



KUWAIT NUTRITION SURVEILLANCE SYSTEM

2014 ANNUAL REPORT

FOOD AND NUTRITION ADMINISTRATION
MINISTRY OF HEALTH
KUWAIT
May, 2015

Preface

The State of Kuwait has established and running a nation-wide Nutrition Surveillance system with consultation provided through WHO/EMRO & CDC. KNSS is run by the Food and Nutrition Administration of Ministry of Health since 2001 until now.

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Introduction

Purpose

The Kuwait Nutrition Surveillance System (KNSS) is intended to provide data that are used to monitor health and nutritional status of the Kuwaiti population. These data are useful to both health professionals who manage public health programs and for policy makers.

The data can be used to:

1. Identify prevalent nutrition-related problems
2. Specify high risk groups
3. Monitor trends
4. Target resources for program planning
5. Evaluate the effectiveness of interventions and programs

Description & Sample selection

KNSS is designed as a "sentinel" surveillance system involving surveillance in a certain number of sites to detect trends in the overall well-being of the Kuwaiti population.

Based on estimated sample size for each population group and each governorate that "reflect" the nutritional status of the population and monitor trends, the KNSS sample size in 2014 KNSS was:

Table 1: KNSS 2014 Sample size according to Age group and Gender

Age Group (years)	Male	Female	Total
<5	1422	1477	2899
5 – <10	2799	2645	5444
10 – <15	2602	2556	5158
15 – <20	1280	1233	2513
≥20	468	603	1071
Total	8571	8514	17085

Indicators of Nutritional Status

For the age group less than five years: data on socio-demographic variables (age and geographic location), anthropometric indices (height/length, weight), hemoglobin, infant feeding patterns and weaning practices were collected by interviewers using questionnaires.

For the school students, ages from 5 to <20 years: age, gender, geographic location, height, weight and hemoglobin data were collected.

For adults ≥20 years: data on age, gender, weight, height, smoking habits, physical inactivity, vegetable and fruit intake were collected by interviewers using a special questionnaire. In addition hemoglobin, blood glucose and blood cholesterol levels were collected and recorded.

KNSS Sites for Data Collection

Data on selected nutritional status indicators about infants and their mothers are collected annually by Nutrition Research Department staff, at selected one or two health clinics (immunization centers) serving Kuwaitis in each Governorate, data on pre-school and school children are collected from selected one or two kindergartens, primary, intermediary and secondary schools from all the Governorates according to their cooperation to participate and where Kuwaiti children are served most.

In addition, adult data is collected from the preventive health clinics. Data on young adults are collected through Kuwait University and Civil Service Commission (where persons undergo registration for employment). Data on retired and elderly are collected through the Public Authority for Social Security. Data by these agencies provide national-level data since each of them is the only site in the country serving all Governorates.

Demographic Characteristics

Population Groups According to Age

Age distribution of population groups monitored by KNSS is determined by the age of population served by each location.

- < 5 years old
- 5 – <10 years old
- 10 – <15 years old
- 15 – <20 years old
- ≥ 20 years old

Geographic Location

All the Six Governorates of Kuwait:

- Capital
- Hawalli
- Farwania
- Ahmadi
- Jahra
- Mubarak Al-Kabeer

Kuwait Nutrition Surveillance System Results (2014)

Summary-Tables and Graphs

Table 2: Summary of selected nutrition indicators according to gender and age-group

Age Group (years)	Sex	Sample (n)	Stunting§ (%)	Wasting† (%)	Overweight‡ (%)	Obesity~ (%)	Anemia* (%)
<5	M	2899	5.8	2.4	6.7	2.4	23.7 (n=1833)
	F						
5 – <10	M	2799			15.2	20.1	13.6
	F	2645			19.0	20.3	12.5
10 – <15	M	2602			19.8	34.1	8.9
	F	2556			24.8	27.1	12.5
15 – <20	M	1280			18.1	32.8	5.4
	F	1233			23.8	20.9	19.6

WHO Standards:

§Stunting: [length/height for age <-2 SD]

†Wasting: [weight for height <-2 SD].

‡Overweight: [BMI for age >+2SD - <+3SD for children <60 months; >+1SD - <+2SD for children ≥60 months].

~Obesity: [BMI for age>+3SD for <60 months; >+2SD for ≥5 years].

*Anemia: cut off: <11.0g/dl for 6-≤60 months; Hb<11.5 g/dl for 5-<12 years and Hb<12.0 g/dl for ≥12 years; Hb<13 g/dl for males 15 -<20 years and Hb<12 g/dl for females 15 - <20 years; subjects <6months were not included in the anemia analysis].

Table 3: Summary of selected nutrition indicators for Kuwaiti adults (≥20 years)

Sex	Sample (n)	^Underweight	Over-weight§ (%)	Obesity† (%)	Morbid Obese‡ (%)	Anemia~ (%)	Glucose* (%)		Cholesterol** (%)	
							Impaired	High	Elevated	High
Males	468	1.0	34.6	36.1	4.5	9.7	13.7	10.9	32.6	13.4
Females	603	1.2	30.5	42.3	8.3	32.7	13.6	8.1	35.1	18.6

WHO References:

^Underweight: [BMI<18.5]

§Overweight: [BMI≥25.0 - <30.0].

†Obesity: [BMI≥30.0 - <40.0].

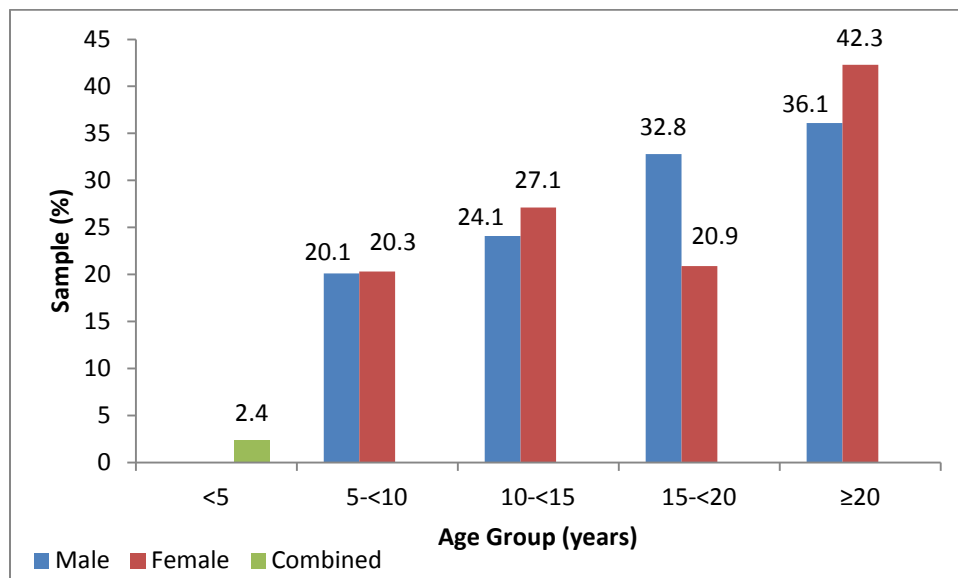
‡Morbid Obese: [BMI ≥40.0].

~Anemia-: cut off: Hb<13 g/dl for males and Hb<12 g/dl for females].

*Glucose: Impaired: ≥6.1-<7.0 mmol/L; High: ≥7.0 mmol/L

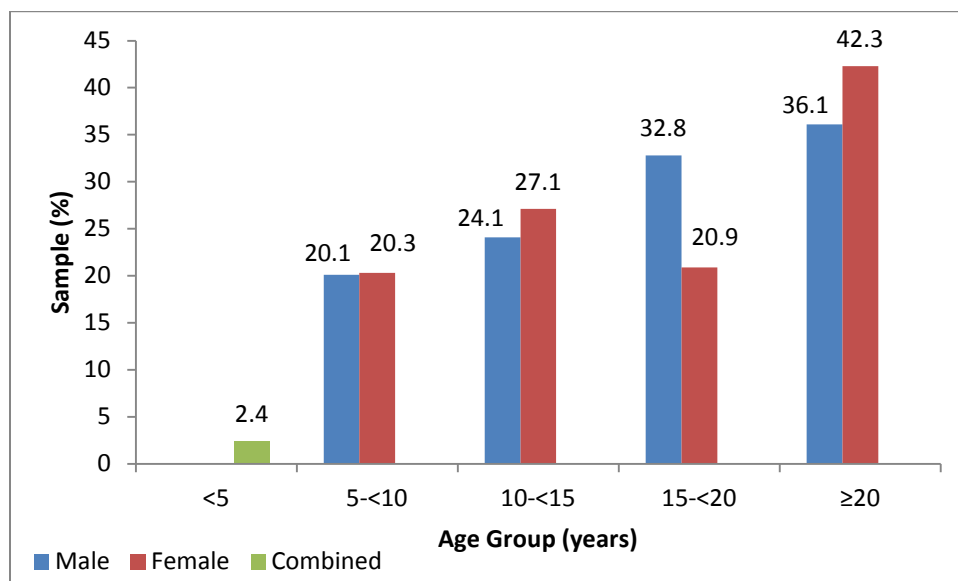
**Cholesterol: Elevated: ≥5.2-<6.2mmol/L; High: ≥ 6.2mmol/L

Graph 1: Prevalence of Obesity among Kuwaiti population according to age group and gender



WHO Standards Obesity: BMI for age>+3SD for <60 months; BMI for age>+2SD for 5-<10 years; BMI for age>+2SD for 10<15 years; BMI for age>+2SD for 15-<20 years; BMI≥30.0 -<40.0 for ≥20 years.

Graph 2: Prevalence of anemia among Kuwaiti population according to age group and gender



WHO Standards Anemia: <11.0g/dl for ≥6 months; Hb<11.5 g/dl for 5-<10 years; Hb<11.5 g/dl for <12 years, Hb<12.0 g/dl for ≥12 years; Hb<13 g/dl for males 15-<20 years, Hb<12 g/dl for females 15-<20 years; Hb<13 g/dl for males ≥20 years and Hb<12 g/dl for females ≥20 years.

Results

Preschool Children (<60 months)

Table 4: Prevalence of selected nutritional variables among children aged <60 months

	Sample (n)	Stunting§ (%)	Wasting† (%)	Overweight‡ (%)	Obesity~ (%)	Anemia* (%)
combined	2899	5.8	2.4	6.7	2.4	23.7 (n=1833)

WHO Standards:

§Stunting: [length for age <-2 SD for children younger than age 24 months or height for age <-2 SD for children aged 24 months or older].

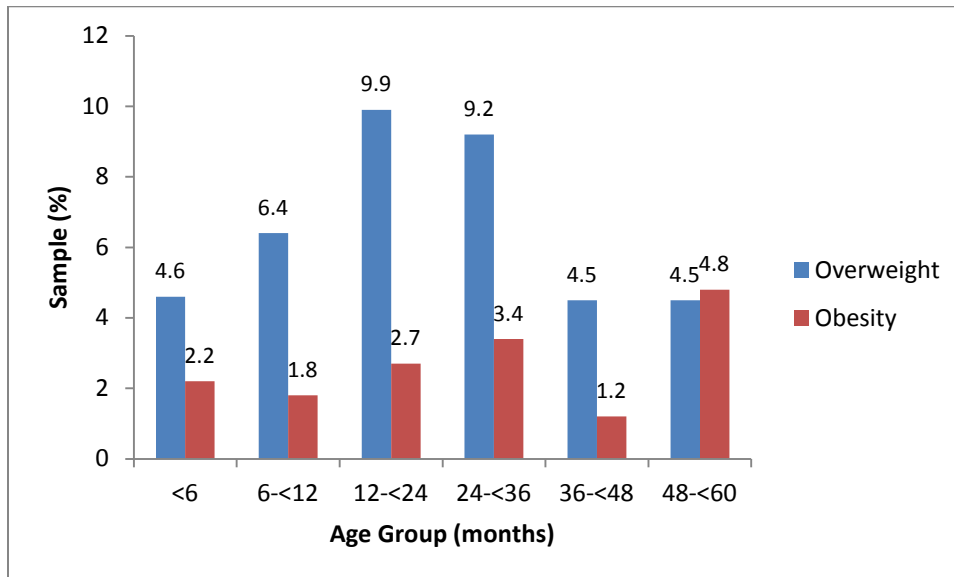
†Wasting: [weight for height <-2 SD].

‡Overweight :[BMI for age >+2SD - <+3SD].

~Obesity: [BMI for age>+3SD].

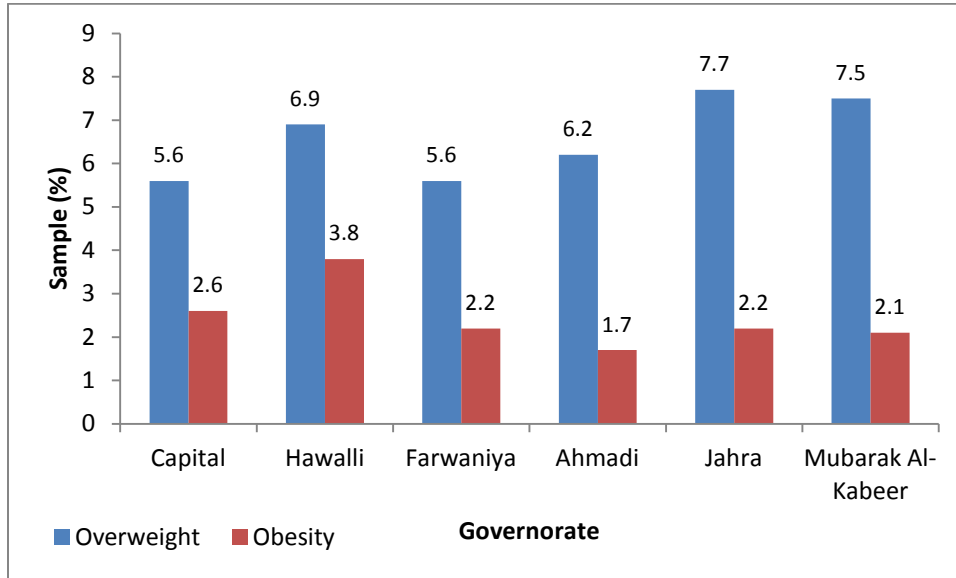
*Anemia: [<11.0g/dl age ≥6 months] subjects <6months were not included in the analysis according to CDC recommendation.

Graph 3: Prevalence of overweight‡ and obesity~ among children <60 months according to age group



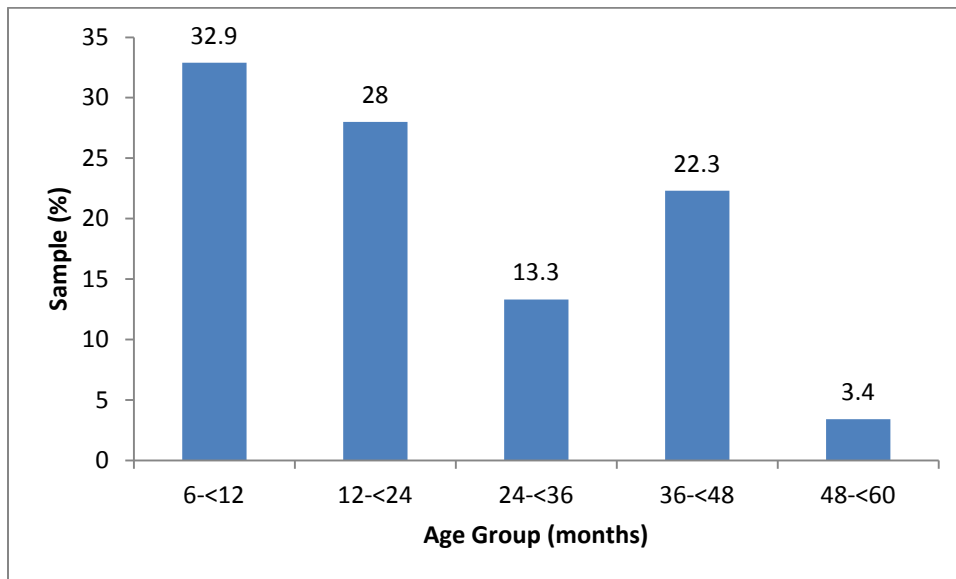
WHO Reference: ‡Overweight: [BMI for age >+2SD - <+3SD]; ~Obesity: [BMI for age>+3SD].

Graph 4: Prevalence of overweight‡ and obesity~ among children <60 months according to governorate



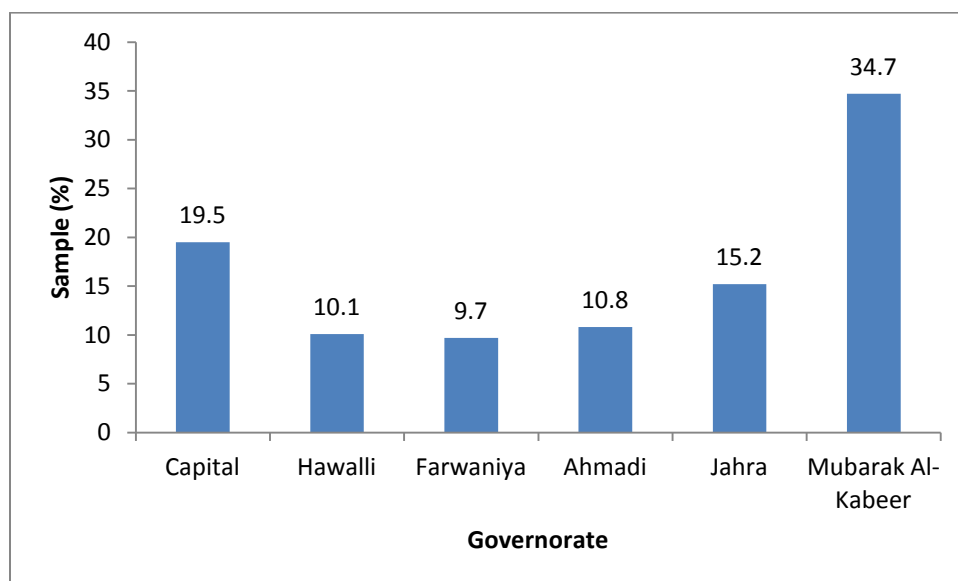
WHO Reference: ‡Overweight: [BMI for age >+2SD - <+3SD]; ~Obesity: [BMI for age>+3SD].

Graph 5: Prevalence of anemia* among children <60 months according to age group



WHO Reference: *Anemia: [Hb<11.0 g/dl].

Graph 6: Prevalence of anemia* among children <60 months according to governorate



WHO Reference: *Anemia: [Hb<11.0 g/dl].

Comments:

1. The overall prevalence of stunting and wasting among Kuwaiti preschool children was within the worldwide accepted levels.
2. Overweight was highest in the age groups 12-<24 and 24-<36 months (9.9% and 9.2%, respectively). Obesity was highest in the age group 48-<60 months (4.8%). Furthermore, the highest prevalence of overweight and obesity were found in the Jahra (7.7%) and Hawalli governorates (3.8%), respectively.
3. The overall prevalence of anemia in preschool children was 23.7%. The highest prevalence was found among infants 6-<12 months of age (32.9%). There was an inverse proportion between age and the prevalence of anemia in the first three years of life. Within governorates, Mubarak Al-Kabeer was found to have a strikingly high prevalence of anemia (34.7%), followed by the Capital (19.5%). The lowest percentage was found in Farwaniya governorate (9.7%).

Children less than 24 months' Health Indicators

Birth weight: 14.0% of the children less than 24 months of age who participated in the 2014 KNSS had low birth weights (<2500 g) while, 1.1% had high birth weights (>4500 g).

Type of Delivery: More than quarter of the mothers (28.6%) had Cesarean Section delivery.

Breastfeeding and complementary feeding indicators for children <24 months

Ever Breastfed Rate: 84.6% of the infants were ever breastfed.

Mean duration of breastfeeding: The mean duration of breastfeeding was 105 days (3.5 months).

Exclusive Breastfeeding Rate: Among Kuwaiti mothers, 19.5% of babies were exclusively breastfed for 6 months with a mean duration of 114 days (3.8 months).

Early Initiation of Breastfeeding Rate: Only 12.9% of the interviewed mothers in the 2014 KNSS sample breastfed their infants within the first hour after delivery.

Complementary foods: KNSS 2014 showed that 81.8% of Kuwaiti mothers introduced complementary food at an appropriate time between the ages of 6 to 8 months whereas 18.2% of infants were introduced to complementary foods before 6 months of age.

Continued Breastfeeding at One Year Rate (proportion of infants aged 12-15 months who were fed breast milk): 22.4% of mothers continued to breastfeed their infants at age 12-15 months.

Preschool children (2- <5 years)

Food habits and physical activity data results

Intake of fruits and vegetables: only 18.5% of children ate ≥ 5 portions of fruits and vegetables a day, whereas 81.5% ate < 5 portions of fruits and vegetables a day (at least one portion of either).

Intake of dairy products: 76.7% of children consumed ≥ 2 cups of dairy products a day and 23.3% consumed < 2 cups of dairy products a day.

Juice Consumption: 72.1% of children consumed $< \frac{1}{2}$ cup of juice per day, while 27.9% consumed $\geq \frac{1}{2}$ cup juice per day; 42.0% of children consumed nectar juice (20-30% fruit juice only); lastly, 51.5% of children consumed a sugary drink (from concentrate).

Carbonated Beverages Consumption: 27.7% of the children consumed $\geq \frac{1}{2}$ cup carbonated drinks daily.

Breakfast Meal: 70.2% of the children ate breakfast. The most common foods eaten were milk and dairy products (95.3%), grains (90.3%) and, meat and eggs (90.2%). Fruit juices (17.2%) and vegetables (23.8%) were least consumed during breakfast.

Daily Activity: 44.9% of mothers reported that their children were active ≥ 1 hour per day, whereas 55.1% said they were active < 1 hour per day.

Sedentary Activities (Screen Viewing Time): 47.2% of children were reported to spend > 2 hours watching T.V. or other electronic device screens, whereas 52.8% spent ≤ 2 hours.

Household smoking exposure (<5 yrs sample): 26.6% of mothers reported that their children were exposed to household smoking.

Primary School Students (5 – <10 Years)

Table 5: Prevalence of selected nutritional variables among children aged 5 – <10 years

Sex	Sample (n)	Overweight‡ (%)	Obesity~ (%)	Anemia* (%)
Males	2799	15.2	20.1	13.6
Females	2645	19.0	20.3	12.5

WHO References:

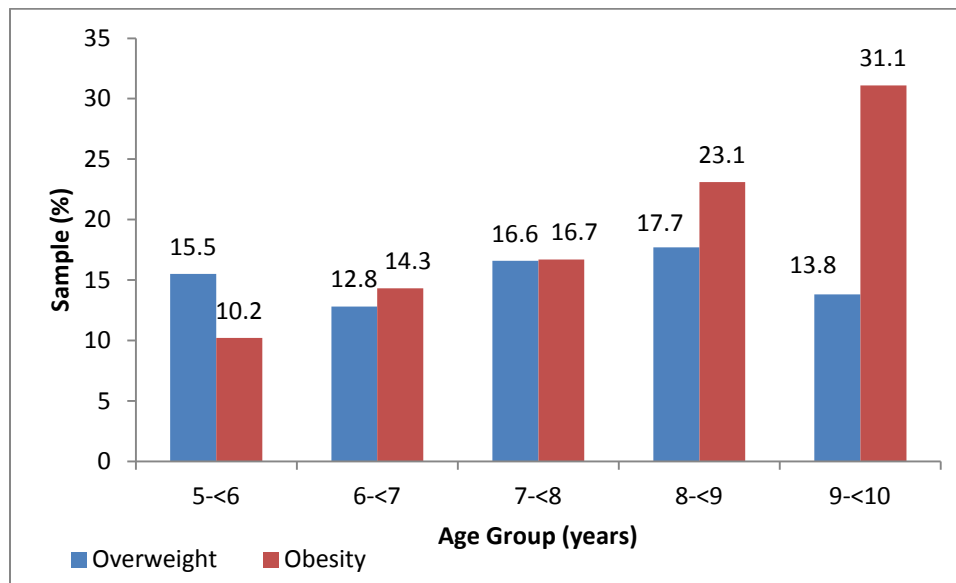
§Stunting: [height for age <-2 SD].

‡Overweight: [BMI for age >+1SD - <+2SD].

~Obesity: [BMI for age>+2SD].

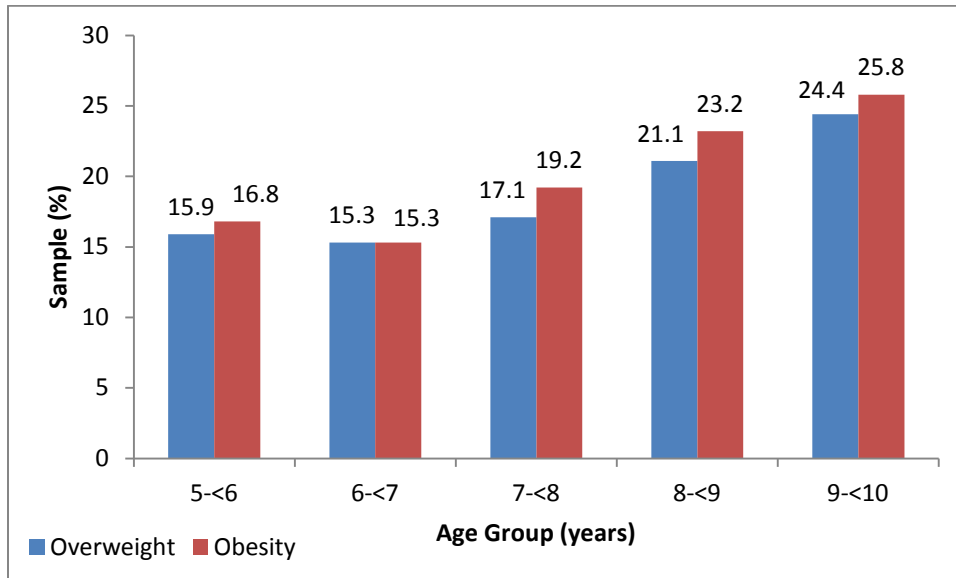
*Anemia: [Hb<11.5 g/dl].

Graph 7: Prevalence of overweight‡ and obesity~ among male children 5-<10 y according to age group



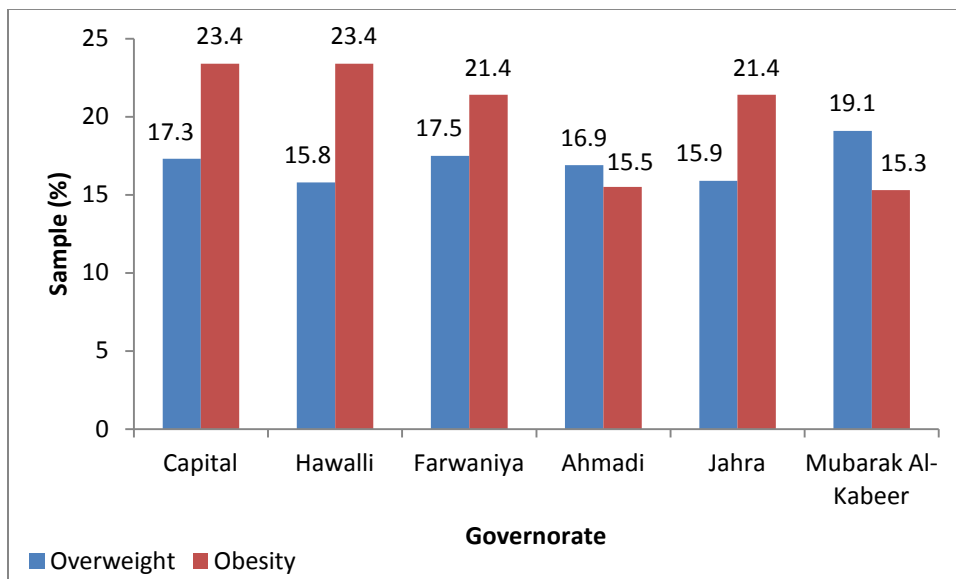
WHO Reference: ‡Overweight: [BMI for age >+1SD - <+2SD]; ~Obesity: [BMI for age>+2SD].

Graph 8: Prevalence of overweight[‡] and obesity[~] among female children 5-<10 y according to age group



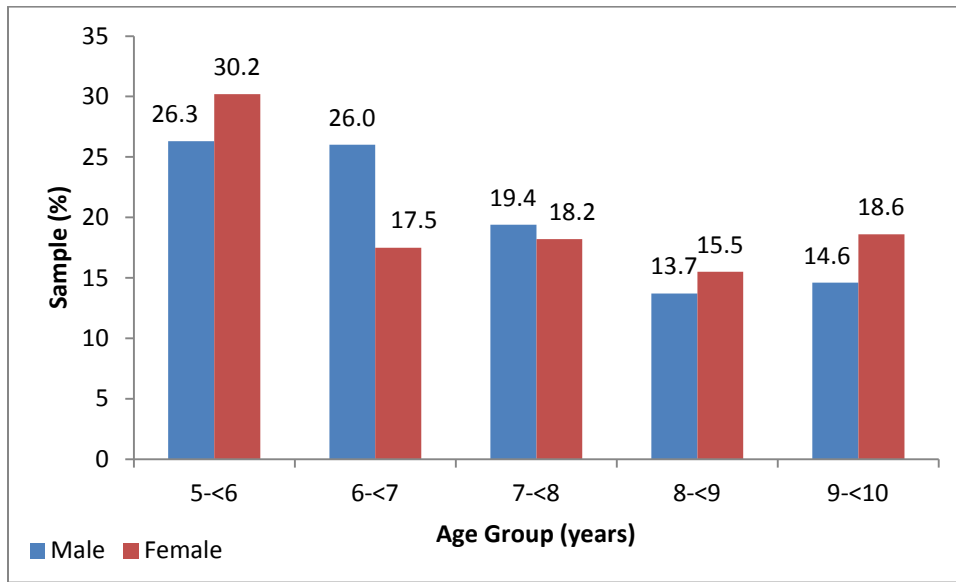
WHO Reference: [‡]Overweight: [BMI for age >+1SD - <+2SD]; [~]Obesity: [BMI for age>+2SD].

Graph 9: Prevalence of overweight[‡] and obesity[~] among children 5-<10 years according to governorate



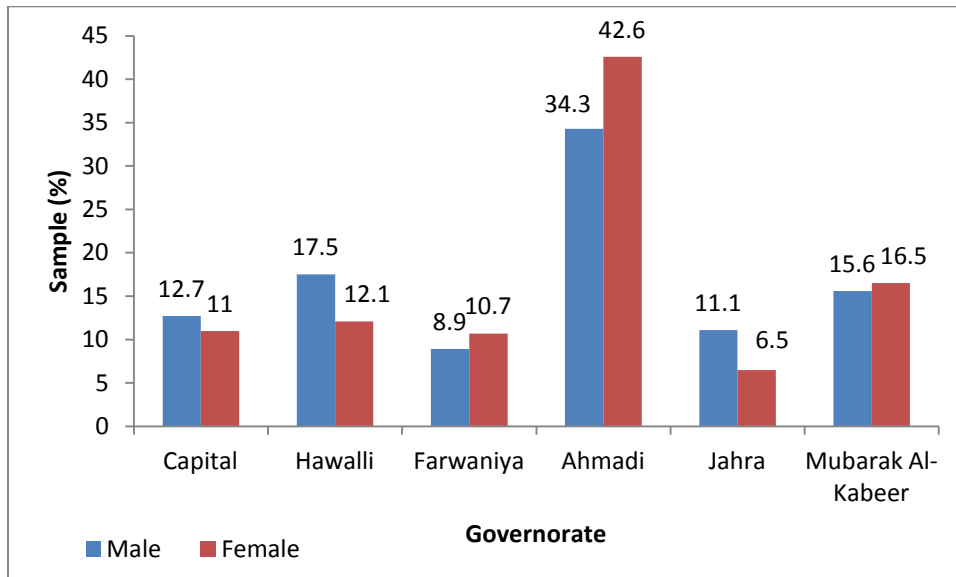
WHO Reference: [‡]Overweight: [BMI for age >+1SD - <+2SD]; [~]Obesity: [BMI for age>+2SD].

Graph 10: Prevalence of anemia* among children 5-<10 years according to gender and age group



WHO Reference: *Anemia: [Hb<11.5 g/dl].

Graph 11: Prevalence of anemia* among children 5-<10 years according to gender and governorate



WHO Reference: *Anemia: [Hb<11.5 g/dl].

Comments:

1. Overall prevalence of stunting among the primary school students was low according to the WHO classification of malnutrition.
2. Obesity was high in both girls (20.3%) and boys (20.1%) and is increasing steadily with age.
3. Anemia was higher in males (13.6%) than females (12.5%) in the age group 5-<10 years. The highest prevalence of anemia was found in 5-<6 years, in both males and females. The Ahmadi governorate showed the highest occurrence of anemia among both males (34.3 %) and females (42.6%).

Intermediary School Students (10 - <15 Years)

Table 6: Prevalence of selected nutritional variables among children aged 10 - <15 years

Sex	Sample (n)	Overweight‡ (%)	Obesity~ (%)	Anemia* (%)
Males	2602	19.8	34.1	8.9
Females	2556	24.8	27.1	12.5

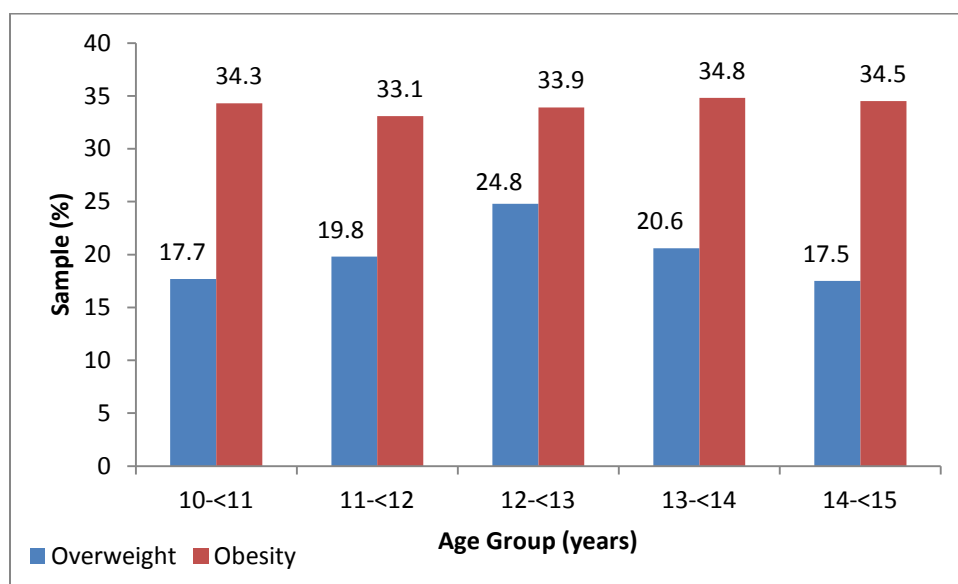
WHO References:

‡Overweight: [BMI for age >+1SD - <+2SD].

~Obesity: [BMI for age>+2SD].

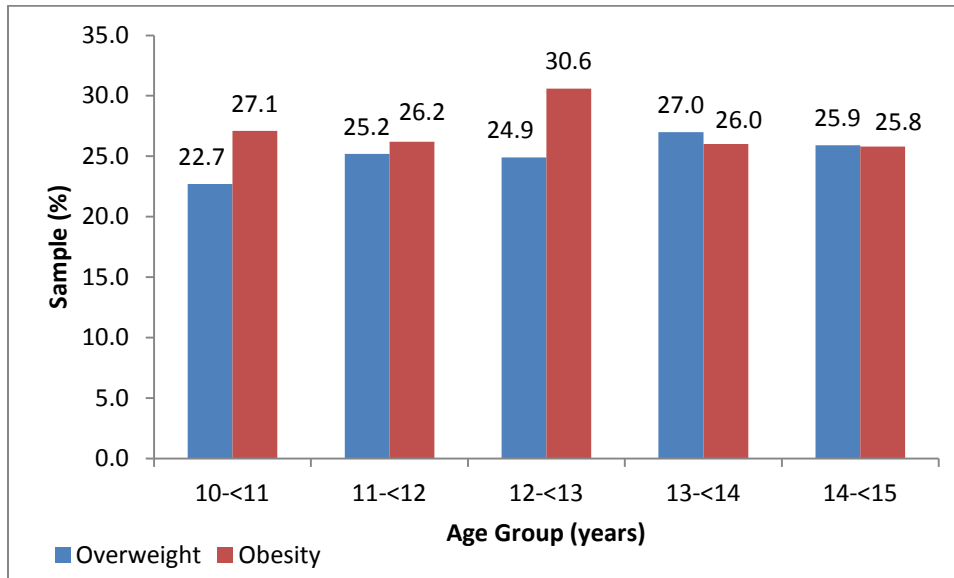
*Anemia: [Hb<11.5 g/dl for <12 years and Hb<12.0 g/dl for ≥12 years].

Graph 12: Prevalence of overweight‡ and obesity~ among male children 10-<15 y according to age group



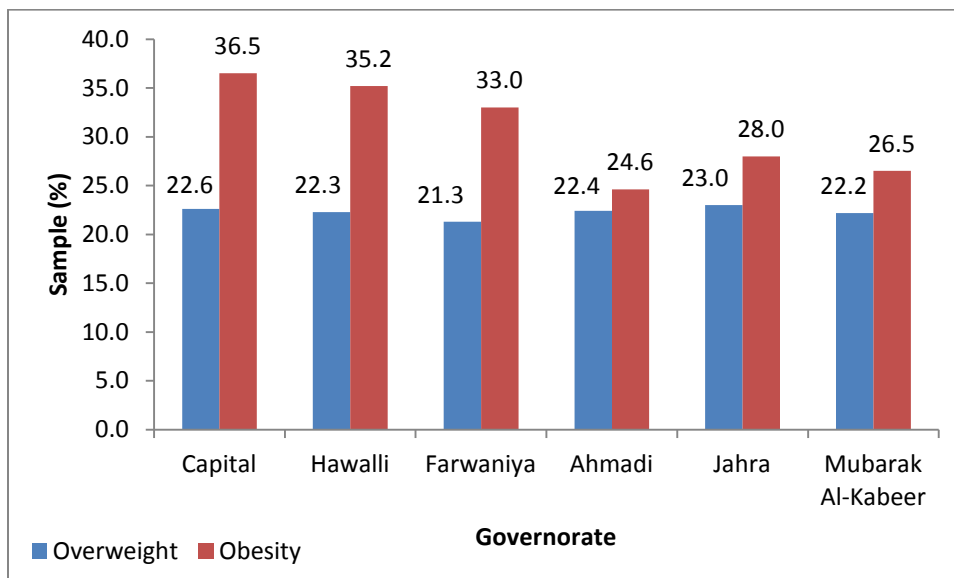
WHO Reference: ‡Overweight: [BMI for age >+1SD - <+2SD]; ~Obesity: [BMI for age>+2SD].

Graph 13: Prevalence of overweight‡ and obesity~ among female children 10-<15 years according to age group



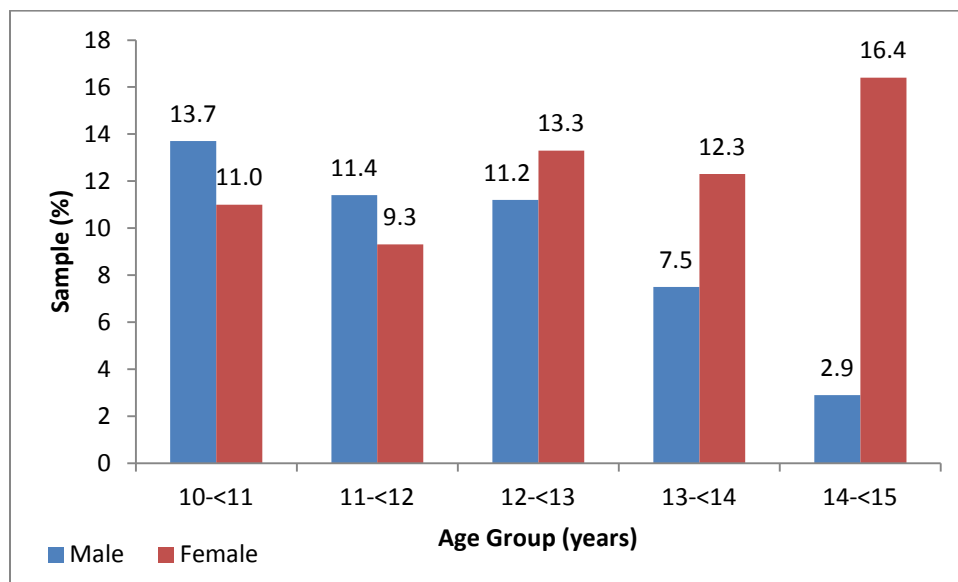
WHO Reference: ‡Overweight: [BMI for age >+1SD - <+2SD]; ~Obesity: [BMI for age>+2SD].

Graph 14: Prevalence of overweight‡ and obesity~ among children 10-<15 years according to governorates



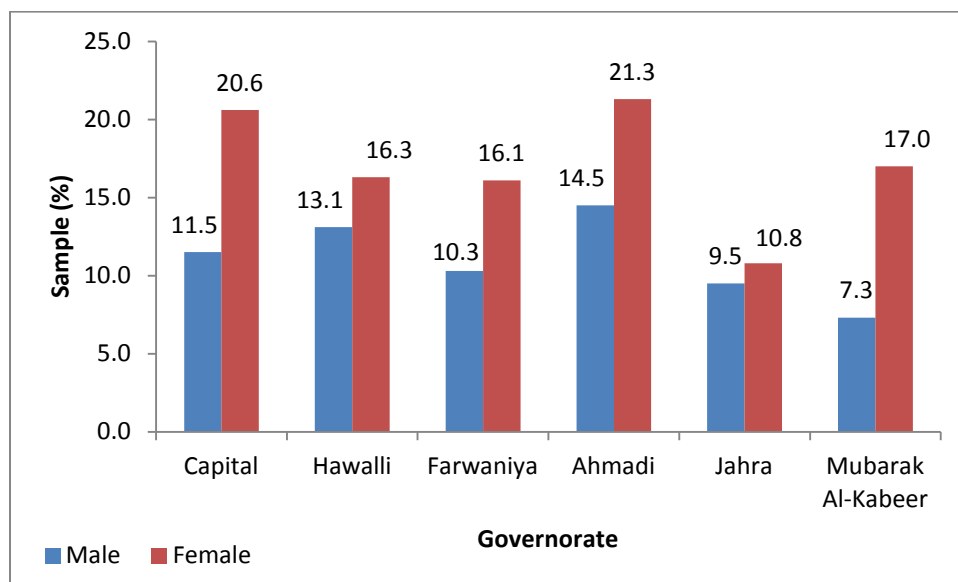
WHO Reference: ‡Overweight: [BMI for age >+1SD - <+2SD]; ~Obesity: [BMI for age>+2SD].

Graph 15: Prevalence of anemia* among children 10-<15 years according to gender and age group



WHO Reference: *Anemia: [Hb<11.5 g/dl for <12 years and Hb<12.0 g/dl for ≥12 years].

Graph 16: Prevalence of anemia* among children 10-<15 years according to gender and governorate



WHO Reference: *Anemia: [Hb<11.5 g/dl for <12 years and Hb<12.0 g/dl for ≥12 years].

Comments:

1. Overweight and obesity is on the rise among all age groups. Overall 19.8% males and 24.8% females of intermediary schools were overweight whereas obesity among males (34.1%) was higher than obesity among females (27.1%).

- The prevalence of anemia was much higher in females (12.5%) than males (8.9%). The highest was found among males (13.7%) in the 10-11 year age group, whereas anemia in females (16.4%) was highest in the 14-15 year age group.
- Ahmadi governorate intermediary school students had the highest prevalence of anemia among both males (14.5%) and females (21.3%).

Secondary School Students (15 – <20 Years)

Table 7: Prevalence of selected nutritional variables among children aged 15 - <20 years

Sex	Sample (n)	Overweight‡ (%)	Obesity~ (%)	Anemia* (%)
Males	1280	18.1	32.8	5.4
Females	1233	23.8	20.9	19.6

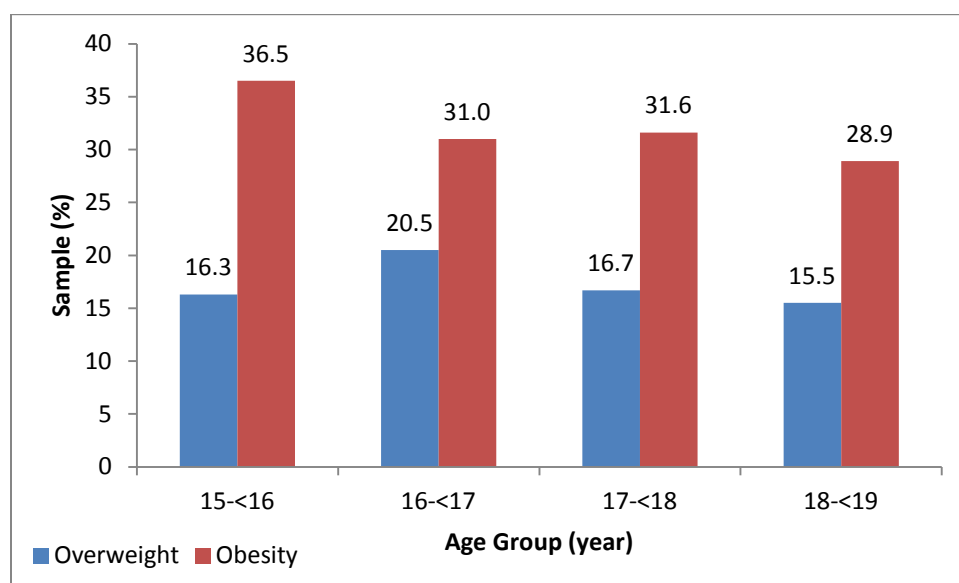
WHO References:

‡Overweight :[BMI for age >+1SD - <+2SD].

~Obesity: [BMI for age>+2SD].

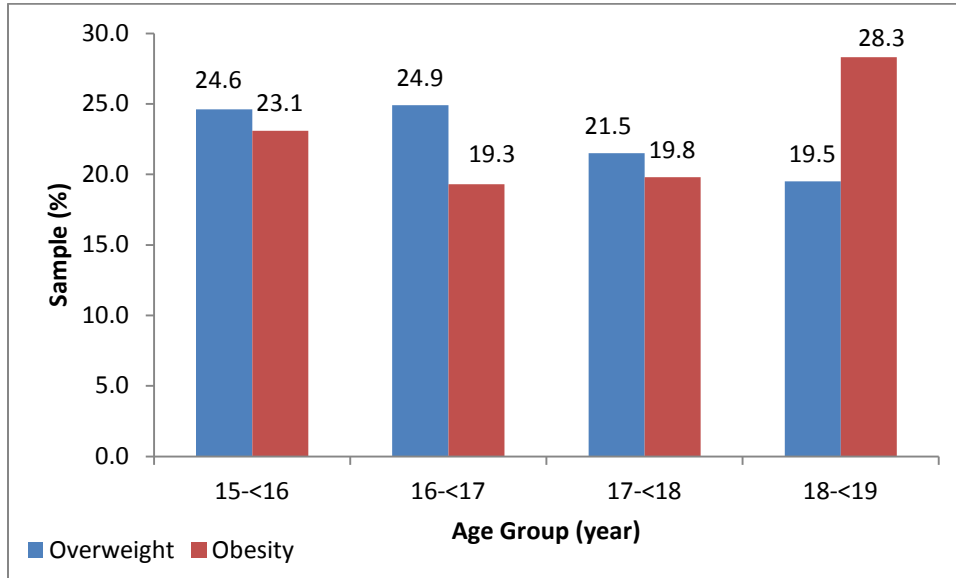
*Anemia: [Hb<13 g/dl for 15-<20 years males and Hb<12 g/dl for 15-<20 years females].

Graph 17: Prevalence of overweight‡ and obesity~ among males aged 15-<20 years according to age group



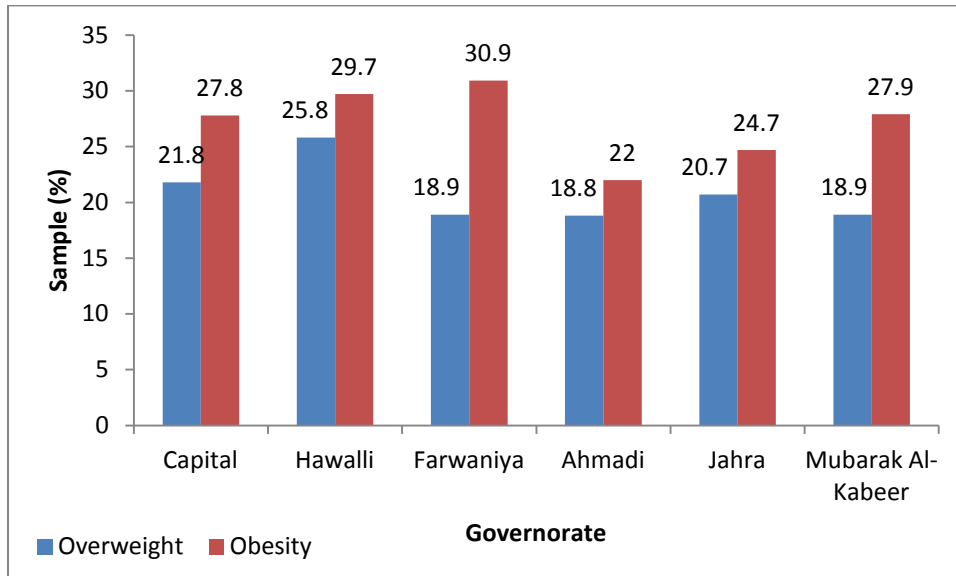
WHO Reference: ‡Overweight: [BMI for age >+1SD - <+2SD]; ~Obesity: [BMI for age>+2SD].

Graph 18: Prevalence of overweight‡ and obesity~ among females aged 15-<20 y according to age group



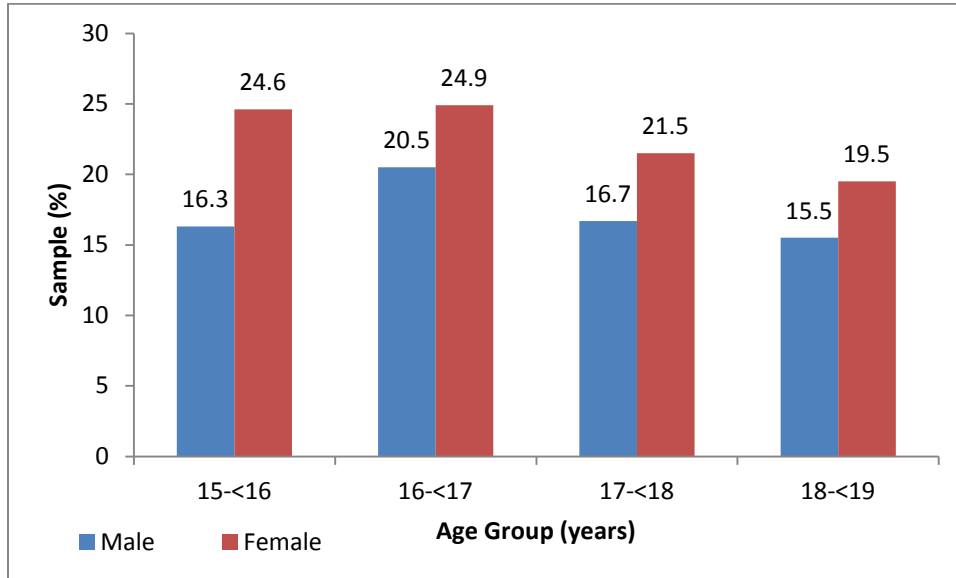
WHO Reference: ‡Overweight: [BMI for age >+1SD - <+2SD]; ~Obesity: [BMI for age>+2SD].

Graph 19: Prevalence of overweight‡ and obesity~ among adolescents aged 15-<20 years according to governorate



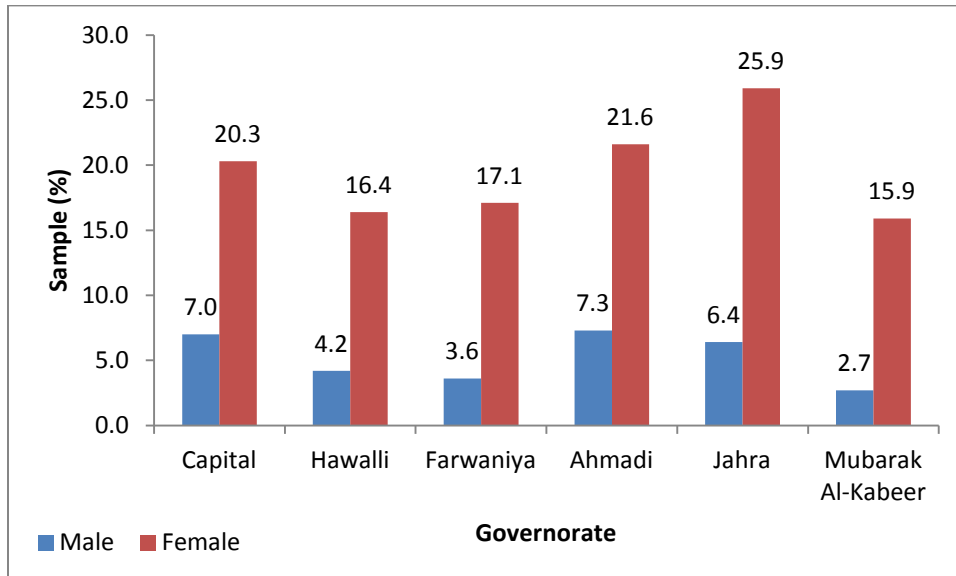
WHO Reference: ‡Overweight: [BMI for age >+1SD - <+2SD]; ~Obesity: [BMI for age>+2SD].

Graph 20: Prevalence of anemia* among adolescents aged 15-<20 years according to gender and age group



WHO Reference: *Anemia: [Hb<13 g/dl for males and Hb<12 g/dl for females.

Graph 21: Prevalence of anemia* among adolescents aged 15-<20 years according to gender and governorate



WHO Reference: *Anemia: [Hb<13 g/dl for males and Hb<12 g/dl for females.

Comments:

1. The findings showed the prevalence of overweight to be higher in females (23.8%) than males (18.1%) whereas the prevalence of obesity was higher in males (32.8%) than females (20.9%). The highest percent of overweight (16.7%) is within the 17-18 years age group and obesity (36.5%) is within the 15-16 years age group among males. Among the females, the prevalence of overweight (24.9%) was highest in 16-17 years age group and obesity was highest in 18-19 years age group (28.3%).
2. Farwaniya governorate had the highest prevalence of obesity (30.9%).
3. The prevalence of anemia was 5.4% for males and 19.6% for females. The highest was in the 16-17 years age group (24.92%) for both female and male (20.5%)
4. Ahmadi governorate secondary school students recorded the highest percent of anemia for male (7.3%) and Jahra governorate for female (25.9%).

Kuwaiti Adults (≥ 20 years)

Table 8: Summary of selected nutrition indicators for Kuwaiti adults (≥ 20 years)

Sex	Sample (n)	^Underweight	Over-weight§ (%)	Obesity† (%)	Morbid Obese‡ (%)	Anemia~ (%)	Glucose* (%)		Cholesterol** (%)	
							Impaired	High	Elevated	High
Males	468	1.0	34.6	36.1	4.5	9.7	13.7	10.9	32.6	13.4
Females	603	1.2	30.5	42.3	8.3	32.7	13.6	8.1	35.1	18.6

WHO References:

^Underweight: [BMI<18.5]

§Overweight: [BMI \geq 25.0 - <30.0].

†Obesity: [BMI \geq 30.0 - <40.0].

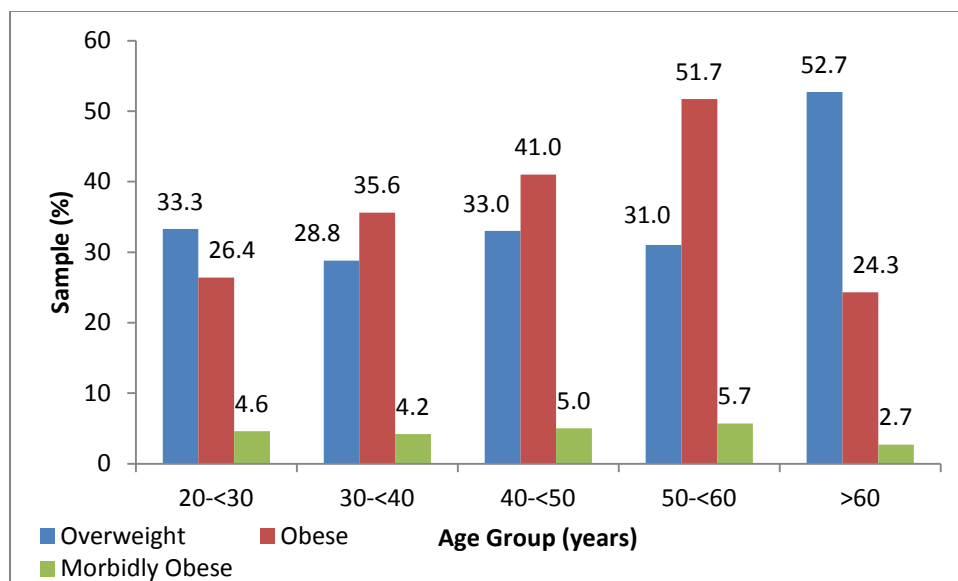
‡Morbid Obese: [BMI \geq 40.0].

~Anemia-: cut off: Hb<13 g/dl for males and Hb<12 g/dl for females].

*Glucose: Impaired: \geq 6.1-<7.0 mmol/L; High: \geq 7.0 mmol/L

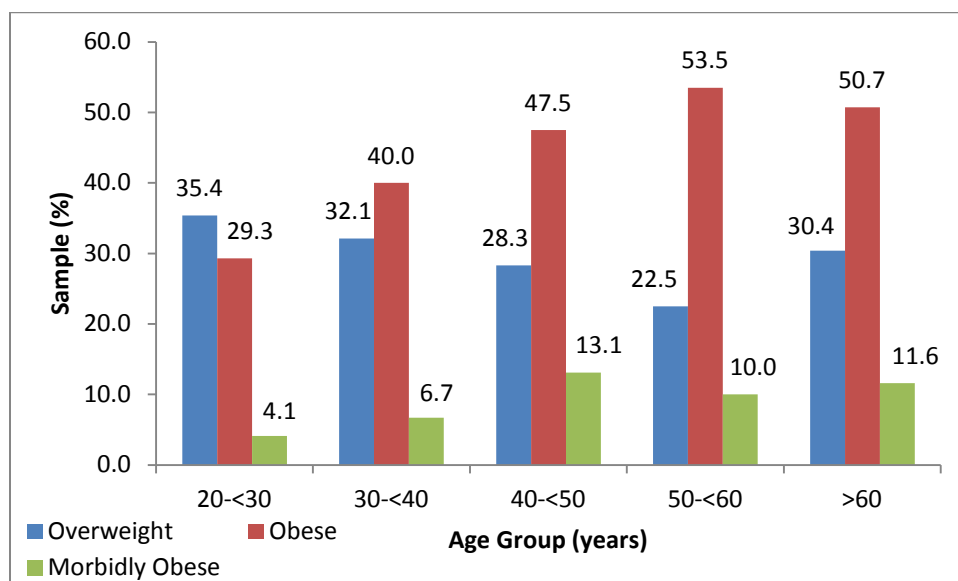
**Cholesterol: Elevated: \geq 5.2-<6.2mmol/L; High: \geq 6.2mmol/L

Graph 22: Prevalence of overweight§, obesity† and morbid obesity‡ among males ≥20 years according to age group



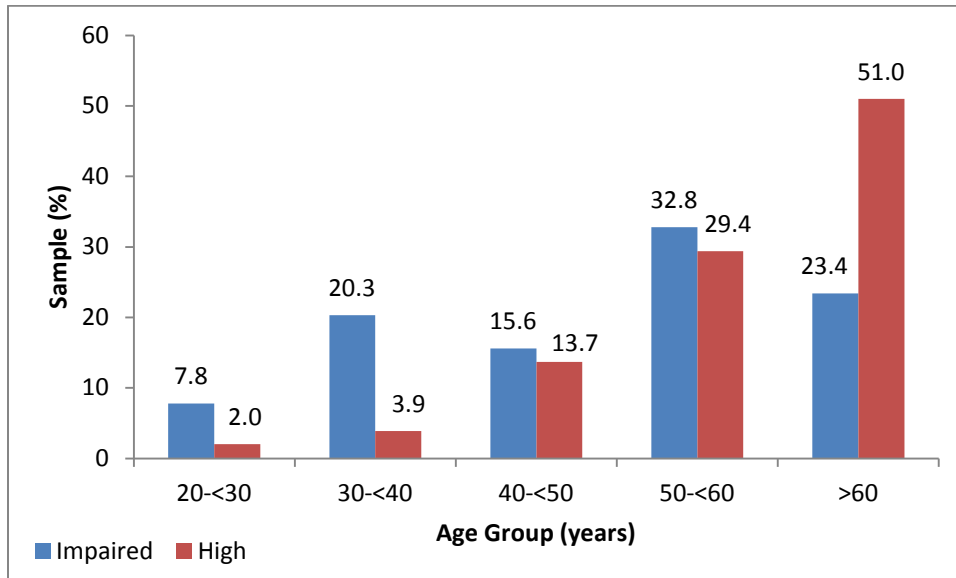
WHO References: §Overweight: [BMI≥25.0 - <30.0]; †Obesity: [BMI≥30.0 - <40.0]; ‡Morbidly Obese: [BMI ≥40.0].

Graph 23: Prevalence of overweight§, obesity† and morbid obesity‡ among females ≥20 years according to age group



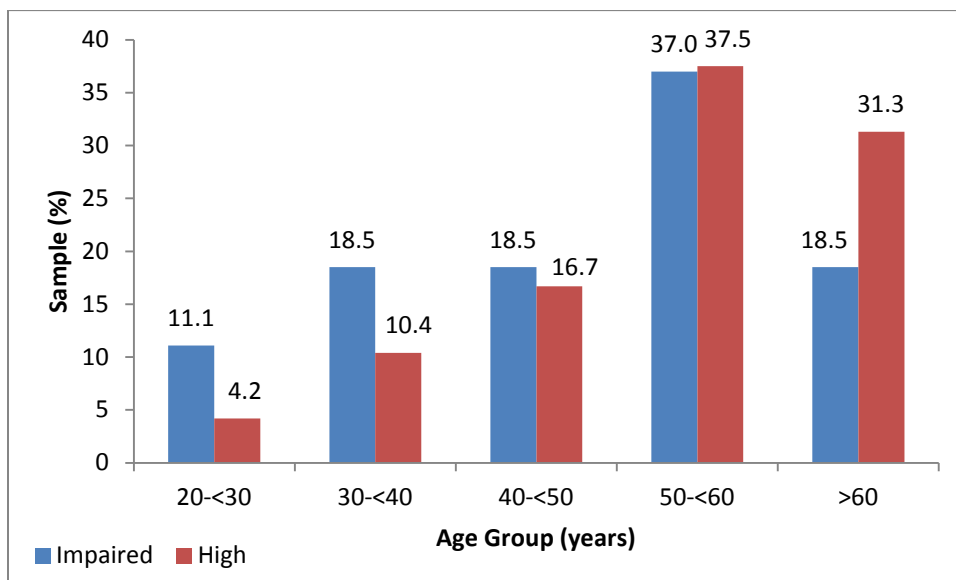
WHO References: §Overweight: [BMI≥25.0 - <30.0]; †Obesity: [BMI≥30.0 - <40.0]; ‡Morbidly Obese: [BMI ≥40.0].

Graph 24: Prevalence of impaired and high *blood glucose among males ≥20 years according to age group



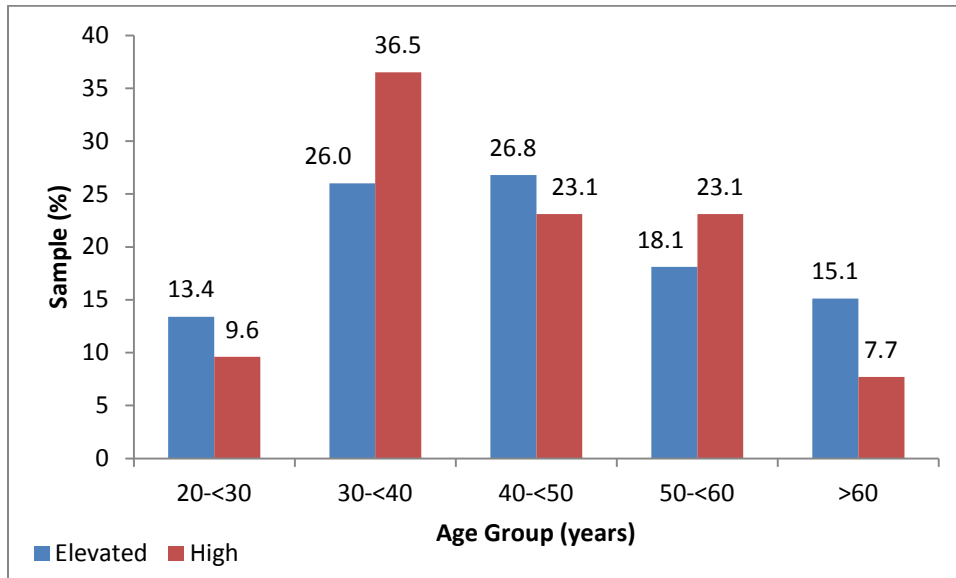
WHO *blood glucose reference, Impaired: ≥6.1-<7.0 mmol/L; High: ≥7.0 mmol/L

Graph 25: Prevalence of impaired and high *blood glucose among females ≥20 years according to age group



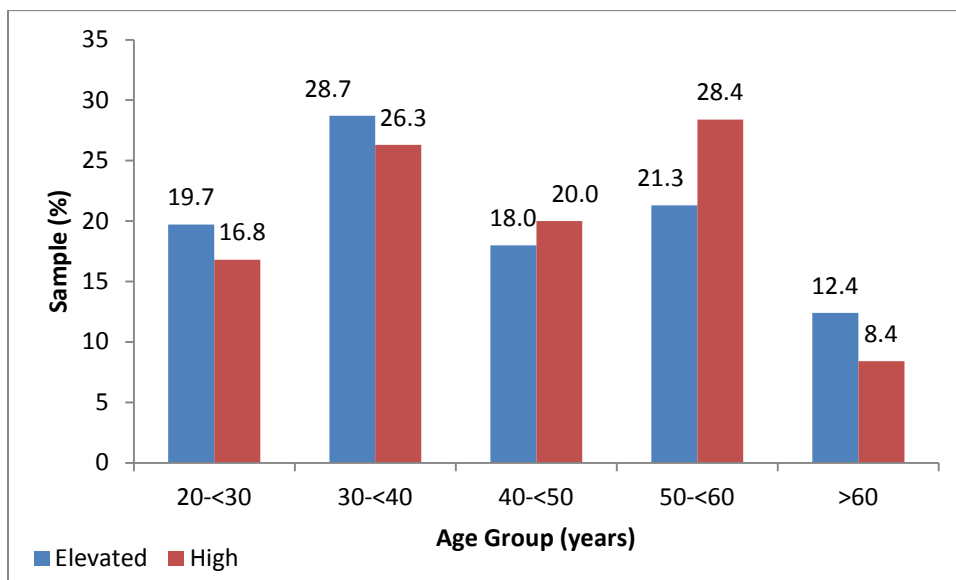
WHO *blood glucose reference, Impaired: ≥6.1-<7.0 mmol/L; High: ≥7.0 mmol/L

Figure 26: Prevalence of high and elevated cholesterol among males ≥20 years according to age group**



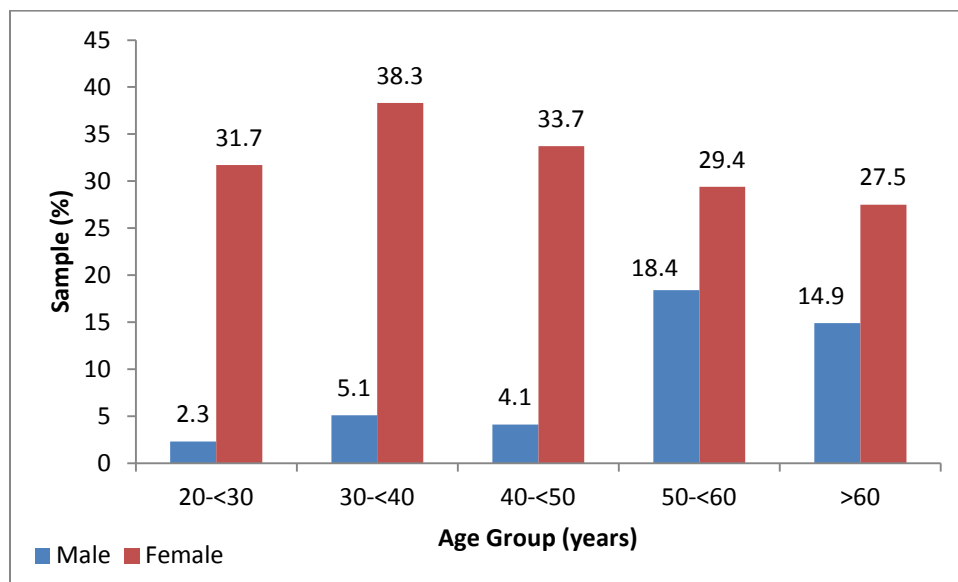
WHO **cholesterol reference, Elevated: ≥5.2-<6.2mmol/L; High: ≥ 6.2mmol/L

Graph 27: Prevalence of high and elevated cholesterol among females ≥20 years according to age group**



WHO **cholesterol reference, Elevated: ≥5.2-<6.2mmol/L; High: ≥ 6.2mmol/L

Graph 28: Prevalence of anemia among adults ≥20 years according to age group and sex



Comments:

1. The above findings showed that the prevalence of overweight was higher in adult males (34.6%) than adult females (30.5%). Whereas obesity was higher in adult female (42.3%) than adult male (36.1%). Morbidly obese was higher in adult females (8.3%) than adult male (4.5%).
2. The prevalence of anemia was 9.7% in adult males and 32.7% in adult females. The highest prevalence of anemia was among adult females at 30-<40 years of age (38.3%).
3. 13.7% of adult males and 13.6% adult female had impaired blood glucose (≥ 6.1 to < 7.0 mmol/L). While 10.9% adult males and 8.1% adult females had high glucose levels (≥ 7.0 mmol/L). Blood glucose levels were increasing with age for both males and females.
4. 41.5% of adult males and 58.5% adult females had elevated cholesterol levels (≥ 5.2 to < 6.2 mmol/l). 29.1% adult males and 34.7% adult females had high cholesterol levels (≥ 6.2 mmol/l).

Adults' Life Style Indicators

Smoking: 31.3% of adult males and 1.0% adult females were smokers. The majority of the males smoked cigarette (80%) with an average of 20 cigarettes per day and 4 times sisha per week. Majority of the females (98%) smoked cigarette with an average of 20 cigarettes per day .

Physical Inactivity: 45.9% Males and 55.0% females were physically active.

Fruit and vegetable intake: 37.0% of Kuwaiti adults consumed 2 servings of fruits daily and 57.0% consumed 2 servings of vegetables.

Cholesterol lowering medication intake: 25.0% of adult males and 23.1% of adult females were on cholesterol lowering medication.

Diabetes type: 46.6% of Kuwaiti adults had type I diabetes and 53.4% had type II.

Diabetes medication intake: 39.5% of adult males and 57.7% of adult females took diabetes medication.

Bariatric surgery: 4.1% of adult females and 1.7% of adult males underwent surgery to reduce their weight.

Consumption of iodized salt: 42.7% of Kuwaiti adults said that they use iodized salt, 12.9% said that they do not use it and 39.2% said that they do not know what kind of salt they are using.

Conclusions

1. Obesity and anemia remain the major two nutritional health problems in Kuwaiti population. The continuous presence of these two problems indicates that the current efforts to combat these problems are not effective.
2. Young children from six months to five years, adolescent girls and females of child bearing age are at greater risk of getting anemia.
3. The elderly population data showed marked increase in anemia level which may indicate poor nutrition habits and need more efforts towards this age group particularly females.

Recommendations

1. There is an urgent need for more effective interventions and legislative measures to control obesity and non-communicable diseases in Kuwait.
2. More efforts should be put toward increasing the activity level among the different population age groups.
3. Promote the recommendation that advice people of all ages to include a minimum of 30 minutes of physical activity of moderate intensity (such as brisk walking) on most (if not all) days of the week.

4. Encourage fruits and vegetables consumption by all available means for all age groups.
5. More nutrition awareness is needed to improve the consumption of fruits and vegetables among all population age groups. It should be available and affordable to all the sectors of the community. Parents and teachers play an important role in teaching children the benefits of eating fruits and vegetable from a very young age.
6. Legislations to control the marketing of food rich in fat should be enacted and strengthened in addition to control measures on the subsidized food commodities.
7. Encourage exclusive breastfeeding from birth to 6 months of age then to start sound complementary food with the continuation of breastfeeding up to two years of age and beyond. If unable to breast-feed, they should use infant formula with iron and iron fortified weaning food.
8. Improve the micronutrient status of pre-school children by fortifying a common local juice product or milk with various hematinics including: iron, folic acid, vitamin A and vitamin C.
9. To reduce anemia prevalence among school children, appropriate supplementation and/ or fortification intervention strategies, tailored to this group should be developed.
10. Include appropriate intervention strategies to combat anemia, tailored to the elderly age group, among the new Elderly Health Promotion Program.