Doctors monitor vaping as possible connection to young COVID-19 patients, UCSF professor says

kron4.com/news/doctors-monitor-vaping-as-possible-connection-to-young-covid-19-patients-ucsf-professor-says

By Gayle Ong

March 22, 2020

SAN FRANCISCO, Calif. (KRON) — Doctors are reportedly watching vaping as a possible connection to young people infected with COVID-19, that's according to a professor of medicine at UCSF.

A link between vaping and COVID-19 has not been confirmed, but health experts say people who do may be vulnerable.

People who smoke or vape may be at increased risk when it comes to coronavirus. This indication comes from Dr. Stanton Glantz, professor of medicine at UCSF.

"Vaping, like smoking, depresses immune function in your lungs and your lungs in addition to moving air in and out of your body, to get oxygen to your cells and to get rid of carbon dioxide have an important immune function because when you're breathing you breathe in a lot of bacteria and viruses," Glantz said.

Dr. Glantz explains e-cigarettes and smoking makes it harder for your body to fight off a viral infection.

Doctors say COVID-19 directly attacks the lungs.

Vaping has skyrocketed particularly in young people.

The CDC reports that young adults from ages 20 to 44 make up a big part of COVID-19 hospitalizations in the United States.

There's been little to no research but Glantz questions whether the virus is tied to vaping.

"A couple of colleagues here who are actually taking care of patients have noticed younger people who came in noticed that they were vaping," Glantz said.

"What we need to start doing is keep track of whether these people are smoking or vaping because that might be contributing to what's going on," Glantz said.

The director of the National Institute on Drug Abuse also flagged the concern in a blog post published last week citing drug concerns in addition to vaping and smoking.

According to the post, opioids slow down breathing and have already been shown to increase mortality in people with respiratory diseases.

“I think one common sense thing to do is stop insulting your lungs as one of my pulmonary friends tells me,” Glantz said. “Lungs are designed to breathe in air, not an aerosol ultrafying particles and chemicals that you get from e-cigarettes.”

Bay Area restaurants feed local healthcare workers amid coronavirus pandemic

PALO ALTO, Calif. (KRON) -- Restaurants in the Bay Area are finding ways to stay in business, while also giving back to local healthcare workers.

Tootsies at the Stanford Barn in Palo Alto is now providing meals for local hospitals through an event called "Adopt A Doc or Nurse".

How smoking, vaping and drug use might increase risks from Covid-19

edition.cnn.com/2020/03/20/health/coronavirus-vaping-drugs/index.html

March 20, 2020

*(CNN)*Earlier this month, the US Centers for Disease Control and Prevention updated its Covid-19 recommendations to specifically target older adults and people with serious underlying medical conditions. They labeled this group as "higher risk."

However, another group of people could be particularly vulnerable to Covid-19 and hasn't received as much attention: people who smoke, vape or have substance use disorders.

"[T]he research community should be alert to the possibility that [Covid-19] could hit some populations with substance use disorders particularly hard," Dr. Nora Volkow, director of the National Institute on Drug Abuse wrote in a blog post published last week.

Because Covid-19 attacks the lungs, those who smoke tobacco or marijuana or who vape may be especially threatened, Volkow said.

"When someone's lungs are exposed to flu or other infections the adverse effects of smoking or vaping are much more serious than among people who do not smoke or vape," Stanton Glantz, professor of medicine and director of the Center for Tobacco Research Control & Education at University of California, San Francisco, wrote in a blog post updated Tuesday.

"Vaping affects your lungs at every level. It affects the immune function in your nasal cavity by affecting cilia which push foreign things out...[T]he ability of your upper airways to clear viruses is compromised," Glantz said in a phone interview.

Young adults under age 44 make up a big part of coronavirus hospitalizations in the US

The CDC reported on Wednesday that young adults under age 44 make up a big part of Covid-19 hospitalizations in the US, and Glantz questions whether the vaping epidemic might have contributed to this.

"Some of my pulmonary [colleagues] have noted people under 30 [with Covid-19] ending up in hospitals and a couple were

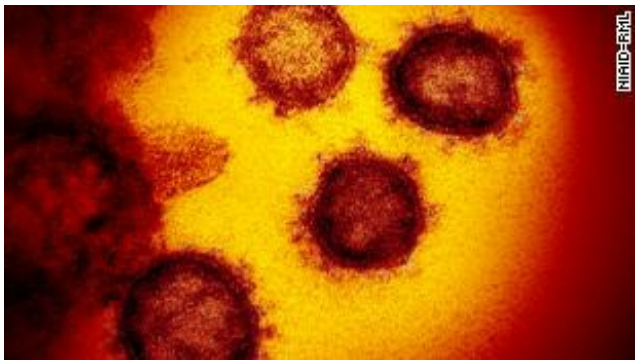
vapors," Glantz said. However, he said, there hasn't been enough research or evidence to support whether there's a link.
People who smoke are generally at an increased risk of serious complications, such as acute respiratory distress syndrome, when they have a severe infection.
The odds of a Covid-19 case becoming more severe -- and at the most extreme, leading to death -- were 14 times higher among people who had a history of smoking compared to those who did not smoke, Glantz said, citing a study from China published in the peer-reviewed Chinese Medical Journal in February. The study also found those with a history of smoking had a 14% higher risk of developing pneumonia.

Concerns about other drugs

Why South Korea has so few coronavirus deaths while Italy has so many

Besides smoking and e-cigarettes, Volkow wrote that people who abuse opioids and methamphetamine may be at risk for serious complications of Covid-19 because of the effects these drugs have on respiratory and pulmonary health.
Opioids slow breathing and have already been shown to increase mortality in people with respiratory diseases, according to Volkow. "[T]hus diminished lung capacity from COVID-19 could similarly endanger this population," she said.
Methamphetamine has been shown to produce significant pulmonary damage since it binds heavily to pulmonary tissue, Volkow explained in a phone interview. This will likely increase the risk of negative outcomes if used during a Covid-19 infection.

How to improve your chances against coronavirus



People with substance use disorders also rely on treatment that traditionally involves human interaction, such as therapy sessions or methadone clinics, which will be challenging in the setting of wide-spread social distancing, according to Dr. Allison Lin, assistant professor in psychiatry and the addiction center at the University of Michigan.
Lin said it's important for everyone to quit smoking due to its unknown -- but potentially serious -- effects on Covid-19 patients. This is particularly important for people with substance use disorders since they are more likely to smoke, she said.
Sign up here to get **The Results Are In with Dr. Sanjay Gupta** every Tuesday from the CNN Health team.

For everyone infected with Covid-19, one thing people can do now to reduce the risk of

serious illness is quitting smoking, according to Glantz.
"At a time when people are looking to reduce risk, it's very sensible to stop insulting your lungs," he said.

Vaping: One of the Best Ways to Trash Your Lungs and Maybe Die if you Catch Coronavirus

msnbc.com/morning-joe/vaping-one-the-best-ways-trash-your-lungs-and-maybe-die-if-you-catch-coronavirus

March 21, 2020

By Dr. Dave Campbell, Morning Joe Chief Medical Correspondent/ MSNBC,
Leslie Diaz, M.D. Infectious Disease Medical Director for Foundcare AND Chair of Infection Control-Palm Beach Gardens Medical Center

The United States is one to three weeks from the exponential increase in infections caused by the unprecedented Coronavirus infecting and overwhelming our healthcare system. The message millennials across the United States hear about their risk for COVID-19 has gone unheeded and created a cavalier attitude. They believe they are invincible and impervious to the virus.

They have heard no one under the age of 19 dying from the Coronavirus. This emboldens them further. They do not take it seriously when their family members tell them that they need to adhere to social distancing. There may be a lack of knowledge on the Coronavirus incubation period. They have been told to avoid catching the virus, so they do not infect their older family members who are more susceptible to the deadly ravages the virus can cause.

There is another dangerous habit that is common among many young people and that is vaping. Vaping injures the lung tissues; they may not even be aware of the long-term health consequences of vaping. They have not heard of any possible correlation to whether or not vaping increases their risk of severe forms of COVID-19. There are so many unknowns about the virus that only time will give us the answers as we further study this dangerous virus.

“Teens and young adults that use e-cigarettes may not be aware of the damage caused to their lung tissue,” Rogelio Choy, M.D., Pulmonary Specialist in Palm Beach County said. “They are more susceptible to horrendous complications from COVID-19. Inhaling any kind of substance irritates and inflames lung tissue. Vaping makes you more susceptible to a myriad of lung diseases.”

“Young adults and teens who vape will not only be at increased risk for COVID-19 infection, but intensity of presentation will be worse,” Ken Fuquay, M.D., Pulmonary Specialist in Palm Beach County said. “Vaping causes interstitial lung disease and is additive to any toxicity from the virus. This is already reflected by the higher mortality in VZV Pneumonitis, encountered in smokers.”

Parents, your teen or child who is ‘all grown up’ will not read this. It will be your responsibility to track down your loved one and politely ask for their JUUL. Once you have it in your hand, it will be your responsibility to destroy it and convince them it’s a matter of life and death. If they want to buy another, that may be beyond your control. If this style of parenting does not work for you, then come up with another safe and effective method of stopping their vaping habit.

If you are successful, then deal with the consequences of nicotine withdrawal sure to follow. Have your child Google ‘nicotine withdrawal’ to learn what they are about to undergo.

You may save their life.

Teens and young adults, Stop Vaping Now. It is not about protecting grandma or grandpa from the Coronavirus. The life you save may be your own.

Doctors say vaping could make coronavirus worse for young people


nypost.com/2020/03/21/vaping-may-be-cause-of-coronavirus-cases-in-young-americans-experts-say

By Sara Dorn

March 21, 2020

US doctors are reportedly eyeing vaping as a possible factor in the alarming number of hospitalizations among young adults diagnosed with COVID-19.

Medical experts began floating the theory last week after the US Centers for Disease Control reported that up to 20% of people hospitalized with the virus were between ages 20 and 44.

“When someone’s lungs are exposed to flu or other infections the adverse effects of smoking or vaping are much more serious than among people who do not smoke or vape,” Stanton Glantz, a professor and director of the Center for Tobacco Research Control & Education at University of California San Francisco, wrote in a blog post.

Glantz said vaping can hinder the nasal cavity’s ability to ward off disease by damaging the microscopic hairs, or cilia, in the upper airway, he told CNN.

“Some of my [colleagues] have noted people under 30 ending up in hospitals and a couple were vapors,” Glantz said, noting a link has not been confirmed.

In China, smokers were 14 times more likely to develop severe cases of COVID-19 than those who did not smoke, according to a February study published in the Chinese Medical Journal.

Glantz said it’s not too late for smokers to help their lungs fight the virus.

“At a time when people are looking to reduce risk, it’s very sensible to stop insulting your lungs,” Glantz said.

COVID-19: Never has it been more important for smokers to quit and for individuals to avoid damaging their lungs by vaping

tobaccofreekids.org/press-releases/2020_03_20_covid-19

March 20, 2020

Statement of the Campaign for Tobacco-Free Kids
March 20, 2020

The coronavirus (COVID-19) attacks the lungs, and behaviors that weaken the lungs put individuals at greater risk. The harmful impact of smoking on the lungs is well documented, and there is a growing body of evidence that e-cigarette use (vaping) can also harm lung health.

There is conclusive evidence that smoking increases the risk for respiratory infections, weakens the immune system and is a major cause of a number of chronic health conditions, including chronic obstructive pulmonary disease, heart disease and diabetes. In addition, there is growing evidence that vaping can also harm lung health. These factors put smokers, and in all likelihood vapers as well, at greater risk when confronted with the coronavirus.

There has never been a better time for smokers to quit and for individuals to protect their health by avoiding use of all tobacco products, including e-cigarettes.

For more information, please see this recent blog post by Dr. Nora Volkow, director of the National Institute on Drug Abuse. It includes the following:

"Because it attacks the lungs, the coronavirus that causes COVID-19 could be an especially serious threat to those who smoke tobacco or marijuana or who vape."

"It is therefore reasonable to be concerned that compromised lung function or lung disease related to smoking history, such as chronic obstructive pulmonary disease (COPD), could put people at risk for serious complications of COVID-19."

"Vaping, like smoking, may also harm lung health. Whether it can lead to COPD is still unknown, but emerging evidence suggests that exposure to aerosols from e-cigarettes harms the cells of the lung and diminishes the ability to respond to infection."

Reduce your risk of serious lung disease caused by corona virus by quitting smoking and vaping

tobacco.ucsf.edu/reduce-your-risk-serious-lung-disease-caused-corona-virus-quitting-smoking-and-vaping

When someone's lungs are exposed to flu or other infections the adverse effects of smoking or vaping are much more serious than among people who do not smoke or vape.

Smoking is associated with increased development of acute respiratory distress syndrome (ARDS) in people with a risk factor like severe infection, non-pulmonary sepsis (blood infection), or blunt trauma. People who have *any* cotinine (a metabolite of nicotine) in their bodies – even at the low levels associated with secondhand smoke – have substantially increased risk of acute respiratory failure from ARDS (paper 1, paper 2, paper 3).

The recent excellent summary of the evidence on the pulmonary effects of e-cigarettes reported multiple ways that e-cigarettes impair lungs' ability to fight off infections:

Effects on immunity

Reporting of respiratory symptoms by e-cigarette users suggests increased susceptibility to and/or delayed recovery from respiratory infections. A study of 30 healthy non-smokers exposed to e-cigarette aerosol found decreased cough sensitivity.82 If human ciliary dysfunction is also negatively affected, as suggested by animal and cellular studies,83 the combination of reduced coughing and impaired mucociliary clearance may predispose users to increased rates of pneumonia. Exposure to e-cigarettes may also broadly suppress important capacities of the innate immune system. Nasal scrape biopsies from non-smokers, smokers, and vapers showed extensive immunosuppression at the gene level with e-cigarette use.84 Healthy non-smokers were exposed to e-cigarette aerosol, and bronchoalveolar lavage was obtained to study alveolar macrophages.46 The expression of more than 60 genes was altered in e-cigarette users' alveolar macrophages two hours after just 20 puffs, including genes involved in inflammation. Neutrophil extracellular trap (NET) formation, or NETosis, is a mode of innate defense whereby neutrophils lyse DNA and release it into the extracellular environment to help to immobilize bacteria, a process that can also injure the lung.85 Neutrophils from chronic vapers have been found to have a greater propensity for NET formation than those from cigarette smokers or non-smokers.57 Given that e-cigarettes may also impair neutrophil phagocytosis,86 these data suggest that neutrophil function may be impaired in e-cigarette users. [emphasis added]

Studies in animals reinforce and help explain these human effects:

Two weeks of exposure to e-cigarette aerosol in mice decreased survival and increased pathogen load following inoculation with either *Streptococcus pneumoniae* or influenza A, two leading causes of pneumonia in humans.97 Furthermore, the aerosol exposure may lead to enhanced upper airway colonization with pathogens and to virulent changes in pathogen phenotype, as shown with *Staphylococcus aureus*.98 99 Thus, although more studies are needed, ***the animal data suggesting that vaping leads to an increased susceptibility to infection would seem to correlate with the population level data in young adult humans, whereby vapers have increased rates of symptoms of chronic bronchitis.***23 [emphasis added]

A meta-analysis of the relationship between smoking and influenza found that smokers were more likely to be hospialized and admitted to the ICU.

Consistent with this science, analysis of deaths from corona virus in China shows that men are more likely to die than women, something that may be related to the fact that many more Chinese men smoke than women. However, one study from China that evaluated predictors of death among all people hospitalized with COVID-19 did not find an association with smoking. Another study from China of patients diagnosed with COVID-19 associated pneumonia who had been in the hospital for two weeks reported that the odds of disease progression (including to death) were 14 times higher among people with a history of smoking compared to those who did not smoke. This was the strongest risk factor among those examined. A review of the available literature done in mid-March 2020 found 5 relevant papers, all from China. Three of the five papers did not find statisticaly significant differences between smokers and nonsmokers in terms of disease progression, but the studies were generally small, which means they had low power to detect an effect if it was there. One did not report a p value and the other (noted earlier in thins paragraph) found worse outcomes for smokers. The general pattern in the non-significant studies was for worse outcomes among the smokers. The authors concluded, "with the limited available data, and although the above results are unadjusted for other factors that may impact disease progression, smoking is most likely associated with the negative progression and adverse outcomes of COVID-19."

Dr. Nora Volkow, director of the National Institute on Drug Abuse, posted an article on her blog "COVID-19: Potential Implications for Individuals with Substance Use Disorders," that stared off by saying

As people across the U.S. and the rest of the world contend with coronavirus disease 2019 (COVID-19), the research community should be alert to the possibility that it could hit some populations with substance use disorders (SUDs) particularly hard. Because it attacks the lungs, the coronavirus that causes COVID-19 could be an especially serious threat to those who smoke tobacco or marijuana or who vape.

She goes on to address other drug use and how COVID-19 could interact with them, including noting that

Vaping, like smoking, may also harm lung health. Whether it can lead to COPD is still unknown, but emerging evidence suggests that exposure to aerosols from e-cigarettes harms the cells of the lung and diminishes the ability to respond to infection. In one NIH-supported study, for instance, influenza virus-infected mice exposed to these aerosols had enhanced tissue damage and inflammation.

The whole blog post is worth reading.

In addition, an article in *Scientific American,* "Smoking or Vaping May Increase the Risk of a Severe Coronavirus Infection," summarizes how smoking and vaping affect the lungs and the immune system that is consistent with the view that using these products increases the risk of infection and worse outcomes. *CNN* also has a good story, "How smoking, vaping and drug use might increase risks from Covid-19."

CDC, FDA, the Surgeon General, state health departments and everyone (including comedians, such as John Oliver who spent his whole show on the issue last weekend) working to educate the public on how to lower risk of serious complications from covid-19 should ***add stopping smoking, vaping, and avoiding secondhand exposure to their list of important preventive measures***.

This would also be a good time for cities, states private employers and even individual families ***to strengthen their smokefree laws and policies*** – including e-cigarettes -- to protect nonsmokers from the effects of secondhand smoke and aerosol on their lungs and to create an environment that will help smokers quit.

(updated March 20, 2020)

Coronavirus: Vaping could make you more vulnerable to COVID-19, scientists warn

mirror.co.uk/science/coronavirus-vaping-could-make-you-21717843

March 19, 2020

It's often portrayed as a healthier alternative to smoking, but if you vape, new warnings may put you off the habit.

Scientists have warned that vaping could make you more vulnerable to a severe infection with the coronavirus.

While there are yet to be any specific studies looking at this link, vaping has previously been shown to suppress immune function in the lungs and trigger inflammation.

Speaking to Scientific American, Dr Melodi Pirzada, a pulmonologist at NYU Winthrop Hospital, said: "All these things make me believe that we are going to have more severe cases—especially [in] people who are [long-term] smokers or vapers.

"It is definitely common sense to think that once you have a history of smoking or vaping, the whole airways, the defence mechanism of your lungs—everything changes."

Young teen vaping (Image: Getty Images/iStockphoto)

Coronavirus: Scientists explain how the immune system fights back against the disease

Coronavirus: People with blood type A may be more vulnerable to COVID-19, study claims

The lungs are lined with hairlike-structures called cilia that are responsible for taking the toxins and mucus out of your airways and clearing the lungs when you cough, Dr Pirzada explained: “For regular smoking, we know it inhibits the ciliary clearance of the airways.”

Meanwhile, if you do become infected with the coronavirus, there tends to be an influx of white blood cells, followed by lympochtes, which help to clear the lungs of infection.

Dr Ray Pickles, a microbiologist at the University of North Carolina, explained: “There’s a very coordinated series of events that take place when you do become infected with a virus.

“These are probably the events that take place in the vast majority of us as individuals, whether we’re infected by influenza or whether we’re infected by SARS-CoV-2. I think once you start perturbing this sequence of events in any which way or direction, that’s when things can go awry.”

Based on this knowledge, experts are urging people who vape or smoke to give up the habit amid the coronavirus outbreak.

Stanton Glantz, director for he Centre for Tobacco Control Research and Education at the University of California, San Francisco, said: “I think that a sensible thing to do for people is to stop smoking and stop vaping—and avoid secondhand exposure.

“We don’t have every little detail on this nailed down. But based on what we know, generally, about smoking and e-cigarettes—and in particular about smoking and COVID-19 from people who are already sick, from one study in China—it stands to reason that you would lower your risk if you stopped doing these things.”

Smoking or Vaping May Increase the Risk of a Severe Coronavirus Infection

SA scientificamerican.com/article/smoking-or-vaping-may-increase-the-risk-of-a-severe-coronavirus-infection1

Tanya Lewis

Smoking or vaping could make you more vulnerable to a severe infection with the novel coronavirus, some experts say.

Although there have not been many studies investigating this link specifically, a wealth of evidence suggests that smoking suppresses immune function in the lungs and triggers inflammation. There have been far fewer investigations of vaping, but preliminary research suggests it may do similar damage. And both long-term smokers and e-cigarette users are at a heightened risk of developing chronic lung conditions, which have been associated with more severe cases of COVID-19, as the disease caused by the new virus is called. Scientists say it therefore seems reasonable to assume that smoking —and possibly vaping—could increase the risk of developing a serious infection from the coronavirus.

“All these things make me believe that we are going to have more severe cases—especially [in] people who are [long-term] smokers or vapers,” says Melodi Pirzada, chief of pediatric pulmonology at NYU Winthrop Hospital on Long Island.* She has not treated COVID-19 patients herself, “but it is definitely common sense to think that once you have a history of smoking or vaping, the whole airways, the defense mechanism of your lungs —everything changes,” she says.

Very little research has looked directly at whether smoking or vaping increases a person’s risk of severe COVID-19. A preprint study in China found that men were slightly more likely than women to be hospitalized for coronavirus infections, and scientists say this observation could be related to the fact that in the country, vastly more men than women smoke. (The paper, which has not been peer-reviewed, has been withdrawn because it was based on early data. It will be replaced with a more up-to-date version soon, the authors write.) Another study, which has been published online in the *Chinese Medical Journal*, involved 78 patients with COVID-19 and found that those with a history of smoking were 14 times as likely to develop pneumonia.**

There is substantial scientific literature showing that smoking inflames the lungs and suppresses immune function. “For regular smoking, we know it inhibits the ciliary clearance of the airways,” Pirzada says. “We have these little [hairlike] structures known as cilia, and they are responsible for taking the toxins and the mucus out of our airways and clearing the lungs when we cough. We know that that is affected when you smoke and when you vape.”

During a respiratory infection in the lungs, there tends to be an influx of white blood cells called neutrophils—the first responders that start killing the pathogen—followed by an influx of lymphocytes—which are responsible for clearing the infection. “There’s a very coordinated series of events that take place when you do become infected with a virus,” says Ray Pickles, an associate professor of microbiology and immunology at the University of North Carolina at Chapel Hill. “These are probably the events that take place in the vast majority of us as individuals, whether we’re infected by influenza or whether we’re infected by SARS-CoV-2,” as the new coronavirus is known. “I think once you start perturbing this sequence of events in any which way or direction, that’s when things can go awry.”

Smoking is a known risk factor for influenza, says Robert Tarran, a professor of cell biology and physiology at Chapel Hill. “People who smoke are immunosuppressed to some degree,” Tarran says. “They make more mucus. It doesn’t clear the lungs as well. There are pro-inflammatory changes; immune cells are changed as well. And all that leads up to, basically, they’re more likely to get viruses and have a worse outcome.”

Vapers’ risk of viral infections has not been studied much, although there are some epidemiological studies suggesting they are more likely to get respiratory infections, Tarran says. And animal studies provide some clues. Mice that were exposed to e-cigarette aerosol and then inoculated with *Streptococcus pneumoniae* bacteria or influenza A were less likely to survive. And vaping may interfere with neutrophil function, some studies suggest. Scientists at Chapel Hill have shown that e-cigarette use suppresses the activity of immune- and inflammatory-response genes in nasal cells—more so even than smoking. And a preprint study found that the gene that encodes the receptor ACE2, which the novel coronavirus uses to infect cells, is more active in smokers than nonsmokers.

Of course, none of these studies directly show that smoking or vaping increases the severity of COVID-19 infections; it is not clear to what extent they can be extrapolated to the current pandemic. But given that smoking and vaping do well-established harm to the immune system, it seems prudent to assume they might make coronavirus infections worse.

“I think that a sensible thing to do for people is to stop smoking and stop vaping—and avoid secondhand exposure,” says Stanton Glantz,director of the Center for Tobacco Control Research and Education at the University of California, San Francisco. “We don’t have every little detail on this nailed down,” he says. “But based on what we know, generally, about smoking and e-cigarettes—and in particular about smoking and COVID-19 from people who are already sick, from one study in China—it stands to reason that you would lower your risk if you stopped doing these things.” After all, Glantz adds, “what’s the downside?”

**Editor’s Note (3/17/20): This sentence was edited after posting to update Melodi Pirzada’s title.*

***Editor's Note (3/19/20): This sentence was edited after posting to correct the figure for the increased risk of pneumonia.*

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Analysis of factors associated with disease outcomes in hospitalized patients with 2019 novel coronavirus disease

journals.lww.com/cmj/Abstract/publishahead/Analysis_of_factors_associated_with_disease.99363.aspx

Original Article: PDF Only

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Background:

Since early December 2019, the 2019 novel coronavirus disease (COVID-19) has caused pneumonia epidemic in Wuhan, Hubei province of China. This study aims to investigate the factors affecting the progression of pneumonia in COVID-19 patients. Associated results will be used to evaluate the prognosis and to find the optimal treatment regimens for COVID-19 pneumonia.

Methods:

Patients tested positive for the COVID-19 based on nucleic acid detection were included in this study. Patients were admitted to 3 tertiary hospitals in Wuhan between December 30, 2019, and January 15, 2020. Individual data, laboratory indices, imaging characteristics, and clinical data were collected, and statistical analysis was performed. Based on clinical typing results, the patients were divided into a progression group or an improvement/stabilization group. Continuous variables were analyzed using independent samples *t*-test or Mann-Whitney *U* test. Categorical variables were analyzed using Chi-squared test or Fisher exact test. Logistic regression analysis was performed to explore the risk factors for disease progression.

Results:

Seventy-eight patients with COVID-19-induced pneumonia met the inclusion criteria and were included in this study. Efficacy evaluation at 2 weeks after hospitalization indicated that 11 patients (14.1%) had deteriorated, and 67 patients (85.9%) had improved/stabilized. The patients in the progression group were significantly older than those in the disease improvement/stabilization group (66 [51, 70] *vs.* 37 [32, 41] years, $U = 4.932$, $P = 0.001$). The progression group had a significantly higher proportion of patients with a history of smoking than the improvement/stabilization group (27.3% *vs.*

3.0%, χ^2 = 9.291, *P* = 0.018). For all the 78 patients, fever was the most common initial symptom, and the maximum body temperature at admission was significantly higher in the progression group than in the improvement/stabilization group (38.2 [37.8, 38.6] *vs.* 37.5 [37.0, 38.4]°C, *U* = 2.057, *P* = 0.027). Moreover, the proportion of patients with respiratory failure (54.5% *vs.* 20.9%, χ^2 = 5.611, *P* = 0.028) and respiratory rate (34 [18, 48] *vs.* 24 [16, 60] breaths/min, *U* = 4.030, *P* = 0.004) were significantly higher in the progression group than in the improvement/stabilization group. C-reactive protein was significantly elevated in the progression group compared to the improvement/stabilization group (38.9 [14.3, 64.8] *vs.* 10.6 [1.9, 33.1] mg/L, *U* = 1.315, *P* = 0.024). Albumin was significantly lower in the progression group than in the improvement/stabilization group (36.62 ± 6.60 *vs.* 41.27 ± 4.55 g/L, *U* = 2.843, *P* = 0.006). Patients in the progression group were more likely to receive high-level respiratory support than in the improvement/stabilization group (χ^2 = 16.01, *P* = 0.001). Multivariate logistic analysis indicated that age (odds ratio [OR], 8.546; 95% confidence interval [CI]: 1.628–44.864; *P* = 0.011), history of smoking (OR, 14.285; 95% CI: 1.577–25.000; *P* = 0.018), maximum body temperature at admission (OR, 8.999; 95% CI: 1.036–78.147, *P* = 0.046), respiratory failure (OR, 8.772, 95% CI: 1.942–40.000; *P* = 0.016), albumin (OR, 7.353, 95% CI: 1.098–50.000; *P* = 0.003), and C-reactive protein (OR, 10.530; 95% CI: 1.224−34.701, *P* = 0.028) were risk factors for disease progression.

Conclusions:

Several factors that led to the progression of COVID-19 pneumonia were identified, including age, history of smoking, maximum body temperature on admission, respiratory failure, albumin, C-reactive protein. These results can be used to further enhance the ability of management of COVID-19 pneumonia.