Nutrition, Movement, and Environment

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Abstract The demand for land for industrialized agriculture associated with the increasing world population leads to the dramatic destruction of our environment. Besides, food production is already responsible for about 30% of global greenhouse gas emissions. To reduce environmental pollution to a necessary level, a sustainable change in diet and food production is required alongside technical solutions to reduce emissions. Currently, animal food production consuming food and feed resources is 5–10 times the amount of a comparable plant-based human diet. Therefore, it is necessary to motivate people to adopt a more sustainable, predominantly plant-based, and even healthier diet. There is a great need for the state to fulfill its ecological and social responsibility by providing financial support or tax breaks for sustainable food options, for example, in school and daycare meals, in canteens, and in hospitals. Comparably effective, incentives for increased physical activity and associated more sustainable forms of mobility can simultaneously improve health and reduce environmental impact. In this context, it is further necessary to make the obstacles transparent that lobbying associations and industry use to try to block sustainable changes and the required legislative amendments due to business interests. In addition to easily accessible knowledge transfer, attractive and practicable instructions for implementation are conducive to optimal motivation. Social and communicative assistance and guidance support a successful, sustainable transition from the initial behavioral change to routinization. In addition to clearly addressing the urgency, the focus should be on positive messages.

Keywords Health · Plant-based nutrition · Physical activity · Behavioral change · Motivation · Environmental burden

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1 Introduction

According to the 2018 international study *Global Burden of Disease* (Lancet), German citizens have the lowest life expectancy compared to all West European countries. Only East European countries have a lower life expectancy. On average, males in Switzerland live four years longer than in Germany. Although 11.2% of the German GDP is spent on health care, which is the highest amount within the EU. What are the causes? An important reason is the simple fact that prevention and health promotion are not taken seriously in Germany.

Germany is the only country in the EU that has not yet executed a prohibition of outdoor advertisement for tobacco products. The previous leader of the parliamentary fraction of a large people's party as well as their economic wing have repeatedly blocked a government bill from 2016 due to "welfare for endangered workplaces."

Similar but less transparent conditions persist in food and agricultural industry. Many other countries have already introduced taxes on or prohibition of excess sugar in baby food and soft drinks. Utilizing a strategy that German tobacco industry applied successfully, the German food industry has forestalled respective legislation. Their measures are counter studies, creating anxieties (i.e., of losing individual freedom), or defaming critics [2].

In no other sector of nutrition health insurances, pediatrics, and other health institutions provide clearer and more explicit scientific data with consequential demands. In many humans, sugar has a similar, even higher addictive potential than smoking. Along with fast food, sugar-sweetened soft drinks, including fruit juices in large quantities, are a major cause that pathological overweight (obesity) and diabetes, especially in children, are increasing significantly. Non-communicable chronic diseases such as coronary heart disease, strokes, dementia, and cancer are becoming increasingly relevant in view of longer life expectancy, despite the progress made by our acute care community.

The knowledge of the importance of healthy diet and exercise has been largely secured for several decades and known to most people. However, there has been little change in the behavior of the individual as well as in the general conditions. What needs to be done? Resigning from the economic forces that drive commercialization and profit maximization? It would be better to utilize the energy and impulse provided by Fridays for Future (even if perceived critically), in order to become active for a better climate and a health-supporting environment. Challenges of preventing Climate Change are similar to the prevention of chronic non-communicable diseases, and both must fight against powerful economic interests.

In any case, changing or transforming any existing conditions means to learn. Successful and sustainable learning, however, requires a simultaneous involvement of different areas in humans (in particular those affective-emotional). In parts, these are known through Pestalozzi's approaches, namely, *learning with head, heart, and hand*. Building on cognitive-intellectual aspects, a long-term anchoring of actions or habits is only possible by means of emotional activation. The mediation of well understandable and verified facts is an important prerequisite for success.

Due to the complexity of the human metabolism, contradictory study results, and of course influences from various interests of the food industry, very contradictory dietary recommendations have been given to date. Low transparency of dependencies and financial links between many food companies and industry complicates an improvement.

2 The EAT-Lancet Commission

Supported by more comprehensive findings in recent years, a group of international scientists from different areas (medical, agriculture, policy, and environmental sustainability) within the *EAT-Lancet* Commission formulated global scientific goals for healthy food and food production with the best available evidence [12]. Only published in early February 2019, these recommendations aim at implementing the United Nations Sustainable Development Goals (SDGs) and the Paris Climate Agreement. According to a big data analysis published in November 2019, the findings of the EAT-Lancet commission were already under attack by the meat lobby just by the time of its publication [5]. This poses towards another health threat resulting from the challenges for science communication posed by "a rapidly changing media landscape and polarization."

The recommended healthy reference nutrition is preferably of vegetables, fruits, whole grain products, legumes, nuts, and unsaturated fats, including a small to moderate amount of fish and poultry. By contrast, no or only a small amount of red meat (less than 280 g per week), of added sugar, refined cereals, and less very starchy vegetables such as potatoes and maize should be consumed. In any case, processed meat is disadvantageous. These recommendations, which are summarized here on the essential statements, have been known for years and are very simple, but are in contrast to the interests of the food industry, which uses all possible means to promote highly processed food at the expense of the environment.

3 What is the Relationship Between Nutrition and the Environment?

There is clear evidence that food production is one of the major contributors to global environmental change, resulting in Climate Change, loss of biodiversity, freshwater consumption and interference with the global nitrogen and phosphorus cycles. Agriculture occupies about 40% of global land. Food production is responsible for up to 30% of global greenhouse gas emissions and for 70% of fresh water consumption.

According to *the EAT-Lancet* Commission, the future planning for food production must be designed in such a way that a world population of around 10 billion people, estimated for 2050, can be adequately provided for. However, already a slight increase in the consumption of red meat or dairy products as a result of increasing prosperity requirements in poorer countries can make it impossible to achieve sufficient food supply for all people. A decisive challenge for a both healthy and sustainable nutrition in the future will therefore be to reduce the consumption of animal products and sugar.

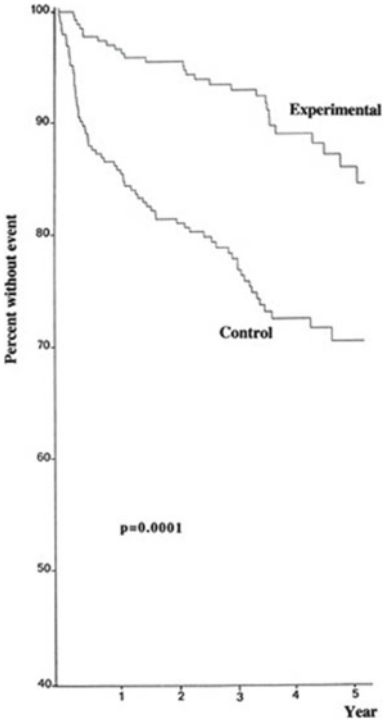

Fig. 1 Cumulative survival without nonfatal infarction and without major secondary end-points (CO_2) (*Source* de Lorgeril et al. [4])

4 Here is an Overview of Some Studies that are Important for a Sustainable Diet

The Lyon Heart Study, published in 1999 in *Circulation*, the most prestigious cardiology journal, ensured that most nutritional recommendations around the world have been rewritten towards a diet similar to a traditional "Crete diet." Three hundred heart attack patients on a "Crete diet" had a 57% lower mortality compared to 300 heart attack patients on a classic cholesterol-restricted cardiologic "heart diet" [4].

A follow-up of more than 120,000 health professionals at Harvard University has shown that the overall mortality rate is about 10% lower with a consumption of 4–5 portions of fruit and vegetables per day [6].

A follow-up to the Nurses Health Study with 84,000 nurses aged 30–55 years showed a decrease in heart attacks of 19% when replacing the required protein supply with meat by protein supply with poultry, of 24% when replacing with fish, of 30% with nuts and of 34% with beans [1].

In 2014, several studies have shown that protein-rich diet is accelerating the aging process. Gerontologist Valter Longo from the Institute of Longevity in Los Angeles was able to show that mortality was 74% higher in people aged 50–65 years who consumed abundant amounts of proteins, especially animal proteins, and that their risk of cancer was four times. High protein advantageously promotes growth during the growth phase in the youth, but at the age of 50–65 years, it seems to promote the growth of cancer cells. At a higher age, this effect seems to disappear higher [8] (Fig. 1).

5 Consequences of Industrial Livestock Production and Rearing

In 2017, agricultural industry used 733,000 t of antibiotics.

As a result, antibiotic-resistant germs are increasingly developing, and many reserve antibiotics available to humans are no longer effective. For example, the WHO classifies Colistin as the last emergency reserve. In Germany, nonetheless, its use for animal fattening increased secretly, while China banned it already in 2015. Because of multiple antibiotic resistance, even young people die in hospitals, and we are re-approaching conditions of the pre-penicillin era.

Residents in areas with a lot of agricultural industry are therefore trying to avoid treatment in local clinics because of the increased antibiotic resistance there.

Increase in extreme nitrogen pollution in agricultural industrial areas: even in the "ideal world of the Chiemgau" (Traunstein and Rosenheim districts), agricultural land with >100 kg nitrogen/hectare adds to the regions with the highest nitrogen surplus in Germany.

The government deliberately accepts fines to the EU resulting from deliberate non-compliance with common EU agreements. Only the application to the European Court of Justice for a "determination of coercive detention against officials of convicted federal states" seems to have prompted Bavaria to consider changes.

Organic cattle also produce only 10–15% less climate-damaging emissions; mainly in the form of methane (greenhouse effect of methane is 25 times stronger than CO_2).

Every day, rainforest the size of 50,000 football fields is cleared, supported by the increasing demand for animal feed for the agricultural industry and for the cultivation of oil palms for the production of palm oil and palm kernel oil (in addition to use as biofuel in the EU mainly for the production of fast food and ready meals; the high proportion of saturated fatty acids in palm and palm kernel oil of 50–80% leads to an increase in LDL cholesterol, among other things).

Against this background, an early quote of Albert Einstein becomes more and more relevant: "*Nothing will increase the chance to survive on Earth as much as the step towards vegetarian diet.*"

Who is not yet so far in its realization, and whose joy of life still depends on the "meat desire," helps himself and the environment in a first step to orient himself more towards our traditional nourishing way, that limited meat consumption in the form of a "Sunday roast" that is appreciated and celebrated with "good meat" as something special (quantity corresponds approximately to the recommendations of *the EAT-Lancet* Commission 2019: <280 g meat/week, with no processed meat).

6 Can Prompts or Recommendations Motivate People to Eat Less Meat?

"Contribute with less meat consumptionto the fact that in the Amazon region less primeval forests have to be cleared and our local drinking watersupply is not endangered by a higher slurry load!" or "f you are between 50 and 65 years old, enjoying plentiful animal protein, you increase your mortality riskby around 75% and your cancer riskeven four times as well as a high probability for the riskof dementia at age!"

The first recommendation is very unlikely to achieve much, while the second recommendation bases on a personal relationship to one's own self and has therefore a higher chance of influencing one's personal diet. In some age groups, however, it can be counterproductive to point out health benefits, since many people do not consider food advertized as particularly healthy to be tasty and attractive. It is therefore better to whet your appetite with messages of pleasure, for example, in combination with deliciously prepared or baked vegetables, or with the Mediterranean cuisine, which is ideal from a nutritional point of view, and which many be associated with positive memories of the Mediterranean (Fig. 2).

Fig. 2 Buffet with Mediterranean crete diet

7 Movement/Physical Activity

The actual data of the National Health Interview Surveys (1997–2008) with 88,140 participants successfully showed, individuals, who reported 150–299 min leisure time physical activity (e.g., brisk walking, dancing, and gardening) per week, had 31% lower risk of all-cause mortality. 1 min of vigorous-intensity (e.g., running, faster cycling, and competitive sports) is calculated as 2 min of moderate intensity physical activity [13]. This study only stands representative of countless others, who have undoubtedly proven the ultimate benefit of regular physical activity as the best preventive measure. In many cases, endurance activity is one of the most sustainable therapies for non-communicable diseases such as coronary heart disease, stroke, diabetes, and cancer.

For those who want to use this insight for themselves: the recommendation with the greatest return on investment (ROI): at least 15–30 min more intensive endurance activity daily with a moderate and more intensive pulse rise at the end.

Despite all recommendations, the "sedentariness" has increased permanently in recent years due to increased use of modern media; currently it is 7.5 h/day. The risk is similar to smoking. In order to better anchor the explosive nature of this fact in our memory, a somewhat more drastic slogan sometimes helps: "Sitzfleisch ist Gammelfleisch" (sitting meat is rotten meat).

8 What is Most Important for Life and Health?

Movement–Movement–Movement, according to Leonardo da Vinci. The chance of actually performing physical activity on a daily basis is more likely when coupled

with other everyday necessities, such as getting to work or climbing stairs instead of an elevator. In recent years, several studies displayed the health advantage when using public transport compared to journeys with an individual car.

A growing number of studies show that commuters using a bicycle live longer and have fewer cardiovascular diseases than commuters using their own motor vehicles have. Two long-term studies from Copenhagen and Shanghai proved that the annual mortality of bicycle drivers was 30% lower compared to those commuters who were not physically active on their own [3, 10].

A meta-analysis of seven studies published in early 2019 shows that the use of public transport leads to a lower BMI compared to driving one's own car [9].

The Copenhagen Heart Study (with 5000 inhabitants, 18 years) showed a positive increase of 5.1 years of life expectancy compared to couch potatoes for a daily more intensive use of the bicycle of 20–30 min. The following cost–benefit calculation as a motivational aid: with a daily investment of 20–30 min (= 1–2% of the time of day), men can improve their life expectancy by 5.1 years; with an average life expectancy of 78 years, this means a gain of 6.5%. Such a return on investment (ROI) can hardly be achieved with any medical measure [10].

9 What Practical Political Demands, Among Other Things, Should Result from These Studies?

School and kindergarten meals should play a pioneering role in healthy nutrition. It is easy to understand that none of the recommendations for a healthy diet can be implemented that way.

Consequently, there is a need for policy action in the field of education and training, higher taxation of sugar, meat, and dairy products, and among other things, new attractive, vegetable-based food plans for school and canteen meals, and thus support for regional food production.

The benefits for the health of the individual and for climate development at the same time, make it all the more urgent to expand local and long-distance public transport and to make it more attractive, thereby making bans on private transport superfluous.

Varied beautiful landscapes, especially in connection with water in various forms, represent an important health resource in the sense of health-promoting landscapes. Exercise in such an environment can be an important preventive and balancing measure to protect against overstrain and burnout out and even antidepressive therapy. Therefore, it must be an important task for politics to allow sensitive access to these landscapes, but at the same time to protect them from destruction because of indifference or economic interests in the area of tourism and agriculture.

As a call for action to involve journalists as partners as often as possible, the following example of a rather conservative regional daily newspaper should serve as a motivational precedent. The lecture by a committed regional entrepreneur with

frightening pictures of Climate Change in the Alps has concerned the head of the publishing house of a group of local newspapers and sensitized him for the urgent need for action. As a result, very well illustrated information on the subject of the sustainability and Climate Change was published over the period of one month in the newspapers of this particular region in upper Bavaria. The series is entitled, "If all people were living as we do in Germany, we need three Earths."

10 Recommendations for Action

Understand meat as a luxury and not basic food, and if consumed, enjoying it consciously in high quality in the future. No processed meat, like sausage or the like.

Mediterranean cuisine with products that are as natural as possible, non-processed: a lot of vegetables, legumes, fruit, nuts, whole grain products, olive oil. Retaining with meat, dairy products, and sugar.

Powering up the circulation system for least 15 min/day with endurance activity by involving as many muscle groups as possible, increasing the pulse frequency accordingly, also going towards the limits (Regardless whether dancing, mountain, climbing, cycling, jogging, cross-country skiing, swimming, or the like …).

Whenever you get into a car, consider that there might be a viable alternative.

Discover the staircase as the best training tool and ultimate alternative to the elevator (saves little power, but could motivate companies to develop power savings for the standby function).

As physicians, we should feel obliged to use the trust placed in us to inform and motivate our patients in an optimal and well-founded way to become equally active for their own health and thus make a significant contribution to environmental protection and climate preservation through their individual lifestyle. Among all professional groups, physicians still have the greatest trust among the population and the best prerequisites for shaping this transformative step towards more committed climate and environmental protection.

An important step in this direction is taken by the newly founded German Alliance for Climate Protection and Health (KLUG) in Berlin, an association of actors from various health sectors.

11 Practical Implementation

Before a lifestyle change or a change or transformation, one should recall three important factors for sustainable success.

Transmission of easily understandable and convincing knowledge, the art to inspire oneself or others for the respective goal, practical guidance and practice over a longer period.

In cardiology, in particular, physical endurance activity and a conscious diet have a more lasting effect on life expectancy than stent implantation and bypass surgery. As part of the WHO project *Health Promoting Hospitals,* we developed in 1995, a one–two weeks Heart Life Style Training for motivated heart patients, in order to make possible more medical interventions superfluous, based on the Ottawa Charter. Since then, this training is carried out several times a year on Crete and on Lake Chiemsee in connection with the Kardioforum Bayern. Flanking heart seminar weeks with an intensive program consisting of varied lectures, Mediterranean cooking courses, relaxation programs, and intensive physical training, partly also in the form of a cardio trekking with a 1 week mountain hike from Lake Chiemsee to Lake Königssee and from Lake Chiemsee across the Alps to Italy. To integrate the mediated lifestyle changes successfully into everyday life, the participation of the spouse is very desirable.

The six pillars of a healthy body and environment:

1. **sound knowledge about body and soul**
2. **physical activity daily for 20–30 min**
3. **eating preferentially vegetable and fruits, but less meat, carbohydrates**
4. **cultivate humor and a meaningful lifestyle**
5. **appreciate social ties, trust, and social engagement**
6. **experience nature consciously**.

Due to the holistic approach of this program [7], the lifestyle of most of the more than 1000 participants had been influenced sustainably. The goal of both the "Herzwochen" on Crete and in the abbey of Frauenchiemsee and the "Kardio-Trekking" is to inspire and enable participants to become active for their own health and to take responsibility for the "health" of their own social and natural environment.

As an introduction to this program, the Munich Physician Patient Forum takes place annually since 1991, together with leading cardiologists from the Munich Heart Centers at the Hotel Bayerischer Hof and the Old Town Hall in Munich. In this context, it is also important to sensitize speakers from the more conservative field of interventional medicine to the connection between health and the environment.

The two major American heart companies, American College at Cardiology (ACC) and the American Heart Association (AHA) have initiated the publication of their new guidelines on the primary prevention of cardiovascular diseases. Today, we are talking about the fact that we can prevent 80% of all cardiovascular diseases by adapting the lifestyle (John J. Warner, Past President of the American Heart Association). The 6-Säulen-Programm of the Bavarian and Crete Heartweeks in cooperation with the Kardioforum Bayern, which has been successfully implemented for several years, complies with these new guidelines.

12 The Power of the Small Steps

> The problem braiding arose by the assignment of each individual can/must within the scope of its possibilities to solve the whole [11].

To a similar extent as human health and life expectancy can be influenced by prevention, it is also possible to influence the "health" of our planet, in large as in small, by using the power of many small steps in addition to great efforts and actions.

The effect of these small steps is so significant because the health of our planet on a large scale and the health of our surrounding landscape on a small scale is closely linked to our health.

A natural, and therefore, usually healthy landscape is a very important resource for our own health. We use the landscape as a space and motivation booster for movement, encounter, and regeneration.

Particularly in combination with water in the form of streams, rivers, lakes, and the sea, landscape stabilizes our mental balance to a special degree, and in combination with exercise, has a comparable effect to an antidepressant. Landscape thus becomes a health-promoting landscape. The awareness for this meaning is not yet very pronounced and usually only develops after it has been impaired and destroyed.

In order to strengthen the awareness for health-promoting landscapes and to create not insurmountable resistance against the necessary protective measures, a path of small steps on different levels is usually the most successful. Good ideas for the practical implementation of these small steps are most likely to emerge during one's own physical activity in such a health-promoting landscape.

However, prevention will always cause conflicts of interests. The effort to achieve this will therefore remain one of the greatest challenges, both globally and personally.

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