

# Prevalence of Systolic Heart Failure in Patients with Dementia in Saudi Arabia: Single-center retrospective data review

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## Abstract

**Background:** Dementia is one of the most common neurological diagnoses in older patients. Previous reports have proposed that heart failure could be a risk factor for dementia. Other studies have suggested that cardiovascular function could have a critical role in the pathogenesis of dementia.

**Aim:** This study aimed to identify the prevalence of heart failure in patients diagnosed with dementia.

**Method:** This was a chart review of medical records of patients followed at King Abdul-Aziz University Hospital and diagnosed with dementia with at least one echocardiogram completed after the diagnosis of dementia. Demographic variations and comorbidities of these patients were collected.

**Result:** A total of 200 patients met the inclusion criteria, with a mean age of 76.28 years. In 10.5% of the participants, the ejection fraction was less than 40%. The dominant type of dementia in the participants was mixed/unspecified type (78.5%).

**Conclusion:** The prevalence of systolic heart failure seems to be higher in patients with dementia when compared to similar age group populations reported in other studies. Multiple limitations are present in this study, and additional research is needed to further assess this possible correlation.

**Key words:** Systolic heart failure, dementia, Saudi Arabia

## Introduction

Heart failure (HF) and dementia are prevalent medical issues in older adults [1]. HF is a complex clinical syndrome in which patients have many symptoms and signs resulting from any structural or functional cardiac issues that can give rise to the failure of the heart to provide adequate blood flow to other organs in the body [2]. It is a central issue in public health, and its prevalence is predicted to progressively increase due to aging of the overall population [3].

Of cardiovascular diseases, HF is considered the leading cause of morbidity and mortality worldwide [4, 5], and it negatively impacts quality of life, healthcare costs, and longevity [5]. The prevalence of HF in adults ranges from 1% to 2% in developed countries, with significantly higher incidence in older individuals [6]. Unfortunately, data on HF in the Arab population and developing countries in general are limited and largely absent [7].

Dementia is a common neurological diagnosis in older patients, defined as set of related symptoms that are caused by progressive brain damage in response to brain pathology. These symptoms mainly consist of progressive impairments of memory, thinking, language, and behavior, which lead to impairment of the ability to perform daily activities, and loss of independence [8, 9].

Research conducted in Sweden proposed that heart failure could be a risk factor for dementia [10]. Furthermore, previous studies have suggested that cardiovascular function in general could play a critical role in the pathogenesis of dementia [11]. However, to the best of our knowledge, little is known about the exact relationship between heart failure and dementia.

This study aimed to identify the prevalence of systolic heart failure among patients of King Abdul-Aziz University Hospital (KAUH) who were known to have dementia.

## Methodology

### Study Design and Setting

This retrospective correlational study was conducted by reviewing the medical records of 231 patients with dementia under the care of the Home Health Care Unit of KAUH, a tertiary referral hospital in Jeddah in the western region of Saudi Arabia.

### Participants

A total of 231 medical records of patients diagnosed with dementia were identified and reviewed. Any patients with echocardiography performed after they were diagnosed with dementia were included in the study. Those without echocardiography performed after they were diagnosed with dementia were excluded.

### Data Collection

Data were collected from the electronic medical record system used in KAUH and categorized into three sections: (1) demographic data (age, gender, nationality, and body mass index (BMI)), (2) clinical features (type of dementia, ejection fraction, diabetes mellitus, hypertension, and dyslipidemia), and (3) other information (smoking status and family history of dementia).

### Confidentiality and Ethical approval

Ethical clearance was obtained from the Institutional Review Board of KAUH (Reference No 363-19). Access to the data was available only to one investigator. To ensure privacy and confidentiality of participants, all identifying variables were removed. Consent was waived given that no personally identifiable data were required in this survey. The survey data used to generate the findings of this study are available upon request from the corresponding author.

### Data Analysis

Data were coded, checked, and entered using SPSS version 22. Categorical variables were described using frequency of occurrence. Continuous variables, including age and BMI, were described using mean and standard deviation.

## Results

A total of 200 eligible patients were identified in this study, with a mean age of 76.28 years ( $\pm$  SD 9.556 years). The youngest patient was 52, and the oldest was 102 years old. Female patients represented 51.5%, and male patients were 48.5%.

Comorbidities were as follows: 133 (66.5%) participants were diabetic, 146 (73%) were hypertensive, 45 (22.5%) had dyslipidemia, and 11 were smokers. Table 1 shows the demographics and comorbidities of the participants.

As shown in Table 2, there were 21 patients (10.5%) with ejection fraction below 40% on at least 1 echocardiogram performed after their diagnosis with dementia.

In general, the types of dementia were as follows: 31 patients (15.5%) had Alzheimer disease, 12 (6%) had vascular dementia, and 157 (78.5%) had unspecified/mixed dementia.

There was no statistically significant evidence that the type of dementia had a true effect on development of HF, as 2 (6.5%) of the patients diagnosed with Alzheimer disease had HF, 1 (8.3%) with vascular-related dementia had HF, and 18 (11.6%) with unspecified type were found to have HF. Table 3 and Figure 1 show more detail about types of dementia and their association with HF.

**Table 1: Demographic variations and comorbidities**

<b>Age</b>		
N	200	
Mean	76.28	
Median	77.50	
Std. Deviation	9.556	
Minimum	52	
Maximum	102	
<b>Gender</b>		
	<b>Number</b>	<b>Percent</b>
male	97	48.5
female	103	51.5
Total	200	100
<b>Comorbidities</b>		
	<b>Number</b>	<b>Percent</b>
Diabetes Mellitus	133	66.5
Hypertension	146	73.0
Smoking	11	5.5
Dyslipidemia	45	22.5

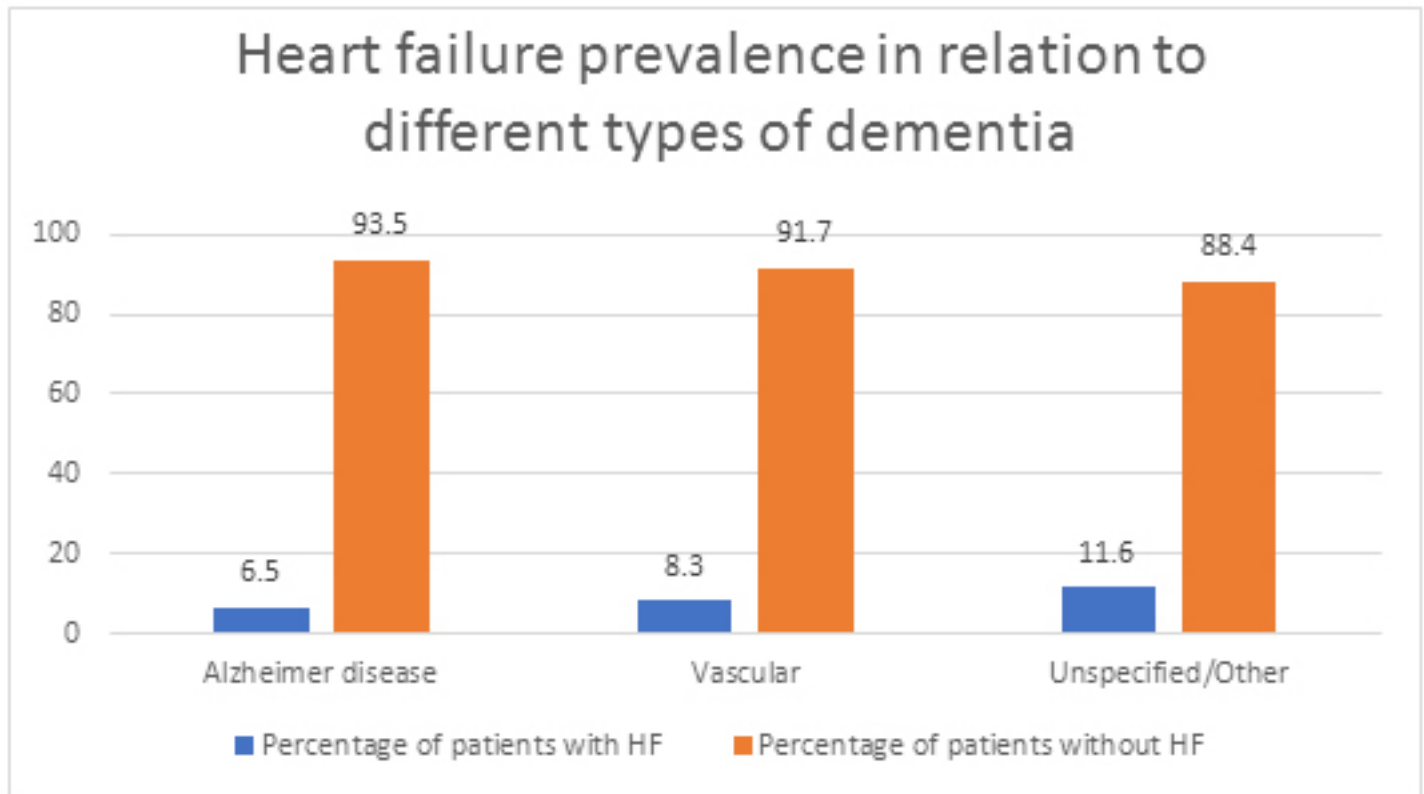
**Table 2. Prevalence of HF in patients with dementia**

Ejection Fraction	Frequency	Percent
Less than 40%	21	10.5
Above 40%	179	89.5
Total	200	100.0

**Table 3. Heart failure prevalence in relation to different types of dementia**

	Alzheimer disease	Vascular	Unspecified/mixed
Number of patients	31	12	157
Number of patients with HF	2	1	18
Number of patients without HF	29	11	139
Percentage of HF	6.5%	8.3%	11.6%

Figure 1. Relationship between HF and different types of dementia



## Discussion

Heart failure is one of the main causes of morbidity, mortality, and rising public health costs [12]. Furthermore, prevalence of HF can be estimated at 1%–2% in the western world, and the incidence is approaching 5–10 per 1000 persons per year. Estimates of the occurrence of HF in the developing world are largely absent [13].

The leading cause of dementia is a topic of debate, with Alzheimer disease considered to be the leading cause in some reports [15], while in other reports, vascular dementia is reported to be more prevalent [10]. This can be explained by different diagnostic criteria for each diagnosis.

Of the participants in this study, unspecified/mixed dementia was the most common (78.5%), with Alzheimer in 15.5%, and vascular-related dementia in 6%. This contrasted with a study done in Stockholm where vascular dementia was found to be the most common. It was found in 35.7% of the study population, with mixed dementia in 20.0%, and Alzheimer in 15.7% [10].

The current study found that HF was present in 10.5% of the patients diagnosed with dementia. In this study there was no control group; however, multiple reports have looked at the epidemiology of HF. One large population-based study estimated the prevalence of HF to be 8.4% in the population aged 75 years or more [6]. Although this study included an older age group compared to our group, the incidence was found to be lower.

Some studies showed that cognitive impairment and dementia were associated with a range of cardiovascular conditions, including hypertension, coronary artery disease, and atrial fibrillation [16]. Previous population-based studies suggested a possible relationship between chronic HF and cognitive impairment, independent of vascular disorders (like hypertension) and other potential confounders [17, 18].

Two other studies reported that low diastolic blood pressure (i.e., < 70 mm Hg) and a clinically significant decrease in systolic pressure were correlated with development of dementia and Alzheimer disease [19, 20]. Based on these findings, they assumed that HF could be correlated with dementia, as low blood pressure in extremely old people could be associated with poor functional status, cardiac insufficiency, and more importantly, cognitive impairment [21].

The presence of dementia in adults with chronic HF is known to be a factor that adds to the complexity of care for these patients [12]. The presence of cognitive impairment has been linked to an increase in the risk of re-hospitalization and mortality in patients with HF [22].

The type of dementia does not have a clear association with the prevalence of HF in our study, most likely due to the small number of patients diagnosed with Alzheimer and vascular dementia in comparison to mixed/unspecified type. Therefore, the association of heart failure with different types of dementia needs further assessment.

This study has some limitations. First, this is a retrospective chart study without a control group. Another limitation is incomplete documentation, as the hospital regularly accepts new patients who have not previously been seen in the clinic. Also, inaccurate data and lack of ethnicity data in medical records are unavoidable limitations.

## Conclusion

The prevalence of systolic HF seems to be higher in patients with dementia when compared to similar age group populations reported in other studies. Multiple limitations in this study show the need for further detailed study in the future to assess possible correlations between different types of dementia and HF.

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