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# Socio-economic status, nutrition and health

by

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## Abstract

*Public health research in almost all European countries convincingly shows that socially deprived subgroups of the population experience higher morbidity and mortality rates as compared to their socio-economically more successful counterparts in society.*

*The mechanisms behind this phenomenon are considered to be very complex, poorly understood and potentially fluctuating across cultures.*

*The complexity of the problem is – amongst others – related to the fact that socio-economic status is not a straightforwardly measurable human “trait”, but rather a multi-factorial “condition” which is embedded in a broad tissue of environmental, material and personal characteristics, which mutually interact in a complex way and which often reinforce each other through self-perpetuating trickledown spirals, not only on individual level and on “social layer” level, but also on intergenerational level.*

*One of the factors in that tissue, that undoubtedly plays an important role in the overall picture of health inequalities, is nutrition.*

*In order to understand the potential role of nutrition in health inequalities and to delineate the potential for interventions, one has to try and understand the broad context of the dynamics behind health inequalities, the main driving pathways and the ways in which they potentially interact.*

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*In this paper, some of the main axes from the overall health inequalities framework are outlined and discussed.*

## **Introduction**

In 1946, The World Health Organisation adopted a definition of health, which today is still widely accepted and frequently cited in many contexts. It says: “health is a state of complete physical, mental and social well-being and not merely the absence of disease or infirmity” (1).

This three-dimensional definition of health clearly illustrates a sound change in the way of thinking about health, that has taken place during the 20<sup>th</sup> century and that has definitively abandoned the purely organic view that was so typical for the science of medicine in previous centuries. With this definition, health was no longer the exclusive area of medicine but had entered a much broader arena of scientific disciplines and multi-sectoral societal debate.

Scientists from a broad variety of research areas (social, political, economical, behavioural, etc.) have come into play and have provided valuable new insights regarding the relevance of social and economical conditions for the thorough understanding of inequalities in health and have made suggestions for the tackling of these inequalities.

Although the term “complete well-being” is perhaps difficult to interpret – “optimal” might have been more appropriate – as it suggests a theoretical maximal level that can be achieved by every human being, the WHO definition yet offers a comprehensive conceptual framework for a multidisciplinary approach aimed at achieving that elementary level of health and well-being all humans deserve access to.

Perhaps naively paraphrasing, one could derive directly from this definition that social inequality by definition leads to inequality in health and that – on population level – health could substantially be improved by reducing the gaps between socially deprived subgroups of the population and those that are much better off in this respect. In other words, the mere existence of social inequalities themselves legitimate continued public policy and public health initiatives aimed at reducing these inequalities.

Although such a qualitative approach surely has a value in its own right, there is of course also a need to quantify differences in socio-economic status, to quantify their impact on public health and to elucidate the mechanisms that underlie these phenomena.

However, as demonstrated in this paper, this is not an easy task, which is deemed to face many problems.

Some of the mechanisms leading to social inequalities in health are undoubtedly acting partially through nutrition – a lifestyle factor one cannot cease to maintain on a daily basis and which is obviously already on an intuitive basis linked to many surrounding factors (geographical, material, personal, social, psychological, etc).

Fortunately, today, we do not need to rely on intuitive knowledge in this domain. Excellent multidisciplinary scientific research has been carried out over the past decades, which has brought us substantial insight in the mechanisms through which social inequality can lead to nutrition inequality and from there to inequalities in health.

In this paper, some observations and insights from literature regarding the interaction between socio-economic status (SES), nutrition and health are brought together and discussed.

### **A complex constellation of contributing factors**

The three main components of the overall issue regarding SES, nutrition and health can be visualised as three angles of an equilateral triangle, such that the notions “top” and “basis” (respectively referring to “endpoint” and “predictor” variables of interest) could vary according to the specific context one is interested in. The sides of such a triangle would then represent the interaction between the angles, which in themselves represent clusters of subcomponents.

In order to get a better understanding of the triangle, it is worth looking at its components.

The first question that needs to be addressed regards the impact of nutrition on health.

Although there are still today many gaps in the knowledge of this relationship, there is at the same time a substantial body of evidence available (from fundamental, clinical and different types of epidemiological research), which allows to conclude that – on population level – nutrition plays a measurable and significant role in the development of many diseases.

From a public health point of view, this refers in the first place to a number of chronic degenerative diseases (cardiovascular diseases,

cancer, diabetes, obesity, osteoporosis, etc) that are to a large extent responsible for overall and premature patterns of morbidity and mortality in most Western countries.

The relationship between nutrition and health relates to many different aspects of nutrition (energy intake, nutrient intake, types of foods, meal patterns, etc.) and nutritional status (body composition, energy balance, metabolic parameters, antioxidant capacity, etc.).

Moreover, there seems to be an important interaction between different nutritional factors and between nutritional factors and other lifestyle factors, such as smoking and physical activity.

The overall body of evidence on the association between nutrition and physical activity on health and the potential of prevention through acting upon these lifestyles, has recently been reviewed by a large number of European experts from different fields and has been summarised in a series of reports and papers, known as the “EURODIET” reports (2-3).

According to this scientific review, unbalanced eating patterns and inactive lifestyles are held responsible in Europe for – amongst others:

- between 30 and 40% of all cancers
- at least one third of premature deaths resulting from cardiovascular diseases
- the pan-European epidemic in obesity and related disorders
- the steep increase in osteoporosis and its health consequences
- a large prevalence of micronutrient deficiencies (like iron and iodine)

All these public health endpoints are known to have higher incidence or prevalence in lower SES subgroups of the population (further elaborated below).

From a health economic point of view, it has been calculated by researchers from the Institute of Public Health in Sweden, that – taking into account disability adjusted life years lost – dietary factors and inactive lifestyles impose costs which exceed that of tobacco use within the EU (3).

One can only speculate to what extent this cost could be reduced by improving socio-economic conditions of socially deprived subgroups of the population. Obviously, such efforts would also have to be financed by public resources but would at the same time potentially improve the quality of life of many people.

A second question that needs to be examined, relates to the side of the equilateral triangle that links SES with health.

Again, we are confronted here with a huge area of multidisciplinary research which is very suggestive for a strong positive association between these two clusters, but which at the same time is still wrestling with many unresolved questions.

It seems important however, to first outline briefly the broad scope of the problem in a semantic and conceptual context.

According to JP Mackenbach from the University of Rotterdam in the Netherlands – who has done a substantial amount of research on this topic – socio-economic inequalities in health can be defined as “*systematic differences in morbidity and mortality rates between individual people of higher and lower socio-economic status to the extent that these are perceived to be unfair*” (4).

Two terms in this definition seem at first sight difficult to measure (“SES” and “unfair”) and indeed they are. In the literature on health inequality, there is – still according to Mackenbach – no consensus as far as the definitions and conceptualisation of socio-economic status and its determinants (income, educational level, job status, ethnicity, etc.) are concerned and that is a considerable problem both in the design of studies and in the interpretation of research results.

In general, two main conceptual frameworks are widely used. Some scientists prefer to work with models based on “social class” – which are derived from theories of society such as the Marxist theory – while other scientists prefer to avoid incorporation of political and economical forces in their models and then mostly use the term “status” instead of class (4).

The notion of “unfair” is also subject to significant variation in interpretation. This has been very comprehensively elaborated by Ilona Kickbusch during a recent congress on this topic in Copenhagen (Denmark) in the year 2000. “*Inequality in health is a political issue*”, she argues, “*and social justice is not on everyone’s agenda. Health has therefore to be defended as a basic human right continuously. However, to the extent that social differences in health are inherent characteristics of societies, it might be more pragmatic to rephrase the whole issue in more readily understandable and realistic terms: how much inequality are we willing to accept both locally and globally?*” (5)

In other words, what degree of inequality is considered to be unavoidable, who is entitled to outline the criteria for such an evaluation and how can we deal with that on societal level? Obviously, this question is deeply rooted in ideological discussions, which fall beyond the scope of this paper.

There is sufficient evidence from historical research that socio-economic inequalities in health are not a recent phenomenon. For a long period in history, however, these differences went unrecognised.

Ever since – from the nineteenth century onwards – population (public health) statistics (e.g. on mortality) have gradually been collected in a more systematic and standardised way in many European countries, interest in the association between SES and health outcomes has also gradually increased and has come under thorough scientific investigation during the past decades.

Due to substantial improvement in many areas of public health, there has been a very general decline in overall mortality during the 20<sup>th</sup> century and the absolute differences in mortality between people with high and low SES have significantly decreased. However, this has most likely not been accompanied by a decline in relative differences. The higher relative risks of dying (in different age groups) for people at lower as compared to higher SES, have remained remarkably stable for a long period (4).

Today, the evidence on social inequalities in health in Europe – as in the rest of the world – is endorsed by many epidemiological studies. The most worrisome conclusion from most of this research is that relative differences in health inequalities between social subgroups have been increasing very rapidly in most European countries over the past four, five decades (6-10). This is even more emphatically the case in a number of Eastern-European countries as a result of rapidly changing political, social and economical patterns in these countries. As a consequence, inequalities in health are considered by some scientists as the major public health issue for the 21<sup>st</sup> century. (11).

Substantial evidence on the association between SES and health has been produced – amongst many others – in the UK, where data on occupational class have been collected and have been prospectively linked to mortality (12).

From figure 1 it can be derived that individuals employed in the lowest occupational class (unskilled workers) had an overall mortality which is substantially higher than the mortality rates in individuals from the highest occupational class (professionals) and that – on the whole – the range of occupational positions from lower to higher is accompanied by a gradual consistent increase in mortality on population level.

Also clear from this figure is that trends are going in diverging directions with higher occupational classes improving their situation and

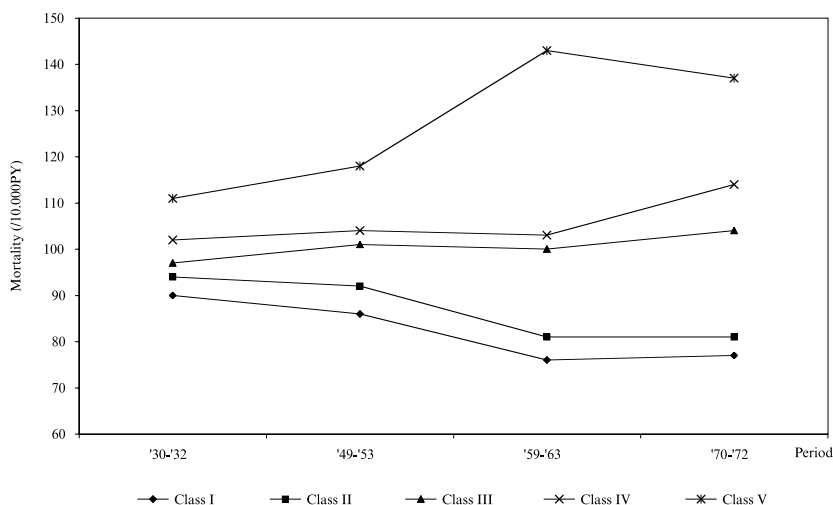


Fig. 1: Mortality (/10,000 PY) of men aged 35-64 by occupational class in the UK in the period 1930-1975 (adapted from reference 12).

lower occupational classes worsening (about 20% difference in the fourth decade up to around 70% difference in the seventh decade of the 20<sup>th</sup> century).

Although a classification of occupations in five distinct categories is of course a huge reduction of a very complex reality, these data are strongly suggestive for a positive correlation between determinants of health (or preventing factors for disease) on the one hand and people's capability to achieve a higher position on the labour market on the other hand.

The latter is in turn undoubtedly correlated with people's educational level, although in fact the reality is much more complex than that. It also relates to such factors like job aspirations, job perception, job satisfaction, etc, which are in turn co-determined by personal characteristics, which – again – have at least part of their roots in “social background” (13).

Other intriguing data on the relationship between SES and health have been provided by the work of Professor David Barker from Southampton (UK). Figure 2 shows data on infant mortality and mortality at age 55-65 in three small English towns in the county of Lancashire in two different time periods during the 20<sup>th</sup> century. Substantial differences in infant mortality between these three cities were observed for

the period 1911-1913. These differences are largely explained by fairly well documented differences in the overall socio-economic situation of these three cities. Due to (unequal) growth in socio-economic environment in all cities, infant mortality has declined to much lower levels and has become comparable in all three cities by the 1970s (14).

The most intriguing observation from figure 2, however, relates to the fact that the geographical patterns of age standardised mortality in older adults during the seventies show a striking parallel with infant mortality in the period when these people were born, i.e. the second decade of the 20<sup>th</sup> century.

Professor Barker has found many other similar associations between several factors (such as birth weight, length at 1 year, etc.) – which in themselves are related to socio-economic conditions – and health outcomes in later life (15-16).

One of the conclusions that David Barker has drawn from these observations is that social class environment during pregnancy and early infancy is a strong predictor of morbidity and mortality in later adult life. The “social environmental” factors are considered to be particularly strongly related to – amongst other conditions – nutrition and nutritional status of pregnant mothers and young children.

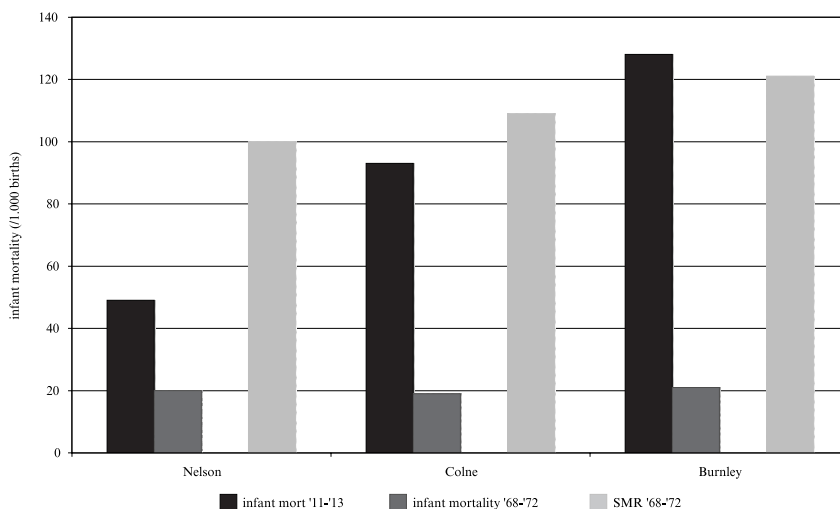


Fig. 2: Infant mortality (/1,000 births) and mortality at age 55-74 (SMR) in three English towns in two periods during the 20<sup>th</sup> century (adapted from reference 14).



The above-mentioned data are of course collected on an ecological level and therefore should be interpreted with some caution. They are however compatible with analogous observations on the association between SES and health on individual level (17-18).

It therefore seems plausible that – on the whole – socio-economic gradients in the population are accompanied by parallel gradations in “environmental” exposures with potential beneficial or adverse health effects.

In Belgium, some data that are suggestive for the differential effects of SES on health outcomes, are available. In the context of the WHO MONICA project (Multinational Monitoring of Trends and Determinants of Cardiovascular Diseases), Professor G. De Backer (Ghent University) and co-workers have convincingly shown that important regional variations in coronary heart disease (CHD) incidence can occur within such small geographical entities such as cities (in casu Ghent) and that – moreover – on population level, the patterning of CHD incidence within the city showed a striking parallel with the distribution of a calculated index of socio-economic status across the city of Ghent (19).

In the same MONICA project, Professor M. Kornitzer from the Université Libre de Bruxelles, has demonstrated a remarkable parallel between diverging trends in CHD incidence in two Belgian cities (CHD incidence decreasing in Ghent and increasing in Charleroi) on one hand and trends in unemployment that were in a similar way diverging in these two cities in the same period (figure 3) on the other hand.

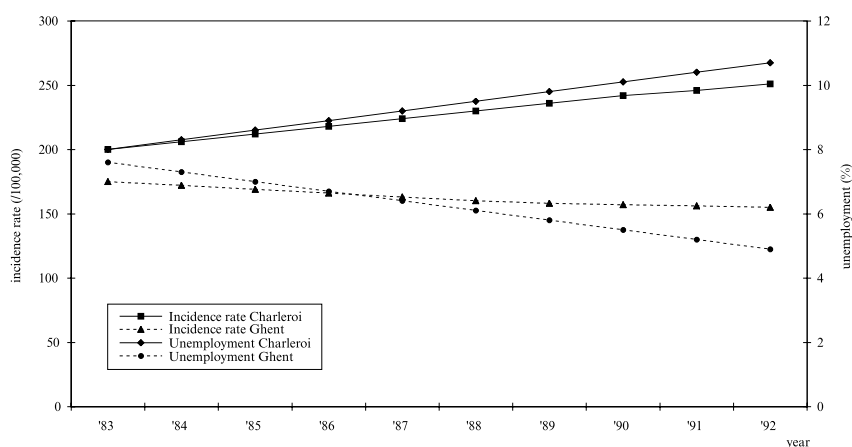


Fig. 3: Trends in incidence rate of AMI and in unemployment between 1983 and 1992 in men aged 25-69 years in Ghent and Charleroi.

## **Explanatory models for social inequalities in health**

Over the past decades, several models have been developed that try to disentangle the complexity of the above described phenomena and to identify and quantify individual predictors that play a role in the overall picture. These models all overlap with each other to some extent in the sense that there is a large consensus among experts on the role that is played by a number of specific predictors or intermediate factors that lead to health inequalities (4). These factors are grouped mostly under the common denominators of “material”, “behavioural” and “psycho-social” factors. Examples of such explanatory factors are respectively “income”, “lifestyle” and “job strain”.

Almost all explanatory models have in common that they try to visualise the development of social inequalities in health as a “layered” or a “chain-like” process.

The main differences between the models are related to the “exposure time” or “exposure period” that is taken into consideration, the integration – or not – of “biological pathways”, the integration – or not – of “macroeconomic”, “macrosocial” and “political” elements and, finally, the notion that the relation between SES and health is working in a “reverse” way or not.

One example of such a model – the so-called “Mackenbach model” is shown in figure 4. This model is very comprehensive and straightforward and therefore very useful as a basis for developing policies and intervention strategies. Mackenbach proposes in his model that the link between socio-economic status and health related problems is triggered and maintained by two distinct types of mechanisms that are active during different periods of life and that act through different pathways, namely “selection” processes and “causative” processes.

A central position in the “selection” process is represented by “childhood health”, which in itself is a major determinant of a second important selection parameter, namely “health in adulthood”. The effect of health on the socio-economic position is further potentially modulated by factors which can act both as “selective” and “causative”, namely “childhood environment”, “psychosocial” and “cultural factors”. The “causation mechanism” is mainly active through three groups of so-called “intermediate” risk factor clusters: lifestyle factors, structural/environmental factors and psychosocial stress related factors. Through a number of closed cycles in the overall picture, health inequalities become self-perpetuating and hence often drag (groups of) people along in a downward negative spiral (4).

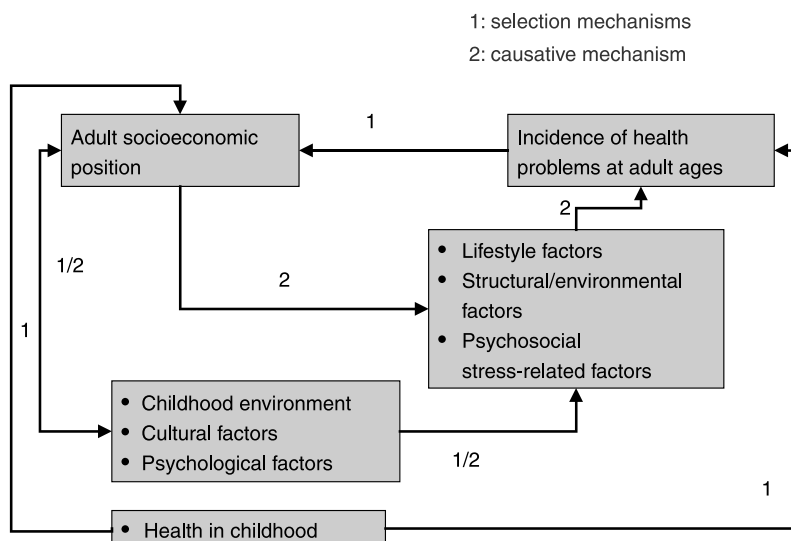


Fig. 4: Selective and causative factors involved in the development of health inequalities in society: model according to Mackenbach (adapted from reference 4).

For example, adverse social environment during childhood can lead to lower socio-economic status at adult age through both selective and causative mechanisms. This lower socio-economic status at adult age can cause an unfavourable health behaviour which may in itself lead to health problems. These mechanisms may then become self-perpetuating as they can reinforce the downward process of socio-economic position, even more adverse health behaviour and more severe health problems.

Obviously, the main lifestyle factor of interest in this paper – nutrition – is nested within the overall lifestyle cluster and one can try to speculate on the particular role of this factor in the overall picture.

### The role of nutrition

This brings up the third question of interest to this paper: what fraction of SES differences in public health can be explained by differences in nutrition and what are the mechanisms?

As GD Smith points out (20), the precise role of nutrition in generating inequalities in health can hardly be delineated, let alone quantified, for several reasons. It is moreover very likely that its impact can vary considerably across cultures and even within cultures.

In order to understand this, one has to realise the complexity of the factors that are implicated in the process that eventually leads to the decision on which foods are eaten in which form, which degree of variation, which quantities, etc.

Figure 5 gives an overview of factors that can potentially play a role in household and individual purchase and consumption of foods (21). Without knowing the quantitative impact of factors like availability of and access to food, household composition, perception of “healthy foods”, attitudes, cooking skills, etc, one can easily appreciate that the socio-economic position of households and individuals will have a modulating effect on many of them.

A number of studies in Europe has clearly identified differences between socio-economic subgroups of the population on the level of foods, food groups and nutrients, pointing – in general – at a more healthy diet in higher educated people (22-24).

A recent review of socio-economic differences in the consumption of fruit and vegetables – based on eleven dietary surveys carried out in seven countries – has led to the conclusion that lower consumption of these food groups in lower socio-economic subgroups of the population are a fairly constant finding in Europe (22).

However, differences between SES groups do not always go in the same direction. In the pan-European “Disparities in food habits” project

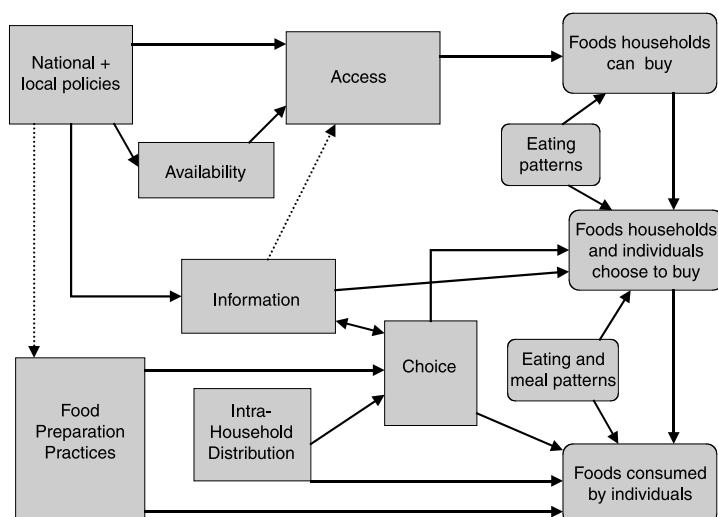


Fig. 5: Factors involved in food purchase / consumption at individual level (adapted from reference 21).

based on household budget surveys in 15 European countries, it appeared that for instance consumption of butter and other animal fat was lower in higher SES groups in northern European countries, whereas the opposite was found to be true in a number of Western and Southern European countries. For fruit and vegetables, however, the association with SES was consistently positive in most countries (23).

Several studies in Europe have also shown the relationship with lower SES and a poorer micronutrient density of the diet (21, 25-29).

In a recent (1997) dietary survey (based on a seven day dietary record methodology) in adolescents aged 14-18 years carried out by the Department of Public Health (Ghent University), some interesting associations between indicators of SES and dietary habits were observed, both on the level of foods and nutrients.

As shown in figure 6, adolescents in the higher educational training programmes had on average a significant higher intake in fruit and vegetables as compared to their counterparts from the vocational training programmes. An analogous pattern was observed when the intake was related to the educational level achieved by the adolescents' parents.

A similar positive association between intake and educational level of both students and their parents was also observed for iron intake (figure 7).

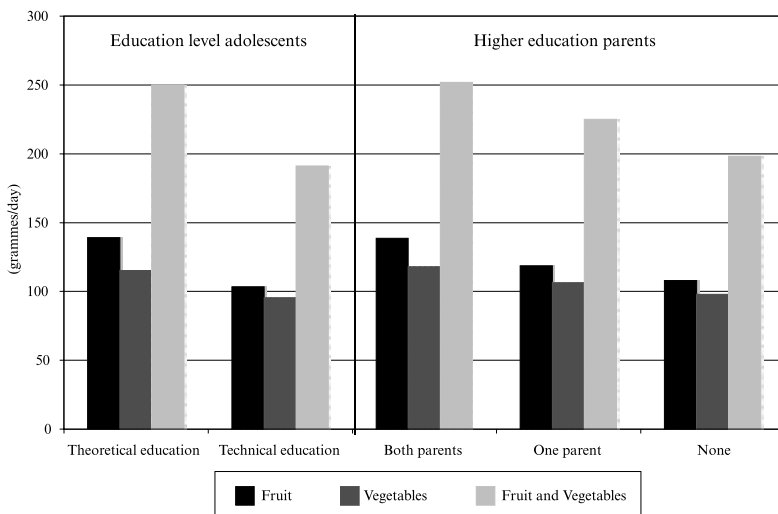


Fig. 6: Intake of fruit and vegetables (g/d) in adolescents from the region of Ghent (anno 1997) by type of education and by their parents' educational level.

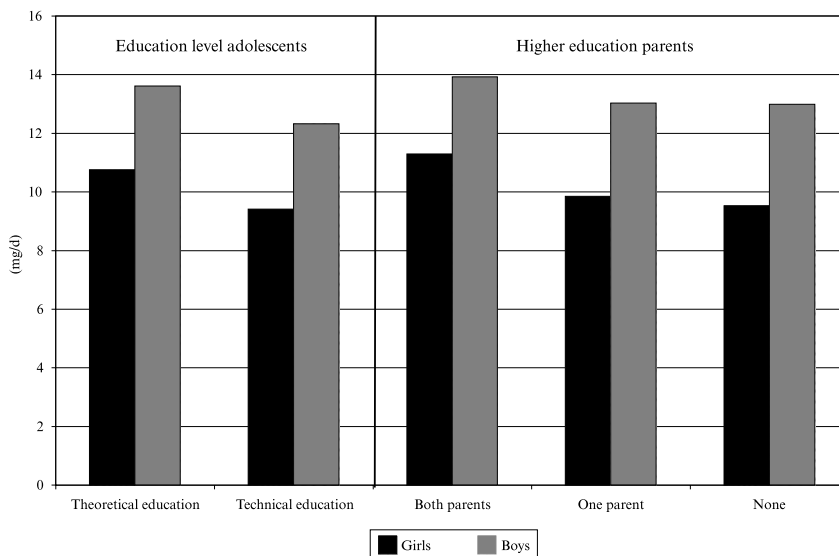


Fig. 7: Intake of iron (mg/d) in adolescents from the region of Ghent (anno 1997) by type of education and by their parents' educational level.

## Final comments/Conclusions

The availability of and access to safe food in sufficient quantities and variation is considered to be a basic human right (Universal Declaration of Human Rights, 1948, Article 25, <http://www.un.org>).

Yet today, large subgroups of the population in both developing and developed countries are still limited in this respect because of social and economical (or other) constraints, that either directly influence the availability of food or the purchasing capacity of households and individuals or that create indirect circumstances which “drive” people towards less healthy food choices.

The dynamics of social differentiation in society – as depicted in several available theoretical explanatory models – are moreover acting in such a way that they substantially increase the likelihood that – on group level – unhealthy food choices are accompanied by other unhealthy lifestyle factors and by other behavioural and psycho-social characteristics that have a negative impact on health (4).

These dynamics of social differentiation – i.e. the mechanisms (“circumstances”) which underlie the social and economical constraints

experienced by socially deprived subgroups of the population – are considered to be extremely complex, still poorly understood and moreover to a certain extent fluctuating over time and over space. They undoubtedly have their roots in many faculties of society, like the overall social and political system, the economical system, the health care system, the educational system, degree of urbanisation, environmental problems, cultural traditions in society and many, many others (5).

One of the mechanisms that seems to be very prominent as a driving force, however, is the fact that many phenomena involved – to varying degrees – in the creation and maintenance of social inequalities and their impact on health, are incorporated in self-perpetuating vicious cycles, that pass on these phenomena from one generation to the next, and that often drag people – within one generation – further and further down a negative spiral of bad social conditions, bad nutrition and bad health.

When people are born in lower social class, they grow up in an environment which is – on average – in many respects less stimulating (intellectually, emotionally, etc.) than for people who were born in higher social classes. It should therefore not be too surprising that the chances of achieving a higher ranking on the socio-economic scale for an individual born in a less stimulating social environment are substantially lower than the chances for an individual born from socially prosperous parents to maintain his/her position on the scale or even improve it further.

There are still many unresolved questions on the position and the role of nutrition in this broad context of self-perpetuating health inequalities (20). For instance, there is still a lot of debate on the question whether (one of) the reasons for an inferior diet of those at the bottom of the social scale are stronger related to an inadequate income than to an inadequate management of an adequate income (or a combination of both). Another example is the question whether social inequality leads to more nutritional imbalances in urban as compared to rural settings. Furthermore, there still is a lot of debate on the social determination of taste and food preferences and their impact on nutritional balance. And indeed on many other questions (30).

Such controversial items and unresolved questions – however interesting from a scientific point of view – should however not prevent public policy makers from continuous monitoring of people's social and living conditions and from taking initiatives to reduce the gap between socially deprived and socially advantaged subgroups of the population.

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