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Nutrition transition in Chile

by

Dr. med. Carsten Krüger, MD

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Abbreviations: DM2 – diabetes mellitus type 2; GNI – gross national income; LBW – low birth weight; NCD – non-communicable diseases; USD – US dollars

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Introduction

Nutrition transition, i.e. the change from a traditional high-fibre, low-fat diet to a “Western” high-fat, high-sugar, low-fibre diet, is a process which is no longer confined to industrialized countries and some wealthier segments of society in a few developing countries.¹⁻³ Several Asian and Arabian countries are heavily affected, but almost all countries in the Caribbean and in Latin and South America experience the same problem.^{4,5} Usually this change is preceded by or associated with the so-called demographic transition (from high fertility and early mortality to low fertility and low/late mortality) and the epidemiological transition (from infectious diseases and malnutrition to non-communicable diseases (NCD) and overnutrition).¹⁻⁵

Typically, the driving forces behind nutrition transition are increasing urbanization, improved economy, including all aspects of nutrition and health systems, and globalization, leading to the changes in diet as described above and to a more sedentary lifestyle with less physical activity.¹⁻⁵ Massive urbanization is a typical feature of industrialized countries, but also of several Arabian and most Latin and South American countries.⁶ With an urbanization rate of 88%, Chile belongs to the 25 countries with the highest rates worldwide.⁶ The pace of changes has been very rapid in Chile (as it is the case in many other low- and middle-income countries), thus virtually overwhelming the country’s capacity to anticipate and react to the magnitude of nutrition transition and its health consequences like overweight/obesity,^A diabetes mellitus type 2 (DM2), hypertension, increased rates of cardiovascular disease and cancer.^{1-5,7-12} Nowadays, Chile has very high rates of adult and childhood obesity.^{4,12,13} This is reason enough to analyze in more detail the current situation and consequences of nutrition transition, its causes and interventions to counteract its effect on the population.

Situation analysis and consequences of the nutrition transition

During the last 20 years or so, the nutritional situation has changed from undernutrition to overnutrition in Chile.^{9,10} Today, hunger and malnutrition are virtually eliminated (underweight, stunting and wasting in children is < 1%;⁶ malnutrition in pregnant women dropped from 26% in 1987 to 15% in 1998),¹⁰ and the opposite, overnutrition and overweight, has developed at an enormous pace.⁹⁻¹² When one looks at the type of food which is consumed today, then indeed the food consumption pattern resembles more or less the “Western” type of diet.^{9-11,14} In 1997, a study among adults found that 37% of them derive > 30% of the calories from fat and 15% of the adults > 10% from sugar.¹⁵ Another study found that in the lowest wealth quintile the highest expenditure

^A Overweight: body mass index > 25 kg/m². Obesity: body mass index > 30 kg/m²

is on bread, meat (= fat) and soft drinks (= sugar).¹⁶ Not only the total amount of calories has increased since the 1970s by almost 10%,^{11,14} but there has also been a shift from grains, fruit and vegetables towards sweet, salty, high-fat foods.^{9-11,14,16} Fat consumption increased by more than 30%.¹¹

A study in school children found that the consumption of energy-dense food was very high.¹⁷ Another study among 6-11 year-old children in 1999 found that 35% preferred snacks as seen in television commercials, 33% soda, and 12% yoghurt. 66% actually bought snacks, 15% soda, and 7% yoghurt.¹⁸ Taken together, all the data demonstrate the strong preference for fat and sugar in the diet not only in children, but also in older age groups (and in children the strong influence of mass media advertising; see below).

While in adults the rates of obesity were 6% in men and 14% in women in 1988,¹¹ in 2003 they were around 22% (19% in men vs. 25% in women),¹⁹ being higher in adults from a low socioeconomic background.^{9,19} Obesity levels in pregnant women rose from 12% in 1987 to 33% in 2004.¹⁹ Even more worrying is the situation among the children. For the last 15 years, overweight and obesity rates have increased steadily to high levels in 6-year old children: the prevalence of overweight increased from 15% in 1987 to 20% in 2000 for boys and from 17 to 22% for girls. The prevalence of obesity increased from 6.5% in 1987 to 17% in 2000 for boys and from 8 to 19% for girls.¹³ In more recent surveys the levels are the same, and there is no sign of prevalence reduction.¹⁹⁻²² Pre-school children have an obesity prevalence of 14%, whereas this is 18.5% in first grade.¹⁹ Most disturbing is the fact, that the rates are still rising in very young children: at the age of 2, 6% are obese, at 3 years 11%, and at 4 years 14% (data as of 2005).¹⁹ As overweight and obesity in childhood pave the way for adult obesity and associated NCD, the outlook is not very good for Chile at present. Indeed, in studies from 2003 several metabolic risk factors for adult chronic NCD could be found in obese Chilean children.²³⁻²⁵ Representative prevalence data on DM2 in children have not been reported yet.

Two other vulnerable groups in the nutrition transition are infants and old people. Worldwide, Chile has one of the highest rates of exclusive breastfeeding (63%) during the first 6 months of life, and the infant mortality rate is 8/1000 live births.⁶ Thus at least in this age group, it does not appear that nutrition transition has a major influence via replacing breastfeeding by bottle feeding with all its associated problems. – But the elder population is affected quite much: in the age group 60-64 years, obesity prevalence was up to 36% for men and up to 44% for women.¹⁹ In those aged 75 years and older, rates decreased to 18% in men and 26% in women.¹⁹ It may be argued that

especially the oldest are still more affected by the time when poverty and undernutrition were the prevailing features of every day's life, hence the lower obesity levels. Contrary to the other age groups, in old people undernutrition is still quite prevalent. Chile targets this group with a special program to alleviate the situation, and so far good progress has been reported.²⁶

Approximately over the same time period, cardiovascular morbidity and mortality in adults has been on the rise, and nowadays it constitutes the largest number of deaths, followed by cancer and diabetes mellitus.^{9,10,14} Chronic NCD contributed 54% in 1970 to the total mortality, but in 1998 this proportion had risen to 75%.¹⁰ Cardiovascular mortality rose from 22% in 1970 to 29% in 1992 and thereafter, a level which is even higher than in Canada.^{9,10} Deaths from cancer contributed 12% in 1970, but already 22% in 1992 to the total mortality.^{9,10} DM2 has a prevalence of around 4-5% in the general population.^{12,27,28,30} In 1997, hypertension was found in 11% of the population, in the age group of 55-64 years even in 27%.^{10,27} Hypertension is more prevalent in rural areas and in people of low socioeconomic status.¹⁰

As in many other regions of the world, indigenous people in Chile are much affected when becoming urbanized because of their peculiar genetic susceptibility to "Western" diet, their rapid decline in physical activity, the prevailing poverty, and consequently the purchase of cheap high-sugar, high-fat diets.^{12,28} Hence they exhibit high levels of obesity, DM2, high blood pressure and cardiovascular disease.¹² In urbanized Aymara and Mapuche aboriginal people, the prevalence of DM2 was 7% and 8%, respectively. Cholesterol was increased in 43% of Aymara and 28% of Mapuche individuals, triglycerides in 17% of Aymara and 23% of Mapuche individuals.²⁸ These prevalence rates in urban aboriginal populations are higher than that of the general population in Chile and of their rural tribesmen. In Aymara people living in the traditional rural environment, the overall prevalence of DM2 was estimated as only 1.5%. Despite a relatively high prevalence of obesity, especially in women (23.5%), and dyslipidemia, the low frequency of sedentary habits and low plasma-insulin concentrations could be responsible for the low prevalence of DM2 in this group.²⁹ The prevalence of DM2 in rural Mapuche people was estimated as 3.2% in men and 4.5% in women. The prevalence of obesity was 56% (40% in men, 63% in women).³⁰ These data are higher than for the rural Aymara and suggest some genetic and environmental differences and probably an increasing trend in the rural Mapuche communities during recent years.

Causes of the nutrition transition

Over the last 30-40 years, profound changes have taken place in Chile.¹⁴ Economically, Chile has made good progress with an increase from USD 2160 GNI/capita in 1991 to USD 5870 GNI/capita in 2005.^{6,31} Industrialization took place and attracted (or sometimes forced) many rural people to move to towns and cities. The annual increase in urbanization was around 2% during the last 10-15 years.⁶ Education was promoted strongly, thus the adult literacy rate is 96% nowadays.⁶ The health system was improved a lot, with a major focus on women's and child health.^{7,8} All these factors resulted in a sharp decline of under-five mortality rate (1960: 138/1000 live births; 2005: 10/1000 live births),^{6,31} infant mortality rate (1960: 107/1000 live births; 2005: 8/1000 live births)^{6,31} and maternal mortality ratio (1980: 67/100000 live births; 2000: 31/100000 live births),^{6,31} accompanied by a rapid epidemiological transition changing from infectious diseases and malnutrition to NCD as main causes of morbidity and mortality, placing Chile in the post-transition phase already.⁷⁻¹⁰ Simultaneously there was a further decline of fertility rates (1970: 3.4; 2005: 2.0),^{6,8} altogether resulting in an accelerated demographic transition: between 1970 and 2005 life expectancy rose from 62 years to 78 years, being now one of the highest in the world.^{6,31} Typically, in older societies NCD play a major role.

Urbanization and industrialization have led to the change of diet to a more "Western" type, as described above. Although this was in the beginning observed in the wealthier parts of society, nowadays mainly poorer members of society purchase this type of food due to low food prices.^{9-12,14,16} A healthy, traditional diet is simply too expensive for some poor people, whereas educated and wealthy people tend to return to the more traditional diet nowadays.^{9-12,14} Mass media, especially television commercials, contribute to the picture.^{9-11,18} It could be shown in a study among school children who were asked about their food preferences and actual food consumption that these matched very much the content of television commercials they had watched before.¹⁸

Smoking (> 40%) and alcohol consumption (> 15% on a regular basis), other additional risk factors, are very common in the Chilean society, especially in men and people of lower socioeconomic status.^{9,10,27} These contribute to the overall picture of increasing rates of chronic NCD although the extent has not been quantified exactly yet.

In addition, urbanization and industrialization have led to more sedentary lifestyle with reduced physical activity.⁹⁻¹² Studies in 1988 found that 55% of men and 77% of women were sedentary, in 1992 the levels were 58 and 80%, respectively.^{32,33} In 1997, > 85% of adults were sedentary, in women of low socioeconomic status this value rose to

97%.²⁷ Physical activity is reduced in children as well, more in girls than in boys.^{17,20} Mass media are involved in this area again: studies in children found that 90% watched 2 hours daily, and > 20% even 3 hours daily, leaving not much time for physical activities.^{17,18}

There is concern that countries with high rates of low birth weight (LBW) infants may experience an additional burden of NCD after the occurrence of nutrition transition in the then adults (Barker hypothesis).¹¹ During the last 2 decades, Chile had a LBW rate of 5-7%.^{6,31} Thus the younger age groups are not affected very much by previous LBW. But in 1975, Chile had a LBW rate of around 11.6%.³⁴ Thus there may be several older adults who develop NCD due to previous LBW but there are no longitudinal data available at present.

Another important factor were nutrition programs in pre-school and school children which were targeted towards the high rate of malnutrition in this age group in the 1980s.^{9-12,35} Although indeed malnutrition could be virtually eliminated in children,⁶ the supplementary school feeding programs were not adjusted early enough and the change of the composition of the diets was too long delayed so that overnutrition occurred.^{9-12,35} As this was a nationwide program, it had a massive impact on childhood nutrition contributing substantially to the current overweight and obesity epidemic in this age group.^{9-12,35}

Interventions against the causes and consequences

There exists unanimous agreement that the nutrition transition and its effects on health can only be tackled by prevention.³⁶ The Chilean government has proposed several initiatives which are supported by the research community.^{9-12,14,16,19,35,37,38,39} The main goal for the decade 2000-2010 is to reduce obesity rates from 10% to 7% in pre-school children, and from 16% to 12% in schoolchildren in first grade.¹⁹ For pregnant women, the goal is to reduce the prevalence from 32% to 28%.¹⁹ Therefore the former school and pre-school feeding programs aiming at malnutrition have been changed, healthier food types were introduced, including their provision in school kiosks.^{35,40-42} Teachers, parents and children received nutrition education, and physical activity programs were extended in school.^{40,41} Some initial evaluations showed a positive trend for reduction of obesity and increase of physical activity,⁴² but recent evaluations of these approaches on a larger scale have not shown significant effects on obesity levels.^{19,41}

The role of the mass media, especially television, was considered as being crucial, too.^{18,41} First, the school children spend much time watching television, thereby

reducing their physical activity.^{17,18} Second, through commercial advertising their food consumption patterns are heavily influenced.¹⁸ Programs need to be developed to reduce the time of watching television and to change the content of television commercials, but so far no real progress has been made.

In adults, no nationwide programs have been initiated yet, thus there is no evidence of any improvement. But as evidence from other countries indicates, these changes are difficult to achieve.⁴³

Recommendations for future intervention programs

The data clearly show that the consequences of nutrition transition, signaled by its first effect overweight, develop already as early as during the first 2-3 years in Chilean children.¹⁹ At this point, usually the family is the primary provider of food and influences the child's food consumption pattern. Thus a critical strategy for success will be to include parents much more and earlier into any preventive program. This will be difficult enough as the data from the adult population show that overweight (and other NCD) are still not declining.¹⁹ But more involvement of the parents will be mandatory for any success, and only programs in preschool children at public institutions like kindergarten will not be sufficient.

As it is also quite obvious, the food industry as the major provider in the area of nutrition needs to be incorporated in any future strategy as well.⁴¹ Besides the provision of healthier food, promotion of healthier food will be critical, too. The mass media will need to contribute to any changes given its substantial influence on nutrition patterns, otherwise no nationwide success will be achieved.^{18,41} And a continuous surveillance system needs to be put in place to react timely to any changes.³⁵

All these suggestions imply that a societal consensus needs to be reached on improved nutrition of the whole population, hence a community-based participatory approach would be ideal.^{36,43} But all these efforts will be futile if it will not be possible to put healthy nutrition high on the political agenda which needs to be guided by expert guidelines and policies from multiple disciplines like nutrition, social sciences, politics, medicine and others.^{36,43} At present this does not seem to be the case in Chile.¹⁹ But there are examples from other countries where large-scale programs produced some remarkable progress.⁴³ Finland is one of the best examples worldwide, where it was not only possible to promote a healthy diet and to reduce obesity rates, but also to reduce the incidence and prevalence of NCD.⁴⁴

Conclusion

Chile is one of the countries which are heavily affected by the consequences of nutrition transition in all age groups. Despite efforts in the recent past to alter this course current data indicate that overweight/obesity and NCD are a major public health problem. A national effort will be needed to reverse this situation, but at present it is questionable if the country will succeed with the resources and policies which are currently directed towards this goal.

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