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Original article

EVOLUTION OF HEALTH IN COVID-19 INFECTION IN PATIENTS AFFECTED BY THE OBESITY EPIDEMIC

POPESCU RADUCU¹

Abstract

The medical scientific community has clearly presented and argued a number of studies linking the correlation between overweight and COVID-19 infection, studies that indicate a strong association with adverse outcomes and adverse developments, including the death of obese people infected with COVID-19. Obesity results in excess adipose tissue or what we colloquially call "fat". It can be said that adipose tissue acts as an endocrine organ, but it is harmful. It releases more hormones and molecules that lead to a chronic state of inflammation in obese patients. This paper brings to the attention of education specialists with various specializations, but involved in teaching with minor students, information about the processes that are at the origin of obesity and the influence of this condition in the evolution of COVID-19 infection. The hypotheses presented were tested and largely verified by comparative analysis of various scientific studies. The study was conducted on a sample of 26 students of the final years, and after analyzing the applied questionnaires we found that 63% consider that they want to know more about the ways of intervention in case of optimizing health in the case of obese people. There is also a percentage of 21% which includes those who consider that they are not prepared and do not have the necessary information to be able to carry out activities in an organized way with obese people. Those who are convinced that they have the theoretical means necessary to work with the obese are 16% present.

Methods. The present study was conducted on a sample of 26 student subjects aged between 20 and 31 years and master's students in the final years of study, who were previously informed on the subject around which the questions of the questionnaire were formulated and which proved interest in finding out the causes of the obesity epidemic. The group was divided into two homogeneous samples, then the results were integrated.

Conclusion. At the end of the period in which the questionnaires were applied, discussions were held and the results of all those involved were presented, which has an obvious contribution in the development of the next stages of the experiment.

Key words: infection, obesity, virus.

Introduction

The pandemic we are facing has painfully highlighted that the obesity epidemic is once again in the attention of medical staff and does not cause long-term damage as we used to believe, obesity has disastrous effects more and more often encountered in a short time. The Centers for Disease Control and Prevention reports that 73% of nurses who were hospitalized because of COVID-19 were obese. In addition, a recent study found that obesity could interfere with the effectiveness of a COVID-19 vaccine center for control and prevention (Ledford 2020). Shortly after the advent of COVID-19, there were many reports from hospitals around the world, drawing attention to an apparent excess of obese patients among those who were ventilated (Bhatraju, Ghassemieh, Nichols, Kim, Jerome, Nalla, Greninger, Pipavath, Wurfel, Evans, 2012). A series of discussions with specialists in the front lines of medical units among those in which patients infected with COVID-19 a concern and concern that they have developed over

the past decade, caused by overweight patients with varying degrees of obesity. The relationship between obesity and viral diseases has been studied for several years. During the H1N1 epidemic, this area gained particular interest because it was observed that obese patients have a higher risk of developing the disease, a longer stay in the intensive care unit (ICU) and a higher mortality (Diaz, Rodriguez, Martin-Loeches, Lorente, Del Mar Martin, Pozo, 2011). This has been demonstrated even in children, with impaired immune response, especially cellular, to influenza virus and, also the inadequate response of the vaccine when obese (Zachariah, Johnson, Halabi, Ahn, Sen, Fischer, 2020). Recently, during the COVID-19 epidemic in Canada, obesity was the third factor the most widespread demographic among children admitted to intensive care. Only those with associated serious diseases, immunosuppression and cancer. In New York, obesity was the most common comorbidity among

¹Faculty of Physical Education and Sport, Ovidius University of Constanta, Constanta, Romania
Eamil: r.popescu.online@gmail.com
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50 severe cases of COVID-19 affecting children and adolescents (WD Green, MA Beck.) Obesity is a very common comorbidity in severe cases of COVID-19 in children and adolescents. Social isolation can lead to increased fat accumulation. Excessive adipose tissue, insulin resistance, high blood pressure, high levels of proinflammatory cytokines and low intake of essential nutrients are factors that compromise the functioning of organs and systems in obese people. These factors are associated with damage to the immune, cardiovascular, respiratory and urinary systems, along with changes in the intestinal microbiota. In coronavirus infection with severe acute respiratory syndrome, these organic changes from obesity may increase the need for ventilatory care, risk of thromboembolism, low glomerular filtration rate, changes in the innate and adaptive immune response, and perpetuation of the chronic inflammatory response (Carlos Alberto Nogueira-de-Almeida, Luiz A. Del Ciampo, Ivan S. Ferraz, Ieda RL Del Ciampo, Andrea A. Contini, Fábio da V. Ued, 2020).

Any doctor is careful when discussing this risk factor with a patient and does not omit to present the size of anyone desired, namely the fact that obesity shortens life, but in the current pandemic this has become obvious to all. The results of research in related fields that researchers have linked to statistics in the last year, suggest that people with obesity have an increased risk of mortality from coronavirus disease 2019 (COVID-19), but the underlying mechanisms are poorly understood. As we expect, these findings must be the basis of the starting point in developing prophylactic measures and treatment schemes for this large vulnerable group. We know that in the case of a segment of viral pneumonia there is a strong association with the cases of obese patients with the serious evolutions of COVID-19 infection. Public interest has increased recently in the obesity epidemic. Among the many voices of increasingly resounding specialists are the voices of doctors from whom we have received constant warnings and who have continuously asked patients to consume less food and exercise more often, this helping or having a contribution in avoiding unwanted evolutions of various diseases and especially in the case of infections in which the cardio-respiratory system is affected. It is scientifically highlighted that obese people have physical problems, such as sleep apnea and joint pain, doctors and researchers, we have long understood the long-term consequences of overweight and obesity. We now know that obesity is associated with at least 236 medical diagnoses, including 13 cancers. Obesity can reduce life expectancy by up to eight years. (Heidi Ledford 2020). More recently, some scientific articles report

much more extensive and rigorous epidemiological investigations. Open SAFELY examined 5,683 deaths from COVID-19 in the UK and reported them to pre-existing potential risk factors documented in more than 17 million electronic medical records (Williamson, Walker, Bhaskaran, Bacon S., Bates C., Morton CE, Curtis HJ, Mehrkar, Evans, Inglesby, 2020) When low-grade inflammation constantly occurs in the human body, it releases cytokines, proteins that fight inflammation in the body, situation that keeps the body in a permanent state of struggle, ready to fight diseases, favorable situation only if this mechanism is continuously monitored and adapted by other systems of the human body. However, in the situation when they are released chronically, an imbalance can occur that causes damage undesirably, by the long-term intervention of a harmful factor. Thus COVID-19 infection causes the body to create another, significantly higher flow of cytokines. In the case of people affected by the obesity epidemic and infected with COVID-19, two hot cascades of cytokines come together, this combination of the two processes harms the lungs more than obese patients than those with normal BMI. Preliminary data from different small cohorts of the sample (less than 400 patients) of COVID-19 patients with short follow-up or poorly described BMI values indicate a poorer prognosis in obese people than in other patients. For example, one study showed a higher frequency of mortality in people with severe obesity admitted to the ICU compared to people with less severe obesity (Bhatraju PK, Ghassemieh BJ, Nichols M). However, it is not possible to conclude from these results that obesity is an independent mortality factor for patients with COVID-19 due to the small sample size in these studies, nor is it possible to accurately estimate the size of the effect of obesity, because of the absence of BMI categories and incomplete tracking.

Therefore, these results need to be confirmed in a large cohort, with available BMI categories and adequate monitoring. To further investigate the subject, we performed an analysis of the association between BMI and mortality risk 30 days after hospitalization for COVID-19 in all public university hospitals in the Paris area (Czernichow, Beeker, Lange, Guerot, Diehl, Katsahian, Hulot, J. Poghosyan, Carette, Jannot). As in all studies to date, age has been the most important pre-existing risk factor, but the effect of obesity has been extremely significant and classified according to the severity of obesity. The hazard ratio for death in those with class III obesity (body mass index [BMI] > 40 kg / m²) was up to 2.28 (1.96-2.65). The International Consortium for Severe Acute and Emerging Respiratory Infections (ISARIC) study of 16,749 COVID-19-related admissions to intensive

care units in the United Kingdom reported a lower risk ratio of 1.37 (1.16-1.63) associated with obesity reported by clinicians. (Docherty, Harrison, Green, Hardwick, Pius, Norman, Holden, Read, Dondelinger, Carson). Experts increasingly claim that obesity worsens the evolution of health in the case of COVID-19 infection. The increase in the number of kilograms and implicitly of the BMI body mass index, is the result of an energy imbalance that occurs when the caloric or energy intake is higher than the total volume of energy resources consumed during a day. In this way there is an increase in adipose tissue that incorporates the energy intake that has not been consumed, forming deposits of free fatty acids, lipid deposits rich in triglycerides. Increasing the number of inflammatory cytokines secreted into the systemic circulation acts on the alveolar capillary unit to potentiate the inflammatory response to SARS-CoV-2 infection). Increased adipose tissue is associated with a reduction in adiponectin secretion from adipose tissue that is at least partially determined by systemic insulin resistance. Studies in mice suggest that adiponectin is abundant in the pulmonary endothelium in healthy lungs and that adiponectin deficiency leads to pulmonary vascular inflammation and predisposes to experimental lung damage.

We know that the excess fat accumulated in the body and all the deposits in which fat is stored produce additional pressure on all access routes from the nostrils, the oral cavity they create a mechanical compression that reduces the possibility of inhaling or expiring air completely. The physical effort required for an obese patient to be able to breathe is considerably higher, which creates

Results

During the discussions with the students of the final years, as well as after analyzing the applied questionnaires, we found that 63% consider that they want to know more about the intervention modalities in case of optimizing the health condition for obese people. There is also a percentage of 21% which includes those who consider that they are not prepared and do not have the necessary information to be able to carry out activities in an organized way with obese people. Those who are convinced that they have the theoretical means necessary to work with the obese are 16% present.

various restrictive lung diseases and in more severe cases, leads to hypoventilation syndrome, which causes a person to have too little oxygen in the blood.

In addition to other factors that promote the unfavorable course of COVID-19 infection, the increased adipose tissue may have several angiotensin 2-converting enzymes - ECA2, an enzyme that allows the virus infection to invade healthy cells and trigger their destruction. A recent study showed an increased association of ACE2 in adipose tissue rather than in lung tissue. This finding further strengthens the hypothesis that obesity plays a major role in more severe COVID-19 infections. As a result, if there is an increased percentage of adipose tissue, the virus can bind and invade more cells, causing higher viral loads, which can make the infection more severe and prolong recovery. ECA2 receptors have been shown to be the entry point into human cells for some coronaviruses, including the SARS virus (Nature Medicine.11(8):875-9.2005). A number of studies have identified that the entry point is the same for SARS-CoV-2, the virus that causes COVID-19 (World Health Organization, 2020). In the context of the current unprecedented health crisis caused by the outbreak of coronavirus disease 2019 (COVID - 19), patients affected by severe obesity (BMI \geq 35), suffer more severe forms of the disease and accelerated and unfavorable evolutions, compared to weak patients with <25). These values collected from Lille University Center in France may not be generalizable to other centers in France or other countries, depending on the criteria implemented for the indication of IMV in other centers (Caussy, Wallet, Laville, Disse,).

The applied questionnaire revealed to our professional satisfaction, the fact that our university students want to know more aspects and are interested in the theoretical and practical content of the courses taught and whose potential target group is subjects whose BMI is > 35%, or who shows trends in this regard. The percentage of those who want more information and theoretical guidance was 63%. This considerable percentage encourages us to hope that future specialists will try and have the necessary tools to be able to make effective and well-founded scientific interventions if they face patients, clients or students of BMI is > 35% or are in risk area with a predisposition to obesity.

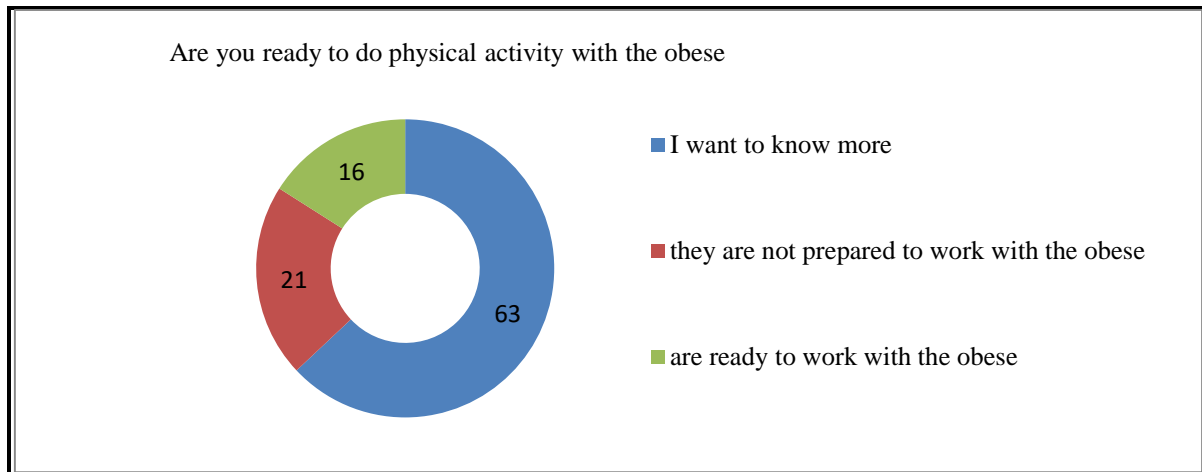


Figure 1 Diagram representing the percentage distribution of answers regarding priorities in addressing the issue given by the obesity epidemic

On the other hand we have a group that does not share the same optimism similar to those in the majority group, but which, we hope, has a degree of realism on which we rely. This opinion found in a percentage of 21% of the number of respondents induces to some extent a state of alert and concern in search of solutions and ways of efficient implementation and consistent with the current structure and curricula. In the background, the question rightly arises, whether there is another cause that contributed to the formation of this opinion. Keeping the optimistic mode, we consider that the serious and realistic way of the students in which they want to practice, as well as the special gravity registered in the evolution of COVID-19 infections, are the reasons why they opted for this option. Having this option, we are obviously advantaged in our approach to teachers when we transmit current and extremely useful information in activities with obese people or those heading for a BMI > 35%.

The sum of the percentages of the two groups, respectively of those who want to receive more information and indications with those who consider that they are ready to work with patients, clients or students affected by the obesity epidemic, produces a result of 79%. This result is more than gratifying and produces a horizon desired by any teacher or medical staff in the current context, in which obese people are affected in a higher percentage and have statistically lower chances of recovery. The group of those who consider that they are ready to work with obese people proves that there is interest from students and equally from teachers, but it raises the question of whether they really have the necessary theoretical and practical knowledge and how they can be supplemented, but also what is the form and way to evaluate objectively. The result of this study contributes and represents the beginning of a theoretical content

that we want to introduce in the didactic process or to make it available to all students together with our total support.

The ways of working discussed with the future specialists and proposed in this paper are grouped in three sections. The first section is represented by the correlation of the theoretical content from several disciplines and the realization of an interdisciplinary subject as a starting point in the accumulation of new theoretical knowledge in anatomy, biomechanics, physiology, psychology, necessary for understanding and subsequent direct and indirect interventions in working with obese people. The importance of knowledge in the disciplines studied during high school but in the first semesters of university activity, directly and unequivocally conditions the ability to understand the complex phenomena that world medicine and health sciences face in the last year. The challenge that is present in the university environment demands in a complex and fast way. The proof that the danger posed by COVID-19 infection in the case of people whose BMI is > 35% is aware is materialized in the obvious intention of a percentage of 46% of the number of respondents. The option of the 46% to enter into possession of a larger volume of theoretical knowledge presented and concatenated interdisciplinary, make us look with confidence at the situations in which these future specialists will face situations in which they will be able to make prophylactic interventions so as to avoid evolutions of various aggravated medical conditions or products caused by the accumulation of large deposits of free fatty acids AGL.

The second section is composed of intervention means, recovery and nutrition techniques adapted and correlated with the particularities of obese people. The percentage of this group is 37% and shows us that nutrition and

food hygiene is a sometimes neglected priority, but which obviously arouses interest through the increasingly complex implications highlighted by current studies. An important part of today's obese people are affected by the long periods of inactivity they went through in the various stages of the pandemic, in which they consumed a quantity of energy from a higher volume of calories than the energy consumed during a days, several days in a row. Consumption or lack of interest in nutrient-rich fruits and vegetables, combined with excessive consumption of fast food and energy-rich, nutrient-poor, ultra-processed foods, will exacerbate an already urgent situation. The effect of the pandemic

on mental and emotional balance has also triggered a number of behavioral and physiological changes that can contribute to weight gain.

Doctors and nutritionists around the world are expressing concern as they begin to see emerging patterns of weight gain and other symptoms related to adult and pediatric patients. Parents and physical education teachers have also reported weight gain in children, probably attracted to unhealthy diets, stress and limited physical activity. The education of the population regarding nutrition belongs to the teachers, those who train future specialists.

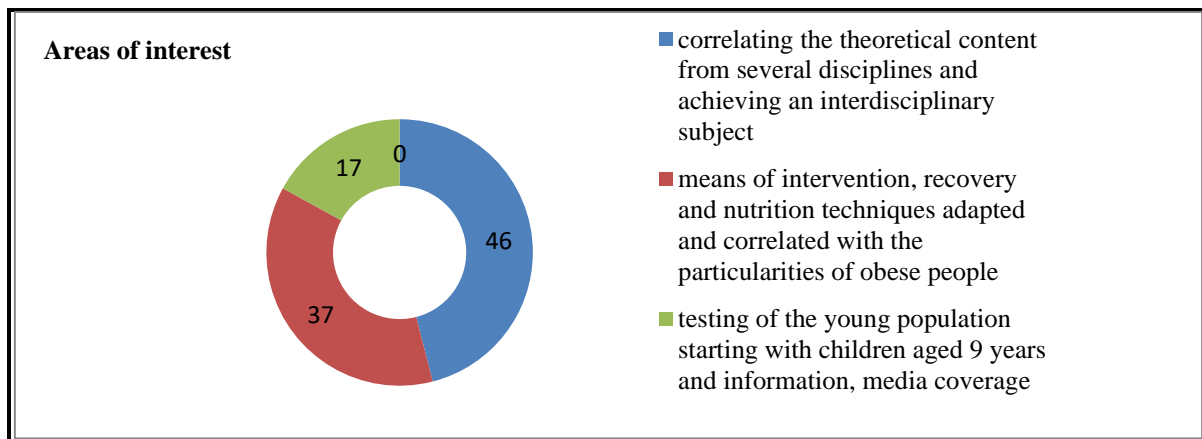


Fig. 2 The diagram representing the percentage distribution of the answers in the areas of interest

In the last section, most of those involved in this study believe that they do not have a clear picture of this fragility called obesity epidemic and consider it appropriate to start a comprehensive approach to information, media coverage and testing of the young population starting with children aged 9 years. From the debate with the participants in the experiment, we noticed that the opinions of those who opted for mass BMI measurement and large-scale communication of results.

Unexpectedly at the beginning of the pandemic there were few who warned the population about the increased risk compared to the average to those who are overweight, a fact later proven by the large number, we can say the majority of obese patients. Those infected with COVID-19 in need of artificial ventilation procedures due to hypoxemic respiratory failure caused by pneumonia (Richardson, Hirsch Narasimhan, Crawford, McGinn, Davidson, Barnaby, Becker, Chelico, Cohen, Northwell, 2020). Frequent finding of elevated levels of D-fibrin dimers in a large proportion of hospitalized patients is consistent with a thrombotic process, as is the frequent occurrence of venous thrombosis

The percentage of those who consider these to be the most appropriate intervention measures is 17%. The chest was preceded by another preliminary study and a series of discussions on the general notions of this complex topic, namely the calculation method for body mass index, notions on food hygiene, trends and evolutions of obesity on the planet. The hereditary factor was a discussed topic and the way in which children can be properly guided to avoid weight gain.

Discussions

and pulmonary emboli during the disease (Connors J.M., Levy J.H, 2020). Not long after the first cases of patients infected with COVID-19.

All those who are aware of the real danger posed by obesity can play an important role in the fight against obesity and in reducing the impact of this chronic disease on society. Obesity is an increasingly common chronic disease, serious and very expensive. The number of adults affected by obesity is growing as shown by the maps made by the Centers for Disease Control and Prevention, in which over 35% of U.S. adults. shows that obesity remains at alarming levels. Suprapoderal people have an increased risk in case of severe diseases where we include the infection with Covid-19, the

risk being 3 times higher, compared to people whose BMI falls in values of maximum 24%. Studies have shown that obesity can cause lower responses to vaccines for many diseases: influenza, hepatitis, tetanus. Black, non-Hispanic adults had the highest growth and are present in the highest percentage among those affected by obesity: 39.8%. The second largest group is represented by Hispanic adults, 33.8% and on the third place in the ranking of obese, are white, non-Hispanic adults, with a percentage of 27.9%. Hispanic and black adults have a higher prevalence of obesity and are clearly present in the risk group where they may experience more severe forms of Covid-19 infection. Obesity is a complex disease, caused by a number of factors related to ethnic and racial groups that have not had many options in recent decades to protect their physical and emotional health and ensure their economic well-being. Studies in Europe have reported a high prevalence of obesity in severe acute respiratory syndrome coronavirus-2 (SARS-CoV-2) that requires invasive mechanical ventilation (IMV).

Conclusions

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