

Coronavirus Disease-19 (COVID-19) and Modern Lifestyle Diseases

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Obesity is supposed to be a risk factor for this coronavirus infection. The contamination in obese subjects as compared to lean subjects depends on three reasons. The first and foremost reason is the obese subjects with influenza, dispose of the virus for more duration compared to the lean subjects; which expands the chances to contaminate the virus to the others¹. Secondly, due to less and prolonged effort to produce interferons by obese human subjects and animals, and the obese microenvironments also allow the cropping up of the novel virulent virus strains^{2,3}. As compared the delay in interferon production with the disparity in the huge amount of viral replication helps more viral RNA replication in spreading out the options in the emergence of novel virulent viral strains³. Thirdly, in accordance with the other two factors mentioned above, the body mass index (BMI) plays emphatically in the spreading out of this contagious as well as virulent virus through exhalation⁴. The pronouncement that BMI plays emphatically in the emergence of this infectious

virulent virus is especially eloquent for male individuals on the basis of the hypothesis related to the fact that higher ventilation volumes and differences in the size and shape of the chest or lungs emphatically plays an important connection with this infection⁴. Presumably, double time duration of approximately 28 days is needed for quarantine in obese individuals as compared to lean subjects¹ since obese subjects dispose of the virus for more duration although the coronavirus disease-19 (COVID-19) is having the incubation period of 14 days. Due to the unavailability of the vaccine till date, the isolation of the confirmed COVID-19 patients is the only action which can be taken along with induction of immune modulation among the patients.

Obesity-related diseases like atherosclerosis, hypertension, and coronary heart diseases (CHD) etc were enlisted under most common cases of comorbidity for COVID-19 infection⁵⁻⁷ as they are associated with dreadful prognosis of respiratory diseases⁸, diabetes

mellitus^{9, 10}, renal diseases¹¹, and pregnancy⁸. Apart from that, as obesity is also considered a multisystem related disorder, it is associated with endocrine as well as circulatory disorders like diabetes mellitus or metabolic syndrome (MS) like disorders, and these conditions may also be commonly observed among the patients positive with COVID-19. It has been found that the patients of diabetes mellitus received the treatment with angiotensin converting enzyme (ACE) inhibitors as well as the angiotensin-II receptor (Type-I receptor) blockers^{12,13} causing increased expression of ACE2 usually seen among the patients of diabetes mellitus. By following the same, the patients of hypertension were also treated by the administration of ACE inhibitors as well as the angiotensin-II receptor (Type-I receptor) blockers¹⁴. Moreover, thiazolidinediones and ibuprofen were described to be responsible for the increased expression of ACE2. On the other hand, the increased expression of ACE2 may accelerate the chance of COVID-19 infection whereas the above mentioned two conditions are supposed to be major cause of prognosis of such infection indirectly.

Diet plan and most importantly physical exercise these two are possible beneficial for immune modulation besides the weight lose moreover, the rate of morbidity and mortality can be reduced by regular physical exercise even being mild obese also. Because, through the regular physical activity is not only beneficial for the production of antioxidant to combat against oxidative stress related damage; but also during any microbial infection, the immune modulation is supposed to be maintained by the increased production of cytokines via TLR (toll-like receptor) signaling pathways, which leads to enhance the host resistance to pathogen invasion¹⁵.

On the basis of an animal model experiment in both obese and non-obese mice infected by the Influenza A virus (IAV), it can be concluded that exercise may change the state of immunity not only in non-obese but also in obese mice leads to accelerate the host-immune defense¹⁶. Thus, physical exercise also supposed to be responsible for the enhancement of certain cytokines and chemokines in bronchoalveolar lavage (BAL) fluid during the early phase of infection, which seems to restore the immune response among

obese mice to normal indicating that, the obesity is related to delayed-immune response. Regular exercise also has several benefits like energy balance as well as leptin response besides a massive responsiveness in type I interferons, exhilarating of muscular pyruvate dehydrogenase complex (PDC), enhances serum anti influenza virus specific IgG2c and appearance of more CD8⁺ T cells in bronchoalveolar lavage (BAL) fluid. These all processes are related with host defense against contaminations or any microbial infection^{16,17}.

So, it can be concluded that, regular physical exercise is the main defeat against any possible chance of contaminations regarding influenza virus or any kind of metabolic of disorders or modern lifestyle related disorders like obesity and its associated metabolic syndrome sometimes. Moreover, it is now well known to all that, obesity as well as metabolic syndrome among the adolescents is a commonly growing problem with additional complications in US and other industrialized countries¹⁸⁻²⁰. Another relatively common disease is gestational diabetes characterized by unusually high blood sugar during the gestational period and usually diagnosed around 26th weeks of gestation. This elevated blood sugar is due to placental hormonal actions with having hindrance during delivery and health problems for your baby or occurrence of type 2 diabetes in the mother, unless the mother already has diabetes have conceived to attain the pregnancy. Thus, all these conditions become strained to women bearing pregnancy, to experience immunological as well as physiological changes which possibly make them more vulnerable for this type of viral respiratory infections including COVID-19.

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