Original Research Article

Study of demographic factors and effect of high protein diet on Severity of patients with Covid-19 at a tertiary healthcare center in Northern Maharashtra: An analytical study

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Abstract

Background: In general eating habits and lifestyle modification always seen to threaten our health. Maintaining a correct nutrition status is crucial, especially in a period when the immune system might need to fight back. Covid-19 pandemic is a global health emergency, and therefore it's prevention and treatment is an important priority of world health. The dietary patterns of people play an important role in health aspects of people. The present study was conducted to assess the effect of high protein diet, age and its co-relation with severity of COVID-19 disease. **Material & Methods:** The present study was a cross-sectional study. Data was collected from people in rural areas of Dhule district. Outcome measures were symptoms, RTPCR result, HRCT score, hospital stay, diet during and after infection, intake of protein powder and multivitamins, that was evaluated with a questionnaire. **Results:** Study included 42 patients. All patients had history of Covid-19 infection or were suspected cases. The vegetarian diet was compared with severity of Covid-19 ($p=0.0023$) thus there is an association between vegetarian diet and more severity of disease. There is significant association between age of the participants and breathlessness ($P=0.042$). There was significant association between consuming protein powder and multivitamins with lesser duration of post Covid-19 weakness ($p=0.002$) and ($p= 0.036$). **Conclusion**: The study tells that severity of Covid-19 is higher in people of advanced age, poor consumption of protein in diet, reduced intake of multivitamins during and after the infection. Those who have taken high protein diet have less severity of Covid-19 infection and it helped in early recovery.

Keywords: Pandemic, HRCT, Covid-19, Severity.

Introduction

Corona viruses is a family of viruses that are known to cause illness that ranges from common cold to more severe tract infection that includes the middle east respiratory syndrome (MERS) and the severe acute respiratory syndrome (SARS) A novel coronavirus (COVID-19) was identified in 2019 in Wuhan, China. This is a new coronavirus that has not been previously identified in humans[1]. Most of the people infected with the covid-19 virus will experience mild to moderate respiratory disease and recover without requiring special treatment. Older people and people with underlying medical illness like cardiovascular disease, diabetes, chronic respiratory disease, hypertension, anemia and cancer are more likely to develop severe illness. The covid-19 virus spreads primarily through droplets of saliva or discharge from the nose when an infected person coughs or sneezes, so it's important that you simply also practice respiratory etiquette (for eg. by coughing into a flexed elbow, by wearing masks or a face shield across the face to avoid transmission of the virus, using sanitizers after contact which objects infected with the virus)[2]. The virus that causes covid-19 can infect people of all ages. However evidence to date suggests that three groups of people are at a higher risk of getting severe covid-19 disease. Firstly, older people (people over 70 years of age), Second being people with serious illness such as: Diabetes, cardiovascular disease, cancer etc. And finally people who are physically inactive[3].

On, January 30 2020 the World Health Organization (WHO) notified to the world that the outbreak of covid-19 disease was a worldwide health emergency and on March 11, the disease was announced as a worldwide pandemic. An unhealthy diet (High consumption of saturated fats and carboxylic acid, increase in the amount of oily food in the diet, low intake of fruits and vegetables, eating salty fruits, people having vegetarian diet, or people with less protein intake etc.) appears to be a serious driver of increases in prevalence of spread of covid-19 virus. Also, many studies have suggested that some dietary patterns may affect the inflammatory markers that may lead to a low grade of the immune system that causes increase of the virus invasion[4].

Eating a healthy and high proteinaceous diet which is extremely important during the covid-19 pandemic. What we eat and drink can affects our body's ability stop, fight and get over infections like covid-19 because it weakens our immune system, and hence having a healthy diet may help to prevent it. While no foods or any dietary supplements can prevent or cure covid-19 infection, having a healthy diet may help to scale back its severity and are important for supporting the immune systems. Having good nutrition also can help reduce the likelihood of developing other health related problems like hypertension, diabetes, obesity, cardiovascular disease and few sorts of cancers [5]. This study aims at finding the correlation between the diet, age and severity of covid-19 disease.

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Material & Methodology

Present study is an analytical study in which the data was collected from rural areas like Morane, Haranmall and Gondur with in Dhule District and also patients who visited ACPM medical college during from 1st July to 24th July 2021.

The duration of our study was 57 days from 2nd July 2021 to 26th August 2021.

Sample size is calculated according to formula $4pq \div d^2$, where p= prevalence of[6] q=100-p and d=20% of p. So the sample size calculated from this formula is 15. We have taken 42 samples. Universal sampling technique was used to enroll the study subjects in the present study.The inclusion criteria's were patients aged between 18 and 75 years and one of the following criteria (1) patients having past history of covid-19 infection (RTPCR positive) (2) patients suspected of having covid-19 infection. In addition, the exclusion criteria were patients not willing to participate in the study. Informed consent from all the patients were taken prior to the study and the participant data is not disclosed to anyone except the examiners. The study was approved by the ethical committee of the college prior to the study. For the purpose of data storage and analysis Microsoft excel, and SPSS trail version were used. This data was collected according to a pre-designed questionnaire. The participants were asked questions about their dietary pattern and regarding the severity of COVID-19 and the data was processed for the research.

Study subjects were evaluated with their symptoms, personal history, type of diet, examination findings, laboratory and radiological parameters.

The data was entered using MS excel software, SPSS version 22 software was used for data analysis. Tables and charts were used for frequency analysis. Appropriate statistical tests were used for data analysis. P-value less than 0.05 was considered to be statistically significant.

Observations & Results

Table 1: Demographic Profile of patients

		No. of Cases	Percentage
Age-Group	Less than 30	01	2.38
	31-45	10	23.81
	46-60	10	23.81
	>60 years	21	50.0
Gender	Male	26	61.9
	Female	16	38.1
Resident	Rural	17	40.5
	Urban	25	59.5

In the present study a total of 42 people were included, out of that 26 (61.9%) were males and 16 (38.1%) were females. The mean age of patients was 59.8± 10.61 years. Majority of the patients i.e. 25(59.5%) were Urban and 17(40.5%) were rural.

Table 2: Co-Morbidities and Pattern of Diet in patients

		No. of Cases	Percentage
Co-Morbidities	Diabetic Mellitus	2	4.76
	Hypertension	2	4.76
	Anaemia	9	21.42
Diet pattern	Eggs	29	69.05
	Meat	29	69.05
	Fruits	33	78.57
	Protein Powder	32	76.19
	Use of Multivitamins	31	73.81

In present study, 2(4.76%) of patients were having Diabetic Mellitus and Hypertension whereas 9(21.42%) of patients were anemia. Majority of the 29(69.05%) of patients were eating eggs and meat. 33(78.57%) of patients eating fruits, 32(76.19%) of patients recommended protein powder and 31(73.81%) were recommended multivitamins.

Table 3: RTPCR & HRCT COVID-19 in patients

Particular		No. of Cases [N=42]	Percentage
RTPCR	Done	39	92.9
	Not Done	03	7.1
HRCT	Done	28	66.7
	Not Done	14	33.3
HRCT score Classification [n=28]	Mild(1-8)	11	26.19
	Moderate (9-16	12	28.57
	Severe17-25)	5	11.90
	none	14	33.33

Regarding covid-19 infection, 39 (92.85%) were RTPCR positive and remaining 3 (7.15%) was suspected cases of covid-19 with symptoms during the period of pandemic. Out of total 42 only 28(66.66%) had done HRCT Scan and there score were differentiated into three category Mild (1-8), Moderate (9-16) and Severe (17-25). Patients with mild score were 11(26.20%), with moderate score were 12(33.33%) and that with severe score were 5(11.9%). The severity of covid-19 was assessed by symptoms such as breathlessness, and HRCT Scan score. Also, the requirement of oxygen and their oxygen saturation levels were assessed.

The patients having severe form of disease which was determine with the help of oxygen requirement and HRCT Scan shows the involvement of lung. There were participants 12(28.57%) who had SpO_2>95%, 13(30.95%) whose SpO2 was between 90-95% and 17(40.78%) who had SpO_2<90%. Out 42 participants, 31(73.1%) had taken proper treatment. They were treated and their post covid-19 weakness was considered as a parameter for the severe involvement of the disease. Those patients who had weakness for more than 15 days 12(28.57%) were considered as a severe case and those with less than 15 days 30(71.43%) of weakness were considered as mild case.

Table 4: Association between generalised weakness and use of Protein Powder & Multivitamin

Particular		weakness		Total	p-value
		≤15 days [n=30]	>15 days [n=12]		
Protein Powder	Given	27	05	32	P=0.002
	Not Given	03	07	10	S
Multivitamins	Given	25	06	31	P=0.036
	Not Given	06	06	12	S

Out of 42, 32(76.19%) consuming protein powder in which, 27 patients were having ≤15 day weakness and 5 patients were having >15 days. There was significant association between protein powder given and duration of weakness (p=0.002).

Out of 42, 31(73.81%) consuming patients multivitamins after infection were having a lesser duration of weakness, There was significant association between consuming patients multivitamins after infection were having a lesser duration of weakness (p=0.036).

Table 5: Association Breathlessness and Diet & Age-group

Particular		Breathlessness		Total	p-value
		Present [n=15]	Absent [n=27]		
Diet	Non-Vegetarian	07	22	29	P=0.035
	Vegetarian	08	05	13	S
Age-group	20-50 years	03	12	15	P=0.042
	More than 50 years	12	15	27	S

The dietary pattern of patients was closely related with severity of the disease. The patients who had included meat and eggs in their diet had less severe symptoms of covid-19. There were statistical significant association between Diet and breathlessness (p=0.035).

Elderly people had more severe symptom such as breathlessness compared to the younger ones *(p*=0.042) as there was association between breathlessness and age-group.

Discussion

A Study by Jung Ki Kim et al showed the percentage of Covid-19, 24.3 % patients were 65 years and above, 56.8% were 35-64 years and 18.1% were between the ages of 18-34 years[7]. About similar findings were showed in present study, 50 % patients were 50 and above, 23.81% were between 41-50 years and 23.81% were between the age of 31-40 years and only 2% were between 23-30 years.

A study by Masum Ahmed et al showed that the proportion of covid-19 infection was distributed as 86.67% in males and 13.33% in females[6]. Savitesh Kushwaha et al showed that the proportion of covid-19 infection was distributed as 65.39% in males and 34.61% in females[8]. The male predominance was also observed in different studies of Covid-19 patients. Similar predominance of males was 61.9% and that of females were 38.1%.

In present study the patients consuming a higher intake of poultry had Breathlessness (p=0.035). Zahra Tavakol et al showed the associations that the patients with a healthier dietary pattern, including more consumption of poultry had a lower severity of the disease (p<0.05)[4].In present study diabetes was being present in 4.7% of patients similar findings was noted by Alizerabidi et al in their study found that who were tested positive for Covid-19, 14.5% were diabetic[9].

In the study conducted by Naseem Essabah Haraj et al. was found that the mean age of the people affected by Covid-19 was 55 years with 51.2% having critical disease[10], present study shows a mean age of 46 years while 35.71% had critical illness.

In accordance with the current study Renzo LD et al[11] also specified the importance of diet and discussed that it helps to reduce virulence of SARS-Cov-2. They supported the findings with reference to two more studies[12-13].

Also Tao Li et al study from Wuhan supported that the prevalence of malnutrition in elderly patients with COVID-19 was high, and nutritional support should be strengthened during treatment, especially for those with diabetes mellitus, low calf circumference, or low albumin[14].

In present study the participants (n=42) the majority of patients were hard working farmers by occupations. There was distribution of protein powder by the local authorities through various programs during the pandemic as a nutritious diet, in the rural areas. They were also given multivitamins tablets by local physicians for consumption.

Conclusion

The COVID-19 disease is more critical in patients with elderly patients. A slight predomination towards male gender is seen. High protein diet like poultry consumption leads to decreased severity of COVID-19. Those who have diabetes are at increased risk. The people who consumed protein powder during and after covid-19 seem to have weakness for a lesser duration. Those people who consumed multivitamins were have quicker recovery post infection. More studies should be done in elderly people. People should consume more high protein diet.

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