

Original Article

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## Prevalence of Elevated Troponin- I among Hospitalized Patients with COVID- 19.

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### Abstract

**Background:** Corona Virus Disease 2019 (COVID-19) pandemic caused millions of pneumonia related death since December 2019. Cardiac troponin-I elevation is associated with adverse outcomes in cardiovascular and non-cardiovascular disease. There is a lack of data regarding the role of troponin-I on the assessment and COVID-19 stage classification and stratification.

**Objective:** The study was aimed to estimate prevalence of troponin-I among hospitalized patients with COVID-19.

**Methods:** This cross sectional descriptive type of observational study was carried out at COVID-19 isolation unit of Sylhet Women's Medical College Hospital during the period of six months from April 2021 to September 2021. Data were collected from purposively selected 204 patients with COVID-19 from patient files and EMR. Data were analyzed by using SPSS version 21.0.

**Results:** The study results revealed that mean age of the patients with COVID-19 was 57.97 years with a standard deviation of 15.78 years. Majority of them (121, 59.3%) were female and the remaining (83, 40.7%) were male. Proportion of comorbidities were estimated and found that each 115 (56.4%) patients were hypertensive and diabetic. Thirty five (16.2%) had ischemic heart disease; 3 (1.5%) had congestive cardiac failure and 2 (1.0%) had asthma. Only 1 (0.5%) patient has atrial fibrillation. Minimum level of troponin-I was 0.01 ng/ml and the maximum level was 21.70 ng/ml with a range of 21.69 ng/ml. Mean troponin-I of patients with COVID-19 was 0.38±1.78 ng/ml. Estimated prevalence of elevated troponin-I was 39.1%. Level of troponin-I in patients of different age group was compared and Chi-square test showed no significant difference ( $p>0.05$ ). Elevation of troponin-I in both sex was compared and again Chi-square test showed no significant difference ( $p>0.05$ ). Elevation of troponin-I was significantly higher on those who were detected by RT-PCR than those who were detected by rapid antigen test ( $p=0.048$ ).

**Conclusion:** Though the pattern of elevation of troponin-I was found similar in younger and older patients and in males and females, a significant number of patients with COVID-19 (65/204, 39.1%) had elevated troponin-I which should be addressed to evaluate and manage patients with COVID-19 more efficiently.

**Key Words:** Prevalence, Troponin-I, COVID-19.

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### Introduction

Corona Virus Disease 2019 (COVID-19)

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is a newly emerging viral infectious disease caused by severe acute respiratory syndrome coronavirus-2 (SARS-CoV2) and transmitted rapidly throughout the countries of the world.<sup>1</sup> COVID-19 remains a pandemic causing lack of pneumonia related mortality and morbidity since December 2019.<sup>2</sup> It is exerting pressure on global health care systems. Though primarily a respiratory infection, COVID-19 involves many vital organs in the body including the heart.<sup>3,4</sup> There is evidence of myocardial injury in 7.2% of patients with COVID-19.<sup>5</sup> Though troponin-I raised in several conditions other than acute coronary syndrome (ACS) it is a well-established biomarker of myocardial injury<sup>6</sup> which may be regarded as a clinical predictor of outcomes for the patients with COVID-19.

Several studies among Chinese patients revealed that raised plasma level of troponin-I is common and related with a more severe clinical course and higher number of death.<sup>7-10</sup> American College of Cardiology suggested to advice troponin-I testing for the patients of COVID-19 only when detection of acute myocardial infarction is being suspected on the basis of clinical features.<sup>11</sup> On the other hand, National Institute for Health and Care Excellence of UK recommended that troponin-I can be ordered for a wide indications. The indications may include patients with non-specific signs and symptoms of injury of myocardium e. g. respiratory distress and intense fatigue.<sup>12</sup> In addition to these, some studies supported for troponin-I testing in all hospitalized patients with COVID-19 at least for prognostic purpose.<sup>13,14</sup> These recommendation are often conflicting and indicate knowledge gaps in this field. However, Cardiac troponin-I elevation is associated with adverse outcomes in cardiovascular and non-cardiovascular diseases. There is a lack of data regarding the role of troponin-I on the assessment and COVID-19 stage classification and stratification in our country too. In this context this study was designed to estimate the prevalence of elevated troponin-I in hospitalized patients with COVID-19. The findings of the study will help clinicians to evaluate patients with COVID-19 especially to stratify, assess prognosis and to manage the hospitalized patients more efficiently.

### Methodology

The cross sectional descriptive type of observational study was carried out in Covid-19 Isolation Unit by the department of cardiology of Sylhet Women's Medical College Hospital during the period of April 2021 to September 2021 consecutively selected 204 patients with COVID-19 admitted in the COVID-19 Isolation Unit. Data were collected from patient files and EMR.

Inclusion criteria was Patients admitted in COVID-19 Isolation Unit whom troponin-I level drawn in the first 24 h of admission. Exclusion criteria were i. Patients with acute coronary syndrome based on the fourth universal definition of myocardial infarction. Patients aged below 18 years were excluded.iii. Patients in which a troponin-I level was not obtained in

the first 24 h of admission were also excluded from the study.

Serum troponin-I level was estimated by using venous blood, collected on the day of admission from each subject with all aseptic precautions and tested in the laboratory of the Sylhet Women's Medical College Hospital's biochemistry lab.

Data were checked for the consistency and completeness and managed accordingly. Data were analyzed by using SPSS version 21.0. Quantitative variables were summarized by mean and standard deviation. On the other hand qualitative variables were summarized by percentage. To find out the relation of elevated troponin-I with different variables Chi-square test was done. A 'p value' of <0.05 was considered as statistically significant. Ethical clearance of the study was obtained from the Institutional Review Board (IRB) of Sylhet Women's Medical College (memo no.....).

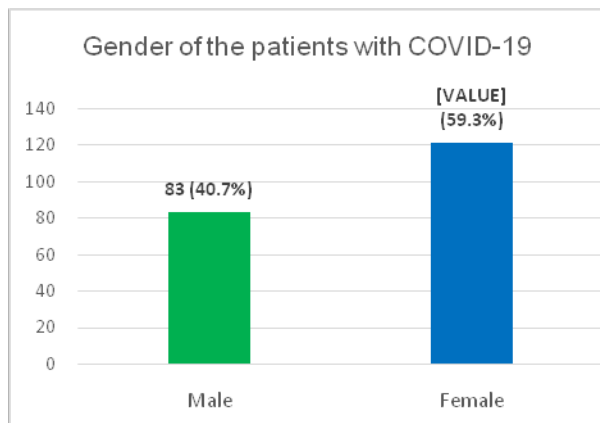
### Results

The study was conducted among 204 patients admitted in COVID-19 Isolation Unit of Sylhet Women's Medical College Hospital with COVID-19 confirmed by either RT-PCR or rapid antigen test. Mean age of the patients with COVID-19 was 53.16 years with a standard deviation of 15.78 years (Table I). Majority of them (121, 59.3%) were female and the remaining (83, 40.7%) were male (Figure 1). Proportion of co-morbidities were estimated and found that each 115 (56.4%) patients were hypertensive and diabetic. Thirty five (16.2%) had ischemic heart disease; 3 (1.5%) had congestive cardiac failure and 2 (1.0%) had asthma. Only 1 (0.5%) patient had atrial fibrillation (Table II).

**Table I: Age\* of the patients with COVID-19 (n=204)**

Age group in years	Number	Percent (%)
21-40	36	17.6
41-60	74	36.3
61-80	83	40.7
81-100	11	5.4
Total	204	100.0

\*Mean±SD=57.97±15.78 years



**Figure 1: Bar diagram showing gender of the patients with COVID-19 (n=204)**

**Table II: Comorbidities\* among patients with COVID-19 (n=204)**

Comorbidity	Present (n)	Percent (%)
Hypertension	115	56.4
Diabetes mellitus	115	56.4
Ischemic heart disease	33	16.2
Congestive heart failure	3	1.5
Asthma	2	1.0
Atrial Fibrillation	1	0.5

\*Multiple responses

Minimum level of troponin-I was 0.01 ng/ml and the maximum level was 21.70 ng/ml with a range of 21.69 ng/ml. Mean troponin-I of patients with COVID-19 was  $0.38 \pm 1.78$  ng/ml (Table III). Estimated prevalence of elevated troponin-I was 39.1% (Table IV). Level of troponin-I in patients of different age group was compared and Chi-square test showed no significant difference ( $p > 0.05$ ). Elevation of troponin-I in both sex was compared and again Chi-square test showed no significant difference ( $p > 0.05$ ). In this study one patient died whose troponin-I was elevated (Table V).

**Table III: Descriptive statistics of serum Troponin-I of patients with COVID-19 (n=204)**

Variable	Sample (n)	Minimum	Maximum	Range	Mean	Standard deviation
Serum Troponin-I (ng/ml)	204	0.01	21.70	21.69	0.38	1.78

**Table IV: Prevalence of elevated Troponin-I among patients with COVID-19 (n=204)**

Variable	Normal (n)	Elevated (n)	Total (n)	Prevalence of elevated serum Troponin-I (%)
Level of serum Troponin-I	139	65	204	31.9

**Table V: Relation of serum Troponin-I of COVID-19 patients with different variables.**

Variable	Category	Troponin-I		Total n (%)	p value (Chi-square test)
		Normal n (%)	Elevated n (%)		
Age group (years)	21-40	29 (80.6)	7 (19.4)	36 (100.0)	0.132
	41-60	53 (71.6)	21 (28.4)	74 (100.0)	
	61-80	51 (61.4)	32 (38.6)	83 (100.0)	
	81-100	6 (54.5)	5 (45.5)	11 (100.0)	
Sex	Male	54 (65.1)	29 (34.9)	83 (100.0)	0.435
	Female	85 (70.2)	36 (29.8)	121 (100.0)	
Mode of detection	RT-PCR	123 (66.1)	63 (33.9)	186 (100.0)	0.048
	Antigen test	16 (88.9)	2 (11.1)	18 (100.0)	
Outcome	Survival	139 (68.5)	64 (31.5)	203 (100.0)	0.252
	Death	0 (0.0)	1 (100.0)	1 (100.0)	

## Discussion

There is evidence that COVID-19 causes myocardial injury detected by elevated level of troponin-I.<sup>15</sup> In this study mean age of the patients with COVID-19 was 53.16 years with a standard deviation of 15.78 years. Abbasi et al. (2020) found a mean age of  $63 \pm 17$  years in a study of USA<sup>1</sup> and an Italian study found mean

age of  $67 \pm 13$  years<sup>16</sup> which were higher than this study. Majority of patients (121, 59.3%) were female and the remaining (83, 40.7%) were male in this study whereas Nie et al. (2020) had 61.1% male and 38.9% female<sup>17</sup> and Abbasi et al. (2020) found 53% male and 47% female.<sup>16</sup> Proportion of comorbidities were estimated and found that each 115 (56.4%) patients were hypertensive and diabetic. Thirty five (16.2%) had ischemic heart disease; 3 (1.5%) had congestive cardiac failure and 2 (1.0%) had asthma. Only 1 (0.5%) patient has atrial fibrillation. Nie et al. (2020) found that overall 62.7% of patients had minimum 1 comorbidity namely hypertension, diabetes mellitus, cardiovascular disease, cerebrovascular disease, asthma or chronic obstructive pulmonary disease, chronic kidney disease and disease of thyroid.<sup>17</sup>

Minimum level of troponin-I was 0.01 ng/ml and the maximum level was 21.70 ng/ml with a range of 21.69 ng/ml. Mean troponin-I of patients with COVID-19 was  $0.38 \pm 1.78$  ng/ml. Estimated prevalence of elevated troponin-I was 39.1% in this study. In a study with Italian patients elevated troponin levels were found in 45.3%<sup>16</sup> and Zhao et al. (2020) found a pooled prevalence of elevated troponin-I as 20.8% from a systematic review and meta-analysis.<sup>18</sup> Level of troponin-I in patients of different age group was compared and Chi-square test showed no significant difference ( $p > 0.05$ ). Elevation of troponin-I in both sex was compared and again Chi-square test showed no significant difference ( $p > 0.05$ ). In this study one patient died whose troponin-I was elevated. Abbasi et al. (2020) found that patients having raised troponin-I in the first 24 hours of admission were more likely to have higher in-hospital mortality (52% vs 10%).<sup>1</sup> Zhao et al. (2020) found that the probability of mortality of patients with raised troponin-I on admission was 42% and on the other hand, probability of mortality of patients having non-elevated troponin-I on admission was 9%.<sup>18</sup>

### Conclusion

Though the pattern of elevation of troponin-I was found similar in younger and older patients and in males and females, a significant number of patients with COVID-19 (65/204, 39.1%) had

elevated troponin-I which should be addressed to evaluate and management of patients with COVID-19 more efficiently.

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