Sustainable Diets

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A calorie-balanced diet mainly based on food of plant origin that would allow the attainment of 60% of daily caloric requirements and a low protein intake from animal foods (focusing in fish and poultry) could significantly reduce global morbi-mortality and the dietary environmental impact maintaining a framework of sustainability conditioned by the consumption of fresh, seasonal, locally produced and minimally packaged products. The implementation of sustainable diets requires working on the triangulation of concepts of food–health–environment from schools and that is permanently reinforced during all stages of the life by healthcare workers, who should establish the appropriate modifications according to the age, gender and health situation.

Keywords: healthy diets ; sustainable diets ; climate change ; global health

1. Introduction

It is expected that human-induced global warming will increase the mortality rate by approximately 250,000 deaths between the third and the fifth decade of this century [1]. The United Nations launched in 2015 the Sustainable Development Goals as a universal call to action to end poverty, climate change and inequality by the year 2030. The fact that climate change and global health are inextricably linked means that health systems and their professionals must adapt and evolve to face this challenge without losing quality of care [2].

Since 2008, the attendees of the Consortium of Universities for Global Health (CUGH) discussed the lack of competencies and standardized study plans to guide programs oriented to global health [3], and healthcare professions have progressively become aware of the importance of this challenge at the level of humanity. Currently, there are already initiatives and proposals to include climate change in the curricula of nurses [4]; its inclusion in medical education has also been proposed [5], and the form of food production and consumption and its relationship with the environment has also been fiercely debated by nutritionists [6].

Today, living sustainably should be regarded as a healthy habit; therefore, it should be promoted by health professionals through the promotion of public health.

Healthcare workers, as nutrition counselors, have an essential role in the nutritional education of patients (therapeutic objectives) and communities (preventive objectives), which positions them as a social speaker for the promotion of a healthy and sustainable diet. However, the way of eating not only has an impact on population health but also has an important environmental impact. The food people consume and the ways in which it is produced, packaged or transported from one side of the world to the other have an energy and environmental cost measured in terms of greenhouse emissions (GHEe), use and deterioration of land and water or loss of biodiversity, among others [7].

Sustainable diets have been defined by the Food and Agriculture Organization (FAO) as diets with low environmental impact that contribute to food and nutritional security and a healthy life for present and future generations. This type of diet improves protection and respects for biodiversity and ecosystems, is culturally acceptable, economically fair, accessible, affordable, nutritionally adequate, safe and healthy, and allows the optimization of natural and human resources [7].

2. Sustainable Diets

Some scholars are convinced that health professionals are the key to promoting a healthy and sustainable future through their educational duty. Therefore, incorporating the dimension of sustainability is essential in nutritional counseling; however, a successful educational intervention requires prior training and conceptual mastery of the subject [8][9].

2.1. Determining the Weight of Food Types in Environmental Impact

It is essential to be clear on the environmental impact of foods or diets when establishing consumption recommendations. Different environmental-impact indicators have been used that determine in what sense land, water or the atmosphere are affected. Among them, greenhouse gas emissions (GHGe) have been considered a good proxy for this total environmental load, but this is not the only parameter to have in account.

Thus, Black et al. (2015) considered foods that are minimally processed, locally grown/sourced, organic, seasonal, with less/minimal packaging and vegetarian options as environmentally sustainable [10]. Several authors have adopted the mean values of the footprint in the form of environmental from Springmann et al. (2018) so they could be considered as reference values [11]:

- The GHG footprint is higher for beef and lamb (~30 gCO_2eq/g), pork (~3 gCO_2eq/g), eggs, milk, rice and palm oil (~1–2 gCO_2eq/g).
- The freshwater footprint is higher for animal-sourced products, sugar, legumes and rice (0.5–1 m^3/kg).
- The cropland use is high for legumes, vegetable oils and oil crops, nuts and seeds and animal-sourced products (5–11 m^2/kg).
- The nitrogen footprint is high for animal-sourced products, cereals (wheat, rice, maize), oil crops, nuts and seeds and fruits and vegetables (10–50 kg N/kg).

In general, the way to measure GHG emissions derived from consumed food is through data sets prepared by public or private entities using the LCA technique. For example, Temme EH et al. (2015) used an external dataset produced by “Blonk Consultants” [12]. LCA is a technique for assessing the environmental burdens associated with all stages of a product’s life, in this case from farm to fork. As the authors acquired this information from external sources, it is not detailed exactly what this technique consists of.

In the Netherlands, where National recommendations involve food groups included in the Wheel of Five according to Health Council of the Netherlands’s dietary guidelines, GHGe associated with food was studied in women and men aged between 7 and 69 years. Meat and cheese contributed about 40% and drinks (including milk and alcoholic drinks) 20% to GHGe of daily diets. Major differences between high- and low-GHGe diets were in meat, cheese and dairy consumption as well as in soft drinks (girls, boys and women) and alcoholic drinks (men). Of those, differences in meat consumption determined the differences in GHGe most [12]. Subsequently, similar results were published by Van der Kamp in 2018, showing that the reduction of meat during dinner to less than half or the partial or total substitution of unhealthy drinks (soft drinks and alcohol) for water were measures that could significantly decrease the emission of greenhouse gases derived from the Dutch diet [13].

Although products of animal origin seem to be those that produce the greatest environmental impact, not all could have the same weight, since some studies show an improvement in the environmental impact when removing meat, but not when removing fish from the diet [14]. From the productive sector, an effort is also being made in innovation to study the intestinal microbiome of ruminants with the aim of raising cattle with lower methane production, although at the moment it is an option under development that has not yet led to definitively consistent results [15].

On the other hand, foods derived from plants (fruits, vegetables, legumes) have been shown to have less impact on the emission of GHGe, which is why they seem to be interesting foods to include in sustainable diets [16][12]. More specifically, Hendrie et al. (2016) observed that fruit (3.5%) and vegetables (6.5%) were the two smallest contributors to total dietary GHGe [17].

2.2. Sustainable Diet and Health-Environment Co-Benefits

Pollution and environmental deterioration directly affect health but also the quality of the food we eat [18]. Thus, there is increasing evidence of the high exposure to environmental contaminants to which people are exposed from birth, since many of them accumulate in breast milk [19]. In addition, environmental pollution is related to the emerging appearance of different types of diseases such as those that have an autoimmune basis [20].

If the evolution of climate change continues, it is estimated that by 2050, global food availability will be reduced, triggering health problems such as malnutrition, stunted growth or anemia, which will lead to the death of 529,000 people worldwide. Nevertheless, the model predicts that Asian countries would reach the greatest mortality rate [9].

Springman (2018) has conducted other global predictive models based on three dietary modifications: reduced meat consumption, appropriate caloric intake control and healthy diets defined by the EAT-Lancet Commission on Healthy Diets from Sustainable Food Systems in the guideline recommendations. As a result, the importance of health-environment co-benefits of a sustainable diet became evident. Although no strategy proved to be perfect at a global level, they provided partial improvements at different levels depending on the socio-economic development of the countries. Nevertheless, the choice of an appropriate strategy in each case always led to a reduction in premature mortality equal to or greater than 10% [11].

On the other hand, studies have focused on dietary patterns in specific countries. Thus, a study analyzing and modeling the Dutch dietary pattern shows that adapting the current Dutch diet to nutritional recommendations makes it healthier, but not significantly more sustainable. Therefore, it requires making the effort to choose low-GHGe foods to achieve health–environment co-benefits [21].

The health impact of a sustainable diet has also been assessed through the disability-adjusted life years (DALYs) indicator, which reflects the number of healthy life equivalent years lost due to poor health status or disability. In Switzerland, it has been reported that a transition from the current Swiss diet to a pattern better adjusted to national recommendations (guidelines of Swiss society of nutrition) was the most sustainable option involving 36% lesser environmental footprint and 2.67% lower adverse health outcome (DALYs) compared with the current diet. This transition implies a slight increase in fruits and vegetables (from 265 and 239 to 325 and 291 g capita^{-1} day^{-1}, respectively) and a more important increase in nuts and legumes (from 5 and 24 to 26 and 50 g capita^{-1} day^{-1}, respectively). In addition, it decreased the consumption of roots and tubers (from 230 to 149 g capita^{-1} day^{-1}) and a significantly decreased consumption of meat, fish, eggs and vegetable oil (from 129, 15, 25 and 71 to 33, 6, 18 and 26 g capita^{-1} day^{-1}). The environmental footprint was quantified, showing a reduction of 54% in GHG emission, 32% in land use and 26%, 33% and 34% in water, nitrogen and phosphorus footprints, respectively [22].

2.3. Strategies to Promote Sustainable Diets

2.3.1. Identification of Sustainable Dietary Patterns

High industrialization and the purchase of low-quality raw materials has meant that these types of foods can be produced and marketed at low cost, making them very affordable to low-income consumers [23].

The substitution of animal foods for those of plant origin as a fundamental step in the transition to a sustainable diet is widely proposed. However, the consumption of meat is culturally rooted, and some authors are committed to educating in the consumption of good quality meat rather than eradicating its consumption [24]. There is sufficient scientific evidence to affirm that vegetarian diets in their variants (vegan, flexitarian, pescatarian, ovolacto-vegetarian) are healthy eating patterns. From an eco-sustainable point of view, it improves many indicators of environmental impact [22][25][11]. Therefore, it should be promoted to spread the adherence of these patterns. However, to adopt a vegetarian and especially vegan eating pattern, it is necessary to have access to a wide variety of plant-based foods, and people must know how to combine them, otherwise they may have certain nutritional deficiencies. On the other hand, psychosocial issues such as the possible stigmatization of this eating pattern can be a barrier to its implementation [26].

de Boer et al. (2014) advocate not to remove all meats from the diet, due to its significance in the Dutch diet. Instead, they propose reducing its consumption and, when this is carried out, choosing better-quality meat [24].

The nutritional quality of meat is associated with the saturated fat content. The higher it is, the less healthy it is to eat. However, people normally talk about meat referring to different animal species (pork, beef, lamb, chicken, etc.) without qualifying the importance of the cut (lean parts of a species can be healthier than fatty parts of another one) and the livestock feeding, which can influence its corporal composition [27].

It should be pointed out that there are dietary patterns that are highly acceptable in each country of the world due to their traditional character. Even though they have many differences, they are characterized by a main consumption of plant-based foods, a diet rich in fish consumption, and a minimal, although existing, contribution of meat. Among them, and without prejudice to the existence of other examples, people have been able to identify the Mediterranean diet [28][29][30][23] and the traditional Japanese diet, *washoku* [31]. Both are characterized by a predominance of plant-origin foods (for example, cereals, legumes, olive oil and moderate alcohol, etc.), associated with longevity and listed as UNESCO's Intangible Cultural Heritage, and both of them have been shown to be sustainable diets in a mathematical modeling study, where the New Zealand diet was also evaluated, which, although it could be optimized to reduce its environmental impact,

could have fewer associated health benefits [32]. These types of diets can be easily culturally adapted to geographies where they are not native, thus allowing them to extend their benefits on health and the environment.

Thus, the different patterns of sustainable diets observed seem to have something in common. They allow the establishment of a balanced caloric intake, defined as one in which carbohydrates account for 55–60% of daily caloric requirements, 30–35% of calories from fatty foods and 10–15% of calories from protein foods.

Carbohydrates are provided through foods of plant origin (legumes, farinaceous and fruits) to which vegetables (pigmented colored vegetable, leafy green and cruciferous) are added to increase the consumption of fiber and antioxidants with low calorie intake.

Calories derived from fatty foods come from oily fish, nuts and vegetable oils whose consumption is also associated with important vitamins such as E and D.

Calorie consumption to cover protein needs (0.8 gr/kg/day) would already be partially covered thanks to whole grain cereals, legumes and nuts; therefore, a high consumption of foods of animal origin is not necessary, focusing on fish and poultry due to their low saturated fat content. In fact, it is not even necessary to consume foods of animal origin to cover protein needs, as a correct vegan diet has shown [33].

2.3.2. Promotion in Clinical Practice and at the School Environment

In order to include the dimension of sustainability in the nutritional management of the patient, as well as in the promotion of healthy lifestyles for the general population, it is important that the healthy and sustainable alternatives identified above are listed in clinical practice guidelines and dietary guidelines.

Nutritional counseling is a routine practice to a greater or lesser extent for different health professionals, and particularly for nurses. They should take into account the age, gender and educational level of the people that they are addressing. Each sector of the population may require specific indications since there are different consumption patterns based on the demographic variables [8][34][35].

On the other hand, children have at least one meal a day in their school environment and the behaviors learned at these ages are more strongly maintained over time, turning the school into a strategic point.

For all of the above, scholars encourage all healthcare professionals, especially those working in schools, to consider sustainability when carrying out a patient counseling menu review, the promotion of healthy lifestyles and/or applying diet therapy as a therapeutic tool.

3. Conclusions

The Western eating pattern and the consequent food production system not only endangers the health of people but also the planet. It is therefore highly advisable to redirect the habits and lifestyles of consumers, in which healthcare workers involved in nutritional counselling have a great task at hand through educational activities and health promotion.

A balanced calorie diet based on plant-based foods that can meet the needs of most micronutrients, fiber, carbohydrates, and most of fat and protein is ideal. The supply of protein of animal origin (prioritizing poultry and fish and taking care of the quality of the product) should be implemented in small quantities to ensure protein requirements of 0.8 g/kg/day and make the appropriate adaptations according to the level of physical activity. It could significantly reduce global morbidity and mortality associated with chronic diseases, reducing the environmental impact of food production and maintaining a framework of sustainability conditioned by the consumption of fresh, seasonal, locally produced and minimally packaged products.

This often does not mean implementing new eating patterns, but rather returning to those that have been traditionally practiced. For this reason, it is necessary to bet on a sustainable diet, with existing varieties, which allows citizens the possibility of choosing.

Consolidating the implementation of sustainable diets requires working on the triangulation of concepts of food–health–environment from children in schools, and that is permanently reinforced during all stages of the life, both for the healthy and ill, by healthcare workers (HCW), who should establish the appropriate modifications according to the age, gender and health situation.

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