

## Original Article

## Comparison of Radiological Findings of Chest X-Ray with Echocardiography in Determination of Heart Size

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### Abstract

**Objective:** The aim of the present study was to compare the findings of CXR and echocardiography in determination of the heart size.

**Methods:** A cross sectional study was conducted from January 2019 to June 2019 among 100 patients attending at Cardiology Department, Cumilla Medical College Hospital, Cumilla after obtaining requisite consent from the patients. Data were collected through the assessment of patients in the Cardiology Department. The collected data were entered into the computer and analyzed by using SPSS (version 20.1) to compare the findings of CXR and echocardiography in determination of the heart size. The study was approved by the institutional ethical committee.

**Results:** In 100 patients's, majority 68% was between 30-50 years and 32% was between 50-90years. Among 100 patients, 64% was female and 36% was male. 36% patients were suffering from hypertension while 12% patients were suffering from Diabetes mellitus and 2% patients suffering from Dyslipidemia. Edema was present in 14% patients. 46% patients had cardiomegaly according to the findings of Chest x-ray. 26 % patients Right Ventricular end diastolic dimension in Echo was 25-45mm which was considered as a cardiomegaly. 36% patients Left Ventricular end diastolic dimension in Echo was 55-60mm which was considered as a cardiomegaly. 12% patient's left ventricular ejection fraction was 37-50%.

**Conclusion:** Echocardiography is superior to chest radiography for providing a better assessment of cardiomegaly.

**Keywords:** Echocardiography, Cardiomegaly.

### Introduction

Cardiomegaly, including ventricular enlargement, is one of the manifestations of the cardiovascular disease. The distribution of the disease is worldwide and is common amongst those having cardiomyopathy, valvular and congenital heart disease, heart failure, cor pulmonale, pulmonary hypertension, high cardiac output States and chronic pressure overload.<sup>1</sup> It is commonly observed in our routine clinical practice that a significant number of echocardiograms are requested in hospitalized patients based on the sole interpretation of admission chest radiography as

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having cardiomegaly without making any detailed appropriate measurement. It is very important to adequately evaluate cardiac dimensions in the clinical setting. Therefore, assessing heart size by measuring the cardiothoracic ratio (CTR) still remains as a useful diagnostic tool in chest radiography evaluation.<sup>2</sup> It has long been accepted that a cardiothoracic ratio (CTR) greater than 50% on a posterior-anterior (PA) chest radiograph (CXR) is representative of cardiomegaly.<sup>3</sup> However, there is a large variation in the subjective judgment of cardiac enlargement (cardiomegaly).<sup>4</sup> However, the diagnosis of cardiomegaly can be made more accurately by other more expensive techniques like cardiac echocardiography, magnetic resonance imaging (MRI), and computed tomography (CT). The echocardiography is commonly superior to other low-technological methods that are used to determine the size of the heart and its chambers.<sup>5</sup> Although

echocardiography is considered as gold standard for the diagnosis of cardiomegaly, it is costly and needs trained personnel for performing and interpreting the results of this diagnostic procedure.<sup>6</sup>

### Materials & Methods

A cross sectional study was conducted from January 2019 to June 2019 among 100 patients attending at Cardiology Department, Cumilla Medical College Hospital, Cumilla after obtaining requisite consent from the patients. Every patients had undergone echocardiography and PA CXR maximum within two days. If cardiothoracic ratio  $>0.5$  on a postero-anterior radiograph then it's considered as a cardiomegaly. RVEDD and LVEDD were used to measure the echocardiographic size of the heart. Normal RVEDD and LVEDD was less than 25 mm and 55 mm respectively. More than or equals 25mm and 55mm respectively considered as cardiomegaly. The study was approved by the institutional ethical committee. The relevant information was entered into the predesigned proforma to compare the findings of CXR and echocardiography in determination of the heart size. The collected data were entered into the computer and analyzed by using SPSS (version 20.1).

### Result

In 100 patients's, majority 68% was between 30-50 years and 32% was between 50-90years. 36% patients were suffering from hypertension while 12% patients were suffering from Diabetes mellitus and 2% patients suffering from Dyslipidemia. Edema was present in 14% patients

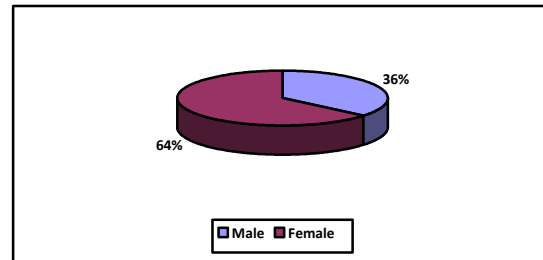
(Table I)

**Table I: Distribution of the respondents by socio-demographic characteristics and clinical feature (n=100)**

sex	Frequency	Percent
Male	36	36.0
Female	64	64.0
Age		
30-50 years	68	68.0
50-90 years	32	32.0
Smoking habit		
smoker	22	22.0
Non smoker	78	78.0
Hypertension		
present	36	36.0
absent	64	64.0

sex	Frequency	Percent
DM		
present	12	12.0
absent	88	88.0
Dyslipidemia		
present	2	2.0
absent	98	98.0
Odema		
Present	14	14.0
Absent	86	86.0

Among 100 patients, 64% was female and 36% was male. (Figure I)



**Figure I: Pie chart showing sex distribution of the population**

Among the 100 participants, 46% patients had cardiomegaly according to the findings of Chest x-ray. 26 % patients Right Ventricular end diastolic dimension in Echo was 25-45mm which was considered as a cardiomegaly. 36% patients Left Ventricular end diastolic dimension in Echo was 55-60mm which was considered as a cardiomegaly. 12% patients left ventricular ejection fraction was 37-50%. (Table II )

**Table II: Distribution of the respondents by chest x-ray and echocardiography findings**

Clinical finding	Frequency	percent
Cardiothoracic ratio in chest x-ray		
< 0.5 on a PA film	54	54.0
> 0.5 on a PA film (cardiomegaly)	46	46.0
Right Ventricular end diastolic dimension in Echo		
20-24 mm	74	74.0
25-45 mm (cardiomegaly)	26	26.0
Left Ventricular end diastolic dimension in Echo		
29-54 mm	64	64.0
55-60 mm (Cardiomegaly)	36	36.0
Left ventricular ejection fraction		
37-50%	12	12.0
51-74%	88	88.0

## Discussion

All together a total of 100 patients were examined during the study period. In 100 patient's, majority 68% was between 30-50 years and 32% was between 50-90years. Near to similar results were obtained in the study conducted by Alghamdi et al (2020). In their study titled "Study of cardiomegaly using chest xray" stated that majority of the patients were between 48-58 years.<sup>7</sup> In our study majority of the participants were female 64%. Dissimilar results were obtained in the study conducted by Chana et al. (2015). In their study majority of the participants were male 56.2%.<sup>8</sup> In our study, 46% patients had cardiomegaly according to the findings of Chest x-ray. 26 % patients Right Ventricular end diastolic dimension in Echo was 25-45mm which was considered as a cardiomegaly and 36% patients Left Ventricular end diastolic dimension in Echo was 55-60mm which was considered as a cardiomegaly. Dis-similar results were obtained in the study conducted by Biharas Monfared et al. In their study they stated that according to CXR and Echocardiography, 24.9% and 50.8% patients had cardiomegaly respectively.

## Conclusion

Echocardiography is superior to chest radiography for providing a better assessment of cardiomegaly. Therefore we should be reminded that when we see an enlarged cardiothoracic ratio on chest radiograph it may not cardiomegaly. The echocardiography will give accurate measurement of heart.

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**Conflict of interests:** None

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