



INDO AMERICAN JOURNAL OF PHARMACEUTICAL RESEARCH



RELATION OF OBESITY AND COVID-19 : ACE – 2 AND CONSEQUENCES

Chaudhari Nikhil Suresh^{1*}, Dr. Milind Wagh¹, Ahire Pavan Vinayak², Kulkarni Prathamesh Manohar³

¹NDMVPS College of Pharmacy, Nashik.

²MGV'S Pharmacy College, NASHIK.

³Sandip Institute of Pharmaceutical Sciences.

ARTICLE INFO

Article history

Received 08/09/2020

Available online

06/10/2020

Keywords

COVID-19,

Obesity,

Ace – 2,

Adipose Tissues.

ABSTRACT

COVID-19 pandemic has been devastating the world with increased number of patients day by day. Obesity which is itself a pandemic proving as key factor which increases the mortality in COVID-19 patients. Lockdown has changed lifestyle and eating habit of people which ultimately worsen the obesity problems. Person with obesity problem has large storage of adipose tissues. Obesity invites many metabolic disorders like diabetes's and hypertension. It has been observed to worsen the COVID-19 situation irrespective of the age and genders. In this article a systematic review on expected mechanism of increased severity of COVID-19 infection due to obesity and its various consequences has been compiled. ACE – 2 enzyme which is playing crucial role in the entry of corona virus into the host cell. Consequences like metabolic disorder, chronic inflammation and oro-naso-sensory perceptions. Renin angiotensin system playing important role and acting as bridge between COVID-19 and obesity relevance. Overall considering the effect of obesity on the COVID-19, it may worsen the case and also increases the chances of the death, By this it may be concluded that obesity and COVID-19 has direct relations.

Corresponding author

Chaudhari Nikhil Suresh

Department of Pharmacy,
NDMVPS College of Pharmacy,
Nashik.

cnikhil328@gmail.com

7588080716

Please cite this article in press as **Chaudhari Nikhil Suresh** et al. Relation of Obesity and COVID-19 : ACE – 2 and Consequences. *Indo American Journal of Pharmaceutical Research*.2020;10(09).

Copy right © 2020 This is an Open Access article distributed under the terms of the Indo American journal of Pharmaceutical Research, which permits unrestricted use, distribution, and reproduction in any medium, provided the original work is properly cited.

INTRODUCTION

WHO has acknowledged COVID-19 as pandemic . It affects more than 160 countries over the world. The pandemic has shifted paradigm of world towards the viral diseases. More ventilators are required and freed for patients suffering from COVID-19 . Its almost important for medical staff like nurses and doctors to treat COVID-19 patients with top most priority as positive cases are being increases day – by – day .¹

COVID-19 being pneumonia pandemic, causing agent is SARS CoV-19 (Severe Acute Respiratory Syndromes Corona Virus) to tackle this pandemic various countries all over the worlds has locked down and closed borders of nationals to avoid the unwanted spread of COVID-19 .²

Patients which are having chronic conditions like diabetes and hypertension shas been more prone to develop severe illness . irrespective of any age group obesity proven as risk factors for the COVID-19 patients which is responsible for various metabolic disorders Obesity has relevance with COVID-19 but its mechanism was not fully known .³

Obesity it self considered as pandemic currently over 2 billions of people all over the worlds are suffering from obesity . Obesity founds to be increase risks of developing pneumonia and others viral tract infections .⁴

Obesity sometimes called as overfat state , which affects negatively to immunity of the persons bodies and its defense mechanisms. Obesity has direct relation with body mass index also shown severe consequences during H1N1 pandemic . Various data from the past pandemic and influenza has shown obesity as the independent risk factors for severe outcomes.⁵

Children are less susceptible to the COVID-19 to develop severe illness. Obesity in children is separate risk factor increases severity among children. Lockdown which are implemented to overcomes COVID-19 pandemics may worsen weight related problems As well As the eating habits of children. The houses contains lots many processed foods and a high caloric – contained foods which leads to increased weight and obesity problem. Diet and nutrition always plays major role in the inflammation and immunity . Consuming junk foods may lead to increase risks of systemic inflammation with the subjects over weight or the having obesity , promoting IL – 6 productions .⁶

Possible Mechanism

COVID-19 has various risk factors such as chronic illness like diabetes, cancer , obesity and smoking as well . The possible mechanism by which obesity increases the severity or morbidity need to be well understood . Possible mechanism as predicted suggest that obesity leads to enhanced entry of virus through the human Angiotensin – Converting Enzyme – 2 (ACE – 2) . ACE – 2 is considered as the well known receptors for the coronavirus entries into the host cells . Adipose tissue contains high levels of the ACE – 2 expression which expressed in the lungs. The m – TOR mechanism is also playing important role in this predicted mechanisms.⁷

ROLE OF RAAS

Renin angiotensin system is associated with obesity. The dysregulation of the system leads to obesity. RAAS regulates fluid balance, blood pressure and cardiovascular functions. ACE1 and ACE2 are acting regulatory enzymes in the systems. ACE 2 degrades the Angiotensin – 2. It was expected that obesity leads to the upregulation of Adipokine which acts on central nervous system . By stimulating RAAS which ultimately causes dysregulation of ACE – 2 .Reduced expression of ACE – 2 is also related with that of Heart Failures , renal function and also hyper tension s . The relevance of coronavirus and ACE – 2 was already explained.

ACE – 2 has been playing dual role in the COVID infection; when ACE – 2 infection has been increased it may predispose to more massive exposure to the virus but it may also expected to avoid the RAAS – mediated lung injuries in response to the corona virus infections later . ACE – 2 is also expressed in adipose tissues. Preexisting obesity accounts for the severity of the coronavirus infections to the persons . Obesity leads to over expressions of the Angiotensin – 2 as well. Obesity as a major factors was avoided by physicians while considering the studies on coronavirus.⁸

Relation of Life Style , Obesity And COVID-19

Diet that is high caloric food and reduced activity leads to the obesity and excess ectopic fats. This has two consequences, first one is related to metabolic and cardio vascular diseases. This is nothing but reduced diaphragm contractility , increased cardio renal stress, increased blood pressure increased blood glucose level. Second thing is dysregulation of the ACE – 2 inhibitors which leads to increased viral shedding . Ultimately causes poor or reduced cardiac health and dysfunctional immune responses. Severity factors for COVID-19 gradually increases.⁹

Consequences:

Reduced Oro – Naso – Sensory Perception .

Loss of senses of smell and taste due to COVID-19 has become common symptom along with others symptoms like fever , dry cough , and thoracic oppressions . There is no direct relation between the obesity and the Oro – Naso Sensory Perceptions but it may alter its .¹⁰

Chronic inflammation :

Abnormal inflammation characterized by the abnormal cytokinin production as well as increased acute phase the reactants . People already having conditions which alter the inflammatory response are at higher risk of COVID-19 infections . Obesity is one of those factor which alters the inflammatory response of the body of person . Obesity leads to abnormal cytokine production and elevated acute phase reactants . Natural immune response system in person having obesity problem is altered . This worsen the complexity of COVID-19 pateints .¹¹

List of Abbreviations

1. COVID-19 – Novel Corona Virus Disease
2. ACE – Angiotensin Converting Enzymes .
3. RAAS – Renin Angiotensin Aldosterone Systems .

Conflict of Interests

No any Conflict of Interests .

REFERENCES

1. Spinelli A, Pellino G. COVID-19 pandemic: perspectives on an unfolding crisis. *Br J Surg.* 2020;107(7):785-787. doi:10.1002/bjs.11627
2. Dashraath P, Jeslyn W, Karen L, ... LM-A journal of, 2020 undefined. Coronavirus disease 2019 (COVID-19) pandemic and pregnancy. *Elsevier.* Accessed July 24, 2020. <https://www.sciencedirect.com/science/article/pii/S0002937820303434>
3. Banerjee M, Gupta S, Sharma P, Shekhawat J, Gauba K. Obesity and COVID-19: A Fatal Alliance. *Indian J Clin Biochem.* Published online July 10, 2020:1-8. doi:10.1007/s12291-020-00909-2
4. Rychter AM, Zawada A, Ratajczak AE, Dobrowolska A, Krela- Kaźmierczak I. Should patients with obesity be more afraid of COVID- 19? *Obes Rev.* Published online June 24, 2020:obr.13083. doi:10.1111/obr.13083
5. Maffetone P, Health PL-F in P, 2020 undefined. The perfect storm: Coronavirus (Covid-19) pandemic meets overfat pandemic. *frontiersin.org.* Accessed July 24, 2020. <https://www.frontiersin.org/articles/10.3389/fpubh.2020.00135/full?fbclid=IwAR11UkoySD79cb0qByEdrSVAf8x5ELbs3xhB5uOVwvrfeYeoBhf9XWEHpUE>
6. Calcaterra V, Vandoni M, Pellino VC, Cena H. Special Attention to Diet and Physical Activity in Children and Adolescents With Obesity During the Coronavirus Disease-2019 Pandemic. *Front Pediatr.* 2020;8. doi:10.3389/fped.2020.00407
7. Bolourian A, Reviews ZM-O, 2020 undefined. Obesity and COVID- 19: The mTOR pathway as a possible culprit. *ncbi.nlm.nih.gov.* Accessed July 24, 2020. <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC7362054/>
8. Iannelli A, Favre G, Frey S, Esnault V, Surgery JG-O, 2020 undefined. Obesity and COVID-19: ACE 2, the Missing Tile. *Springer.* Accessed August 5, 2020. <https://link.springer.com/content/pdf/10.1007/s11695-020-04734-7.pdf>
9. Sattar N, McInnes IB, McMurray JJ V. Obesity a Risk Factor for Severe COVID-19 Infection: Multiple Potential Mechanisms. *Circulation.* 2020;142:4-6. doi:10.1161/circulationaha.120.047659
10. Khan AS, Hichami A, Khan NA. Clinical Medicine Obesity and COVID-19: Oro-Naso-Sensory Perception. *mdpi.com.* doi:10.3390/jcm9072158
11. Chiappetta S, Sharma A, ... VB-IJ of, 2020 undefined. COVID-19 and the role of chronic inflammation in patients with obesity. *nature.com.* Accessed August 13, 2020. <https://www.nature.com/articles/s41366-020-0597-4>.



54878478451200902



Submit your next manuscript to **IAJPR** and take advantage of:

- Convenient online manuscript submission
- Access Online first
- Double blind peer review policy
- International recognition
- No space constraints or color figure charges
- Immediate publication on acceptance
- Inclusion in **Scopus** and other full-text repositories
- Redistributing your research freely

Submit your manuscript at: editorinchief@iajpr.com






