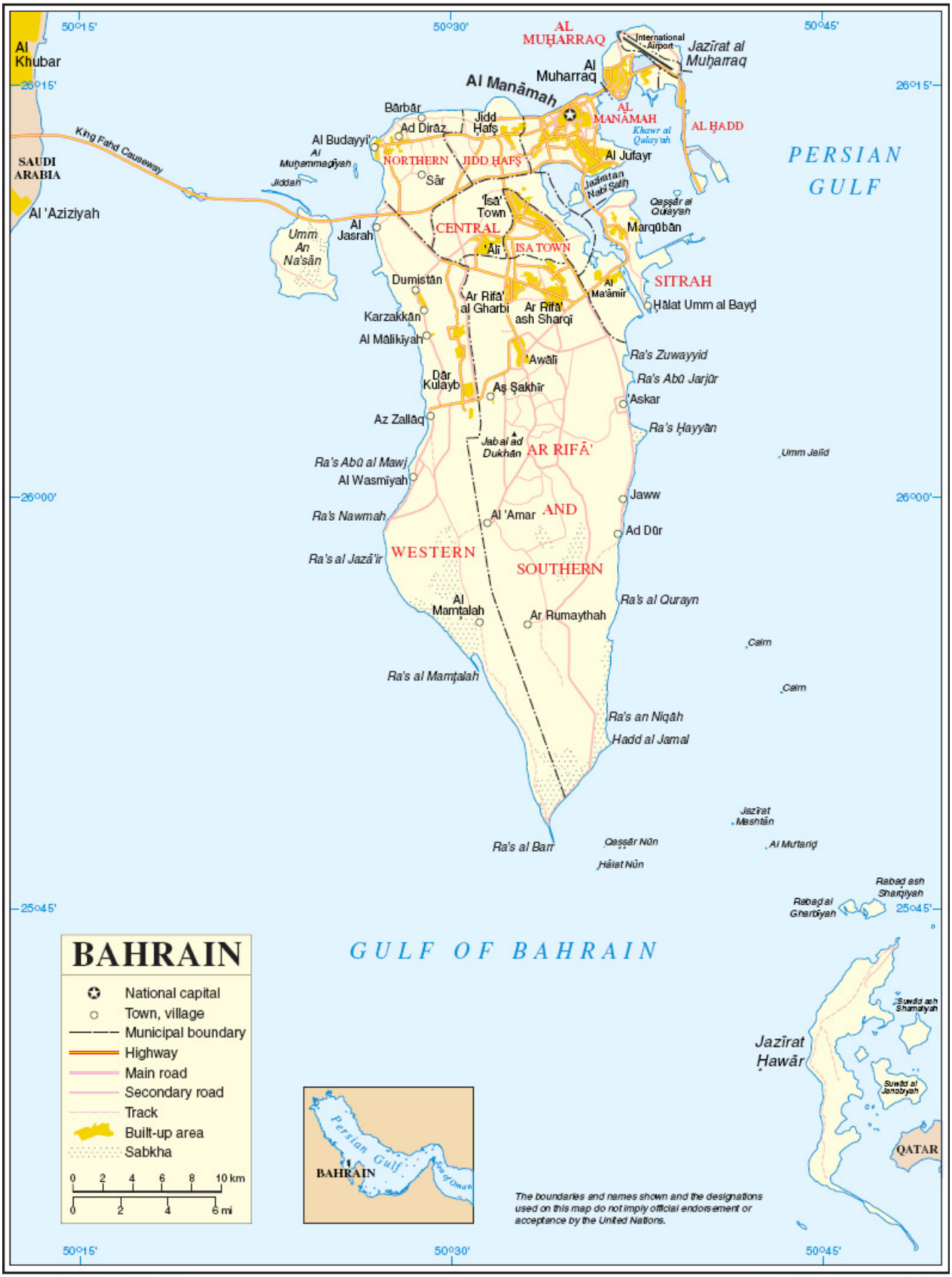
NUTRITION COUNTRY PROFILE
KINGDOM OF BAHRAIN
2007



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Summary

The Kingdom of Bahrain is a small country of the Near East which has experienced a major improvement in the standard of living in the last decades.

Due to harsh environmental conditions, agricultural production covers only a small fraction of the country's food needs. Nevertheless agricultural production has increased due to expansion of cultivated areas and development of irrigation, in spite of important constraints such as soil infertility, scarcity of irrigation water, and a limited supply of skilled workers.

There have been major improvements in access to health services and education. Health Services provide free medical care to all Bahraini citizens. Over the last three decades life expectancy has increased from 60 to 74 years. The quality of maternal and child health care is reflected in the low infant mortality rate and in the decrease in maternal mortality.

The Human Development Index has reached a high level. The proportion of the population affected by poverty is minor. Social programmes are well established and will enable the National Millennium Development Goals to be met.

Due to globalization and to the rapid increase in living standards, dietary patterns have undergone an intense westernization. Consumption of fast-foods and eating out have become common. Lifestyles are often sedentary. Almost two-thirds of the adults are either overweight or obese. This nutrition transition will cause a sharp increase in the incidence of non-communicable diseases.

The immigrant population, which is quite large, shares the same problems of overnutrition as the Bahraini population.

Breastfeeding is a very common practice among Bahraini women as 95% of children under two years were reported to have been breastfed at some point. Yet, exclusive breastfeeding is very low among infants under 4 months. Furthermore, bottle-feeding is a very common practice. These inadequate infant feeding practices probably play an important role in the obesity epidemic. The Baby Friendly Hospital Initiative (BFHI) and the Code of Marketing of Breast-milk Substitutes, which have been implemented for more than a decade, have not yet given the expected results.

Regarding micronutrient deficiencies, iron deficiency anemia remains an important public health problem. High prevalence is observed among preschool children and women, but more data are needed to assess the impact of current intervention programmes such as iron supplementation and flour fortification with iron. Vitamin A and iodine deficiency are not considered public health problems in Bahrain.

Despite notable efforts of the government in the nutrition and health sectors, the obesity epidemic is progressing and innovative ways of combating it are needed.

Summary Table

Basic Indicators				Year
Population				
Total population		0.707	million	2004
Rural population		10	%	2003
Population under 15 years of age*		37	%	2004
Annual population growth rate		3.4	%	2003
Life expectancy at birth*		74	years	2004
Agriculture				
Agricultural area		14	%	2002
Arable and permanent cropland per agricultural inhabitant		<1	Ha	2002
Level of development				
Human development and poverty				
Human development index		0.846	[0-1]	2003
Proportion of population living with less than 1$ a day (PPP)	***MDG1***	0	%	2003
Population living below the national poverty line	***MDG1***	11	%	2003
Education				
Net primary enrolment ratio	***MDG2***	90	%	2003
Youth literacy (15-24 years)	***MDG2***	99	%	2003
Ratio of girls to boys in primary education	***MDG3***	1	girl per 1 boy	2003
Health				
Infant mortality rate	***MDG4***	10	‰	2004
Under-five mortality rate	***MDG4***	11	‰	2004
Maternal mortality ratio (adjusted)	***MDG5***	28	per 100 000 live births	2000
Tuberculosis prevalence	***MDG6***	16	per 100 000 people	2004
Environment				
Sustainable access to an improved water source in rural area	***MDG7***	100	% of population	2004
Nutrition indicators				*Year*
Energy requirements				
Population energy requirements		2230	kcal per capita/day	2000
Food Supply				
Dietary Energy Supply (DES)		n.a.		
Prevalence of undernourishment	***MDG1***	n.a.		
Share of protein in DES		n.a.		
Share of lipids in DES		n.a.		
Food diversification index		n.a.		
Food consumption				
Average energy intake (per capita or per adult)		n.a.		
Percent of energy from protein		17	%	2002
Percent of energy from lipids		22	%	2002
Infant and young child feeding	**Age**			
Exclusive breastfeeding rate	<4 months	10	%	2002
Timely complementary feeding rate		n.a.		
Bottle-feeding rate		n.a.		
Continued breastfeeding rate at 2 years of age		n.a.		
Nutritional anthropometry				
Stunting in children under 5 years		8	%	2000
Wasting in children under 5 years		6	%	2000
Underweight in children under 5 years		8	%	2000
Women with BMI<18.5 kg/m²		4	%	1999
Women with BMI ≥25.0 kg/m²		65	%	1999
Micronutrient deficiencies				
Prevalence of anemia in women		51	%	2003

n.a.: not available
MDG: Millennium Development Goal
* Bahraini citizens only

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Acronyms

BMI	Body Mass Index
CDC-US	Center for Disease Control and Prevention 2000 growth charts for the United States
CIO	Central Informatics Organization of Bahrain (former Central Statistics Organization – CSO. The name was changed in 2003)
FAO	Food and Agriculture Organization of the United Nations
FAOSTAT	FAO Statistical Databases
FIVIMS	Food Insecurity and Vulnerability Information and Mapping Systems
GDP	Gross domestic product
HID	Health Information Directorate, MOH
ILO	International Labour Organization
ITU	International Telecommunication Union
MDG	United Nations' Millennium Development Goals
MICS	Multiple Indicator Cluster Survey
MOC	Ministry of Industry & Commerce
MOH	Ministry of Health
NNS	National Nutrition Survey
PPP	Purchase Power Parity
UNDP	United Nations Development Programme
UNESCO	United Nations Educational, Scientific and Cultural Organization
UNICEF	United Nations Children's Fund
UNPD	United Nations Population Division
UNSTAT	United Nations Statistics Division
WB	World Bank
WHO	World Health Organization

Part I: Overview and basic indicators

I.1 Context

The Kingdom of Bahrain consists of an archipelago of over 30 islands in the southern Persian Gulf, between the Qatar Peninsula on the east and the coast of Saudi Arabia on the west. The total area is of about 700 km^2, most of which consists of the main island, also named Bahrain (FAO, Forestry Division Country Profiles). Bahrain was formerly split into twelve municipalities administered from the capital city of Manama. In 2002, these were superseded by five governorates or *muhafazath*: Capital, Muharraq, Central, Northern and Southern.

The islands are mostly low-lying and rocky, although Bahrain Island rises to an elevation of 135 m at its centre. The country is very arid. Rainfall is scarce, averaging about 80 mm annually, the rainfall period extending from November to April. The average annual temperature is about 27° C, but summer temperatures often exceed 38 °C. Winter temperatures are mild, ranging from 10 °C to 27 °C. Relative humidity is high (annual mean 67%) due to the surrounding sea water (CIO, 2003).

I.2 Population

Population indicators

Bahrainis represent 62 % of the total population, estimated at about 707 000 in 2004, and are concentrated mainly in the capital city Manama and in the Muharraq Island (MOH, 2005; CIO, Statistical reports). Population density has reached 1 113 inhabitants per km^2 in 2005 (CIO, Statistical reports). The majority of the population lives in urban areas (UNDP, 2005).

The population is very young: more than half of Bahrainis (57%) are under 25 years of age. In contrast, the non-Bahraini population (immigrants) is mainly composed of adults: approximately 75 % are aged between 25 and 60 years. Bahrain has a high annual population growth rate which was estimated at 3.4 % in 2003. The crude birth rate was 21.1 ‰ in 2004 (MOH, 2005).

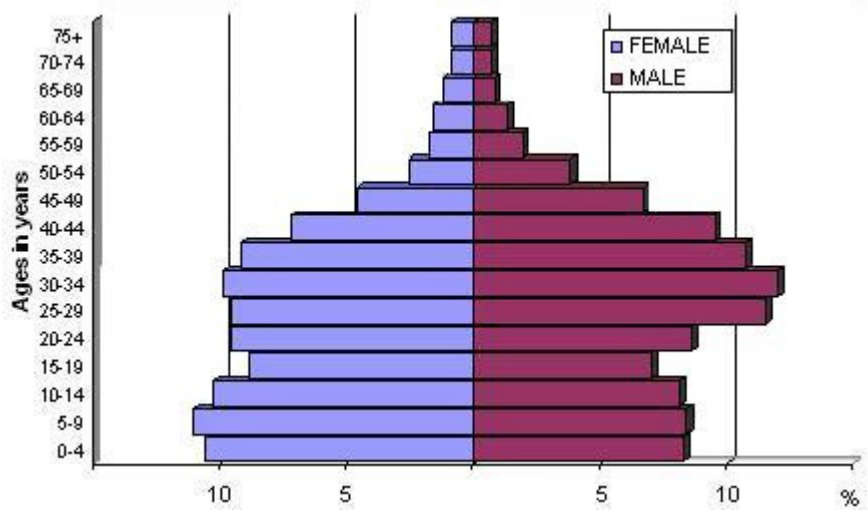
Life expectancy at birth of the Bahraini citizens has increased in the last decades from about 60 years during the period 1965 - 1970 to 74 years in 2004.

The net migration rate varies greatly from one year to another (UNSTAT, United Nations Common Database).

Table 1: Population indicators

Indicator	Estimate		Unit	Reference Period	Source
	Bahraini	Non-Bahraini			
Total population	0.707		million	2004	HID
Annual population growth rate	3.4		%	2003	UNDP
Crude birth rate	21.1		‰	2004	HID
Population distribution by age:					
0-4 years	12	5	%	2004	HID
5-14 years	25	9	%	2004	HID
15-24 years	20	11	%	2004	HID
25-59 years	37	74	%	2004	HID
60 and over	6	1	%	2004	HID
Rural population	10		%	2003	UNPD
Agricultural population	<1		%	2004	FAO
Population density	1113		inhabitants per km^2	2005	CIO
Median age	28		years	2005	CIO
Life expectancy at birth	74	n.a.	years	2004	HID
Population sex ratio	135		males per 100 female	2004	HID
Net migration rate	9.6		%	2000	UNSTAT
Total dependency rate	43		%	2004	HID

Population pyramid



Source: CIO, 2002
Note: this pyramid includes both Bahrainis and immigrants.

I.3 Agriculture

Despite the difficulties faced by agriculture in Bahrain because of infertile soils, scarcity of irrigation water, and a limited supply of skilled workers, production has increased due to growth of cultivated areas and irrigation. This growth occurred as the Ministry of Municipalities and Agricultural Affairs adopted different strategies such as providing farmers with mechanical equipment and seeds at low prices. The Directorate of Agriculture also provides training to farmers for better production, focusing mainly on overcoming problems related to water scarcity and soil quality. In order to develop the poultry industry, the Ministry also established a shareholding company which produces poultry and eggs. Many private sector farmers are working in this field (CIO, 2003). Nevertheless, the food production of Bahrain fulfils only a small fraction of the country's food needs.

Land use and irrigation statistics

Table 2: Land use and irrigation

Type of area	Estimate	Unit	Reference period	Source
Total Land Area	72	1000 Ha	2004	HID
Agricultural Area	14	%	2002	FAO
Arable lands & Permanent Crops	8	%	2002	FAO
Permanent Crops	6	%	2002	FAO
Permanent Pasture	6	%	2002	FAO
Forested land areas	n.a.	-	-	-
Irrigated agricultural land	6	%	2002	FAO
Arable & Permanent cropland	<1	Ha per agricultural inhabitant	2002	FAO

N.B. Percents are calculated on the total land area.
n.a.: not available

Main crops, agricultural calendar, seasonal food shortage

In 2002, the major food commodities produced in Bahrain were cow milk, dates, fresh fruits, tomatoes and eggs (FAO, Statistics Division).

Tomato production increased from 2 048 tons in 2001/2002 to 3 067 in 2002/2003. Cabbage production increased in the same period from 677 to 842 tons. Similar increases were achieved in the production of lettuce, green onions, okra, cantaloupes and cow milk (CIO, 2003).

Crop Calendar

Foods are usually available all year round. However, for many locally produced vegetables, prices fluctuate throughout the year.

Livestock production and fishery

Industrial and non-industrial fisheries are the main source of local fish supply. This has allowed Bahrain to become self-sufficient in fishery products and to develop exports of sea products. The Directorate of Fisheries provides fishermen with training and essential support such as low profit financial loans, suitable seaports, and safe shelter for boat keeping (CIO, 2003).

Table 3: Livestock and fishery statistics

Livestock production and fishery	Estimate	Unit	Reference period	Source
Cattle	11 000	number of heads	2003	FAO
Sheep and Goats	59 000	number of heads	2003	FAO
Poultry Birds	470	thousands	2003	FAO
Fish catch and aquaculture	13 641	tons	2003	FAO

I.4 Economy

The Bahraini economy relies mainly on aluminium and oil industries, along with other industries (food, metal, printing and paper, building materials). Trade, hotels and restaurants, construction, real estate and business activities make up over 25 % of the total GDP.

Oil, since its discovery in the early 1930's, has been a major component of the Bahraini economy. Oil & gas represent about one third of the total contribution of non-financial corporations, and manufacturing represents approximately 16 %. The non-financial corporations provide 74 % of total GDP, the financial corporations contribute 17 %, government services 11 %, education and health services combined make up 7 %, The rest is made up of other activities, import duties and other adjustments (MOC, 2003).

Table 4: Basic economic indicators

Indicator	Estimate	Unit	Reference Period	Source
Gross Domestic Product per capita	15 490	US $	2004	HID
GDP annual growth	6.8	%	2003	WB
Gross National Income per capita	14 680	US $	2004	HID
Industry as % of GDP	24	%	2002	MDG
Agriculture as % of GDP	0.4	%	2003	CIO
Services as % of GDP	66	%	2002	MDG
Paved roads as % of total roads	79	%	2002	CIO
Internet users	2 161	per 10 000 people	2003	WB
Total debt service as % of GDP	n.a.	-	-	-
Military Public expenditure	5.1	% of GDP	2003	UNDP

n.a.: not available

I.5 Social indicators

Health indicators

The recent economic development has had a large impact on the overall health conditions in Bahrain. Health services have been greatly enhanced, and public health conditions improved. On the other hand the economic development has led to unhealthy changes in dietary patterns.

Public Health Services in Bahrain started in the 30's with preventive services to eradicate malaria, smallpox and tuberculosis. As a result, a noticeable decrease in the prevalence of these diseases was documented. Since then, the Government has been working to provide advanced free medical care to all inhabitants of Bahrain, both Bahraini and non Bahraini citizens. However, in the 90's, a nominal fee of one Bahraini Dinar (≅ 2.6 US$) per visit was introduced for non-Bahraini citizens.

The Government also adopted the World Health Organization's Goal to achieve "Health For All in the Year 2000". As a result of the health development experienced by Bahrain, life expectancy of Bahrainis has increased significantly in the last decades, i.e. from 60 years in 1965-70 to 74 years in 2004 (MOH, 2005).

Maternal and child health services have been a priority of the government for many years. This is reflected in the relatively low infant mortality rate (10 ‰) and the decrease of maternal mortality rate from 23 per 100 000 live births in 1999 to 20 in 2004 for Bahrainis and non-Bahrainis taken together (MOH, 2005).

Due to high immunization coverage among young children (more than 98 %), childhood diseases have been almost eradicated in Bahrain. BCG vaccination, which provides protection against tuberculosis, is given at birth to expatriates newborns. Tuberculin testing is routinely done among pre-school children 4-6 years old (MOH, 2005). Non-immunized pregnant women are vaccinated against tetanus which also protects the newborn.

Furthermore, there has been a substantial decrease in the number of malaria (P. vivax) cases (all imported, i.e. not originated in Bahrain) from 192 cases in 1995 to 81 cases (11.5/100 000) in 2004, while there has been no local transmission since 1985. However, prevalence of viral hepatitis increased from 23.3/100 000 in 2000 to 64.1/100 000 in 2004. Recently, cases of sexually transmitted diseases have been increasing due to unprotected sexual contacts (MOH, 2005).

Table 5: Health indicators

Indicator	Estimate	Unit	Reference Period	Source
Mortality				
Infant mortality	10	‰	2004	HID
Under-five mortality	11	‰	2004	HID
Maternal mortality ratio :				
reported	20	per 100 000 live births	2004	HID
adjusted	28	per 100 000 live births	2000	UNICEF
Morbidity				
Prevalence of diarrhea in the last 2 weeks in under-fives	10	%	2000	MICS
Oral Rehydration rate among under-fives	21	%	2000	MICS
Percentage of under-fives with acute respiratory infections in the last 2 weeks	4	%	2000	MICS
Tuberculosis prevalence	16	per 100 000 people	2004	HID
HIV/AIDS				
Prevalence of HIV/AIDS cases in adults	<1	%	2003	UNICEF
Percentage of women (15-24) who know that a person can protect herself from HIV infection by consistent condom use	32	%	2000	MICS
Immunization				
Percent of infants with immunization against tuberculosis at 1 year of age*	n.a.	-	-	-
Percent of infants with DTP3 immunization at 1 year of age	98	%	2004	HID
Percent of infants with immunization against measles at 1 year of age	99	%	2004	HID
Percent of pregnant women immunized against tetanus	49	%	2004	HID

n.a.: not available
DTP3: Diphtheria, Pertussis (whooping cough) and Tetanus vaccine – three doses

Water and sanitation

According to the Ministry of Health, 100 % of the population, Bahrainis and non-Bahrainis included, has access to an improved water source. Moreover, the whole population has access to improved sanitation (MOH, 2005). There are no significant differences between rural and urban areas, as all benefit from water and sanitation services.

Table 6: Access to safe water and sanitation

Indicator	Estimate	Unit	Reference period	Source
Sustainable access to an improved water source				
Urban	100	% of population	2004	HID
Rural	100	% of population	2004	HID
Access to improved sanitation				
Combined urban/rural	100	% of population	2004	HID

Access to health services

Health personnel and structures are well developed and equally distributed among the different *muhafazath* of the country. The number of physicians per 100 000 people has increased from 153 in 2000 to 224 in 2004. The whole population (including immigrants) has access to affordable essential drugs. The percentage of births attended by skilled health personnel has increased from 98 % in 2000 to 99 % in 2004 (MOH, 2005).

Table 7: Access to Health Services

Indicator	Estimate	Unit	Reference Period	Source
Health personnel: number of physicians	224	per 100 000 people	2004	HID
Population with affordable access to essential drugs	100	%	2004	HID
Percentage of births attended by skilled health personnel	99	%	2004	HID
Public expenditure on Health	2.1	% of GDP	2004	HID

Education

Figures show high literacy rates among the Bahraini population (88 %), with the female literacy rate reaching 90% of the male rate (MOH, 2005). Education in public schools in Bahrain is free for all Bahraini and non-Bahraini students. The Ministry of Education provides all public schools with a cafeteria. Food in compliance with the specifications of the Ministries of Education and Ministry of Health is sold in school canteens.

Table 8: Education

Indicator	Estimate	Unit	Reference Period	Source
Adult literacy	88	%	2003	UNDP
Adult literacy rate : females as % of males	90	%	2003	UNDP
Youth literacy (15-24 years)	99	%	2003	UNDP
Net primary enrolment ratio	90	%	2002-2003	UNESCO
Grade 5 completion rate	99	%	2002-2003	UNESCO
Ratio of girls to boys in primary education	1.00	number of girls per 1 boy	2002-2003	UNESCO
Public expenditure on education	4.1	% of GDP	1999	UNDP

Level of development, poverty

The government has established social programmes to meet the National Millennium Development Goals and help the poor. The Human Development Index for Bahrain has increased from 0.747 in 1980 to 0.846 in 2003 (UNDP, 2005). There is no extreme poverty in Bahrain; however 11% of the Bahraini population lives with less than US$29 per day per family of 6 members, which is considered the average level of expenditure needed to live in Bahrain at an acceptable level, covering needs for food, drink, housing, clothing, energy, fuel, transport, communication, education and health (MDG, 2003).

Table 9: Human development and poverty

Indicator	Estimate	Unit	Reference period	Source
Human development index (HDI)	0.846	value between 0-1	2003	UNDP
Proportion of population living with less than 1$ a day (PPP)	0	%	2003	MDG
Population (families) living below the national poverty line	11	%	2003	MDG
Human poverty index (HPI-1)	n.a.	-	-	-

n.a.: not available

Other social indicators

The rate of employment of Bahraini women has increased from 17 % of total employment in 1991 to 24 % in 2001. In the agricultural sector, the percentage of employed women increased from 5 % in 2002 to 8 % in 2003. In the industrial sector, women's participation decreased slightly from 28 % in 2002 to 26 % in 2003. Women are mainly employed in health services in Bahrain, as in 2003 they accounted for about 53 % of the total health sector employees (CIO, 2003).

According to the Bahrain MICS conducted in 2000, 5.5 % of Bahraini children aged 5-15 years held paid jobs, while 0.5 % did unpaid work outside the family (MICS, 2001). In November 2001, a major regional workshop, supported by UNICEF, was held in Bahrain regarding the protection of children from abuse and neglect. Projects were developed including the use of media to raise awareness of child protection issues (UN, 2003).

Table 10: Other social indicators

Indicator	Estimate	Unit	Reference period	Source
Gender related development index (GDI)	0.837	value between 0-1	2003	UNDP
Women's wage employment in non-agricultural sector as % of total non agricultural employees	12.5	%	2002	UNSTAT
Ratification of ILO Convention 182 on The Worst Forms of Child Labour	ratified	-	2001	ILO

Part II: Food and nutrition situation

II.1 Qualitative aspects of the diet and food security

Food consumption patterns

Traditional staple foods of the Bahraini diet are rice and other cereals accompanied by fish, meat and poultry.

Large scale changes in foods patterns have occurred in the last 30 years. There has been a massive "westernization" of dietary patterns due to the recent economic development of the country. Consumption of rice and other cereals, as well as fish, appear to have decreased while the intake of red meat, chicken, eggs and milk has increased. These changes are due to income growth and improved standards of living as well as to the increasing urbanization and rapid development of the food processing industry. Processed foods are more available than before and snacking is becoming very common. Fast-food consumption has increased, even in families where a domestic helper is available. Also eating out has become a common habit, particularly during week-ends and holidays, as it is a pleasant way of socializing. To a large extent, these changes are considered to be making food habits unhealthy.

There is much discussion about the role played by fast food and take-away restaurants in changing food habits of Bahrainis. Food served in these restaurants, which are rapidly multiplying, is relatively cheap. However there hasn't been any specific assessment of their contribution to overall energy and fat intakes in Bahrain. Soft drinks are also very cheap and are frequently considered as contributing to excess energy intake. Larger portions and loss of control over the composition of meals are other issues considered as potential contributing factors to increased fat and energy intake.

There are no major differences in food habits between urban and rural areas. In addition, Bahrain has no food availability or food access problem and all types of food and international cooking are available.

Bahrainis still enjoy sharing meals with the whole family. The average number of meals is 2-3 per day, with 2-3 additional unhealthy snacks (deep fried stuffed pastry, soft drinks, traditional sweets like *halwa*, *baklawa*, dumplings, etc). Most families join their relatives for a weekly meal, which is longer and richer both in quantities and quality of food than regular everyday meals and therefore leads to an increased food intake.

Adolescents are at high risk of overnutrition as their food habits are becoming unhealthy. Girls are more aware of their body image, and this can lead them to adopt risky dietary patterns, such as unbalanced restrictive diets (e.g. low carbohydrate/high protein diets, very low calorie diets) without medical supervision.

Food security situation

Food security is defined as "A situation that exists when all people, at all times, have physical, social and economic access to sufficient, safe and nutritious food that meets their dietary needs and food preferences for an active and healthy life" (FIVIMS).

Bahraini citizens have easy access all year round to all types of food and the food security situation is adequate. The 1994/95 Household Expenditure and Income Survey, carried out among 4078 households residing throughout Bahrain, showed the following pattern of expenditure on food and beverages: meat accounted for 13 % of the mean annual household expenditure, followed by fruit (11 %), fish (11 %), cereals (10 %), milk and dairy products (8 %). Vegetables accounted for only 7 % of expenditure. Expenditure on food eaten away from home was 6 %, on sugar and sugary products was 4 %, while expenditures on fats, spices, and nuts were 3 %, 3 %, and 2 % respectively (CSO, 1995).

There are no data on the food security situation of the immigrant population.

II.2 National food supplies data

Supply of major food groups

No data are available on supply of major food groups at national level. Consequently statistics regarding the per capita dietary energy supply are not available. At national level, energy requirements are estimated at 2230 kcal per capita per day[1].

Food imports and exports

In Bahrain, less than 10% of the food consumed by the population is locally produced and most of the food imports are under government control.

Food aid

Bahrain is not a food aid beneficiary. During international crises or emergencies, Bahrain has acted as a food aid donor.

II.3 Food consumption

National level surveys

The Bahrain National Nutrition Survey (NNS), carried out in 1998-1999, is the only nationwide representative survey that provides information on dietary intake of individuals (MOH, 2002). The total sample comprised 2 301 individuals, 1 120 males and 1 181 females. The participants were adults aged 19 years and over. They were randomly selected from 11 of the 12 municipalities of the country, representing all four health regions. The Eastern region was not included as it is the least populated.

Two dietary assessment methods were used, a quantitative 24-hour recall and a qualitative food frequency questionnaire (FFQ). Respondents were asked to report all foods and beverages consumed over the previous 24 hours (midnight to midnight). For accuracy, respondents were first asked to recall all food items as they remembered them, and then were asked specific questions about the types of food and ingredients of mixed dishes. The amounts of food items were specified. Portion sizes were estimated using household measures such as bowls and plates commonly used among Bahraini households. Information on food consumed outside the home was also collected through direct questions and recorded in portion sizes (MOH, 2002). The FFQ was used to assess usual dietary intake over a period of a week.

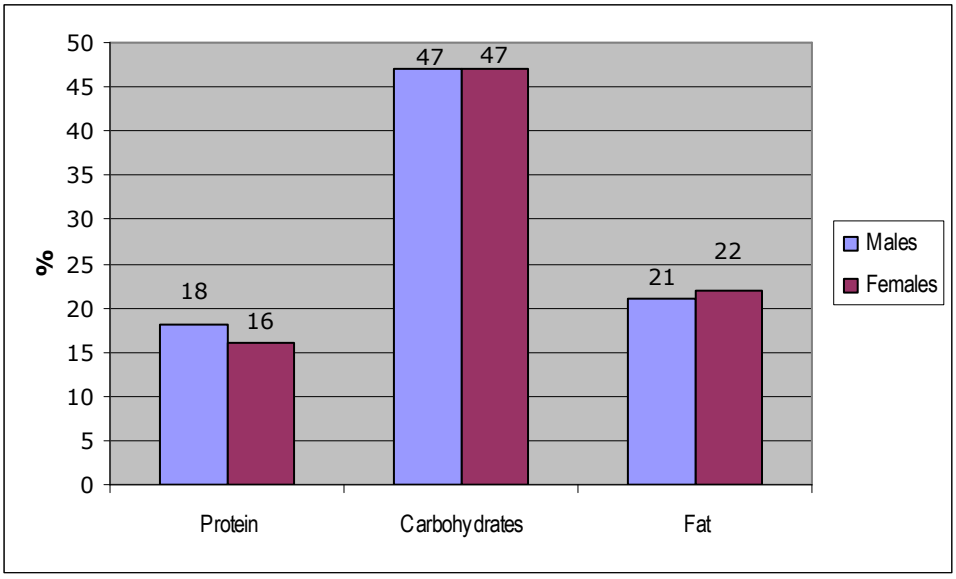
Data based on the 24-hour recall, presented in Fig.1, show that the share of protein, carbohydrates and fat in energy intake was adequate with regard to current recommendations (WHO/FAO, 2003). However, energy intake was lower than recommended (British Nutrition Foundation, 2004). This was probably due to under-reporting which was more frequent among individuals who were overweight or obese. Both males and females underreported their intake. Intakes of sodium were high, with mean levels more than twice those recommended. Intake of selected micronutrients was generally adequate except for calcium in men and women, zinc in older men and women (50 years and above), iron in women of child-bearing age and folate in older women, but interpretation is made difficult due to the overall underestimation of intake.

Results of the FFQ showed that the Bahraini people rely mostly on cereals, dairy products, meat, fish and fruit for their diet. Staple foods are cereals (rice, white bread, other grains and cereal sub-products) as 80 % of the population consume these foods on a daily basis. Dairy products (mainly full fat milk and milk products) are consumed daily by 66 % of the population. Fruit and vegetables are consumed daily by 44 % of Bahrainis. White bread is consumed much more often than whole wheat bread.

[1] Energy requirements are for a healthy and active lifestyle calculated using the FAO software (FAO, 2004). Software default values attribute to 90 % of the urban adult population a light physical activity level (PAL=1.55) and greater than light activity to the remaining 10% (PAL=1.85), and to 50% of the rural adult population a light activity (PAL=1.65) and greater than light physical activity (PAL=1.95) to the other 50%.

The consumption of red meat is less common than that of chicken: 47 % of Bahrainis consume red meat 2 or more times per week, while 76 % consume chicken 2 or more times per week. Fish consumption is quite frequent as 86 % eat fish 2 or more times per week. Regarding eggs, 58 % consume eggs 2 or more per week (MOH, 2002).

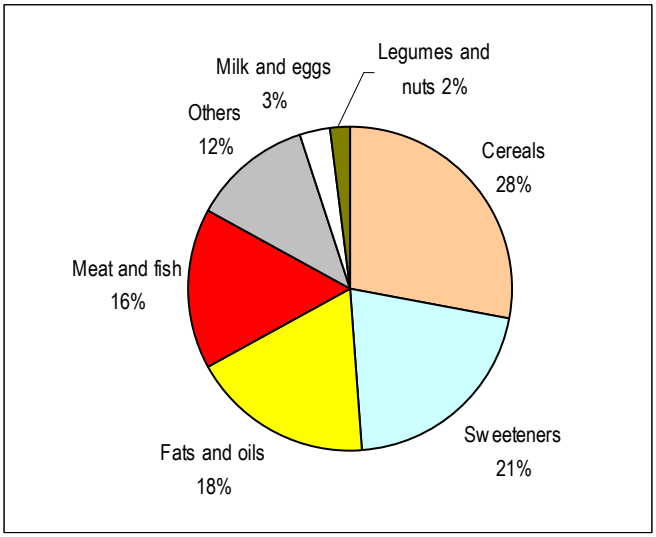
Figure 1: Macronutrient contribution to total energy intake among adults



Source: MOH, 2002

The share of macronutrients in energy intake is adequate in comparison with WHO/FAO recommendations (WHO/FAO, 2003). Nevertheless, since there was underreporting of food intake, these results should be interpreted with caution as there could have been differential under-reporting of the macronutrients, e.g. more underreporting of fat rather than protein and carbohydrates (MOH, 2002).

Figure 2: Contribution of foods to energy intake



Source: MOH, 2002

Main sources of energy are cereals, followed by sugars (sweeteners), fats and oils (vegetable oils and animal fats taken together), and meat and fish. This indicates that the proportion of energy of non-animal origin is higher than energy from animal origin.

The main sources of protein are meat (56 %) and cereals (25 %). The most important fat sources are fats and oils (58 %) and meat (31 %) (MOH, 2002).

II.4 Infant and young child feeding practices

A national survey on breastfeeding in Bahrain took place in 2002 in 19 health centres, throughout the country, attended by mothers for the routine screening and vaccination of their children. Four hundred children aged 0 to 24 months were surveyed to assess the breastfeeding practices in Bahrain (MOH, 2003). The results indicate that breastfeeding is a very common practice among Bahraini women as 95 % of children 0-24 months were breastfed. Unfortunately, sample sizes for the estimation of prevalence of current infant feeding practices are somewhat small limiting the validity of the estimates. The rate of exclusive breastfeeding up to 4 months of age appeared to be very low (10 %), while the prevalence of bottle feeding among 0-11 month infants was very high (61%). Furthermore, 51 % of the children received formula milk as well as breast milk. The mean age for introduction of complementary feeding was 4.2 months (MOH, 2003).

Data on initiation and duration of breastfeeding are documented by two earlier national surveys conducted in 1995 and 1989. According to the 1995 Family Health Survey, 38% of neonates were breastfed within one hour of birth and mean duration of breastfeeding, estimated among children under three years, was 15 months (MOH, 2000a). The previous 1989 Bahrain Child Health Survey, conducted among 3714 Bahraini households randomly selected from the Central Population Registry, showed that the prevalence of early initiation of breastfeeding, i.e. within the first hour of birth, was almost the same, 34 %, while mean duration of breastfeeding was 11 months for children under five (MOH, 1992). Thus, between 1989 and 1995, the prevalence of early initiation of breastfeeding did not increase.

The 1995 survey showed that duration of breastfeeding was shorter among urban mothers and educated mothers (MOH, 2000a).

The Baby Friendly Hospital Initiative (BFHI) was adopted in 1992. By 1993, all governmental hospitals in Bahrain were accredited as Baby Friendly Hospitals by UNICEF. In addition, the implementation of the Code of Marketing of Breast-milk Substitutes took place in 1993, and a national committee was appointed to monitor and follow up this issue. Data from the 2002 survey indicate that these initiatives were not very successful in reducing the prevalence of bottle-feeding (MOH, 2003). Infant feeding practices are still not adequate; therefore more efforts are needed to improve them.

Table 11: Initiation and duration of breastfeeding

Survey name/date (Reference)	Background characteristics	Sample size (all children under two years)	Percentage of children under two years everbreastfed	Number of children under two years everbreastfed	Among children everbreastfed, percentage breastfed within one hour of birth	Among children everbreastfed, percentage breastfed within 24 hours of birth*	Median duration of breastfeeding in children under two years (in months)
Breastfeeding Patterns & Practices in The Kingdom of Bahrain 2002 (MOH, 2003)	**Total**	408	95.1	388	n.a.	n.a.	n.a.
	Sex						
	M	206	95.6	197	n.a.	n.a.	n.a.
	F	202	94.6	191	n.a.	n.a.	n.a.
	Mother's education						
	≤ High school	296	94.3	279	n.a.	n.a.	n.a.
	> High school	112	97.3	109	n.a.	n.a.	n.a.
Survey name/date (Reference)	Background characteristics	Sample size (all children under three years)	Percentage of children under three years everbreastfed	Number of children under three years ever breastfed	Among children everbreastfed, percentage breastfed within one hour of birth	Among children everbreastfed, percentage breastfed within 24 hours of birth*	Median duration of breastfeeding in children under three years (in months)
Bahrain Family Health Survey 1995 (MOH, 2000a)	**Total**	1 947	96.5	1 879	37.6	n.a.	14.6
	Sex						
	M	952	96.1	1 871	36.7	n.a.	13.9
	F	995	97.0	1 889	38.7	n.a.	15.2
	Mother's status						
	no education	184	95.1	175	35.3	n.a.	17.5
	primary	423	97.0	699	43.5	n.a.	16.3
	secondary or higher	340	96.5	1 006	36.3	n.a.	12.8

*Includes children who started breastfeeding within one hour of birth

II.5 Nutritional anthropometry

Low birth weight

In the Kingdom of Bahrain, all neonates are weighed. In 2004, the prevalence of low birth weight (less than 2 500g) was 8.3 % for Bahrainis and 8.0 % for non-Bahrainis (MOH, 2005). Since the vast majority of births (99.2 %) were attended by skilled health personnel, these estimates can be considered as representative at national level.

Anthropometry of preschool children

Three consecutive national surveys, conducted in 1989, 1995 and 2000, document the nutritional status of preschool children (MOH, 1992; MOH, 2000a; MICS, 2001).

The last survey, conducted in 2000, revealed that only 8 % of Bahraini preschool children were stunted. Prevalence of wasting was 6 % and 8 % of children were underweight (MICS, 2001).

According to the previous survey, the Bahrain Family Health Survey conducted in 1995, the stunting prevalence was found to be 10 % for boys and 9 % for girls. Stunting affected children immediately after birth: in the first 6 months of life already 7 % were stunted. Severe stunting was uncommon. Wasting rates were the same among male and female children (5 %). Furthermore, no severe wasting was found (MOH, 2000a).

Regional differences were not documented.

Prevalence of overweight is not documented in the most recent surveys. According to the 1989 survey, prevalence of overweight (weight-for-height >+2 Z-scores) was 3 % in children under five years of age (MOH, 1992).

Table 12: Anthropometry of preschool children

Name/date of survey (month/year) (Reference)	Background characteristics	Age (years)	Sex	Sample size	**Prevalence of malnutrition**					
					Percentage of children with					
					Stunting Height-for-age		Wasting Weight-for-height		Underweight Weight-for-age	
					<-3 Z-scores	<-2 Z-scores*	<-3 Z-scores	<-2 Z-scores*	<-3 Z-scores	<-2 Z-scores*
Bahrain family health survey 1995 (MOH, 2000a)	**Total**	0-4.99	M/F	673	2.7	9.7	0.0	5.3	1.8	8.7
	Sex									
		0-4.99	M	345	3.5	9.9	0.0	5.3	1.2	7.4
		0-4.99	F	329	1.8	9.4	0.0	5.3	2.9	10.7

* Category <-2 Z-scores includes <-3 Z-scores

Anthropometry of school-age children and adolescents

A national study was conducted in 2000-2001 in order to assess the anthropometric status and dietary intakes of school children and adolescents in relation to socio-demographic variables (Gharib, 2005). The sample consisted of a total of 2594 students, aged 6-18 years, drawn from schools in all regions.

Results showed that students' mean BMI was higher than the CDC-US standard (Ogden et al., 2002); however, the children were shorter in height than their American counterparts. Overall prevalence of overweight and obesity was high from 6 to 18 years (girls 26%, boys 21%), especially during adolescence. Energy intake ranged from 82% to 103% of the Estimated Average Requirements (British Nutrition Foundation, 2004). Half of the girls and 36% of boys were regularly skipping breakfast.

Among children aged 6-9.99 years, the survey found no stunting but the prevalence of thinness was high (23 %) (Table 13). The prevalence of overweight and obesity was 17 %, and appeared to increase with age. There were no differences by gender.

Table 13: Anthropometry of school-age children

Name/date of survey (month/year) (Reference)	Background characteristics	Age (years)	Sex	Sample size	Anthropometry of school-age children			
					Percentage of children with			
					Stunting Height-for-age	Body Mass Index (kg/m²) BMI-for-age		
					<3rd percentile[1]	<5th percentile[1] (thinness)	85th -94th percentile	≥95th percentile
Assessment of nutritional status of school children in Bahrain (Gharib, 2005)	**Total**	6-9.99	M/F	677	1.2	23.3	6.5	10.0
	Sex							
		6-9.99	M	331	0.3	20.5	6.6	11.2
		6-9.99	F	346	2.0	26.0	6.4	9.0
	Age (4 classes)							
		6-6.99	M/F	81	0.0	22.2	9.9	8.6
		7-7.99	M/F	176	1.1	29.0	6.8	8.0
		8-8.99	M/F	203	1.0	22.7	3.9	8.4
		9-9.99	M/F	217	1.8	19.8	7.4	13.8

n.a.: not available; [1] CDC-US 2000 references (Ogden et al., 2002)

No stunting was found among adolescents (10-17.99 years) (Table 14). However, the prevalence of overweight and obesity was high (26 %). A high BMI for age was more frequent among girls.

Table 14: Anthropometry of adolescents

Name/date of survey (month and year) (Reference)	Background characteristics	Age (years)	Sex	Sample size	Anthropometry of adolescents			
					Percentage of adolescents with			
					Stunting Height-for-age	Body Mass Index (kg/m²) BMI-for-age		
					<3rd percentile[1]	<5th percentile[1] (thinness)	85th -94th percentile	≥95th percentile
Assessment of nutritional status of school children in Bahrain (Gharib, 2005)	**Total**	10-17.99	M/F	1565	0.8	8.3	12.6	13.7
	Sex							
		10-17.99	M	766	0.3	10.1	10.2	13.5
		10-17.99	F	799	1.3	6.6	14.9	14.0
	Age							
		10-10.99	M/F	217	0.5	12.9	10.6	13.8
		11-11.99	M/F	233	1.7	10.7	12.9	11.6
		12-12.99	M/F	194	0.5	5.2	9.3	17.5
		13-13.99	M/F	189	0.5	8.5	15.3	11.6
		14-14.99	M/F	195	1.0	5.6	13.9	12.8
		15-15.99	M/F	156	0.0	7.7	10.9	14.1
		16-16.99	M/F	194	0.5	4.6	13.9	12.9
		17-17.99	M/F	187	1.1	10.2	13.9	16.0

n.a.: not available; [1] CDC-US 2000 references (Ogden et al., 2002)

In conclusion, there was no stunting neither among school-age children nor adolescents. The high prevalence of thinness at school-age could be, at least in part, an artefact due to the use of the CDC reference which is biased in the direction of overweight. In contrast, the trend towards overweight in both school-age children and adolescents seems more certain. Low levels of physical activity, sedentary habits, high protein and sugar intakes, low fibre consumption and frequent snacking possibly contributed to the high prevalence of overweight and obesity (Gharib, 2005).

Anthropometry of adult women

Anthropometry of women 19 years old and above was studied in the National Nutrition Survey (NNS) carried out in 1998 – 1999 (MOH, 2002). The results indicate that 28 % of the women were overweight (BMI of 25-29.9 kg/m²) and more than one third of the women were obese (BMI ≥ 30.0 kg/m²). An alarming overall percentage (65 %) of Bahraini women was either overweight or obese, representing a major public health problem. A more specific analysis of prevalence by age was not possible due to the small sample size.

Table 15: Anthropometry of adult women

Name/date of survey (month/year) (Reference)	Background characteristics	Age (years)	Anthropometry of adult women								
			Height			Body Mass Index[1] (kg/m²)					
			Sample size	Mean (cm)	Percent of women with height < 145cm	Sample size	Mean (kg/m²)	Percentage of women with BMI			
								<18.5 (chronic energy deficiency)	18.5-24.9 (normal)	25.0-29.9 (overweight)	≥30.0 (obesity)
National Nutrition Survey for Adult Bahrainis Aged 19 Years and above, 1998-1999, (MOH, 2002)	**Total**	19-49	634	156.1	4.9	634	27.2	3.6	31.7	28.1	36.6
	Age										
		19-24	112	156.3	0.4	112	24.6	10.7	52.7	22.3	14.3
		25-29	91	156.8	0.5	91	26.8	4.4	37.4	31.9	26.4
		30-34	107	157.0	0.5	107	28.1	1.9	31.8	29.9	63.6
		35-39	110	156.2	0.6	110	28.4	1.8	31.8	34.5	33.6
		40-44	114	155.4	0.9	114	30.8	0.9	17.5	24.6	57.0
		45-49	100	155.5	1.4	100	30.4	4.0	19.0	26.0	51.0

[1] Excludes pregnant women and women with a birth in the 2 months preceding the survey

Anthropometry of adult men

Anthropometry of adult men aged 19-49 years was also measured in the NNS. Overweight and obesity (BMI ≥ 25.0 kg/m²) were also of concern with an alarming prevalence of 65 % (MOH, 2002).

Table 16: Anthropometry of adult men

Name and date of survey (month/year) (References)	Background characteristics	Age (years)	Sample size	Anthropometry of adult men				
				Body Mass Index (kg/m²) (BMI)				
				Mean	Percentage of men with BMI			
					<18.5 (chronic energy deficiency)	18.5-24.9 (normal)	25.0-29.9 (overweight)	≥30.0 (obesity)
National Nutrition Survey for Adult Bahrainis Aged 19 Years and above, 1998-1999, (MOH, 2002)	**Total**	19-49	606	27.1	3.1	32.2	37.5	27.2
	Age							
		19-24	104	24.6	7.7	52.9	29.8	9.6
		25-29	108	26.3	3.7	37.0	39.8	19.4
		30-34	100	27.4	1.0	40.0	25.0	34.0
		35-39	121	27.9	3.3	22.3	42.1	32.2
		40-44	75	28.8	2.7	13.3	41.3	42.7
		45-49	98	27.9	0.0	23.5	46.9	29.6

II.6 Micronutrient deficiencies

Iodine deficiency disorders (IDD)

Prevalence of goitre and urinary iodine

A national study among school children aged 8-12 years was conducted in 2000 to estimate the prevalence of goitre and iodine deficiency disorders (MOH, 2000b). A total of 1 600 children were randomly chosen from all governmental schools. The children were examined for goitre by a surgeon and 749 of them were randomly selected and tested to assess their urinary iodine level.

About 2 % of children were found to have goitre, with a higher percentage among boys. Among the 749 children tested for urinary iodine level, 16 % had urinary iodine lower than 100µg/L. This prevalence of IDD was slightly lower for boys than girls, and showed some geographic variation, with the highest prevalence in the Central region, and no IDD at all in the Eastern region.

Although IDD does not seem to constitute a public health problem in Bahrain, it is affecting a number of children. Health education can help increase public awareness about the nutritional value of iodized salt for the prevention and control of IDD (MOH, 2000b).

Table 17: Prevalence of goitre and level of urinary iodine in school-age children

Survey name/date (Reference)	Background characteristics	Sex	Age (years)	Prevalence of goitre		Level of urinary iodine	
				Sample size	Percentage with goitre [Total Goitre]	Sample size	Percentage with urinary iodine <100µg/L
National Study on the Prevalence of Iodine Deficiency Disorders Among School Children Aged 8-12 years old in Bahrain (MOH, 2000b)	**Total**	M/F	8-12	1 600	1.7	749	16.2
	Sex						
		M	8-12	800	n.a.	385	15.8
		F	8-12	800	n.a.	364	16.5

Use of iodized salt at household level

The 2000 MICS survey indicated that the percentage of households using iodized salt was less than 9 % (MICS, 2001). As IDD does not seem to represent a public health problem in Bahrain, at present there is no salt iodization programme. However, the Ministry of Health is currently working with the Ministry of Industry & Commerce to ensure that all imported salt is iodized at WHO/UNICEF/ICCIDD recommended level, i.e. 20 – 40 mg of iodine per kg of salt in order to maintain the low national level of IDD (WHO/UNICEF/ICCIDD, 1996).

Vitamin A deficiency (VAD)

Prevalence of sub-clinical and clinical vitamin A deficiency

Although no data are available to document VAD, this micronutrient deficiency does not appear to be prevalent among the Bahraini population.

Vitamin A supplementation

There is no Vitamin A supplementation in Bahrain.

Iron deficiency anemia (IDA)

Prevalence of IDA

There are no published reports on anemia of preschool and school-aged children.

A study was conducted in 1995 to estimate the prevalence of Iron Deficiency Anemia among Bahraini preschool children (MOH, unpublished). A total of 1 179 children representing all geographic and health regions participated in the study, along with the associated Maternal and Child Health centres (Table 18). Regarding hematological data, information was available for 945 children. Anemia was defined as Hb<11 g/dL. Prevalence of anemia was high, affecting almost half of the children. Prevalence was highest among the younger children, exceeding 50%, and decreased with age. However, estimates need to be interpreted with caution because sample sizes are very small for certain age groups.

Table 18: Prevalence of anemia in preschool children

Survey name/date (Reference)	Background characteristics	Age (months)	Sex	Sample size	Percentage of children with	
					Any anemia (<11.0 g/dL)	Severe anemia (<7.0 g/dL)
Preschoolers Study, MOH 1995 Unpublished data	**Total**	6-59	M/F	945	48.0	0.1
	Sex					
		6-59	M	466	48.5	0.0
		6-59	F	477	47.6	0.2
	Age					
		6-9	M/F	256	59.8	0.4
		10-11	M/F	13	53.8	0.0
		12-23	M/F	333	51.4	0.0
		24-35	M/F	187	42.2	0.0
		36-47	M/F	92	27.2	0.0
		48-59	M/F	63	30.2	0.0

Some data from a small unpublished survey conducted among school-age children in 2005 also showed a high prevalence of anemia (Table 19). Prevalence appeared higher among girls. However, the data must be interpreted with caution as it is not known whether they are representative of the school-age population of the country.

Table 19: Prevalence of anemia in school-age children

Survey name/date (Reference)	Background characteristics	Age* (years)	Sex	Sample size	Percentage of children with	
					Any anemia (<12.0 g/dL)	Severe anemia (<7.0 g/dL)
Assessment of nutritional status of school children in Bahrain 2005 (Unpublished data)	**Total**	6-14	M/F	341	37.0	0.3
	Sex					
		6-14	M	176	28.4	0.6
		6-14	F	165	46.1	0.0

Prevalence of anemia in women

In 2003, the first monitoring study on "The Impact of the National Flour Fortification Programme on the Prevalence of Iron Deficiency and Anemia among Women of Reproductive Age in the Kingdom of Bahrain" was implemented by the Ministry of Health in collaboration with WHO/EMRO (Al-Dallal & Moosa, 2003). A nationally representative sample of 393 women of childbearing age (14 – 49 years) was selected randomly with the collaboration of the CSO (today CIO) and the level of hemoglobin (Hb) and serum ferritin (SF) were assessed. Using dual criteria, Hb<12.0 g/dL and SF<15 µg/L, the prevalence of iron deficiency anemia among women of childbearing age was found to be 25 %, while the prevalence of any anemia was 51 %.

The NNS carried out in 1998-1999 examined a nationally representative sample of 1181 non-pregnant women 19 years old and over (MOH, 2002). The results showed that 37 % of women were anemic (Hb <12.0 g/dL), and that women aged 19-50 years had insufficient iron intake.

Results from these two surveys seem to indicate that anemia prevalence among adult women increased between 1998 and 2003.

Prevalence of anemia in men

The NNS also examined a nationally representative sample of 1 120 men of 19 years of age and above (MOH, 2002). About 21 % were found to be anemic (Hb <13.0 g/dL). However, no severe anemia was recorded.

According to the NNS report, the high prevalence of anemia among adults in Bahrain could be attributed to folic acid deficiency and to unhealthy dietary habits, in particular a high consumption of tea and coffee which inhibits iron absorption, and to genetic factors (MOH, 2002).

Interventions to fight Iron deficiency anemia

Several interventions were conducted to alleviate and prevent IDA. For example, iron supplementation for pregnant women is included in prenatal care provided in Health clinics in all *muhafazath*. In 2001, the National Flour Fortification Programme was implemented as part of a large scale programme to reduce the incidence of IDA.

II.7 Policies and programmes aiming to improve nutrition and food security

The Nutrition section of the Bahraini Ministry of Health is responsible i) for identifying major nutritional problems in the community by conducting various research activities, ii) for organizing nutrition education and training of health and non-health personnel, and iii) for planning, monitoring and evaluating national nutritional programmes. The Nutrition Section actively campaigns to promote healthier dietary patterns and lifestyles and to reduce nutrition related diseases. In addition, it works to monitor food provided in canteens in different locations (e.g. schools, institutions, factories, etc) and to establish a Surveillance Programme. Specific measures have been taken in some areas, mainly in maternal and child health care, and concerning school children's, adults' and the elderly nutrition.

The Nutrition section works in partnership with stakeholders to improve the nutritional status of the population of Bahrain by ensuring that everyone has access to high quality and comprehensive nutritional and dietetic health services and by encouraging personal responsibility for well being. Multi-disciplinary and multi-sectoral approaches have been developed to integrate the nutrition activities into general health services, including preventive as well as curative activities.

Several programmes focusing on particular aspects of nutrition are presented below.

The obesity & nutrition-related disorders programme
The programme comprises three main actions:

1. The implementation of annual National Healthy Lifestyle Campaigns, in the framework of the Universal National Prevention Programme aiming to cover the entire population, and in line with the WHO Global Strategy for Diet & Physical Activity.
2. The implementation of the School Health Programme (primary prevention), in the framework of the Selective Prevention Programme targeting vulnerable groups of the population such as school children.
3. The implementation of clinical guidelines on obesity, available at Primary Health Care Facilities, in the framework of the Targeted Prevention Programme targeting individuals that are overweight but not yet obese (secondary prevention).

The Micronutrient Control Programme
The Micronutrient Control Programme carries out a screening programme for pregnant women, infants, preschoolers, and school age children, and implements programmes for iron and folate supplementation (mainly to pregnant mothers), food fortification, dietary diversification via education, and training of health and non-health workers on nutrition-related issues.

The Promotion of Infant and Young Child Feeding Programme
The implementation of the Baby Friendly Hospital Initiative (BFHI) was started in 1993 in all the Government Maternity Services, with the Amiri Decree on Control of Marketing of Breastmilk Substitutes. By 1993, all governmental hospitals in Bahrain were accredited as "Baby Friendly" by UNICEF. In addition, a national committee was appointed to monitor and follow up the implementation of the Code of Marketing Breastmilk Substitutes.

The main operational functions of the Promotion of Infant and Young Child Feeding Programme are to:

- Provide nutrition education to pregnant and lactating women to ensure timely initiation and duration of breast-feeding and exclusive breastfeeding.
- Ensure the continuous training of health and non-health personnel on maternal nutrition (during pregnancy and lactation) as well as on infant feeding.
- Enforce the implementation of the Global strategy for infant and young child feeding.
- Produce educational material and organize educational activities for the public.
- Develop and finalize a surveillance programme on maternal and infant nutrition (in progress).

The survey data currently available indicate that this programme has not yet given the expected results. The prevalence of bottle-feeding is still extremely high and exclusive breastfeeding is still rare. These inadequate infant feeding practices probably play an important role in the obesity epidemic.

The Support Nutrition Programme
The following activities are carried out under the Support Nutrition Programme:

- Medical and clinical diagnosis to determine certain types of illnesses or abnormalities that are directly associated with nutritional problems, as part of clinical research, early detection (screening) and treatment programmes.
- Clinical counselling on nutrition-related diseases.
- Clinical training and education on nutrition-related health problems for the health and non-health personnel to promote "good health at least cost" through proper nutrition.

The School Nutrition Programme
The School Nutrition Programme has adopted the WHO Global Strategy for Diet and Physical Activity, and operates to increase nutrition education and physical fitness for school and university students. The Programme provides school-based comprehensive health services; it monitors and modifies when necessary the food served in school canteens, introducing school nutrition programmes to improve the quality of food served at school. Continuous trainings are provided to decision-makers to promote healthy school nutrition, and educational activities on nutrition are regularly organized for school children in all public schools.

Nutrition Education Programmes with special focus on school children, adolescents, and pregnant women are also continuously broadcast through different mass media.

Despite all these efforts and the large investments of the government in nutrition and health, over-nutrition is progressing and affecting a large segment of the population. Innovative ways of combating this epidemic are needed.

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