exacerbation. All the sites admitted patients with all types of financial health coverage.

Instruments

A baseline questionnaire was developed for the current study to include patient sociodemographic data, medical history using Charlson's Comorbidity Index (CCI), clinical presentation, physical assessment, and laboratory findings, in addition to echocardiography and cardiac catheterization findings. Data on the discharge status, discharge medication, and education provided were also collected. These data were retrieved from the patient records.

Frailty was assessed using the Survey of Health, Ageing and Retirement in Europe (SHARE) index, a valid and reliable screening tool that has been rigorously studied in 12 countries in Europe on more than 20,000 participants 50 years of age and above (Romero-Ortuno et al., 2010). This age group was convenient for this study since most of the patients with HF are older adults. This index records changes in eating and sleeping habits, in addition to physical activity tolerance and a measure of the handgrip in kilograms. The sum of scores yields a number reflecting a categorical variable of frail, prefrail, or not frail. The validity of this tool has been confirmed using the Dfactor model, which is a more accurate form of factor analysis convenient for the different scale types of this tool. The results showed a standard $R2$ of 0.61, with the indicators dividing into the three classes of frailty: nonfrail, prefrail, and frail. This tool had been used in this same format previously (Deek et al., 2017), and no difficulties in administration were recorded.

Participants were screened for depression using the Patient Health Questionnaire 9 (PHQ-9). This is an easy-to-administer questionnaire of 9 questions on sleeping and eating habits, loss of interest, tiredness, concentration, and suicidal ideation (Löwe, Kroenke, Herzog, & Gräfe, 2004). It had been validated against well-established scales for the screening of depression such as the Composite International Diagnostic Interview, which has sensitivity and specificity scores of 86% and 78%, respectively (Arroll et al., 2010). The PHQ-9 has been translated and validated in the Arab population and has been proven to be a valid and reliable tool. Cronbach's alpha for the Arabic version of this tool was shown to be 0.857 (Arroll et al., 2010).

Self-care was evaluated using the Arabic translated version of the Self-Care HF Index (ASCHFI). The validity of this tool was evaluated using exploratory factor analysis, in which the three constructs of the tool explained 37% of the variance. Confirmatory factor analysis yielded adequate fit indices (chi-square = 339.800, goodness of fit index = 0.918, Tucker-Lewis Index = 0.912, comparative fit index = 0.931, and root mean square error of approximation = 0.069), and the tool was found to be reliable in the maintenance, management, and confidence subscales, with composite reliability coefficients of 0.87, 0.97, and 0.97, respectively (Deek, Chang, et al., 2016). Adequate self-care was assumed with a cut-off score of 70 or above on any of the three subscales: self-care maintenance,

self-care management, and self-care confidence (Vellone et al., 2013).

Procedure

Ethical approval was secured from all study sites prior to initiation of the study. All participants signed an informed consent form before data collection. After being informed of the objective of the study, every patient approached agreed to participate. Enrollment was achievable since it involved no financial constraints and participants were convinced of the potential benefits in the absence of such initiatives in usual practice. Two training sessions were conducted for the data collectors (referred to here as investigators) at the study sites. They were all nurses with a master's level of education and research experience. The sessions involved training on how to administer the tools and the use of the handgrip dynamometer. The investigators conducted daily rounds for potential participants. When patients were identified, they were introduced to the study, consent was signed, and data were collected.

Data Analysis

Data were entered and analyzed using SPSS version 24 software (IBM Corp., Armonk, NY, USA). Descriptive statistics were presented as frequencies, percentages, means, and standard deviations. Group comparison was done using the chi-square test for categorical variables and the independent t test for continuous variables.

Results

We contacted 27 hospitals for this study and got approval from only eight sites. The sites were scattered across Lebanon, and two hospitals were included from the capital city of Beirut. One of these hospitals was governmental and the other was private, with the total patient representation from Beirut being 40.1%. Two private hospitals from northern Lebanon were also included, representing 15.4% of the total. A single governmental hospital was included from southern Lebanon, representing 17.5% of the total. Two private hospitals recruited 19% of the participants from the Beqaa region and one hospital in Mount Lebanon recruited 8% of the participants.

Study Sample

A total of 137 patients presenting with HF exacerbation were admitted to the study hospitals during the

study period. The mean age of the study sample was 72 ($SD = 13$) years and the majority were female patients (52%). Most were Lebanese (91%) and illiterate (52%), with illiteracy defined as the lack of ability to read and write. The majority were unemployed or retired (89%), and the main source of income was a sibling with a mean monthly income of \$US610 ($SD = \$367$). When looking at the medical profile, the mean CCI score was 4 ($SD = 2$), with the majority having hypertension (80%), diabetes (56%), lung diseases (42%), and renal diseases (25%). HF was a chronic condition in 103 patients (80%), with a mean EF of 41% ($SD = 11\%$). The main cause of HF was ischemia (52%), followed by hypertension (30%). The main documented causes of the current admission were dyspnea or orthopnea ($n = 50$, 40%), limb edema ($n = 32$, 25%), and chest pain ($n = 16$, 13%). The mean length of stay was 8 ($SD = 7$) days, with shorter lengths of stay among those who were discharged alive (8 days, $SD = 7$) than among those who died during the index admission (12 days, $SD = 7$; $p = .052$). The majority were frail (87%), and the self-care scores were all below average and not associated with chronicity, gender, or marital status. However, when compared to their less educated counterparts, those with a higher level of education were less likely to be frail ($n = 20$, 37% vs. $n = 34$, 63%; $p = .013$) and scored significantly higher scores on the confidence scale of the ASCHFI (mean = 46 [$SD = 14$] vs. 37 [$SD = 18$]; $p = .002$). Baseline details are presented in Table S1.

More than half of those having their EF reported presented with HFrEF ($n = 81$, 60%), and 25 (18%) presented with HFpEF. Those admitted with HFrEF were significantly younger, smoked more, had a higher incidence of ischemic cause of HF, and had a higher incidence of diabetes mellitus with end organ damage than those with HFpEF. No difference was found between the groups in CCI scores, in-hospital medication administration, discharge medication prescription, or discharge education. The details of these findings are presented in Table S2.

The mean score of the PHQ-9 depression scale was 14 ($SD = 6$), indicating major depression, although only 22 patients (16%) indicated having a history of depression. Those who reported depression ($n = 22$, 16%) had higher scores on the depression scale than those who did not report depression ($n = 115$, 84%), and this finding was near significant (mean score = 16 [$SD = 5$] vs. mean score = 13 [$SD = 6$]; $p = .06$, respectively). Depression was not correlated with chronicity, gender, or New York Heart Association (NYHA) class; however, the younger group reported more depression than the older group (mean age = 64 [SD

= 3] years vs. mean age = 73 [*SD* = 1] years, *p* = .006).

Management During Hospitalization

In reference to the European Society of Cardiology (ESC) guidelines on medication prescription during admission, only 46 patients (37%) were given angiotensin-converting enzyme inhibitor or angiotensin II receptor blocker (ACEI/ARB), while 97 (70%) were on beta-blockers, 101 (74%) were on diuretics, and only 3 (2%) required inotropes. Echocardiography was performed in 106 patients (77%), while pro b-type natriuretic peptide testing and brain natriuretic peptide testing was performed in only 17 patients (12%). Cardiac catheterization was performed in 32 patients (25%) of those admitted, although 111 (81%) had a positive troponin level. Chest radiography was performed in 83 (61%) of the patients.

Discharge Profile

The majority of the patients were discharged home (93%), while only 10 (7%) died during the admission. Those discharged were mostly in NYHA class II or III (*n* = 73, 58%). In terms of medication prescription, only 52 patients (41%) were discharged on ACEI/ARB, while 102 (80%) were discharged on beta-blockers and only 42 (33%) were discharged on both. When looking at those with HFrEF (EF below 50%), 36% were discharged on ACEI/ARB, 74% were discharged on beta-blockers, and 70% on both. As for discharge education, 106 patients (84%) reported receiving discharge education, but when looking at the types of education, it was found that only 57 (45%) received education about the main topics covered by the 2016 ESC guidelines (i.e., pharmacologic treatment, physical activity, smoking cessation, diet, and alcohol), while none received education on immunization. The discharge profile is presented in Table S3.

The mean cost of hospitalization was $US2,472 (*SD* = $2,545) for the whole sample. These costs differed between the governmental and private hospitals, with a mean cost in the governmental hospital of $US2,610 (*SD* = $2,731) and that in the private hospitals being $US2,186 (*SD* = $2,130). The difference was not significant.

Discussion

The Lebanese HF Snapshot provided a profile of the current treatment for HF. The distribution of the participating hospitals across Lebanon provided good insight into the admission, management, and discharge trends of patients with HF. Additionally, the majority of the sample was Lebanese, which allowed for generalizability of the findings to the Lebanese context. This study was a replication of previous snapshots that provided exclusive information on their selected patients in the chosen study settings (Chew et al., 2013; Newton et al., 2016). Additionally, since many of the Lebanese doctors gain their clinical education and expertise from international universities, they follow different methods in implementing their medical care to their patients in Lebanon. Therefore, Lebanese physicians follow both European and American guidelines in HF management.

No registries on HF are conducted in Lebanon, but a few have been conducted in neighboring regions that are comparable in terms of culture. The Gulf Acute HF Registry (Gulf CARE) captured the data of over 5,000 patients admitted to almost 50 hospitals in seven countries in the Gulf region over a 10-month period (Sulaiman et al., 2015). In comparison to the current sample, the mean age was lower (59 [*SD* = 15] years vs. 72 [*SD* = 13] years). This could explain the higher proportion of those with new onset of the disease (45%) compared to only 20% in the current sample. The difference lies, however, in the lower EF in the Gulf (35%) and in other Middle Eastern countries (33.7% ± 13%; Suwaidi et al., 2012) when compared to the EF in the current study sample (mean EF = 41%), as well as the higher rates of those having HFrEF in the Gulf (69%) when compared to the current study sample (60%). The primary cause of HF, ischemia, was reported to be similar in Lebanon and the Gulf; however, the second most prevalent cause of HF in the Gulf was cardiomyopathies, accounting for 18% of the cases, while it was reported to be the cause in 7% in the current sample. The use of coronary interventions in the Gulf was performed much less frequently than in the current study; these interventions were performed on 10% of the admitted patients in the Gulf (Sulaiman et al., 2015), and even less commonly in other Middle Eastern countries (3.9%). The length of hospital stay was highest in the current study compared to those admitted in the Gulf (7 [range 3–10] days in the Gulf and 5.7 + 4.6 days in other Middle Eastern countries; Sulaiman et al., 2015; Suwaidi et al., 2012). In-hospital mortality in the current study (7%) was comparable to that in the Gulf (6.3%) (Suwaidi et al., 2012). Medication prescription at discharge varied greatly, with 71% discharged on beta-blockers in the Gulf (compared to

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74% in the current study), while 78% were discharged on ACEI/ARB (compared to only 36% in the current study) (Sulaiman et al., 2015). Additionally, other countries reporting ACEI and beta-blocker prescription at discharge included Oman, with 67% and 52%, respectively, while aldosterone antagonists were prescribed in only 31% of the discharged patients (Panduranga et al., 2016). A Korean study reported similar numbers: ACEI/ARB was prescribed in 69% of the patients, beta-blockers in 52%, and aldosterone antagonists in 46% (Lee et al., 2017). It is important to note, however, that medication prescription may vary due to the different treatment approaches in those with HFrEF compared to those with HFpEF. The ESC now identifies a grey group with EF, ranging between 40% and 49%, that does not fall under either of the other two groups (Ponikowski et al., 2016). This group needs further assessment and analysis.

The low scores on the self-care scale were not surprising in the Lebanese setting; similar scores were previously reported for the baseline measures in a randomized trial. These scores improved significantly with an educational intervention on family involvement in self-care (Deek, Chang, et al., 2016). Additionally, those having a higher level of education in the current study scored higher on the self-care confidence scale than did their less educated counterparts, which matches the findings of the literature, in which those with at least a high school education had significantly higher self-care confidence scores than those having less than a high school education (Chen, Yehle, Plake, Murawski, & Mason, 2011). Illiteracy was a noteworthy finding in our study, in which slightly more than half of the patients were illiterate. The percentage of illiteracy in the current sample was higher than reported in any other registries in Africa, Asia, the Middle East, or South America (Dokainish et al., 2016). The high rates of illiteracy could explain the low self-care scores. This is because self-care in HF requires comparison and documentation of numbers, weights, and blood pressures, in addition to critical reflection on the manifestations and the need for possible self-management (Riegel et al., 2011).

Although it is recommended that natriuretic peptide testing be performed in patients presenting with acute HF exacerbation in the absence of echocardiography (Ponikowski et al., 2016), natriuretic peptide testing was performed in patients who had already undergone echocardiography during this same admission. The low proportion of patients having this blood test done (12%) could be attributed to its high cost and the lack of financial coverage by most of the paying parties. This was seen in previous studies in which overdiagnosis of HF was noticed due to inappropriate use of diagnostic procedures such as echocardiography and natriuretic peptide testing (Morbach et al., 2018).

Pooled data suggest that female patients with HF are more likely to be depressed (Rutledge et al., 2006), while our findings show no difference in terms of gender. However, the difference in depression incidence was correlated with age, with younger patients being more depressed. This is congruent with previous findings that those under 60 years of age were more likely to be depressed (Freedland et al., 2003). Further investigations need to be carried out on the causes of depression in our sample, as there could be other causes that were not accounted for. Additionally, depression should be diagnosed using valid diagnostic tools rather than screening tools to allow for proper referral and follow-up.

The costs in this study are different from those previously reported because the latter were a calculated estimate of the overall in-hospital expenditure of public and private paying parties (Tatari et al., 2015). The surprising element was the higher cost of hospital admission in the governmental hospitals compared to the cost of admission in private hospitals. Another surprising element was the relatively low costs associated with admissions in Lebanon as compared to the costs of admission in the United States. These differences need to be investigated in future studies since they fall outside the scope of the current study.

Conclusions

The findings of the HF snapshot show that the HF population comprises mainly older adults with multiple comorbidities and low literacy levels. Additionally, the more numerous days of hospitalization are a key point that was highlighted in comparison to other studies. These finding draw major implications for nursing practice, including meticulously formulated educational interventions, optimal discharge planning, and structured follow-ups. Nationwide policies should be implemented to assure adequate prescription and tapering of HF medication in abidance with international guidelines. Additionally, depression, literacy level, self-care, and frailty are key measures that should be evaluated to inform the practice of care for patients presenting acutely. These findings can be applicable to the HF population globally. Finally, future research should target the needs of older adults with multiple comorbidities and low literacy levels in a resource-limited setting such as in Lebanon.

Acknowledgments

Clinical Resources

- American Heart Association. Heart failure guidelines toolkit. https://www.heart.org/en/health-topics/heart-failure/heart-failure-tools-resources/heart-failure-guidelines-toolkit
- European Society of Cardiology. Acute and chronic heart failure guidelines: ESC clinical practice guidelines. https://www.escardio.org/Guidelines/Clinical-Practice-Guidelines/Acute-and-Chronic-Heart-Failure
- National Heart Foundation of Australia and Cardiac Society of Australia and New Zealand. Guidelines for the prevention, management of heart failure in Australia 2018. https://www.heartfoundation.org.au/Conditions/Heart-failure-for-professionals

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Supporting Information

Additional supporting information may be found in the online version of this article at the publisher's web site:

Table S1. Baseline and Demographic Characteristics of the Study Participants (N=137).

Table S2. Significant Differences in Clinical Characteristics Between Patients With Reduced and Preserved Ejection Fraction (N=106, 78%).

Table S3. Discharge Profile From Index Admission (n = 127, 93%).

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