

# Nutrition transition in Morocco

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## Abstract

*Objective:* To analyse the nutritional transition in Morocco.

*Design:* Examination of Moroccan national survey data.

*Results:* Morocco is undergoing a demographic, epidemiological and social transition. The urban population increased from 29% in 1960 to 53% in 1997. Per capita gross domestic product increased steadily from 1972 to 1999. Life expectancy at birth increased to 70 years in 1999 from 47 years in 1962. Both infant and juvenile mortalities have decreased, from 92/1000 and 69/1000 in 1982–87 to 46/1000 and 37/1000 in 1992–97, respectively. In parallel, the diet changed considerably: the intake of animal products increased while that of cereals and sugar remained relatively high, reflecting the specificity of Moroccan dietary habits. The rise in the consumption of meats and vegetables was accompanied by a steady consumption of bread, used to eat the sauce in which the meat and vegetables are cooked. Sugar is mainly used in tea, the very sweet, national drink consumed throughout the day. Under-nourishment persists among children under five (23% stunting and 10% underweight in 1997) while overweight is rising (9% in 1997 compared with 3% in 1987 for children under three). Among adults, overweight (body mass index (BMI) > 25 kg m<sup>-2</sup>) increased from 26% in 1984 to 36% in 1998. It is higher among women (32% in 1984 and 45% in 1998) than among males (19% in 1984 and 25% in 1998). It is also higher among urban populations (30% in 1984 and 40% in 1998) than rural populations (20% in 1984 and 29% in 1998). Obesity (BMI > 30 kg m<sup>-2</sup>) increased from 4% in 1984 to 10% in 1998. Overweight seems to be positively associated with economic status but negatively with education level.

*Conclusion:* Overweight and obesity constitute major health problems in Morocco.

**Keywords**  
Nutrition transition  
Morocco

For a long time, nutrition and health professionals in developing countries focused their attention on diet deficits and undernutrition. Often, anthropometric data on adults were not collected and were limited to 'nutritionally vulnerable groups', i.e. children under five. Among the children, data analysis only considered under-nourishment since overweight and obesity were not reported. Recently, it became obvious that in many developing countries not only has overnutrition affected a sizeable portion of the population, but it is growing at a faster pace than what would have been expected based on experiences of higher-income countries such as Japan and Korea<sup>1</sup>. It seems that nutrition scientists and international organisations were slow in recognising the shift that was happening in these countries and are presently striving to reverse these shifts.

This present paper analyses the demographic, epidemiological and social transitions in Morocco, which predict a nutritional transition. Moreover, the country has long been recognised as one of large disparities among different socio-economic classes, but especially between urban and rural areas. In fact, the differences in general development between the two areas predict large differences in nutritional status. It is clear that not only is

the country undergoing a nutritional transition in relation to the epidemiological transition, but that both under- and overnutrition coexist.

The discussion will attempt to make a case from available data. However, it is important to keep in mind that, in Morocco, as in similar developing countries, data are scarce and methodologies tend to differ from one survey to another, making data comparison difficult.

## Demographic transition

Morocco is among the 10 most populated African countries with its 29 million inhabitants. Demographic forecasts<sup>2</sup> estimate a growth rate 1.4%, with the total population reaching 35 million in 2014. Then the growth rate is expected to decrease to 0.5% – the present average growth rate in developed countries – until 2060. The total fertility rate, which began a steady decline in the first half of the 1970s, reached 3.1 children per woman during the period from 1995 to 1997<sup>3</sup>, showing that the country is undergoing its last phase of demographic transition. However, the disparities are still large among different regions of the country and between urban and rural areas;

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**Table 1** Evolution of intake by food group

Population group and year		Cereals and cereal products	Vegetables	Legumes	Fruits	Fats	Sugar	Dairy products	Eggs	Meats	Poultry	Fish	All animal products
Intake (kg person <sup>-1</sup> year <sup>-1</sup> )													
Urban	1970/71	157.9	118.1	5.5	47.1	15.9	26.5	30.5	2.2	20.5	3.6	7.1	63.9
	1984/85	169.1	132.6	6.1	41.2	16.3	25.1	43.5	3.6	13.7	6.4	9.9	77.1
Rural	1970/71	245.0	66.5	4.7	45.5	11.7	31.2	27.3	0.8	13.1	1.7	1.8	44.7
	1984/85	241.9	88.2	5.5	24.7	13.3	28.5	20.2	2.4	7.9	4.9	3.5	38.9
National	1970/71	216.4	83.7	5.0	46.1	13.1	29.7	28.3	1.3	15.5	2.3	3.6	51.0
	1984/85	210.4	107.4	5.8	31.8	14.6	27.0	30.3	2.9	10.4	5.6	6.2	55.4

Source: Direction de la Statistique, 1992<sup>9</sup>.

indeed, rural women have twice the completed fertility rate of urban women.

The population over 60 years of age increased from 3.9% in 1982 to 7.1% in 1997 and is expected to reach 8.3% in 2014<sup>2</sup>. Life expectancy at birth increased to 70 years in 1999 from 47 years in 1962<sup>4</sup>. This is the result of the decline in both infant and juvenile mortalities (from 92/1000 and 69/1000 in 1982–87 to 46/1000 and 37/1000 in 1992–97, respectively) and the improvement in adult longevity, itself the consequence of the progress in health care. However, these figures conceal large disparities between urban and rural areas. The life expectancy of urban inhabitants is 6 years longer and infant mortality is half that of rural inhabitants.

Urbanisation is expanding rapidly from its level of 29% in 1960. The urban population reached 53% in 1997 and is expected to reach 65% in 2014<sup>2</sup>. Moreover, a third of the urban population is concentrated in the country's two largest cities, Casablanca and Rabat<sup>5</sup>.

### Economic and social transition

Gross domestic product (GDP) per capita has increased steadily from an average of US\$ 878 in 1972–74 to an average of US\$ 1342 in 1995–99 (in constant 1995 US\$)<sup>6</sup>. Household budget surveys also show that the nominal, annual, per capita income increased steadily from DH 900\* in 1970 to DH 3623 in 1985, DH 6780 in 1990 and DH 7823 in 1998<sup>7</sup>. However, in real terms, the standard of living decreased by 1.9% between 1990 and 1998 (–2.5% in urban areas and –2% in rural areas)<sup>7</sup>.

These data do not relate the huge discrepancy among economic classes. In 1998, the highest 10% of the consumption expenditure class spent almost 12 times more than the lowest 10% of the class. The latter spent merely 2.6% of total consumption expenditures and only 0.26% of the mean consumption expenditures. It is worth noting that these inequalities increased between 1990 and 1998. The overall (rural and urban) poverty rate has, in

\*DH is the symbol for Dirham, the currency in Morocco. Ten DH approximate one US\$.

fact, increased from 13% in 1990 to 19% in 1998; this increase was even higher in rural areas, increasing from 18 to 27%.

It is expected that the existence of these different economic classes will be reflected in the coexistence of under- and overnutrition.

### Dietary transition

In parallel, the diet has changed considerably. Per capita daily caloric supply increased from an average of 2410 kcal in 1968/70 to 3031 kcal in 1997/99<sup>8</sup>. Per capita daily supply of fat increased from 42 g to 59 g. However, as supply data do not reflect the discrepancies between areas and socio-economic classes, data from household Budget and Consumption surveys will be discussed.

### Food expenditures

The share of the budget expended on food has decreased steadily from 70% in 1959 to 54% in 1970, 49% in 1984, 46% in 1990 and 43% in 1998<sup>7</sup>. Rural inhabitants decreased their mean budget share (from 76% in 1959 to 54% in 1998) more than their urban counterparts (from 60% in 1959 to 38% in 1998), reflecting their lower economic status.

Examination of data on food expenditures by food groups from four national surveys reveals the direction of their evolution. While animal product expenditures have increased steadily throughout the period in urban areas, they fluctuated in rural areas. At the same time, cereal expenditures have varied very little in urban areas while they increased until 1990 in rural areas and then dropped a little in 1998. As will be discussed subsequently, this reflects the dietary behaviour of Moroccan households whose cereal intake does not automatically decrease as their animal product intake increases. This is further confirmed by the examination of annual per capita food group expenditures by expenditure class (1998/99 survey). Examination shows that higher quintiles have higher expenditures for all food groups, including cereals. While the lowest expenditure quintile spends an average of DH 444 person<sup>-1</sup> year<sup>-1</sup> on cereals, the highest quintile spends more than double that amount<sup>7</sup>, or an average of

**Table 2** Anthropometric status through two national surveys: the National Household Budget and Consumption Survey, 1984/85, and the National Survey on Standard of Living, 1998/99

Anthropometric class of adults $\geq 20$ years of age		Urban (%)		Rural (%)		National (%)	
		1984/85	1998/99	1984/85	1998/99	1984/85	1998/99
Sample size*	Men	10 597	4052	9234	2826	19 831	6875
	Women	11 586	4375	10 109	2778	21 695	7153
	All	22 183	8427	19 343	5604	41 526	14 028
Underweight (BMI < 18.5 kg m <sup>-2</sup> )	Men	10.6	5.5	10.4	6.1	10.5	5.7
	Women	7.9	3.5	10.5	7.0	9.1	4.8
	All	9.2	4.4	10.5	6.5	9.8	5.3
Overweight only (BMI = 25–30 kg m <sup>-2</sup> )	Men	19.8	24.1	13.6	17.0	16.9	21.1
	Women	28.9	31.1	21.8	25.8	25.5	29.0
	All	24.5	27.7	17.8	21.3	21.4	25.2
Obese only (BMI > 30 kg m <sup>-2</sup> )	Men	2.0	4.7	1.3	3.8	1.6	4.3
	Women	8.7	19.1	3.7	11.1	6.4	16
	All	5.5	12.2	2.6	7.4	4.1	10.3
Overweight & obese (BMI > 25 kg m <sup>-2</sup> )	Men	21.8	28.8	14.9	20.8	18.5	25.4
	Women	37.6	50.2	25.5	36.9	31.9	45.0
	All	30.0	39.9	20.4	28.7	25.5	35.5

\*Number of persons with valid data excluding pregnant and lactating women. The sample is larger for the 1984/85 survey, which was a Budget and Consumption survey based on 14 520 households. The 1998/99 survey was a Standard of Living survey based on approximately 5184 households.

DH 990 person<sup>-1</sup> year<sup>-1</sup>. The magnitude of the disparity in expenditures among classes is even higher for most other food groups, resulting in total food expenditures of the highest quintile (DH 6549 person<sup>-1</sup> year<sup>-1</sup>) being almost five times that of the lowest quintile (DH 1439 person<sup>-1</sup> year<sup>-1</sup>).

National expenditures of all other food products increased from 1970 to 1990 and decreased in 1998 because 1990/91 was a good agricultural season that readily provided resources for higher food consumption. Therefore, the decline in some food group expenditures in 1998 is the artefact of a relatively higher increase from 1984 to 1990. In fact, total consumption expenditures (food and non-food) increased by 17.4% annually between 1984 and 1990 and by only 2% between 1990 and 1998<sup>7</sup>.

### Dietary intake

Only the 1970/71 and 1984/85 surveys provide data on actual intake. Table 1<sup>9</sup> shows the shifts in the intake of different food groups between the two surveys. The cereal products and sugar groups appear to have resisted change; in fact, their intake remained high in both urban and rural areas. This is explained by the role of these two food groups in Moroccan dietary habits. Sugar is used in tea, the sweet national drink that is drunk throughout the day. Cereals are mostly used in bread, which accompany most dishes (e.g. *tagine*\*) or in *couscous*.† The latter is consumed in most urban areas once a week (on Fridays), but is consumed more frequently in rural areas.

Hence, the economic betterment of households does

not necessarily decrease cereal consumption,‡ but their consumption of animal products (mainly meat, chicken and fish) and of vegetables increases. Both meats and vegetables (together or separately) are prepared in *tagine* and tend to induce more bread consumption;§ moreover, these dishes are prepared in oil, the usual cooking medium for *tagine*. The sauce is usually eaten with bread. It is, therefore, expected that people tend not only to consume more animal products and more vegetables with an improvement in economic status, but also to continue consuming a high quantity of cereals and oil, resulting in a higher calorie consumption overall.

These shifts in dietary intake between the 1970 and 1984 surveys were reflected in a similar shift in caloric intake, and in its structure. Mean daily caloric intake increased from 2466 to 2606 kcal person<sup>-1</sup> (5.7%) during this period. Calories from total fats increased from 452 to 576 kcal and those from free fats from 284 to 391 kcal. Calories derived from total carbohydrates increased from 1730 to 1793 kcal and those derived from sugar by only 2% (from 296 to 302 kcal). Of course, sugar intake was already very high in 1970 due to the frequent consumption of very sweet tea.

### Anthropometric transition

Table 2 shows the evolution of the proportion of each anthropometric class among men and women over 20 years of age obtained from two national surveys (1984/85 and 1998/99). In spite of the difference in methodology between the two surveys, it is possible to observe the

\**Tagine* is a dish composed of vegetables with or without meat and sauce; it is eaten with bread.

†*Couscous* is a dish composed of wheat semolina and vegetables, with or without meat.

‡Data from the 1984/85 survey show that the annual intakes of all types of cereal increase with income.

§Most Moroccan people eat with their hands and use bread instead of a fork or a spoon.

**Table 3** Anthropometric status by economic classes (National Survey on Standard of Living 1998/99)

Anthropometric class of adults ≥ 20 years of age			Quintile of expenditures based on per person annual consumption expenditures (%)						Level of significance
			20	40	60	80	100	All	
Urban	Underweight	Men	8.4	8.5	5.6	5.5	4.1	5.5	$P = 0.001$
		Women	5.5	5.9	4.1	2.7	2.6	3.5	$P = 0.001$
		All	6.9	7.2	4.8	4.0	3.3	4.4	$P = 0.000$
	Overweight	Men	20.3	22.5	23.5	27.0	35.5	28.8	$P = 0.000$
		Women	39.5	42.8	48.0	50.2	55.2	50.3	$P = 0.000$
		All	30.3	32.8	36.3	39.1	45.7	40.0	$P = 0.000$
Rural	Underweight	Men	6.4	5.7	7.0	5.2	5.8	6.1	$P = 0.753$
		Women	8.7	7.9	5.0	6.8	4.2	7.0	$P = 0.027$
		All	7.2	6.8	5.3	4.7	3.6	5.3	$P = 0.000$
	Overweight	Men	15.5	18.3	22.4	23.8	34.1	20.8	$P = 0.000$
		Women	31.2	33.1	40.4	39.0	51.2	36.9	$P = 0.000$
		All	25.3	28.3	34.1	36.7	45.2	35.3	$P = 0.000$
National	Underweight	Men	6.8	6.9	6.2	5.4	4.4	5.7	$P = 0.015$
		Women	8.0	7.1	4.5	4.0	2.8	4.8	$P = 0.000$
		All	7.4	7.0	5.3	4.6	3.6	5.3	$P = 0.000$
	Overweight	Men	16.5	20.1	23.0	26.0	35.3	25.5	$P = 0.000$
		Women	33.1	37.2	44.8	46.8	54.6	45.1	$P = 0.000$
		All	24.7	28.7	34.2	36.7	45.3	35.5	$P = 0.000$

general evolution between the two periods. The prevalence of underweight decreased and overweight increased among all categories. For both periods, underweight is more frequent among men than among women and in rural areas more than in urban areas, but overweight and obesity are more prevalent among women and in urban areas.

### Effect of lifestyle

The difference in anthropometric status between urban and rural populations may be explained by the difference in diet quality and in lifestyle. Regarding diet, although total energy intake is higher in rural areas (2746 kcal person<sup>-1</sup> day<sup>-1</sup>, compared with 2423 kcal person<sup>-1</sup> day<sup>-1</sup> in urban areas), it has a lower contribution from fats (19%, compared with 28% in urban areas) and of animal products (4.6%, compared with 9.7% in urban areas). Regarding lifestyle, rural people have higher calorie expenditure because of their agricultural occupation and transportation methods. Rural inhabitants generally walk to their fields, to the market and within their villages because of the lack of roads and mass transit systems; by contrast, urban people ride motorcycles, cars or buses.

### Effect of gender

The survey differences between men and women are interesting and some elements of explanation can be offered.

- *Difference in height.* Women tend to be shorter and lighter than men, and hence their body mass index (BMI) shifts rapidly to the overweight/obesity class.
- *Difference in physical activity.* Unemployment affects women more than men. In 1998, only 33% of the workforce were women while they represented more

than 50% of the population over 15 years of age<sup>7</sup>. Hence, compared with unemployed women, employed men would tend to spend more energy (working and walking to the workplace). Also, in relation to housework, which is the main energy-spending activity of housewives, women in the middle- and higher-income households recruit maids and therefore they rarely engage in any strenuous activity themselves. The availability of this type of 'womenpower' labour is still high in Morocco because of poverty and the lack of alternative jobs. Most middle- and high-income women hire a woman, or more often an adolescent or younger girl,\* to do the housework. These maids are often permanently employed and liberate the housewife from many energy-spending house chores, especially since labour-saving devices are not widely used in most households.

- *Difference in physiology.* Many women have multiple pregnancies and accumulate stored energy in their body during pregnancy. Since they do not engage in any hard activity (sports or work) after pregnancy, they do not lose the extra weight. It is also possible that higher energy intake and metabolism accompany hormonal changes during pregnancy and menstruation. It is common that initially svelte women became overweight after their first child. Examination of raw data from the 1998/99 survey confirms that there are more overweight married women under 25 years of age (27.6%) than single women of the same age group (18.7%).
- *Cultural factor:* As in all Arab and African countries,

\*In spite of the fact that Morocco has ratified the international children's rights convention, child labour is still very common. Lately, authorities with civil society have organised campaigns against children's employment but the effect is still very poor.

fatness has always been desirable and even considered a beauty criterion for women. It is considered a sign of prosperity and health; the following section corroborates this.

### ***Effect of economic status***

In other respects, obesity prevalence increases with economic status; overweight prevalence (men and women) is lowest (Table 3) among the lowest expenditure quintile (25%) and highest among the highest quintile (45%). The same tendency is observed when the observations are aggregated by age group. The opposite trend is observed for the prevalence of underweight; it is highest among the lowest quintile (7.4%) and lowest among the highest quintile (3.6%). Nevertheless, it is worth noting that the prevalence of overweight is high in all economic classes, and is certainly the major nutritional problem among all classes.

### ***Effect of education status***

Among men, the level of education has no effect on the prevalence of underweight in urban or rural areas, but does have an effect on the prevalence of overweight in urban areas. Indeed, overweight in urban areas is more prevalent among men with kindergarten schooling (religious basic schools) or no schooling (36.2%) than among those who have attended school (25.5%); among the latter, level of education has no effect. The same relationship is found when aggregating data by age group.

Among urban women, underweight is less prevalent among women with kindergarten schooling or no schooling (2.7%) than among those who have attended school (4.3%). This effect is not seen in rural areas. Prevalence of overweight is affected by level of education in urban and rural areas. In urban areas, lower levels of education tend to be associated with a higher rate of overweight (56.7%) than higher levels of education (43.1%). But this association is seen for women less than 40 years of age only and in urban areas only, as older women and rural women tend to be illiterate.

Therefore, it seems that higher levels of education tend to be associated with a lower rate of overweight. However, it should be stressed that overweight remains high among persons of all education levels. It is also worth noting that the relationship between anthropometric status and education is not in the same direction as that with economic status. This is explained by the fact that, in Morocco, level of education does not increase with income; in fact, richer people may even be illiterate.

### ***Children's anthropometric status***

Data from the PAPCHILD 1997 survey show that while under-nourishment persists (24% stunting and 9% underweight) among children under five years<sup>3</sup>, the prevalence

of overweight\* is quite high (9.2%).† This prevalence is slightly higher among boys (9.5%) than among girls (8.8%) and higher among urban children (10.1%) than among rural children (8.6%).

Unfortunately, the only available data on overweight from previous surveys are those from the 1987 national survey among children under 36 months of age. These show that the prevalence of overweight was 3.1% (2.6% for boys and 3.6% for girls), slightly higher in urban areas (4.3%) than in rural areas (2.5%). It is clear, therefore, that in spite of the difference in age group, the prevalence of overweight among children is on the rise.

### **Health transition**

Data analysis of a survey conducted by the Ministry of Health in 2000 on risk factors of cardiovascular diseases is ongoing. Preliminary results‡ indicate that hypertension affects about a third of the population over 20 years of age, and is higher among women than among men. Diabetes equally affects 6.6% of men and women nation-wide, but is higher in urban areas. Hypercholesterolaemia is a concern of 29% of the population and is more frequent among women, and in urban areas.

With regard to lifestyle, the survey considered cigarette smoking that is common among 32% of men (34% in urban and 30% in rural areas). The figure for women is very low (0.6%) and may be related to under-declaration.

Some estimations indicate that cancer is the fourth leading cause of death in the country, accounting for 7.8% of the global mortality, and that 40 000 new cases are recorded annually. However, these figures cannot be considered accurate since no official register for cancer or for death causes is presently available in the country.

### **Conclusion**

Examination of available data revealed that overweight and obesity are on the rise in Morocco. While they constitute a major public health problem for both men and women in rural and urban areas, the analysis shows overweight is a more serious problem among women and urban people than among men and rural people. Both the shift in diet and the change in lifestyle appear to contribute to what seems to be a rapidly growing nutrition and health problem.

\*Based on a weight-for-height Z-score higher than or equal to 2.00.

†It is interesting to note that the PAPCHILD 1997 survey report did not include any values for overweight among children. When I enquired about data, the researcher indicated that they did not think there is enough 'overweight' among children to 'worry about' and hence the available data were not included in the report. However, the researcher sent me the results. Those that I examined revealed that overweight is actually growing among children.

‡Unpublished.

However, this should not hinder the continuing existence of undernutrition, especially among children. The efforts aimed at improving the nutritional status in the country should necessarily address both undernutrition and overweight through the betterment of diet and lifestyle.

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