

“Food the forgotten medicine; how can clinicians and patients maximise its potential benefits?”

We are reaching a critical point, where obesity levels and the prevalence of conditions such as Diabetes Mellitus Type 2 (DMT2) are soaring ⁽¹⁾. Yet, mixed messages about what we “should” and “should not” eat are relentlessly being exploited by the media, and unhealthy foods are more accessible than ever ⁽²⁾. Approximately 62% of the UK population are defined as overweight, with almost 25% of those being clinically obese ⁽¹⁾. In addition our children are suffering too, 19% of 10-11 year old are obese and a further 14% are overweight ⁽¹⁾. This is the legacy we are leaving for the next generation. Therefore, we, as healthcare professionals, have the responsibility to make the change, educate our patients and their families into changing their attitudes to food and ultimately taking responsibility for their own health ⁽³⁾. However, the real question is how can we make people listen and take action?

It could be argued that the Western world is becoming an overindulgent society where eating is no longer purely to fuel our bodies ⁽⁴⁾. Consequently, we are no longer noticing or even understanding what exactly we are putting into our bodies. Nowadays, the relationship people have with food is often unhealthy and food has become the focus of society, but not always in a positive way ⁽⁵⁾. Instead, perhaps our entire approach to food should be altered, and eating should centre around nourishing and protecting our bodies.

On the other hand, there is a socioeconomic gradient where those at the lowest end of the spectrum relying on energy-dense, nutrient poor food as the easiest and cheapest way to meet the recommended daily calorie intake ⁽⁶⁾. For this reason, the highest rates of both obesity and DMT2 are seen in the most deprived areas, but often with equally low levels of education ⁽⁶⁾. A similar picture can be seen for healthy life years; Males living in the least deprived areas of Wales can expect to have good health for 21 more years than in the most deprived, women

can expect 16 healthy years longer ⁽⁷⁾. Hence, we could ask ourselves, is education the key to improving socioeconomic issues regarding healthy eating?

Early on in medical school, we followed the journey of an oncology patient; I was assigned to an inspirational lady with metastatic cancer. She had been diagnosed five years previously and given months to live, yet she was still here and living life to the full. She believed that alongside the chemotherapy, she owed her health to what she put in her body. She had always put a lot of emphasis on natural ingredients and home-cooked food, and this was only heightened after her diagnosis. There is an abundance of research into diet as a risk factor for cancer, however role of nutrition in terminally ill patients is less understood, but it does make one question its significance. Despite there being a clear association between malnutrition and reduced quality of life and survival, all too often it is attributed to the natural progression of the disease rather than trialling early nutritional support techniques ^(8,9).

The magnitude of studies performed to attempt to demonstrate links between diet and a whole host of diseases is daunting. Cancer is a huge focus of this research because diet is one of the most modifiable risk factors. Hence, it has been estimated that up to 35% of cancers are associated to some extent with dietary factors ⁽¹⁰⁾. There is general agreement that a "healthy diet" consists of fruit, vegetables, whole grains, fish, nuts and 'good' fats, whilst alcohol, processed meat, saturated fat, refined flour and sugars should be limited or avoided ⁽¹⁰⁾. This is often referred to as the Mediterranean diet, with studies showing a 10% reduced overall cancer mortality ⁽¹¹⁾. For each specific cancer, the World Cancer Research Fund and American Institute for Cancer Research have produced a list of best-established associations between dietary factors and cancer mortality rates ⁽¹⁰⁾. However, due to the long latency period for cancer development and complex pathogenesis, isolating specific foods is always going to prove a challenge ⁽¹⁰⁾.

Further studies expand on the role of dietary patterns on non-transmissible chronic diseases (NTCDs). It is widely acknowledged that DM2 can be reversed

by diet alone ⁽¹²⁾. However, the role of calorie restriction (CR) in other conditions is beginning to show promising results in a variety of species, even suggesting an increase in life expectancy ⁽¹³⁾. In humans, specifically overweight individuals, preliminary studies appear to support CR with regards to enhancing mitochondrial function, improving insulin sensitivity and reduce various cardiovascular risk factors ⁽¹⁴⁾. For example, a liquid based intermittent fasting (IF) CF regimen has been shown to modulate visceral fat mass and pro-atherogenic adipokines resulting in a protective effect against coronary heart disease ⁽¹⁵⁾. Two mechanisms in particular, the reduction of oxidative damage and increased cellular stress resistance have been found to promote the beneficial effects of IF and CR ⁽¹⁶⁾. Interestingly, these effects have shared mechanisms with regular physical exercise ⁽¹⁶⁾. Similarly, there is a consistent link with reductions in inflammation and oxidative stress showing favourable effects on the cardiovascular system, such as attenuation of atherogenesis within the vasculature and preservation of left ventricular function ⁽¹⁷⁾. Therefore, CR and its protective role in obesity, DM2, cancer and other diseases, may be the key to extending not only life expectancy, but healthy life years ⁽¹⁷⁾. However, the limiting factor is that most individuals struggle to maintain long-term restriction, so research has focused on alternative techniques such as intermittent fasting (i.e. the 5:2 diet) ⁽¹⁴⁾.

Another relatively new area is Nutrigenomics, the term created when scientists started to question how the fundamental molecular processes are affected by food, and thus the positive or negative impact on the health of an individual ⁽¹⁸⁾. Examples include modulating the chronic process of inflammation in obesity by anti-inflammatory bioactives such as caffeic acid, tyrosol and lycopene ⁽¹⁹⁾. Or minerals such as Selenium, Prostacyclins and Zinc acting as protectors against cancer development ⁽¹⁹⁾. The idea would be to create and thus, prescribe customised diets according to the individual's genotype ⁽¹⁹⁾. This is particularly relevant in the area of NTCs, as it would be possible to alleviate the symptoms of existing diseases or prevent future illness ⁽¹⁹⁾.

The best-seller Ella Woodward's story highlights how diet can sometimes succeed where medicine cannot ⁽²⁰⁾. Previously, a self-confessed sugar and processed food addict, until the development of Postural Tachycardia Syndrome forced her to be bed-bound due to chronic pain ⁽²⁰⁾. It is a rare condition with limited management options and no licensed pharmacological treatment ⁽²¹⁾. Overnight she adopted a plant-based, whole foods diet and within months started to feel revitalised, ultimately giving her, her life back ⁽²⁰⁾. There is no current evidence that diet has any role in treating this illness, however it opens our eyes to the power of food and healing properties, if not physically but perhaps on a psychological level it can have a massive impact. Furthermore, dietary patterns have also been found to be key in functional disorders. Irritable bowel syndrome, the most common functional gastrointestinal disorder, estimated to affect more than 10% of the population globally, now has a sufficiently strong treatment evidence base in the form of the FODMAP diet ^(22, 23). Level II evidence demonstrates benefit in 75% of patients on this diet, supporting the need for widespread application ^(23, 24).

In addition, there is now growing evidence into the use of natural ingredients playing a role in numerous chronic conditions including autoimmune, cardiovascular and neurological disorders ⁽²⁵⁾. For example, Curcumin, the active component of Turmeric, described in Chinese medicine for years, now shows promise in modern science due to its potential to modulate several important molecular targets ⁽²⁶⁾. Clearly, there will be limitations, as issues such as poor bioavailability are inevitable in natural elements, however it does pose the question of whether the focus should be shifted onto personalised diets specific to one's genotype and/or underlying conditions ⁽²⁵⁾.

"Let food be thy medicine and medicine be thy food" shows the link between food and health since antiquity ⁽²⁷⁾. It was not necessarily implying that food was medicine ⁽²⁷⁾. Instead, that they work to complement each other, and perhaps that diet may contribute towards the basis of managing our modern-day conditions ⁽²⁷⁾. In addition, there is a significant evidence base that a diet rich in the typical "healthy foods" is related to better psychological well-being, which in

return leads to reduced levels of anxiety, stress and potential mental health issues ⁽²⁸⁾. Hence, it our job as healthcare professionals to encourage good food choices and ultimately change current ways of thinking and attitudes towards food. This links back to education; So perhaps the answer is to demonstrate the positive and negative effects of food on the body in both health and disease within schools. Hence, giving the next generation the tools they need to confidently embrace the right food options and succeed in tackling the growing obesity crisis and modern-day diseases.

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