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A research investigation on safety protocols and pertinent details concerning individuals recovering from the COVID-19 pandemic

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Abstract
Corona virus disease 2019 (COVID-19) is a contagious disease characterized by pneumonia and acute respiratory distress syndrome, which is caused by a novel corona virus (2019-nCoV). On 12th January, 2020, WHO confirmed that a novel coronavirus was cause of respiratory illness in a cluster of people in Wuhan, Hubei, China, which was reported to the WHO on 31st December 2019. The first fatal case was reported on 11th January, 2020 at China. In India first case of COVID-19 reported in Kerala on 30th January. The present study was conducted on 300 post COVID-19 adult patients comprised 150 males and 150 females in Bikaner City. Majority of subjects experienced mild COVID-19 signs and symptoms such as fever (78.3%), loss of appetite (65.9%) and gastrointestinal infection (48.5%). Maximum number of subjects (64.0%) felt abnormality after recovery from COVID-19 such as fatigue (69.7%) and also experienced stress and anxiety (65.7%). The majority of participants adhered to pandemic mitigation guidelines, and it was determined that the safety measures implemented by patients proved to be effective in curbing the spread of the virus.

Keywords: COVID-19, Fever, appetite, gastrointestinal infection etc.

Introduction

Coronavirus Disease 2019 (COVID-19), caused by severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2), has observed an increase of cases in the hospitals across the world (Dong *et al*., 2020) [2]. In December 2019, several cases reported with severe pneumonia of unknown cause in the city of Wuhan, China. The virus novel SARS-CoV-2 spread across the world within three months resulted in pandemic posed a devastating threat to human health (Rohaimi and Otaibi, 2020) [2]. On 12th January, 2020, WHO confirmed that a novel coronavirus was cause of respiratory illness in a cluster of people in Wuhan, Hubei, China, which was reported to the WHO on 31st December 2019. The first fatal case was reported on 11th January, 2020 at China. In India first case of COVID-19 reported in Kerala on 30th January, which rose to three cases by 3rd February, in students returning from Wuhan. Apart from these, no significant rise in transmissions observed in February. On 4th March, 2020 twenty two new cases were reported, including 14 infected members of an Italian tourist group. The transmissions grew after several people with travel history to affected countries and their contacts, tested positive. On 12th March, a 76 year old man, with a travel history to Saudi Arabia, became the first case of COVID-19 fatality in India. After that on March 11th, 2020 WHO called COVID-19 as a pandemic (www.wikipedia.org, 2020). The Prime Minister of India announced 22nd March, 2020 as 'Janta Curfew' to solicit social distancing, before enforcing a nationwide lockdown for 21 days, starting from 25th March, 2020.

The Government of India declared a countrywide COVID-19 lockdown starting at mid night on 24th March, 2020 and lasting for 3 weeks until 14th April, 2020 (lockdown phase 1). On 14th April, 2020, the Government of India extended the countrywide lockdown until 3rd May (phase 2). The lockdown was then extended again on 1st May, 2020, by a further 2 weeks until 17th May, 2020 (phase 3). On 17th May the lockdown was extended by the National Disaster Management Authority until 31st May, 2020 (phase 4). On 30th May, 2020 it was announced that the continuing lockdown would be additionally extended up to 30th June, 2020 in containment areas, with services resuming in a phased manner starting from 8th June, 2020; this was termed 'unlock 1.0'. The Indian Prime Minister later clarified that the lockdown period in the country had ended and that 'unlock' had already begun. The second phase of unlocking, 'unlock 2.0' was declared for the period of 1st–31st July, 2020 with more easing of restrictions. After that with this countrywide COVID-19 unlock phase started with no restriction (Saha and Chouhan, 2021) [10].

As of December 2020, Rajasthan reported 3,00,716 confirmed COVID-19 cases with 2,634 deaths and 2,86,481 cases recovered while in Bikaner there are 18,942 confirmed COVID-19 cases with 165 deaths and 18,689 recovered cases (www.COVID19india.org, 2020).

Table 1: Prevalence of COVID-19

COVID-19 Cases*	Confirmed	Recovered	Death
Global	7,80,18,199	4,39,98,920	17,17,124
India	1,01,00,330	96,63,291	1,46,487
Rajasthan	3,00,716	2,86,481	2,634
Bikaner	18,942	18,689	165

*www.COVID19india.org (2020)

It was observed that COVID-19 is two to three times more contagious than influenza (Anderson *et al*., 2020) [1].

At starting stage it is asymptomatic and able to be transmitted from one sufferer to another and due to these characteristics, outbreaks of COVID-19 occur in clusters. Identifying COVID-19 early may be helpful in reduce the number and size of clusters, but early symptoms are not well-defined (Sun *et al*., 2020) [14]. Onset of Symptoms of COVID-19 Health Organization (WHO) currently advise the public to call their doctor if they believe they have been exposed to COVID-19 or exhibit fever and cough (Sohrabi *et al*., 2020) [13]. Some Clinical signs are associated with COVID-19 infection wherein most of the case symptoms appear within 3-7 days. Fever, diarrhea, runny nose, pharyngological myodynia-like symptoms appear in the first week which can create hypoxia and dyspnea in the later week of infection (Eastin and Eastin, 2020) [3]. There are many different types of face masks and respirators offering different levels of protection to users (Long *et al*., 2020) [6]. Generally, masks do not fit tightly while respirators do. Masks and respirators may be reusable or disposable. Reusable ones include industrial-use half or full face piece respirators with cartridge filter attached and homemade or commercial cloth masks; disposable ones include surgical masks, N95 respirators, and KN95 respirators (Rubbo S. D. and Abbott, 1968) [9].

Methodology
Locale of study: The study was conducted in Bikaner City of Rajasthan. The post COVID-19 adult patients were selected for the present investigation. Three hundred both male and female were selected by purposive random sampling on the basis of their willingness to cooperate during the study. A structured interview schedule with sufficient number of items prepared short, crisp, scientifically structured, validated, easy-to-use and applicable for each group was developed to collect the data from the subjects. The schedule approved by the experts before implementing on the subjects. The pretested interview schedule consists following section:

Specific information about COVID-19
Some specific information assessed about COVID -19 such

as symptoms experienced by respondents, test used to detect, place of treatment, time of treatment, severity of disease, co-morbidities, duration of isolation, long term effect of COVID-19, stress and anxiety levels, plasma therapy, *Aarogya Setu app,* social distancing, use and type of mask, hand sanitization, frequency of hand sanitization, disinfecting the things, use of personal protective equipment (PPE) kit and intake of immunity booster.

Results and Discussion
Information related to disease
▪ **Source of getting the knowledge of symptoms**
Data presented in table (1) unfurl that majority (55.0%) of the subjects got knowledge of about COVID-19 symptoms through internet followed by television (18.67%), newspaper (14.3%) and other sources (12.0%). None of the respondents got information from journals & magazines.

▪ **Signs and symptoms experienced**
According to WHO (2020), fever, dry cough, tiredness, sore throat, diarrhea, headache, rash on skin and loss of smell and taste are some common symptoms of COVID-19. Table (1) displays that most common symptoms at onset of illness noted fever (78.3%), loss of appetite (65.9%), gastrointestinal infection (48.5%) observed by maximum number of subjects while 26.4, 17.1 and 5.7 percent of the subjects had cough, difficulty in breathing and loss of smell & taste, respectively. Females (9.3%) found highly asymptomatic than males (3.3%). Fifty three percent of subjects faced other symptoms such as myalgia, conjunctivitis, abdominal pain, chest pain & tightness.
Almost similar study was conducted by Mizrahi *et al.* (2020) [7] that most common symptoms in COVID-19 patients experienced and reported cough (21%), fatigue (19%), rhinorrhea or nasal congestion (17%), headache (16%), myalgia (11%) and fever (10.3%).

▪ **Indication**
Indications of COVID-19 presented in table (1) shows that majority of subjects (47.7%) had visible signs and symptoms and 12% decided to go for random check-up. Twenty five percent got infected through physical contact

Table 1: Distribution of subjects according to information related to disease

Parameters	Males n = 150 (50)	Females n = 150 (50)	Total N = 300 (100)
Source of getting the knowledge of symptoms			
Internet	90 (60.0)	75 (50.0)	165 (55.0)
Television	41 (27.34)	15 (10.0)	56 (18.67)
Newspaper	9 (6.0)	34 (22.7)	43 (14.3)
Journals and magazines	0 (0)	0 (0)	0 (0)
Any other	10 (6.67)	26 (17.3)	36 (12.0)
Signs and symptoms of COVID-19 experienced			
Cough	46 (30.7)	33 (22.1)	79 (26.4)

Parameters	Males n = 150 (50)	Females n = 150 (50)	Total N = 300 (100)
Fever	107 (71.3)	127 (85.2)	234 (78.3)
Difficulty in breathing	33 (22.0)	18 (12.1)	51 (17.1)
Loss of appetite	96 (64.0)	101 (67.8)	197 (65.9)
Loss of smell &taste	12 (8.0)	78 (52.3)	17 (5.7)
GIT infection	67 (44.7)	5 (3.4)	145 (48.5)
Asymptomatic	5 (3.3)	14 (9.3)	5 (1.7)
Any other	81 (54.0)	78 (52.3)	59 (53.2)
Indication			
Symptoms	68 (45.3)	75 (50.0)	143 (47.7)
Random checkup	24 (16.0)	12 (8.0)	36 (12.0)
Contact with infected person	40 (26.7)	35 (23.4)	75 (25.0)
Any other	18 (12.0)	28 (16.0)	4615.3)
Mode of infection			
Community spread	77 (51.4)	61 (40.7)	138 (46.0)
Frontline worker	3 (2.0)	0 (0)	3 (1.0)
Health care worker	2 (1.3)	0 (0)	2 (0.7)
Social gathering	28 (18.7)	27 (18.0)	55 (18.3)
Test used for detection			
Molecular Test	125 (83.3)	145 (96.7)	270 (90)
Rapid antigen test	25 (16.7)	5 (3.3)	30 (10)
State of disease			
Mild	119 (79.3)	115 (76.7)	234 (78.0)
Moderate	25 (16.7)	35 (23.3)	60 (20.0)
Severe	6 (4.0)	0 (0)	6 (2.0)
Any co-morbidities			
Cardiovascular disease	7 (4.7)	8 (5.3)	15 (5.0)
Lung problems	0 (0)	0 (0)	0 (0)
Diabetes	0 (0)	3 (2.0)	3 (1.0)
Obesity	48 (32.0)	59 (39.3)	107 (35.7)
Cancer	0 (0)	0 (0)	0 (0)
Any other	95 (63.3)	80 (53.3)	175 (58.3)

Note: Figures in parenthesis indicates percentage of subjects and 15.3 percent did not mention the source of infection. Observations reflected high prominent symptoms in females (50%) as compared to their counterparts (45.3%).

The result of present study corroborated with the findings of study done by Johansson *et al.* (2021) [5] who also reported that most (75%) of the COVID-19 patients recorded symptoms while 25% did not show any sign & symptoms of infection.

▪ **Mode of infection:** Data presented in table (1) depicts that out of 300 subjects, 46% reported to be infected due to community spread followed by 18.3% due to social gathering while 34% did not know the source of infection. In present study, none of the females engaged as frontline or health care worker while in case of males, two percent helped as a frontline worker and 1.3 percent as a health care worker.

▪ **Test for detection:** Majority of the respondents (90%) was opted for molecular test while 10% subjects gone for rapid antigen. In case of males and females, (83.3%), (16.7%) and (96.7%), (3.3%) used molecular test and rapid antigen test respectively [Table 1].

▪ **State of disease:** Data presented in table 4 (1) depict

that majority of subjects (78%) reflected mild COVID-19 symptoms, whilst 20 percent had moderate symptoms. Out of 300 subjects, only 4 percent of male had severe condition. None of the subjects noted critically ill.

Similar result also reported by Silverio *et al.* (2021) [12] that maximum number of the adult COVID-19 patients had mild (81%) and severe (14%) symptoms followed by critical cases (5%).

▪ **Type of co-morbidities**
Maximum number of the subjects had obesity (35.7%), followed by cardiovascular disease (5%) and diabetes (1%). While 58.3 percent subjects was suffered from other type of disease like thyroid, anemia, and hypertension. In present study, none of the subjects had lung problems and cancer [Table 1].
Present findings regarding the type of co-morbidities are close to the results reported by (Silverio *et al.* 2021) [12] that the prevalence of hypertension (65.3%), cardiovascular disease (10.3%), and diabetes (4%) observed in adult patients with COVID-19.

Table 2: Distribution of subjects according to information related to treatment of COVID -19

Parameters	Males N = 150 (50)	Females N = 150 (50)	Total N = 300 (100)
Initiation of treatment			
Immediately	70 (46.7)	52 (34.7)	122 (40.7)
2-5	61 (40.7)	72 (48.0)	133 (44.3)

>5	19 (12.6)	26 (17.3)	45 (15.0)
Immediately	70 (46.7)	52 (34.7)	122 (40.7)
Place of treatment			
Home	60 (40.0)	79 (52.7)	139 (46.3)
Hospital	90 (60.0)	71 (47.3)	161 (53.7)
If hospitalized, then type of ward allotted			
General ward	90 (60.0)	71 (47.3)	161 (53.7)
Intensive Care Unit	0 (0)	0 (0)	0 (0)
Plasma therapy			
Yes	7 (4.7)	0 (0)	7 (2.3)
No	143 (95.3)	150 (100)	293 (97.7)
Medicine prescribed after recovery			
Yes	17 (11.3)	7 (4.7)	24 (4.7)
No	133 (88.7)	143 (95.3)	286 (95.3)

Note: Figures in parenthesis indicates percentage of subjects

(II) Information related to treatment of COVID-19
▪ **Initiation of treatment**
Data enrolled in table (2) that majority of the subjects (44.3%) underwent treatment within 2-5 days after infection followed by 40.7 percent patients underwent immediately and 15 percent underwent treatment after five days. Higher percentage of males (46.7%) underwent treatment immediately than females (34.7%).

▪ **Place of treatment**
It elucidated from table (2) that out of 300 subjects, 46.3% underwent treatment at home while 53.7% treated at hospitals. Result showed that maximum number of females (52.7%) underwent home treatment than males (40.0%).

▪ **If hospitalized, then type of ward allotted**
This study conducted on adult post COVID-19 patients and table (2) unfolds data that 53.7% admitted in general ward while none of the patients admitted in ICU ward. Hence, it can be inferred from the study that critically ill patient reported less during the research.

▪ **Plasma therapy**
Plasma treatment is a rapid technique to get over COVID-19 in which patients who recover from COVID-19 earlier could donate plasma to infected one.

Only 2.3% male patients received plasma treatment and rest of the subjects not received plasma therapy Table (2)].

▪ **Medicine prescribed after recovery**
Data presented in table (2) discloses that 4.7 percent of patients continued medicine even after they recovered from COVID-19, who had experience low immune system, fatigue, hypertension and cardiovascular disease. Ninety five percent patients did not take any medicine after recovery. It observed that higher percentage of males (11.3%) prescribed medicine after recovery than females (4.7%).
Result of present study corroborated with findings done by Fang *et al.* (2021) [4], who concluded that the person who suffered from co-morbidities or has low immune system was on medicines even after recovery. Severe patients with co-morbidities had significantly low cure rate (19.3% vs 38.9%) compared to those without co-morbidities.

▪ **Experienced any persistence of abnormality after recovery**
Table (3) explicit that maximum number of subjects (64.0%) experience abnormality after recovery from COVID-19. While 36 percent did not felt any long term symptoms.

Table 3: Distribution of subjects according to other information related to COVID-19

Parameters	Males n=150 (50)	Females n = 150 (50)	Total N=300 (100)
Experienced any persistence of abnormality after recovery			
Yes	98 (65.3)	94 (62.7)	192 (64)
No	52 (34.7)	56 (37.3)	108 (36)
List out the symptoms experienced after recovery?			
Fatigue	92 (61.3)	120 (80.0)	212 (70.6)
Respiratory	0 (0)	0 (0)	0 (0)
Neurological	53 (13.3)	17 (11.3)	70 (23.3)
Any other	5 (3.3)	13 (8.7)	18 (6.0)
Observed any change in behaviour of people after COVID-19			
Yes	65 (43.3)	69 (46.0)	134 (44.7)
No	85 (56.7)	81 (54.0)	166 (55.3)
Any change in stress and anxiety levels faced after recovery			
Increased	94 (62.7)	103 (68.7)	197 (65.7)
Decreased	0 (0)	0 (0)	0 (0)
No change	56 (37.3)	47 (31.3)	103 (34.3)

Note: Figures in parenthesis indicates percentage of subjects

Similar study was conducted by Sayed *et al.* (2021) [11] stated that fatigue and sleep disturbances are among the frequently reported manifestations after recovery from this novel viral pandemic.

▪ **List out the symptoms experienced after recovery?**

Data in table (3) unfolds that majority of the subjects (69.7%) felt fatigue followed by neurological symptoms (24.3) and only 6 percent felt symptoms like headache, sore throat, cough change in taste and smell and night sweating for several days after recovery.

Likewise the obtained result was stayed in good agreement with the same stated by Lopez *et al.* (2021) that majority of the subjects (80%) infected with SARS-CoV-2 developed one or more long-term symptoms. The five most common symptoms fatigue (58%), headache (44%), attention disorder (27%), hair loss (25%), and dyspnea (24%) were commonly felt by subjects after recovery.

▪ **Observed any change in behavior of people**

Data have been presented in table (3) explains that 44 percent of the subjects maintained distance from others, while 55.3 percent did not observe any change in behaviour of people after recovery.

▪ **Any change in stress and anxiety levels faced after recovery**

Majority of the subjects (65.7%) experience increased stress and anxiety levels after the infection and 34.3% felt no change Table (3). Females (68.7%) felt more stressed than their counterparts (62.7%).

The result of present study corroborated with the findings done by Xiong *et al.* (2020) [15] described that high level of anxiety (50.9%) and depression (49.1%) is reported in most

of the subjects during the COVID-19 pandemic.

(IV) Information related to guidelines followed by subjects

▪ **Quarantine/ isolation centre**

Data presented in table (4) shows that majority of the subjects (56.3%) who fewer symptoms isolated at home had followed by 37.0 percent isolated at hospital and 15.0 percent at COVID-19 care center. Among 150 subjects, higher percentage of females (42.0%) isolated at hospital as compared to males (32.0%).

▪ **Duration of isolation**

Table (4) denotes that among 300 subjects, majority (46.3%) of them isolated for fourteen days while 29.7% patients were isolated for a week. In a comparative study, higher females (29.3%) than males (18.7%) isolated for long period (<14 days) of time.

▪ **Installed *Aarogya Setu* app**

Aarogya Setu is an app launched by Central government which helps to track about COVID-19 patients, their location and also give online help about COVID-19 treatment and guidelines etc. According to present study data have been presented in table (4) show that majority of the subjects (61.3%) installed *Aarogya Setu* app followed 38.7% did not aware about this app. Greater percentage (73.3%) of males installed this app as compared to females (49.3%).

Table 4: Distribution of subjects according to guidelines followed related to COVID-19

Parameters	Males n=150 (50)	Females n=150 (50)	Total N=300 (100)
Quarantine/ isolation centre			
Home	73 (48.7)	71 (47.3)	144 (48.0)
Hospital	48 (32.0)	63 (42.0)	111 (37.0)
Any other	29 (19.3)	16 (10.7)	45 (15.0)
Duration of isolation			
7 days	53 (35.3)	36 (24.0)	89 (29.7)
14 days	69 (46.0)	70 (46.7)	139 (46.3)
>14 days	28 (18.7)	44 (29.3)	72 (24.0)
Installed *Aarogya Setu* app			
Yes	110 (73.3)	74 (49.3)	184 (61.3)
No	40 (26.7)	76 (50.7)	116 (38.7)
Distance maintained			
Yes	143 (95.3)	127 (84.7)	270 (90.0)
No	7 (4.7)	23 (15.3)	30 (10.0)
Mask used in public place			
Yes	150 (100)	150 (100)	300 (100)
No	0 (0)	0 (0)	0 (0)
Type of mask used			
Surgical	26 (17.3)	25 (16.7)	51 (17.0)
Cloth	87 (58.0)	94 (62.7)	181 (60.3)
N95	20 (13.3)	20 (13.3)	40 (13.3)
Face mask with valves	17 (11.4)	11 (7.3)	28 (9.4)
Face cover and application of oil in nose			
Yes	118 (78.7)	143 (95.3)	261 (87.0)
No	32 (21.3)	7 (4.7)	39 (13.0)
Using hand sanitizer regularly			
Yes	150 (100)	150 (100)	300 (100)
No	0 (0)	0 (0)	0 (0)
Frequency of hand sanitization			
10-15 minutes	65 (43.3)	65 (43.3)	130 (43.3)
15-20 minutes	55 (36.7)	36 (24.0)	91 (30.3)

>20 minutes	30 (20.0)	49 (32.7)	79 (26.4)
Avoiding 3Cs (Closed, crowded and closed contact)			
Yes	115 (76.7)	134 (89.3)	249 (83.0)
No	35 (23.3)	16 (10.7)	51 (17.0)
Frequently cleaning and disinfecting surfaces			
Yes	123 (82.0)	132 (88.0)	255 (85.0)
No	27 (18.0)	18 (12.0)	45 (15.0)
Using PPE (Personal Protective Equipment) Kit			
Yes	0 (0)	0 (0)	0 (0)
No	0 (0)	0 (0)	0 (0)

Note: Figures in parenthesis indicates percentage of subjects

▪ **Distance maintained**
It is an important follow-up to prevent the spread of COVID-19 virus. Majority of the subjects (90.0%) maintained social distance. Only 10% did not follow properly the guidelines of social distancing [Table 4 (IV)].

▪ **Mask used in public place**
Mask protects us from getting infected. All the subjects used mask to protect themselves from common infections. Majority of the subjects (60.3%) used cloth mask followed by surgical mask (17%), N95 mask (13.3%) and mask with valves (9.4%) as per the elucidation given in Table (4).

▪ **Face cover and application of oil in nose**
Table (4) shows that subjects followed guidelines of wearing mask so as to ever cover mouth and nose, used tissue papers while sneezing, had put mouth beneath elbow while coughing or sneezing and applies oil in & outside of the nose. Among 300 subjects, 87% followed these guidelines and 13% those who never abide these guidelines. It noted to be higher percentage of females (95%) followed guidelines as compared to males (78.7%).

▪ **Using hand sanitizer regularly**
Washing hands repeatedly by using running water applying sanitizer are an effective tool to fight with the COVID-19. All the subjects regularly sanitize their hands Table (4).

▪ **Frequency of hand sanitization**
According to guidelines people have to sanitize their hands frequently to avoid spread of COVID-19 virus. Among 300 subjects, 43.3% sanitized their hands after touching any objects within 10-15 minutes and 30.3% sanitized their hands within 20 minutes and rest of (26.4%) sanitized their hands after 20 minutes Table (4).

▪ **Avoiding 3Cs (closed, crowded and closed contact)**
Majority of the respondents (83.0%) avoided closed, crowded and contact while17% did not follow this rule Table (4).

▪ **Cleaning touched regularly surfaces**
It is clear from the table (4) that frequently cleaning and disinfecting of those surfaces which are touched regularly like door handles, faucets and phone screen are necessary to stop the spread of infection. Interestingly, eighty five% of the subjects frequently cleaned and disinfected the surfaces with *dettol* and *lyzol* etc. and only 15% did not follow so.

▪ **Using PPE (Personal Protective Equipment) Kit**
PPE kit use by medical staff that who works in COVID-19

ward, so that they may protect from catchy infection. As per the results, observed less serious cases and none of the subjects belonged to medical departments. Hence no one used PPE kit table (4).

Conclusion
It can be concluded from the investigation that stress and anxiety levels increased after the infection and some subjects also felt fatigue. Measures regarding to stop the pandemic such as social distancing, hand sanitization, avoided closed and cleaning touched surfaces adopted by maximum number of subjects. Immunity boosters have a significant impact in COVID-19, also in this present study various immunity boosters taken by maximum number of subjects. All the safety measures taken during pandemic were helpful to prevent spreading of disease.

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