The implications of E-cigarettes or "vaping" on the nutritional status

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Abstract: Cigarette smoking is the leading cause of disease and early death all over the world. Even though cigarette smoking has slowly declined in some countries in the world but many alternatives have gained popularity. Many people may turn to e-cigarettes as a way to try to stop smoking, and there is evidence that they can be effective for smoking cessation. Even so, E-cigarettes would never be considered the first choice for smoking cessation because of the risks and given the extent of the current outbreak of severe lung disease, e-cigarettes should be avoided at the present time.

The FDA has not approved e-cigarettes as a way to quit smoking. Doctors and the FDA recommend evidence-based methods for quitting smoking. If you have used e-cigarettes to stop smoking, do not return to smoking cigarettes instead of using e-cigarettes. Instead, turn to safe ways to deliver nicotine such as nicotine patches, gum, lozenges, and nasal spray. Research works are still limited on the effect of E-smoking on the nutritional health. However, products included in the vape can cause so many nutritional problems which affect the health status in general such as vomiting and diarrhea lead to electrolytes imbalance and dehydration, loss of appetite and malabsorption of certain minerals such as Ca, Fe and Mg and some vitamins such as Vitamin C and D.

Introduction:

Electronic cigarettes are also known as e-cigarettes, e-cigs, vape pens, or vapor cigarettes. These devices may look like traditional cigarettes, pens, or USB flash drives [1]. They can be battery operated or rechargeable. E-cigarettes do not burn tobacco. Instead, they have cartridges filled with a liquid that may contain flavorants, nicotine, tetrahydrocannabinol (THC), or cannabinoid (CBD) oils and other chemicals. The e-cigarette heats the liquid chemicals into a vapor or steam that a person inhales, which is why using these is often called "vaping" [2].

E-cigarettes, aka JUULs and vape pens, use a battery to heat up a special liquid into an aerosol that users inhale. It's not just harmless water vapor. The "e-juice" that fills the cartridges usually contains nicotine (which is extracted from tobacco), propylene glycol, flavorings and other chemicals. The e-cigarette heats the liquid chemicals into a vapor or steam that a person inhales, which is why using these is often called "vaping" [2].

While the types and concentrations of toxins vary by brand and device, all e-cigarettes contain harmful substances. They have only been readily available in the United States since 2006 [4]. As a result, there is limited research on their long-term health risks. Because of the risks, the U.S. Food and Drug Administration (FDA) took initial steps towards regulating these products in 2016, though there is still limited regulation of the contents of the e-liquids and the devices [5].

Because the Food and Drug Administration (FDA) has not begun its review of any e-cigarette or its ingredients, nor has FDA issued any standards on the products, e-cigarette composition and effects vary. What researchers do know is that these toxic chemicals and metals have all been found in e-cigarettes:

- Nicotine: is a highly addictive substance that negatively affects adolescent brain development. Nicotine suppresses appetite because of its effect on the brain and the central nervous system and increases BMR leading to weight
loss. Nicotine can also increase the buildup of plaque (fat, cholesterol, calcium, and other substances) in blood vessels, raises triglycerides, and lower the good cholesterol (HDL) [6].

- Propylene glycol: is a common additive in food; also used to make things like antifreeze, paint solvent, and artificial smoke in fog machines. When consumed in toxic quantities, the buildup of lactic acid can lead to acidosis and kidney failure. Acidosis occurs when the body cannot get rid of the acid fast enough. It begins to build up in the blood, which interferes with proper functioning [7].

- Acrolein is a herbicide primarily used to kill weeds, can cause irreversible lung damage. Acrolein is an α,β-unsaturated aldehyde formed by thermal treatment of animal and vegetable fats, carbohydrates and amino acids. In addition, it is generated endogenously. As an electrophile, acrolein forms adducts with glutathione and other cellular components and is therefore cytotoxic [8].

- Diacetyl is a chemical linked to a lung disease called bronchiolitis obliterans "

- Diethylene glycol – a toxic chemical used in antifreeze that is linked to lung disease [9].

- Heavy metals such as nickel, tin, lead. Prevents essential nutrients from being absorbed such as Ca, Fe, Mg and thus leading to deficiency in these nutrients.

- Cadmium is a toxic metal found in traditional cigarettes that causes breathing problems and disease

- Benzene is a volatile organic compound (VOC) found in car exhaust

- Other Carcinogens- chemicals known to cause cancer, including acetaldehyde and formaldehyde [10].

Other problems caused by E-smoking can be caused by nicotine. Nicotine suppresses appetite because of its effect on the brain and the central nervous system. Nicotine does not damage a person’s health - it is the tar and carbon monoxide from the cigarettes that can cause cancer, lung disease and coronary heart disease [11].

Smoking irritates the nasal passage which can cause inflammation and impair your sense of smell. This is unlikely to directly affect diet and nutrition but will undoubtedly influence your enjoyment of food [12].

E-Smoking affects the body's ability to absorb a variety of vitamins and minerals including calcium and vitamins C and D. It also affects the body's circulation by causing blood vessels to narrow and become blocked because of an increased build up of fatty deposits. Stopping smoking is an effective method of helping avoid deficiencies of vitamins [13].

E-cigarettes are still fairly new, and more research is needed over a longer period of time to know what the long-term effects may be. So far, research has found that using e-cigarette products is likely to be significantly less harmful than smoking regular cigarettes. This is mostly because e-cigarettes do not burn tobacco, a process that produces an estimated 7,000 chemicals, including at least 70 chemicals that cause cancer. But e-cigarettes do contain nicotine, which comes from tobacco and is very addictive [14].

While the possible long-term health effects of e-cigarettes aren’t yet clear, there have been recent reports of serious lung disease in some people using e-cigarettes or other vaping devices. Symptoms have included:

- Cough, trouble breathing, or chest pain
- Nausea, vomiting, or diarrhea and this can lead to dehydration, electrolytes imbalance and loss of nutrients.
- Fatigue, fever, or weight loss

Some cases have been severe enough to require hospitalization, and several people have died from their illness. However, it's not yet clear exactly how widespread these cases are, or if they all have the same cause [15]. There are a huge number of different vaping devices on the market, and an even larger number of different chemicals (in the form of e-juice) that can be used in them, including ones that users sometimes add themselves. At this time, the main thing these cases have in common is that the people used e-cigarettes or other vaping devices. The US Centers for Disease Control and Prevention (CDC), the Food and Drug Administration (FDA), and several state health departments are looking into these cases to try to figure out what else they might have in common [16].

Although the effects of cigarette smoking on a variety of diseases, from cancer through emphysema and cardiovascular illness are well documented, direct effects on the levels of macro- and micronutrients in the body are reported less frequently. In fact, imbalances in these nutrients may have a role in many of the pathological conditions attributed to smoking. Tobacco smoke contains numerous compounds emitted as gases and condensed tar particles, many of them being oxidants and pro-oxidants, capable of producing free radicals thus enhancing lipid peroxidation in
biological membranes [17]. Vitamin E, vitamin C, B-carotene and selenium are involved in the overall cellular anti-oxidant defense against deleterious effects of reactive oxygen species. Smoking has been shown to lower the level of vitamin C and B-carotene in plasma. Cadmium, naturally found in tobacco, decreases the bioavailability of selenium and acts antagonistically to zinc, a cofactor for the antioxidant enzyme, superoxide dismutase. Vitamin E, the principle lipid-soluble antioxidant, may be at suboptimal levels in tissues of smokers. In addition, tobacco constituents have been shown to reduce levels of several vitamins of the B-complex [18]. Nutritional status in smokers may be further compromised by an inadequate diet. Data from the Second National Health and Nutrition Examination Survey indicates that smokers are less likely to consume fruits and vegetables, particularly those high in vitamin C and carotenes. The medical community should be responsible for making recommendations to lower the risk in smokers to tobacco related diseases. Nutritionists could have a role in this process. There exists a lively debate as to where levels of nutrients should be set [19].

References:

