

ORIGINAL ARTICLE

FREQUENCY OF HEART FAILURE PATIENTS RECEIVING INFLUENZA VACCINE

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Objectives: To determine the frequency of heart failure (HF) patients receiving influenza vaccine.

Methodology: This descriptive cross-sectional study included both male and female patients with diagnosis of heart failure in last five years having age between 18 to 75 years visiting to Adult Cardiology Department, inpatients or outpatients, of National Institute of Cardiovascular Diseases (NICVD), Karachi, Pakistan. All the demographic and clinical data were recorded on a predefined and validated questionnaire.

Results: Among 334 heart failure patients 23 (6.9%) were vaccinated. The average age was 62.3 ± 5.95 years, 26 (7.8%) study subjects have age of <50 years, 239 (71.6%) study subjects were male, in which 13 (5.4%) vaccinated as against 10 (40.5%) among female patients ($p=0.09$). The average duration of heart failure was 3.4 ± 1.6 years. The average number of previous hospitalization was 3.5 ± 2.1 times. A total of 236 (70.7%) subjects were from urban areas and 98 (29.3%) patients were from rural areas in which vaccination rate was 17, 7.2% vs. 6, 6.1%; $p=0.001$ respectively.

Conclusion: In conclusion, the vaccination uptake rate in cases of HF was very poor in our population. It was observed to be positively associated with younger age, duration of HF, education level, and household monthly income.

Keywords: Heart failure, influenza vaccine, knowledge of influenza, attitude

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INTRODUCTION

In cases of heart failure (HF), acute exacerbation of chronic HF leading to hospitalization is a frequent adverse event that determines disease progression.¹ Respiratory tract infections (RTI) are the causes in almost half of these hospitalizations especially during winter seasons.² A good number of these seasonal RTIs are secondary to influenza and pneumococcal infections. Due to underlying pulmonary congestion and poor respiratory reserve, HF patients are not only susceptible to influenza but also behave worse in terms of acquiring secondary bacterial infection, severe pneumonia, prolonged hospital stay and increased mortality³ thus adding to already dismal prognosis in this patient population.

Majority of Influenza infections can be prevented simply by effective annual vaccination.⁴ The European society of cardiology and AHA / ACC has strongly endorsed the annual influenza immunization as a secondary precautionary measure for cardiovascular disease and all- cause mortality.⁵ Yet the acceptance of immunization remains low partly due to unfounded myths associated with it and also due to competing health care priorities and inadequate resources. Data derived from more than 8000 patients in a multicenter

PARADIGM HF trial showed that overall 20% of HF patients have been vaccinated against influenza,⁶ and reported 4.4% prevalence in Indian population.⁴ Even in USA condition is not satisfactory where only 71% of elderly patients received anti influenza vaccination.⁷

As per the recommendations of World Health Organization (WHO) and the U.S. Centers for Disease Control and Prevention (CDC) the population above six month of age should be annually vaccinated especially those at high risk.⁸ The European Centre for Disease Prevention and Control has also given the recommendations of annual vaccination of high risk clusters.⁹ These groups consist of pregnant ladies, the aging ones, children between the age of six months to five years, those with other health problems, and those who work in healthcare.⁸

During last decades the frequency of influenza vaccination is rising, which is a potential measure in the reduction of hospitalization rate¹⁰ which results in the mortality amongst elderly persons in the course of influenza epidemics. Community-centered researches support the preventive usefulness of anti-influenza immunization on cardiovascular consequences, but their outcomes are not stable.¹¹

To the best of our information no such research has ever been conducted on Pakistani population. With geographic, climatic, and cultural proximities of Pakistani population with Indian population, influenza vaccination status, attitude, and knowledge of heart failure patients towards influenza is expected to be poorer than western population, similar to what reported for Indian population. Therefore, aim this study was to evaluate the frequency of influenza vaccination status among heart failure (HF) patients presented at the largest cardiac care center of the country.

METHODOLOGY

This descriptive cross-sectional study was performed in the department of Adult Cardiology at National Institute of Cardiovascular Disease (NICVD), Karachi, for 6 months during 18-March-2018 to 18-September-2018. The sample size was calculated using WHO sample size calculator version 2.0, with the expected frequency of influenza vaccination among heart failure patients as 4.4%,⁴ 95% confidence interval, and 2.2% of margin of error a sample size of 334 was calculated. A total of 334 cases of heart failure were involved in the study. The inclusion criterion was both male and female patients diagnosed with heart failure in last five years having age between 18 to 75 years. Patients with incomplete information with regards to diagnosis of heart failure on the basis of history were excluded from this study. The study was started after approval of ethical review committee of NICVD. Before annexation the determination and outcome of the research were clarified to all study population and verbal consent permission were obtained by the principal investigator from all patients. Patients visiting to Adult Cardiology Department, inpatients or outpatients, of National Institute of Cardiovascular Diseases (NICVD), Karachi, Pakistan during the research duration were involved in this study. Demographic profile of the patients like gender, age (years), residence, occupation, monthly income (PKR), educational status, diagnosis, duration of HF (months), and number of previous hospitalizations (last 12 months) were recorded on a predefined and validated questionnaire. Patients who received influenza vaccine in past 12 months were considered vaccinated. Data analysis was performed with the help of SPSS version-21 (IBM Corp. Released 2012. IBM SPSS Statistics for Windows, Version 21.0. Armonk, NY: IBM Corp). Frequency and percentages of influenza vaccinated patients were obtained and confounding variables such as age, gender, occupation, residence, educational status, diagnosis, monthly income, duration of HF, and number of previous hospitalizations were controlled through stratification and post stratification appropriate chi-

square test or fisher exact test were applied with p-value ≤ 0.05 as statistical significance.

RESULTS

In this study 334 heart failure patients were included with average duration of heart failure was 3.4 ± 1.6 years. A total of 23 (6.9%) of patients were vaccinated. The average age of patients was 62.3 ± 5.95 years, 26 (7.8%) study subjects have age of <50 years. A total of 239 (71.6%) study subjects were male with vaccination rate of 13 (5.4%) vs. 10 (40.5%) for female patients (p=0.09). The average number of previous hospitalization of patients was 3.5 ± 2.1 times (Table 1).

Table 1: Distribution of demographic characteristics and influenza vaccination rate of patients with heart failure

	Distribution	Vaccination rate	P-value
Total (N)	334	6.9% (23)	-
Age			
<50	7.8% (26)	34.6% (9)	0.001
≥50	92.2% (308)	4.5% (14)	
Gender			
Male	71.6% (239)	5.4% (13)	0.090
Female	28.4% (95)	10.5% (10)	
Duration of Heart failure (year)			
<2	53.9% (180)	4.4% (8)	0.050
≥2	46.1% (154)	9.7% (15)	
Number of previous hospitalization			
None	21.9% (73)	5.5% (4)	0.270
1-2 times	44.9% (150)	9.3% (14)	
>2 times	33.2% (111)	4.5% (5)	
Occupation			
Manager	15% (50)	2% (1)	0.011
Technician/associate professional	28.1% (94)	2.1% (2)	
Professionals	22.2% (74)	9.5% (7)	
Service & sales workers	8.1% (27)	3.7% (1)	
Labor/agricultural/forestry/fishery	17.1% (57)	8.8% (5)	
Craft & related workers	1.8% (6)	16.7% (1)	
Housewife/unemployed	3.6% (12)	25% (3)	
Others	4.2% (14)	21.4% (3)	
Education level			
No formal education	25.7% (86)	1.2% (1)	0.001
Primary education	22.2% (74)	4.1% (3)	
Secondary education	26.3% (88)	2.3% (2)	
Inter/graduate education	25.7% (86)	19.8% (17)	
Residence			
Urban	70.7% (236)	7.2% (17)	0.720
Rural	29.3% (98)	6.1% (6)	
Diagnosis			
HFpEF	47% (157)	6.4% (10)	0.720
HFrEF	53% (177)	7.3% (13)	
Monthly Household income (PKR)			

<15000	46.4% (155)	0.6% (1)	0.001
15000–30000	23.1% (77)	1.3% (1)	
30001–45000	8.1% (27)	7.4% (2)	
45001–60000	10.2% (34)	26.5% (9)	
More than 60000	12.3% (41)	24.4% (10)	

HFpEF=heart failure with preserved ejection fraction,
HFrEF=heart failure with reduced ejection fraction

Vaccination status and occupation, education status, and monthly income of the patients showed significant association with $p=0.011$, $p=0.001$, and $p=0.001$ respectively. A total of 236(70.7%) study subjects were from urban areas with the vaccination rate of 7.2% as against 6.1% or the rural residents ($p=0.001$).

DISCUSSION

Influenza is the main reason of illness and death in the peoples with long-standing medical conditions.¹² The cases of heart failure (HF) always has the risk of hospitalization during influenza season in comparison to the non-influenza season¹³ and reaching the peak in winter.¹⁴ Both European Society of Cardiology and American Heart Association recommended influenza immunization as an important part of management plans for acute and chronic HF.¹⁵ Though the degree of influenza vaccination in cases with cardiovascular disease (CVD) is quite low, and even lesser in low- and middle-income countries such as ours.¹⁶ The current research was planned to evaluate the frequency of uptake of influenza vaccine in the cases of HF. We observed low vaccination uptake in cases of HF in our population. The vaccination rate in our population was observed to be as low as 6.9% and there was positive association of influenza uptake with younger age, duration of HF, education level, and household monthly income.

The data is scarce on influenza immunization rates in cases of cardiac failure globally. A considerable global area wise discrepancy has been reported in the immunization rate of heart failure patients, with relatively better figures for Western Europe, the United States, and Canada as compared to the Asian regions.¹⁷ Even in the United States, with considerable efforts from the American Heart Association, yearly vaccinations rate was only 53% in this high-risk group.¹⁷ The significant predictors of immunization comprised of old age, cases of diabetes mellitus, lower NYHA functional class, decreased cardiac rate, usage of digoxin, and patients with implantable cardioverter-defibrillator or cardiac resynchronization therapy.^{18,19} A lower vaccination rates among Asian countries can be attributed to various aspects like resource limited health care system, particularly in developing countries, region-specific facts and perceptions concerning efficacy of the influenza vaccine, and lack of awareness and availability of

vaccine.⁸ Country-specific GDP seemed to be related with per-country vaccination rates, proposing that socioeconomic condition of the country may have a role.¹⁹

The effects of influenza immunization in CVD are not very clear. In a Cochrane analysis of 8 researches adding up to 12,029 subjects did not offered adequate evidence to support the usefulness of immunization in preventing lethal or non-lethal cardiac events. Though, it is documented that influenza immunization might decrease cardiovascular death and joint cardiovascular events in confirmed cases of CVD.²⁰ A research conducted on patients of acute coronary syndrome (ACS) having COPD, reveals a lesser risk of hospitalization in immunized cases.²¹ The advantages of influenza immunization are not limited to prevention of decompensation of heart failure due to pulmonary infection. The influenza immunization was also found to be associated with low rate of need of coronary procedures, lessening the cerebrovascular accidents, low rate of hospital admission and expenses.^{22,23} Multiple measures can be taken to improve the influenza immunization rate among heart failure patients such as improve convenience to the vaccination centers, reduce cost and price of vaccine and vaccination, increase awareness regarding importance efficacy of influenza immunization, and taking effective measures to increase trust level and decrease misbeliefs regarding contents of the vaccine.¹⁸

Our study has certain limitations, single center coverage and small sample size is the main limitation of our study. Considering the geographic and socioeconomic diversity of our population, multi-center studies are needed for robust estimation of uptake rate of influenza immunization in our population.

CONCLUSION

In conclusion, the vaccination uptake rate in cases of HF was very poor in our population. It was observed to be positively associated with younger age, duration of HF, education level, and household monthly income. Immediate effective measures are needed to improve the influenza immunization rate such as improve convenience to the vaccination centers, reduce cost and price of vaccine and vaccination, increase awareness regarding importance efficacy of influenza immunization, and taking effective measures to increase trust level and decrease misbeliefs regarding contents of the vaccine.

AUTHORS' CONTRIBUTION

MAS, JAS, and KIB: Concept and design, data acquisition, interpretation, drafting, final approval, and agree to be accountable for all aspects of the work. KHS, and SJS: Data acquisition, interpretation, drafting, final approval and agree to be accountable for all aspects of the work.

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