The Kuwait Nutrition Surveillance System

برنامج الترصد التغذوي

2019 Annual Report

التقرير السنوي للعام 2019

Food and Nutrition Administration

إدارة التغذية والإطعام

Ministry of Health

وزارة الصحة

KUWAIT

دولة الكويت

August, 2020

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Abbreviations:

KNSS	The Kuwait Nutrition Surveillance System
MOH	Ministry of Health
EMRO	Eastern Mediterranean Region (EMRO)
FNA	Food and Nutrition Administration
WHO	World Health Organization
BMI	Body Mass Index
Hb	Haemoglobin
mmol/l	millimoles per litre
gm/dl	grams per deciliter
BW	Birth Weight
LBW	Low Birth Weight
CS	Caesarean Section
SD	Standard Deviation
95%CI	95% Confidence Interval
IQR	Interquartile Range
EMAN	Eastern Mediterranean Approach for Control of Non Communicable Diseases

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Summary

Kuwait Nutritional Surveillance System (KNSS) collects data from Kuwaiti citizens using standardized data collection forms through personal interviews conducted by trained data collectors who are permanently employed for this purpose. Data are collected from various age groups that include children (0-23 months), children 24-60 months, school children >5 years and ≤19 years and finally adults >19 years. Below is the summary of the main findings in each age group.

- **Children 0-23 months**

Data were collected on 1,779 children in this age group (0-730 days) of whom 833 (46.82%) were females. Approximately, 25% of the children in this age group were born with low birth weight (Birth weight <2500 gm) as reported by their mothers. More than 76.11% of these children were born in private hospitals and 28.43% were born by caesarean section (CS). Around 49.87% of Kuwaiti mothers initiated breastfeeding within the first hour of birth (or recovery from the CS) and the rest delayed the initiation of breastfeeding for nonspecific reasons. Of all children 0-23 months, 93.82% were ever breastfed, while only 29.90% of the children ≤3 months and 22.94% of children ≤6 months were currently breastfeeding (any breastfeeding). Exclusive breastfeeding was 7.83% among children ≤ 6 months, while predominant breastfeeding was 9.23%. Among children 0–23 months, age-appropriate breastfeeding was 5.77% and breastfeeding at 1 year was 8.64 %. Minimum dietary diversity was 45.77%. Approximately, 30.64% of children in this age group were exposed to second-hand smoking at home- as reported by mothers or child's guardians. Stunting was around 10%; while wasting was less than 5% among children in this age group. Overweight and obesity was 5.79% and 2.55% in this age group, respectively.

- **Children >2 years to ≤ 5 years**

In this age group, data were collected on 969 children of whom 48.30% were males. In this age group, 41.59% were exposed to second-hand smoking at home and 43.45% consumed canned non-fresh sweet juice six times or more per week. The prevalence of obesity and overweight in this age group was 2.82% and 6.16% respectively; while stunting and wasting were 3.00% and 1.46% respectively. Approximately, 25.06% of the mothers of normal weight children thought that their children are underweight.

- **School children >5 years to 19 years**

Data were collected from 12,315 of whom 5,848 (47.55%) were males. The overall prevalence of overweight and obesity in this age group was 20.19% and 28.39%, respectively.

- **Adults > 19 years**

Data were collected on 1,551 individuals of whom 881 (56.80%) were females. The mean (SD) Body Mass Index (BMI) was 29.53 (5.81) which is similar to that reported in EMAN study. In total 41.74%% were obese while 36.39% were overweight. Thus 78.13% of Kuwaiti adults were either obese or overweight which is similar to that reported in EMAN (Eastern Mediterranean Approach for Control of Non Communicable Diseases) study. Approximately 62.67% of Kuwaiti adults do not exercise at all and more than 40% of Kuwaiti males are currently smokers (cigarettes, shisha or both).

Preface

The State of Kuwait established Nutrition Surveillance System (KNSS), which has been running for more than 20 years. The KNSS has been designated to collect, analyse, and disseminate surveillance data to guide public health policy and action. Among children, it gathers data on infants feeding and breastfeeding practices, and anthropometric measurements. It also collects data on anthropometric measurements of Kuwaiti adults in addition to self-reported hypertension, self-reported high cholesterol and behavioural factors such as smoking and practicing exercise. It is run by The Food and Nutrition Administration (FNA) at The Ministry of Health (MOH), Kuwait. This year due to financial and other logistical constrains, no blood samples were collected from children or adult. Therefore, the related section will not be shown in the report of this year.

In 2014, efforts were made to strengthen KNSS and improve the quality and the quantity of data that are collected. Data collection forms were modified to collect data on important indicators that are currently required by various organizations. The data forms were tested, and the training of data collectors was conducted. Previously, the KNSS collected data without ethical approval. In 2015, ethical approval was obtained from the ethics committee at Ministry of Health. This report provides various key indicators of health and nutrition of the population that are essential to monitor over time.

1 Introduction

The overall objective of KNSS is to provide regular and updated information on the nutritional status of Kuwaiti population (children and adults) and the influencing factors. The system also aims to provide nationwide information on the trends of nutritional status on all age groups by tracking nutritional status over time. This information will provide a basis for the decisions made by those responsible for policy, planning and management of programmes related to improvement of nutritional status of Kuwaiti population.

The data from KNSS can be used to:

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

2 Methods

KNSS collects data from Kuwaiti citizens using standardized data collection forms through personal interviews conducted by trained data collectors who are employed permanently for this purpose. An instruction manual was prepared to cover all aspects of data collection including interview and anthropometric measurements. The data are collected throughout the year on various settings which cover the six governorates of Kuwait. The methodology and sites of data collection in each age group is described below.

2.1 Children in the age group "less than or equal to two years i.e. 0-23 months"

Children (<730 days of age) are selected from health centres during vaccination from all governorates of Kuwait (one health centre in each governorate). Ideally data should be collected by a household survey, but this is not probably feasible in Kuwait. However, unlike other countries where the vaccination coverage is low, vaccination in Kuwait is free of charge and the coverage reaches almost 100%. Thus, it is possible to assume that recruiting children from health centres will generate a representative sample of Kuwaiti children. According to the vaccination schedule in Kuwait, babies should be vaccinated at the age of 2nd, 3rd, 4th, 6th, 12th, 18th, 24th and 42nd months.

Data are collected by face-to-face interviews on breastfeeding practices, complementary feedings practices, in addition to the history of illness during the last three months of the visit date. The data are also gathered on the type of delivery, birth weight (BW) in addition to the exposure to smoking at home. The data form for this age group has

been developed to generate a set of core and optional indicators as outlined by WHO [1-3]. Weight of children is measured using digital scale (SECA ALPA®) to the nearest 100 gm; while length is measured to the nearest 0.1 cm using length board. Weight scales are calibrated regularly using well known weight set. Data collectors are trained annually to measure the weight and height in a standardized manner.

2.2 Children in the age group "more than two years and less than or equal to five years i.e. 24-60 months"

Children (730 days to1856 days of age) in this group are also recruited from health centres during vaccination and from nurseries[i] distributed in all governorates of Kuwait. Data are collected on various nutritional factors including the time of first meal and the food diversity in addition to mother's perception on the weight of her child. Data are also collected on the screen time during weekends and weekdays in addition to second hand smoking. Weight of children in this group is measured using digital scale (SECA ALPA®) to the nearest 100 gm; while height (to the nearest 0.1 cm) is measured using portable height scale (SECA®).

2.3 School-age children and adolescents (more than 5 to 19 years)

Participants in this age group are recruited basically from public schools in all governorates of Kuwait. School are sex-segregated at all levels in Kuwait. KNSS selects one school for each gender from public primary, middle and high schools in each governorate making sure that the same school is not selected in two consecutive years. In this particular group, only data on height, weight and haemoglobin levels are collected. Weight of school children is measured using digital scale (SECA ALPA®) to the nearest 100 gm; while height (to the nearest 0.1 cm) is measured using portable height scale (SECA®). No other data are collected from this group (no data form was developed for this age group) because the administration of school health at Ministry of Health conducts regular school surveys using Global School-based Student Health Survey. It is worth noting that in this survey weight and height are self-reported and not objectively measured.

2.4 Kuwaiti adult (> 19 years old)

This group is selected from attendants to various places including-but not limited to- attendants to health centres because of minor disease conditions and The Public Authority for Social Security. Formal letters from FNA are sent

[i] Only data on anthropometric measurements and Haemoglobin are collected from children in this age group if they are recruited from nurseries.

to the relevant institutions seeking their permission; and asking for the arrangements for data collection, which include providing a private office space to be used for data collection. Data are collected on gender, education, nature of the job (if any), smoking habits, methods used to control weight (if any) and being diagnosed with hypertension, diabetes, or hypercholesterolemia in addition to questions on fruit and vegetable intake based on The WHO STEPwise approach [4]. Anthropometric measurements are conducted according to a standardized protocol. It is thought that this amount of data is sufficient given the fact that this particular group is the main focus of the EMAN study (a major survey on the risk factors for chronic non-communicable disease), which is conducted in Kuwait regularly.

2.5 Data analysis and reporting:

Completed data forms are checked for completeness and consistency before data entry; and then entered into the database at the FNA. Feedbacks are given to data collectors by five individuals who are trained in this field. Body Mass Index (BMI) is calculated and underweight, overweight and obesity are defined using WHO growth standards and references for children or WHO cut-off points for adults. All other national indicators are calculated per the WHO guidelines [1-3]. Data are also analysed to search for secular trends that cover longer periods of time. Annual reports are prepared and distributed to all relevant departments and Ministries in Kuwait. The final report is also posted on the website of the Ministry of Health. Finally, the results are forwarded to the WHO database managers, which can be accessed via the WHO website of the **N**utrition **L**andscape **I**nformation **S**ystem (**NLIS)** (www.who.int/nutrition/nlis).

3 Indicators calculated from children 0-23 months

The total number of participants in this age group (0-730 days) was 1,779 of whom 833 (46.82%) were females. Of 1,779 children, mother was the source of information in 1,587 (89.21%). Below are main indicators calculated from this group.

3.1 Birth weight (BW), low BW, high BW

The majority of the parents remembered the BW of their babies (1,656 of 1779). The mean (SD) of BW was 2889.5 (579.4) gm. The distribution of the BW in both genders is shown in Figure 1. Table 1 shows that 24.64% of the children 0-23 months were born with LBW or very LBW.

Figure 1: Distribution of birth weight in Kuwait as reported by 1791 parents (Kuwait Nutritional Surveillance System, 2019).

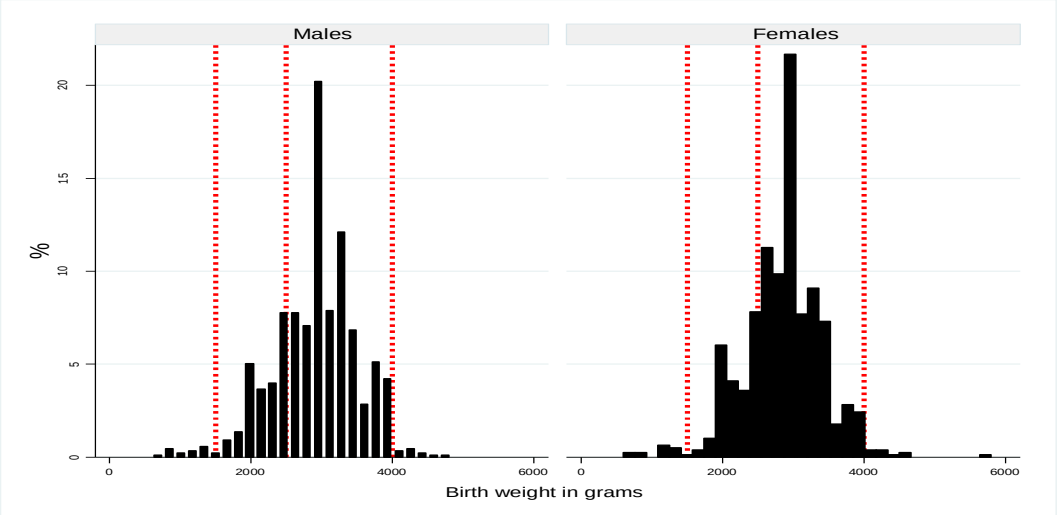


Table 1: Low birth weight among Kuwaiti children as reported by 1,656 parents, (Kuwait Nutritional Surveillance System, 2019)

Birth weight categories[1]	n	(%)
Very Low Birth Weight< 1500 gm	31	(1.87)
Low Birth Weight≥ 1500 gm to < 2500 gm	377	(22.77)
Normal Birth weight≥ 2500 gm to <4000 gm	1,227	(74.09)
High Birth weight≥ 4000 gm	21	(1.27)

[1] according to WHO definition.

Low weight at birth whether as the result of preterm birth (before 37 weeks of gestation) or restricted foetal (intrauterine) growth is a predisposing factor for foetal and neonatal mortality and morbidity, inhibited growth and cognitive development, and chronic diseases later in life [5]. We estimated that more than one fifth of the children are born with LBW. This is higher than that reported from USA where only 9% had LBW [4] but similar to that reported in South East Asia where more than one quarter of children are born LBW [5]. Kuwait is affluent country, therefore poor socio-economic conditions that predispose to LBW are unlikely explanation for the high prevalence of LBW. Also, physically demanding work and infections during pregnancy are unlikely to be the underlying cause in the light of easily accessible antenatal care in Kuwait (see below). Although some these LBWs can be attributed to prematurity (see below), other factors such as mothers' own foetal growth, her diet from birth to pregnancy [6], and her body composition at conception [7] can all contribute to LBW. It worth noting that these finding may represent an overestimate of low birth weight, because mothers who were unable to recall the birth weight of their child are more likely to have a normal weight child. We had 123 mother who were unable to recall the weight of their child. If we include this group in the denominator, the estimated low birth weight will remain high (22.93%). Surveillance data are usually used to generate hypothesis. Therefore, the data in this report highlight the importance of conducting a study to estimate LBW and to identify the underlying predisposing factors.

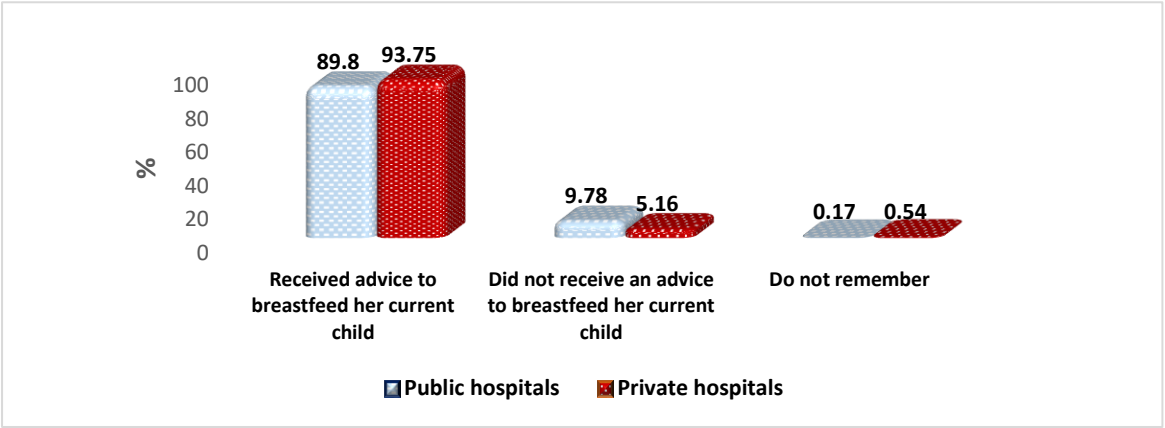
3.2 Antenatal care, type of delivery, place of delivery and prematurity

During pregnancy, 48.00% of mothers visited private clinics, 13.63% visited governmental clinics, while 37.98% visited both private and governmental clinics. Only 0.38% of Kuwaiti mothers did not visit a private or a governmental clinic during pregnancy. 76.11 % of the children in this age (0-23 months) were born in private hospitals, while 1.12% were born outside Kuwait. The rest of children 22.77% were born in governmental hospitals. Of all those born in Kuwait (1,759 children), 28.43% were born by caesarean section (CS). Of those born in private hospitals, 23.34% were born by CS compared to 45.43% in governmental hospitals ($p<0.001$). About 6.80% of babies were born prematurely less than 35 weeks (8 months or less) of gestation as reported by their mothers.

3.3 Advice to breastfeed child in the hospital

Approximately, 90.61% of mothers, reported they had received an advice to breastfeed their child in the hospital, where their child was born[ii]. This was not significantly different between governmental hospitals and private hospitals (Figure 2).

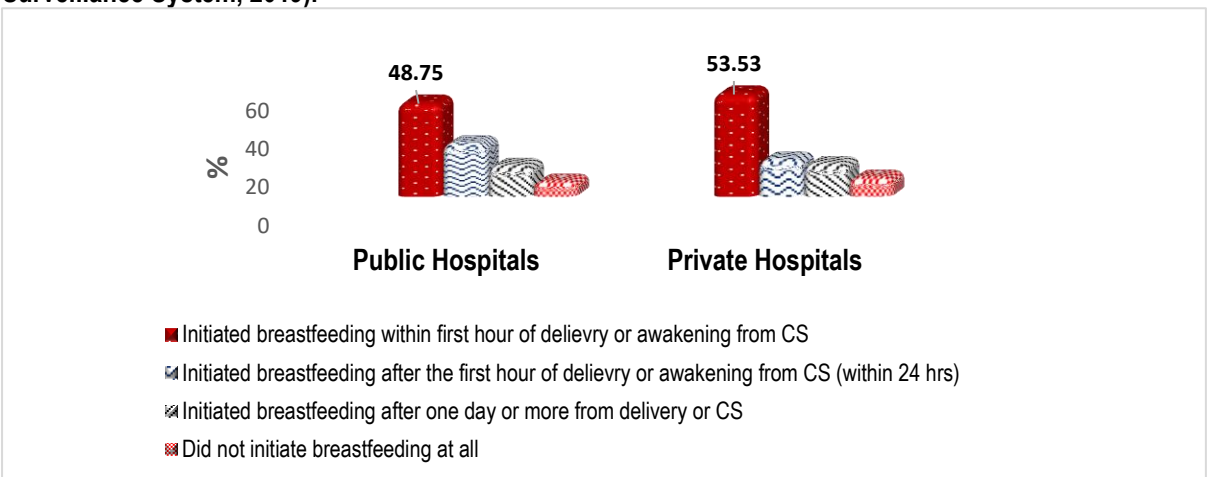
Figure 2: Proportion of mothers who received an advice to breastfeed their child in private and public hospitals. (Kuwait Nutritional Surveillance System, 2019)



3.4 Early initiation of breastfeeding[iii]

Overall, 49.87% of Kuwaiti mothers did initiate breastfeeding within the first hour of delivery or after recovering from CS. This was not significantly different between governmental and private hospitals (48.67 % vs. 53.53%, respectively p=0.103) (see Figure 3). The most commonly reported reasons for delay of initiation of breastfeeding (by mothers) were mother felt tired after giving birth, no milk or child was in an incubator.

Figure 3: Early initiation of breastfeeding in governmental and private hospitals. (Kuwait Nutritional Surveillance System, 2019).

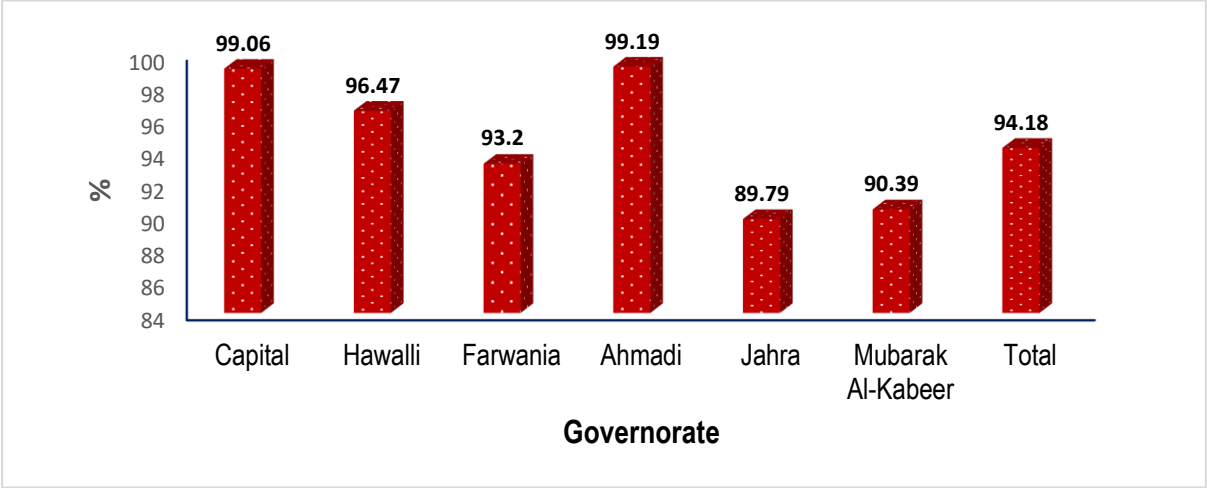


[ii] Question was asked only, if the mother was the sources of information.
[iii] Question was asked only if the mother was the sources of information.

3.5 Children ever breastfed[iv]

Of all children 0-23 months, 93.82% were ever breastfed with no difference by the gender of child (94.42% of males vs.93.92% of females,p=0.653). but border line significant by the place of delivery (94.81% in private hospitals vs. 92.10% in governmental hospitals; 0.041). The proportion of children 0-23 months who ever breastfed was lower in Jahra and Mubarak al-Kabeer governorates compared to other governorates (p<0.001) (Figure 4).

Figure 4: Proportion of children 0-23 months who ever breastfed in each governorate. (Kuwait Nutritional Surveillance System, 2019).



3.6 Current breastfeeding

Table 2 shows the proportion of mothers who are currently breastfeeding their infants≤3 months (i.e. <91 days) or ≤6 months (i.e. <183 days). This is based on the number of infants who were breastfed yesterday. The prevalence of breastfeeding was 29.90% (95%CI: 24.87-35.33%) and 22.94% (95%CI: 19.90- 26.20%) among children≤3 months and ≤6 months, respectively. Although this based on small numbers, mothers in Jahra governorate were less likely to breastfeed their infants compared to mothers in other governorates.

[iv] The denominator for this indicator does not include those children who died. However, infant mortality is extremely low in Kuwait and unlikely to change this estimate. We also excluded those who were born outside Kuwait, which has only minimum impact on the findings.

Table 2: Current breastfeeding (any breastfeeding) of infants≤3 months and ≤6 months in each governorate. (Kuwait Nutritional Surveillance System, 2018)

Any breastfeeding yesterday		N	n	(%)
Total	infants≤3 months[1]	311	93	(29.90)
	infants≤6 months[2]	715	164	(22.94)
Capital	infants≤3 months	42	28	(66.67)
	infants≤6 months	87	45	(51.72)
Hawalli	infants≤3 months	54	24	(44.44)
	infants≤6 months	117	46	(39.32)
Farwania	infants≤3 months	68	7	(10.29)
	infants≤6 months	140	13	(9.29)
Ahmadi	infants≤3 months	51	15	(29.41)
	infants≤6 months	104	28	(26.92)
Jahra	infants≤3 months	38	5	(13.16)
	infants≤6 months	140	11	(7.86)
Mubarak Al-Kabeer	infants≤3 months	58	14	(24.14)
	infants≤6 months	127	21	(16.54)

[1] Infants <91 days [2] Infants <183 days

3.7 Exclusive breastfeeding

Table 3 shows the prevalence of exclusive breastfeeding among children ≤3 months or ≤6 months. Exclusive breastfeeding was 8.68% (95%CI: 5.80-12.37%) and 7.83% (95%CI: 5.97-10.05%) among children≤3 months and ≤6 months respectively.

Table 3: Exclusive§ breastfeeding of infants≤3 months or ≤6 months in each governorate (Kuwait Nutritional Surveillance System, 2018).

Exclusive breastfeeding yesterday		N	n	(%)
Total	infants≤3 months	311	27	(8.68)
	infants≤6 months	715	56	(7.83)
Capital	infants≤3 months	42	13	(30.95)
	infants≤6 months	87	23	(26.44)
Hawalli	infants≤3 months	54	5	(7.41)
	infants≤6 months	117	12	(10.26)
Farwania	infants≤3 months	68	1	(1.47)
	infants≤6 months	140	3	(2.14)
Ahmadi	infants≤3 months	51	3	(5.88)
	infants≤6 months	104	9	(8.65)
Jahra	infants≤3 months	38	1	(2.63)
	infants≤6 months	140	1	(0.71)
Mubarak Al-Kabeer	infants≤3 months	58	4	(6.90)
	infants≤6 months	127	8	(6.30)

§ Defined as only breast milk without anything else except ORS, vitamins, minerals and medicines.

3.8 Predominant breastfeeding under 6 months

This is the proportion of children ≤6 months who are predominantly breastfed. This indicator was 9.23% (95%CI: 7.21-11.59%). This is also low because breastfeeding was low in general.

3.9 Age-appropriate breastfeeding

This is the proportion of children 0–23 months of age who are appropriately breastfed. This is calculated as infants 0–5 months of age who received only breast milk during the previous day divided by infants 0–5 months of age; in addition to children 6–23 months of age who received breast milk, as well as solid, semi-solid or soft foods, during the previous day divided by the number of children 6-23 months of age. This indicator was 5.77% (95%CI: 4.73-6.96%), which is not surprising as the exclusive breastfeeding was low.

3.10 Continued breastfeeding at 1 year

This is the proportion of children 12-15 months of age who are currently breastfed: 8.64 %. This was also low because breastfeeding in general was low even at earlier age (see item 3.6)

3.11 Continued breastfeeding at 2 year

This is the proportion of children 20-23 months of age who are currently breastfed: 8.57% (95%CI: 3.21-17.73%). The number of children in this age group was too small (n=70) to provide a precise estimate.

3.12 Introduction of solid, semi-solid or soft foods

This is the proportion of children 6-8 months who received solid, semi-solid or soft food yesterday. This is estimated to be 72.09% (95%CI: 67.21- 76.60%).

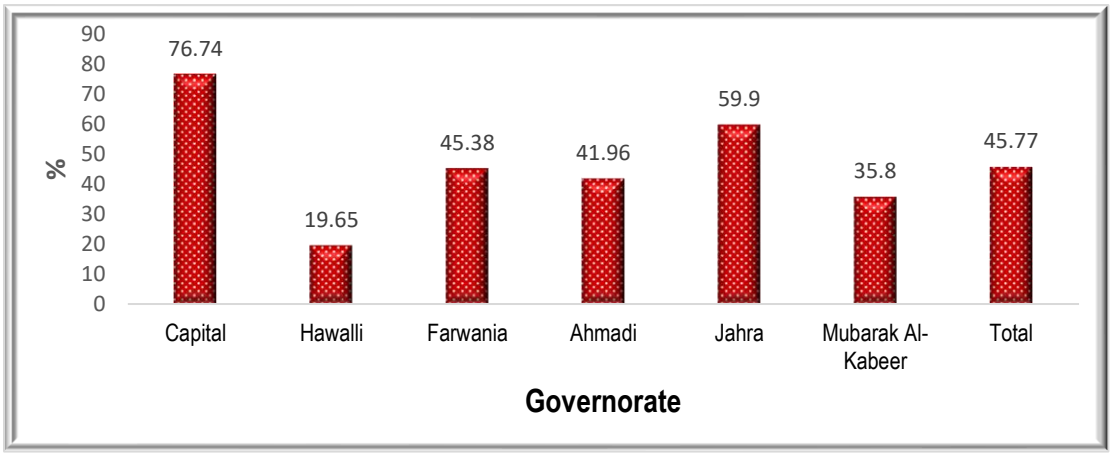
3.13 Minimum dietary diversity

This is the proportion of children 6-23 months of age who received foods from 4 or more food groups. The food groups are:

- Grains, roots and tubers
- Dairy products (milk, yogurt, cheese)
- Eggs
- Other fruits and vegetables
- Legumes and nuts
- Flesh foods (meat, fish, poultry and liver/organ meats)
- Vitamin A rich fruits and vegetables

The calculated indicator was 45.77% (42.74-48.82%). There was significant difference in this indicator between governorates (p<0.001), (Figure 5).

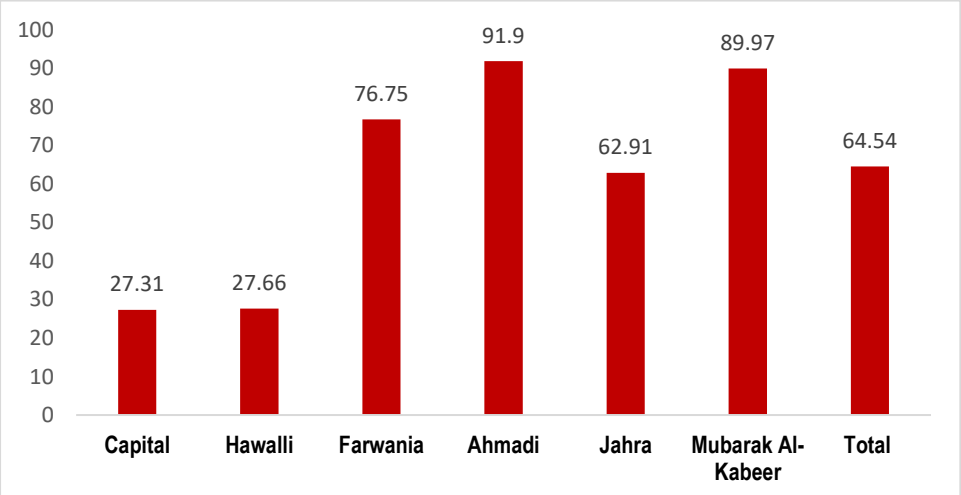
Figure 5: Children (6-23 months) with minimum dietary diversity in each governorate. (Kuwait Nutritional Surveillance System, 2019)



3.14 Bottle feeding[v] in children 0-23 months

This is the proportion of children 0-23 months of age who are fed from a bottle with a nipple. Of children in this group, 64.54% (95%CI: 62.26-66.77%) were bottle fed. This was significantly different between governorates (p<0.001) (Figure 6). This high proportion of children in this age who drank anything from a bottle with a nipple yesterday can be understood in the light of the low breastfeeding.

Figure 6: Children (0-23 months) with bottle feeding in each governorate. (Kuwait Nutritional Surveillance System, 2019)

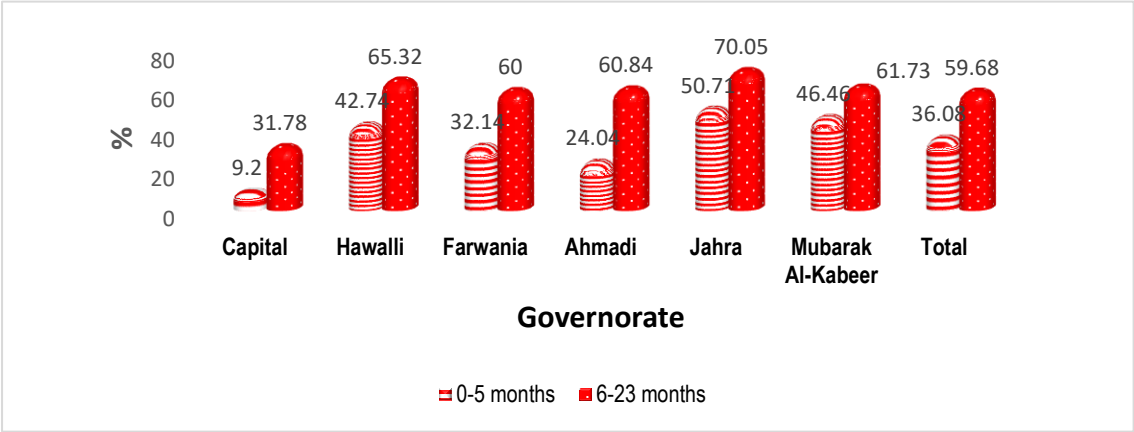


[v] This is not necessarily formula milk.

3.15 Illness during the last 3 months among children 0-23 months

This is the proportion of children 0-23 months of age who had an illness (at least once) that required consulting a physician in public or private sector in the last three months. Of the children in this group, 50.20% (95%CI: 47.85-52.55%) had an illness that required consulting a physician in the last three months. This was 36.08% (95%CI: 32.56-39.72%) and 59.68% (95%CI: 56.66-62.64%) among children 0-5 months and children 6-23 months respectively. Figure 7 shows the distribution of this by governorates. The majority of those who had an illness during the last three months had it only once while another 16.00% had an illness twice. The most commonly reported illness in the age group was chest/respiratory infections.

Figure 7: Children (0-23 months) with illness during the last 3 months in each governorate (Kuwait Nutritional Surveillance System, 2019)

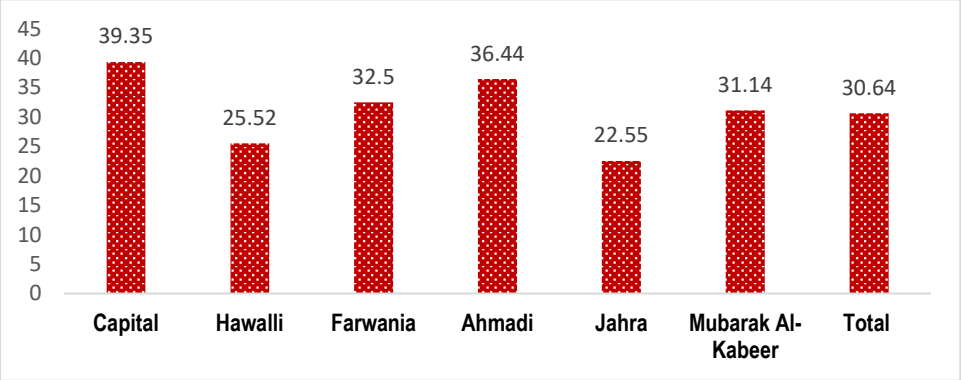


3.16 Smoking in household among children 0-23 months

This is the proportion of children 0-23 months of age who are exposed to smoke of cigarettes, shisha or both at home. This was 30.64% (95%CI: 28.05-32.84%) and varied significantly between governorates (p<0.001) (

Figure 8).

Figure 8: Children (0-23 months) exposed to smoking in each governorate. (Kuwait Nutritional Surveillance System, 2019)



Child's father alone or with other relatives was the main person smoking in the house. Effort to educate parents on the harmful effect of smoking on their children may help reduce the burden of smoking on children and their parents.

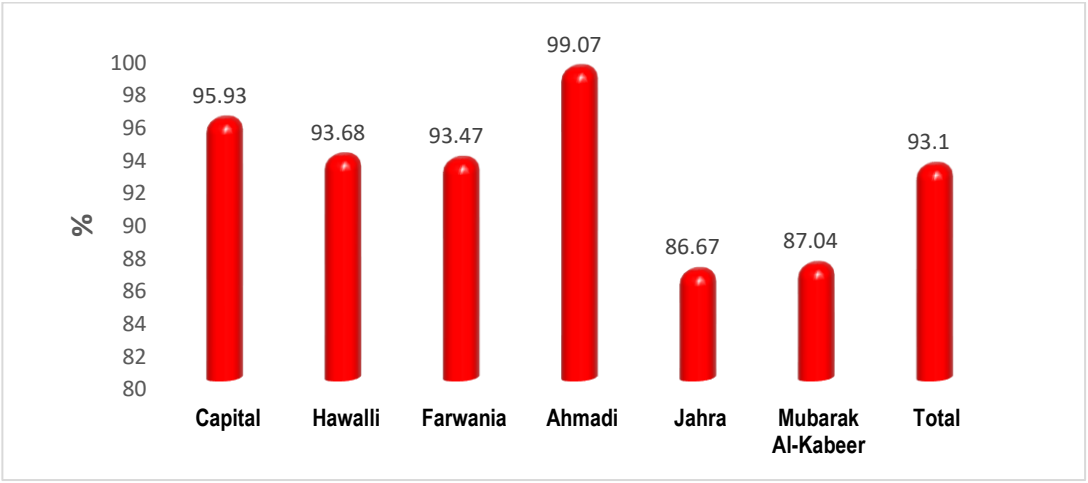
4 Indicators for children from 2 years to 5 years

In this age group, the data were collected on 969 children of whom 48.30% were males. This group of children were recruited from health centres, where the interview with mothers or child's guardians was conducted.

4.1 Children between 2-5 years ever breastfed

This is the proportion of children 2-5 years who ever breastfed, 93.10% (95%CI: 91.31-94.63%) were breastfed at least for one time. There was significant difference in the proportion of children 2-5 years that ever breastfed between different governorates, Figure 9 ($p<0.001$).

Figure 9: Children (2-5 years) ever breastfed in each governorate. (Kuwait Nutritional Surveillance System, 2019)



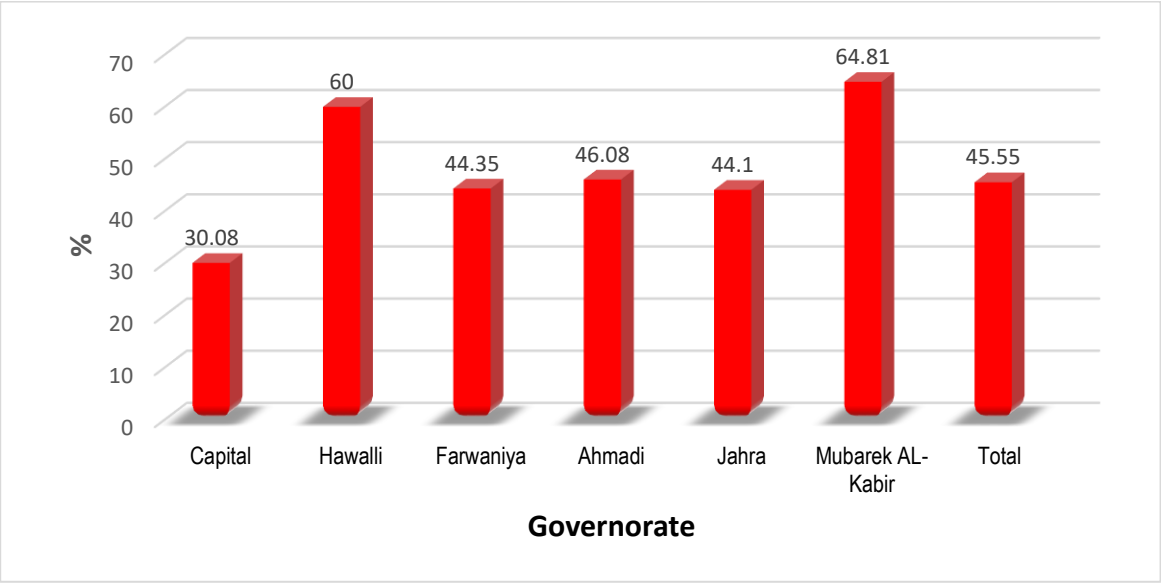
4.2 Bottle feeding[vi] in children 2-5 years

This is the proportion of children 2-5 years of age who are fed from a bottle with nipple. Of children in this age group, 37.46 % (95%CI: 34.40-40.59%) were bottle fed.

4.3 Illness during the last 3 months among children 2-5 years

This is the proportion of children 2-5 years of age who had an illness (at least once) that required consulting a physician in public or private sector in the last 3 months. Of the children in this group, 45.55% (95%CI: 42.37-48.75%) had an illness that required visiting a doctor. Figure 10 shows the distribution of this by governorate ($p<0.001$).

Figure 10: Children (2-5 years) who had illness during the last 3 months in each governorate. (Kuwait Nutritional Surveillance System, 2019)

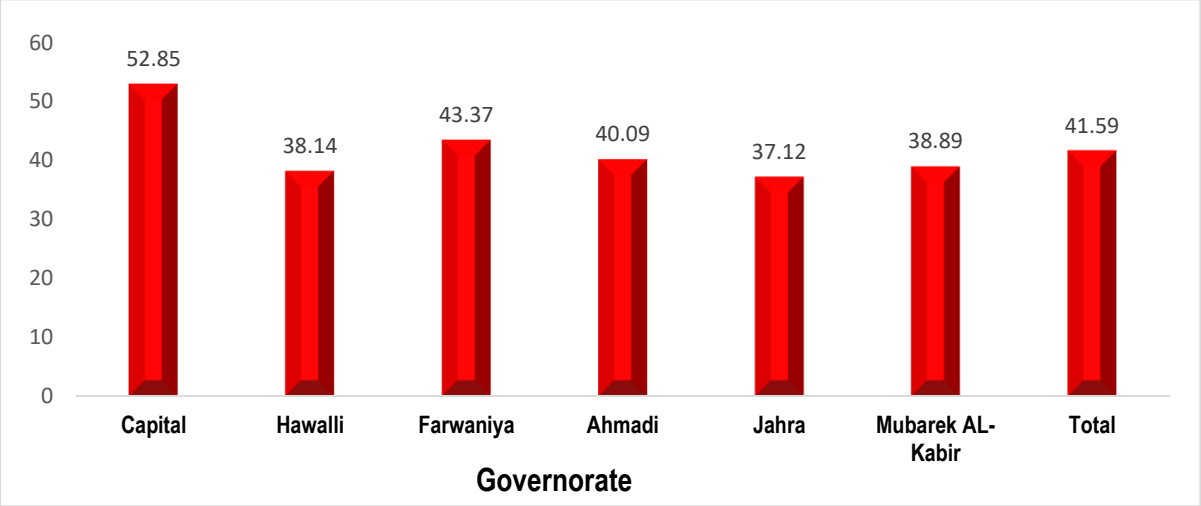


4.4 Smoking in household among children 2-5 years

This is the proportion of children 2-5 years of age who are exposed to smoke of cigarettes, shisha or both at home. This was 41.59% (95%CI: 38.46-44.76%). Figure 11 proportion of children in the age 2-5 who are exposed to smoking in their homes by governorate ($p=0.084$)

[vi] This is not necessarily formula milk.

Figure 11: Children (2-5 years) exposed to smoking at home in each governorate. (Kuwait Nutritional Surveillance System, 2019)



4.5 Screen time among children 2-5 years

The American Academy of Paediatrics recommends that parents limit the amount of time that children spend watching TV or other media to no more than 1-2 hours per day for children aged 2 years or older. Table 4 shows the time spent by this group of children on TV watching and computer games during weekdays and weekends. Although most children in this age group watch TV for less than two hours, there is an increasing use of computer games and other electronic devices. Thus, the total amount of time that children in this age spend watching TV or other media is higher than two hours (the recommended time).

Table 4: Screen time among Kuwaiti children 2-5 years. (Kuwait Nutritional Surveillance System, 2019).

	Days	Screen Time	n	(%)
TV watching	Weekdays[1]	Less than 2 hours	835	(86.35)
		2-3 hours	96	(9.93)
		More than 3 hours	36	(3.72)
	Weekends[1]	Less than 2 hours	833	(86.14)
		2-3 hours	100	(10.34)
		More than 3 hours	34	(3.52)
Computer games/videogames	Weekdays[1]	Less than 2 hours	776	(80.25)
		2-3 hours	155	(16.03)
		More than 3 hours	36	(3.72)
	Weekends[1]	Less than 2 hours	755	(77.97)
		2-3 hours	172	(17.79)
		More than 3 hours	41	(4.24)

[1]missing for 2 participant.

4.6 Consumption of soft drinks among children 2-5 years.

Approximately, 48% of children in the age group 2-5 year consumed carbonated drinks at least once per week (Figure 12). More importantly, more than 40% of children in this age group consumed other sweet drinks (canned non-fresh sweet juice) six or more times per week (Figure 13). A systematic review of prospective cohort studies and randomized controlled trials showed that sugar-sweetened beverages promotes weight gain in children and adults [8]. In this age group, non-fresh sweet juice seems to be very popular, therefore parents should be encouraged to avoid giving these drinks to their children.

Figure 12: Consumption of carbonated drinks among children 2-5 years (Kuwait Nutritional Surveillance System, 2019)

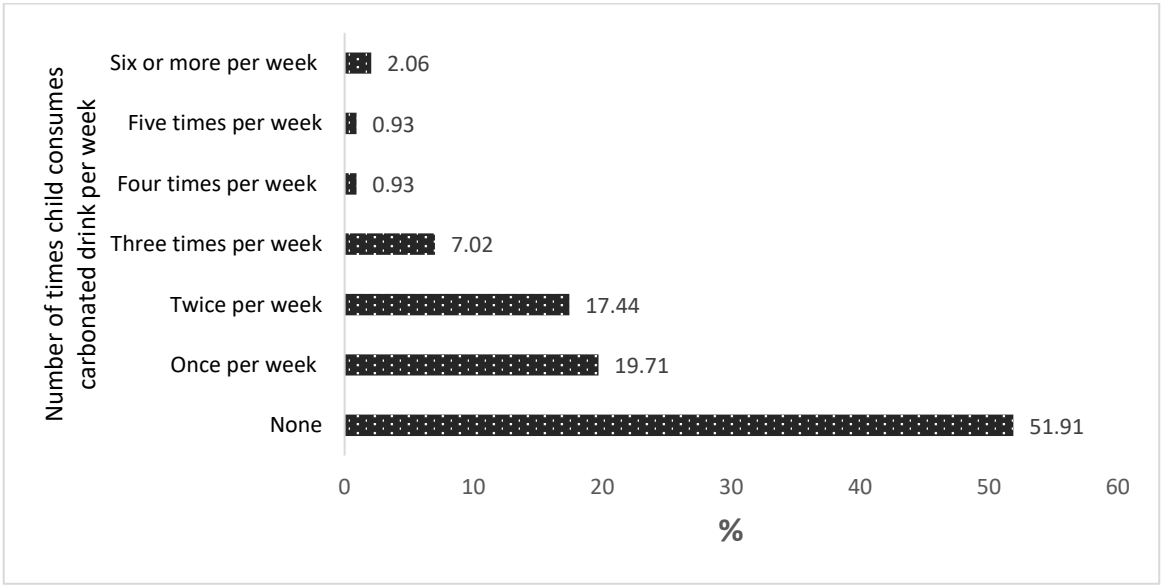
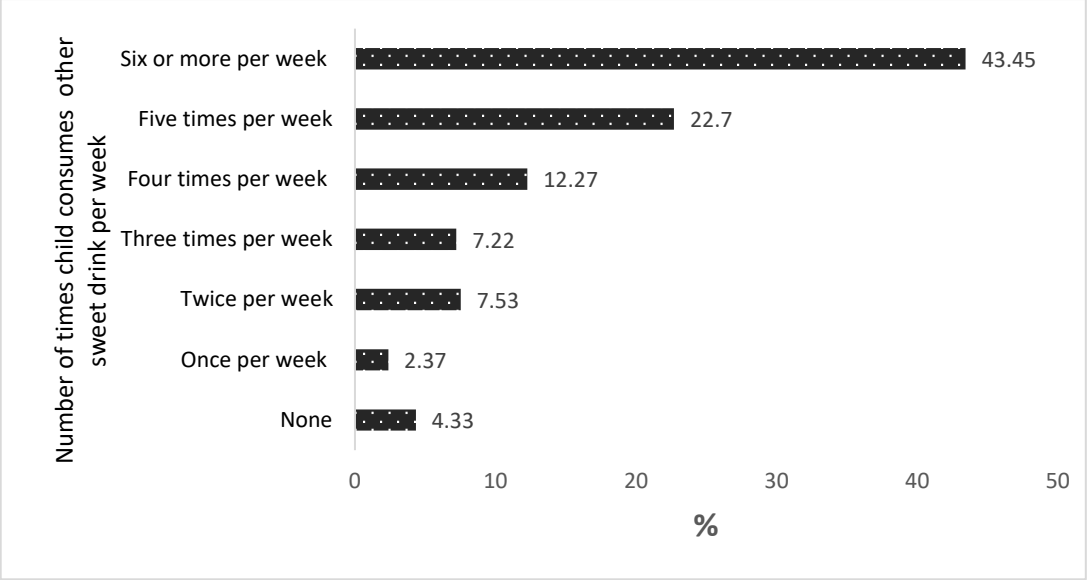


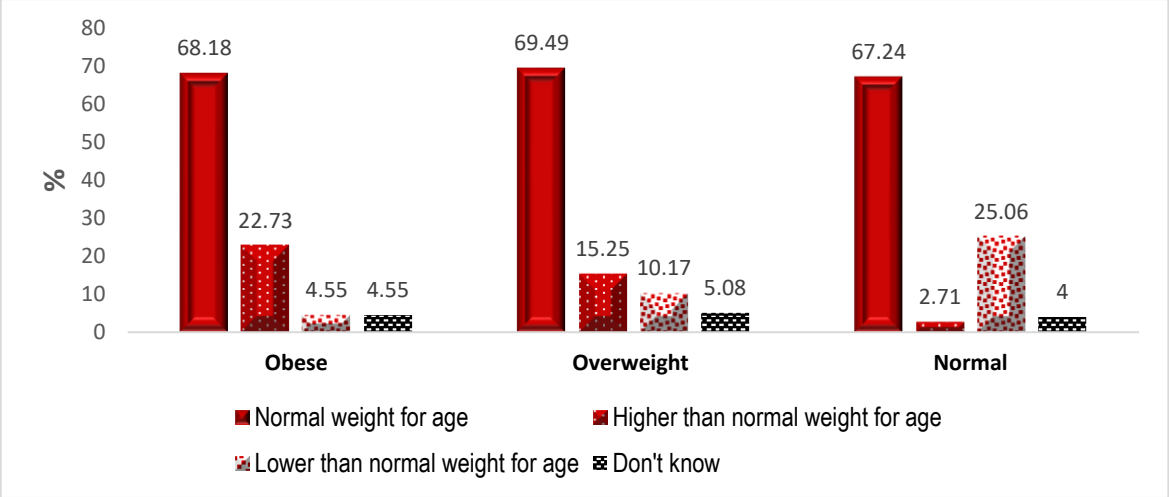
Figure 13: Consumption of canned non-fresh sweet juice among children 2-5 years (Kuwait Nutritional Surveillance System, 2019)



4.7 Perceptions of mothers about the weight of their child (2-5 years) in comparison to the actual weight of the child.

In this age group (2-5 years), mothers or child's guardian were asked whether the weight of their child was normal for his/her age, higher than the normal, or lower than the normal. We excluded 14 children who had wasting (weight for height<-2 SD). Figure 14 shows perception of the parents on the weight of their children by the actual body weight of the child. Approximately, 25% of mothers or child's guardian thought the weight of their children was less than the normal despite the fact that they were normal weight. These findings remain unchanged when the analysis was restricted to mothers as the only source of information.

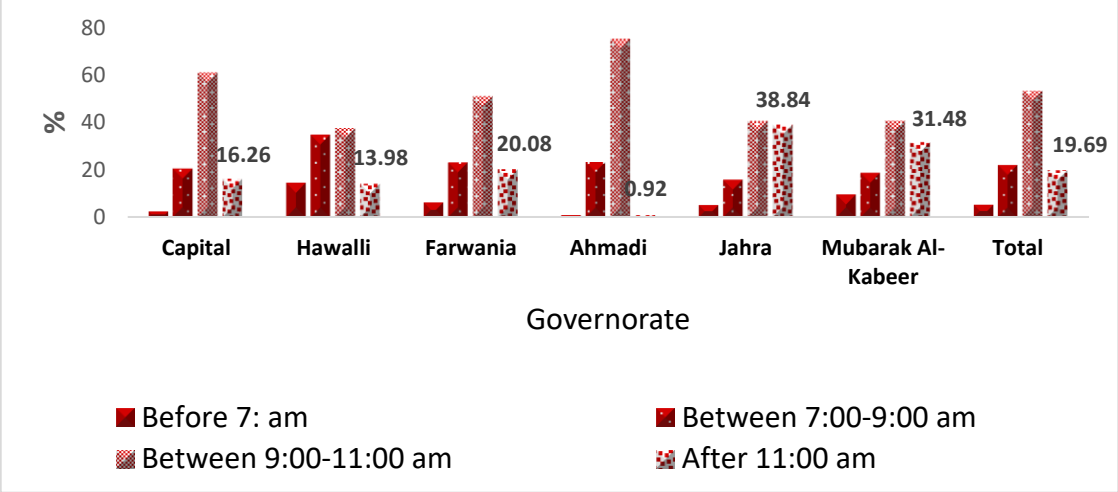
Figure 14: Perception on the weight of children (2-5 years) by actual weight. (Kuwait Nutritional Surveillance System, 2019)



4.8 Reported time of the first meal among children 2-5 years

This is the approximate time at which a child between 2-5 years has his/her first meal. Approximately, one fifth of children in this age group have their first meal after 11:00 am. Figure 15 shows the time for the first meal in each governorates.

Figure 15 : Time of the first meal among children (2-5 years) by governorate. (Kuwait Nutritional Surveillance System, 2019)



5 Anthropometric measurements children 0-5 years

Table 5 shows that around 5% of the children in the age 24-60 months were obese while around 2% of the children in the age 0-23 months were obese. These number are slightly higher that reported in previous years. Wasting (weight-for-height) was far below 5% as expected in Kuwait. Stunting (height-for-age) was less than 10% among children 0-23 months and less than 5% in the age 24-60 months. These estimates are far below that reported from most developing countries.

Table 5: Prevalence of stunting, wasting, overweight and obesity among children (0-5 years). (Kuwait Nutritional Surveillance System, 2018).

Age (Months)	Sex	Sample (n)	Stunting§ (%)	Wasting† (%)	Overweight‡ (%)	Obesity~(%)
0-23	All[α]	1,747	9.27	2.44	5.79	2.55
	Male	924	10.06	2.88	6.19	2.13
	Female	823	8.38	1.93	5.33	3.03
24-60	All[φ]	969	3.00	1.46	6.16	2.82
	Male	467	2.78	1.95	6.07	1.81
	Female	500	3.2	1.01	6.24	2.30

§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 to <3SD; ~Obesity: BMI for age≥3SD. [α]Numbers may vary due to excluding biologically implausible z-score (32 height-for-age, 8 weight-for-height and 17 BMI-for-age).[φ] Numbers may vary due to excluding biologically implausible z-score (1 height-for-age, 10 weight-for-height and 10 BMI-for-age).

6 Conclusion and recommendations from the data of children 0-5 years

- We estimated that more than one fifth of Kuwaiti children to be LBW<2500 gm. It is not clear if this is due to intrauterine growth retardation or due to prematurity which is increasing globally due to elective CS at 32-37 weeks of gestation [11]. The data on BW was reported by mothers who remarkably remembered the BW of their children. Data from records are hard to obtain and there is little data on BW from Kuwait. In addition to short-term consequences of LBW, it has long-term impact on health including increasing the risk of chronic non-communicable diseases during adulthood. Therefore, investigation of this issue to describe the actual prevalence of LBW and the underlying reasons should be a priority.
- Breastfeeding practices seems to be less optimal with only around one third of Kuwaiti mothers were breastfeeding their infants by the age of 3 months. Predominant breastfeeding was about 9% while exclusive breastfeeding was about 8% by the age of 6 months. Around 50% of Kuwaiti mothers initiated breastfeeding within the first hour of birth or recovery from CS, while the rest reported delay in initiation of breastfeeding for nonspecific reasons. There is no meaningful change in any of these indicators from the previous years. Efforts should be made to improve breastfeeding practices among Kuwaiti mothers. This may start at the time of pregnancy during antenatal care visit as 99% of pregnant mothers have seen a clinician during pregnancy. Efforts should be made that mothers initiate breastfeeding immediately after birth and sustain exclusive breastfeeding up to 6 months and continue breastfeeding with the sound complementary feeding practices thereafter. Private sector should be encouraged to join the strategies to improve breastfeeding among Kuwaiti mothers because the majority of Kuwaiti mother give birth in private hospitals.
- More than one third of Kuwaiti children in the age 0-5 years are exposed to passive smoking at their homes. Efforts should be made to reduce the exposure to smoke which would have positive dual impact on the health of children and their parents.

7 Anthropometric measurements among school children (>5-19 years)

The data were collected on 12,315 school children of whom 6,262 (50.85%) were males. The mean (SD) age was 11.00 (3.67) years. Table 6 shows the demographic characteristics of the participants.

Table 6: Demographic characteristics of school children participated in Kuwait Nutritional Surveillance 2019.

Characteristic		n	(%)
Gender, male		6,262	(50.85)
Age, years			
	>5	2,051	(16.65)
	7-	2,399	(19.48)
	9-	2,236	(18.16)
	11-	1,640	(13.32)
	13-	1,582	(12.85)
	15-	1,735	(14.09)
	17-	672	(5.46)
Governorate			
	Capital	2,262	(18.37)
	Hawalli	2,099	(17.04)
	Farwania	1,952	(15.85)
	Ahmadi	2,828	(22.96)
	Jahra	1,692	(13.74)
	Mubarak Al-Kabeer	1,482	(12.03)

Figure 16 shows the prevalence of obesity and overweight by age group and gender. The overall prevalence of overweight and obesity was 20.19% and 28.39%, respectively. There was a significant trend for the prevalence of obesity/overweight to increase by age (chi-square for trend p<0.001). Table 7 shows the prevalence of overweight and obesity by age in each governorate.

Figure 16: Prevalence of obesity and overweight among school children by age and gender. (Kuwait Nutrition Surveillance, 2019)

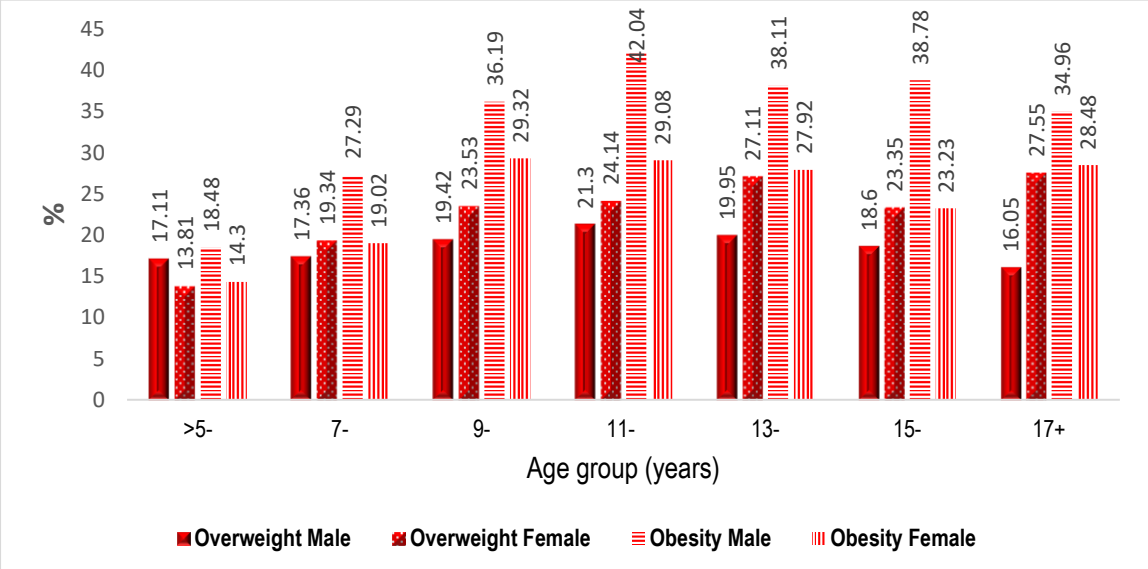


Table 7: Prevalence of obesity and overweight among school children by age and governorate. (Kuwait Nutrition Surveillance, 2019)

		N	n	Overweight	n	Obesity
All governorates n(%)	**Age, year**					
	>5	2,051	317	(15.46)	336	(16.38)
	7-	2,399	441	(18.38)	552	(23.01)
	9-	2,236	481	(21.51)	731	(32.69)
	11-	1,640	370	(22.56)	595	(36.28)
	13-	1,582	369	(23.32)	527	(33.31)
	15-	1,735	363	(20.92)	541	(31.18)
	17-	672	145	(21.58)	214	(31.85)
	Total	12,315	2,486	(20.19)	3,496	(28.39)
Capital n(%)	**Age, year**					
	>5	370	59	(15.95)	63	(17.03)
	7-	393	65	(16.54)	93	(23.66)
	9-	415	77	(18.55)	149	(35.90)
	11-	315	78	(24.76)	124	(39.37)
	13-	332	66	(19.88)	120	(36.14)
	15-	318	74	(23.27)	104	(32.70)
	17-	119	37	(31.09)	45	(37.82)
	Total	2,262	456	(20.16)	698	(30.86)
Hawalli n(%)	**Age, year**					
	>5	372	63	(16.94)	65	(17.47)
	7-	402	74	(18.41)	111	(27.61)
	9-	353	64	(18.13)	131	(37.11)
	11-	302	67	(22.19)	119	(39.40)
	13-	290	70	(24.14)	105	(36.21)
	15-	285	60	(21.05)	92	(32.28)
	17-	95	19	(20.00)	28	(29.47)
	Total	2,099	417	(19.87)	651	(31.01)
Farwania n(%)	**Age, year**					
	>5	360	38	(10.56)	53	(14.72)
	7-	452	94	(20.80)	99	(21.90)
	9-	356	79	(22.19)	109	(30.62)
	11-	174	42	(24.14)	73	(41.95)
	13-	172	49	(28.49)	66	(38.37)
	15-	312	64	(20.51)	104	(33.33)
	17-	126	26	(20.63)	46	(36.51)
	Total	1,952	392	(20.08)	550	(28.18)

Table (7): continued

		N	n	Overweight	n	Obesity
Ahmadi n(%)	**Age, year**					
	>5	420	64	(15.24)	77	(18.33)
	7-	559	108	(19.32)	136	(24.33)
	9-	528	121	(22.92)	163	(30.87)
	11-	403	89	(22.08)	112	(27.79)
	13-	370	86	(23.24)	97	(26.22)
	15-	407	67	(16.46)	119	(29.24)
	17-	141	28	(19.86)	33	(23.40)
	Total	2,828	563	(19.91)	737	(26.06)
Jahra n(%)	**Age, year**					
	>5	270	52	(19.26)	53	(19.63)
	7-	323	53	(16.41)	60	(18.58)
	9-	315	80	(25.40)	78	(24.76)
	11-	240	48	(20.00)	95	(39.58)
	13-	228	55	(24.12)	85	(37.28)
	15-	223	61	(27.35)	58	(26.01)
	17-	93	20	(21.51)	29	(31.18)
	Total	1,692	369	(21.81)	458	(27.07)
Mubarak Al-Kabeer n(%)	**Age, year**					
	>5	259	41	(15.83)	25	(9.65)
	7-	270	47	(17.41)	53	(19.63)
	9-	269	60	(22.30)	101	(37.55)
	11-	206	46	(22.33)	72	(34.95)
	13-	190	43	(22.63)	54	(28.42)
	15-	190	37	(19.47)	64	(33.68)
	17-	98	15	(15.31)	33	(33.67)
	Total	1,482	289	(19.50)	402	(27.13)

8 Conclusion and recommendations from the data on school children

More than 45% of Kuwaiti school children are either obese or overweight. This is extremely high and exceeds that reported from other settings including USA. Obesity is higher in males compared to females in all age groups. Recent analysis of data from KNSS showed that obesity has been increasing over the last 13 years and that obesity has started to level off in females (submitted but not published yet). Efforts should be made to reduce overweight and obesity among school children. This should go beyond increasing knowledge and awareness about obesity and focus more community-based and school-based interventions.

9 Selected risk factors for non-communicable diseases among Kuwaiti adults (>19 years)

Data were collected on 1,577 individuals but calculating age based on date of birth showed that 26 participants were 19 years old or younger. Therefore, the analysis below included 1,551 participants of whom 881 (56.80%) were females. The median (Interquartile range) of age was 39.00 (IQR: 29.94-53.78) years. Table 8 shows the age distribution, highest educational level completed and the current employment status for the participants.

Table 8: Demographic characteristics of the adult participants, (Kuwait Nutrition Surveillance, 2019)

Characteristics	n	(%)
Gender, female	881	(56.80)
Age, years		
>19-	394	(25.40)
30-	384	(24.76)
40-	277	(17.86)
50-	298	(19.21)
60+	198	(12.77)
Educational level		
No formal education	47	(3.03)
Primary	48	(3.09)
Intermediate	192	(12.38)
Secondary	243	(15.67)
Diploma	419	(27.01)
University	546	(35.20)
Master/doctorate	57	(3.61)
Employment status		
Doesn't work able to work	13	(0.84)
Doesn't work unable to work	12	(0.77)
Government employee	819	(52.80)
Non-Government employee	41	(2.64)
Self-employed	18	(1.16)
Student	77	(4.97)
Housewife	52	(3.35)
Retired	480	(30.94)
Others	35	(1.93)
Government		
Capital	363	(23.40)
Hawalli	202	(13.02)
Farwania	236	(15.22)
Ahmadi	203	(13.09)
Jahra	266	(17.15)
Mubarak Al-Kabeer	281	(18.12)

9.1 Exercise among Kuwaiti adults

Figure 17 shows the proportion of Kuwaiti adults who do not exercise at all in each governorate. Of all the participants in this age group, 972 (62.67%; 95%CI: 60.02-65.08%) did not practise any exercise. Most of the

participants who practice exercise (>61%) reported walking as the main exercise they practise. The proportion of those who did not exercise at all varied by age (Figure 18).

Figure 17: Exercise among Kuwaiti adults (>19 years old) by governorate. (Kuwait Nutrition Surveillance, 2019)

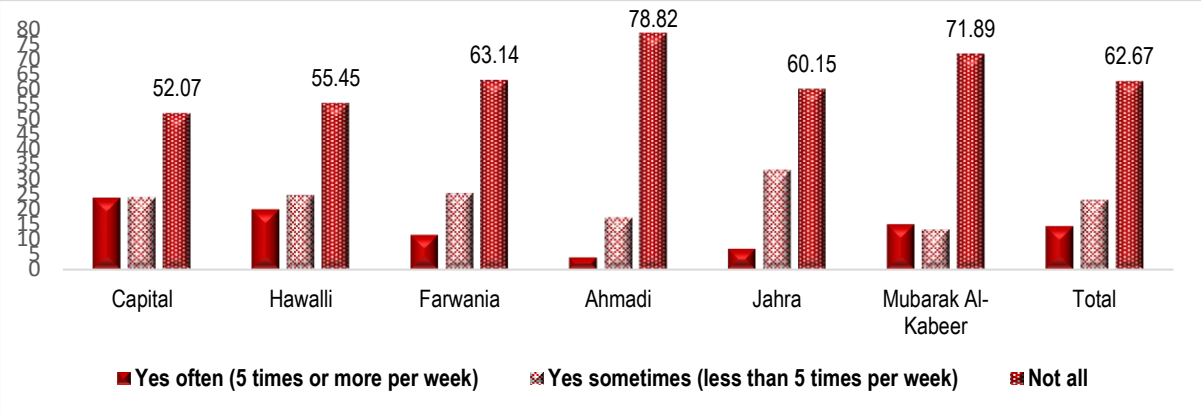
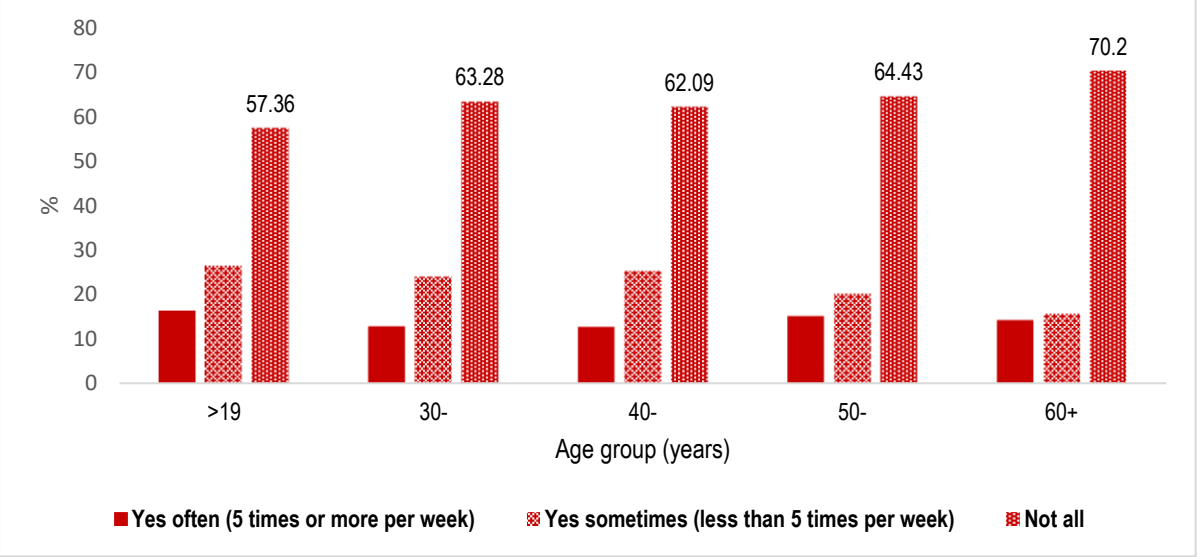


Figure 18: Exercise among Kuwaiti adults (>19 years old) by age. (Kuwait Nutrition Surveillance, 2019)



9.2 Smoking cigarettes and shisha

Figure 19 shows smoking cigarettes, shesha or both in each governorate by gender. In total, 234 (15.09%) currently smoke only cigarettes, while 30 (1.93%) currently smoke both cigarettes and shesha in addition to 60 (3.87%) who smoke only shesha. Smoking showed significant difference between males and females. Smoking only cigarettes was 33.43% among males compared to 1.14% among females ($p<0.001$). Similarly smoking only shisha was 8.51% among males compared to 0.34% among females ($p<0.001$). These findings are similar to that reported in a survey of risk factors for chronic non-communicable disease (EMAN study) [15] and also to the

estimates reported in previous reports. There is little doubt that the true prevalence of smoking in females is higher than these estimates because of under-reporting. The proportion of those who currently smoke (cigarettes, shesha or both) was particularly high among young men (Figure 20).

Figure 19: Proportion of Kuwaiti adults (>19 years old) who smoke currently cigarettes, Shesha or both by governorate. (Kuwait Nutrition Surveillance, 2019)

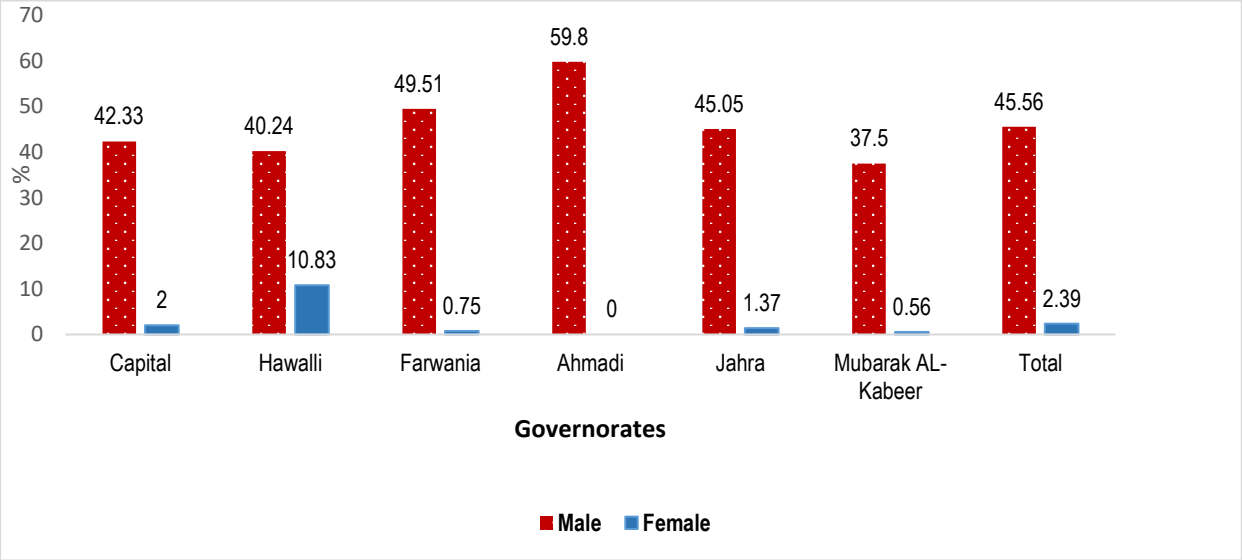
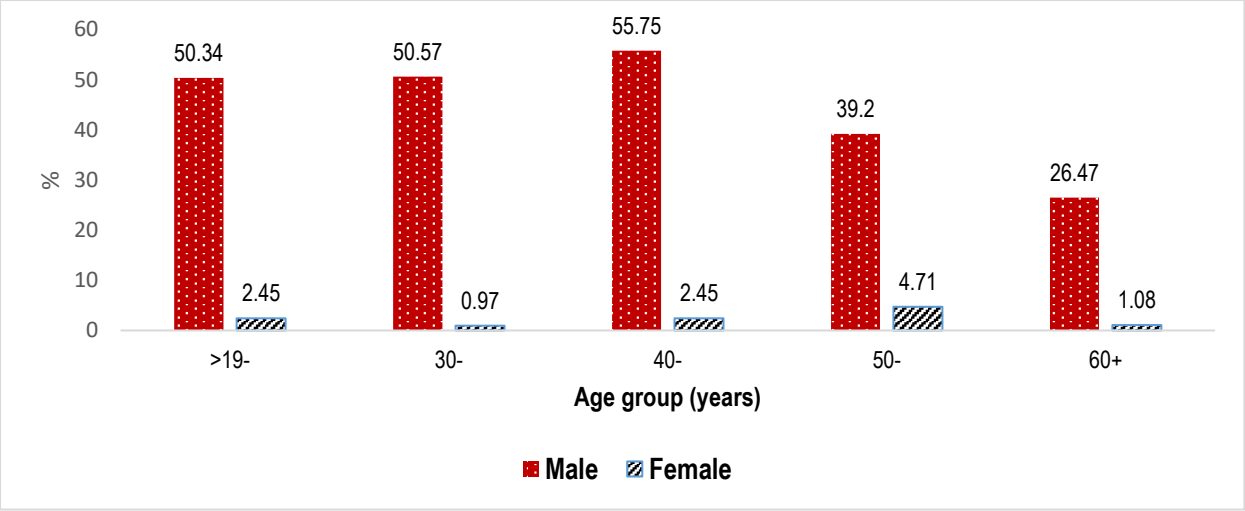


Figure 20: Proportion of Kuwaiti adults (>19 years old) who smoke currently cigarettes, Shesha or both by age and gender. (Kuwait Nutrition Surveillance, 2019)

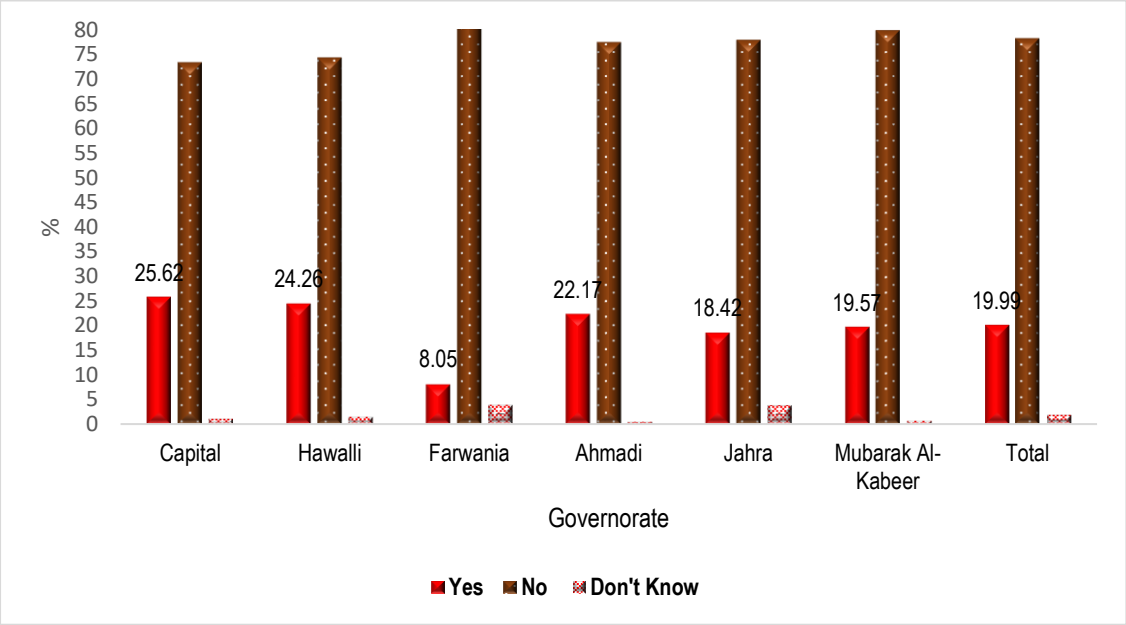


9.3 High level of cholesterol (self-reported)

Figure 21 shows the proportion of Kuwaiti adults who self-reported having high cholesterol level in each governorate. Overall, 310 (19.99%; 95% CI: 18.02-22.06%) reported having high level of cholesterol with no significant difference between the two genders, 20.30 and 19.75 among males and females, respectively

(p=0.611). Of 310 who self-reported high level of cholesterol, 272 (87.74%) participants currently take medication for high cholesterol level. These estimates is similar to that reported in EMAN study which reported hypercholesterolemia to be around 19.5% [15].

Figure 21: Proportion of Kuwaiti adults (>19 years old) who self-reported high cholesterol level by governorate. (Kuwait Nutrition Surveillance, 2019)



9.4 High level of blood glucose (self-reported)

Figure 22 shows the proportion of people who self-reported having high level of blood glucose in each governorate (self-reported). Overall, 296 (19.08%; 95% CI: 17.15-21.13%) reported high level of glucose. Of these, 278 (93.92%) were already taking medications for the increased blood glucose. There was no significant difference between males and females in self-reported high blood glucose (20.00% vs. 18.39%; respectively; p=0.493). There was significant increase in the proportion of those who reported high level of blood glucose with increasing age (chi-square for trend p<0.001) (Figure 23).

Figure 22: Proportion of Kuwaiti adults (>19 years old) who self-reported high blood glucose level by governorate. (Kuwait Nutrition Surveillance, 2019)

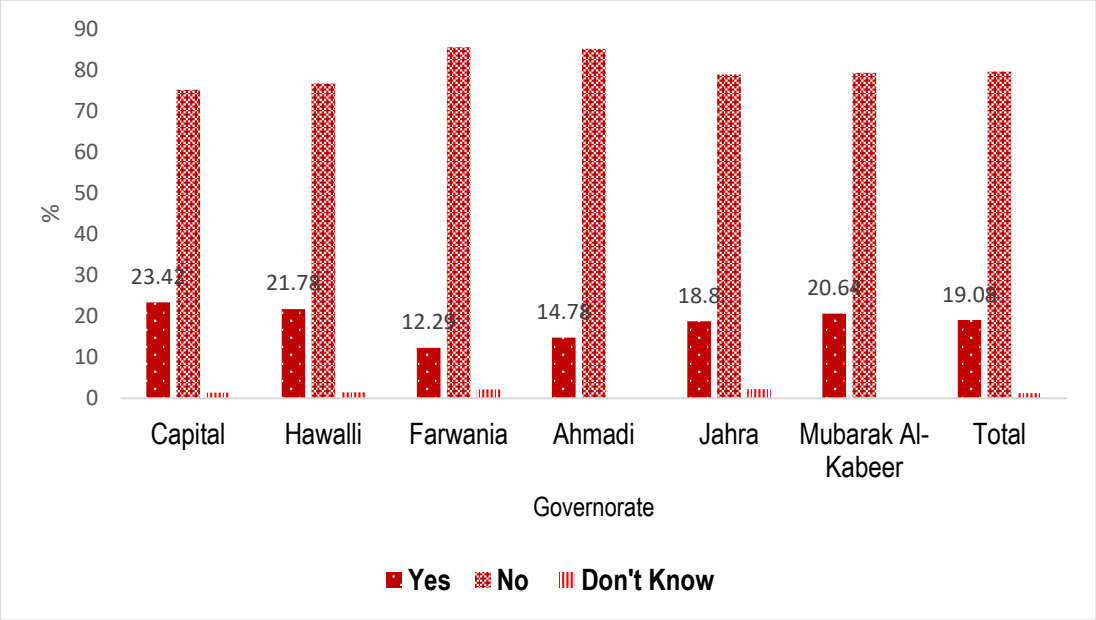
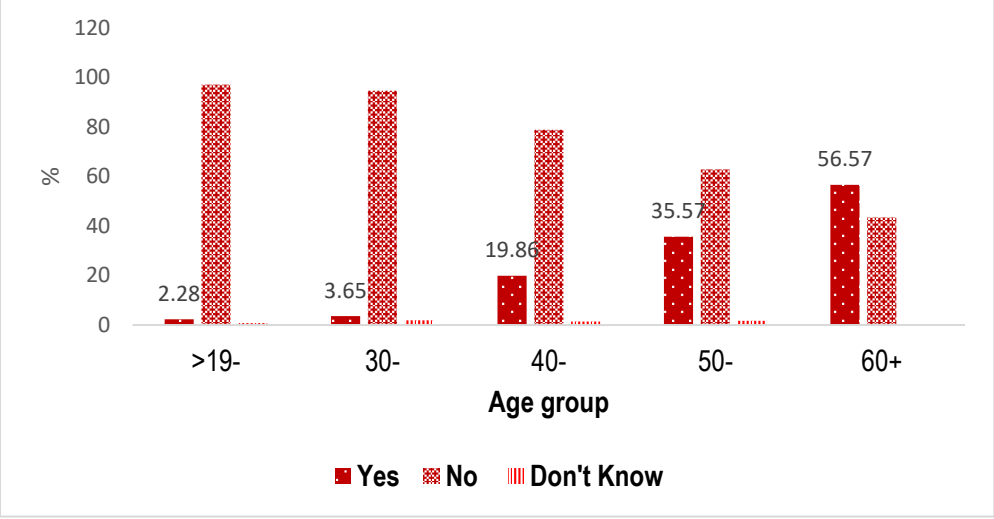


Figure 23: Proportion of Kuwaiti adults (>19 years old) who self-reported high blood glucose level by age. (Kuwait Nutrition Surveillance, 2019)



9.5 High blood pressure (self-reported)

Figure 24 shows the proportion of Kuwaiti adults who reported having high blood pressure in each governorate. Overall, 300 (19.34%; 95% CI: 17.40-21.40%) reported having high blood pressure and 285 (95.00%) of them were currently taking medication for high blood pressure. This is similar to that reported in EMAN study (17.7%)

[15]. The prevalence of self-reported high blood pressure was similar in men and women. As expected there was a tendency for the proportion of people who reported having high blood pressure to increase with increasing age (Figure 25) (Chi-square for trend p<0.0001). of those reported high blood pressure, 48.67 reported high cholesterol (p<0.001).

Figure 24: Proportion of Kuwaiti adults (>19 years old) who self-reported high blood pressure by governorate. (Kuwait Nutrition Surveillance, 2019)

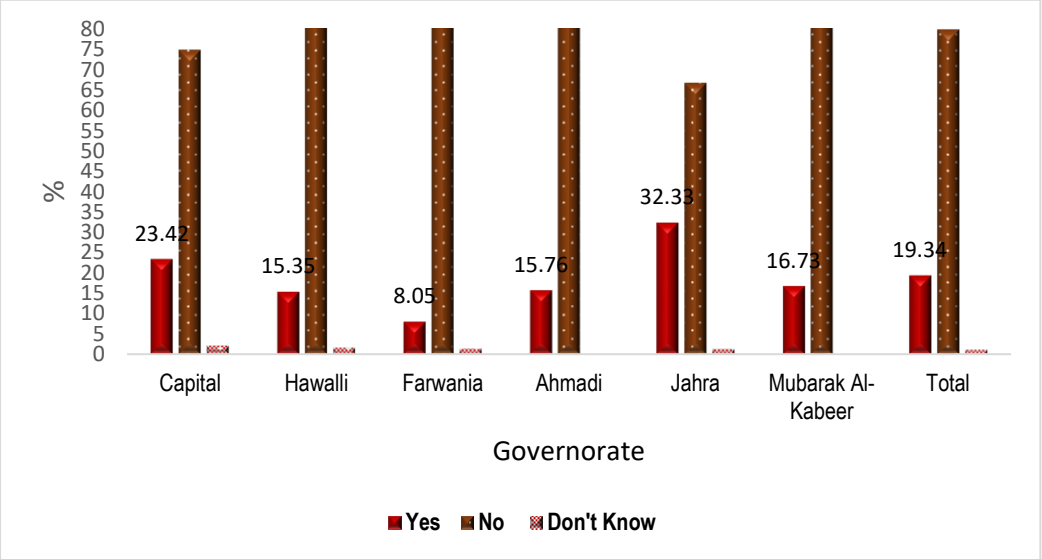
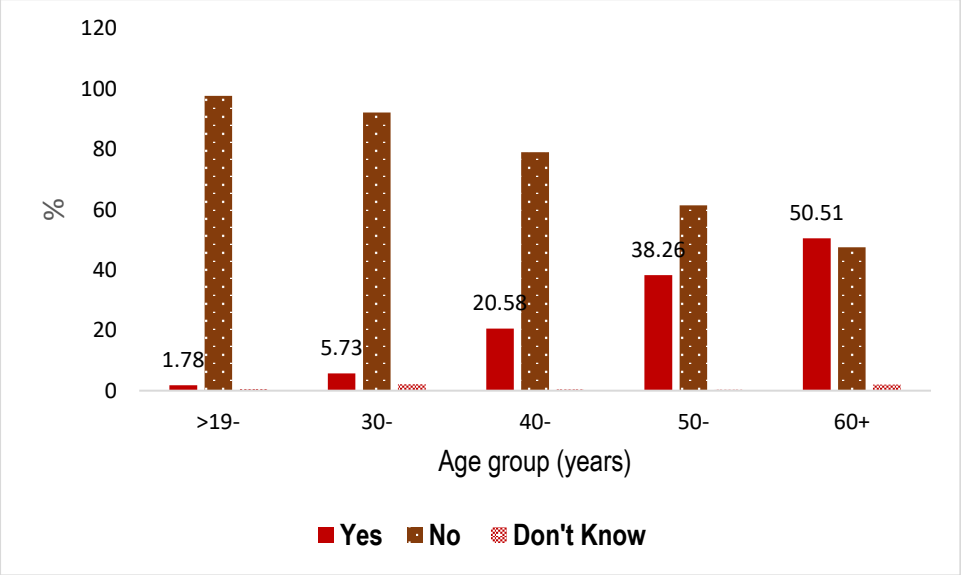


Figure 25: Proportion of Kuwaiti adults (>19 years old) who self-reported high blood pressure by age. (Kuwait Nutrition Surveillance, 2019)



9.6 Obesity and overweight among Kuwaiti adults

The mean (SD) Body Mass Index (BMI) was 29.53 (5.81) which is similar to that reported in EMAN study 29.4 [15]. The distribution of obesity and overweight in each governorates is shown in Figure 26. In total 647 (41.74%) were obese while 564 (36.39%) were overweight. Overall 1211 (78.13%; 95% CI: 75.99-80.16%) of Kuwaiti adults were either obese or overweight, which is similar to that reported in the EMAN study (77.0%) [15]. The prevalence of obesity was significantly higher among females compared to males (44.15% vs. 38.57%, respectively; p=0.025). There was a tendency for the proportion of people with normal weight to decline with age (chi-square for trend p<0.0001) (Figure 27).

Figure 26: Prevalence of obesity and overweight among Kuwaiti adults (>19 years old) by governorate. (Kuwait Nutrition Surveillance, 2019)

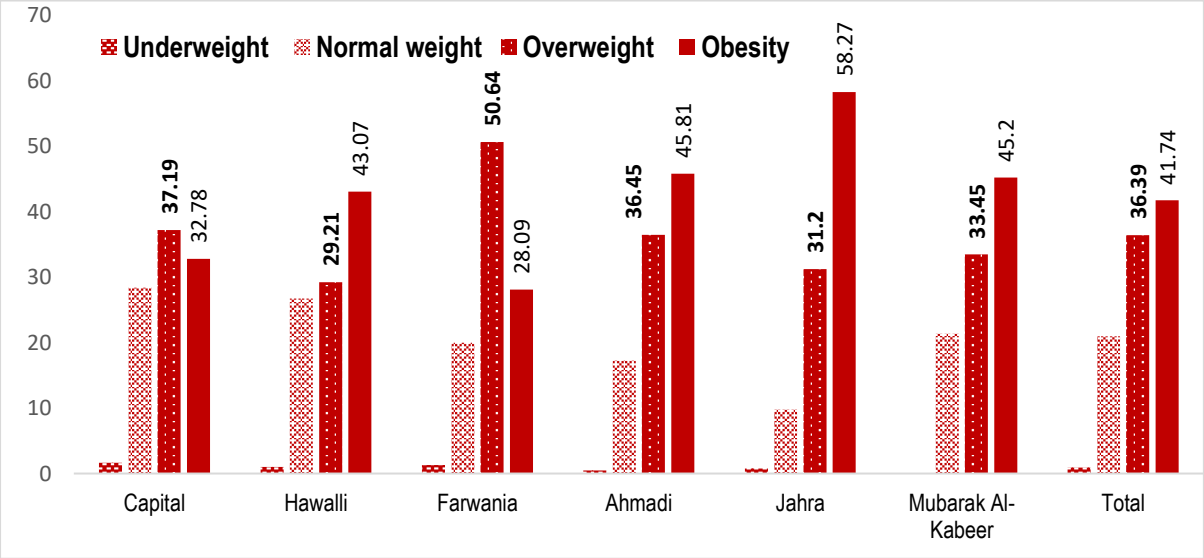


Figure 27: Prevalence of obesity and overweight among Kuwaiti adults (>19 years old) by age. (Kuwait Nutrition Surveillance, 2019)

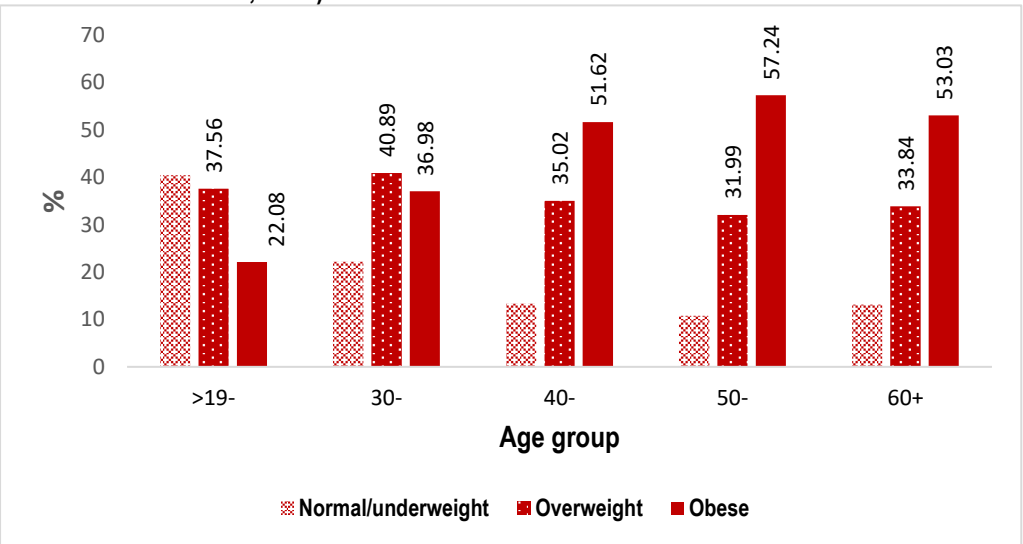
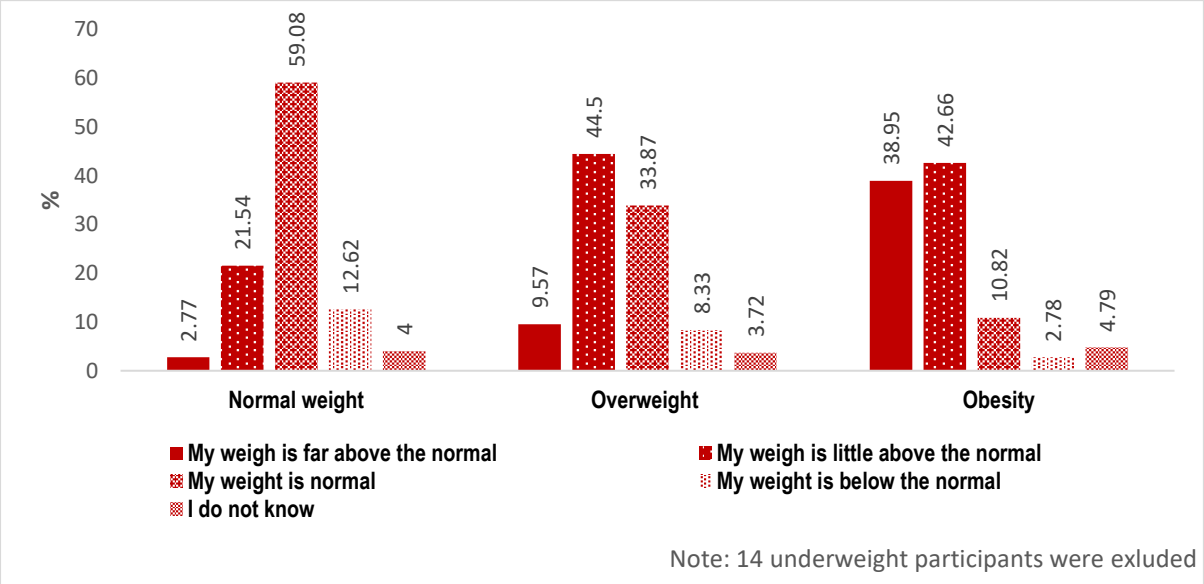


Figure 28 shows the perception of the participants about their weight compared to their actual weight status (normal weight, overweight, obese). Around 80% of the obese participants recognized that their weight is above the normal. This shows the limitation of increasing awareness as a way to tackle obesity and that efforts to reduce obesity should focus on enabling these individuals to control their weight.

Figure 28: Self-perception of body weight among Kuwaiti adults (>19 years old) by body mass index status, (Kuwait Nutrition Surveillance, 2019)



Approximately 20.83% of the participants reported that they tried to reduce their weight. Of all participants, 14.57% used diet, 9.48% used exercise, 3.03% used herbs, <1% used medicines and 3.68% had surgery.

9.7 Fruit and vegetable intake

We used The WHO STEPwise approach [16], which is the tool WHO recommends for risk factors surveillance and was designed to improve the global information. According to this approach, fruits and vegetables consumption is gauged by four questions. We created photo cards that were specifically designed for KNSS. Of 1551 participants, 39 (2.51%) participants reported that they do not know how many days per week they consume fruits or did not answer this question at all. Therefore, the data were available on 1,512 participants, of whom 385 (24.82%) reported consuming fruits every day (7 days a week).

Similarly, 59 (3.80%) participants reported that they do not exactly know how many days per week they consume vegetables or did not answer this question at all. As a result, the data are available on 1,492 of whom 640 (42.90%) reported consuming vegetables daily. Table 9 shows the average number of days in which fruits or

vegetables are consumed in a typical week. The median number of days in which fruits or vegetables consumed was the same in males and females. Table 10 shows the mean number of servings of fruits or vegetables.

Table 9: Mean number of days in which fruits and vegetables are consumed by Kuwaiti adults in a typical week by gender (Kuwait Nutrition Surveillance, 2019)

Gender	n	Fruits Median (IQR)	n	Vegetables Median (IQR)
Male	646	3.00 (1.00-7.00)	633	5.00 (2.00-7.00)
Female	866	3.00 (1.00-7.00)	859	5.00 (2.00-7.00)
Total	1,512	3.00 (1.00-7.00)	1,492	5.00 (2.00-7.00)

IQR: Interquartile Range

Table 10: Mean number of servings of fruits and/or vegetables on average day by gender (Kuwait Nutrition Surveillance, 2019)

Gender	n	Fruits Median (IQR)	n	Vegetables Median (IQR)
Male	507	2.00 (1.00-3.90)	580	1.00(1.00- 2.00)
Female	729	2.00(1.00-3.00)	774	1.00(1.00- 2.00)
Total	1,236	2.00(1.00-3.20)	1,354	1.00(1.00- 2.00)

10 Conclusion and recommendations from the data of Kuwaiti adults (>19 years old)

The result of KNSS in this age group echoed the findings of the EMAN study and showed similar estimates for various population parameters. More than 60% of Kuwaiti adults do not practise any exercise and more than 45% of Kuwaiti men are currently smokers. Almost 8 out of every 10 Kuwaiti adults were either obese or overweight and most of those obese recognized their obesity status. These findings highlight the importance of preventive interventions that aim to reduce the burden of chronic non-communicable diseases.

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