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## The Impact Of Pandemic On Cancer Survival With Co-Morbidities

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### ABSTRACT:

**Background:** The corona virus disease 2019(COVID-19) pandemic (officially declared on the March 11, 2020), and the resulting measures, are impacting daily life and medical management of cancer patients. This study is intended to evaluate the association between COVID 19 pandemic and cancer survival, and to explore the prevalence of co-morbidities in cancer patients.

**Methods and materials used:** The retrospective study was carried out in the oncology department for a period of six months. The data were collected from patient history and, Medical Record Department. A total of 150 subjects were included in this study with 75 Pre-pandemic cancer patients and similar age, gender matched 75 Post-pandemic patients. Charlson Comorbidity Index (CCI) is used to assess the survival rate of cancer patients.

**Results:** Based on the comparison of survival rate of Pre-pandemic and Post-pandemic cancer patients, the Pre-pandemic cancer patients have mild survival rate (44%) and the Post-pandemic cancer patients have moderate survival rate (62.67%). Both males and females among the study population have moderate survival rate of 44.12% and 51.22% respectively.

By comparing the survival rate of breast cancer patients with other cancer patients, both the groups have moderate risks of survival for next 10 years (46.34%) and (48.62%) respectively.

Metastatic cancer patients have severe risks of survival (59.02%), whereas other cancer patients have moderate risks of survival (100%) for the next 10 years.

**Conclusion:** The prevalence of co-morbidities in cancer patients has increased after the covid-19 pandemic. Our finding reveals that the risk of survival of cancer patients has increased from mild to moderate level after covid-19 pandemic.

**Keywords:** Co-morbidities, COVID-19, CCI, Breast cancer, Metastasis, Cancer survival.

## INTRODUCTION

The COVID-19 pandemic has been immensely disruptive to health care system in India, permeating nearly every aspect of medical care.

Cancer are a group of diseases characterized by uncontrolled growth and spread of abnormal cells. The spread of cancer cells is known as metastasis which is not controlled, it can result in death. Cancer is caused by many external factors (tobacco, chemicals, radiation and infectious organisms) as well as some internal factors (inherited mutations, hormones, immune conditions and random mutations). The causes of cancer are diverse, complex and only partially understood.

It was predicted by global demographic characteristics that about 420 million new cases of cancer by 2025 annually, which means increasing cancer incidence in years. Cases of cancer about 18 million in 2018 were recorded worldwide; in men about 9.5 million and in women about 8.5 million. Globally about 9.6 million deaths were estimated in cancer. The commonest cancers are prostate cancer (1.28 million), female breast cancer (2.09 million), colorectal cancer (1.1 million), stomach cancer (1.03 million) and non-melanoma skin malignancies (1.04 million).

Cancer-related deaths, from most to least frequent, are due to lung cancer (1.76 million), colorectal cancer (862,000) and stomach cancer (783,000), liver cancer (782,000). Over 100 types of cancers affect humans. 1 The most common cancers are, • Lung Cancer • Breast Cancer • Colorectal Cancer • Prostate Cancer • Skin Cancer and • Stomach Cancer.

Diagnosis of cancer is carried by doctors by taking screening tests of patients. For example, colonoscopy, mammography and a pap test. Other test are also performed before screening tests to check the abnormalities in the body. For example, CT scan, MRI scan, X-rays and ultrasound. Person with cancer who have no symptom then they diagnosed during tests of other conditions or issues, and if any person has symptoms of cancer doctor will perform various tests like, Lab test , Imaging test ,CT scan, MRI scan, Nuclear scan, X-rays , Ultrasound and Biopsy.

The Charlson Comorbidity index, a method of predicting mortality by classifying or weighing comorbid conditions has been widely utilized by health researchers to measure burden of disease and case mix. Since the publication of Charlson et al., original article in 1987, the paper has been cited nearly 5500 times and the index has been validated for its ability to predict mortality in various disease subgroup including cancer, renal disease, stroke, intensive care and liver disease. These studies consistently demonstrate that the Charlson index is a valid prognostic indicator for mortality. There are several studies which shows the poor survival among cancer patients with comorbidities. However the underlying mechanism remains unclear. The access to health care for patients diagnosed with different diseases, including cancer patients has been limited during covid-19 pandemic.<sup>8</sup> The covid-19 pandemic affected health care services in many dimensions, starting from interrupting regular patient flow to health care resources and leading to the implementation of extra protective measures and social distances with increased utilization of telehealth and virtual medicine. Many cancer patients are affected dramatically by the covid-19 pandemic. Therefore this study is performed to explore the impact of pandemic on cancer survival. We have used Charlson comorbidity index to measure the survival rate of cancer patients with comorbidity conditions. Many of the cancer patients are affected by the COVID- 19 pandemic due to various factors. Disruptions in the cancer care during the pandemic create a major impact on the quality of life. This study is intended to explore the correlation between pandemic and cancer survival and to improve the quality of life of cancer patients.

## METHODS

**Study Design:** The study design was a retrospective study.

**Study Site:** The study site was carried out in the oncology department of Thangam Hospital, Namakkal. **Duration of the Study:** This study was carried out a period of 6 months from OCTOBER 2022 to MARCH 2023.

**Inclusion Criteria:** Cancer patients with co-morbidities before pandemic. Cancer patients with co- morbidities after pandemic. Cancer patients without co-morbidities.

**Exclusion Criteria:** Pediatrics patients Geriatrics patients.

**Data Entry Form:** A specially designed data entry form was used in this study. It consists of following details the Patient name, Age, Gender, IP/OP No, Height, Weight, BMI, Occupation, reason for admission, past medical history, past medication history, family history, social history, laboratory investigations, diagnosis and therapeutic chart.

**Study Population:** 150 subjects.

**Data Source:** Data was collected from patient history, Medical Record Department.

## RESULTS AND DISCUSSION

This study was initiated on October 2022 and completed on March 2023 at Thangam Cancer Center in Namakkal. The study comprised of 150 subjects out of which 75 Pre- Pandemic Cancer patients, Similarly 75 Post-Pandemic Cancer patients.

The mean age of Pre-pandemic patients is 43.6 and the Post-pandemic patients' mean age is 45.8. The age wise distribution among the study population has shown in table no 6.1. Most number of participants is in the age group of 41-50 years (53.33%) 80 subjects, while the least number of participants are in the age group of below 21 years (0.66%) 1 subject. The mean age of the study participants is 44.7.

This study consists of 68 (45.33%) males and 82 (54.66%) females. Table 6.2. Which shows that the females are more likely to have cancers than males.

Among our study participants 22(14.66%) are alcoholic and 23(15.33%) are smokers. This has shown in Table 6.4.1 and 6.4.2 respectively. Among the all study participants 19(12.66%) subjects are under body weight, 90 (60%) subjects are normal body weight, 31 ( 20. 66 %) subjects are over body weight, and 10 (6.66%) subjects are in obese.

In a study conducted by Jacob.J.lang (2022) estimated 1/3 of patients experienced disruptions to cancer care due to the COVID-19 pandemic.

Restrictive measures like national lockdown and home quarantine have had a major impact on cancer patients, including a sharp reduction in cancer screening and postponement of ongoing therapy during the initial months of pandemic. This may contribute the occurrence of new comorbidities among the cancer patients.

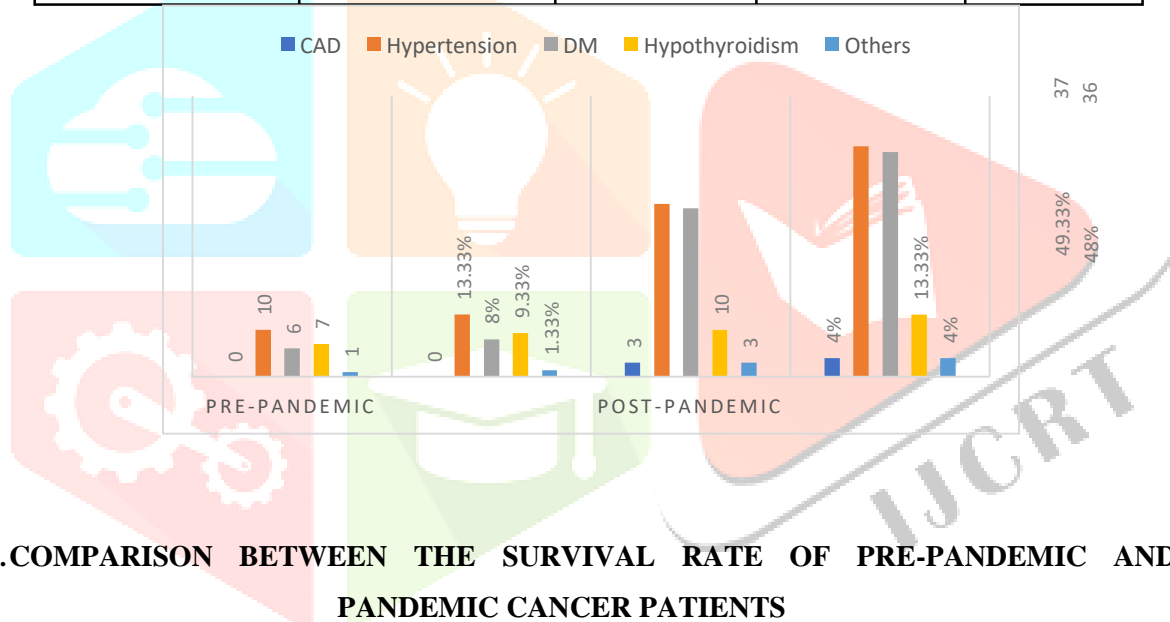
## 1.DISTRIBUTION OF CO-MORBIDITIES AMONG THE CANCER PATIENTS

A total of 150 subjects, 75 subjects are Pre-pandemic cancer patients and 75 subjects are Post-pandemic cancer patients. The Co-morbidities for both group was analyzed and compared. (Table 1, Figure 1)

Hypertension coexists with cancer in most of the cases. The number of cancer patients affected by hypertension has increased dramatically from 10(%) patients to 37(41.57%) patients.

**Table 1: Distribution of co-morbidities among the cancer patients.**

Co-morbidities	Pre-Pandemic		Post-Pandemic	
	Number of patients	Percentage (%)	Number of patients	Percentage (%)
CAD	0	0	3	4
Hypertension	10	13.33	37	49.33
DM	6	8	36	48
Hypothyroidism	7	9.33	10	13.33
Others	1	1.33	3	4

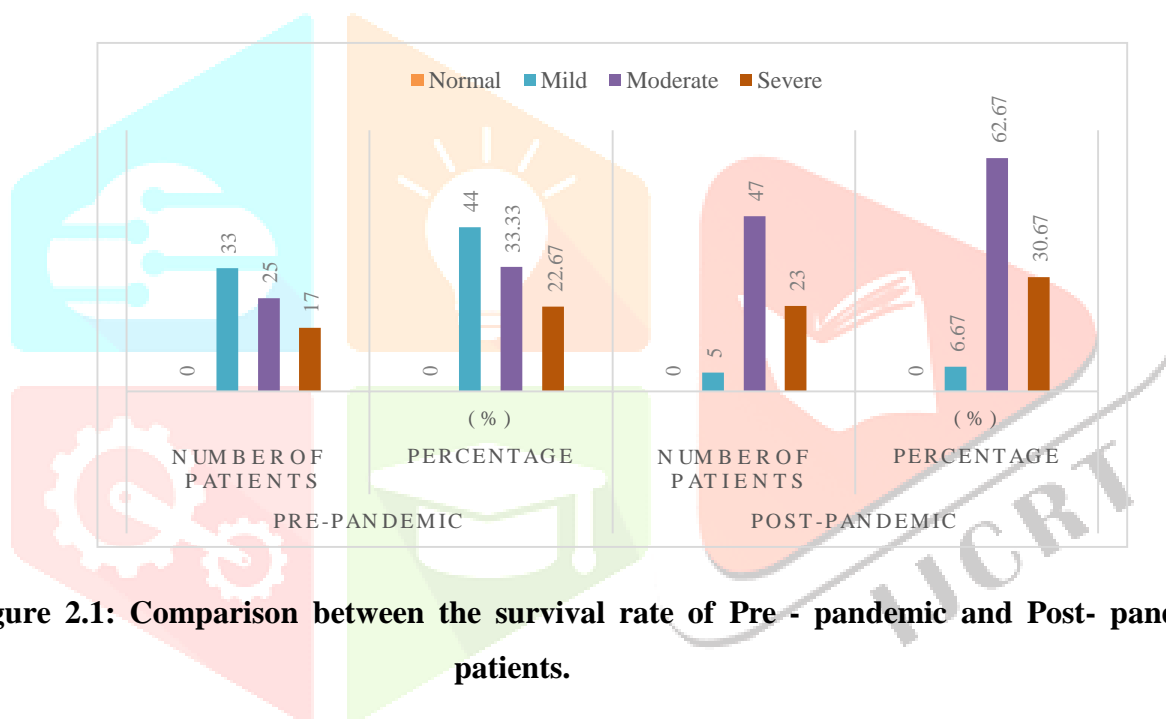


## 2.COMPARISON BETWEEN THE SURVIVAL RATE OF PRE-PANDEMIC AND POST-PANDEMIC CANCER PATIENTS

A total of 150 subjects, 75 subjects are Pre-pandemic cancer patients and 75 subjects are Post-pandemic cancer patients. The CCI score for both groups are analyzed and compared. (Table 2, Figure 2.1 & 2.2)

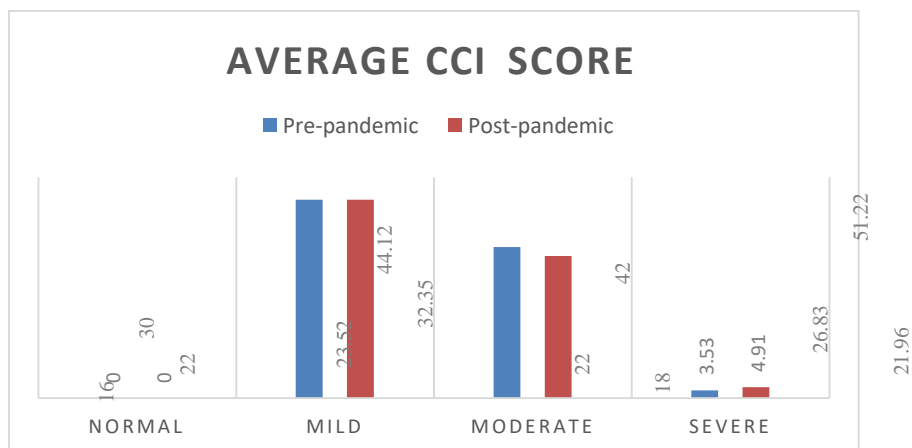
**Table 2: Comparison between the survival rate of Pre-pandemic and Post-pandemic cancer patients.**

Survival rate	Pre-Pandemic			Post-Pandemic		
	Average CCI Score	Number of patients	Percentage (%)	Average CCI Score	Number of patients	Percentage (%)
Normal	0	0	0	0	0	0
Mild	90	33	44	90	5	6.67
Moderate	68.36	25	33.33	64.23	47	62.67
Severe	3.53	17	22.67	4.91	23	30.67



**Figure 2.1: Comparison between the survival rate of Pre - pandemic and Post- pandemic cancer patients.**

In this study most of pre-pandemic cancer patients have mild risk of survival for the next ten years, whereas the most post-pandemic cancer patients have moderate risk for survival. However the average percentage of survival (CCI Score) has reduced in post-pandemic moderate survival risk cases.



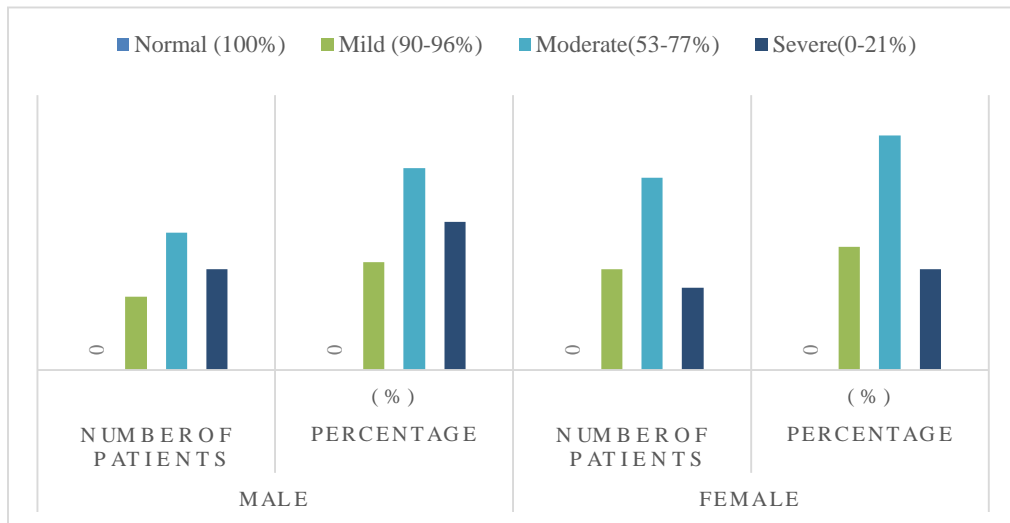
**Figure 2.2: Comparison of average CCI Score of Pre-pandemic and Post-pandemic cancer patients.**

### 3. GENDER WISE COMPARISON OF SURVIVAL RATE OF CANCER PATIENTS

A total of 150 subjects, 68 subjects are male cancer patients and 82 subjects are female cancer patients. The CCI score for both groups are analyzed and compared. (Table 3, Figure 3.1 & 3.2)

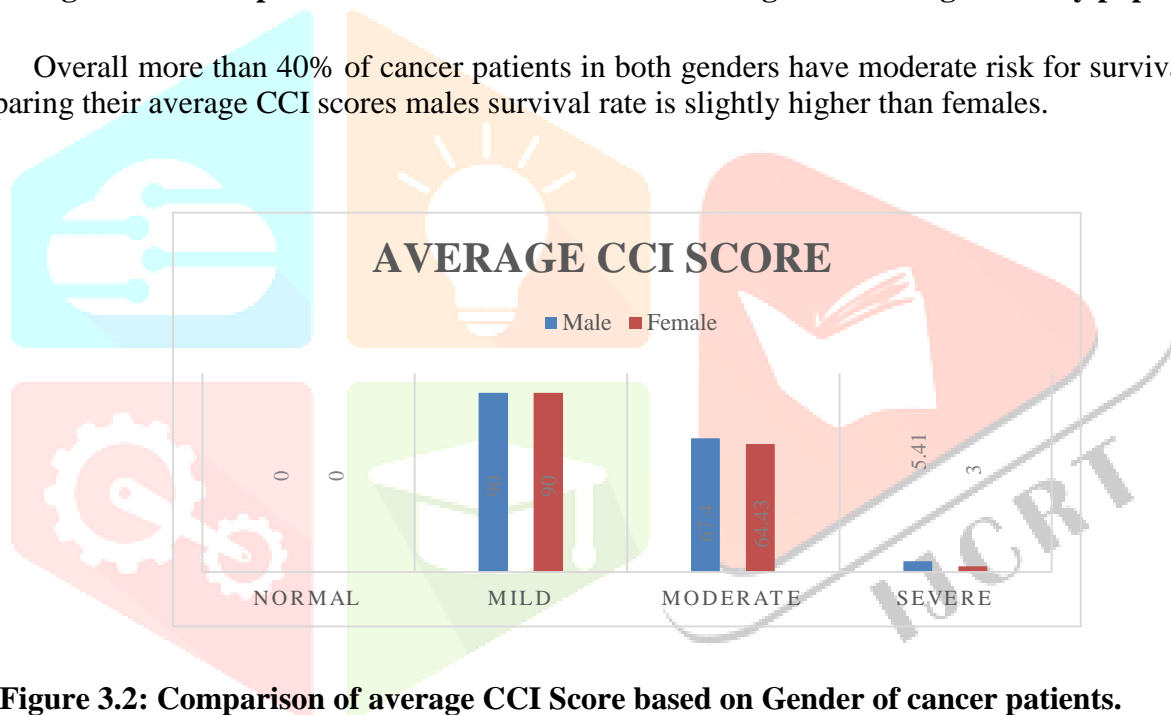
**Table 3: Comparison of survival rate based on the gender among the study population.**

Charlson Score of survival rate	Male			Female		
	Average CCI Score	Number of patients	Percentage (%)	Average CCI Score	Number of patients	Percentage (%)
Normal (100%)	0	0	0	0	0	0
Mild (90-96%)	90	16	23.52	90	22	26.83
Moderate (53-77%)	67.4	30	44.12	64.43	42	51.22
Severe (0-21%)	5.41	22	32.35	3	18	21.96



**Figure 3.1: Comparison of survival rate based on the gender among the study population.**

Overall more than 40% of cancer patients in both genders have moderate risk for survival. By comparing their average CCI scores males survival rate is slightly higher than females.



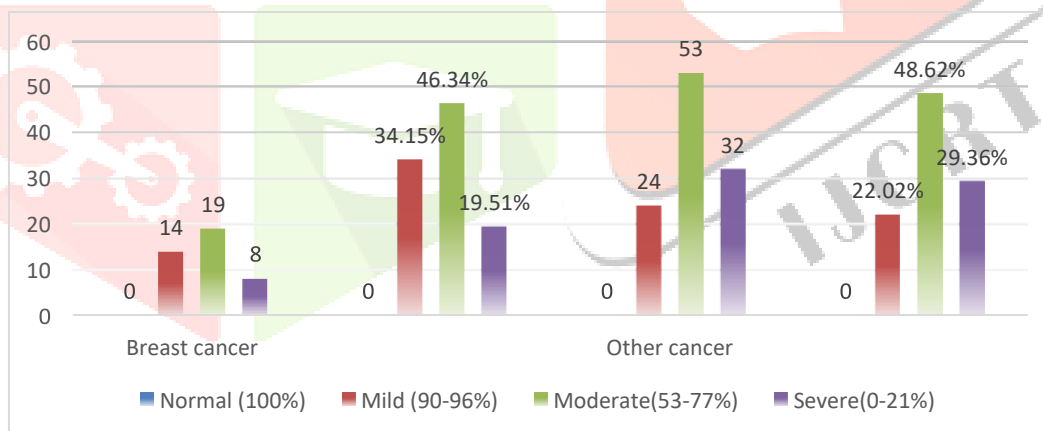
**Figure 3.2: Comparison of average CCI Score based on Gender of cancer patients.**

#### 4..COMPARISON BETWEEN THE SURVIVAL RATE OF BREAST CANCER PATIENTS WITH OTHER TYPES OF CANCER PATIENTS

A total of 150 subjects among them 41 subjects are breast cancer patients and 109 subjects are other type of cancer patients. The CCI scores of both groups are analyzed and compared. (Table 4, Figure 4.1 & 4.2).

**Table 4: Comparison between the survival rate of breast cancer patients with other types of cancer patients.**

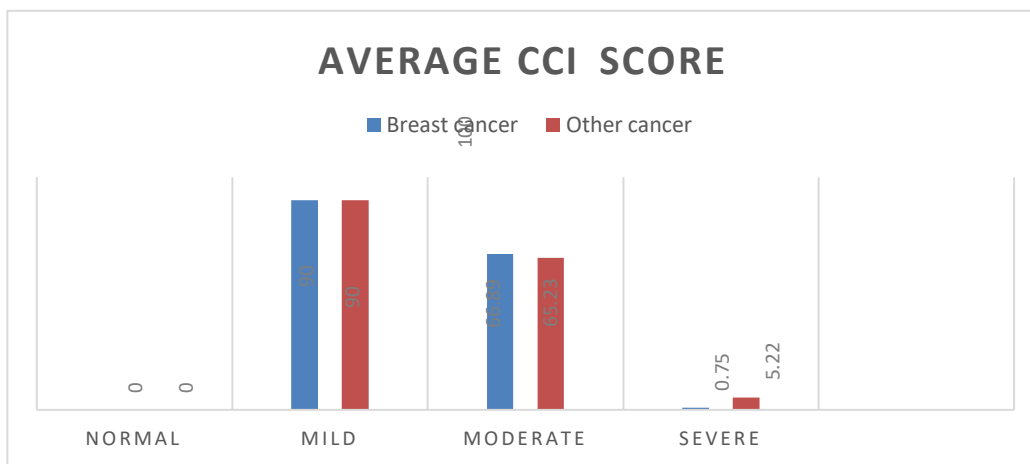
Survival rate	Breast cancer			Other cancer		
	Average CCI Score	Number of patients	Percentage (%)	Average CCI Score	Number of patients	Percentage (%)
Normal (100%)	0	0	0	0	0	0
Mild (90-96%)	90	14	34.15	90	24	22.02
Moderate (53-77%)	66.89	19	46.34	65.23	53	48.62
Severe (0-21%)	0.75	8	19.51	5.22	32	29.36



**Figure 4.1: Comparison between the survival rate of breast cancer patients with other types of cancer patients.**

Almost one third of our study participants are breast cancer patients, while comparing the rate of survival of breast cancer patients with other type of cancer patients more breast cancer patients have mild risk for survival than other cancer patients. In contrast more other cancer patients have severe risk for survival than breast cancer cases.





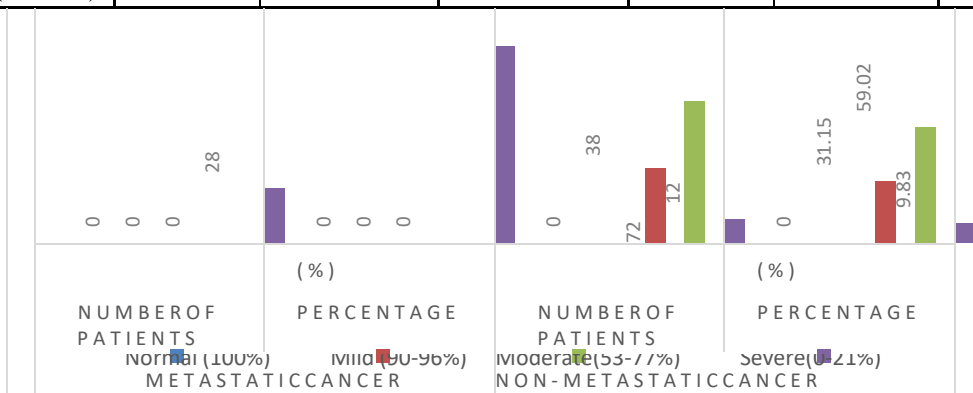
**Figure 4.2: Comparison of average CCI Score between the breast cancer patients with other types of cancer patients.**

**5.COMPARISON BETWEEN THE CANCER SURVIVAL IN METASTATIC CANCER AND NON-METASTSTIC CANCER PATIENTS**

A total of 150 subjects among them 28 subjects are metastatic cancer patients and 122 subjects are non-metastatic cancer patients. The CCI scores of both groups are analyzed and compared. (Table 5, Figure 5.1 & 5.2).

**Table 5: Comparison between the cancer survival in metastatic cancer and non-metastatic cancer patients.**

Charlson Score of survival rate	Metastatic cancer			Non-metastatic cancer		
	Average CCI Score	Number of patients	Percentage (%)	Average CCI Score	Number of patients	Percentage (%)
Normal (100%)	0	0	0	0	0	0
Mild (90-96%)	0	0	0	90	38	31.15
Moderate(53-77%)	0	0	0	65.67	72	59.02
Severe(0-21%)	0.85	28	100	12.45	12	9.83

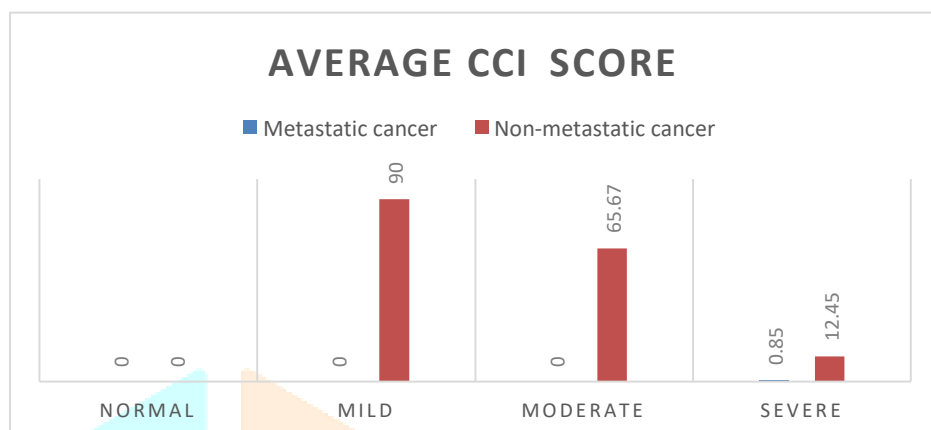


**Figure 5.1: Comparison between the cancer survival in metastatic cancer and non- metastatic cancer**

patients.

Metastasis is the leading reason for the resultant mortality of cancer patients.

In this present study we have compared the survival risk of metastatic cancer patients with other cancer patients. Our finding shows that all the metastatic cancer cases have severe risk for mortality and their average percentage of survival is 0.85%.



**Figure 5.2: Comparison of average CCI Score between the metastatic cancer patients and the non-metastatic cancer patients.**

## CONCLUSION

The prevalence of co-morbidities in cancer patients has increased after the covid-19 pandemic. Our finding reveals that the risk of survival of cancer patients has increased from mild to moderate level after covid-19 pandemic. The present study also reveals the metastatic cancer patients have severe risk for survival than the non-metastatic cancer patients.

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