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Volume 2, Number 3, March 2011

Journal of the World Public Health Nutrition Association
Published monthly at www.wphna.org

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Editorial **Small is ecological**



Small is Beautiful is the title of a book first published almost 40 years ago. It encouraged the environmental movement, and the 'organic' farming movement, worldwide. 'When it comes to the question of size, there is no *single* answer', wisely said the author, EF (Fritz) Schumacher (1). Curiously though, he made no reference

Cite as: Anon. Small is ecological. [Editorial]
World Nutrition March 2011, 2, 3, 101-107

to what might be considered the most fundamental issue of all: the size of humans. Take the photograph above, of the meeting in 2009 between the US and the UK heads of state, and their consorts. The two couples seem to be almost as if of different species. Which is the right size? Indeed, there is no single answer. But in general, the question is important and urgent, and there are some answers. In this issue of *WN*, we publish a commentary by the retired systems engineer Thomas Samaras (2). After over 35 years of research on the topic, he challenges a view on human size that almost everybody now may well feel is practically self-evident. He proposes that it is usually better to be small, and in particular to be short relative to current average heights in higher-income countries (3).

Some readers may feel exasperated, at space being given to ‘an amateur’ whose opinions, if taken seriously, could impede current programmes meant to reduce child malnutrition. Size is indeed a serious issue, and Thomas Samaras’s views are currently most unusual. But in some respects he is clearly correct, and in others evidently at least partly correct. Nor does he claim that shorter people are better off in every way. Thus, in materially rich countries now, sexual, social and professional success is highly correlated with tallness. In general, any overall judgement about human size depends on what criteria are considered to be most important. Is the biggest issue biological, or is it social, or occupational, or environmental? Should we be most concerned for humans who are alive now, and who are about to be born, or should we look some generations ahead?

The orthodox consensus

Certainly, the settled consensus of epidemiologists and nutritionists is that it is better to be tall, and better not to be small. A leading proponent of this consensus is George Davey Smith of the Department of Social Medicine at the University of Bristol. Referring to the literature on height and mortality, he says: ‘In developed countries, taller people have lower all-cause mortality rates and live longer’. (4) Association founder member Reynaldo Martorell of the Department of Global Nutrition at Emory University is a leading authority on childhood growth in low-income settings. He is a champion of the obverse consensus view. Of the heterodox ‘small but healthy’ theory proposed in the 1980s (5,6), he says: ‘Adults in developing countries have small body sizes largely as a result of poor diets and infection during childhood. Therefore, to acclaim small body size as a desirable attribute for populations is also to affirm that its causes are desirable... Growth retardation, rather than an innocuous response to environmental stimuli, is a warning sign of increased risk of morbidity and mortality... Small is not healthy’. (7)

So that might seem to be that. However, these careful evidence-based statements are about relative freedom from disease, and length of life, of populations now. These important issues are not the only ones that should concern us. Furthermore, the statements need examination, and can be reconstructed.

Thus, what George Davey Smith can be seen as saying, is that in societies where being tall is prized, where pediatric services emphasise the vital importance of growth throughout childhood, where children's diets are usually high in growth-promoting and energy-dense foods, and where everybody knows that taller people are more likely to succeed, tallness is strongly associated with less disease and longer life. But is tallness *of itself* healthy? It is surely impossible to disentangle all the confounding factors. And what are the biological mechanisms?

Reynaldo Martorell's view also may seem to be unchallengeable from a public health point of view. But shortness in children, particularly in impoverished settings, is established as a reliable *marker* of deficient nutrition of the mother when pregnant, or of her child, or also of infection or infestation, or of combinations of or all of these factors. Shortness, including when defined by the loaded word 'stunting', is not *of itself* pathological. Rather, it is a reliable sign of pathological conditions.

It might be said that even if this is not the same thing, it amounts to the same thing. But it doesn't. When shortness of itself is seen as pathological, and children whose diets have been frugal are then fed energy-dense diets in order to 'catch up', they tend to grow sideways rather than upwards – they stay relatively short but become fat. Stockbreeders have underfed and then overfed animals to accelerate fat deposition certainly since the time of Aristotle. In effect, the same process makes humans fat, as has been accepted for nearly 20 years (8,9).

Occupational health, welfare and prowess

So the story on tallness is not as straightforward as it might seem. These days most professionals have rather a narrow focus, on biology and the medical model. Views of health used to be wider and included fitness for purpose and well-being. Thus here follow some minutes of a meeting of the sub-committee of the Advisory Committee on Nutrition of the British Ministries of Health, held in April 1936 (10). Present were John Buchan, a medical officer of health; Edward Cathcart of Glasgow University, author of *The Physiology of Protein Metabolism*; Edward Mellanby, Secretary of the Medical Research Council; and HE Magee of the Ministry of Health.

- Buchan* Is there any greater value in height or weight? I cannot see any great advantage in it.
- Cathcart* Industrially, height is a drawback.
- Magee* Would you agree that, as you know that food has to do with the physique of the individual, we should feed people in accordance with the employment you think they should take part in?
- Buchan* ... If we want to feed people for good health or perfect health, the question of making them two or three inches taller does not to my mind necessarily arise.

Mellanby ... It is a good thing to be taller and stronger.... Quite apart from that, I would much rather see a fine Colonial person walking along the streets than the average person walking along our streets.

As Edward Mellanby's remark indicates, what is now called 'stunting' combined with general debility was a public health problem in Britain in the 1930s, and all the more so as the Second World War loomed. Is his advocacy of what he might have called 'fine figures of men' and 'strapping women' relevant to the profession of nutrition? Surely yes it is. There again, Edward Cathcart made his contrary point at a time when there were over a million coal miners in Britain. Boys bred to be tall men would be much less able to work and earn a living, when crouched in deep pits. The same point applies to men and women in peasant communities who work with their hands. People who we may see as short, and maybe stumpy, physically close to the ground, are better able to bend to sow and tend their fields, and thus feed their families.

It can be smart to be small, and plenty of smart people are short. Mortality of short foot soldiers is lower: there is less of them to hit, and their heads are more likely to be hidden below parapets or other concealments. Size was also a factor in the military outcome of the Vietnam Wars. Foreign commanders and troops were unable to understand how small 'gook' soldiers, who they 'looked down on', could defeat them. As a relevant aside, the former president of the Vietnamese nutrition society Tu Giay, who died recently aged 88, made a crucial contribution to the Viet Cong military victories. He was commissioned by General Vo Nguyen Giap, whose height in middle age was 1.52 metres (5 foot) (11), who stood on a crate to address his troops, and who is now in his 100th year, to compile a 'little green book' to be carried by all Viet Cong troops. This showed them how to live off the land, cook without smoke, and thus to survive in tunnels impenetrable by foreign troops.

It is becoming apparent that the judgements summarised by George Davey Smith and Reynaldo Martorell mostly apply only to the health and welfare of current urban sedentary populations. Also, the question 'Which is best, to be tall or short?' is only partly answered by judgements based on relative risk of disease or on longevity.

So indeed, when it comes to issues of size, there is no single answer. If one aspect of nutrition is or should be occupational health, welfare, and safety, and indeed the ability to do specific types of work, then the story is mixed. Tall people are now generally at an advantage as politicians, Vladimir Putin, Silvio Berlusconi and Nicholas Sarkozy notwithstanding, simply because in these days people 'look up to' tall people. The same applies to executives. For most ordinary sedentary occupations, there is nothing in it one way or the other, aside from prejudice in favour of being tall. Perhaps this is why nutritionists and epidemiologists, usually being sedentary themselves, now overlook nutrition and occupational fitness and health .

There are various occupations and vocations in which being tall is an advantage, and some sports require tallness or bigness. But as well as miners and peasants, jockeys, racing drivers, dancers, rock climbers, gymnasts, and endurance athletes, are usually or even necessarily short and light. The greatest contiguous empire ever, was created in what Europeans call the mediaeval age, by hordes of warriors from Mongolia who rode horses the size of ponies, conquered most of Asia, and destroyed the armies of eastern and central Europe. Mongols were described by Matthew Paris at the time as 'short in stature and thickset, compact in their bodies and of great strength; invincible in battle, indefatigable in labour... owing to the shortness of their legs, they mount [their horses] by three steps instead of stirrups' (12).

In modern times, some of the most ferocious, tireless and decorated foot-soldiers in British armies have been Nepalese Gurkhas, who average around 1.62.5 metres (5 foot 4). Of the strength and endurance of their civilian counterparts, the nutrition scientist John Waterlow has observed: 'The porters of Nepal are able to carry loads up to their body weights up 1000 metres in a day, something that none of us here could do' (13). Furthermore, the 1985 UN report on human energy and protein requirements made a couple of observations which, from an orthodox point of view, are paradoxical: 'Cardiorespiratory function, physical performance, and muscular strength were found to be significantly better in stunted Tunisian children... than in children from affluent families, whose growth was closer to that of the standard in developed countries. Similarly, Italian children from poor families performed better in physical fitness tests than their counterparts from more prosperous families, in spite of their smaller size and lower habitual energy intakes' (14).

One obvious response to this information, is that the days of the Mongol empire are done, as are those of miners hacking at coal faces, the Vietnam war is over, the Gurkhas are pensioned off, children don't have to be strong these days, and the trades and vocations mentioned are specialist. But even if so, this is no matter. The point made here, is that general judgements about the relative merits of being tall or short depend on what is being judged, when, why, where and what for.

Also, one big issue remains with us now. Should we favour public health policies that make rural populations most of all in Asia, taller and also bigger, when such physique makes it difficult for them to work by hand with the earth on their land? A planet with a total population of say 9 billion, of which say 6 billion live in cities, of which 3 billion survive in slums and shanty-towns, and in which most agriculture depends on machines, seems to be where we will be, in the lifetime of some readers. But if we as professionals accelerate this trend, by collectively devoting our efforts towards policies meant to protect against disease and also prolong life, in an overpopulated planet, while in effect being part of the process that drives subsistence farmers off their land into slums, will we have done well? The answer has to be no.

Helping to save the planet

If our attention turns from the health and lifespan of people now, to the welfare and survival of the biosphere, the planet, and the living world including the human species in future, the verdict on human size is unequivocal. Here is John Waterlow again. 'If everyone were to achieve the height now common in industrialized countries, this height explosion almost be almost as disastrous as the population explosion, carrying with it the need not only for more food, but for more clothing, more space, more natural resources of all kinds' (13).

At the recent Porto conference on public health nutrition, the point was put positively. If relative to current averages, a 5 per cent shorter and 10 per cent lighter human race turned over say 10 per cent less energy, the world's cattle population could drop by something like 150 million and the world's yearly burger consumption by maybe 100 billion, emissions of greenhouse gas would drop by 2-5 per cent, and every year 350 million fewer barrels of oil could be needed, and 100 kilometres /cubed of water could be saved. John Waterlow concludes: 'We will have to accept that future generations will be smaller, leaner, and perhaps slower....The declaration in the UN Convention on Human Rights that all people have a *right* to fulfill their genetic potential, does not seem realistic if the race is to survive'.

Thomas Samaras's commentary touches on a great number of issues of concern to our profession. Given his epic vision, nobody could back every aspect and opinion with impregnable evidence. He is swimming against a tide that he hopes will turn. On the environmental issue, fundamental to our survival and our place in the world, he must be right. The best chance for the human species includes a varied while what we would call frugal diet for the mother after conception, extended exclusive breastfeeding, steady while slow growth, relatively late sexual maturity, and relatively low attained adult height and also body mass. Our duty is to tread lighter on the planet. This duty begins with those whose life's trajectory we can affect. It is too late for us, but we should also be thinking of the generations not yet born.

Michelle Obama has turned over some of the White House land to growing food, and that's great. The British royal family is notorious for their overuse of gas-guzzling transportation, and that's bad. But on the matter of human height, Queen Elizabeth and Prince Philip are not stunted. They are small and healthy.

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The editors

Acknowledgement and request

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World Nutrition March 2011, **2**, 3, 101-107