

Obesity, undernourishment and malnutrition: contrasts between regions at extremes of development

The geography of health is of growing significance in a world of such vast developmental contrasts. Nutrition is a fundamental factor underlying many health issues – not least in affecting our susceptibility to illness and capacity for recovery. This **Geofile** examines the stark contrasts between nutrition issues at extremes of development – the USA and sub-Saharan Africa.

Figure 1: Defining overweight and obesity

The labels 'overweight' and 'obesity' are used synonymously to indicate a range of weight greater than what is generally considered healthy for a particular height. For adults, overweight and obesity ranges are determined by using both weight and height to calculate a number called the 'body mass index' (BMI). Arguably a crude measure, BMI is used because it is easily calculated and for most people correlates with their amount of body fat.

- An adult who has a BMI between 25 and 29.9 is considered overweight.
- An adult who has a BMI of 30 or higher is considered obese.

For children, BMI ranges are modified to take into account biological differences between boys and girls.

Critics of the BMI note that whilst it is strongly associated with body fat, it does not directly measure body fat. Consequently, athletes for example, who have a high weight of muscle tissue, may be considered overweight using BMI, even though they do not have excess body fat. Other techniques of estimating body fat include physical body measurements, such as waist circumference, or the use of new technologies such as magnetic resource imaging.

A national epidemic: obesity in the USA

In the United States, one in three adults and one in seven children is now obese (Figure 1); this represents a doubling since 1980. In the last 20 years, the home of Coca-Cola and MacDonald's has gained the dubious accolade of being the 'fattest nation on the planet'.

Obesity data presents interesting geographical patterns. In 2007, only one state had an obesity rate of less than 20%; whilst a southern trio of states – Alabama, Mississippi and Tennessee – had a prevalence equal to or greater than 30%. State-wide socio-economic differences, including racial and ethnic composition and urban/rural population size, have been suggested as possible explanatory factors.

In particular, overweight and obesity represent growing and serious health risks for children. Around one in five Americans aged 6–19 years are overweight; this represents an approximate increase of around 12% in the last 30 years.

Nevertheless, not until recently has the collective American consciousness resulted in any direct state involvement. The Healthy People 2010 national health initiative aims to reduce the rate of overweight and obesity to less than 15% among adults and to less than 5% amongst children.

Economic cost of obesity

A study of national medical expenses attributed to both overweight and obesity stated that the costs accounted for 9.1% of total US medical expenditure in 1998, amounting to \$92.6 bn in 2002. Approximately half of these costs were paid for by the state-funded **Medicaid** and **Medicare**. There is a divide in state-wide expenditure on obesity, ranging from \$87 million (Wyoming) to \$7.7 bn (California). However, whilst there is a loose association with level of economic development, the patterns

are more closely associated with population density.

Contributing factors

A variety of factors interplay to contribute to obesity: behaviour, environment, culture, socio-economic status and genetic issues may all have an effect in causing people to be obese. Whilst an individual factor may increase the risk of personal weight gain, ultimately overweight and obesity are the results of eating too many **calories** and not getting sufficient physical activity.

Tackling obesity in the USA, as throughout highly developed societies in the North, is a complex problem, as the interplay of all these factors is unique to an individual. Nevertheless, responses to obesity have focused on changing an individual's behaviour and their immediate environment.

Behaviour focuses simply on eating and exercise. Eating too much, in marked contrast to the key nutritional concerns of the South, results in an excessive energy intake. Large portion sizes for food and beverages, eating meals away from home, frequent snacking on energy-dense foods and consuming beverages with added sugar are often hypothesised as contributing to the excess energy intake of both children and teenagers that leads to obesity. Decreased levels of physical activity have been recorded, in particular amongst children of school age. This is associated with the increase in sedentary behaviour: advances in technology, including high levels of ownership of TVs, DVDs and game/entertainment systems have all increased the amounts of time spent at home in non-active behaviour.

Environmental considerations are of particular interest to geographers. In common with other geographical 'hazards', there is a strong causal association between the risk of obesity and the place or location in which someone may find themselves. People make health-related decisions in part

Figure 2: Tackling obesity

Moses Lake, situated within the state of Washington, is typical of 'small town America'. Nearly 60% of adults in Washington State are overweight or obese, and like other communities across the USA, changing behaviour patterns and the local environment is central to tackling the obesity epidemic.

Healthy Communities Moses Lake represents a series of 'interventions' to encourage good nutrition and physical activity. An action plan was adopted by the county (local government and policy changes implemented. Physical activity was encouraged by improved access to community facilities, such as by developing new dedicated cycle paths and walking trails. Where possible, these exploited existing resources, such as 'trails' alongside irrigation canals or disused rail lines, to create interconnected and safe corridors of travel.

In close partnership with local residents, youth and school groups, a community garden project has also been established to provide participants who work in the garden, with improved access to fresh and healthy produce.

To encourage good nutrition from birth, the Moses Lake Breastfeeding Coalition promotes the health benefits of breast-feeding, and works with local businesses to support it in the workplace.

as a result of their local surroundings – whether at home, within the workplace or the wider community. For example, access to recreational spaces or a 'healthy' diet will vary across an urban area, whether in an office, classroom or kitchen at home. As a result of this influence, it is important to create environments (Figure 2) that break this link and provide 'spaces' where it is easier to exercise in physical activity and eat a balanced and healthy diet.

Genes also are a contributing factor in causing obesity, but their role should not be overstated. Simply put, the genetic make-up of the population does not change rapidly – we are, in essence, much the same 'population' as a generation ago. Therefore in order to explain the dramatic increases in

obesity, particularly in MEDCs, there must be significant changes in other, non-genetic factors.

Other factors, such as diseases and drugs, also have relevance. Some illnesses, for example, Cushing's disease, may lead to obesity, and the side-effects of some antidepressants, **corticosteroids** and oral contraceptives may also include weight gain. However, in a majority of cases the effects are only temporary, and may be countered by alternative medications or advice from the relevant medical professionals.

Health, economic and psychosocial consequences

The health consequences of overweight, and particularly obesity, are often discussed in the context of so-called 'diseases of affluence' associated with over-indulgence and the pressured way of life in **MEDCs**. In short, obesity increases the risk of a large number of debilitating and life-threatening conditions. Whilst 'risk' is sometimes difficult to measure, and varies with age, gender and socio-economic status, it is scientifically proven that the risk of all of the following increases:

- liver and gallbladder disease
- coronary heart disease
- type 2 diabetes
- cancers (endometrial, breast, and colon)
- high blood pressure
- high cholesterol
- stroke
- breathing difficulties such as asthma and sleep disruption.

Such health risks have clear financial implications, both direct and indirect. In short, the cumulative economic cost of obesity is significant.

Direct costs include preventive health care and treatment – for example, healthy eating campaigns or medical care to treat obesity. Drug treatments, for instance, still require patients to follow a calorie-controlled diet and start an exercise plan. For those who are morbidly obese, or who have a risk factor for an obesity-related disease, weight reduction surgery is an additional cost – principally gastric banding, bypass or balloon insertion.

Indirect costs are defined as the value of revenue lost from decreased productivity, restricted activity, absenteeism and so-called bed days.

Mortality costs are the value of future income lost by premature death.

Finally, some obese children and adolescents can be victims of bullying. The psychological stress of social stigmatisation can lead to low self-esteem which, in turn, can hinder academic and social functioning, and persist into adulthood.

Responses

The Nutrition, Physical Activity and Obesity Program (NPAO) is a US government-funded programme to prevent and control obesity and other chronic diseases through healthy eating and physical activity.

NPAO aims to develop strategies to:

- increase physical activity
- increase the consumption of fruits and vegetables
- decrease the consumption of sugar-sweetened beverages
- increase breast-feeding initiation, duration and exclusivity
- reduce the consumption of high energy, dense foods
- decrease television viewing.

It is through this programme that the targets of the Healthy People 2010 national health initiative referred to earlier are hoped to be met. Such targets present a stark contrast to the **undernourishment and malnutrition** faced at the other developmental extreme.

Nutritional misery in sub-Saharan Africa

Undernourishment and the so-called global 'silent emergency' of malnutrition are no better illustrated than throughout sub-Saharan Africa. The number of undernourished of all ages in this region increased from about 90 million in 1970 to 225 million in 2008. An additional 100 million are projected in the next five years. Furthermore, malnutrition is cited as a contributory factor in 4 million sub-Saharan deaths annually – one-third of the global total. Whilst not synonymous, undernourishment and malnutrition tend to be best understood in tandem. In sub-Saharan Africa, every third child is underweight, while up to half are 'stunted' (failing to reach a normal height) and/or 'wasted' (failing to reach their normal weight). The contrasts with the USA could not be greater (Figure 3).

Figure 3: Contrasting images from America and sub-Saharan Africa



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The basic causes of undernourishment and malnutrition are brutally blunt in their origins – poverty, ignorance and prejudice. Poverty, at all scales from household to national, results in a lack of access to the basic necessities of food, healthcare, clean drinking water and sanitation. Ignorance results from inadequate education. Prejudice is prevalent towards women – often the principal farmers and food preparers – not simply in reducing their access to education and economic resources, but in depriving them of the rest and care they need throughout pregnancy and child-rearing.

Well-documented ‘vicious cycles’ of misery interconnect poverty and ill health with underproduction

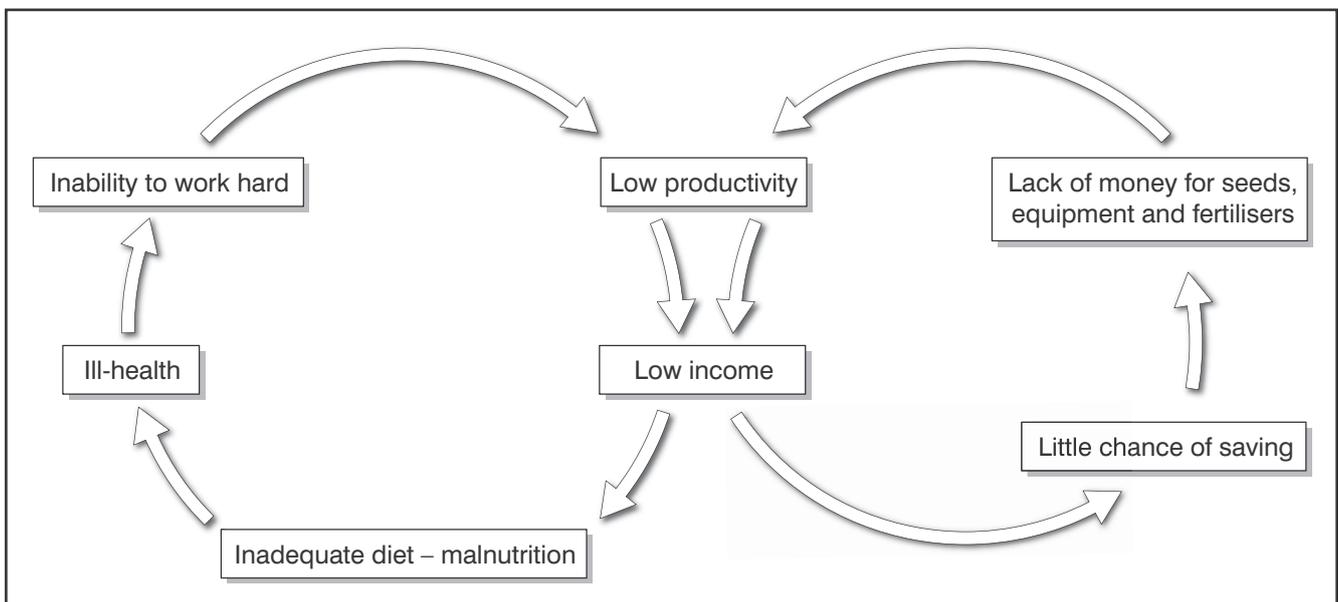
(Figure 4). For example, a balanced diet should comprise around 60% carbohydrate, 20% protein and 20% fat. Sufficient roughage, vitamins and minerals should also be included. But an understanding of dietetics requires education – not least the means to implement the knowledge. Carbohydrates, for example, are common in staple foodstuffs such as sorghum and maize. Such staples are starchy, and in circumstances of rapid population growth may have to be relied upon simply for their bulk rather than nutritional value. Proteins, by contrast, are comparatively scarce. (Only relatively wealthy countries, such as the USA, can produce sufficient meat for widespread human consumption.) Consequently, the

physical weakness and lethargy associated with undernourishment and malnutrition persist – so limiting production. Ill health is further promoted by climatic variables such as heat and high humidity, encouraging the breeding of insects and vermin. Malaria and river blindness are spread by water-borne flies. Polluted water spreads hepatitis and dysentery. Most notably in sub-Saharan Africa, malaria, HIV/AIDS and tuberculosis are particularly prevalent, with the hungry, malnourished and poor hit the hardest. The costs of funerals, healthcare for the sick, and support for orphans, push millions of families deeper into these interconnected cycles of misery. Furthermore, the cycles are generational, in that a malnourished adolescent in poor health tends to grow up and bear malnourished, underweight, physically and intellectually impaired children.

Responses

Such vicious cycles of misery may seem overwhelming in scope, but the issues can and are being addressed where there is a political will at national and international levels. Governments have to understand and then disseminate knowledge of the causes and consequences of undernourishment and malnutrition, as only through the active involvement of families and local communities can the trends be halted and reversed. Established international agencies such as **UNICEF** and the **WHO** play a key role in promoting, funding and

Figure 4: Cycles of misery



managing effective community-based health care and education programmes aiming to, for example, improve healthy child growth and development. Indeed, cost-effective primary healthcare schemes, with educational and practical follow-up components, can be put in place at the grassroots level. This allows communities to take the matter of nutrition into their own hands, monitor their families' growth and determine what they require to meet their children's needs. In Tanzania, for example, such programmes have improved the nutrition of half the country's children – improving national health levels, in marked contrast to other sub-Saharan countries, particularly the poorest in western Africa, the Sahel, and south-eastern Africa.

A key feature of such successful initiatives is community involvement in identifying the specific problems, mobilising action to resolve them, and monitoring and evaluating progress. Furthermore, given the prejudice referred to earlier, special efforts should be made to improve the situation of women as the primary child-carers – with particular attention to their health, nutrition and the promotion of breast-feeding. In addition, infection control measures should be included in all such schemes. Low-cost, yet highly effective training of village volunteers and mothers (who should be regarded as first among front-line health workers) allows efficient surveillance, early diagnosis and simple treatment of common childhood infections – hence, for example, diarrhoea death rates being reduced dramatically through early oral rehydration with a glucose-salt mixture.

Conclusion

The study of the geography of health is one of contrasts; there are few better examples than the study of food production and consumption. Globally, chronic undernourishment affects over 800 million people, whilst 950 million adults are overweight. In **LEDCs** 17% of the population are undernourished, whilst **MEDCs** account for the majority of the 25% of the world's adult population that are overweight and the 10% that are obese. Recent figures from the **FAO** (see Further reading) predict a growing 'food divide' between the wealthiest nations, such as the USA, and the world's poorest in sub-Saharan

Africa. There may be a growing list of superlatives to describe these stark contrasts, but there seems only one answer. Food sustainability, argue the **FAO**, is inextricably linked to global poverty. In the poorest **LEDCs**, agriculture remains the single biggest source of income and employment; yet population pressure is resulting in environmental degradation and periodic famine. Tackling global poverty as a multidimensional problem is, ultimately, the only solution to the world health imbalance.

Glossary

Calories: units of energy supplied by food. The more active you are, the more calories your body needs. By eating less than your body needs, and exercising more, you force your body to use its existing fat stores for energy. By burning excess fat, you lose weight.

Corticosteroids: pharmaceutical steroids used to suppress tissue inflammation and the immune response.

FAO: the UN Food and Agricultural Organisation.

LEDCs (less economically developed countries): the so-called Third World countries of the South.

Malnutrition: a general term for the medical condition caused by an inadequately balanced or partially deficient diet. Malnutrition is widely recognized to compromise immune systems: resulting in higher risks of infection.

MEDCs (more economically developed countries): the rich countries of the North.

Medicaid: a (US) federal health programme for low-income, financially needy people. It was set up by the federal government and is administered differently in each state.

Medicare: a (US) federal health programme, paid for by employment taxes. Only employees and their spouses who have paid into the programme are entitled to make a health claim.

Undernourishment: a measure of hunger referring simply to not having enough food to develop or function normally. In children it can stunt both physical and mental growth and can lead to major health problems.

UNICEF (United Nations Children's Emergency Fund): the UN agency responsible for promoting programmes to aid education, and the health of children and mothers in **LEDCs**.

WHO (World Health Organisation): the UN agency helping governments improve health services and responsible for coordinating international health activities.

Further reading

<http://www.fao.org/>: Food and Agricultural Organisation
<http://www.who.int/en/>: World Health Organisation
<http://www.unicef.org.uk/>: UNICEF
<http://www.cdc.gov/>: Centres for Disease Control and Prevention (USA)

Focus Questions

1. Copy and complete the table to identify the causes of obesity and undernourishment.

	Social	Economic	Environmental
Obesity			
Undernourishment			

2. To what extent is personal choice a factor in contributing to obesity and malnutrition?

3. a) What do you understand by the terms 'food security' and 'food sustainability'?
 b) Explain why these two terms are strongly associated. Discuss with reference to named examples.