High intake of processed red meat and type 2 diabetes risk

High intake of processed red meat contributes to the risk of type 2 diabetes

In modern era, global meat production and consumption has considerably increasing. Ritchie & Roser (2019) reported that meat production has growth rapidly over the past five decades as the consuming of meat in the industrial countries is almost double the quantity in developing countries. This statement showed the rising popularity of western diet that contains high intake of dairy, whole meal grain and red meat. The proliferation of meat eater population has considerably expanded the marketing of processed meat such as bacon, sausages, ham and any meat that undergo fermentation and salting. According to Clonan, Wilson, Swift, Leibovici, & Holdworth (2015), the admiration of meat is caused by a long-standing assumption that meat products are significantly benefits for human's wellbeing. It is a good source of high-quality protein which is essential to the body growth and provide energy. Protein is crucial for human as it is providing amino acids which are easy to digest than the protein from plant sources. Moreover, a recent study claims that red meat provides important dietary source of zinc, irons and other minerals including fats and vitamins particularly vitamin B which supports normal energy yielding metabolism and normal heart function (Cosgrove, Flynn & Kiely, 2005).

Although, some researchers emphasizing the vital of red meat and processed meat to human diets, it has been widely noted as the risk factor that causes type 2 diabetes, cancers, cardiovascular diseases. The processing of red meat has examined by Lajous, Tondeur, Fagherazzi, Guillan, Ruault & Chapelon (2012) to be considerably developing the risk of

type 2 diabetes. The World Health Organization (2016) reports that type 2 diabetes is no longer predominantly prevalence in the rich nations but also steady increasing in the world's middle-income countries. This report was supported by Song, Manson, Buring & Liu (2004), that the higher consumptions of red meat especially processed meat has significantly causes the rising of type 2 diabetes. However, this essay will incessantly argue that processed meat intake has increasing the rising of diabetes. The reasons for this are threefold: processed meat produce heme iron that scientifically proved to be associated with type 2 diabetes; It is a source of saturated fat and cholesterol that widely believed to be the core causes of obesity and type 2 diabetes, and finally the preservatives, additives and chemicals that are added to the red meat during manufacturing are associates with the rising of type 2 diabetes.

Firstly, the heme iron produces in processed meat has a significant association with the risk of Type 2 diabetes. Bao, Rong, Rong, & Liu (2012) discuss that heme iron is essential for individuals particularly females. Its transporting the oxygen in red blood cells throughout the body. A study undertook by the Institute of Medicine, food and nutrition (2001), they found that female and Male at the age of 19 to 50 years has different recommended daily intake of heme iron which are 18mg and 8 mg respectively. The menstruation period and pregnancy of female leads them to consume more than male. Deficiency of heme iron in human are often causes anemia and leads to fatigue. However, the higher intake of processed meat and heme iron increases the risks to type 2 diabetes. Heme iron is rich in processed meat and its easily absorbing by the body than the non-heme

iron produces by plants (White & Collinson, 2013). Moreover, Rajpathak, Manson, Willet & Frank (2006) suggested three potential mechanisms that could be linked the iron intakes to the causes of type 2 diabetes. First, large heme iron stores increase the oxidative stress, by speed up the formation of reactive hydroxyl radicals which reduces the ability of the body to counteract its effects and therefore induces the insulin resistances. Similarly, high amount of iron stores in the body hindered the extraction of insulin in the liver and leads to peripheral hyperinsulinemia. Finally, the overload of iron causes it to discharge directly from the pancreatic Beta cells which can affected the secretion of insulin and allowed the glucose to accumulate inside the bloodstreams. On the other hand, some researchers argue that heme iron content in unprocessed meat is overall higher than in processed red meat, thus does not describe the positive risks of heme iron in type 2 diabetes (Freskens, Sluik & Woudenberg, 2013). According to Fretts et al. (2012), the differences of iron content in unprocessed and processed red are considerably low. Subsequently, their survey found out that there are more meat consumers are eaten more than 2 serving of processed meat per week than the unprocessed meat. For this reason, the higher consumption of processed meat is tending to have stores a large amount of iron in the body throughout the weeks. Hence, high heme iron levels in the body may cause insulin resistance and therefore leading to a greater risk of type 2 diabetes.

Moreover, recent studies proved that saturated fats in processed red meat play a significant role in increasing the risk of type 2 diabetes. Also, it contains more saturated fats compared to normal red meat (van Dam, Willett, Stampfer & Hu, 2002). According to Riserus, Willet and Hu (2009),

the association of fats and type 2 diabetes has been a clinical interest for many years. The reason for this attention, is that some scientist claim that consuming of saturated fats is beneficial to human health. Yet, there is no proof of evidence to support the importance of this dietary fats. Subsequently, they claim that the incidence of diabetes and saturated fats intake seems unclear. Conversely, the alteration of the cellular functions of cell membrane and influences its fluidity, ion permeability, insulin receptor and binder are affecting the translocation and breaking down of glucose. The variations affect insulin sensitivity in the tissues and the whole body. This statement supported by Morino, Petersen & Shulman (2006) with a detailed examining of the mechanism, that the consuming of carbohydrates will be obtained by human as starch than digest it in the digestive tract and transport it to the bloodstream as glucose. These glucoses are targeted to enter the muscle cells to break down into energy however, it requires insulin to activate the muscles membrane for the glucose to pass through. Instead, the higher level of saturated fats in bloodstream will freely enter the muscle cells and form radicals which resist the insulin from opening the membrane. Therefore, causes glucose to accumulate on the bloodstream then causes type 2 diabetes. Riserus, Willet and Hu (2009) and Roden, et al (1999) suggested that saturated fats should be replaced by unsaturated and polysaturated fats in order to reduce the risks of type 2 diabetes. For example, among the Asian countries they are consuming fish and marine n-3 fatty acids and regular fat dairy foods will be associated with reducing the risk of type 2 diabetes as well with other health disease. Similarly, an investigation undertook by the Cancer Norfolk in Europe shows that among 23, 631 female and male who were surveyed during 3 to 7 years, majority of

them shifted from consuming of processed red meat and saturated fat to consume unsaturated fats has illustrated a greater reduction of type 2 diabetes independently of countless lifestyle factors (Riserus, Willet, & Hu, 2009). Thus, saturated fat from processed red meat has a significant impact of the sensitivity of insulins.

Finally, the chemicals added to the processed meat when manufacturing has a strong contribution to the rising of type 2 diabetes. According to Sindelar (2012), there are constituents such sodium, nitrate and nitrates who are particularly causes the type 2 diabetes. They are certain types of preservatives, addictive and chemicals arising from meat production and preparations. Moreover, processed meats contain about 400 percent more sodium and 50 percent more nitrates per gram (Micha, Michas & Mozaffarian & 2012). In the New Zealand Food safely website (2019), it states that consuming of processed meat with preservative chemicals has proven by the WHO that even a small portion of chemical it will accumulate in the body and therefore causes type 2 diabetes and cancer. Subsequently, WHO established a limited amount for consumption which should be less than 70 g per day. However, a handful of studies done by Kleinbongara et al. (2005), discusses the links of N-nitrosamine compounds in processed meat to the risks of type 2 diabetes. It is a byproduct of nitrites and nitrates when added to the variety of heterocyclic amines and polycyclic aromatic hydrocarbons formed during its preparations. The N-nitrosamine are toxic to pancreatic Beta cells which affects the production of insulin and therefore increases the glucose level in the body then leads to type 2 diabetes. Similarly, Pan and Hu (2014) added that high concentration of nitrite in blood have been proved to

be positively associated with endothelial dysfunction and reduced insulin response. They also suggested another potential explanation for the associations of diabetes with advanced glycation end products that occurs during processing and preparation of the processed red meat. It is providing a metabolic environment that can lead to type 2 diabetes by increase the oxidative stress and low-grade inflammation and perhaps promote insulin resistance. In contrary, Sinderlar and Milkowski (2001) described the significance of preservatives to food consumption is undeniable. Nitrite in processed red meat is believed to be act as an antioxidant that can reduce the oxidative stress and improve the production of insulin in the pancreases. Additionally, the preservatives are playing a significant role as a " bacteriostatic and bacteriocidal agent" (p. 4). Unfortunately, there are still lack of evidence to prove its degree of antioxidant as most of the studies was done on rats which does not describe its effectiveness on human (Institute of Medicine, Food and Nutrition, 2001).

In conclusion, there is a definite evidence that higher intakes of processed red meat is related to the increase of type 2 diabetes. There are three major components of processed red meat noteworthy contribution to the causes of type 2 diabetes. First, heme iron is notable as an important protein in red blood cells that effectively transporting oxygen throughout the body. Unfortunately, the access amount of heme iron in the body causes hereditary hemochromatosis which catalyzes the formation of hydroxyl radicals and leads to insulin resistance. Moreover, the alterations of cell membranes function and insulin receptor hindered the insulin from breaking down of glucose. Finally, the additional chemicals particularly nitrate and

nitrites for preservatives and curing in processed meat will prospective increase the risk of type 2 diabetes. Overall, the discussed components of processed red meat that causes type 2 diabetes are seem to entirely cause insulin resistance and few may causes genetic mutations which inherit type 2 diabetes from one generation to another independently from dietary. Similarly, females and males has different limited intakes amount of the heme iron, saturated fats and preservatives but the total recommended amount for processed red meat are seems to be the same. This variations may be due to the different metabolism amongst genders. For example, female requires more heme iron than male to recover the blood loss through menstrual period. Also, male has a fast metabolism which allow them to consume more saturated fats than female. Therefore, these explain the rapid growth of processed red meat intakes is correlative to the rising of type 2 diabetes.

However, dietary habits and the rising of type 2 diabetes is directly proportional to each other particularly to red meat consumers. Most researchers deduced that it is significant to address the issue of type 2 diabetes and consult the meat eaters to reduce the consumption of processed red meat. From a personal perspective, majority of individuals are perhaps focusing on the beneficial side of processed meat consumption with less conscious of its actual impacts on health. Dietary is readily modifiable but individuals and clinician must aware of its potential benefits before considering the dietary changes. This idea describes the importance of health consultation.

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