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# A STUDY ON NORMAL REFERENCE VALUES OF ECHOCARDIOGRAPHIC MEASUREMENTS IN GERIATRIC POPULATION OF WEST BENGAL

Cardiology

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## ABSTRACT

**Objectives:** To determine the basic echocardiographic measurements in geriatric population visiting NRS Medical College,Kolkata. **Methods:** This study was performed on adult patients aged 65-80 years of either sex either admitted in any department in NRSMCH, or attending outdoor clinic of any department NRSMCH, a tertiary care hospital without any cardiac diseases or any other disease which has direct or indirect influence on cardiac structure in the period from 1st May 2019 TO 31ST July 2020 (15 months). **Result:** The mean age (mean± s.d.) of patients was 72.2815± 4.1303 years. 177(43.7%) patients were Female and 228(56.3%) patients were male. In 66-70 age group, the mean LVEF (mean± s.d.) of patients was 66.6213± 2.9658. In 71-75 age group, the mean LVEF (mean± s.d.) of patients was 66.4648± 3.0543. In 76-80 age group, the mean LVEF (mean± s.d.) of patients was 66.7447± 2.7038. Difference of mean LVEF with three age group was not statistically significant (p=0.7650). Difference of mean LVIDd with two sex groups was not statistically significant (p=0.4763). Difference of mean LVIDs with two sex groups was not statistically significant (p=0.2181). **Conclusion:** The findings of this study permit to conclude that, in geriatric population of the urban region of our hospital, the means and the normal distribution conventionally accepted as the limits of normality for the dimensions of interventricular septum, posterior wall and left ventricular mass are lower than those presented in the literature of reference; left ventricular mass is larger in men, corrected or not for anthropometric variables.

## KEYWORDS

Echocardiographic measurements, Geriatric population, Left ventricular mass.

## INTRODUCTION

Echocardiography is a reliable and versatile tool for the assessment of cardiac structure, function and hemodynamics. It remains the gold standard especially with the constant evolution of new applications and technologies of various echocardiography techniques. Compared with other cardiovascular imaging modalities it is relatively inexpensive, does not expose the patient to radiation, is noninvasive, displays live real-time images and is widely available[1,2]. The number of echocardiographic studies performed yearly in the United States, for instance, is estimated to be more than 20 billion studies[3]. For both cardiac and non-cardiac patients' decisions regarding medical, interventional and surgical management of patients are widely dependent on the result of echocardiography on a daily base [4]. Old age comprises "The later part of life; the period of life after youth and middle age" [5]. The WHO and United Nations has agreed that 65 + years may be usually denoted as old age or geriatric age and this is the first attempt at an international definition of old age [6]. Despite decline in the rates of mortality due to heart disease in the past two decades, cardiovascular disease remains the most frequent single cause of death among persons over 65 years of age [7]. With aging of the myocardium, there is an increase in the size of myocytes and the rate of degenerative changes – lipid deposition, tubular dilatation, lipofuschin deposition and a decrease in the mitochordrial oxidative phosphorylation. The valves, apart from calcific changes, develop fibrous thickening and mitral leaflets may simulate prolapsing mitral valves[8].

There is more preservation of myocardial contractile strength, but the relaxation process is substantially slowed, therefore there is primarily diastolic dysfunction with preservation of systolic function [2]. In order to detect abnormalities, accurate definition of normal values of echocardiographic measurements are of the utmost importance in order to be a reliable guide for decision making. But there has been a paucity of normal echocardiographic data of the healthy elderly group [9]. India has become an ageing country with the population of the elderly crossing seventy million. So, it is considered worthwhile to have an echocardiographic information on elderly who are free of overt cardiovascular disease, so that these can be compared to pathological conditions common in aged [10]. Differences have been shown to exist in some echocardiographic measurements that could be attributed to social, ethnic or gender differences. Available reference values are all from western population study. Hence aim of the study is to define the normal echocardiographic reference values for various cardiac measurements of dimensions and function in geriatric healthy population of West Bengal.

## AIMS AND OBJECTIVES

### GENERAL OBJECTIVES:

To study the normal reference of value of echocardiographic measurements in geriatric population of West Bengal

### Specific Objectives:

1. To determine the basic echocardiographic measurements in geriatric population visiting NRS Medical College
2. To compare echocardiographic measurements in geriatric bengali population with the prevail standard echocardiographic measurements.

## MATERIALS AND METHODOLOGY

### STUDY AREA

N.R.S. Medical College and Hospital, Kolkata

### Study Population

Adult patients aged 65-80 years of either sex either admitted in any department in NRSMCH, or attending outdoor clinic of any department NRSMCH, a tertiary care hospital without any cardiac diseases or any other disease which has direct or indirect influence on cardiac structure. Normal Population picked from geriatric relatives or attendants accompanying the patient.

### Study Period

Form 1st MAY 2019 TO 31ST JULY 2020 (15 months)

### Sample Size

A minimum of 300 subjects

**Sample Design**
Consecutive eligible

**Study Design**
Cross- sectional, observational, single hospital-based study

**Inclusion Criteria**
Geriatric patients of both sexes aged 65-80 yrs

**Exclusion Criteria**
1. Subjects not giving consent
2. Subjects with clinically evident cardiovascular or renal disease, hypertension or diabetes
3. H/o any systemic disease (endocrine, collagen, metabolic, nutritional or infections)
4. History of long-term regular physical training
5. Echocardiographically detected cardiac pathology

**Statistical Analysis:**
Once a *t* value is determined, a *p*-value can be found using a table of values from Student's t-distribution. If the calculated *p*-value is below the threshold chosen for statistical significance (usually the 0.10, the 0.05, or 0.01 level), then the null hypothesis is rejected in favour of the alternative hypothesis. p-value ≤ 0.05 was considered for statistically significant.

## RESULT & ANALYSIS

In our study, 169(41.7%) patients were 66-70 years old, 142(35.1%) patients were 71-75 years old and 94(23.2%) patients were 76-80 years old. The mean age (mean± s.d.) of patients was 72.2815± 4.1303 years. 177(43.7%) patients were Female and 228(56.3%) patients were male.

It was found that in 66-70 age Group, the mean LVIDd (mean± s.d.) of patients was 43.4834± 1.6361. In 71-75 age Group, the mean LVIDd (mean± s.d.) of patients was 43.7585± 1.7590. In 76-80 age Group, the mean LVIDd (mean± s.d.) of patients was 43.9351± 1.8073. Difference of mean LVIDd with three age Group was not statistically significant (p=0.1033). In 66-70 age group, the mean LVIDs (mean± s.d.) of patients was 27.8757± 2.5744. In 71-75 age group, the mean LVIDs (mean± s.d.) of patients was 28.0958± 2.8179. In 76-80 age group, the mean LVIDs (mean± s.d.) of patients was 27.9489± 2.4129. Difference of mean LVIDs with three age Group was not statistically significant (p=0.7601).

We found that in 66-70 age group, the mean IVSd (mean± s.d.) of patients was 27.8757± 2.5744. In 71-75 age group, the mean IVSd (mean± s.d.) of patients was 28.0958± 2.8179. In 76-80 age group, the mean IVSd (mean± s.d.) of patients was 27.9489± 2.4129. Difference of mean IVSd with three age group was not statistically significant (p=0.7601).

Our study showed that in 66-70 age group, the mean LVPWd (mean± s.d.) of patients was 8.1538± .9880. In 71-75 age group, the mean LVPWd (mean± s.d.) of patients was 8.3451± 1.0656. In 76-80 age group, the mean LVPWd (mean± s.d.) of patients was 8.2128± 1.0764. Difference of mean LVPWd with three age group was not statistically significant (p=0.2629). In 66-70 age group, the mean LVEF (mean± s.d.) of patients was 66.6213± 2.9658. In 71-75 age group, the mean LVEF (mean± s.d.) of patients was 66.4648± 3.0543. In 76-80 age group, the mean LVEF (mean± s.d.) of patients was 66.7447± 2.7038. Difference of mean LVEF with three age group was not statistically significant (p=0.7650).

We examined that in 66-70 age group, the mean LVFS=H1/2 (mean± s.d.) of patients was 33.3107± 1.4829. In 71-75 age group, the mean LVFS=H1/2 (mean± s.d.) of patients was 33.2324± 1.5271. In 76-80 age group, the mean LVFS=H1/2 (mean± s.d.) of patients was 33.3723± 1.3519. Difference of mean LVFS=H1/2 with three age group was not statistically significant (p=0.7650). In 66-70 age group, the mean LV mass (mean± s.d.) of patients was 133.8817± 17.4079. In 71-75 age group, the mean LV mass (mean± s.d.) of patients was 131.6831± 16.3162. In 76-80 age group, the mean LV mass (mean± s.d.) of patients was 130.2234± 16.1785. Difference of mean LV mass with three age group was not statistically significant (p=0.2091). In 66-70 age group, the mean LA (mean± s.d.) of patients was 24.5621± 3.5820. In 71-75 age group, the mean LA (mean± s.d.) of patients was 24.4155± 3.5335. In 76-80 age group, the mean LA (mean± s.d.) of patients was 24.3936± 3.9026. Difference of mean LA with three age group was not statistically significant (p=0.9134).

It was found that in 66-70 age group, the mean ACS (mean± s.d.) of patients was 17.1243± 1.3938. In 71-75 age group, the mean ACS (mean± s.d.) of patients was 16.9859± 1.4390. In 76-80 age group, the mean ACS (mean± s.d.) of patients was 17.0638± 1.4724. Difference of mean ACS with three age group was not statistically significant (p=0.6964). In 66-70 age group, the mean Ao (mean± s.d.) of patients was 28.3077± 2.5142. In 71-75 age group, the mean Ao (mean± s.d.) of patients was 27.8099± 2.5065. In 76-80 age group, the mean Ao (mean± s.d.) of patients was 27.8298± 2.2843. Difference of mean Ao with three age group was not statistically significant (p=0.1430).

In our study, in Female group, the mean age (mean± s.d.) of patients was 72.2938± 4.0695 years. In Male group, the mean age (mean± s.d.) of patients was 72.2719± 4.1857 years. Difference of mean age with two sex group was not statistically significant (p=0.9580).

It was found that in Female group, the mean LVIDd (mean± s.d.) of patients was 43.6153± 1.6898. In Male group, the mean LVIDd (mean± s.d.) of patients was 43.7386± 1.7550. Difference of mean LVIDd with two sex group was not statistically significant (p=0.4763). In Female group, the mean LVIDs (mean± s.d.) of patients was 27.7876± 2.6566. In Male group, the mean LVIDs (mean± s.d.) of patients was 28.1114± 2.5925. Difference of mean LVIDs with two sex group was not statistically significant (p=0.2181).

Our study showed that in Female group, the mean IVSd (mean± s.d.) of patients was 9.0678± .6957. In Male group, the mean IVSd (mean± s.d.) of patients was 9.0219± .7417. Difference of mean IVSd with two sex group was not statistically significant (p=0.5263). In Female group, the mean LVPWd (mean± s.d.) of patients was 8.2147± 1.0656. In Male group, the mean LVPWd (mean± s.d.) of patients was 8.2500± 1.0169. Difference of mean LVPWd with two sex group was not statistically significant (p=0.7345). In Female group, the mean LVEF (mean± s.d.) of patients was 66.3446± 3.0019. In Male group, the mean LVEF (mean± s.d.) of patients was 66.7895± 2.8716. Difference of mean LVEF with two sex group was not statistically significant (p=0.1303).

We found that in Female group, the mean LVFS=H1/2 (mean± s.d.) of patients was 33.1723± 1.5009. In Male group, the mean LVFS=H1/2 (mean± s.d.) of patients was 33.3947± 1.4358. Difference of mean LVFS=H1/2 with two sex group was not statistically significant (p=0.1303). In Female group, the mean LV mass (mean± s.d.) of patients was 132.2825± 17.0057. In Male group, the mean LV mass (mean± s.d.) of patients was 132.2456± 16.6292. Difference of mean LV mass with two sex groups was not statistically significant (p=0.9825). In Female group, the mean LA (mean± s.d.) of patients was 24.5311± 3.6276. In Male group, the mean LA (mean± s.d.) of patients was 24.4254± 3.6461. Difference of mean LA with two sex group was not statistically significant (p=0.7721).

We also found that in Female group, the mean ACS (mean± s.d.) of patients was 17.2825± 1.1963. In Male group, the mean ACS (mean± s.d.) of patients was 16.8904± 1.5626. Difference of mean ACS with two sex group was statistically significant (p=0.0059). In Female group, the mean Ao (mean± s.d.) of patients was 28.0056± 2.3196. In Male group, the mean Ao (mean± s.d.) of patients was 28.0351± 2.5789. Difference of mean Ao with two sex group was not statistically significant (p=0.9053).

## DISCUSSION

In our study, out of 405 patients, 169(41.7%) patients were 66-70 years old, 142(35.1%) patients were 71-75 years old and 94(23.2%) patients were 76-80 years old. 177(43.7%) patients were Female and 228(56.3%) patients were male. We found that in Female group, the mean age of patients was 72.2938± 4.0695 years. In Male group, the mean age of patients was 72.2719± 4.1857 years. Difference of mean age with two sex group was not statistically significant (p=0.9580).

Phillip B et al [11] (2003) found that the mean age was 72 ± 7 yr. Multiple linear regression analyses showed that patients with a history of myocardial infarction (P = 0.021), angina pectoris (β = −6.09, 95% CI: −9.66, −2.52; P = 0.01), and valvular heart disease (β = −5.05, 95% CI: −9.56, −0.55; P = 0.028) had lower LVEF than those without such conditions. Of the patients with normal LVEF, 61.5% had diastolic filling abnormalities. These results suggest that evaluation of LV

systolic function alone is not discriminatory in comprehensively characterizing LV function in geriatric surgical patients.

Nakagawa K et al [12](2012) found that Mean age at procedure was 75.8 ± 3.8 years (range: 70–85 years). Mean Qp/Qs was 2.4 ± 0.7 and mean ASD diameter was 20.3 ± 6.4 mm. Nine patients (30%) had a history of hospitalization due to heart failure. ASD closure was successfully performed in 28 patients (93%) without significant complications.

In 66-70 age group, the mean LVIDd of patients was 43.4834± 1.6361. In 71-75 age group, the mean LVIDd of patients was 43.7585± 1.7590. In 76-80 age group, the mean LVIDd of patients was 43.9351± 1.8073. Difference of mean LVIDd with three age group was not statistically significant (p=0.1033). In 66-70 age group, the mean LVIDs of patients was 27.8757± 2.5744. In 71-75 age group, the mean LVIDs of patients was 28.0958± 2.8179. In 76-80 age group, the mean LVIDs of patients was 27.9489± 2.4129. Difference of mean LVIDs with three age group was not statistically significant (p=0.7601). In 66-70 age group, the mean LVIDs of patients was 27.8757± 2.5744. In 71-75 age group, the mean LVIDs of patients was 28.0958± 2.8179. In 76-80 age group, the mean LVIDs of patients was 27.9489± 2.4129. Difference of mean LVIDs with three age group was not statistically significant (p=0.7601). In 66-70 age group, the mean LVPWd of patients was 8.1538± .9880. In 71-75 age group, the mean LVPWd of patients was 8.3451± 1.0656. In 76-80 age group, the mean LVPWd of patients was 8.2128± 1.0764. Difference of mean LVPWd with three age group was not statistically significant (p=0.2629).

Ojji DB et al [13](2009) found that the mean age of the patients was 50.60 ± 15.29 years, and 50.9% of the study population were males while 49.1% were females. The commonest cause of heart failure identified was hypertension in 61.5% of the patients; 75.5% had systolic heart failure, whereas 23.5% had heart failure with preserved ejection fraction.

Leibowitz D et al [14](2011) found that there were no differences between the groups in percentage of participants with impaired diastolic function or average ratio of early diastolic transmitral flow velocity to early diastolic mitral annular tissue velocity (11.5 vs 11.8; P =.64).In this age-homogenous cohort of the oldest old, high LVMI and LAVI and indices of systolic but not diastolic function as assessed according to Doppler were associated with limitations in ADLs.

Misbach C et al [15] (2014) found that a significant BW effect was observed for all variables, except LA/Ao, FS%, and mitral E/A ratio. A significant but negligible effect of gender and age was also observed for 5/15 and 4/15 of the tested variables, respectively. Only the BW effect on M-mode variables was considered as clinically relevant and the corresponding regression-based RIs were calculated. Body weight should be taken into account when interpreting echocardiographic values in CKCS, except for LA/Ao, FS%, and mitral E/A ratio.

Martínez-Sellés M et al [16](2015) found that Mean left ventricular (LV) ejection fraction was 60.0 ± 10.5%. Moderate or severe aortic valve stenosis was found in 16%, mitral valve regurgitation in 15%, and aortic valve regurgitation in 13%. Diastolic dysfunction was assessed in 79 subjects and was present in 55 (69.6%). Katz index and LV dilation were independently associated with the ability to walk 6 m. Age, Charlson and Katz indexes and the presence of significant abnormalities in echocardiography were associated with mortality. Centenarians have frequent ECG alterations and abnormalities in echocardiography. More than one fifth has atrial fibrillation, and most have diastolic dysfunction. Left ventricular dilation was associated with the ability to walk 6 m. Significant abnormalities in echocardiography were associated with mortality.

Our study found that in 66-70 age group, the mean LVEF of patients was 66.6213± 2.9658. In 71-75 age Group, the mean LVEF of patients was 66.4648± 3.0543. In 76-80 age group, the mean LVEF of patients was 66.7447± 2.7038. Difference of mean LVEF with three age group was not statistically significant (p=0.7650). Difference of mean LVFS=H1/2 with three age group was not statistically significant (p=0.7650). In 66-70 age group, the mean LV mass of patients was 133.8817± 17.4079. In 71-75 age group, the mean LV mass of patients was 131.6831± 16.3162. In 76-80 age group, the mean LV mass of patients was 130.2234± 16.1785. Difference of mean LV mass with three age group was not statistically significant (p=0.2091). In 66-70 age group, the mean LA of patients was 24.5621± 3.5820. In 71-75 age group, the mean LA of patients was 24.4155± 3.5335. In 76-80 age group, the mean LA of patients was 24.3936± 3.9026. Difference of mean LA with three age group was not statistically significant (p=0.9134). In 66-70 age group, the mean ACS of patients was 17.1243± 1.3938. In 71-75 age group, the mean ACS of patients was 16.9859± 1.4390. In 76-80 age group, the mean ACS of patients was 17.0638± 1.4724. Difference of mean ACS with three age group was not statistically significant (p=0.6964). In 66-70 age group, the mean Ao of patients was 28.3077± 2.5142. In 71-75 age group, the mean Ao of patients was 27.8099± 2.5065. In 76-80 age group, the mean Ao of patients was 27.8298± 2.2843. Difference of mean Ao with three age group was not statistically significant (p=0.1430).

**Published studies that produced echocardiographic normal reference range values for male and female subjects from healthy individuals in well-defined geriatric populations.**

| Study | Important findings | |
|---|---|---|
| Ojji DB et al 13 (2009) | Mean age (years) | 50.60 ± 15.29 years |
| Phillip B et al 11 (2003) | | 72 ± 7 yr |
| Our study showed that | | 72.2815 ± 4.1303yr |
| Phillip B et al 11 (2003) | mean LVEF | 54.3 ± 13.1 |
| Martínez-Sellés M et al 16 (2015) | | 60.0 ± 10.5 |
| Our study showed that | | 66.5951 ± 2.9339 |
| Laszlo R et al 17 (2016) | mean right ventricular end diastolic area | 23.5 ± 5.6 cm2 (males), 20.3 ± 5.0 cm2 (females) |
| Our study showed that | RVIDd | 17.9649± 2.3520 (Male), 17.8305± 2.0267 (Female) |

In Female group, the mean LVIDd of patients was 43.6153± 1.6898. In Male group, the mean LVIDd of patients was 43.7386± 1.7550. Difference of mean LVIDd with two sex group was not statistically significant (p=0.4763). In Female group, the mean LVIDs of patients was 27.7876± 2.6566. In Male group, the mean LVIDs of patients was 28.1114± 2.5925. Difference of mean LVIDs with two sex group was not statistically significant (p=0.2181). In Female group, the mean IVSd of patients was 9.0678± .6957. In Male group, the mean IVSd of patients was 9.0219±.7417. Difference of mean IVSd with two sex group was not statistically significant (p=0.5263). In Female group, the mean LVPWd of patients was 8.2147± 1.0656. In Male group, the mean LVPWd of patients was 8.2500± 1.0169. Difference of mean LVPWd with two sex group was not statistically significant (p=0.7345). In Female group, the mean LVEF of patients was 66.3446± 3.0019. In Male group, the mean LVEF of patients was 66.7895± 2.8716. Difference of mean LVEF with two sex group was not statistically significant (p=0.1303). In Female group, the mean LVFS=H1/2 of patients was 33.1723± 1.5009. In Male group, the mean LVFS=H1/2 of patients was 33.3947± 1.4358. Difference of mean LVFS=H1/2 with two sex group was not statistically significant (p=0.1303). In Female group, the mean LV mass of patients was 132.2825± 17.0057. In Male group, the mean LV mass of patients was 132.2456± 16.6292. Difference of mean LV mass with two sex group was not statistically significant (p=0.9825). In Female group, the mean LA of patients was 24.5311± 3.6276. In Male Group, the mean LA of patients was 24.4254± 3.6461. Difference of mean LA with two sex group was not statistically significant (p=0.7721). In Female group, the mean ACS of patients was 17.2825± 1.1963. In Male group, the mean ACS of patients was 16.8904± 1.5626. Difference of mean ACS with two sex group was statistically significant (p=0.0059). In Female group, the mean Ao of patients was 28.0056± 2.3196. In Male group, the mean Ao of patients was 28.0351± 2.5789. Difference of mean Ao with two sex group was not statistically significant (p=0.9053).

## CONCLUSION

In our study, 169(41.7%) patients were 66-70 years old, 142(35.1%) patients were 71-75 years old and 94(23.2%) patients were 76-80 years old. In our study, 177(43.7%) patients were female and 228(56.3%) patients were male.

We found that LVIDd, LVIDs were not statistically significant in different age groups.

It was found that IVSd, LVPWd, LVEF and LVFS were not statistically significant in different age groups.

LV mass, LA, ACS and Ao were not statistically significant in different age groups.

We found that LVIDd, LVIDs, IVSd, LVEF and LVPWd were not statistically significant in gender groups.It was found that Mean ACS was higher in female compared to male which was statistically significant.

It was found that LV mass, LA and Ao were not statistically significant in male and female Estimation of local reference values is important as they need to be considered when defining normal so as to be able to detect abnormalities relevant to our local population. While racial and ethnic differences exist, the difference from international recommendations is not pronounced albeit a higher upper reference limit for ACS/BSA especially in females and relatively smaller ACS in young male.

In conclusion, the findings of this study permit to conclude that, in geriatric population of the urban region of our hospital, the means and the normal distribution conventionally accepted as the limits of normality for the dimensions of interventricular septum, posterior wall and left ventricular mass are lower than those presented in the literature of reference; left ventricular mass is larger in men, corrected or not for anthropometric variables. The consequences of these findings for clinical practice are obvious as, for example, in the risk stratification of patients with hypertension.

**Table 1: Distribution of mean LVIDd, LVIDs, IVSd, LVPWd, LVEF, LVFS=H1/2, LV mass, LA, ACS and Ao: Age in Years**

| | Age | Number | Mean | SD | Minimum | Maximum | Median | p-value |
|---|---|---|---|---|---|---|---|---|
| LVIDd | 66-70 | 169 | 43.4834 | 1.6361 | 41.3000 | 47.8000 | 42.8000 | 0.1033 |
| | 71-75 | 142 | 43.7585 | 1.7590 | 41.2000 | 47.8000 | 43.0000 | |
| | 76-80 | 94 | 43.9351 | 1.8073 | 41.8000 | 47.8000 | 43.3000 | |
| LVIDs | 66-70 | 169 | 27.8757 | 2.5744 | 21.0000 | 33.0000 | 28.3000 | 0.7601 |
| | 71-75 | 142 | 28.0958 | 2.8179 | 21.0000 | 33.0000 | 28.3000 | |
| | 76-80 | 94 | 27.9489 | 2.4129 | 22.0000 | 33.0000 | 28.5000 | |
| IVSd | 66-70 | 169 | 9.1183 | .7222 | 8.0000 | 10.0000 | 9.0000 | 0.1245 |
| | 71-75 | 142 | 8.9507 | .7079 | 8.0000 | 10.0000 | 9.0000 | |
| | 76-80 | 94 | 9.0426 | .7320 | 8.0000 | 10.0000 | 9.0000 | |
| LVPWd | 66-70 | 169 | 8.1538 | .9880 | 7.0000 | 10.0000 | 8.0000 | 0.2629 |
| | 71-75 | 142 | 8.3451 | 1.0656 | 7.0000 | 10.0000 | 8.0000 | |
| | 76-80 | 94 | 8.2128 | 1.0764 | 7.0000 | 10.0000 | 8.0000 | |
| LVEF | 66-70 | 169 | 66.6213 | 2.9658 | 59.0000 | 72.0000 | 66.0000 | 0.7650 |
| | 71-75 | 142 | 66.4648 | 3.0543 | 59.0000 | 71.0000 | 67.0000 | |
| | 76-80 | 94 | 66.7447 | 2.7038 | 58.0000 | 71.0000 | 67.0000 | |
| LVFS=H1/2 | 66-70 | 169 | 33.3107 | 1.4829 | 29.5000 | 36.0000 | 33.0000 | 0.7650 |
| | 71-75 | 142 | 33.2324 | 1.5271 | 29.5000 | 35.5000 | 33.5000 | |
| | 76-80 | 94 | 33.3723 | 1.3519 | 29.0000 | 35.5000 | 33.5000 | |
| LV mass | 66-70 | 169 | 133.8817 | 17.4079 | 99.0000 | 170.0000 | 140.0000 | 0.2091 |
| | 71-75 | 142 | 131.6831 | 16.3162 | 98.0000 | 168.0000 | 132.0000 | |
| | 76-80 | 94 | 130.2234 | 16.1785 | 98.0000 | 167.0000 | 130.0000 | |
| LA | 66-70 | 169 | 24.5621 | 3.5820 | 19.0000 | 33.0000 | 24.0000 | 0.9134 |
| | 71-75 | 142 | 24.4155 | 3.5335 | 19.0000 | 33.0000 | 24.0000 | |
| | 76-80 | 94 | 24.3936 | 3.9026 | 19.0000 | 33.0000 | 24.0000 | |
| ACS | 66-70 | 169 | 17.1243 | 1.3938 | 15.0000 | 19.0000 | 18.0000 | 0.6964 |
| | 71-75 | 142 | 16.9859 | 1.4390 | 15.0000 | 19.0000 | 17.0000 | |
| | 76-80 | 94 | 17.0638 | 1.4724 | 15.0000 | 19.0000 | 17.5000 | |
| Ao | 66-70 | 169 | 28.3077 | 2.5142 | 24.0000 | 33.0000 | 28.0000 | 0.1430 |
| | 71-75 | 142 | 27.8099 | 2.5065 | 24.0000 | 33.0000 | 28.0000 | |
| | 76-80 | 94 | 27.8298 | 2.2843 | 24.0000 | 33.0000 | 28.0000 | |

**Table 2: Distribution of mean Age, LVIDd, LVIDs, IVSd, LVPWd, LVEF, LVFS=H1/2, LV mass, LA, ACS and Ao: Sex**

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| Age | Female | 177 | 72.2938 | 4.0695 | 66.0000 | 80.0000 | 72.0000 | 0.9580 |
| | Male | 228 | 72.2719 | 4.1857 | 66.0000 | 80.0000 | 71.0000 | |
| LVIDd | Female | 177 | 43.6153 | 1.6898 | 41.3000 | 47.8000 | 43.0000 | 0.4763 |
| | Male | 228 | 43.7386 | 1.7550 | 41.2000 | 47.8000 | 43.0000 | |
| LVIDs | Female | 177 | 27.7876 | 2.6566 | 21.0000 | 33.0000 | 28.3000 | 0.2181 |
| | Male | 228 | 28.1114 | 2.5925 | 21.0000 | 33.0000 | 28.7000 | |
| IVSd | Female | 177 | 9.0678 | .6957 | 8.0000 | 10.0000 | 9.0000 | 0.5263 |
| | Male | 228 | 9.0219 | .7417 | 8.0000 | 10.0000 | 9.0000 | |
| LVPWd | Female | 177 | 8.2147 | 1.0656 | 7.0000 | 10.0000 | 8.0000 | 0.7345 |
| | Male | 228 | 8.2500 | 1.0169 | 7.0000 | 10.0000 | 8.0000 | |
| LVEF | Female | 177 | 66.3446 | 3.0019 | 58.0000 | 71.0000 | 67.0000 | 0.1303 |
| | Male | 228 | 66.7895 | 2.8716 | 59.0000 | 72.0000 | 66.0000 | |
| LVFS=H1/2 | Female | 177 | 33.1723 | 1.5009 | 29.0000 | 35.5000 | 33.5000 | 0.1303 |
| | Male | 228 | 33.3947 | 1.4358 | 29.5000 | 36.0000 | 33.0000 | |
| LV mass | Female | 177 | 132.2825 | 17.0057 | 98.0000 | 168.0000 | 136.0000 | 0.9825 |
| | Male | 228 | 132.2456 | 16.6292 | 99.0000 | 170.0000 | 132.0000 | |
| LA | Female | 177 | 24.5311 | 3.6276 | 19.0000 | 33.0000 | 24.0000 | 0.7721 |
| | Male | 228 | 24.4254 | 3.6461 | 19.0000 | 33.0000 | 24.0000 | |
| ACS | Female | 177 | 17.2825 | 1.1963 | 15.0000 | 19.0000 | 18.0000 | 0.0059 |
| | Male | 228 | 16.8904 | 1.5626 | 15.0000 | 19.0000 | 17.0000 | |
| Ao | Female | 177 | 28.0056 | 2.3196 | 24.0000 | 33.0000 | 28.0000 | 0.9053 |
| | Male | 228 | 28.0351 | 2.5789 | 24.0000 | 33.0000 | 28.0000 | |

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