Research article   *Clinical research*

Study on the post-covid impact among the patients, based on their comorbidities

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ABSTRACT

Background: Severe acute respiratory syndrome corona virus 2 (SARS-CoV-2) is the pathogen responsible for the coronavirus disease 2019 (COVID-19) pandemic, which has resulted in global health crises and strained health resources. COVID-19 is now known to be a multi-organ disease with a wide range of symptoms.

Objectives: To assess that those who reported COVID-19 with comorbidities have high risk as compared to those without comorbidities.

Methodology: To better understand and characterize symptoms os post COVID-19 patients, a retrospective cohort analysis was conducted. Five hundred and eighty-three post COVID patients with and without comorbidities were selected for this cross-sectional study. Symptoms occurrence and severity were studied through questionnaires. Relative risk (RRs) were calculated by Chi square test where statistical significance was set as P<0.05.

Results: Out of 583 post COVID patients, we have 196 (33.61%) comorbid patients and 387 (66.38%) non-comorbid patients. The most common comorbidity was diabetes mellitus. By analyzing 257 comorbid cases, we had diabetes (29.57%), hypertension (22.17%), pulmonary disorder (23.34%), cardiovascular disorder (8.56%), renal disorder (2.33%), tumor (0.38%), obesity (8.94%), cerebrovascular disease (0.38%0 followed by dyslipidemia (4.28%). Also, by comparing the risk on respiratory and cardiovascular symptoms in post COVID-19 patients, we found that comorbid patients have more risk as compared to non-comorbid patients. We found risk on respiratory was significant (P=0.003248).

Conclusion: COVID-19 patients with comorbidity have high risk as compared to patients without comorbidity. We also found that patients with comorbidity have more deteriorating outcomes compared with patients without.

Keywords: SARS-CoV-2; COVID-19; Relative Risk; Chi-square test; Comorbidities; MERS; ACE2; CDC; RT-PCR; HRCT.

INTRODUCTION

The corona virus disease (COVID-19) is a highly transmissible and pathogenic virus produced by the severe acute respiratory syndrome corona virus 2 (SARS-COV-2)[2]. In Wuhan, China, a new Corona virus (covid-19) was discovered in 2019[10]. The initial case of COVID-19 was reported in China. On January 30, 2020, India reported its first case of COVID-19[12]. On January 30, 2020, India reported its first case of COVID-19[12]. On January 30, 2020, the first case of the COVID-19 pandemic in Kerala (as well as the first case in India) was confirmed in Trissur[13]. SARS-CoV-2 can spread through both direct and indirect contact[11]. The incubation period, often known as the time between initial infection and disease onset[15].

Comorbidities

Comorbidities is defined as the occurrence of two or more conditioning a patient, either concurrently or sequentially.

Types Of Comorbidities:

Diabetes
Hypertension
Pulmonary Disorder: COPD and Asthma
Cardiovascular Disorder
Dyslipidemia
Obesity
Cerebro-vascular Disease
Renal disease
Tumor

Treatment

Drugs used are
- TabChloroquine base 600
- Tab Azithromycin 500 mg
- Tab Oseltamivir 75 mg

Prevention

- Regularly wash your hands with soap and water for at least 20 seconds
- Maintain social space
- Avoid huge gathering and events
- Cover your mouth and nose with tissue paper if you cough or sneeze
- Stay at home for a while and listen to your doctor's advice
- Avoid direct physical contact with respiratory and other body systems

METHODOLOGY

- Study site :Kerala

- Study population: Post COVID-19 patients in Kerala
- Study design: cross sectional epidemiological study design
- Study period: 4 month from December to February
- Study material: Google forms and survey
- Study criteria: *Inclusion criteria*: All post COVID-19 patients with or without comorbidities
- *Exclusion criteria*: Non post COVID-19 patients

STUDY PROCEDURE

The survey will be conducted after getting permission from the college.

A Cross sectional epidemiological study will be utilized for evaluating the demographic information, clinical manifestation - post covid symptoms and their side effects, impact of covid - 19 patients among comorbid patients. Post covid patients should be identified from the general population of Kerala through google forms- Chelembra region in Malappuram district of Kerala was conducted through survey.

We will explain the purpose of the Survey. If willing, we shall collect their information on interviewing the post covid people based on the survey form about their demographic information (Name, age, gender, occupation, blood group, height, weight) and comorbidities such as diabetes, hypertension, pulmonary disorder, cardiovascular disease, renal disease, tumor, obesity, cerebrovascular disease.

From the observations, the given objective will be assessed and evaluated using suitable statistical techniques.

RESULT AND DISCUSSION

The Questionnaire based survey on the topic Post Covid Impact among the comorbid and non- comorbid patients. From the total of 583 Participants of Covid positive cases with 196 Comorbid and 387 non-comorbid patients which comply with inclusion criteria of our study protocol were taken and thus we came to the following results.

Demographic Characteristics Of The Patients

AGE (YEARS)	MALE (256)	PERCENTAGE (%)	FEMALE (327)	PERCENTAGE (%)
<18	11	1.88%	13	2.22%
18-45	172	29.50%	249	42.71%
46-60	45	7.72%	48	8.23%
>60	28	4.80%	17	2.92%

The number of positive caseson the basis of age and gender were categorized. The majority of patients (72.04%) under the age group of 18-45 years and when considering the gender majority of covid positive patients were females (56.09%). These findings are almost identical to those of Manoj V.Murhekar et al.,found that the majority of positive cases were in the category of 18- 45 years (48.5%) and females (51.5%).

Post Covid Manifestation

POST COVID MANIFESTATION	NUMBER (583)	PERCENTAGE (%)
Fatigue	299	51.29 %
Recurrent fever	164	28.13 %
Joint pain	270	46.31 %
Weightloss	183	31.39%
Loss of smell	91	15.60 %
Loss of Taste	77	13.20 %
Shivering	76	13.03 %
Vomiting	58	9.95 %
Allergy	85	14.58 %
Memory loss	67	11.49%
Sleep disturbance	292	50.08 %
Headache	358	61.41 %
PSYCHOLOGICAL SYMPTOMS		
Anxiety	120	20.58 %
Depression	111	19.04 %

In the study done by Bircan Kayaaslan *et.al*.,the most persistent symptoms was fatique and headache. The neuropsychiatric symptoms such as memory loss and sleep disturbance. Where as in our study headache (61.41%), fatique (51.29%) and neuropsychiatric symptoms such as memory loss (11.49%) and sleep disturbance (50.08%). The psychiatric symptoms such as anxiety (20.58%) and depression (19.04%), similar to Marwa Kamal *et al.*, were patients experiencing Anxiety and depression.
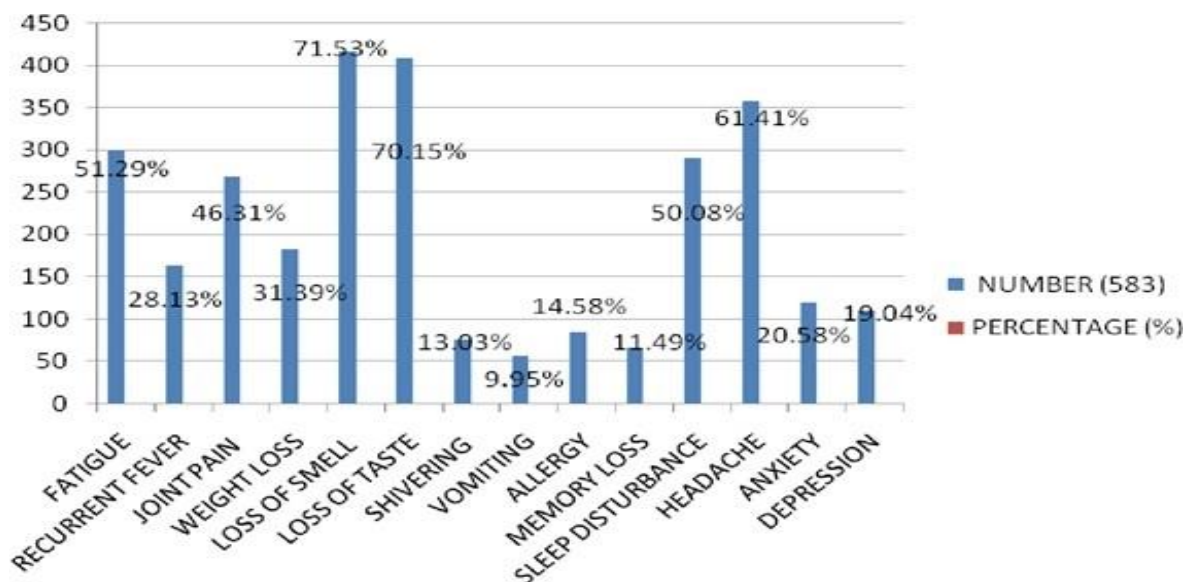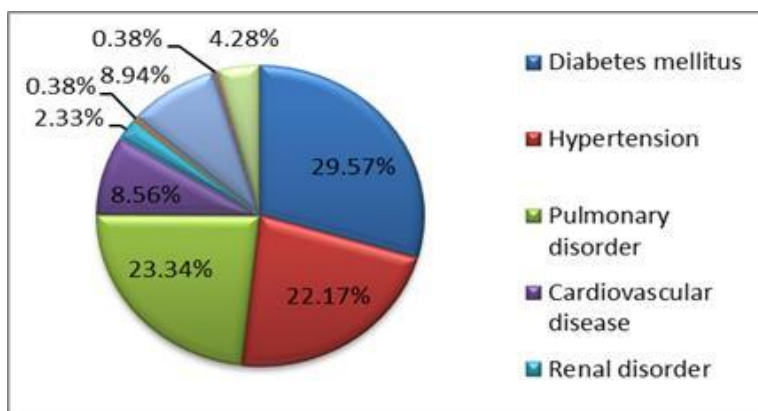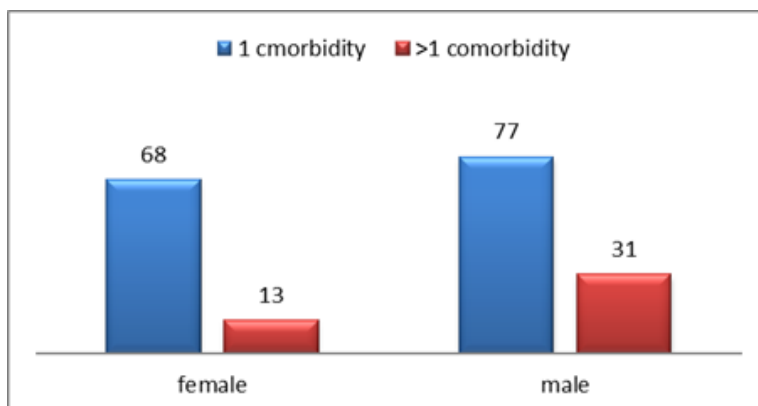

Comorbidities

COMORBITIES	NUMBER (257)	PERCENTAGE (%)
Diabetes mellitus	76	29.57%
Hypertension	57	22.17%
Pulmonary disorder	60	23.34%
Cardiovascular disease	22	8.56%
Renal disorder	6	2.33%
Tumor	1	0.38%
Obesity	23	8.94%
Cerebrovascular disease	1	0.38%
Dyslipidemia	11	4.28%

In our survey the most observed comorbid condition was Diabetes mellitus (29.57%) followed by pulmonary disorder (23.34%) and hypertension (22.17%). This result was compared with Akin Osibogun et al., the most common ones were hypertension (74.2%), diabetes (30.3%) and asthma (10.2%).

Databased On Sex

In our data, the number of comorbidities by sex were higher in male with both one and more than one comorbidities, that is similar to Akin Osibogun et al.,the higher proportion of male in both one and more than one comorbidity.

Risk On Respiratorysymptoms In Covid Patients

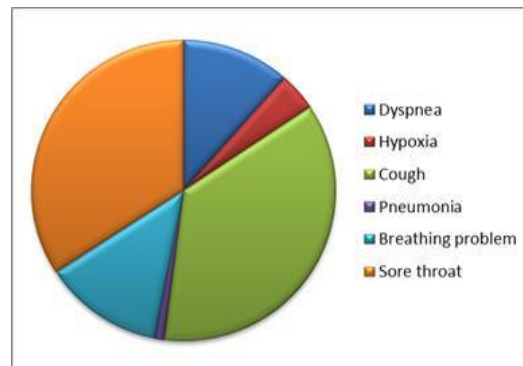|	COMORBIDITY (196)	NON COMORBIDITY (387)	
Dyspnea	67	56	
Hypoxia	41	20	
Cough	154	177	P Value= 0.0032
Pneumonia	16	5	
Breathing Problem	74	62	
Sore throat	146	166	

Chi-square test was performed to find risk on Respiratory symptoms in covid patients with or without comorbidity.The patients with severe respiratory symptoms have high risk of getting Covid infection was significant.

By analysing the data, the most common respiratory symptom was cough, followed by sore throat, followed by breathing problem, followed by Dyspnea in both comorbid and non-comorbid patients. This result was compared to Islam Galal et al.,The most common respiratory symptoms were cough (29.3%) and dyspnea (29.1%).
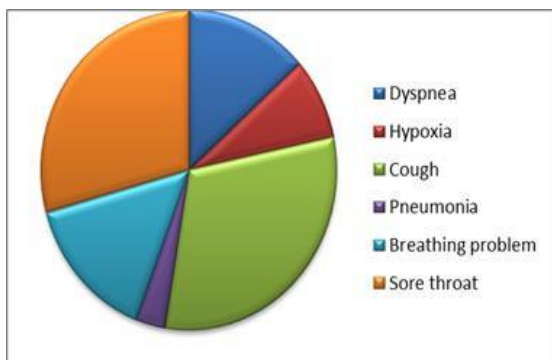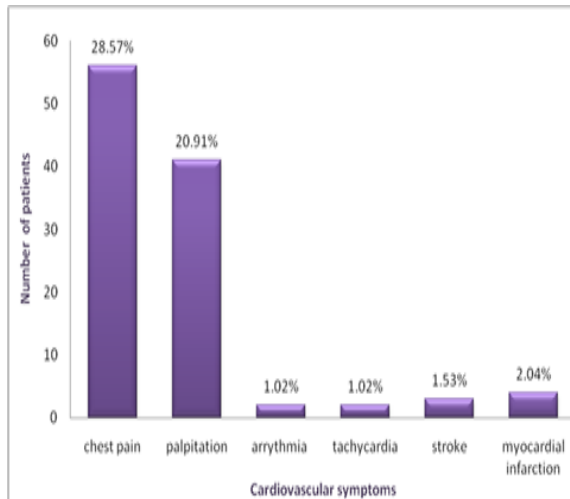

Risk in Comorbidities

Risk in Non-Comorbidities

Risk On Cardiovascular In Covid Patients

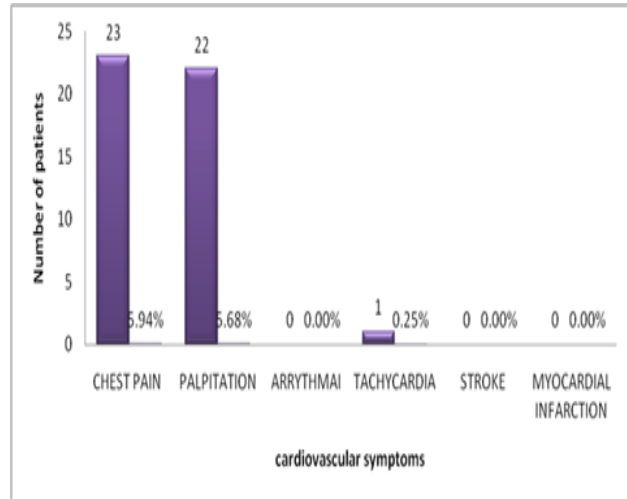|	COMORBIDITY (196)	NON COMORBIDITY(387)	
Chest pain	56	23	
Palpitation	41	22	
Arrhythmia	2	0	**P Value=0.46**
Tachycardia	2	1	
Stroke	3	0	
Myocardial infarction	4	0	

Chi-square test was performed to find risk on cardiovascular symptoms in covid patients with or without comorbidity. The patients with severe cardiovascular symptoms have high risk of getting Covid infection was Non-significant.

By analysing the data, the most common cardiovascular symptoms were chest pain in both comorbid and non-comorbid patients. But the occurrence of chest pain is greater in comorbid patients (28.57%) than non-comorbid patients (5.94%). It is similar to Shaoba Shi. et al.,chest pain is also greater with comorbid patients (13.4%) as compared to without comorbid patients (0.9%).
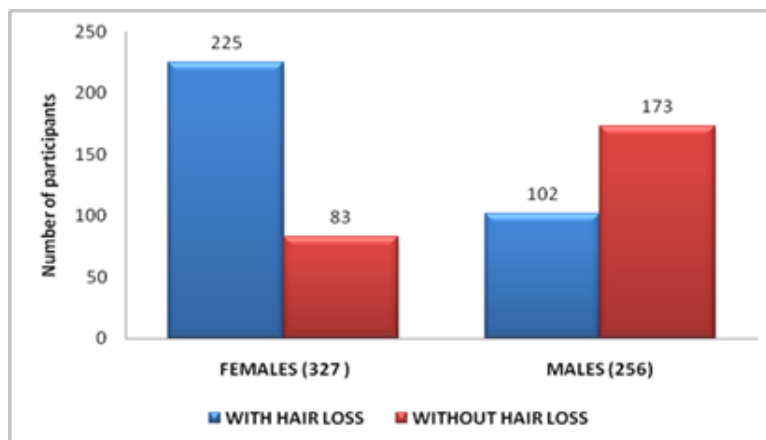
| Risk in comorbidities | Risk in Non- Comorbidities |

Change In Hair Loss
Hair loss was another common sequela during our study, by observing the data out of 583 post covid patients 327 patients experienced hair loss.

Change In Hair Loss In Gender

|	FEMALE (327)	MALE (256)
WITH HAIR LOSS	225	102
WITHOUT HAIR LOSS	83	173

Change in Hair loss in Gender

By comparing the change in hair loss, female category (68.81%) had experiencing hair loss than the male category (39.84%). It is similar to Qiutang Xiong *et al.*,During this analysis 154 survivors had hairloss (12 male and 142 female patients). The prevalence of this sequela in women was as high as 48.5%.

Change In Menstrual Cycle
Data Based On Menstrual Cycle

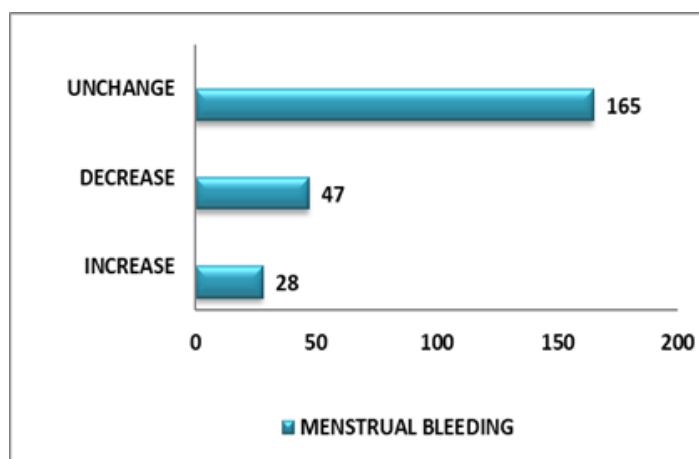|	NUMBER (280)	PERCENTAGE (%)
Females without change in Menstrual cycle after Covid-19	165	58.92%
Females with change in Menstrual cycle after Covid-19	115	41.07%
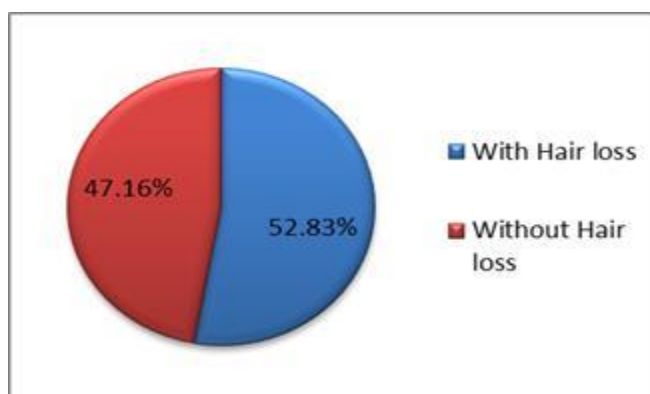
By analysing the data of change in menstrual cycle in females after covid-19, we found that165 females out of 280 (58.92 %) had no change in menstrual cycle and 115 females (41.07%) had change in menstrual cycle.

### *Data Based On Change In Menstruation In COVID Patients*
By performing Chi-square test, we found that the variations in menstrual cycle such as menstrual bleeding, cycle length, pain, changes in pre menstrual symptoms shows significant P value (0.0329).

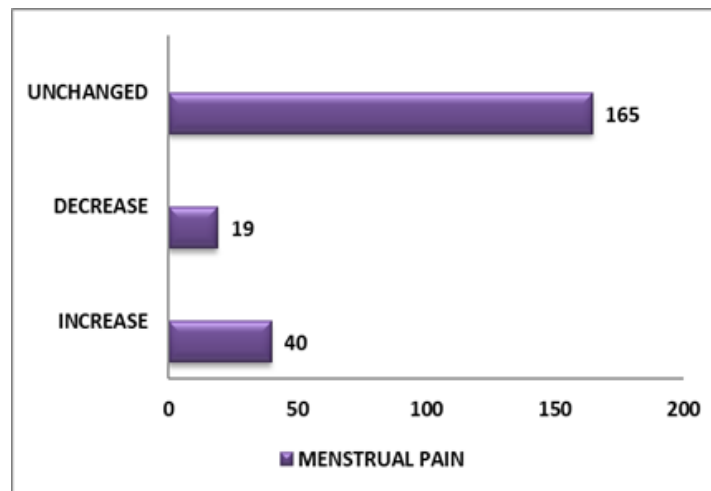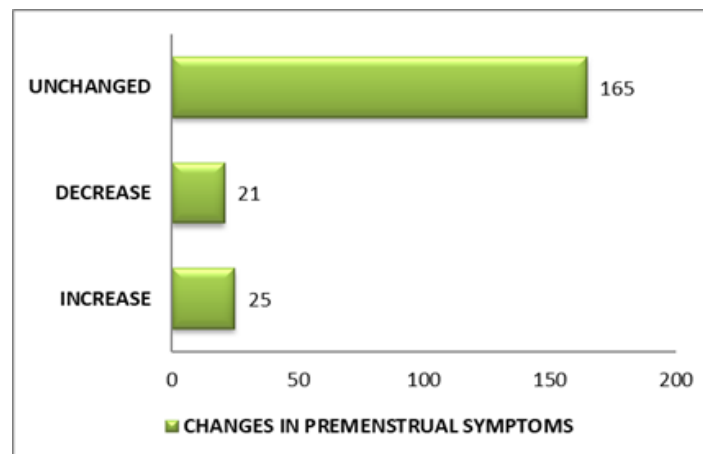| Change in menstrual cycle	Unchange	Decrease	Increase	
Menstrual Bleeding	165	47	28	
Menstrual Cycle Length	165	33	49	P Value=0.0329
Menstrual Pain	165	19	40	
Change in Premenstrual Symptoms	165	21	25	

Menstrual Bleeding

Menstrual Cyclelength
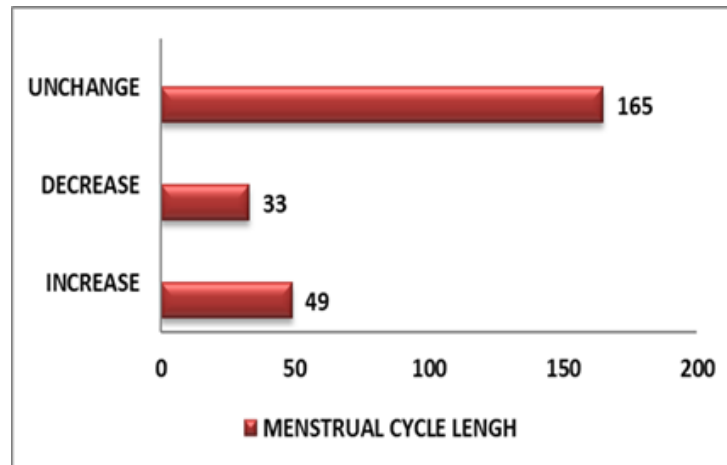
Menstrual Pain

Changes In Premenstrual Symptoms

- By Analysing the data of change in menstrual cycle after covid-19, we found that165 females out of 280 (58.93 %) had no change in menstrual cycle and 115 females (41.07%) had change in menstrual cycle. It is similar to Sana M. Khan et al.,ie, participants who did not report change in their menstrual cycle after Covid infection was 84.3% and participants who reported a change in menstrual cycle after Covid infection was 15.7%.

- By comparing menstrual bleeding data, 58.93% patients had no change in menstrual bleeding, 16.78% patients had decrease in menstrual bleeding and 10% decrease in menstrual bleeding. It is similar to Kezhen Li et al.,ie, greater percentage of people (75%) had no change in menstrual bleeding, followed by decrease in menstrual bleeding (20%), followed by increase in bleeding (5%).

- By analyzing menstrual cycle length data, the 58.93% patients had no change in their menstrual cycle length, 17.5% patients had prolonged cycle length and 11.78% patients had shortened cycle length. It is similar to Kezhen Li et al.,ie, higher percentage of patients (72 %) had no change in their cycle, 18% patients had prolonged cycles and 3% patients had shortened cycles.

Other Changes

	YES	PERCENTAGE (%)	NO	PERCENTAGE (%)
Difficulty in urination	23	3.94%	560	96.05%
Change in sugar level	66	11.32%	517	88.68%
Change in pressure level	88	15.07%	495	84.90%
No changes	450			77.19%

By analyzing the data of 583 patients, 23 patient's shows difficulty in urination (3.94%), 66 patients shows change in sugar level (11.32%) , 88 patients shows change in pressure level (15.07%).

CONCLUSION

In our Retrospective Cohort study, we found that the most of the post COVID-19 patients is in the female gender and in the age group of 18-45. The most observed post COVID manifestation was headache. About 33.61% post COVID patients have comorbidity and the most common comorbidity was diabetes mellitus. The study on post COVID impact on comorbidities (Risk in Respiratory and Cardiovascular symptoms), We found that patients with comorbidities have high risk as compared with patients without. Several changes observed in menstruation after Covid-19 in some female population, such as changes in menstrual bleeding, menstrual cycle length, menstrual pain and premenstrual symptoms. The study shows effect of hair loss in post Covid patients. Individuals with comorbidities should take all necessary steps to avoid SARS CoV-2, because of their poor rate of recovery.

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