Characteristic of Patient with Heart Failure Admission in Medical Intensive Care Unit at a University Hospital

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Abstract

This study aims to evaluate the characteristics of patients with heart failure admitted to medical intensive care at a university hospital that will help in designing a proper clinical pathways and staff training for such advance complicated cases. Retrospective cohort study was conducted on 60 decompensating Heart Failure patients admitted to medical ICU. Detailed history was obtained about patients baseline characteristics and diagnosis. Results shows the complexity of risk factors in the cohort 43 (71.7%) have Hypertension, 32 (53.3%) with Diabetes, 22 (36.7%) have Renal Failure, only 7 (11.7%) were diagnosed with Rheumatic heart disease, 22 patients (36.7%) have Ischemic heart disease, 21 (35%) Stroke, and 19 (31%) Atrial Fibrillation. Therefore, it can be stated that knowing such patients characteristics had to the planning of clinical pathways and staff specific training.

Keywords: *Heart Failure; Heart Failure Nurse; Education; Multidisciplinary Team*

Introduction

Heart failure is a common, clinical syndrome that results from any functional or structural cardiac disorder that impairs the pumping ability of the heart. According to the Department of Health patients with heart failure account for 5% of acute admissions to hospital. This group of patients have a poor quality of life, poor prognosis and high re-admission rates (35 - 43%). Common signs and symptoms include breathing difficulties, fatigue and swollen feet, ankles or legs. Diagnosis is made on the presence of symptoms of heart failure, once a diagnosis of heart failure is made there are many treatments available to help the heart function better.

Nurses and other clinically based health care providers, as a part of a multidisciplinary team, can play a critical role in HF care by optimizing the assessment, management, and evaluation of a patient's current status and care during transitions from one setting to another, especially from hospital to home.

Patients require ongoing education, especially self-assessment of new or worsening HF signs and symptoms, and adherence to self-care maintenance recommendations. Nurses and other health care providers have pivotal roles in bridging these potential gaps, when transitioning patients from one setting of care to another.

Methodology

Design will be used to collect data, who is Admitted with heart failure to medical ICU in King Abdulaziz University Hospital.

Sample size collected from electronic medical recorded will be retrospectively reviewed for all heart failure patients in medical ICU.

The study will be conducted from 1 November 2018 to 1 November 2019.

Data will be collected retrospectively using information from the patient's electronic medical records. The data collection instrument will be evaluated to ensure that it is validity and appropriateness to resolve the research questions of the study. Only those records which meet the inclusion criteria will be used.

Data analysis

All data were analysed using SPSS version 23.0 for Windows (SPSS), and summary statistics were calculated for all patient variables. Continuous variables are presented as means ± one standard deviation (SD) or medians. For non-continuous variables, absolute and relative frequencies (%) were used.

Ethics and human subjects

A formal approval letter from the Institutional Review Boards of the affiliated University and King Abdulaziz University Hospital before data was collected. To ensure confidentiality, all patients' records was reviewed within the hospital premises. Data regarding the patients' hospital numbers and names was also be coded and all identifying information omitted during analysis and presentation.

The study used data from electronic records of patients who was admitted to medical intensive critical unit from 1 November 2017 to 1 November 2018.

Study setting

The study was conducted at King abdulaziz University Hospital, Jeddah city, Saudi Arabia. Data was collected from medical intensive critical unit.

Summary

Most population-based estimates of incident hospitalized heart failure (HF) have not differentiated acute decompensated heart failure (ADHF) from chronic stable HF nor included racially diverse populations. The Atherosclerosis Risk in Communities Study conducted surveillance of hospitalized HF events (age ‡55 years) in 4 US communities. We estimated hospitalized ADHF incidence and survival by race and gender. Potential 2005 to 2009 HF hospitalizations were identified by International Classification of Diseases, Ninth Revision, Clinical Modification.

Results

Total of 60 patients were collected retrospectively from medical records of each patient. The mean age of patients group was found to be 66.10 and the age ranged from 25 to 90 years old. The study includes 46 (76.7%) males and 14 (23.3%) females. The distribution of ethnicity in the patients group was as follow; 27 (45%) Saudi and 33 (55%) non-Saudi (Table 1).

Demographic Data	N	%
Age		
Range	25 - 90	
Mean ± SD	66.10 ± 18.366	
Gender		
Male	46	76.7
Female	14	23.3
Nationality		
Saudi	27	45.0
Non-Saudi	33	55.0

Table 1: The descriptive data for demographic data.

Medical history was described in table 2 that showed in a Sixty patients, there were 43 (71.7%) have Hypertension, 32 (53.3%) with Diabetes, 22 (36.7%) have Renal Failure, only 7 (11.7%) were diagnosed with Rheumatic heart disease, 22 patients (36.7%) have Ischemic heart disease, 21 (35%) Stroke and 19 (31%) Atrial Fibrillation.

Medical history	N	%
Hypertension	43	71.7
Diabetes	32	53.3
Renal failure	22	36.7
Rheumatic heart disease	7	11.7
Ischemic heart disease	22	36.7
Stroke	21	35.0
Atrial fibrillation	19	31.7

Table 2: *The descriptive data for Medical history.*

The symptoms presented in the study patients were as follow: 35 (58.3%) Orthopnea, 42 (70%) Peripheral oedema, 11 (18%) Paroxysmal nocturnal dyspnea, 52 (86.7%) Shortness of breath (Table 3).

Symptoms	N	%
Orthopnea	35	58.3
Peripheral oedema	42	70.0
Paroxysmal nocturnal dyspnea	11	18.3
Shortness of breath	52	86.7

Table 3: *The descriptive data for symptoms.*

Five laboratory tests were collected from each patient's medical record. The mean of Hb was (11.697 ± 2.435), the Median of Creatinine and Urea were 200 and 18 respectively. The mean of Sodium (135.582 ± 4.685), whereas the mean of Potassium was (4.247 ± 0.477) (Table 4).

Laboratory tests	
Hb Range (Mean ± SD)	6.2-16.2 11.697 ± 2.435
Creatinine Median (IQR)	200 (173)
Urea Median (IQR)	18 (9.1)
Sodium Range (Mean ± SD)	123-153 135.582 ± 4.685
Potassium Range (Mean ± SD)	3.3-5.2 4.247 ± 0.477

Table 4: *The descriptive data for laboratory tests.*

In our study LVEF was the variable used to describe the Echocardiography result, and the mean of LVEF in our study was (33.176 ± 7.769) (Table 5).

Echocardiography	
LVEF	15-46
Range (Mean ± SD)	33.176 ± 7.769

Table 5: *The descriptive data for LVEF.*

Our study reported the median of length of hospital stay in table 6 which was 7 (10) days.

Outcome	
Length of hospital stay	7 (10)
Median (IQR)	

Table 6: *The descriptive data for Length of hospital stay.*

Discussion

The present study demonstrated by using the Medical Records database that indicates the baseline characteristics of Heart Failure patients admitted to ICU. The result shows that the age of patients ranged from 25 to 90 years by Mean ± SD (66.10 ± 18.366), (76.7% (were males and (55%) were non-Saudi. This result was similar to other studies conducted worldwide. A Prospective Study carried out in Bahrain by Al Bannay, Husain, Agarwal and AlHaiki [1] reported that the mean age was 64.5 + 13.5 years and (69%) patients were males. Another study conducted in Oman by Panduranga., *et al.* [2] who reported that the mean age of patients was 63±12 years, more than half (57%) were male and 95% were Omani citizens. Lee., *et al.* [3] found the mean age was (68.5 ± 14.5) years, (53.2%) were males, While the result was inconsistent with study conducted by Newton., *et al.* [4] who reported that the mean age of patients was (77 ± 13) years, and (58%) were men. Oguri., *et al.* [5] reported that the average age was 77 (69 - 85) years, and 56.8% were male. While the study of Abohammar, ElSaidy, Fathalla, and Aldosarri [6] found the mean age of patients was 59 ± 8 years and 55% were women.

Most patients presented with comorbidities and bad medical history, including hypertension (71.7%), Diabetes Mellitus (53.3%), ischaemic heart disease (36.7%), renal disease (36.7%), Stroke (35%), Rheumatic heart disease (11.7%) and atrial fibrillation (31.7%). These diseases increase the worsening of Heart failure patients and if not controlled assist in admission of these patients. Hypertension is more common in elderly patients and common cause of more than tow third of patient admission. This result was similar to study conducted by Al Bannay, Husain, Agarwal and AlHaiki [1] reported that hypertension was the most common comorbidity (73%), followed by hyperlipidaemia (68%), and DM (64%). Sulaiman., *et al.* [7] Co-morbid conditions were common, particularly hypertension (61%), diabetes mellitus (50%), CAD (47%), and hyperlipidaemia (36%). Abohammar, ElSaidy, Fathalla and Aldosarri [6] reported that Hypertension (64%), dyslipidaemia (76%), atrial tachyarrhythmia (38%), prior heart failure (33%) and anemia (35%). Newton., *et al.* [4] found that most patients presented with comorbidities, including ischaemic heart disease (56%), renal disease (55%) and diabetes (38%) and hypertension (25%).

Regarding symptoms, data reveals that majority of the patients presented with Shortness of breath (86.7%), Peripheral odema (70%), Orthopnea (58.3%), Paroxysmal nocturnal dyspnea (18.3%). The worsening in Heart Failure symptoms results in hospitalization and may associated with a high mortality rate and post-discharge rehospitalization. Sulaiman., *et al.* [7] who reported that the three most com-

mon presenting signs and symptoms were dyspnoea (98%), basal lung crepitations (92%), and orthopnoea (79%). Panduranga., *et al.* [2] found the primary comorbid conditions were hypertension (72%), coronary artery disease (55%) and diabetes mellitus (53%). Margoto, Colombo and Gallani [8] who found that dyspnea (85.2%), lower limb edema (80.3%), fine rales (75.4%) and hepatomegaly (55.7%) were the most symptoms recorded on the day of hospitalization. Hamaguchi., *et al.* [9] reported that 80% patients had peripheral edema.

For Lab Result, Hb was 6.2 - 16.2 (11.697 ± 2.435), Creatinine median was 200 (173), and the Median for Urea was 18 (9.1), Sodium mean was 123-153 (135.582 ± 4.685) and Potassium 3.3 - 5.2 (4.247 ± 0.477). Panduranga., *et al.* [2] reported that the median haemoglobin (Hb) was 12.5 (11 - 14) g/dL. Hamaguchi., *et al.* [9] reported the result of lab investigations were serum creatinine (1.2 - 1.8 mg/dL), Na (138 - 140 mequiv./L), haemoglobin (12 - 13 g/dL), and plasma B-type natriuretic peptide (BNP) (900 - 1300 pg/mL).

Result shows the Range (Mean ± SD) for LVEF was 15-46 (33.176 ± 7.769). Al Bannay, Husain, Agarwal and AlHaiki [1] who reported that the mean of LVEF was 34.4+14. The study of Sulaiman., *et al.* [7] showed the median of LVEF was 35%. Panduranga., *et al.* [2] reported that the median left ventricular ejection fraction of the cohort was 36% (27 - 45%). The result was contradicted with Abohammar, El-Saidy, Fathalla and Aldosarri [6] who found the left ventricular ejection fraction (LVEF) > 50%. Mean (LVEF) was 61 ± 3. A multivariable analysis carried out by Dar and Cowie (2008) found older age, higher blood urea nitrogen, higher systolic blood pressure, low haemoglobin, and low sodium associated with increase admission. Hamaguchi., *et al.* [9] found mean LVEF was ranging from 38% to 43%.

Also, the present study shows that the Median for Length of hospital stay was 7 (10) days. This result was consistent with result of Al Bannay, Husain, Agarwal and AlHaiki [1] who reported the median length of stay was 7 days. This result was contradicted with study of Hamaguchi., *et al.* [9] who reported that the mean length of stay was 33.9 ± 34.9 days.

Conclusion

From the result, we can conclude that hospitalized heart failure patients admitted to the hospital due to many causes related to their socio-demographic characteristics, medical history, clinical status and laboratory data on admission. However, the data show that the hospitalized patients presented a large number of factors that have been associated to repeated hospitalizations. Elderly patients with heart failure was more to be expected admitted to the hospital as the age is consider as predictor increasing the rate of admission among heart failure patients.

Also, presence of one or more chronic diseases such as hypertension, diabetes mellitus, ischemic heart disease, renal disease, Stroke, and Rheumatic heart disease increase the rate of admission. Regarding the signs and symptoms that led to hospitalization especially among elderly patients, those patients with Shortness of breath, Peripheral odema, Orthopnea, and Paroxysmal nocturnal dyspnea as the most prevalent among admitted patients. We also conclude that half of all hospitalizations could be prevented by continuous clinical monitoring and healthcare education of patients, promoting treatment compliance.

From the result of previous data, the following recommendations are suggested:

1. Indicate the need to design and implement interventions that will allow for better follow-up and control of Heart Failure patients.

2. KPI can be driven from the results concluded to drive the quality improvements in ICU treating heart failure patients.

3. Results have represented a platform that can serve in ICU staff training and development.

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