The effect of fast food consumption: cardiovascular system

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Research question: How and why does fast food consumption cause heart disease and negative for consumers?

Abstract: I am researching the question how and why does the fast food consumption cause heart diseases and why are they negative for consumers. My intention of researching this topic had risen after my trip to America. Nearly one out of 5 teenagers I have seen were obese. I was shocked by the fact I saw and decided to investigate further on about this topic and find out the main causes of diseases and how exactly did the fast food consumption cause people to be obese. Therefore my aim in this extended essay is to find why the fast food consumption cause people to get fat and its effect on the cardiovascular system.

Hypothesis:

Introduction

Bakground Information:

Fast food, Quick Service Restaurant or restaurants refferred as QSR within the industry itself is a concept that is found in 19th century by the Roman vendors who were selling bread soaked in the wine in the pre-modern europe. Then as the world become more modernized and the growing demands of the people increased, the concept of fast food become more industralized and popular and the number of fast food places increased in huge amounts compare to recent decades. Restaurants such Mc. Donalds, Burger King became really popular and the face of the term ' Fast food' and started making billions of profits a year. The concept of food is well defined by the term itself. Food, that can is cooked and consumed ' fast' is fast food. Everyday millions of teens and adults consume ' Fast food' all over the world. Fast foods are very famous out-of-home foods. The consumers can buy fast foods just about anywhere that sells foods and snacks; vending machines, drive throuh restaurants or any restaurants which works by swing through system. As it can be seen from its inception, fast food has been designed to be eaten " on the go". People prefer fast foods because it is quick, convenient tasty and cheap. However instead of nutritious foods such as lean meats, fresh fruits, and vegetables it is usually made with cheaper ingredients such as refined grains, high fat meat and added sugar and fats which makes it load with with saturated fat and calories and makes it low in nutrients. Therefore it is very unhealthy type of eating style and moreover it might cause some serious health issues. Long term consumption of fast

foods can lead to health issues such as high blood pressure, hypertension, heart disease, obesity, diabetes. These problems occurs by high levels of Saturated fats and cholesterol found in the fast food contribute to increases in blood preasure by develooping plaques on vessel walls which causes reduction in diameter and elasticity.

What are Fast Foods?

The types of foods that are refferred to as ' fast foods' are meals that are low in nutrients and high in concentration of fats. Fats, reffered to as ' lypids' in biology are great source of energy and . It is also very important that they are used in the part of the cell membrane for controlling what comes in the cell and goes out the cell. They are a broad category of molecules that includes; Triglycerides (neutral lipids), phospholipids, glycolipids and steroids. Phospolipds are main structual components. It is composed of a glycerol backbone, two fatty acids tails and a hydrophilic ' head' that incorpates with a phosphate group. Glycolipids are like phospholipids in terms of structural means but they are seen in structure of myelinated neurons. Steroids are among all the lipids with no fatty acid tails which are inportant in membrane structure and in metabolism. Steroids are different in their functional groups but they all have the same glycerol backbone made up of four carbon rings. Triglycerides in other words neutral lipipds are the products of dehydration synthesis between three molecules of fatty acids and one molecule of glycerol. Fatty acids are divided into major groups; Saturated and unsaturated fatty acids. Saturated fatty acids are the fats that are solid at room temparature. Only single C-C bonds occurs in the backbone of the tails, and hydrogen atoms are attached to those carbon atoms at the

remaining bonding sites. Unsaturated fatty acids are the fats that are liquid at room temperature. They have one or more double bounds between carbon atoms in the tails of their fatty acids. They are liquid because the double bonds create kinks that disrupt packing between tails.

However not all the fats are bad for the human body, some are healthy and benefitial. The fats that are good and benefial for human body are monounsaturated and polyunsaturated fats. These unsauraturated fats are found in the foods from such as vegetable oils nuts and seeds and also in fishes. and also fishes. The fats that can be reffered to as ' bad' are ' Trans' and ' Saturated fats becasue they increase the risk of having diseases. Saturated fats are unhealthy and dangerouns because human body doesn't need saturated fats at all because it can produce all its own saturated fats that is needed for the body and extra intake of saturated fats in the body is undesirable and unhealthy for the cardiovascular system.

Saturated Fats

Because saturated fats boosts cholesterol level by increasing the harmful LDL and but also increases protective HDL. (In this cases unsaturates fats are much prefereable because it lowers the harmful LDL and increases the protective, goods HDL). LDL is low-density lipoproteins. They are responsible for carrying cholesterol from liver to the rest of the body. When going throught the cells in the body, the cell might attach themselves in it and extract fat and cholesterol. So that is why they are referred to as bad and harmful lipoproteins. HDL is high-density lipoproteins. They are the cholesterol scavengers in the bloodstream. They catch the fats and

cholesterols in the blood. That is why they are reffered to as protective, good lipoproteins. Trans fatty acids is a name for unsaturated with trans-isomer fatty acids.

Trans Fatty Acids

Trans fatty acids in other words trans fats made by hydrogenation process by heating liquid vegetable oils in the presence of hydrogen whic means the liquid is saturated and converted into turned into solid making it more stable. This is for easier transportation hyrogenetead oils can withstand longer and this is ideal for frying process of making foods. Trans fats are even worse than saturated fats because not only they increase LDL but they lower the level of HDL in the blood. The consumption of these saturated fats and most importantly Trans fatty acids causes problems in the cardiovasular system such as causing people to have heart diseases, stroke, diabetes, obestes and other related chronic condition. But what is worse is that in some places, mostly in developing countries people use partially hydrogenated oils because they are cheaper. But these oils are completely different than the oils that are used for cooking, they are mostly like trans-rich partially hyrogenated oils and they are really bad and the main causes of heart diseases.

What is Cardiovascular System?

Why are fast foods Bad ?

The consumption of fast foods as stated aboved causes cardiovascular diseases such as high blood pressure, heart disease, stroke, diabetes, obesetes and other realted chrnoic conditions. The reason for these

problems to occur is because of one disesase in specific, as a result of fast food consumption, is called Arteriosclerosis. Arteriosclerosis is a term used for describing the hardening of artery walls (as can be seen from its greek names, arterio means artery and sclerosis means hard). Arteriosclerosis happens due to atheromatous plaque that are stored in the artery walls. Atherogenic is the term that is used for describe the substances/plaques that cause Arteriosclerosis. Atherosclerosis is known as arteriosclerotic vascular disease or ASVD which is used for the tickening and loss of elasticity in the artery walls due plaques. The substances that are reffered to as plques are the fatty materials from fast foods such as low-density lipoproteins such as triglycerides (trans fatty acids) and cholesterol. Because Saturated fats and cholesterol can not travel in the bloodstream and and need special carriers to help them travel through the blood. These special carriers are low-density proteins. They are globular shaped and have hollow core for cholesterol transportation. When LDL-bound cholesterol levels are too high, cholesterol are deposited in arterial walls. Plaques are deposited within the wall of the artery between the smooth muscle and and the inner ining, inner layer(endolithelium). Atherosclerosis starts when the inner lining in the vessel is diseased. Then the monocytes and T cells starts become activated and move from bloodstream into the artery where they become into faomy structures and collect fatty acids and cholesterols. In over some time the smooth muscles moves from middle layer into the lining of artery walls where they join with these foam cells and starts to grow inside the artery. The formation of is long termed. It builds up in the artery walls slowly progressive and cumulative over time as fast food consumption continues.

Over the time, the level of Atheromatous plaque in the artery increases

The formation of atheromatous plaques may form ventricular anerysm. This is when the damaged muscles(plaqued muscles) start to from thin bulges on the walls of ventricules. It slows down/blocks the blood flow through the vessel and causes heart beat to abnormal by reducing the pumping ability of the heart. As the blood flows slowly through the aneurysms, blood clots may form in the heart chambers blocking the blood flow to the chambers. Another problem that might occur is that, in over time the as the atheromatous plaques in the artery walls increases, they start to block the bloodstream through the vessel and this is when the problems start to occur. As the atheromatous plaque is big enough, the vulnurable plaque which is composed of white cells and lipids (including cholesterol from the consumption of fast foods) ruptures causing Thrombus, which is decreasing or blocking the bloodstream thorugh the vessel. This rupture stimulates the blood platelets to adhere to the vessel wall and initiate blood clots. These blood clots lead to further obstruction inside the artery and may completely block it. They form by breaking off from the dead muscles in heart and travelling throught the bloodstream and lodging in the vessel thoroughout the whole body. They may even lodge in the blood supply vessel of the brain and cause strokes. This leads to the death of the tissues in the vessel as there is no blood supply to it. This event is called Infarction(area of death tissuses due to lack of blood and oxygen due to obstruction in the artery). And this is the case with all the fast food consumers. As they consume fast food too much, low-density lipoproteins, (the trans fatty acids and the cholesterol) which are in the foods, start to form atheromatous plaque in the

arteries but mostly in the coronary arteries, the vessel which delivers oxygen-rich blood to myocardium. These coronary arteries as a result can not maintain the proper blood flow through them. This might cause chest pressure, ache beneath the breast bone or shortness of breaths on people. These are the basic symthomes of coronoary desiases. Further on these symtphomes might be a sign of angina (an obstruction in the vessel, a lack of blood and oxygen) and stroke and possible heart attacks depending on the location and the level of blockage in the vessel.

There are many statistical examples that show the effect of fast food consumption and cholesterol level on the increase in the cardiovascular diseases. The research is sported by the statistics showing the unhealthy diet, intake of high choleterol level on the motality and morbidity from studies of American Heart Association, National Institutes of Health, World Helath Organization and other well recognized health organizations which are run by health professionals and medical researchers.

The reseach topic is strengened by the following examples. The reason for using the choosen exapmle is because of their reliability. The exapmle are taken from the study thats has been done by ' Prospective Studies Collobration' from Clinical Service Unit and Edpidemical Studies Unit, University of Oxford. The organization and the study itself is suported and funded by UK Medical Rsearch Council British Heart Foundation and European Union (EU BIOMED). The study itseld took 5 years and was completed in 18 March 2009. It is collabrative meta-analysis of 57 prospective studies of vascular risk factors (blood cholesterol, blood pressure, , diabetes) and cause sfor pecific reason on mortality by finding

BMI, body mass index. (The weight of participants, in kg were divided by the square of their height and the ones that had around 30 were considered to be obese and have CVD) The collabration was done in 1996. 897. 546 people were used in the study. The relevant studies were identified computer researches of MEDLINE and EMBASE. The participants in the study where choose according to their possitive of stroke and heart disease problems to minimize the uncertainty of other causes for heart diseases other than cholesterol level and when data was collected the age, sex of participants and their health history such as smoking cigarettes wre adjusted to fin the real effect of cholesterol on mortality.

The graph above shows the risk of cardiovascular disease, hazard ratio against the single measurement of cholesterol. As it can be clearly seen from the graph as the baseline total cholesterol increases the Hazard ratio increases.

As it is seen from the graph above as the SBP, Systolic blood pressure (the amount of pressure that the blood has on the vessels while flowing through the vessels) increases as the usual total cholesterol level in the blood level increases. This is due to High level cholesterol in the blood. As the higher the total cholesterol level and the ststolic blood pressure the higher the Hazard ratio and this can be seen from graph and the numbers stated next to the graph.

The people that are in least danger of cardiovascular disease and have the least hazard ratio is the people who have the systolic blood pressure less than 125 mmol/L. They are the youngest range of people in the study who

have 64. 7 as a mean age. This can be seen from the death rate and the amount of people that are dead that have less than 125 mmol/L Systolic blood pressure. As the SPB level increases the death rate also increases. The class that has the biggest death rate is the people who have SBP level between 125-144. The people in this range are the in the mean range. The mean age for this range is 68. 6. What also can be seen from the data is that the age of the people also play huge role in the hazard ratio and cardiovasular disease problems. Beucase as can be seen from the graph above in some the people who are younger might have more total cholesterol level but they have the same hazard ratio with the people who are older however the main cause of people to be in danger zone is the choleterol level in their blood.

Ischaemic stroke is when atheromatous plaques in the artery walls increases, they start to block the bloodstream through the vessel causing thrombus which is decreases or blocks the bloodstream thorugh the vessel because fatty acids acids deposits lining the vessel walls and therefore atherosclerosis occurs. %87 percent of the stroke cases occur as a result of Haermorrhagiv stroke (4).

Haermorrhagic stroke is when the wekaned blood vessels form , balloons and eventually ruptures causing the blood acummulation and comprassion to surrounding brain tissues. %13 percent of the stroke cases occur as a result of Haermorrhagiv stroke(4).