

Original Research Article

Effect of lockdown due to COVID-19 pandemic on lipid profile of Indian male population

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ABSTRACT

Background: SARS-COV-2 pandemic is one of the biggest health challenges for modern era and this type of pandemic was never witnessed in recent past. To control the pandemic various measures were taken by various authorities like lockdown and shutdown. This study was meant to find the effect of this new way of social isolation during lockdown on Indian male population.

Methods: The study was conducted in IMS and SUM hospital, Bhubaneswar, Odisha. Those having routine blood check-up before lockdown in the hospital were again re-evaluated for their lipid profile after lockdown. Only male between age group of 20 to 59 included in the study who were mostly confined to home during lockdown. Female, front line workers and people already having deranged lipid profile were excluded from the study.

Results: It was found that there are significant variations in the triglyceride and cholesterol level in men before and after lockdown whereas the level of HDL did not show any significant variation.

Conclusions: From above study it may be concluded that though lockdown is somehow able to control the rapid spread of the virus but it has negative effect on the lipid profile and indirectly cardiovascular health of a man.

Keywords: Lipid profile, COVID-19, Lockdown, Social isolation

INTRODUCTION

Coronavirus pandemic is one of the major catastrophic events of the world in the recent times, which lead to adoption of various measures like lockdown, undertaken by all countries around the world to control it. India also imposed complete and partial lockdown across the country for months, which restricted movement of people and their social activities.¹ Social relationships and inter personal relationships are of fundamental importance to health. Social support is one of the strong and consistent predictors of health outcomes.² Social isolation is associated with increased risk of premature mortality and chronic disease morbidity.³ Evidence suggested that both of these measures of social relationships impact on health.⁴ Social networks and support may affect health

both through behavioural pathways such as influences on healthy lifestyles and adherence to medical recommendations or through direct psychobiological processes.⁵ Prospective epidemiological COHORT studies have shown associations between lack of social life and risk of cardiovascular diseases that remain significant after behavioural factors like co-morbidity and socioeconomic status (SES) are taken into account.⁶ Isolation along with the fear of pandemic and the economic impact of lockdown may lead to depression. Depression is considered as one among the major health problems in the world as it is highly prevalent in the general population and leads to great loss of quality of life and social functioning in the affected individual.

Cardiovascular diseases (CVD) were recognized as important threats to human health.⁷ It was the leading

cause of death in India.⁸ Various lipids of blood were influenced by body weight, physical activity, nutrition, medications and also by genetic factors.^{9,10} Also there was evidence that blood lipids were also affected by mental status.¹¹ It was postulated that various stressors in life increased blood lipids by increasing the enzyme hepatic lipoprotein lipase activity caused by an increased sympathetic neuronal response. So it was concluded that stress may have a role in causing CVD. Many studies had investigated the influence of mental status on the levels of different blood lipid. A review done by Dimsdale et al suggests that the levels of free fatty acids and total cholesterol rise following acute and/or chronic stress.¹² It had been consistently shown that the increasing concentration of low-density lipoprotein cholesterol (LDL-C) was associated with an increased risk of myocardial infarction and vascular death.¹³ High-density lipoprotein cholesterol (HDL-C) was one of the strong and independent predictor of CVDs, which had been confirmed by different studies on various racial and ethnic groups throughout the world.^{14,15} Also triglycerides (TG) can enter the arterial wall with increase concentration and then accumulate in the arterial wall, thus causing the risk of atherosclerosis.¹⁶ Between the year 2007 and 2008, there was an increasing evidence of TG being associated with an increased risk of myocardial infarction, ischemic heart disease, ischemic stroke, according to studies in the Copenhagen city heart study and women's health study.¹⁷

The present study tried to find out the effect of lockdown in India during COVID-19 pandemic on the lipid profile of male population.

METHODS

This cross-sectional study was conducted in the clinical chemistry laboratory of IMS and SUM hospital, Bhubaneswar from the month of September 2020 to December 2020.

All the males between the age group of 20 to 59 years who came for routine health check-up to the hospital in the month of January to March 2020 before the implementation of lockdown by the government were included in the study.

Their lipid profiles were collected from the data base of the laboratory and they were requested over phone to visit again in the month of September for the re-evaluation after the lockdown was removed and free transportation was provided within the city.

Their fasting blood was collected to estimate their lipid profile which included TG, total cholesterol (TC) and HDL-C. Only males between age group of 20 to 59 years who came to hospital for routine check-up before lockdown and were mostly at home without much outside activities during lockdown included in the study.

Females were excluded from the study. Also those who did not appear for post lockdown evaluation were excluded from the study. Those having deranged lipid profile and other known chronic diseases before the lockdown were excluded from the study. People who have active duties during lockdown like doctors, police were excluded from the study.

Universal sampling method was used. All the subjects who fulfilled the inclusion criteria were included in the study. After applying all inclusion and exclusion criteria 50 people were included in the study and written consent was taken from them regarding the study.

Data was analysed by SPSS software version 20.0 licensed to the institute. Continuous variables were expressed as mean and standard deviation. Categorical variables were expressed as percentage. Paired sample t test was used to compare the means. A p value of <0.05 was considered statistically significant.

Serum TC, TG and HDL-C were measured by Cobas Integra 400 Autoanalyzer by enzymatic colorimeter methods.¹⁸

The study was cleared by institutional ethical committee.

RESULTS

In the present study we found that out of the entire study population after putting inclusion and exclusion criteria were from middle age group than young adult (76% middle aged and 24% young adult) (Table 1). This was consistent with the fact that middle aged and older people come to hospital more frequently for routine health check-up rather than young people (Figure 1).¹⁹

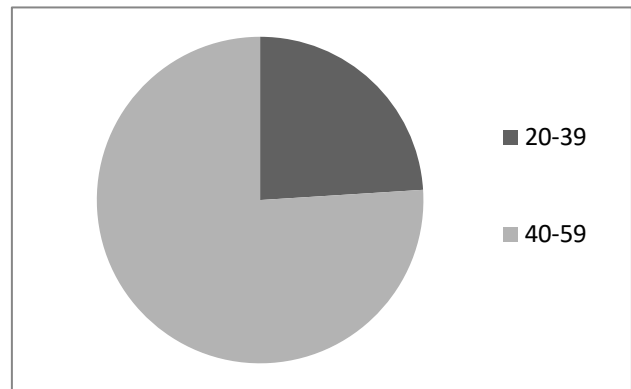


Figure 1: Age distribution of study population.

Table 1: Age distribution of study population.

Age group (in years)	No. of participant	Percentage
20-39	12	24
40-59	38	76

Table 2: Lipid profile before lockdown.

Parameters	Mean	SD
TC	160.16	22.44
TG	105.48	23.07
HDL-C	46.26	4.76

Table 3: Lipid profile after lockdown.

Parameters	Mean	SD
TC	167.66	17.31
TG	118.36	18.92
HDL-C	46.04	3.69

Table 4: Comparison between lipid profile before and after lockdown.

Lipid profile	Before lockdown	After lockdown	P
TC	160.16	167.66	0.00013
TG	105.48	118.36	0.0029
HDL-C	46.26	46.04	0.571

If we see the study population lipid profile just before the lockdown, we observe that the mean of TC, TG and HDL-C is 160.16 mg/dl, 105.48 mg/dl and 46.26 mg/dl respectively, whereas the mean of the above parameter of same study population just after the lockdown is 167.66 mg/dl, 118.36 mg/dl and 46.04 g/dl (Table 2 and 3). Now when we compare each parameter before and after lockdown, we found that there is significant increase in the blood level of cholesterol and TG ($p < 0.5$) whereas there is no significant change in the HDL-C values ($p > 0.5$) (Table 4).

DISCUSSION

High levels of social isolation were associated with negative cardiovascular, metabolic and neuroendocrine process and therefore, suggested that the impact of social isolation on CVD risk may be mediated by dysregulation of these systems. Various interventions for increasing perceived social support such as the enhancing recovery in coronary heart disease (ENRICHED) trial did not find any increasing social support in post-myocardial infarction patients leads to favourable cardiovascular outcomes.²⁰ But the impact of interventions for increasing social connectedness and reduce isolation on stress responsively has still not been evaluated. These studies would clarify the causal relationships between stress and social isolation.

In our study it was found that, psychological stress was a risk factor for increasing triglycerides and LDL and no change for HDL. Stressful situations are hazards for lipid profiles. These hazards included physical and psychological stress.^{21,22} Psychological stress had effects on different part of human body especially some organs and physiological parameters, lipid profiles were one of

these parameters. It appeared that stresses due to psychological reasons that were mentioned in many studies were more prominent in relation to dyslipidemias.

The results of our study indicated that social isolation during lockdown situation was associated with larger total/HDL cholesterol ratio response to stress in socially isolated men. These associations were not just related to loneliness but also due to other factors like lack of physical activities, stress regarding future economic scenario. Also being at home whole day made the dietary habit more unfavourable regarding lipid profile. The associations between social isolation and other cardio vascular profile, neuroendocrine disturbances may be present for which further studies may require. These just indicated that the social isolation can be associated for variety of health outcomes.

In our study, we found a significant variation in cholesterol and TG levels reactivity to social isolation in men who were isolated completely at home due to lockdown and associated stress may have played a major role for these variations in lipid profile. Many previous studies had also shown that men have had a higher lipid response to stress, although this had not been consistently replicated in all situations.^{23,24}

It was also found that there was not much difference in subjective response to stress and other biological measures of stress such as blood pressure, so this cannot explain the disparity between men and women in lipid responses. The finding that socially isolated men at home in lockdown had greater cholesterol reactivity to stress may be particularly important for health as men were at a higher risk of coronary artery disease in comparison to women of middle age. Individual changes in acute stress responses in LDL, HDL and TC were found to predict fasting HDL and total HDL cholesterol ratio in a 3 year follow up study, showing that the changes in cholesterol may be small, they have clinically relevant outcome.²⁵ Epidemiological evidence had consistently demonstrated that men seemed to have a greater health benefit from a socially active life than women which further underlined the role of gender in relation to the effects of social isolation.^{26,27}

CONCLUSION

So it may be concluded from the above study that though social isolation during lockdown is important for a pandemic point of view to stop the spread of an infectious disease but it may have other effect on the health status of the person. Particularly the effect of isolation on lipid profile of male population is significant. So people must make themselves engage in other active activities like exercise, good diet and stress relieving measures during lockdown to remain fit and healthy.

The study was conducted on few numbers of subjects in a particular geographic location. It also included only male

subjects. More extensive studies are needed with greater number of subjects and in different areas to get a more definite conclusion.

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Conflict of interest: None declared

Ethical approval: The study was approved by the institutional ethics committee

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