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Review

Meat consumption: Which are the current global risks? A review of recent (2010–2020) evidences

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ABSTRACT

Meat consumption has been increasing since the 1960s, but especially from the 1980s decade to today. Although meat means an important source of nutrients, it is also evident that a great consumption of this source of proteins has also a negative environmental impact. Livestock production does not only have a negative influence on GHG emissions, but also on the water footprint, water pollution, and water scarcity. With respect to human health, in 2015 the International Agency for Research on Cancer (IARC) stated that red meat was a probable carcinogen to humans (Group 2A), while consumption of processed meat was carcinogenic to humans (Group 1). Most environmental contaminants (PCDD/Fs, PCBs, PBDEs, PCNs, etc.) that are frequently found in meats are highly soluble in fats. Therefore, avoiding ingesting fats from red meats and meat products, doubtless would help in the prevention, not only of the well-known cardiovascular diseases derived of fats consumption, but also of certain kinds of cancers, mainly colorectal cancer. On the other hand, consumption of meat – especially wild meat – is related to virus infections, as many viruses have been found in wild meat trade markets. Based on the scientific literature here reviewed, we have noted that the results of the investigations conducted after the statement of the IARC, have corroborated the recommendation of reducing significantly the consumption of red meats and meat products. In turn, the reduction of meat consumption should contribute to the reduction of GHG emissions and their considerable impact on global warming and climate change. It seems evident that human dietary habits regarding meat consumption in general, and red meats and wild meats in particular, should be significantly modified downward, as much and as soon as possible.

1. Introduction

Global warming is a major concern of the actual climate change scenario (Marques, Nunes, Moore, & Strom, 2010). According to the Intergovernmental Panel on Climate Change (IPCC), anthropogenic activities have been the responsible of the increase of 1 °C, being 1.53 °C higher between 2006 and 2015 with respect to the temperatures of the pre-industrial era (years 1850–1900) (IPCC, 2019). Moreover, anthropogenic activities are currently increasing the global temperature at a rate of 0.2 °C per decade (IPCC, 2018). Climate models suggest that the consequences derived from this increase – higher temperatures in land and oceans, and extreme meteorological events – would be less dramatic with a 1.5 °C increment than with a 2 °C increase, which is the actual global agreement (IPCC, 2018). Furthermore, the average temperature over land was 0.66 °C higher than the equivalent global mean temperature change (IPCC, 2019). Additionally, not all countries would be equally exposed to this temperature increase, being the vulnerability very high for some African countries and low for all the first-world countries (Yeni & Alpas, 2017).

Up to 23% of the total greenhouse gas emissions (GHG) are derived from the agriculture, forestry and other land uses, which are among the major contributors to the global warming (IPCC, 2019). Moreover, agricultural overexploitation – larger farm and field sizes, and more use of pesticides and fertilizers – is causing a loss of natural biodiversity and habitats (Geiger et al., 2010). Among agricultural practices, livestock industry is also an important contributor to the global climate change, contributing between 12% and 18% to the total GHG emissions (Gomez-Zavaglia, Mejuto, & Simal-Gandara, 2020; Allen & Hof, 2019).

Consumption of meat and meat products means an important source of nutrients – proteins, iron and vitamins, among others – to the human diet. However, it is clear that this source of proteins has also a great environmental impact (Salter, 2018). With respect to this, it is well known that livestock production does not only have a negative influence on GHG emissions, but also on the water footprint, water pollution and water scarcity (Farchi, De Sario, Lapucci, Davoli, & Michelozzi, 2017). Therefore, it is evident that there is an urgent need to change the

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current lifestyle and consumption habits, not only for the planet health, but also for the own human health.

Given the importance of this for worldwide, in order to establish policies that can help mitigate the climate change/global warming, it is essential to get access to all the available information. In relation to this, the present paper was aimed at reviewing the impact of meat production and consumption on global warming and human health by focusing, specifically, on dietary habits, human health, climate change and viral infections. The aim of this review is neither a *meta*-analysis nor a systematic review, but an update and an extension of the previous reviews from our group related to this topic (Domingo & Nadal, 2016, 2017; Domingo, 2017).

2. Search strategy

For this purpose, PubMed (https://www.ncbi.nlm.nih.gov/pubmed/) and Scopus (https://www.scopus.com) were used as scientific databases, with extensive data on the topic of the present paper. Search was carried out with the following search terms: "meat consumption" combined with "global health", "human health", "greenhouse gases", "global warming", "viral infections" and "zoonosis". Up to 68 peer-reviewed articles were used for the present review, being divided for the different section as follows: a) thirteen for meat consumption and dietary habits; b) twenty-two for meat consumption and human health; c) thirteen for meat consumption and climate change; and d) twenty for meat consumption and viral infections.

3. Meat consumption and dietary habits

In most countries, meat consumption has been increasing since the 1960 s, but especially from the 1980 s decade to today. While some investigators have suggested that there has been a 204% rise in the supply of meat products (period 1960 – 2010) (Basu, 2015), other recent studies have reported increases in meat consumption as high as 500% (1992 – 2016) (Katare et al., 2020). What is clear is that nutritional habits have notably changed in the last century.

Europe has not been an exception, where the dietary habits have also substantially changed over the years. Recently, Bonnet, Bouamra-Mechemache, Réquillart, and Treich (2020) reported the trends in meat consumption habits in the European continent. While in the 1960 s, protein availability primarily came from plant-derived products such as wheat, nowadays, up to 58% of the protein availability comes from animal-derived products. Consequently, at present, meat products constitute the major source of proteins (28 g of protein/person/day), accounting for 30% of total calories consumption (Bonnet et al., 2020).

Among the different kinds of meats that are available in the markets, poultry and pig meats have shown the highest increase in consumption (Basu, 2015; Milford, Le Mouël, Bodirsky, & Rolinski, 2019). On one hand, pig meat consumption has mainly increased in Southeast Asia, while poultry meat consumption has increased in all world regions – mainly in North America (Basu, 2015). On the other hand, in recent years cattle meat consumption has remained stable, even decreasing slightly (Milford et al., 2019). According to Salter (2018), in the period 2014–2016 total meat consumption per capita worldwide was 34.1 kg/year, being almost 60% red meats (pork, sheep and beef). This fact is concerning because red meat production, especially beef meat, produces more CO_2 emissions than white meat, which is due to the ruminant enteric fermentation (Farchi et al., 2017).

It is also well established that different production systems of meat could mean less contamination. Nguyen, Hermansen, and Mogensen (2010) assessed the environmental consequences of different beef meat production systems in the European Union. The results showed that beef intensively reared from dairy calves contributed less to the global warming than beef fattened based on suckler herds, which is an extensive production method. Although a less contaminant production system should be primarily chosen to produce meat, there is also an urgent need to change the dietary habits of most people, at least in developed western countries, and very especially, to reduce meat consumption.

According to that, nowadays, only about 5% of the global population considers themselves as vegetarian, while there are much more people (between 14 and 60%) that define themselves as flexitarian, which means that they reduce meat consumption, but it is not totally eliminated from the diet (Kemper, 2020). There are a few reasons to switch to a reduced-meat diet. Firstly, some authors (González-García, Esteve-Llorens, Moreira, & Feijoo, 2018; Sabaté, Sranacharoenpong, Harwatt, Wien, & Soret, 2015; Scarborough et al., 2014) have reported lower GHG emissions when a vegetarian diet is followed. For example, Scarborough et al. (2014) compared the GHG emissions in different diet styles, concluding that a high-meat diet emitted 7.19 carbon dioxide equivalents per day (kgCO_2e/day), while vegetarian diet emitted 3.81 kgCO_2e/day. It means almost a half of reduction in GHG emissions. The decrease is even greater when following a vegan diet: 2.89 kgCO_2e/day.

In turn, Sabaté et al. (2015) investigated the environmental costs of producing 1 kg of protein from different plant- and meat-based products. The results showed that production of 1 kg of protein from beef needed 18 times more land, 10 times more water, 9 times more fuel, 12 times more fertilizer, and 10 times more pesticides than the same amount of proteins obtained from kidney beans. Moreover, production of proteins from chicken or eggs also generates less waste than proteins from beef (Sabaté et al., 2015). In a recent review, González-García et al. (2018), reviewed 21 articles, which were available in the scientific literature. These authors also concluded that diets consistent in vegetables were more environmentally friendly than those mainly constituted by meat products (González-García et al., 2018). These are clear indicators that strong efforts must be done to change the dietary habits of the population to a more eco-friendly lifestyle. However, there is still a lack of awareness of the negative impact of meat consumption. In a survey conducted in Australia, almost half of the participants (47%) believed that meat was good for the health, while only 0.9% of the participants declared that environmental concerns influenced their dietary choices (Bogueva, Marinova, & Raphaely, 2017). Additionally, Sogari, Bogueva, and Marinova (2019), conducted a survey in Australia to elucidate consumers' perception of eating insects as a protein source. Results showed that, still, there is a low willingness of replacing meat by insects, being neophobia and disgust, the main reasons behind that opinion (Sogari et al., 2019). Even the strong scientific evidence, the environmental benefits of reducing meat consumption are not having an impact on the consumers' dietary habits, which do not only have an influence on the environment but, also, on our health.

4. Meat consumption and human health

Another important reason to reduce meat consumption in general, but especially red meats, is directly related with the potential adverse effects of this consumption on human health. In 2015, the International Agency for Research on Cancer (IARC) stated that red meat was a probable carcinogen to humans (Group 2A) due to limited evidence, while consumption of processed meat was carcinogenic to humans (Group 1) given the sufficient evidence (IARC, 2015).

After publication in 2015 of the IARC monograph, we have conducted a couple of critical reviews on this subject. Recently, we concluded that epidemiological evidence was strong enough to confirm that intake of red meat or processed meat increased the risks of cancer, and more specifically that of colorectal cancer (Domingo & Nadal, 2017). Moreover, in general terms, consumption of red meat should be reduced below 50 g/day to avoid an increased risk of prostate cancer, breast cancer, or colorectal cancer. In a previous review, we highlighted the potential relevance of the environmental (chemical) contaminants, which are often found in meat and meat products, being some of them potentially carcinogenic. Thus, these chemical pollutants could also have some influence on the etiology of some kinds of cancer (Domingo

& Nadal, 2016).

In general terms, poultry (white meat) contains lower amounts of environmental pollutants (Domingo, 2017; González et al., 2019; González, Marquès, Nadal, & Domingo, 2018). Since most of these environmental contaminants (PCDD/Fs, PCBs, PBDEs, PCNs, etc.) are highly soluble in fats, to avoid consuming fats present in red meats and meat products, would help in the prevention not only of the well-known cardiovascular diseases derived of fats consumption, but also of certain cancers.

Since the publication of these reviews (Domingo & Nadal, 2016, 2017), a number of recent studies have reported adverse health outcomes related to the consumption of processed and red meat. Colorectal cancer is one of the main focuses of the studies found in the literature. A non-significant decrease of colorectal cancer was observed when comparing a cohort of vegetarians/pescetarians with a cohort of meat-eaters (Gilsing et al., 2015). This finding was similar to that previously reported by Tantamango-Bartley, Jaceldo-Siegl, Fan, and Fraser (2013), who noticed that vegan diet conferred a statistically significant protection on the incidence of cancer in both genders, as well as for female-specific cancers.

Even different types of cooking practices could also have an effect on the development of colorectal cancer. An increased cancer risk for cooking practices requiring high temperatures - such as grilling or barbequing - has been found (Mehta et al., 2020). In turn, Deoula et al. (2020) conducted a case-control study in order to assess the relationship of red and white meat, as well as processed meat with colorectal cancer risk. Results showed a positive association between red meat and colon cancer, but no associations were found for rectal cancer. On the other hand, no significant correlations were found between the consumption of white meat and colorectal cancer. In addition, industrial processed meat – but not traditionally processed meat – was positively correlated with a higher risk of colorectal cancer (Deoula et al., 2020). Other authors have estimated that limiting the consumption of red meat below 100 g per day would not mean a higher risk of colorectal cancer for both genders (De Oliveira Mota, Boué, Guillou, Pierre, & Membré, 2019).

Other types of cancer, like biliary tract cancer or bladder cancer, for example, have been less studied for this kind of correlation. Makiuchi et al. (2020) performed a study to elucidate the role of red meat in biliary tract cancer. Consumption of red meat was negatively associated with the risk of suffering biliary tract cancer in men. However, in women it was not significantly correlated with the risk. Interestingly, in both genders, a higher consumption of poultry meat was not associated with an increased risk of biliary tract cancer (Makiuchi et al., 2020).

In the USA, Ma et al. (2019) conducted a study aimed at elucidating the potential relationship between meat intake and hepatocellular carcinoma in two prospective cohorts. The results showed that higher red meat consumption was associated with an increased risk of 84% of suffering hepatocellular carcinoma, while white meat intake reduced up to 39% the risk of this carcinoma (Ma et al., 2019). In another recent study, Di Maso et al. (2019) found that following a diet based on vegetables and dairy products had a positive impact on the risk of suffering bladder cancer. In contrast, following a diet with higher red meat consumption showed an increased risk. This risk was specially increased when the red meat was stewed or roasted (Di Maso et al., 2019). Finally, considering breast cancer, in a recent investigation conducted by Lo, Park, Sinha, and Sandler (2020), it was found that consumption of red meat increased the risk of suffering breast cancer. However, in contrast, this risk was significantly reduced if, alternatively, poultry meat was consumed (Lo et al., 2020). However, these results are not in accordance with those found by Anderson et al. (2018), who found that red meat consumption was not associated with breast cancer. Anyhow, a recently conducted systematic review, concluded that, in fact, high processed meat consumption was associated with an increased breast cancer risk (Farvid et al., 2018).

In general terms, and based on the above information, it seems evident that following a vegetarian, or a vegan diet, should reduce the incidence of cancers, or at least of some kinds of cancer.

Apart from cancer risk, there are other studies that focus on the role of meat consumption on developing other diseases, such as metabolic diseases, which can be also increased by red meat consumption (Tantamango-Bartley et al., 2013). In a prospective study conducted in China, it was found that consumption of red meat, but not poultry, was positively correlated with a higher incidence of diabetes (Du et al., 2020), results that are in agreement with those from a previous Danish study (Ibsen, Warberg, Würtz, Overvad, & Dahm, 2019), showing that replacement of red meat consumption by fish or poultry were associated with a lower risk of type 2 diabetes. Even replacing processed red meat with unprocessed red meat was associated with a lower risk of diabetes (Ibsen et al., 2019).

Other diseases, like chronic kidney disease, were also found to be positively correlated with higher red meat consumption (Huang et al., 2020; Luan, Wang, Campos, & Baylin, 2020; Mirmiran et al., 2020). The risk of suffering chronic kidney disease decreased when red meat-derived proteins were replaced by other protein sources (Mirmiran et al., 2020). On the other hand, a recent study conducted in Costa Rica has shown that consumption of red meat has a negative impact on the metabolic syndrome, which is associated with increased risk for type 2 diabetes and/or cardiovascular diseases (Luan et al., 2020). In turn, abdominal obesity and a high fasting glucose might be the responsible of the association between metabolic disease and red meat consumption (Luan et al., 2020). The above findings are in accordance with those found in a longitudinal study carried out in China (Huang et al., 2020), in which the authors also reported that red meat intake was associated with an increased risk of metabolic syndrome.

Interestingly, consumption of red meat can even have an impact on life expectancy. Ranabhat, Park, and Kim (2020) conducted a study including results from 164 countries – with data from international organizations – focused on determining whether consumption of red meat could influence the life expectancy. It was noted that although in high-and in middle-income countries, the current intake of red meat is having a negative impact on life expectancy, it could not be correlated with life expectancy in low-income countries (Ranabhat et al., 2020).

5. Meat consumption and climate change

It is well-known that climate change could have an effect on the meat organoleptic qualities and also on the meat safety (Gregory, 2010). Potential effects of climate change would be a higher mortality during transport or higher contamination of carcasses with *Escherichia coli* or *Salmonella*, which means an overall reduction of the meat quality (Gregory, 2010).

However, it is important to remember that livestock production is one of the greatest contributors to the global warming (Allen & Hof, 2019). Therefore, it is necessary to quantify and consider the environmental impacts of meat consumption. To do so, one of the most used approaches is the life cycle assessment (LCA). In LCA, environmental impacts associated to climate change, such as acidification, land and water use, and eutrophication are assessed. First of all, there is a necessity to establish which dietary habits are more eco-friendly. To do so, recently, a LCA study was performed on different types of meal where authors found that meals with a higher environmental impact contain red meat (Heard, Bandekar, Vassar, & Miller, 2019).

In another investigation conducted in Denmark, Bruno et al. (2019) used LCA to estimate the carbon footprint of four diet scenarios (standard, carnivore, vegetarian and vegan). All activities were taken into account, from the farm production to the consumption. Results showed that carnivore diets emitted more CO_2 (1.83 t CO_2eq/person/year), which means that this kind of diets has the highest environmental impact. By contrast, other diets such as vegetarian or vegan, showed lower emissions (0.89 and 1.37 t CO_2eq /person/year, respectively) (Bruno et al., 2019).

These results are similar to those found in a Canadian investigation, where carbon footprint derived from different dietary patterns was assessed (Veeramani, Dias, & Kirkpatrick, 2017). Activities ranging from farm production to household processes, such as cooking or storage, were also considered. Dietary habits including beef meat, such as diet not containing pork meat and omnivorous diet, showed the highest carbon footprint (3160 kg CO_2eq and 2282 kg CO_2eq, respectively). Other diets, not including beef meat, but including other meats, had a carbon footprint 60% lower than that of the no-pork diet (Veeramani et al., 2017). In addition, vegetarian and vegan diets had the lowest carbon footprint (55 and 1015 kg CO_2eq, respectively) (Veeramani et al., 2017). In general terms, most results corroborate that meat products, followed by dairy products, are the foodstuffs with a higher environmental impact, which is due to the involvement of various agronomic and zootechnical activities (Notarnicola, Tassielli, Renzulli, Castellani, & Sala, 2017).

Having clarified which are the most eco-friendly diet styles, it is also important to specifically assess the environmental impact of meat production. With respect to this, Dougherty et al. (2019) examined the carbon footprint derived from the sheep production in California. These authors evaluated – through an LCA assessment – the environmental impact of five different production systems. The results from the LCA showed that carbon footprint ranged from 3.9 to 30.6 kg CO_2e/kg meat, when considering a lamb production on a mass basis, and between 10.4 and 18.1 kg CO_2e/kg meat, when considering lamb production on an economic basis. It is also important to remark that enteric methane emissions contributed up to 72% of the total emissions (Dougherty et al., 2019).

Other authors also found carbon footprint for other kinds of red meat. For example, Wiedemann et al. (2015) analyzed the impacts of Australian beef and lamb exported to the USA. GHG emissions derived from beef production ranged from 23.4 to 27.2 kg CO_2eq/kg beef, while emissions for lamb production were 6.1 kg CO_2eq/kg lamb. In that study, it was also noted that enteric emissions contributed from 70% to 75% for beef and lamb, respectively (Wiedemann et al., 2015). Similar results had been reported in a previous study conducted in the USA by Lupo, Clay, Benning, and Stone (2013), where GHG emissions derived from cattle production were estimated to be 22 kg CO_2eq/kg carcass. In this case, enteric methane emissions were also the highest contributors to the total emissions (65%) (Lupo et al., 2013).

LCA for pork production system was also evaluated by Six et al. (2017). These researchers estimated that the carbon footprint for pork production was 4.6 kg CO_2eq/kg, which is similar to lamb production, but much lower than that estimated for beef production. Most emissions came from feed production (Six et al., 2017). This result is also in accordance to that found in a recent study conducted in Spain, where fodder production and transport were found to be the most critical stages for environmental burdens (Noya et al., 2017).

On the other hand, white meats such as of rabbit or poultry have a lower carbon footprint when compared to production of red meats (Cesari et al., 2018, 2017). Cesari et al. (2018), analyzed the environmental impact of a rabbit production system. Climate impact for the production of 1 kg of rabbit was estimated to be 3.86 kg CO_2eq/kg, which is substantially lower to that calculated for beef meat, but similar to that estimated for lamb and pork meats. Cesari et al. (2017) had previously assessed the environmental impact of poultry production. Carbon footprint for poultry production was estimated to be 5.52 kg CO_2eq/kg carcass. These results are similar to those found for other kinds of white meat, being also similar for pork and lamb production. However, these results are substantially lower than those corresponding to beef production. Overall, the data suggest that consuming white meat or red meat (derived from pork and lamb), has a lower environmental impact than the consumption of red meat coming from beef.

6. Meat consumption and viral infections

Finally, there is also a concern between the link of meat and viral infections. Consumption of meat – especially wild meats – is believed to be related to virus infections, as many viruses have been found in wild meat trade markets (Cantlay, Ingram, & Meredith, 2017). One of the most extended viral diseases acquired through meat consumption is hepatitis E (HEV) (Alvarado-Esquivel, Gutierrez-Martinez, Ramírez-Valles, & Sifuentes-Alvarez, 2020). The virus is transmitted mainly through those meats that have not been well cooked, being the main reservoirs pigs, wild boars and deers (Lenggenhager & Weber, 2020; Sooryanarain & Meng, 2019). Fortunately, up to 80% of the virions can be inactivated by cooking the meats at temperatures higher than 60 °C (Sooryanarain & Meng, 2019). They should reach an internal temperature of 71 °C during 20 min to inactivate the infectious virion (Barnaud, Rogée, Garry, Rose, & Pavio, 2012).

People infected with HEV are mostly asymptomatic, but some of them can suffer severe or lethal effects (Sooryanarain & Meng, 2019). Hepatitis E is commonly present in both developed and developing countries (Alvarado-Esquivel et al., 2020). It has been detected in European countries such as Italy or Spain (Kukielka, Rodriguez-Prieto, Vicente, & Sánchez-Vizcaíno, 2016; Marcantonio et al., 2019). In Italy, HEV has been reported to affect 2.1/100 persons-year, being the probability of becoming infected of 6.5% between the participants tested (Marcantonio et al., 2019). Analysis of wild boar and red deer samples was carried out in Spain. Up to 10% of wild boar and 16% of red deer samples contained RNA from HEV (Kukielka et al., 2016). Additionally, 57% and 13% of wild boar and red deer, respectively, contained antibodies for HEV, meaning that a great number of animals have become into contact with the virus (Kukielka et al., 2016).

In China, Ma et al. (2010) studied the seroprevalence and distribution of HEV in three ethnic groups. Seroprevalence of anti-HEV was in a range between 8.9 and 32.9% for the three ethnic groups. This seroprevalence was correlated with the contact with pigs, which are the most important reservoir of the virus (Ma et al., 2010). In America, the presence of the virus has also been reported. In the USA, Ditah et al. (2014) studied the seroprevalence of HEV in the population of the country. The seroprevalence was 6% while 0.5% of the population had a recent exposure to the virus, since immunoglobulin-M was present in the participants. Again, seropositivity was correlated with meat consumption ($>$ 10 times/month) (Ditah et al., 2014). In turn, Alvarado-Esquivel et al. (2020) reported the seroprevalence in Mexicans. Antibodies anti-HEV were found in 31.5% of the subjects. This seropositivity was also associated with consumption of meat from different types (goat, sheep, boar, pigeon and turkey).

Although HEV is one of the most important zoonotic diseases worldwide, we cannot overlook one of the biggest concerns at the present time. In 2018, potentially novel coronavirus were found in samples from bats and rats in Vietnam. It was observed that 22% of the bat fecal samples presented coronavirus RNA. Moreover, coronavirus RNA was also present in 4.4% of rat fecal samples tested (Berto et al., 2018). Therefore, zoonosis derived from bat meat consumption is likely to happen, if security measures are not taken. Since December 2019, the novel coronavirus (SARS-CoV-2) is causing struggles throughout the world. According to the most recent literature, the main hypothesis is that this RNA virus could have its origin in a seafood market from Wuhan (China), where vertebrate and invertebrate – wild and farmed – animal are sold (Li, Li, & (Justin), Xie, X., Cai, X., Huang, J., Tian, X., & Zhu, H. , 2020). Moreover, there is a belief that an intermediate host was needed for the transmission from animals to humans (Acter et al., 2020). Main routes for human – human transmission are nosocomial – inside an hospital – or during close contact between people through respiratory routes, i.e., droplets produced when an infected person coughs or sneezes (Acter et al., 2020). Air pollution could be also an important route of exposure. In a recent study conducted in China, researchers observed a significantly positive correlation between different air pollutants ($PM_{2.5}$, PM_{10}, SO_2, CO, NO_3 and O_3) with COVID-19 cases (Zhu, Xie, Huang, & Cao, 2020). So, highly-polluted cities could be a significant source of infection.

The health effects derived from the exposure to the SARS-CoV-2 are mainly respiratory, which include coughing, breathing difficulties and fever (Gabutti, d'Anchera, Sandri, Savio, & Stefanati, 2020; Khan & Atangana, 2020; Rothan & Byrareddy, 2020; Sohrabi et al., 2020; Wang, Horby, Hayden, & Gao, 2020). Although a vaccine or a specific treatment has not been found yet, progresses have been made in this field to find a good treatment (Abd El-Aziz & Stockand, 2020). Nonetheless, the most important is to carry out an early recognition and intervention of the most critical patients (Sun, Qiu, Huang, & Yang, 2020).

Up to date, more than two million people have been already infected and about 200,000 individuals have already dead because of the SARS-CoV-2 (www.worldometers.info/coronavirus/). Therefore, the global mortality rate is being considerably high although it varies notably among countries. Anyway, there is an urgent need to change the dietary habits in order to avoid zoonosis, which could cause again another global pandemic sooner than late.

7. Conclusions

In 2015, the IARC established that red meat was a probable carcinogen to humans (Group 2A), while consumption of processed meat was carcinogenic to humans (Group 1). Colorectal cancer -among other kinds of cancer- would be of special concern. We have here reviewed a number of recent studies regarding some important issues related with the human dietary intake of meats, whose consumption has dramatically decreased increased in recent decades in most countries over the world. Since the point of view of health,

The results of a number of investigations conducted after the statement of the IARC have corroborated the clear recommendation of reducing significantly the consumption of red meats and meat products. Because red meats can contain important quantities of fats, to reduce their consumption should be useful for reducing cardiovascular and cancer risks, simultaneously. On the other hand, a reduction of meat consumption should contribute to the reduction of GHGs emissions and their impact on global warming and climate health. In addition, a number of studies conducted in recent years have demonstrated the important carbon footprint to which red meats contributes.

Lastly, but not the least, the current pandemic of COVID-19 has suggested that consumption of wild meats can mean a very serious risk of transmission of viruses from animals to humans. Taking all this into account, it seems evident that for different, but important reasons, the human dietary habits regarding meat consumption in general, and red meats and wild meats in particular, should be significantly modified downward, as much and as soon as possible. The health of the planet and people require it.

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