



ASSESSMENT OF THE PSYCHOLOGICAL HEALTH, QUALITY OF LIFE IN PRE COVID - 19, DURING COVID - 19 AND POST COVID - 19 PATIENTS AND ITS ASSOCIATION WITH THE DIETARY PATTERNS OF INDIANS AGED 50-85 YEARS

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ABSTRACT:

The COVID - 19 pandemic is one of the major health crises which have changed the lives of millions all over the world. The study aimed to assess the psychological health, quality of life and its association with the dietary patterns of Indian adults in pre COVID-19, during COVID-19 and post COVID-19 patients aged 50-85 years. This observational prospective/retrospective comparative study was carried out on 351 participants who have been infected with COVID - 19 aged 50-85 years. The validated questionnaire was administered to the patients to assess the psychological health and overall well-being of the participants using five validated scales for three different phases, i.e., pre COVID - 19, during COVID - 19 and post COVID - 19. The scales used in the study were Depression, Anxiety and Stress scale (DASS-21), COVID - 19 Stress Scale, Perceived Stress Scale modified for COVID - 19 (PSS-10-C) and WHO-QOL BREF (Quality of life). A 24-hour dietary recall was taken which was correlated with the PSS-10-C to study the impact of psychological health on dietary patterns in different phases of COVID - 19. Along with the questionnaire administration, standard telephonic nutrition counseling was done for individual patients as well as family members. Participants experienced difficulty in relaxing (47.6%), over reactive to situations (41.0%), nervous arousal (42.5%) and getting agitated (42.7%) during COVID - 19 phase. The anxiety subscale of the DASS-21 revealed that 43.9% of the participants experienced difficulty in breathing and feeling scared without any reason. About 39.6% experienced dryness of mouth, worried about situations of panic (39.9%). The mean energy (1415.7 ±309.6 kcal), protein (40.9 ±10.9g), carbohydrate (174.4 ±34.8g) and fat intake (46.5 ±13.0g) of the participants during COVID - 19 infection period which indicated that the consumption of these macronutrients as well as micronutrients decreased dramatically during the COVID - 19 phase as compared to pre COVID - 19 and post COVID - 19 period. The correlation of 24-hour diet recall with the stress, anxiety and depression subscale of the PSS-10-C revealed that the consumption of protein, carbohydrate, iron, selenium, fibre, omega-3 fatty acids, Vitamin A, riboflavin, pyridoxine, and Vitamin D was inversely related to stress, anxiety and depression levels. The psychological health, mental health, social well-being and Quality of Life of the participants were adversely affected during the COVID - 19 phase as compared to the pre COVID - 19 and post COVID - 19 phases.

KEYWORDS:

COVID - 19, PSYCHOLOGICAL HEALTH OF ELDERLY, STRESS, ANXIETY, DEPRESSION, DIETARY PATTERN OF ELDERLY, QUALITY OF LIFE OF ELDERLY.

1. INTRODUCTION

The coronavirus disease 2019 (COVID - 19) has emerged as a pandemic worldwide alerting the scientific and medical communities. This pathology which is termed as COVID - 19 by the World Health Organization (WHO) has killed and infected millions of people, especially older adults across the globe (*Coronavirus (COVID - 19) Disease Pandemic- Statistics & Facts | Statista, n.d.*).

Clinical observations have found that the elderly population with COVID - 19 are at high risk of malnutrition or co-malnutrition. Moreover, CoV attacks the mucosal epithelium and causes GI symptoms, which further damage the nutritional status of elderly patients (Abadía Otero et al., 2021). Notably, it is well known that a healthy dietary pattern is linked to lower mortality and reduction in

obesity, type 2 diabetes mellitus, low-grade inflammation, cancer, Alzheimer's disease, depression, and Crohn's disease (Di Renzo et al., 2020). Older patients (>65 years) with co morbidities and Acute Respiratory Distress Syndrome (ARDS) have a higher fatality and mortality rate (Yang et al., 2020).

The United Nations (UN) emphasized that COVID - 19 could be a root cause for major mental health crises as well, especially for vulnerable segments of the population such as older adults (De Pue et al., 2021). The disease has negatively affected mental and psychological health and created new barriers and challenges for people already suffering from mental illness and substance use disorder (Vahia et al., 2020). Various emotional outcomes associated with the COVID - 19 were stress, depression, fear, anger, frustration, irritability, insomnia, boredom and

stigma associated with quarantine (García & Ramírez Navarro, 2018).

In many cases of Coronavirus infection, patients remain bedridden in the intensive care unit (ICU) and have an extended hospital stay. Patients often remain in a prone position for hours, which causes post-ICU dysphagia, muscle dystrophy, myopathy, and neuropathy owing to critical illness, reduced joint mobility, neck and shoulder pain, difficulty standing and walking, and gait, with limitations in activities of daily living (Zhang & Ma, 2020).

There has been little research on the psychological and social problems of people with coronavirus, some of which include mental wellbeing anxiety and sleep quality. Therefore, there is no comprehensive study that examines the quality of life, psychological and mental health consequences of individuals infected with the virus (MAHNAZ et al., 2019). Hence, there is an urgent need to mitigate the psychological and mental health consequences of COVID - 19 positive older adults. The proposed work is value addition to fill the lacunae in the literature regarding the effect of COVID 19 on psychological health parameters of patients aged 50-85 years. It will give an insight into what is the psychological impact of COVID - 19 on geriatric population and the assessment and interventions to be considered towards the management of these patients.

2. RESEARCH METHODOLOGY

2.1 STUDY DESIGN AND PARTICIPANTS

In this retrospective/prospective observational comparative study, about 800 patients were recruited after they gave consent through purposive sampling from Mumbai for the study and were contacted telephonically. Out of these, only 351 participants met the inclusion criteria and were enrolled in the study. A pilot study was carried out on 25 participants for the purpose of validation of questionnaire. The ethics approval for the study was granted by Lilavati Hospital And Research Centre (LHRC) - Ethics Committee For Biomedical And Health Research (EC - BHR) Regn. No. EC/ NEW/ INST/2020/ 504.

The duration of the study was 6 months. Patients suffering from COVID-19 were selected from the case records and were contacted telephonically as well as at OPD when patients reported for medical check-up after post COVID - 19. Pre COVID - 19 refers to the time period of 1 month prior to COVID - 19 infection. During COVID - 19 refers to the time period extending from the date of diagnosis till the day of discharge. Post COVID - 19 refers to the time period of 1 month after the discharge from hospital.

Recovered COVID - 19 patients in the age group of 50-85 years (male and female), symptomatic and asymptomatic COVID - 19 patients, COVID - 19 patients with or without co-morbidities were included in the study. Participants excluded were COVID - 19 patients on mechanical ventilation or critically ill and admitted to the ICU, COVID - 19 patients who were DAMA (Discharged Against Medical Advice) or dead, COVID - 19 patients with pre-existing

psychological illness, pregnant and lactating women.

2.2 DATA COLLECTION TOOLS

The interview cum questionnaire method was used to collect the data using Cognito forms. The different aspects included in the questionnaire were socio-demographic details, anthropometric indices, clinical data, past and personal medical history, 24- hour diet recall, Perceived stress scale modified for COVID - 19 (PSS-10-C), Depression, anxiety and stress scale (DASS-21), COVID - 19 stress scale, World Health Organization Quality of life (WHO QoL).

2.3 STATISTICAL ANALYSIS

Descriptive data of participants are reported as Mean \pm SD and 95% confidence interval (CI) for continuous variables. The associations between the variables were analysed using chi square test. Differences between two groups was analysed by t-test for all study variables. Differences in more than 2 groups will be studied using ANOVA. Pearson's correlation will be done to find the correlation between two or more variables. Significance was defined as p value of <0.05 .

3. RESULTS AND DISCUSSION

3.1 BASELINE CHARACTERISTICS OF PARTICIPANTS

The study was conducted with the aim of assessing the psychological health, quality of life of Indian adults in pre COVID - 19, during COVID - 19 and post COVID - 19 period. A total of 351 COVID - 19 patients (Males N =228; Females N=123) gave virtual consent and participated in the study. The percentage of male participants in the study was 65% whereas the percentage of the female participants was 35%. About 27.6% of the total participants were employed in the service sector whereas 24.5% of the participants were in the business sector. About 20.8% of the participants were housewives, 20.8% were retired whereas 5.7% of the participants were involved in other sector. 42.8% of the participants belong to a nuclear family, 32.7% of the participants were belonging to joint family, whereas only 24.6% of the participants had an extended family. Out of the total participants, only 1.7% of the participants were living alone while most of them i.e., 98.3% of the participants lived with their family members. As per the data collected, out of the total participants, 86% of them were married whereas 2.6% were single. Of the total participants only 1.1% was divorced and 10.3% were widow.

When ANOVA test was applied to obtain the association of BMI and anthropometric measurements, it was observed that there was significant statistical difference ($p<0.05$) in the body mass index (BMI) and weight which represented that the patients who were overweight (63.3 ± 6.1) and obese (67.7 ± 10.5) had a higher BMI. There was no significant difference in the height and IBW and its association with the BMI of the patients (p value=0.302).

3.2 COMPARISON OF STRESS, ANXIETY, DEPRESSION

AMONG THE COVID- 19 PATIENTS USING DEPRESSION, ANXIETY AND STRESS (DASS – 21) SCALE, COVID - 19 STRESS SCALE, PERCEIVED STRESS SCALE IN THE PRE

COVID -19, DURING COVID -19 AND POST COVID - 19 PHASES.

TABLE 3.2.1. COMPARISON OF STRESS AMONG THE COVID- 19 PATIENTS USING DEPRESSION, ANXIETY AND STRESS (DASS – 21) SCALE IN THE PRE COVID -19, DURING COVID -19 AND POST COVID - 19 PHASES

Categories	Pre COVID – 19 (%)	During COVID – 19 (%)	Post COVID – 19 (%)	Chi Square Value	P Value
Hard to wind down					
Did not apply at all	67.8	25.1	28.5	92.626	0.000
Applied to some degree	18.5	17.4	18.5		
Applied to a considerable degree	11.1	16.0	35.9		
Applied very much	2.6	41.6	17.1		
Tended to over - react to situations					
Did not apply at all	66.1	24.5	26.5	70.524	0.000
Applied to some degree	22.2	15.7	20.5		
Applied to a considerable degree	10.0	18.8	33.9		
Applied very much	1.7	41.0	19.1		
Use of a lot of nervous energy					
Did not apply at all	66.1	23.9	63.8	70.041	0.000
Applied to some degree	22.5	19.7	23.9		
Applied to a considerable degree	8.5	14.0	10.8		
Applied very much	2.8	42.5	1.4		
Getting agitated					
Did not apply at all	68.1	27.6	28.2	87.364	0.000
Applied to some degree	18.5	16.8	21.7		
Applied to a considerable degree	8.8	12.8	33.6		
Applied very much	4.6	42.7	16.5		
Difficult to relax					
Did not apply at all	62.4	22.2	26.2	78.405	0.000
Applied to some degree	23.9	12.8	20.2		
Applied to a considerable degree	8.0	17.4	33.6		
Applied very much	5.7	47.6	19.9		
Intolerant of anything					

Did not apply at all	64.1	27.1	29.6	79.127	0.000
Applied to some degree	26.5	18.5	23.4		
Applied to a considerable degree	6.0	12.8	30.8		
Applied very much	3.4	41.6	16.2		
Felt rather touchy					
Did not apply at all	68.1	29.1	33.9	71.797	0.000
Applied to some degree	17.7	16.8	22.2		
Applied to a considerable degree	10.5	12.8	26.2		
Applied very much	3.7	41.3	17.7		

When the stress subscale of the DASS – 21 questionnaire was administered (Table 3.2.1), it was observed that there was statistically significant difference (p value <0.05) in chronic stress levels in pre COVID – 19, during COVID – 19 and post COVID – 19 phases as shown in Table 3.2.1 The analysis of the data reveals that majority of the participants experienced difficulty to wind down (41.6%),

over reactive to situations (41.0%), nervous arousal (42.5%), getting agitated/being easily upset /irritable (42.7%), difficulty in relaxing (47.6%), impatient and intolerant (41.6%) and being oversensitive (41.3%) in the during COVID – 19 phase when compared to the pre COVID – 19 and post COVID – 19 phases.

TABLE 3.2.2. COMPARISON OF ANXIETY AMONG THE COVID- 19 PATIENTS USING DASS - 21 SCALE IN THE PRE COVID -19, DURING COVID -19 AND POST COVID - 19 PHASES

Categories	Pre COVID – 19 (%)	During COVID – 19 (%)	Post COVID – 19 (%)	Chi Square Value	P Value
Dryness of mouth					
Did not apply at all	71.2	20.5	24.2	53.587	0.000
Applied to some degree	20.2	21.9	29.1		
Applied to a considerable degree	6.6	17.9	34.8		
Applied very much	2.0	39.6	12.0		
Experienced breathing difficulty					
Did not apply at all	66.4	18.5	24.2	56.217	0.000
Applied to some degree	21.4	16.2	26.5		
Applied to a considerable degree	10.3	21.4	36.5		
Applied very much	2.0	43.9	12.8		
Experienced trembling					
Did not apply at all	70.4	35.0	37.0	326.628	0.000
Applied to some degree	20.2	14.5	18.8		
Applied to a considerable degree	6.8	12.5	31.6		

Applied very much	2.6	37.9	12.5		
Worried about panic situations					
Did not apply at all	63.8	25.9	27.1	313.104	0.000
Applied to some degree	23.9	16.8	25.6		
Applied to a considerable degree	10.8	17.4	32.5		
Applied very much	1.4	39.9	14.8		
Felt close to panic					
Did not apply at all	63.2	28.8	27.4	280.103	0.000
Applied to some degree	20.8	21.7	15.4		
Applied to a considerable degree	11.7	30.2	12.3		
Applied very much	4.3	19.4	45.0		
Aware of the action of heart in the absence of physical exertion					
Did not apply at all	67.0	31.3	29.9	269.878	0.000
Applied to some degree	19.7	17.1	25.1		
Applied to a considerable degree	10.3	13.4	30.2		
Applied very much	3.1	38.2	14.8		
Felt scared without any good reason					
Did not apply at all	60.1	24.5	28.2	312.211	0.000
Applied to some degree	25.6	17.1	24.2		
Applied to a considerable degree	8.8	14.5	31.6		
Applied very much	5.4	43.9	16.0		

When the Anxiety subscale of the DASS – 21 questionnaire was administered among the participants (Table 3.2.2), there was statistically significant difference (p value <0.05) in anxiety levels in pre COVID – 19, during COVID – 19 and post COVID – 19 phases. The analysis of the data revealed that majority of the participants experienced difficulty to wind down (41.6%), over reactive to

situations (41.0%), nervous arousal (42.5%), getting agitated/being easily upset /irritable (42.7%), difficulty in relaxing (47.6%), impatient and intolerant (41.6%) and being oversensitive (41.3%) in the during COVID – 19 phase when compared to the pre COVID – 19 and post COVID – 19 phases.

TABLE 3.2.3. COMPARISON OF DEPRESSION AMONG THE COVID- 19 PATIENTS USING DASS - 21 SCALE IN THE PRE COVID - 19, DURING COVID -19 AND POST COVID - 19 PHASES

Categories	Pre COVID – 19 (%)	DURING COVID - 19 (%)	POST COVID – 19 (%)	Chi Square Value	P Value
Couldn't seem to experience any positive feeling at all					
Did not apply at all	65.5	20.8	24.2	75.190	0.000

Applied to some degree	20.8	18.8	22.5		
Applied to a considerable degree	10.3	16.5	35.3		
Applied very much	3.4	43.9	17.9		
Found it difficult to work up the initiative to do things					
Did not apply at all	72.1	23.6	27.6	339.113	0.000
Applied to some degree	15.1	14.2	25.1		
Applied to a considerable degree	10.3	19.9	29.3		
Applied very much	2.6	42.2	17.9		
Felt nothing to look forward to					
Did not apply at all	67.8	25.6	28.2	65.372	0.000
Applied to some degree	18.2	18.5	22.8		
Applied to a considerable degree	8.5	12.8	28.5		
Applied very much	5.4	43.0	20.5		
Felt down hearted and blue					
Did not apply at all	67.8	28.8	33.9	135.441	0.000
Applied to some degree	18.2	15.1	22.5		
Applied to a considerable degree	11.4	12.3	26.2		
Applied very much	2.6	43.9	17.4		
Unable to become enthusiastic about anything					
Did not apply at all	60.7	25.4	29.6	63.711	0.000
Applied to some degree	21.9	16.5	21.7		
Applied to a considerable degree	12.5	12.5	32.5		
Applied very much	4.8	45.6	16.2		
Felt worthless as a person					
Did not apply at all	69.2	29.6	32.8	86.114	0.000
Applied to some degree	21.9	14.8	20.5		
Applied to a considerable degree	6.8	12.0	30.5		
Applied very much	2.0	43.6	16.2		
Felt life was meaningless					

Did not apply at all	64.7	24.5	31.1	340.475	0.000
Applied to some degree	23.1	19.7	22.5		
Applied to a considerable degree	8.5	12.0	30.8		
Applied very much	3.7	43.9	15.7		

The analysis of the data represented in Table 3.2.3 revealed that majority of the participants could not experience any positive feeling (43.9%), found difficult to initiate work (42.2%), had nothing to look forward (43.0%), felt downhearted and blue (43.9%), unable to become enthusiastic (45.6%), felt worthless (43.6%) and meaningless (43.9%) in the during COVID - 19 phase when compared to the pre COVID - 19 and post COVID - 19 phases.

One of the online surveys on psychological correlates of COVID - 19 pandemic in the Austrian population used

DASS-21 to assess the mental health status of 4126 individuals. The analysis of the data revealed that 43.3% of the respondents rated the psychological impact as moderate (5.6%) or severe (37.7%). 26.5% of the participants reported moderate (13.3%) to severe (13.2%) depression; 20.3% moderate (8.9%) to severe (11.4%) anxiety and 21.2% reported moderate (10.5%) or severe stress (10.7%). Being female, lower levels of literacy, higher age group, student or pupil status, poor self-rated health were significantly associated with higher psychological burden (Elbay et al., 2020).

TABLE 3.2.4. COMPARISON OF ANXIETY, SOCIOECONOMIC CONSEQUENCES AND FEAR OF CONTAMINATION FROM THE VIRUS AMONG THE COVID - 19 PATIENTS IN THE PRE COVID- 19, DURING COVID- 19 AND POST COVID - 19 PHASES

Categories	Pre COVID - 19 (%)	During COVID - 19 (%)	Post COVID - 19 (%)	Chi Square Value	P Value
ANXIETY					
Worried about contracting the virus					
Yes	32.5	66.1	64.1	162.797	0.000
No	67.5	35.9	33.9		
Worried That Basic Hygiene Is Not Enough To Keep the patient Safe From The New Strain of Virus					
Yes	25.4	69.5	65.5	20.846	0.000
No	74.6	30.5	34.5		
Worried that the healthcare system is unable to keep the patient safe from the new strain of virus					
Yes	27.1	68.8	65.8	30.000	0.000
No	72.9	33.6	34.2		
Worried that the healthcare system won' t be able to protect the loved ones From The New strain of the virus					
Yes	28.2	65.5	67.8	19.915	0.000
No	71.8	34.5	32.2		
Worried that social distancing is not enough to keep the patient safe From The New Strain of Virus					
Yes	23.1	73.8	64.7	14.526	0.000
No	76.9	26.2	35.3		
SOCIOECONOMIC CONSEQUENCES					
Worried about visiting the grocery store and contracting the infection					
Yes	25.4	64.4	60.4	15.981	0.000
No	74.6	35.6	39.6		

Worried about the grocery store running out of cold and flu remedies					
Yes	21.4	63.8	63.8	11.515	0.001
No	78.6	36.2	36.2		
Worried about the pharmacies running out of prescription medicines					
Yes	20.2	64.7	62.4	17.580	0.000
No	79.8	35.3	37.6		
Worried about the grocery stores running out of cleaning or disinfectant supplies					
Yes	23.4	60.1	59.3	15.646	0.000
No	76.6	39.9	40.7		
Worried that the grocery stores will shut down					
Yes	20.5	66.4	63.0	28.981	0.000
No	79.5	33.6	37.0		
CONTAMINATION					
Worried that people around will infect with the new strain of the virus					
Yes	57.8	65.8	63.2	41.885	0.000
No	42.2	34.2	36.8		
Worried about touching something in public spaces would infect the patient with the new strain of the virus					
Yes	27.4	66.7	66.4	25.809	0.000
No	72.6	33.3	33.6		
Worried that if someone coughs or sneezes nearby would infect with the new strain of the virus					
Yes	60.1	76.9	62.7	14.250	0.000
No	39.9	23.1	37.3		
Worried that handling money or ATM machine would infect with the new strain of the virus					
Yes	41.6	69.8	64.1	9.165	0.000
No	58.4	30.2	35.9		
Worried that mail or home deliveries are contaminated					
Yes	28.5	65.3	63.8	34.648	0.000
No	71.5	34.7	36.2		

Table 3.2.4 depicts the questions which are useful in assessing the levels of anxiety among the participants. As shown in the above figure, the participants experienced less anxious behavior in the pre COVID - 19 phases as compared to the during COVID - 19 and post COVID - 19 phases. Most of the respondents (66.1%) were worried about contracting the virus during COVID - 19, whereas a similar number of respondents (64.1%) were worried about the same even in the post COVID - 19 phase. Majority of the participants (69.5%) reported that the

basic hygiene was not enough to protect themselves from the virus during the COVID - 19 phase, whereas 65.5% reported the same even in the post phase. About 68.8% and 65.5% of the respondents reported that the healthcare system was unable to protect themselves and their loved ones during COVID - 19 phases respectively. Majority of the participants (73.8%) felt that social distancing was not enough to protect themselves from contracting the virus whereas, 64.7% reported the same in the post COVID - 19 phase.

TABLE 3.2.5. COMPARISON OF STRESS AMONG THE PARTICIPANTS USING PSS-10-C IN THE PRE COVID - 19, DURING COVID - 19 AND POST COVID - 19 PHASES

Categories	Pre COVID - 19 (%)	During COVID - 19 (%)	Post COVID- 19 (%)	Chi Square Value	P Value
Felt as if something serious was going to happen unexpectedly with the epidemic					
Never	39.9	5.4	6.8	191.834	0.000
Hardly ever	19.7	7.4	13.1		
Occasionally	35.0	20.5	27.9		
Almost always	4.0	8.8	29.6		
Always	1.4	57.8	22.5		
Unable to control important things in life due to the epidemic					
Never	37.0	4.8	5.1	285.621	0.000
Hardly ever	19.9	8.8	11.1		
Occasionally	31.6	27.1	29.3		
Almost always	9.1	13.7	29.6		
Always	2.3	45.6	24.8		
Felt nervous or stressed about the epidemic					
Never	36.8	3.4	5.7	230.385	0.000
Hardly ever	16.8	7.1	10.3		
Occasionally	34.2	21.7	28.8		
Almost always	10.8	16.2	30.8		
Always	1.4	51.6	24.5		
Felt confident about the ability to handle personal problems related to the epidemic					
Never	14.0	36.5	12.8	231.800	0.000
Hardly ever	15.7	10.5	28.2		
Occasionally	27.6	21.4	32.8		
Almost always	13.4	11.4	18.8		
Always	29.3	20.2	7.4		
Felt optimistic that the things are going well with the epidemic					
Never	10.8	49.6	10.5	239.128	0.000
Hardly ever	15.4	6.6	30.2		
Occasionally	31.6	19.9	33.0		
Almost always	13.4	11.1	20.5		
Always	28.8	12.8	5.7		
Felt unable to cope up with the things to monitor an infection					
Never	36.5	3.7	4.6	357.931	0.000
Hardly ever	13.1	6.8	7.1		

Occasionally	34.5	30.8	35.0		
Almost always	11.7	16.5	34.8		
Always	4.3	42.2	18.5		
Control the difficulties that could appear in life as a result of infection					
Never	13.7	39.6	14.0	325.424	0.000
Hardly ever	12.8	10.0	28.8		
Occasionally	34.5	32.2	34.5		
Almost always	12.0	11.1	19.4		
Always	27.1	7.1	3.4		
Felt things under control in relation to the epidemic					
Never	16.5	40.5	14.0	282.387	0.000
Hardly ever	10.3	10.8	30.2		
Occasionally	34.5	31.6	35.0		
Almost always	12.0	12.0	17.7		
Always	26.8	5.1	3.1		
Felt upset that the things related to the epidemic are out of control					
Never	35.6	4.0	3.7	237.625	0.000
Hardly ever	15.1	5.1	9.4		
Occasionally	36.5	25.9	32.2		
Almost always	10.0	10.0	40.2		
Always	2.8	55.0	14.5		
Felt that the difficulties are increasing in these days of the epidemic and unable to overcome them					
Never	36.2	4.3	5.1	282.203	0.000
Hardly ever	14.5	7.1	8.3		
Occasionally	36.5	32.2	35.6		
Almost always	7.7	14.2	36.2		
Always	5.1	42.2	14.8		

Table 3.2.5 represents the level of perceived stress experienced by the COVID - 19 patients in the three phases of COVID - 19 using Perceived Stress Scale - 10 - C which offers five response options ranging from Never to Always. Upon application of Chi Square test for comparison of stress and its associative symptoms among the participants, it was observed that there was a statistically significant association ($p < 0.05$) in the stress levels experienced by the participants in the three phases.

Amongst the three phases, it was observed that there was statistically greater level of stress experienced by the COVID - 19 patients during the COVID - 19 phase. Majority of the participants (42.2%) always were unable to cope up with the things to monitor the infection in the during COVID - 19 phase, whereas, 4.3% and 18.5% of the respondents reported the same even in the pre COVID - 19 and post COVID - 19 phase. ($p < 0.05$)

3.3 ASSESSMENT OF DIETARY INTAKE

TABLE 3.3.1 COMPARISON OF THE NUTRIENT INTAKE IN THE PRE COVID - 19, DURING COVID - 19 AND POST COVID - 19 PHASES USING 24 HOUR DIETARY RECALL AMONG THE PARTICIPANTS

Nutrients	Pre COVID - 19 (N=351)	During COVID -19 (N=351)	Post COVID - 19 (N=351)	T Value	P Value
Energy (kcal)	1734.8 ±376.0	1415.7 ±309.6	1682.4 ±351.6	20.984	0.000
Protein (g)	51.3 ±12.6	40.9 ±10.0	50.2 ±14.1	20.092	0.000
Carbohydrate (g)	231.9 ±427.6	174.4 ±34.8	206.2 ±35.9	2.517	0.000
Fat (g)	57.3 ±18.4	46.5 ±13.0	55.0 ±20.8	17.880	0.000
Sodium (mg)	2365.4 ±1053.8	2165.9 ±918.0	2434.7 ±1174.5	6.513	0.000
Potassium (mg)	2199.1 ±496.5	1906.0 ±517.9	2229.6 ±711.2	10.770	0.000
Iron (mg)	15.4 ±6.6	13.9 ±6.4	15.6 ±6.3	8.089	0.000
Calcium (mg)	389.6 ±268.7	355.8 ±340.7	413.5 ±306.7	2.834	0.005
Selenium (mcg)	51.2 ±24.3	40.8 ±20.3	61.9 ±88.3	8.808	0.000
Zinc (mg)	6.7 ±4.7	6.0 ±5.5	7.1 ±5.7	5.271	0.000
Fibre (g)	26.0 ±6.1	23.3 ±5.1	27.6 ±8.2	8.679	0.000
Omega 3 F.A. (mg)	345.6 ±374.2	249.8 ±185.0	327.4 ±331.1	6.072	0.000
Vitamin A (mcg)	217.7 ±267.1	182.3 ±229.0	268.6 ±293.1	4.148	0.000
Thiamine (mg)	0.8 ±0.4	1.9 ±4.1	1.3 ±6.7	0.456	0.648
Riboflavin (mg)	0.7 ±0.4	0.6 ±0.4	0.8 ±0.5	3.643	0.000
Niacin (mg)	7.5 ±4.3	6.5 ±5.0	7.6 ±4.3	4.153	0.000
Folic acid (mcg)	135.0 ±214.5	109.2 ±140.3	122.3 ±150.8	3.164	0.002
Pyridoxine (mg)	19.4 ±47.1	3.5 ±13.9	10.8 ±25.8	6.688	0.000
Biotin (mg)	13.4 ±7.8	12.4 ±7.8	15.5 ±10.2	4.569	0.000
Vitamin B12 (mcg)	1.1 ±2.5	0.7 ±1.3	0.8 ±0.8	3.090	0.002
Vitamin C (mg)	62.1 ±54.1	77.4 ±96.4	68.7 ±50.1	-4.514	0.000
Vitamin D (mcg)	0.6 ±1.2	0.5 ±1.2	0.3 ±0.3	3.894	0.000
Vitamin E (mg)	1.3 ±1.5	1.2 ±1.3	1.4 ±1.4	3.662	0.000

When t test was applied to observe the nutrient intake of the participants in the pre COVID - 19, during COVID - 19 and post COVID - 19 phases, it was revealed that there was a statistical difference ($p < 0.05$) between the macronutrients, i.e., Energy, Protein, Carbohydrate and fat and the micronutrients. There was statistically insignificant difference in the Thiamine (mg) intakes respectively.

The mean Energy levels in the pre COVID - 19 and post COVID - 19 phases were 1734.8 ±376.0 and 1682.4 ±351.6 respectively which dropped to 1415.7 ±309.6 during COVID - 19 phase. The mean protein intake were 51.3 ±12.6 and 50.2 ±14.1 in pre COVID - 19 and post COVID - 19 phase. The protein intake was less during the COVID -

19 period i.e., 40.9 ±10.0. The pre COVID - 19 Carbohydrate in take among the participants were 231.9 ±27.6 which drastically dropped to 174.4 ±34.8 during the COVID - 19 phase. The mean fat intake of the participants in the pre COVID - 19 and post COVID - 19 period were 57.3 ±18.4 and 55.0 ±20.8 respectively, whereas, the mean fat intake during the COVID - 19 phase was lower. i.e., 46.5 ±13.0 The mean fibre intake of the participants was found to be 26.0 ±6.1, 23.3 ±5.1 and 27.6 ±8.2 in the pre COVID - 19, during COVID - 19 and post COVID - 19 period. The mean sodium (2165.9 ±918.0) and the potassium (1906.0 ±517.9) intake of the participants were lowered during the COVID - 19 period when compared to the pre COVID - 19 and post COVID - 19 period. The mean iron intake in the

pre COVID - 19 phase was 15.4 ± 6.6 . The mean intake of the same lowered during the COVID - 19 phase (13.9 ± 6.4) and post COVID - 19 phase (15.6 ± 6.3) as compared to pre COVID - 19 phase. The mean calcium intake of the participants dropped drastically during the COVID - 19 phase (355.8 ± 340.7) as compared to pre COVID - 19 (389.6 ± 268.7) and post COVID - 19 phases (413.5 ± 306.7). The mean selenium and the zinc intake of the respondents were 40.8 ± 20.3 and 6.0 ± 5.5 respectively during the COVID - 19 phase, which was much lower when compared to the pre COVID - 19 and post COVID - 19 intakes of the participants. The mean intake of riboflavin (0.6 ± 0.4), niacin (6.5 ± 5.0), folic acid (109.2 ± 40.3) and pyridoxine (3.5 ± 13.9) among the participants were significantly

lower during the COVID - 19 phase when compared to the pre COVID - 19 and post COVID - 19 phases. The mean intakes of Vitamin D and E was lowered to 0.5 ± 1.2 and 1.2 ± 1.3 in the during COVID - 19 phase when compared to pre COVID - 19 and post COVID - 19 period.

The Vitamin B12 and Vitamin D intakes of the participants were higher, i.e., 1.1 ± 2.5 and 0.6 ± 1.2 in the pre COVID - 19 phase which slightly decreased to 0.7 ± 1.3 and 0.5 ± 1.2 during the COVID - 19 period respectively. Of all the nutrients discussed, only Vitamin C was found to be increased during the COVID - 19 phase as shown in Table 3.3.1.

3.4 ASSOCIATION OF DIETARY INTAKE WITH PSS-10-C

TABLE 3.4.1 CORRELATION OF 24-HOUR DIETARY RECALL WITH STRESS USING PSS-10-C AMONG THE PATIENTS IN THE PRE COVID - 19, DURING COVID - 19 AND POST COVID - 19 PHASES

	Pre COVID - 19		During COVID -19		Post COVID - 19	
	Pearson Correlation	P Value	Pearson Correlation	P Value	Pearson Correlation	P Value
Stress	1	0.000	1	0.000	1	0.000
Nutrients						
Energy (kcal)	-0.111	0.037	0.085	0.112	0.017	0.756
Protein (g)	0.020	0.708	-0.222	0.000	-0.133	0.013
Carbohydrate (g)	0.077	0.148	-0.113	0.034	0.049	0.361
Fat (g)	0.404	0.000	0.016	0.759	0.01	0.834
Sodium (mg)	0.132	0.013	-0.099	0.065	-0.051	0.337
Potassium (mg)	0.009	0.869	0.066	0.219	0.056	0.298
Iron (mg)	-0.191	0.000	-0.114	0.033	0.093	0.084
Calcium (mg)	0.281	0.000	-0.054	0.314	-0.014	0.799
Selenium (mcg)	0.244	0.000	-0.239	0.000	-0.025	0.646
Zinc (mg)	0.000	0.995	-0.074	0.167	0.015	0.782
Fibre (g)	-0.035	0.517	-0.148	0.005	-0.067	0.214
Omega 3 F.A. (mg)	0.427	0.000	-0.204	0.000	-0.048	0.373
Vitamin A (mcg)	0.125	0.020	-0.201	0.000	-0.064	0.234
Thiamine (mg)	0.05	0.351	-0.083	0.121	-0.100	0.060
Riboflavin (mg)	-0.056	0.299	-0.107	0.046	-0.019	0.719
Niacin (mg)	0.172	0.001	0.093	0.081	-0.118	0.027
Folic acid (mcg)	-0.155	0.004	0.010	0.858	-0.024	0.654
Pyridoxine (mg)	0.286	0.000	-0.102	0.056	-0.017	0.756
Biotin (mg)	-0.034	0.531	-0.061	0.258	0.040	0.455

Vitamin B12 (mcg)	0.119	0.026	-0.032	0.545	0.008	0.877
Vitamin C (mg)	0.078	0.144	-0.092	0.085	-0.028	0.602
Vitamin D (mcg)	-0.038	0.480	-0.242	0.000	-0.111	0.039
Vitamin E (mg)	0.119	0.025	-0.071	0.187	-0.009	0.874

TABLE 3.4.2 CORRELATION OF 24-HOUR DIETARY RECALL WITH ANXIETY USING PSS-10-C AMONG THE PATIENTS IN THE PRE COVID - 19, DURING COVID - 19 AND POST COVID - 19 PHASES

	Pre COVID - 19		During COVID -19		Post COVID - 19	
	Pearson Correlation	P Value	Pearson Correlation	P Value	Pearson Correlation	P Value
Anxiety	0.938	0.037	0.961	0.000	0.948	0.000
Nutrients						
Energy (kcal)	-0.114	0.033	0.097	0.070	0.070	0.192
Protein (g)	0.011	0.841	0.217	0.000	0.165	0.002
Carbohydrate (g)	0.116	0.030	0.129	0.016	0.070	0.189
Fat (g)	0.383	0.000	-0.007	0.893	0.049	0.360
Sodium (mg)	0.130	0.015	0.126	0.018	-0.043	0.419
Potassium (mg)	-0.007	0.899	0.063	0.238	0.055	0.308
Iron (mg)	-0.196	0.000	0.127	0.018	0.128	0.017
Calcium (mg)	0.287	0.000	0.058	0.276	0.013	0.815
Selenium (mcg)	0.245	0.000	-0.248	0.000	-0.013	0.809
Zinc (mg)	0.001	0.988	-0.084	0.116	0.034	0.52
Fibre (g)	-0.027	0.609	-0.148	0.006	-0.047	0.380
Omega 3 F.A. (mg)	0.409	0.000	-0.235	0.000	-0.039	0.474
Vitamin A (mcg)	0.129	0.016	-0.207	0.000	-0.051	0.340
Thiamine (mg)	0.050	0.352	-0.085	0.111	-0.102	0.056
Riboflavin (mg)	-0.023	0.673	0.122	0.023	0.014	0.795
Niacin (mg)	0.154	0.004	0.099	0.064	0.106	0.046
Folic acid (mcg)	-0.149	0.005	0.006	0.910	-0.031	0.561
Pyridoxine (mg)	0.282	0.000	-0.102	0.058	-0.004	0.944
Biotin (mg)	-0.010	0.849	-0.147	0.383	0.059	0.272
Vitamin B12 (mcg)	0.107	0.046	-0.023	0.662	0.045	0.407
Vitamin C (mg)	0.092	0.087	-0.096	0.072	-0.047	0.375
Vitamin D (mcg)	-0.050	0.358	-0.194	0.000	0.106	0.048
Vitamin E (mg)	0.123	0.022	-0.061	0.257	0.017	0.750

TABLE 3.4.3 CORRELATION OF 24-HOUR DIETARY RECALL WITH DEPRESSION USING PSS-10-C AMONG THE PATIENTS IN THE PRE COVID - 19, DURING COVID - 19 AND POST COVID - 19 PHASES

	Pre COVID - 19		During COVID -19		Post COVID - 19	
	Pearson Correlation	P Value	Pearson Correlation	P Value	Pearson Correlation	P Value
Depression	0.941	0.000	0.973	0.000	0.958	0.000
Nutrients						
Energy (kcal)	-0.119	0.026	0.085	0.111	0.025	0.638
Protein (g)	0.000	0.996	0.224	0.000	0.143	0.007
Carbohydrate (g)	0.033	0.538	0.117	0.029	0.037	0.496
Fat (g)	0.395	0.000	-0.004	0.943	0.022	0.675
Sodium (mg)	0.138	0.009	-0.102	0.056	-0.027	0.616
Potassium (mg)	0.005	0.926	0.080	0.136	0.061	0.252
Iron (mg)	-0.188	0.000	0.119	0.026	0.090	0.093
Calcium (mg)	0.299	0.000	-0.058	0.281	-0.009	0.869
Selenium (mcg)	0.229	0.000	-0.229	0.000	0.007	0.895
Zinc (mg)	0.003	0.958	-0.079	0.143	0.024	0.654
Fibre (g)	0.001	0.989	-0.152	0.004	-0.067	0.210
Omega 3 F.A. (mg)	0.388	0.000	-0.208	0.000	-0.032	0.551
Vitamin A (mcg)	0.151	0.005	-0.191	0.000	-0.092	0.087
Thiamine (mg)	0.051	0.342	-0.084	0.117	-0.101	0.060
Riboflavin (mg)	-0.029	0.587	0.109	0.041	-0.021	0.699
Niacin (mg)	0.172	0.001	0.087	0.105	0.135	0.011
Folic acid (mcg)	-0.169	0.002	0.002	0.970	-0.034	0.526
Pyridoxine (mg)	0.242	0.000	-0.090	0.095	0.021	0.688
Biotin (mg)	-0.023	0.673	0.056	0.299	0.036	0.506
Vitamin B12 (mcg)	0.093	0.083	-0.046	0.386	0.013	0.804
Vitamin C (mg)	0.085	0.112	-0.107	0.045	-0.018	0.713
Vitamin D (mcg)	-0.041	0.445	-0.220	0.000	0.119	0.027
Vitamin E (mg)	0.102	0.05	-0.060	0.265	-0.007	0.899

With respect to Tables 4.4.1, 4.4.2 and 4.4.3, following observations was analyzed in stress, depression and anxiety during the pre COVID - 19, during COVID - 19 and post COVID- phase:

PRE COVID - 19 PHASE

Stress

The analysis of the data revealed that the energy, iron and folic acid intake were significantly decreased when the stress level increased. The perceived stress was the lowest

in the pre COVID-19 phase and henceforth, the nutrient intake was slightly better comparatively.

Anxiety

The analysis of the data revealed that there was a statistically significant correlation ($p < 0.05$) between the intake of carbohydrate, fat, sodium, calcium, selenium, omega 3 fatty acids, Vitamin A, niacin, folic acid, pyridoxine, Vitamin B12 and Vitamin E intakes and the level of anxiety experienced by the participants. There was

an inverse correlation between the anxiety levels and the consumption of energy, iron, and folic acid which implies that as the intake of these nutrients decreases, the stress level increases.

Depression

On the application of the Pearson's correlation test, it was revealed that there was an inverse correlation between the depression levels and the consumption of energy, iron and folic acid which implies that as the intake of these nutrients decreases, the depression level increases.

DURING COVID - 19 PHASE

Stress

The data revealed a statistically significant inverse correlation (p<0.05) between the intake of protein, carbohydrate, iron, selenium, fibre, omega-3 fatty acids, Vitamin A, riboflavin, pyridoxine, and Vitamin D intakes and the level of stress experienced by the COVID - 19 infected patients. As a result of increased stress, the nutrient intake was significantly reduced during the COVID-19 when compared to the other phases.

Anxiety

On the application of the Pearson's correlation test, it was revealed that there was an inverse correlation between the anxiety levels and the consumption of selenium, fibre, omega 3 fatty acids, Vitamin A and Vitamin D which

implies that as the intake of these nutrients decreases, the anxiety level increases.

Depression

A statistically significant inverse correlation (p<0.05) was observed between the intake of selenium, fibre, omega 3 fatty acids, Vitamin A, Vitamin C and Vitamin D and the level of depression experienced by the participants.

POST COVID - 19 PHASE

Stress

It was observed that there was a statistically significant inverse correlation (p<0.05) between the intake of protein, niacin and Vitamin D and the levels of stress experienced by the participants.

Anxiety

The analysis of the data revealed that there was a statistically significant direct correlation (p<0.05) between the intake of protein, iron, niacin and Vitamin D intakes and the level of anxiety experienced by the participants.

Depression

The analysis of the data revealed that there was a statistically significant correlation (p<0.05) between the intake of protein, niacin and Vitamin D and the level of depression experienced by the participants.

3.5 ASSESSMENT OF THE QUALITY OF LIFE OF PARTICIPANTS

TABLE 3.5.1. COMPARISON OF QUALITY OF LIFE AMONG THE PARTICIPANTS IN THE PRE COVID - 19, DURING COVID - 19 AND POST COVID - 19 PHASES USING WHOQOL-BREF

Categories	Pre COVID - 19	During COVID - 19	Post COVID - 19	T Value	P Value
DOMAIN 1 (Physical health)					
	68.8 ±20.1	35.1 ±27.6	63.3 ±16.7	0.403	0.000
DOMAIN 2 (Psychological health)					
	71.2 ±17.6	43.2 ±22.3	66.7 ±17.1	24.854	0.000
DOMAIN 3 (Social relationships)					
	82.0 ±19.9	64.0 ±18.2	75.4 ±23.3	9.991	0.000
DOMAIN 4 (Environment)					
	68.3 ±17.2	47.9 ±16.0	66.7 ±17.9	18.219	0.000

Table 3.5.1 represents the comparison of the quality of life of the participants in the 3 phases of COVID - 19. Upon the application of the t test, it was observed that there was a significant difference (p<0.05) in the quality of life of the participants in the 3 phases.

Domain 1 represents the physical health of the participants. As shown in Table 3.5.1., the Domain 1 score of the participants in pre COVID - 19 phase was 68.8 ±20.1 which deteriorated drastically during the COVID - 19 phase (35.1 ±27.6). The mean physical health score of the participants in the post COVID - 19 phase was 63.3 ±16.7 which was better as compared to the during COVID - 19

phase (35.1 ±27.6).

Domain 2 represents the psychological health of the participants. The mean Domain 2 score of the patients during the COVID - 19 infection phase was significantly lower (43.2 ±22.3) when compared to pre COVID - 19 (71.2 ±17.6) and post COVID - 19 (66.7 ±17.1) phases which interprets that the psychological health of the patients was adversely affected during the COVID - 19 phase.

Domain 3 represents the social relationships of the participants. As shown in the above table, there was statistically significant difference (p<0.05) in the mean

Domain 3 score of the participants in the three phases. The mean score of the participants during the COVID - 19 phase was 64.0 ± 18.2 .

Domain 4 represents the immediate environment which affects the overall well-being of an individual. The mean Domain 4 score of the participants was 68.3 ± 17.2 and 66.7 ± 17.9 in the pre COVID - 19 and post COVID - 19 phases respectively, whereas, the mean score sharply deteriorated during the COVID - 19 (47.9 ± 16.0) infection phase of the patient which interprets that the overall well-being and quality of life of COVID - 19 patients was deteriorated and negatively affected after the contraction of the virus.

One study aimed to conduct a quality of life assessment of COVID - 19 patients after recovery in Bangladesh using WHO-QOL BREF. In the study, it was revealed that the physical, psychological and social domains differ significantly among different age groups. The mean scores of quality of life were highest for the physical domain (68.25 ± 14.45) followed by social (65.10 ± 15.78), psychological (63.28 ± 15.48) and environmental domain (62.77 ± 13.07) (Hawlder et al., 2021).

4. CONCLUSION

The study revealed that the majority of the participants (43.9%) couldn't experience any positive feeling, felt downhearted and blue and felt life to be meaningless in the during COVID - 19 phase when compared to the pre COVID - 19 and post COVID - 19 phases. The stress, anxiety and depression levels were higher during the COVID - 19 phase. The macronutrient as well as the micronutrient intake of the participants was significantly decreased during the COVID - 19 phase.

The psychological health, mental health, social well-being and Quality of Life of the participants were adversely affected during the COVID - 19 phase. Males experienced higher levels of Stress, Anxiety and Depression during the COVID - 19 phase as compared to the female counterparts. The mean physical health, psychological health, social relationships and immediate environment scores of the participants signified that the overall well-being and quality of life of COVID - 19 patients deteriorated and negatively affected after being detected positive for the virus.

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