The Kuwait Nutrition Surveillance System

برنامج الترصد التغذوي

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Food and Nutrition Administration
إدارة التغذية والإطعام
Ministry of Health
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Abbreviations

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

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Summary

The Kuwait Nutritional Surveillance System (KNSS) implements a systematic approach to collect data on the nutritional status of Kuwaiti citizens. This is achieved through the utilization of standardized data collection forms that are administered through personal interviews with trained data collectors who are permanently employed for this purpose. The data collection effort covers various age groups, including children aged 0-23 months, children aged 24-60 months, and adults above 19 years of age. However, due to the COVID-19 pandemic, data collection was not performed on school-aged children (5-19 years). The following presents a summary of the key findings obtained from each age group.

Children 0-23 months

In this age group of 0-23 months, data was collected from 2079 children, with 49.1% being female. According to the mothers' reports, 17.1% of the children in this group were born with low birth weight (less than 2500 grams). The majority, 83.5%, were born in private hospitals and 29.9% were delivered via caesarean section.

The initiation of breastfeeding within the first hour of birth or recovery from caesarean section was reported by 63.7% of Kuwaiti mothers, while the remaining delayed breastfeeding for non-specific reasons. Of all the children in this age group, 92.8% were ever breastfed, while only 29.9% of the children aged 0-3 months and 37.5% of children aged 0-6 months were currently receiving any breastfeeding. The rate of exclusive breastfeeding among children aged 0-6 months was 13%, predominant breastfeeding was 13%, and breastfeeding at one year was 8.4%. The minimum dietary diversity was 75.8%. It was reported by mothers or guardians that approximately 28.4% of children in this age group were exposed to second-hand smoke at home.

In this age group, stunting occurred at a rate of 9.1%, whereas wasting was below 5%. Concurrently, overweight prevalence was 5.8%, and obesity stood at 2.8%.

Children 24-60 months

The data was collected from a sample of 1444 children aged 24-60 months, with 51.7% being male. The analysis revealed that 35.5% of the children were exposed to second-hand smoke in the home environment. Additionally, 38.8% of the children consumed canned non-fresh sweet juice on six or more occasions per week.

In this age group, obesity and overweight rates were 4.0% and 9.60%, respectively, while stunting and wasting were found at 2.2% and 2.8%, respectively. Notably, around 18.4% of mothers with normal weight children perceived their child as underweight.

Adults >19 years

The current report collected data from a sample of 1676 Kuwaiti adults, with 59.7% being female. The mean Body Mass Index (BMI) was calculated to be 29. The surveillance revealed that 38.1% were classified as obese and 38.5% as overweight. This indicates that 76.6% of the Kuwaiti adult population were either obese or overweight.

In addition, it has been noted that a significant number of Kuwaiti adults (62.6%) refrains from participating in physical exercise, while a substantial 43.1% of Kuwaiti males partake in smoking activities, including cigarette and shisha consumption.

Preface

The State of Kuwait established the Kuwait Nutrition Surveillance System (KNSS) to monitor and direct health policy and action through the collection, analysis, and dissemination of nutritional surveillance data. Under the direction of the Food and Nutrition Administration of the Ministry of Health, the KNSS collects data on infant feeding and breastfeeding practices, anthropometric measurements, behavioral, nutritional, and biomedical indicators, such as hypertension, diabetes, high cholesterol, dietary habits, smoking, and physical activity among Kuwaiti children and adults.

This report provides an overview of the essential health and nutrition indicators for long-term monitoring. Due to financial and logistical constraints, no blood samples were collected during the current year. Consequently, no data pertaining to blood samples are presented in this report.

The KNSS seeks to provide valuable insights into the nutritional status and health behaviors of the Kuwaiti population, and as such, it remains an indispensable instrument for guiding health policy and practice.

1. Introduction

The Kuwait Nutrition Surveillance System (KNSS) was established with the overarching objective of providing current and updated information on the nutritional status of the Kuwaiti population, including both infants and adults, and the factors that influence their nutritional health. Through tracking nutritional status over time, the system also seeks to generate nationwide data on the trend of nutritional status across all age groups. This data will serve as a resource for policymakers, administrators, and program managers charged with enhancing the nutritional status of the Kuwaiti population.

The KNSS data collection serves multiple purposes, including:

- identifying prevalent issues related to nutrition.
- identifying groups at high risk.
- tracking trends over time
- allocating resources for program planning.
- assessing the efficacy of interventions and programs.

KNSS collects data via in-person interviews with Kuwaiti citizens utilizing standardized data collection instruments. Full time employed data collectors undergo extensive training to ensure the accuracy of data collection. Different age groups are interviewed in a variety of locations throughout the six governorates of Kuwait.

During vaccination, children aged 0 to 23 months are recruited from health centers. Since Kuwait has a high vaccination rate, it is presumed that this method of recruitment produces a representative sample of Kuwaiti children. In addition to breastfeeding and complementary feeding practices, data are collected on illness history, type of delivery, birth weight, and smoking exposure. Utilizing standardized apparatus and procedures, anthropometric measurements of weight and height are taken.

Children aged 24 to 60 months are recruited from various health centers across Kuwaiti governates. Nutritional factors such as mealtime, dietary variety, and a mother's perception of her child's weight, as well as screen time and passive smoking, are measured. Utilizing standardized apparatus and procedures, anthropometric measurements of weight and height are taken.

Due to the COVID-19 pandemic, no data were collected from school-aged children and adolescents in the current year.

Adults aged 19 and older are recruited from a variety of settings, including health centers and the Public Authority for Social Security, with consent from the participants. Collecting information on gender, education, occupation, smoking behaviors, methods of weight management, chronic diseases such as hypertension, diabetes, hypercholesterolemia, fruit, and vegetable consumption. Utilizing standardized protocols, anthropometric measurements are taken.

Before being entered into the database at the Food and Nutrition Administration (FNA) of Kuwait, data forms are checked for completeness and consistency. Data analysis and reporting are performed by trained personnel in accordance with WHO guidelines. Using WHO growth standards and references for children or adult cutoff points, the Body Mass Index (BMI) is calculated and underweight, overweight, and obesity are defined. The FNA conducts an annual analysis of trends. The results of the analysis are published in a report that is distributed to relevant departments and ministries. The final report is also published on the website of the Ministry of Health.

2. Indicators calculated for children 0-23 months

In the age group 0-23 months, the total population under surveillance was 2,079 participants, of which 49.1% were female. The mother was the primary source of information for the majority of children (88.9%). The following are the primary indicators of surveillance derived from this sample:

2.1. Birth weight (BW), low BW, high BW

The results of this surveillance indicate that most parents 94.1% were able to recall the birth weight (BW) of their infants. The average BW was 2905.27 grams. Figure 1 depicts the distribution of BW among male and female infants. Table 1 shows that 17.1% of 0 to 23 months old infants were classified as having either low birth weight (LBW) or very low birth weight.

Figure 1: Distribution of birth weight in Kuwait as reported by parents (Kuwait Nutritional Surveillance System, 2021).

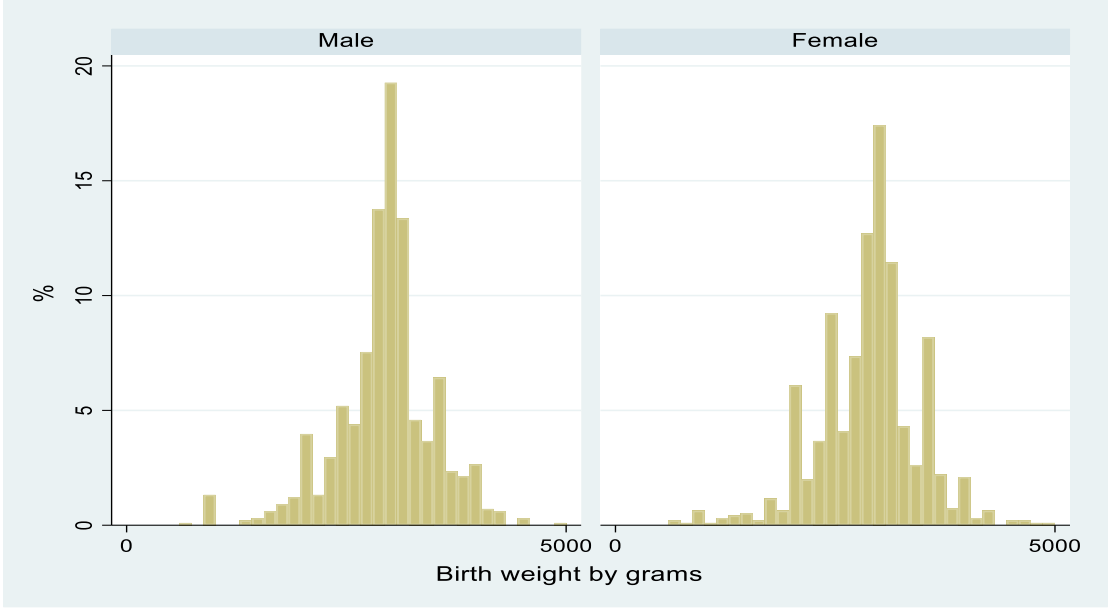


Table 1: Birth weight categories of Kuwaiti children as reported by parents, (Kuwait Nutritional Surveillance System, 2021)

Birth weight categories[1]	**n**	**(%)**
Very Low Birth Weight< 1500 gm	35	(1.8)
Low Birth Weight ≥ 1500 gm to < 2500 gm	295	(15.3)
Normal Birth weight ≥ 2500 gm to <4000 gm	1539	(79.6)
High Birth weight ≥ 4000 gm	65	(3.3)

[1] According to WHO definition.

Low birth weight (LBW) is a known predictor of foetal and perinatal mortality and morbidity, stunted growth and cognitive development, as well as chronic diseases in adulthood (UNICEF, 2004). Although Kuwait is an affluent nation, the high prevalence of LBW cannot be attributed to socioeconomic factors. In addition, the ubiquitous availability of antenatal care in Kuwait eliminates the possibility that physical labor and infections during pregnancy are underlying causes. Other factors such as maternal foetal growth history, diet from infancy to pregnancy (Malhotra *et al*, 2014), and body composition at conception (Farah *et al*, 2011) also play a role in low birth weight. These results highlight the importance of conducting a study to ascertain the prevalence of LBW and its underlying risk factors.

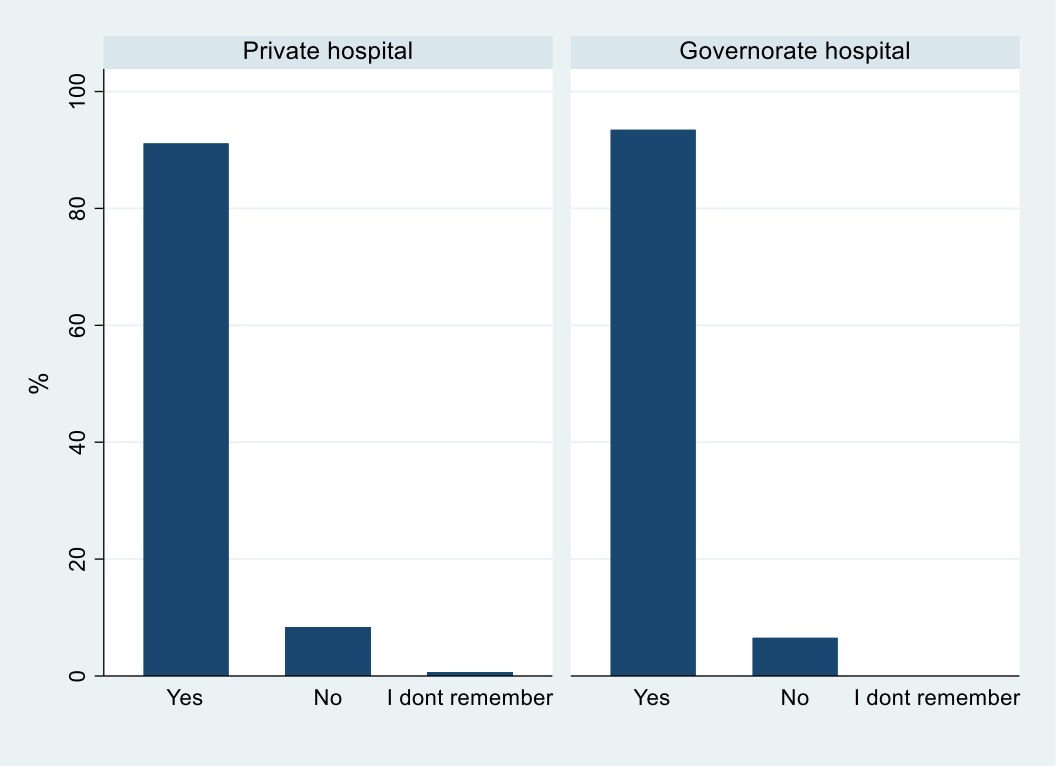
2.2. Antenatal care, type of delivery, place of delivery and prematurity

Regarding antenatal care, 54.4% of the mothers visited private clinics, 9.3% visited government clinics, and 25.4% visited both types of clinics. Only 0.7% of all Kuwaiti mothers did not receive any form of antenatal care. This surveillance reported 83.5% of infants aged 0 to 23 months were delivered in private hospitals, while 15.9% were born in government hospitals, and 0.6% had their births occur outside Kuwait. Of the total births in Kuwait, 29.9% were delivered via caesarean section (CS). Our surveillance revealed that 27.4% of CS births took place in private hospitals, compared to 43.9% in government hospitals, with a statistically significant difference ($p<0.001$). As reported by their mothers, 5.75% of all neonates were born prematurely, which is defined as before 35 weeks (8 months or less) of gestation.

2.3. Advice to breastfeed child in the hospital.

A significant majority of mothers, 91.4%, reported receiving breastfeeding advice during their hospital stay following the birth of their infant, according to the analyzed data. There was no discernible difference between government and private hospitals with regard to this trend. Figure 2 illustrates this information.

Figure 2: Proportion of mothers who received advice to breastfeed their child in private and Governorate hospitals. (Kuwait Nutritional Surveillance System, 2021)

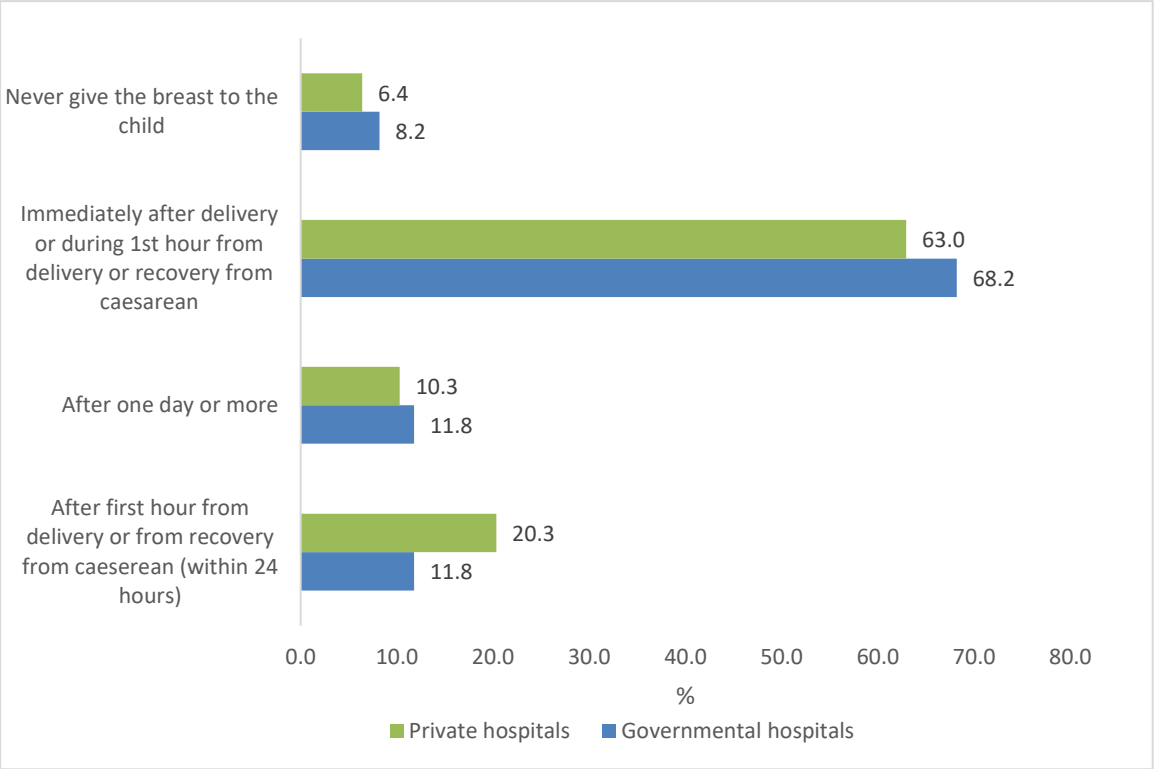


2.4. Early initiation of breastfeeding[1]

According to the collected data, the rate of early initiation of breastfeeding among Kuwaiti mothers was determined to be 63.7%. There was a statistically significant difference in this rate between government and private hospitals, with a higher rate observed in government hospitals 68.2% than in private hospitals 63.0% (p=0.005). This information is depicted in Figure 3. The reasons cited by mothers for delayed breastfeeding initiation included postpartum fatigue, insufficient breastfeeding, and the requirement to place the infant in an incubator.

[1] Question was asked only if the mother was the sources of information.

Figure 3: Early initiation of breastfeeding in governmental and private hospitals. (Kuwait Nutritional Surveillance System, 2021)

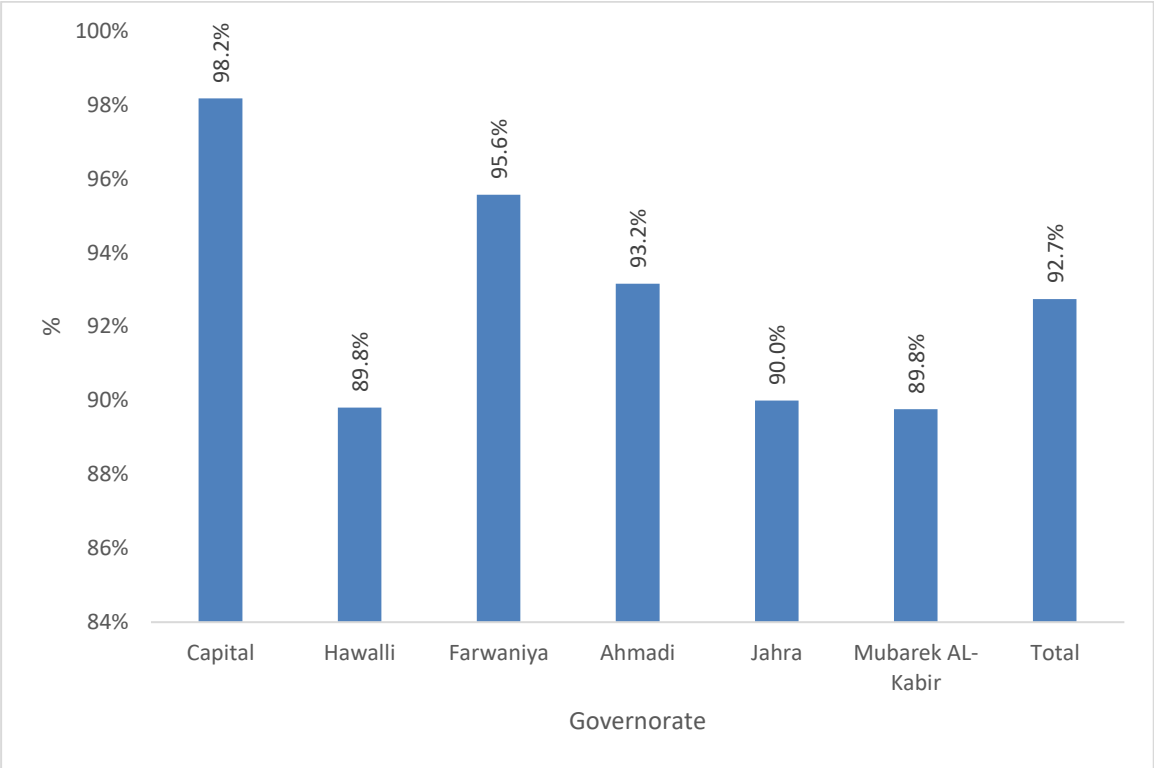


2.5. Children ever breastfed[2]

The data analysis indicates that a substantial proportion, 92.7%, of children within the age range of 0-23 months were reported to have had a history of breastfeeding. No gender-based differences were noted in this regard, with rates of 92.2% and 93.3% recorded for male and female children, respectively, and with no statistically significant difference. However, a disparity was identified in the proportion of children within the age range of 0-23 months who had a history of breastfeeding across various governorates, with lower rates observed in the governorates of Hawalli, Mubarak Al-Kabir, and Jahra compared to other governorates. These results are depicted in Figure 4.

[2] The denominator for this indicator does not include those children who died.

Figure 4: Proportion of children 0-23 months who ever breastfed in each governorate. (Kuwait Nutritional Surveillance System, 2021).



2.6. Current breastfeeding

As presented in Table 2, the proportion of mothers who are currently breastfeeding their infants, based on the number of infants who were breastfed the previous day, is shown for infants aged ≤3 months (i.e. less than 91 days) and ≤6 months (i.e. less than 183 days). The prevalence of breastfeeding was determined to be 37.5% for infants aged ≤3 months and 30.1% for infants aged ≤6 months.

Table 2: Current breastfeeding (any breastfeeding) of infants≤3 months and ≤6 months in each governorate. (Kuwait Nutritional Surveillance System, 2021)

Any breastfeeding yesterday		**N**	**n**	**(%)**
Total	infants≤3 months[1]	360	135	(37.5)
	infants≤6 months[2]	750	226	(30.13)
Capital	infants≤3 months	69	56	(81.16)
	infants≤6 months	126	86	(68.3)
Hawalli	infants≤3 months	44	21	(47.73)
	infants≤6 months	121	37	(30.6)
Farwania	infants≤3 months	60	13	(21.67)
	infants≤6 months	140	26	(20.7)
Ahmadi	infants≤3 months	62	18	(29.03)
	infants≤6 months	107	24	(22.4)
Jahra	infants≤3 months	54	7	(12.96)
	infants≤6 months	121	11	(6.1)
Mubarak Al-Kabir	infants≤3 months	71	20	(28.17)
	infants≤6 months	135	39	(28.9)

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

2.7. Exclusive breastfeeding

The prevalence of exclusive breastfeeding for infants aged 3 months and 6 months is depicted in Table 3. According to the findings, 18.5% of infants aged 3 months and 13.0% of infants aged 6 months were exclusively breastfed.

Table 3: Exclusive[§] breastfeeding of infants≤3 months or ≤6 months in each governorate (Kuwait Nutritional Surveillance System, 2021).

Exclusive breastfeeding yesterday		N	n	(%)
Total	Infants≤3 months	379	70	(18.5)
	infants≤6 months	797	104	(13.0)
Capital	infants≤3 months	69	40	(58.0)
	infants≤6 months	126	52	(41.3)
Hawalli	infants≤3 months	50	9	(18.0)
	infants≤6 months	132	11	(8.3)
Farwania	infants≤3 months	64	8	(12.5)
	infants≤6 months	147	16	(10.9)
Ahmadi	infants≤3 months	66	5	(7.6)
	infants≤6 months	112	7	(6.3)
Jahra	infants≤3 months	55	6	(10.9)
	infants≤6 months	129	10	(7.8)
Mubarak Al-Kabir	infants≤3 months	75	8	(10.7)
	infants≤6 months	151	18	(11.9)

§ Defined as only breast milk without anything else except oral rehydration solution (ORS), vitamins, minerals and medicines.

2.8. Predominant breastfeeding under 6 months

The proportion of infants aged ≤6 months who are predominantly breastfed is presented as an indicator in this analysis. The results indicate a prevalence of 13.0%.

2.9. Continued breastfeeding at 1 year

The prevalence of breastfeeding among children aged 12 to 15 months was 8.4%. This low rate of breastfeeding aligns with the previously reported at earlier ages. (as outlined in 2.6).

2.10. Continued Breastfeeding at 2 Years

The prevalence of continued breastfeeding among 20-23-months-old children was 4.5%.

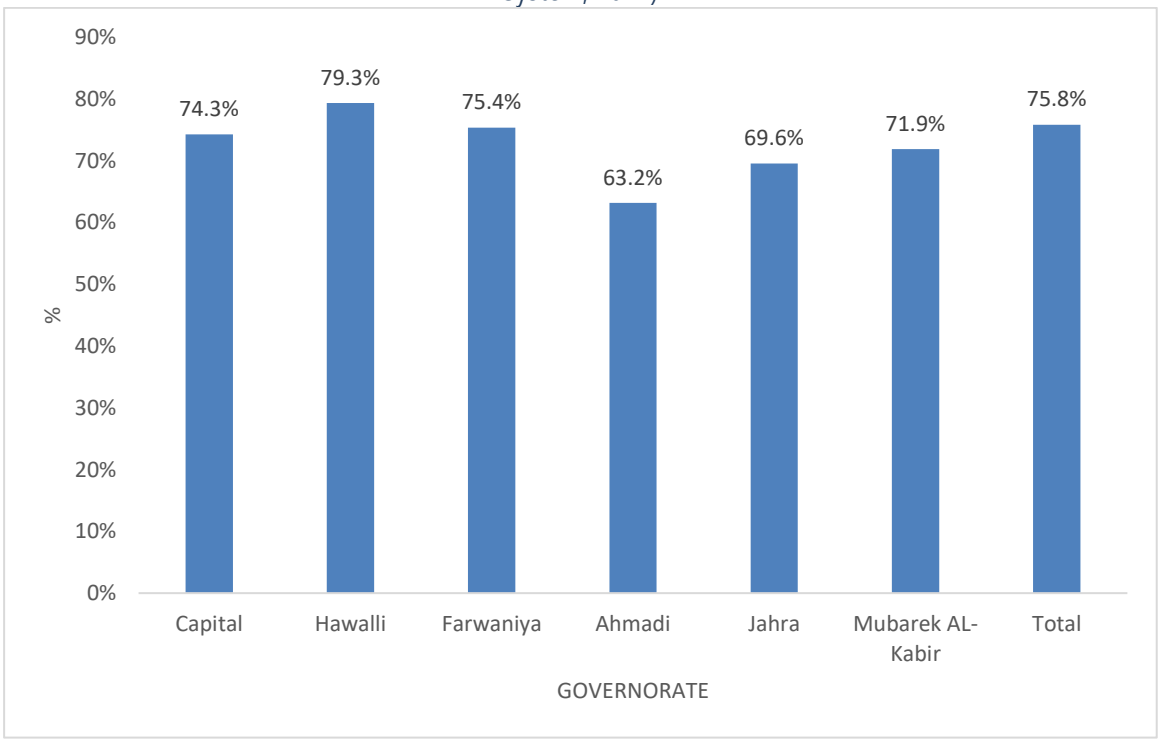
2.11. Introduction of Solid, Semi-solid, or Soft Foods

The surveillance reported 85.7% of children aged 6-8 months had received solid, semi-solid, or soft food the previous day.

2.12. Minimum Dietary Diversity

This surveillance reported 75.8% of children aged 6-23 months received foods from at least four food groups, which included grains, roots and tubers, legumes and nuts, dairy products, flesh foods, eggs, vitamin A-rich fruits and vegetables, and other fruits and vegetables. As illustrated in Figure 5, no significant difference was observed across the governorates.

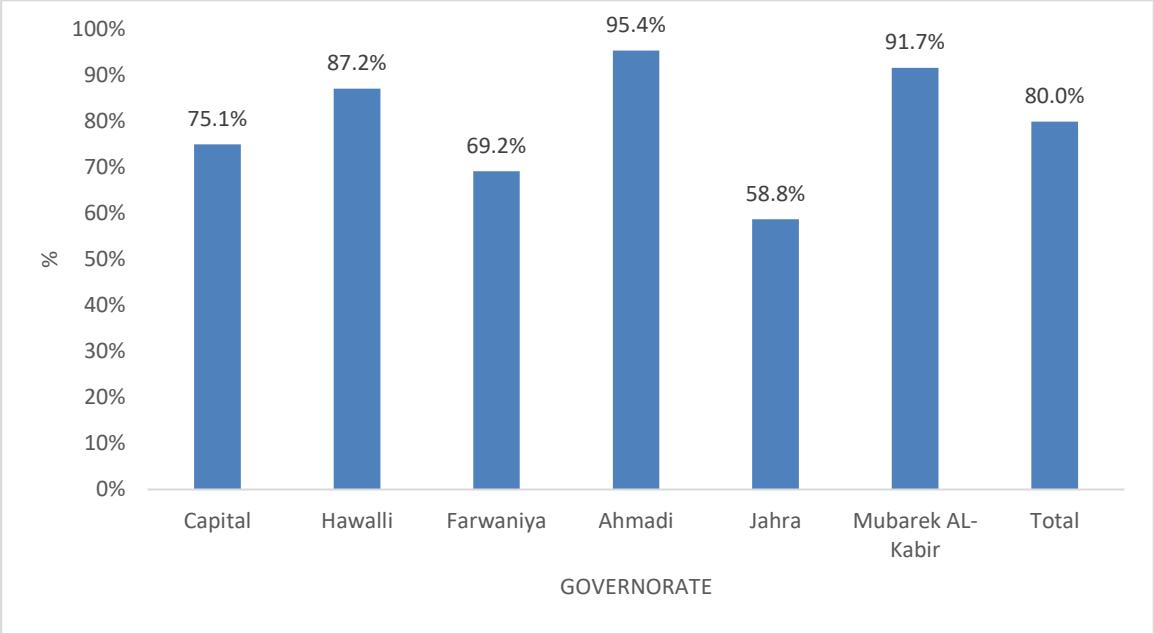
Figure 5: Children (6-23 months) with minimum dietary diversity in each governorate. (Kuwait Nutritional Surveillance System, 2021)



2.13. Bottle feeding[3] in children 0-23 months

This surveillance reported the feeding practices of infants aged 0 to 23 months. The results indicate that 80.0% of the infants in this age group used a bottle with a nipple. As depicted in Figure 6, there is a substantial variation in the use of bottle feeding across the governorates.

Figure 6: Children (0-23 months) with bottle feeding in each governorate. (Kuwait Nutritional Surveillance System, 2021)

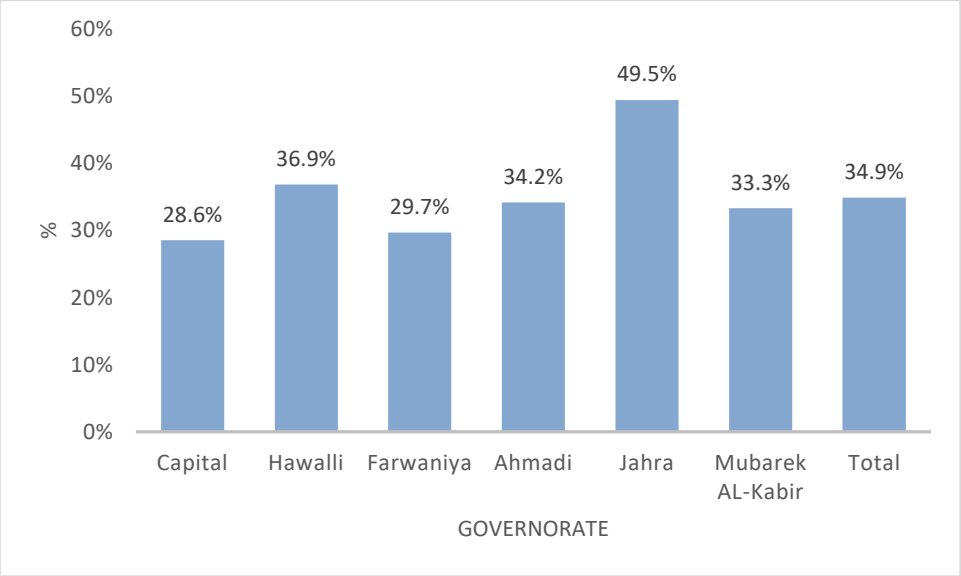


2.14. Illness during the last 3 months among children 0-23 months

The incidence of illness requiring medical consultation in the government or private sector among children aged 0 to 23 months was analyzed. During the specified period, 34.9% of the children in this demographic experienced an illness requiring medical attention. The incidence of disease was reported to be 20.2% among infants aged 0-5 months and 43.7% among infants aged 6-23 months. Figure 7 depicts a graphical representation of the distribution of disease across various governorates. The majority 90.7% of children with a recent illness experienced a single episode, while 9.3% reported two occurrences. Chest/respiratory infections were the most frequently illness reported among this age group.

[3] This is not necessarily formula milk.

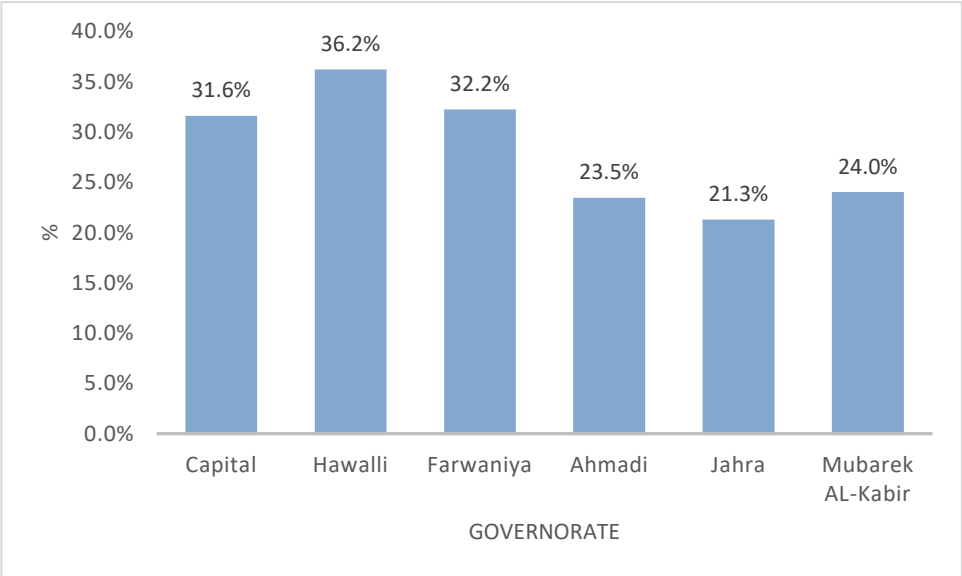
Figure 7: Children (0-23 months) with illness during the last 3 months in each governorate (Kuwait Nutritional Surveillance System, 2021)



2.15. Smoking in household among children 0-23 months

This surveillance reported that 28.4% of children in this age group were exposed to one or more smoke sources in their households. As shown in Figure 8, there was a considerable variation in exposure levels across governorates.

Figure 8: Children (0-23 months) exposed to smoking in each governorate. (Kuwait Nutritional Surveillance System, 2021)



The primary individual responsible for smoking within the household was identified as the child's father.

To mitigate the adverse effects of smoking on both children and their parents, it is recommended to educate parents on the risks associated with passive smoking exposure. This type of education may reduce the prevalence of smoking in households and benefit the health of both children and parents.

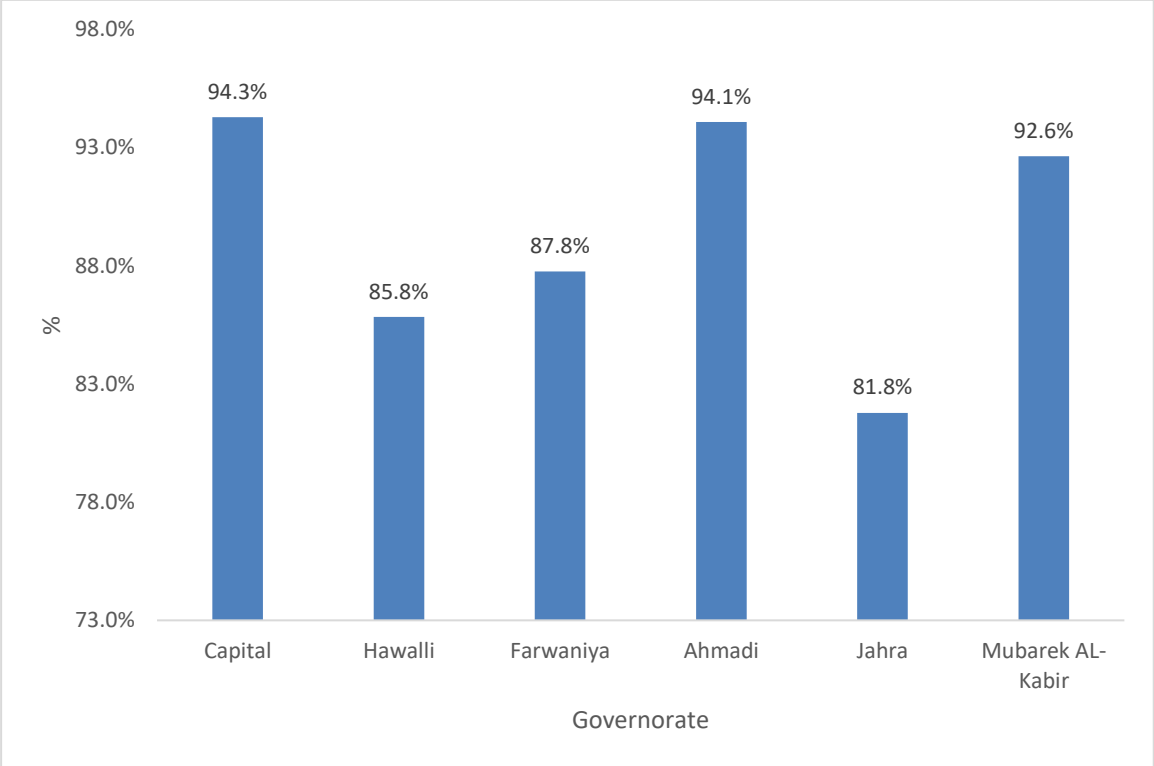
3. Indicators for children from 24 to 60 months

A sample of 1444 children aged 24 to 60 months (2-5 years) was collected and 51.7% of these children were male. Data was gathered through interviews with the mothers or guardians of these children, who were recruited from health centers.

3.1. Children between 24 to 60 months ever breastfed

The findings indicate that 89.1% of the children in this age group had been breastfed at least once in their lifetime. The results also highlight a significant difference in the proportion of children who have ever been breastfed across various governorates, as depicted in Figure 9 ($p<0.001$).

Figure 9: Children (24 to 60 months) ever breastfed in each governorate. (Kuwait Nutritional Surveillance System, 2021)



3.2. Bottle feeding[4] in children 24 to 60 months

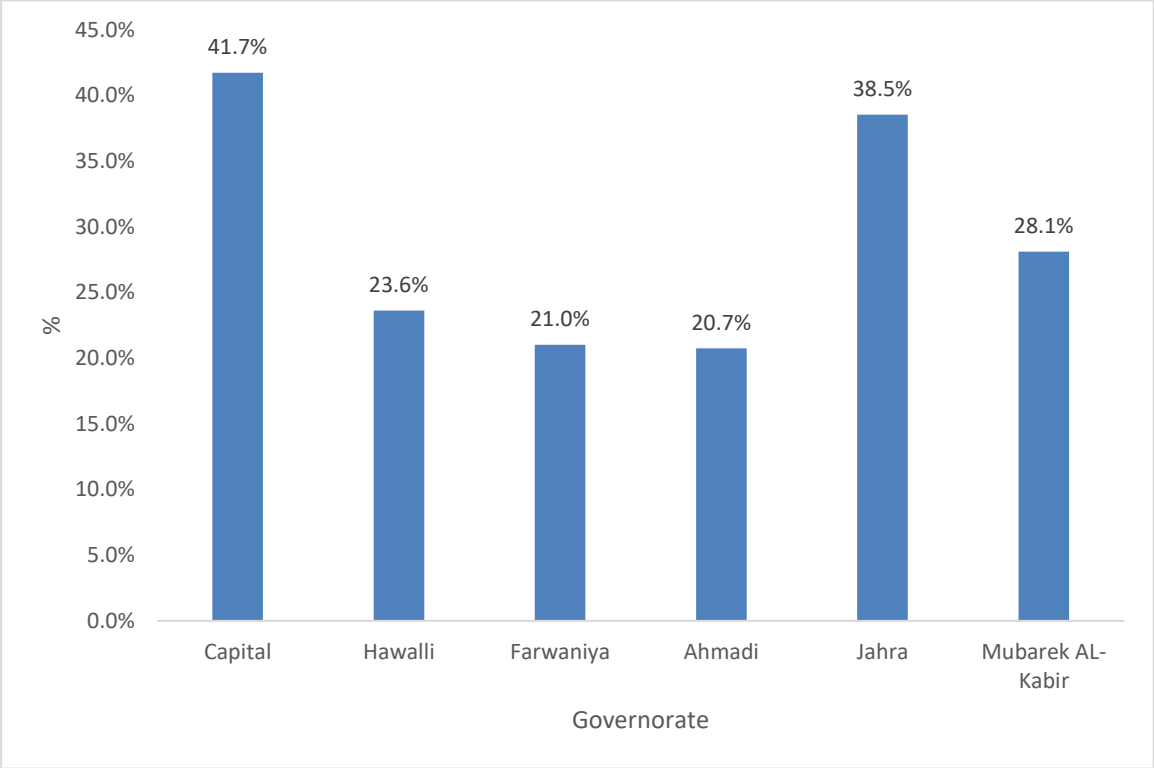
This surveillance reported 30% of infants aged 24 to 60 months are fed using a bottle with a nipple.

[4] This is not necessarily formula milk.

3.3. Illness during the last 3 months among children 24 to 60 months

This surveillance reported 27.8% of children aged 24 to 60 months required medical consultation for an illness in either the government or private sector. Figure 10 depicts the distribution of this prevalence across governorates, which was found to be substantially variable.

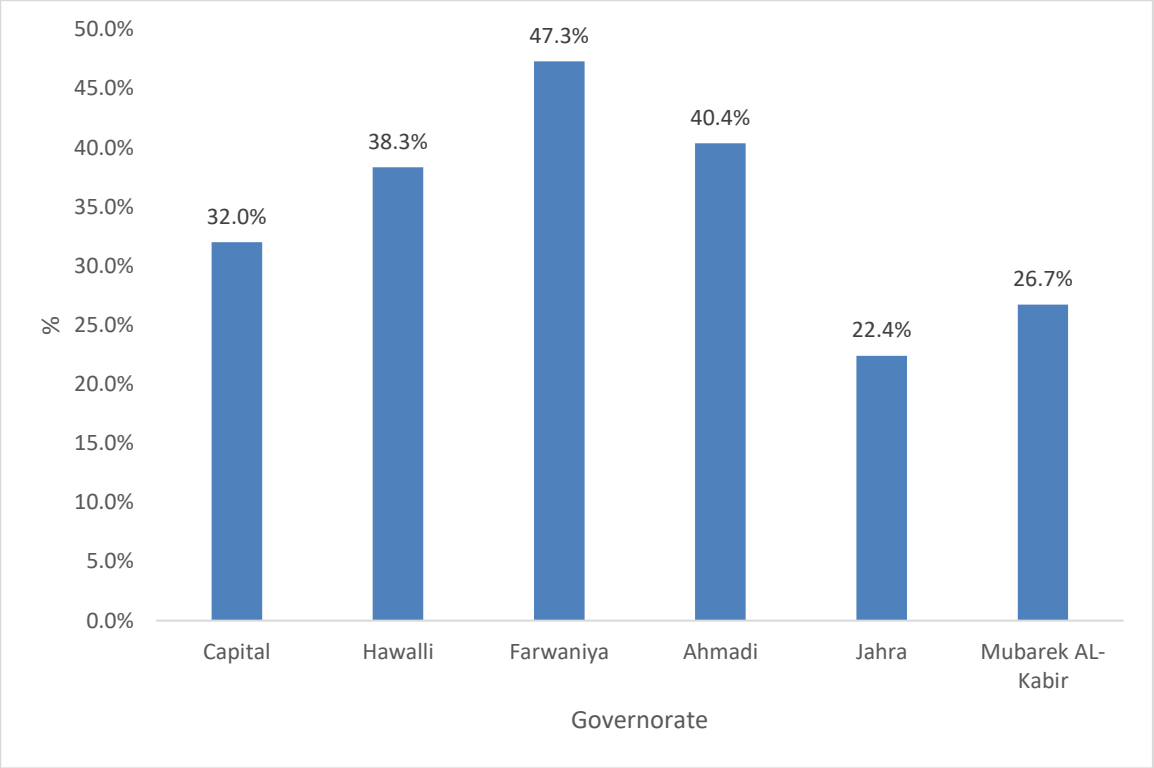
Figure 10: Children (24 to 60 months) who had illness during the last 3 months in each governorate. (Kuwait Nutritional Surveillance System, 2021)



3.4. Smoking in household among children 24 to 60 months

This surveillance reported 35.5% of children aged 24 to 60 months are exposed to cigarette, shisha, or both smoke in their homes. As shown in Figure 11, the analysis of the data revealed statistically significant ($p<0.001$) differences in the proportion of children exposed to secondhand smoke in their households across governorates.

Figure 11: Children (24 to 60 months) exposed to smoking at home in each governorate. (Kuwait Nutritional Surveillance System, 2021)



3.5. Screen time among children 24 to 60 months

The American Academy of Pediatrics advocates limiting media exposure, including television and computer activities, to a maximum of 1-2 hours per day for children aged 2 and older (Strasburger *et al*, 2013). Table 4 presents the daily media usage patterns, including television and computer game usage, of children aged 24 to 60 months (2-5 years) on weekdays and weekends. Despite the fact that the majority of children 72.4% adhere to the recommended daily limit of two hours or less of television viewing, the increasing use of computer games and other electronic devices has resulted in an increase in media exposure that exceeds the recommended daily maximum of two hours.

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Table 4: Screen time among Kuwaiti children 24 to 60 months. (Kuwait Nutritional Surveillance System, 2021).

	Days	Screen Time	n	(%)
TV watching	Weekdays	Less than 2 hours	1044	(72.4)
		2-3 hours	311	(21.6)
		More than 3 hours	87	(6.0)
	Weekends	Less than 2 hours	1040	(72.2)
		2-3 hours	308	(21.4)
		More than 3 hours	93	(6.4)
Computer, games/videogames	Weekdays	Less than 2 hours	976	(67.7)
		2-3 hours	336	(23.3)
		More than 3 hours	130	(9.0)
	Weekends	Less than 2 hours	958	(66.4)
		2-3 hours	360	(25.0)
		More than 3 hours	124	(8.6)

3.6. Consumption of soft drinks among children 24 to 60 months

This surveillance reported 61.9% of children aged 24 – 60 months do not consume carbonated drinks, whereas 38.8% of children in this age group routinely consume non-fresh, sweetened juices six times or more per week, as shown in Figure 13.

Figure 12: Consumption of carbonated drinks among children 24 to 60 months (Kuwait Nutritional Surveillance System, 2021)

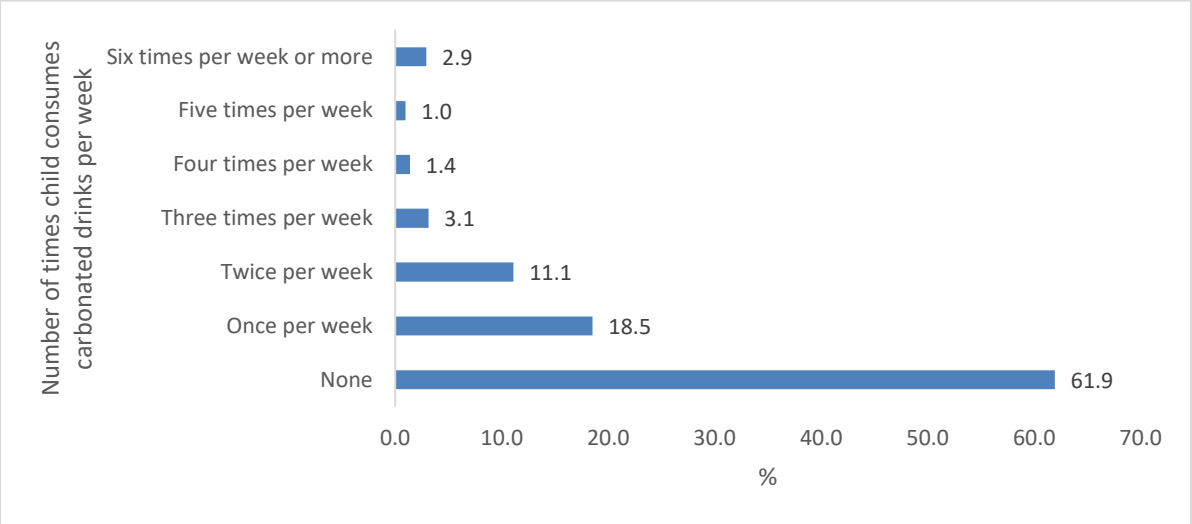
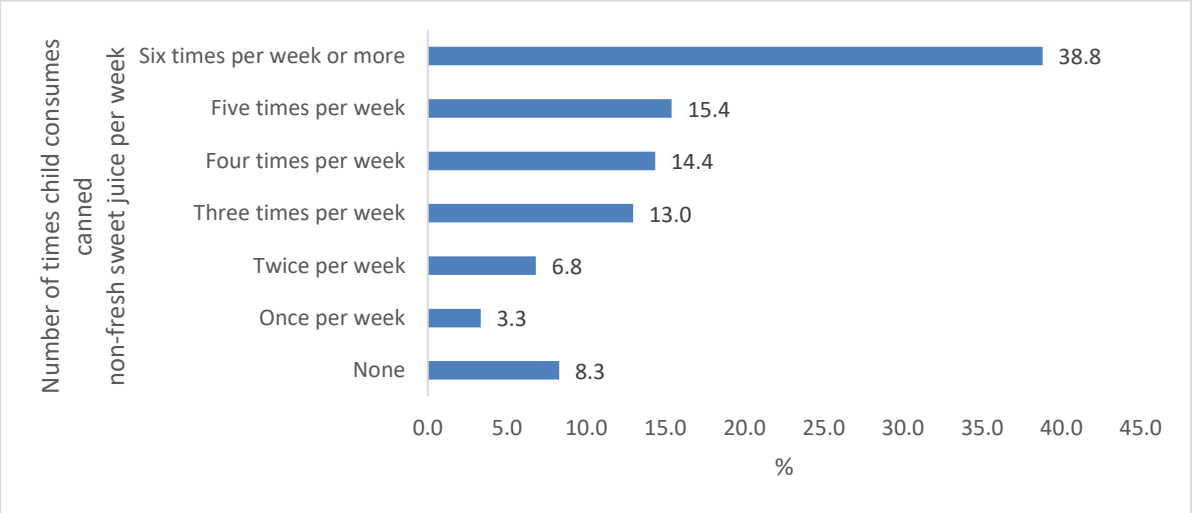


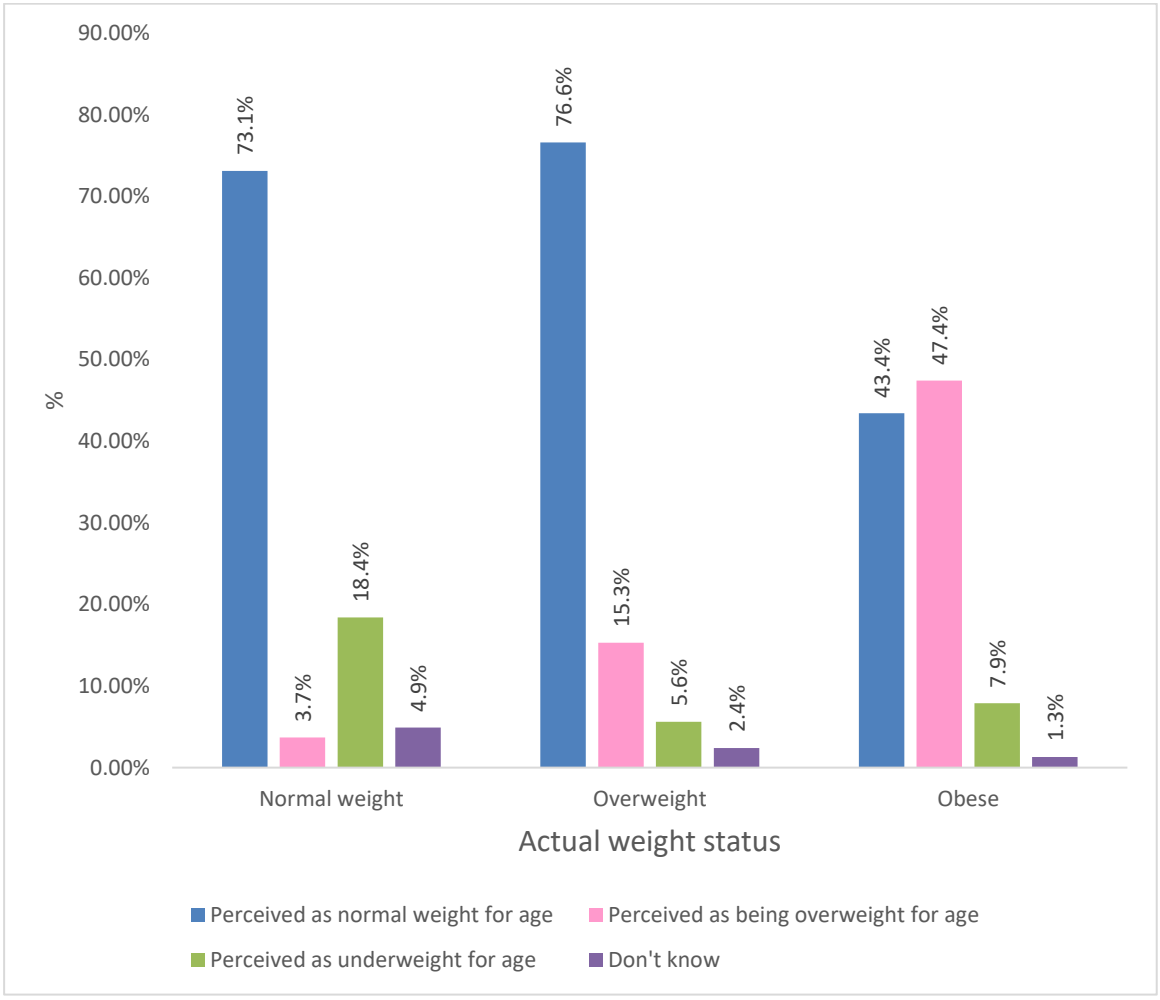
Figure 13: Consumption of canned non-fresh sweet juice among children 24 to 60 months (Kuwait Nutritional Surveillance System, 2021)



3.7. Perceptions of mothers about the weight of their child (24 to 60 months) in comparison to the actual weight of the child.

Using self-reported information from mothers or guardians, the weight status of 24 to 60 months old children was evaluated. According to figure 14, 17% of participants believed that their child weight was below the normal range

Figure 14: Perception on the weight of children (24 to 60 months) by actual weight. (Kuwait Nutritional Surveillance System, 2021)

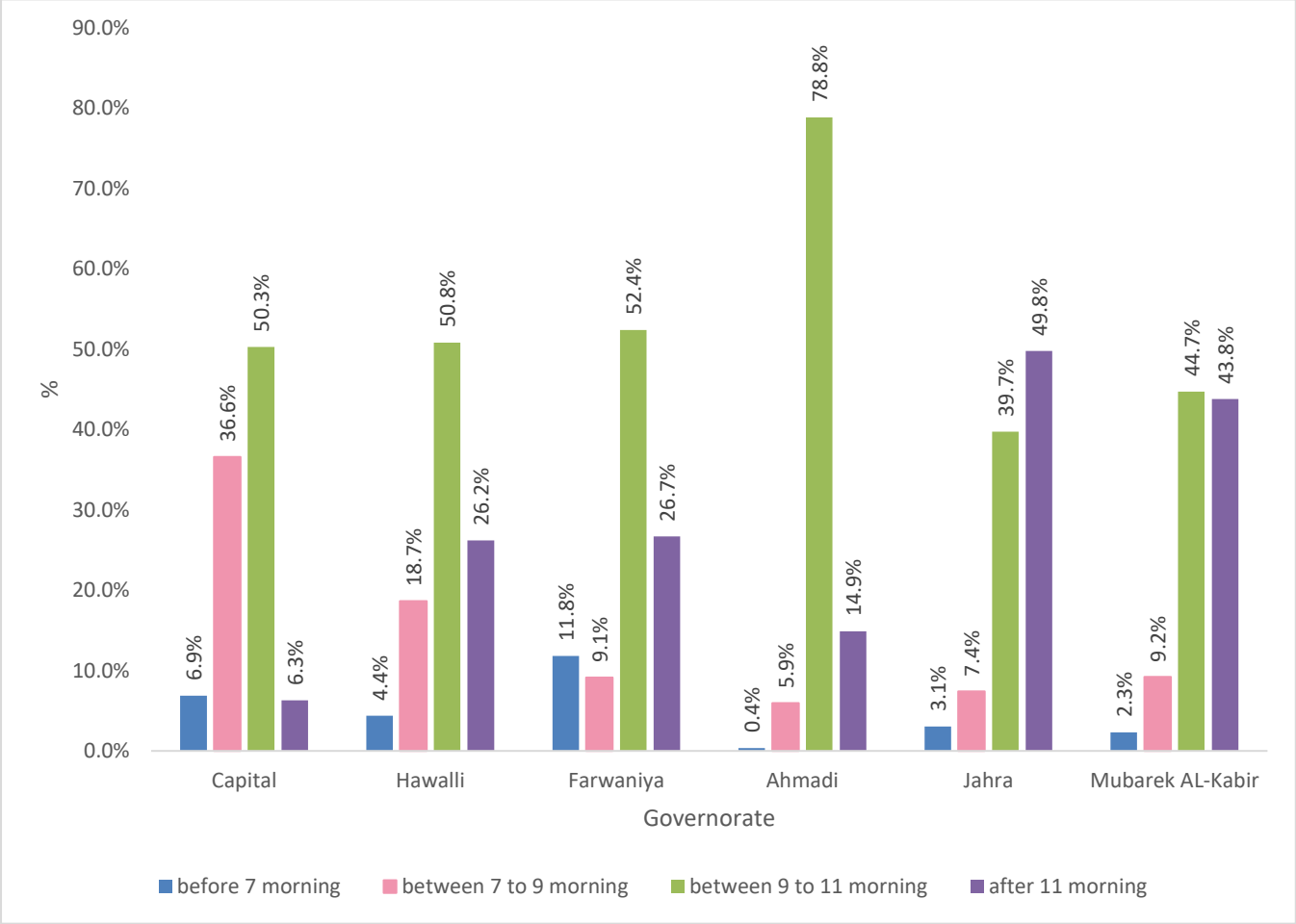


According to the surveillance report a significant proportion of mothers have varying perception regarding their child weight status. For children with normal weight, the majority of mothers 73.1% perceived their child weight is normal for their age, while 18.4% consider it to be below it. Furthermore, a majority of mothers 76.6% perceived their overweight child weight is within the normal range, while a smaller proportion consider them as either higher 15.3% or lower 5.6%. Additionally, for obese children, almost half of the mothers 47.4% perceived their child weight to be overweight, while 43.4% perceived them as normal.

3.8. Reported time of the first meal among children 24 to 60 months

The surveillance reported 20% of children aged 24 to 60 months initiate their first meal after 11 a.m., as shown in Figure 15, which depicts the distribution of the timing of the first meal across governorates.

Figure 15: Time of the first meal among children (24 to 60 months) by governorate. (Kuwait Nutritional Surveillance System, 2021)



Anthropometric measurements children 0-5 years

Table 5 shows that 4% of children aged 24 to 60 months were obese, compared to 2.8% of children aged 0 to 23 months. In. contrast to prior years, these data indicate a modest increase. Kuwait's wasting (weight-to-height ratio) remained substantially below the anticipated 5%. Less than 10% of children aged 0–23 months and less than 5% of children aged 24–60 months showed stunting (height-for-age).

Table 5: Prevalence of stunting, wasting, overweight and obesity among children (0-5 years). (Kuwait Nutritional Surveillance System, 2021).

Age (Months)	Sex	Sample (n)	Stunting§ (%)	Wasting† (%)	Overweight‡ (%)	Obesity~ (%)
0-23	All[α]	2047	9.1	3.2	5.8	2.8
	Male	1056	10.9	2.8	5.3	3.3
	Female	1018	7.3	3.5	6.4	2.3
24-60	All[ω]	1380	2.2	2.8	9.6	4.0
	Male	713	3.1	3.3	8.5	3.0
	Female	667	1.4	2.3	10.8	5.2

§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).[ω] Numbers may vary due to excluding biologically implausible z-score (1 height-for-age, 10 weight-for-height and 10 BMI-for-age).

Conclusion and recommendations based on the data of children 0-5 years

According to our analysis, over one-fifth of Kuwaiti infants have a low birth weight (LBW) of less than 2500 grams. This pattern is attributed to intrauterine growth retardation, or the global trend of increasing prematurity caused by elective caesarean sections between 32 and 37 weeks of gestation (Martin *et al*, 2015). Mothers provided the birth weight data and demonstrated an exceptional ability to recall the birth weights of their infants. Obtaining data from records is challenging, and Kuwait has limited data on the weight of newborns. LBW has both short-term and long-term health consequences, including an increased risk of chronic noncommunicable diseases in maturity. It is of the utmost importance to investigate this matter to determine the actual prevalence of LBW and its root causes.

It appears that breastfeeding practices in Kuwait are suboptimal, as one-third of Kuwaiti mothers continue to breastfeed their infants at three months of age. At the age of six months, 13% of infants are predominantly breastfed and 13% are exclusively breastfed. Nearly half of Kuwaiti mothers initiate breastfeeding within the first hour of birth or recovery from caesarean section, with the remainder citing unspecific reasons for delayed initiation. Compared to prior years, there has been no significant change in these indicators. It is crucial to improve breastfeeding practices among Kuwaiti mothers, beginning with antenatal care visits, since most expectant mothers consult a healthcare professional during pregnancy. Initiatives should encourage mothers to initiate breastfeeding immediately after delivery, breastfeed exclusively for the first six months, and then continue breastfeeding with appropriate complementary feeding practices. As the majority of Kuwaiti mothers give birth in private hospitals, the private sector should be encouraged to contribute to strategies aimed at increasing breastfeeding.

Over one-third of 0-5-year-old Kuwaiti children are exposed to passive smoking in their households. Reduced exposure to passive smoke would have positive effects on the health of both children and parents. It is possible to employ public awareness campaigns to educate parents about the risks of passive smoking and to promote smoke-free environments. Additionally, smoking cessation support programs could be expanded and made more accessible in order to help parents cease smoking and create a healthier environment for their children.

4. Selected risk factors among Kuwaiti adults

The surveillance report analyzed data from 1,651 participants older than 19 years, excluding 25 participants younger than 19 years. The females constituted 59.7% of the sample, and the median age group was 37 years. The participants' age distribution, highest level of education, and current employment status are summarized in Table 6.

Table 6: Demographic characteristics of the adult participants, (Kuwait Nutrition Surveillance, 2021)

Characteristics	n	(%)
Gender, Female	986	(59.7)
Male	665	(40.3)
Age, years		
>19-	432	(26.2)
30-	491	(29.7)
40-	277	(16.8)
50-	246	(14.9)
60+	205	(12.4)
Educational level		
No formal education	70	(4.2)
Primary	32	(1.9)
Intermediate	155	(9.4)
Secondary	285	(17.3)
Diploma	436	(26.4)
University	557	(33.7)
Master/doctorate	87	(5.3)
Retired	24	(1.5)
Employment status		
Doesn't work able to work	5	(0.3)
Doesn't work unable to work	2	(0.1)
Government employee	1016	(61.7)
Non-Government employee	48	(2.9)
Self-employed	22	(1.3)
Student	78	(4.7)
Housewife	58	(3.5)
Retired	414	(25.2)
Others	3	(0.2)
Government		
Capital	407	(24.7)
Hawalli	265	(16.1)
Farwania	324	(19.6)
Ahmadi	151	(9.1)
Jahra	308	(18.7)
Mubarak Al-Kabir	196	(11.9)

4.1. Exercise among Kuwaiti adults

Figure 16 depicts the proportion of adults in Kuwait who reported participation in physical activity by governorate. The surveillance reported 52.8% do not participate in any form of physical activity. Most respondents who reported participation in physical activity stated walking as their primary form of exercise (62.7%). Figure 17 shows the proportion of adults who reported not participating in physical activity varied with age.

Figure 16: Exercise among Kuwaiti adults by governorate. (Kuwait Nutrition Surveillance, 2021)

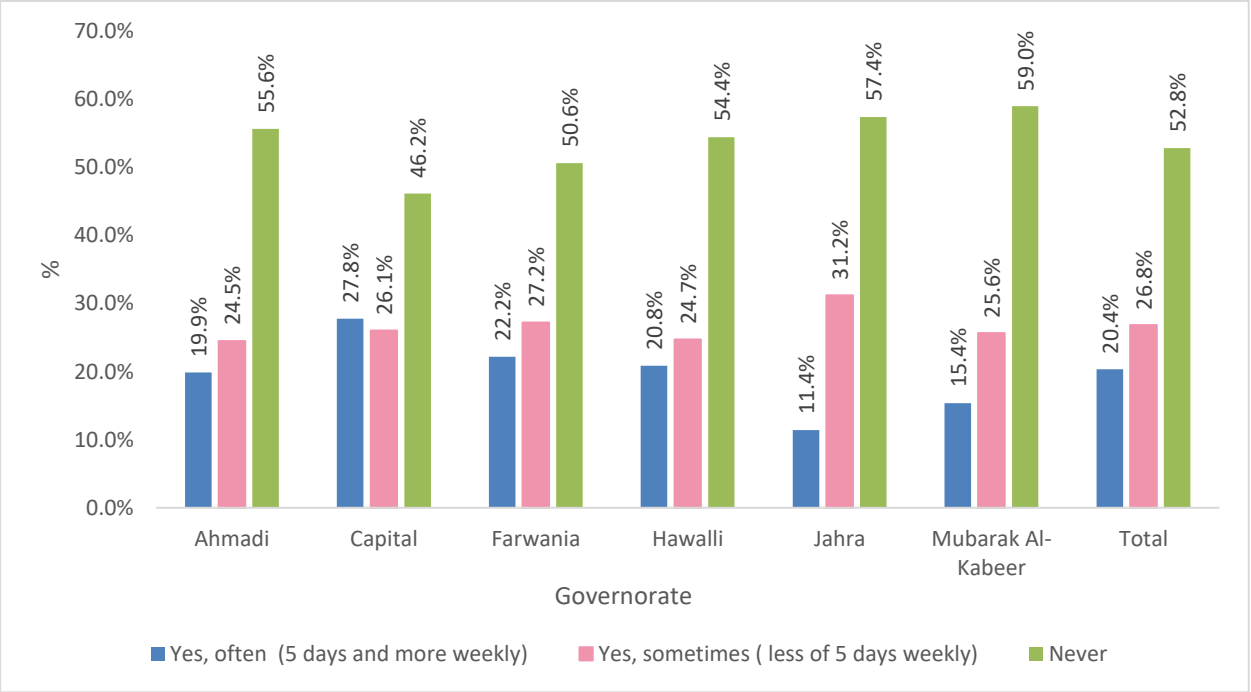
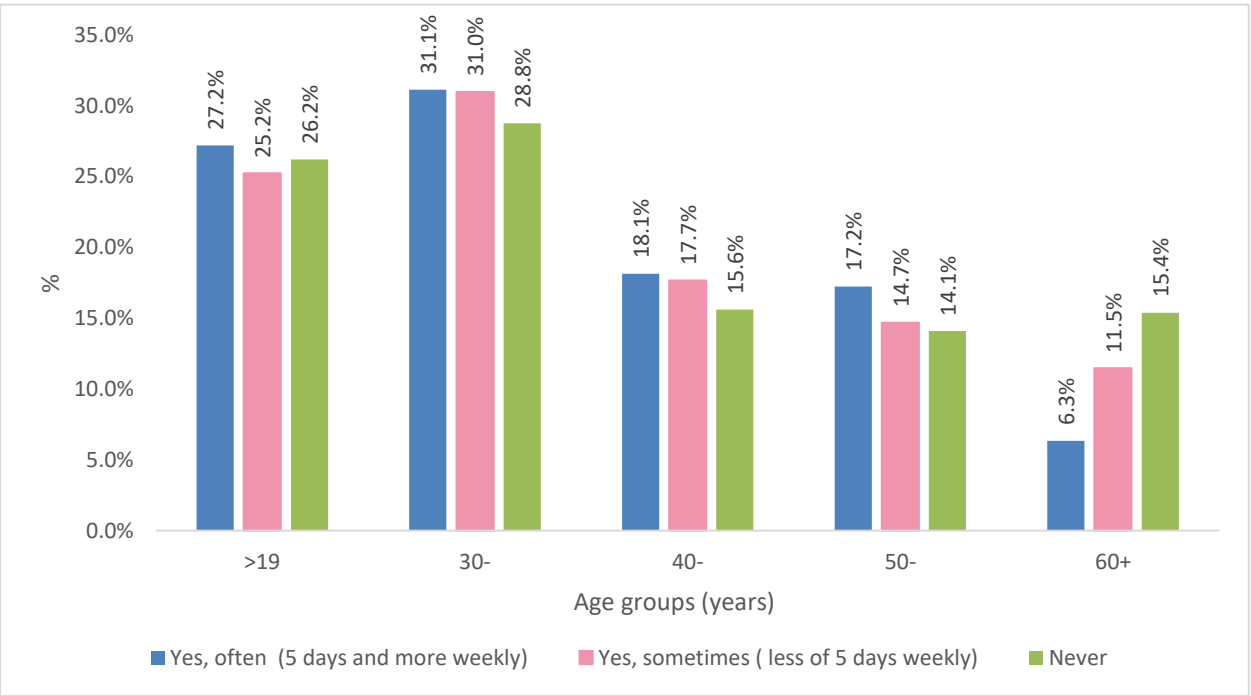


Figure 17: Exercise among Kuwaiti adults by age. (Kuwait Nutrition Surveillance, 2021)



4.2. Smoking cigarettes and shisha

In total, 13.3% of the participants reported smoking only cigarettes, while 1.7% reported consuming both cigarettes and shisha and 3.5% reported smoking shisha only. There were significant gender differences in smoking habits. The prevalence of cigarette smoking among males was 28.3%, while it was 3.3% among females. Similarly, the rate of exclusively smoking shisha among males was 5.8%, compared to 2.0% among females. Figure 18 depicts the gender distribution of consuming cigarettes, shisha, or both in each governorate. Among young males, the proportion of current smokers (cigarettes, shisha, or both) was notably elevated. (Figure 19).

Figure 18: Proportion of Kuwaiti adults who smoke currently cigarettes, Shisha by gender. (Kuwait Nutrition Surveillance, 2021)

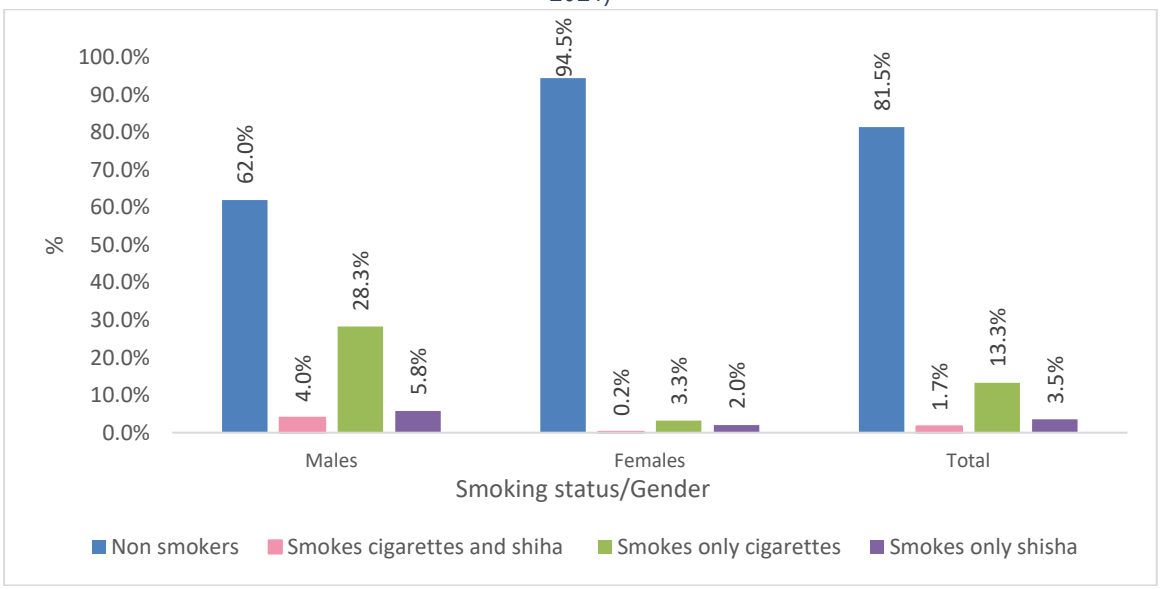
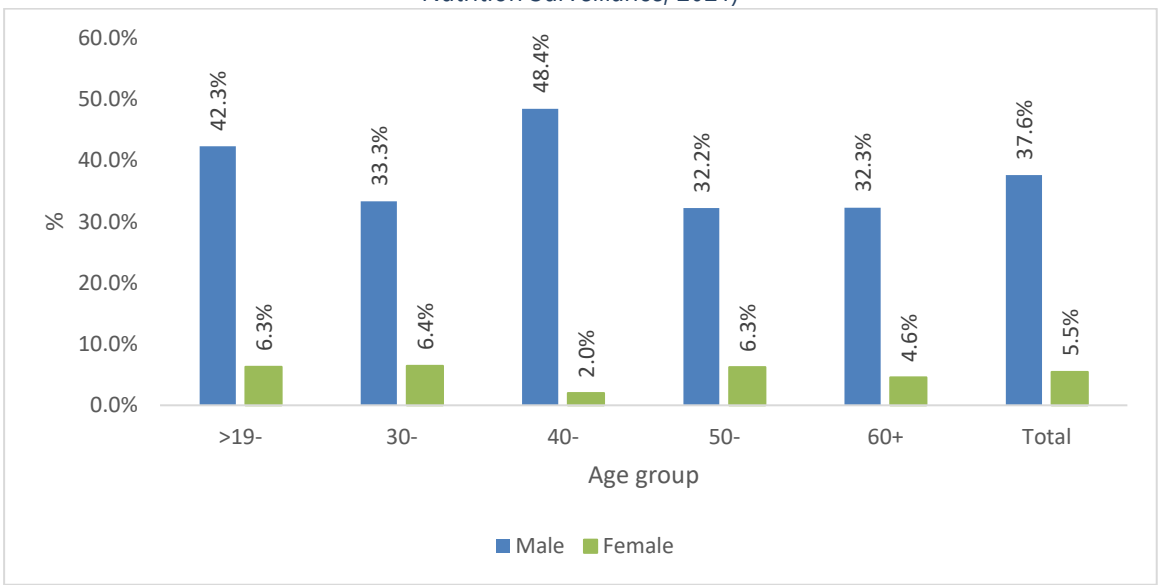


Figure 19: Proportion of Kuwaiti adults who smoke currently cigarettes, Shisha or both by age group and gender. (Kuwait Nutrition Surveillance, 2021)



4.3. High level of cholesterol (self-reported)

Figure 20 depicts the geographical distribution of Kuwaiti adults who self-reported having elevated cholesterol levels. High cholesterol levels were reported by 15.9% of the population. This result was substantially different between men and women, with 11.9% of men and 18.6% of women reporting elevated cholesterol levels. Among adults who self-reported elevated cholesterol levels 84.35% reported taking medication to treat their condition.

Figure 21 presents the distribution of Kuwaiti adults who self-reported having elevated cholesterol levels across age groups.

Figure 20: Proportion of Kuwaiti adults who self-reported high cholesterol level by governorate. (Kuwait Nutrition Surveillance, 2021)

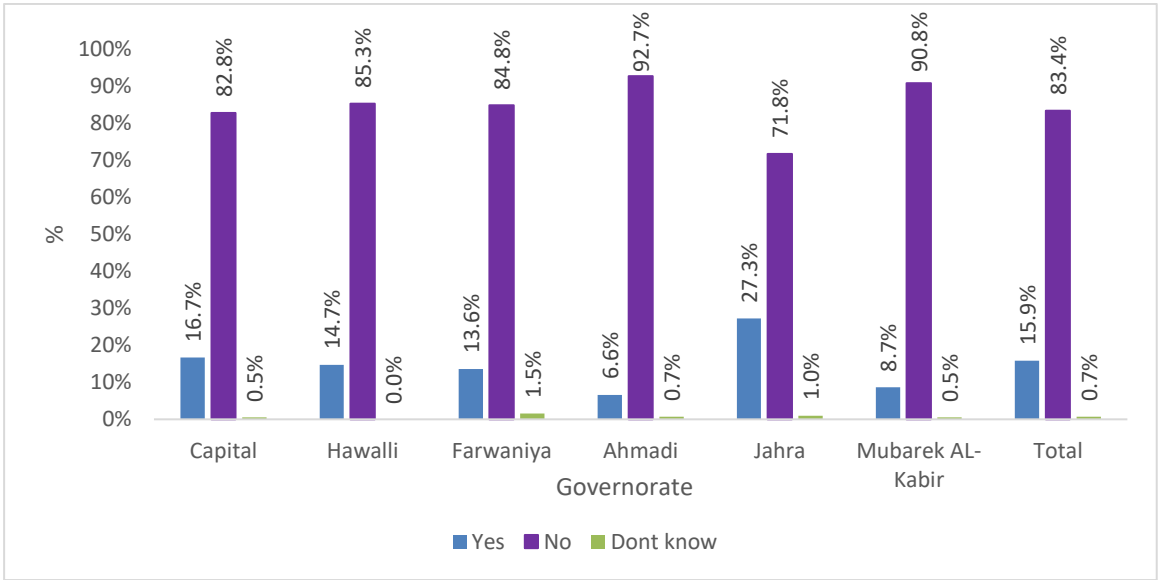
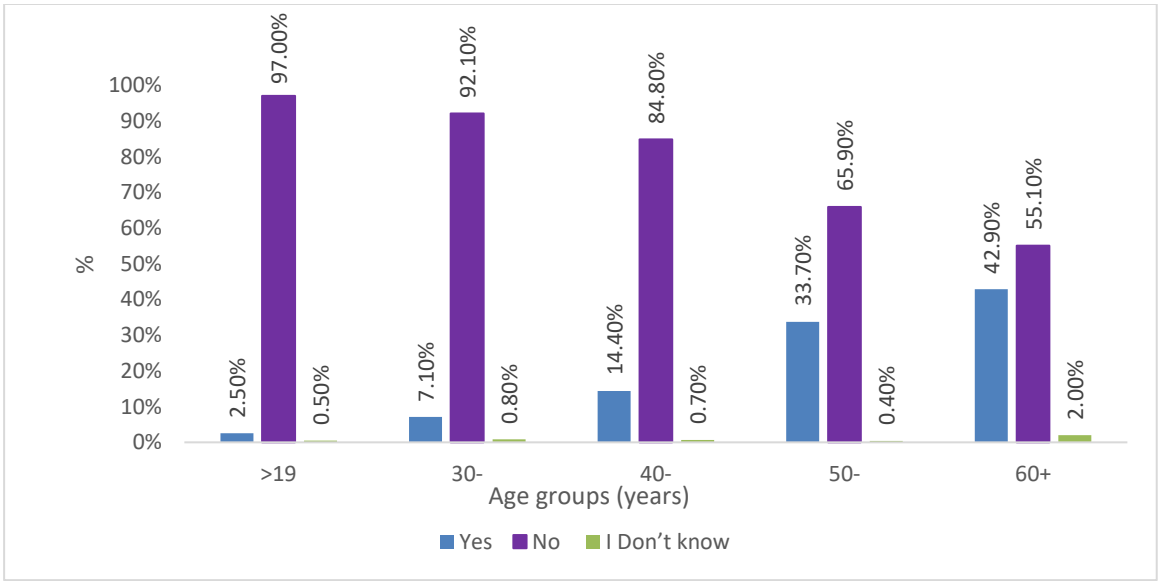


Figure 21: Proportion of Kuwaiti adults who self-reported high cholesterol level by age. (Kuwait Nutrition Surveillance, 2021)



4.4. High level of blood glucose (self-reported)

Figure 22 depicts the self-reported prevalence of elevated blood glucose levels across various governorates. Among participants who self-reported high cholesterol levels, 84.3% stated that they were taking medication to manage their condition. There is a statistically significant difference between males and females in self-reported elevated blood glucose levels, with 17.7% of males and 23.7% of females reporting elevated levels. In addition, as shown in Figure 23, the proportion of adults reporting elevated blood glucose levels increased markedly with age.

Figure 22: Proportion of Kuwaiti adults who self-reported high blood glucose level by governorate. (Kuwait Nutrition Surveillance, 2021)

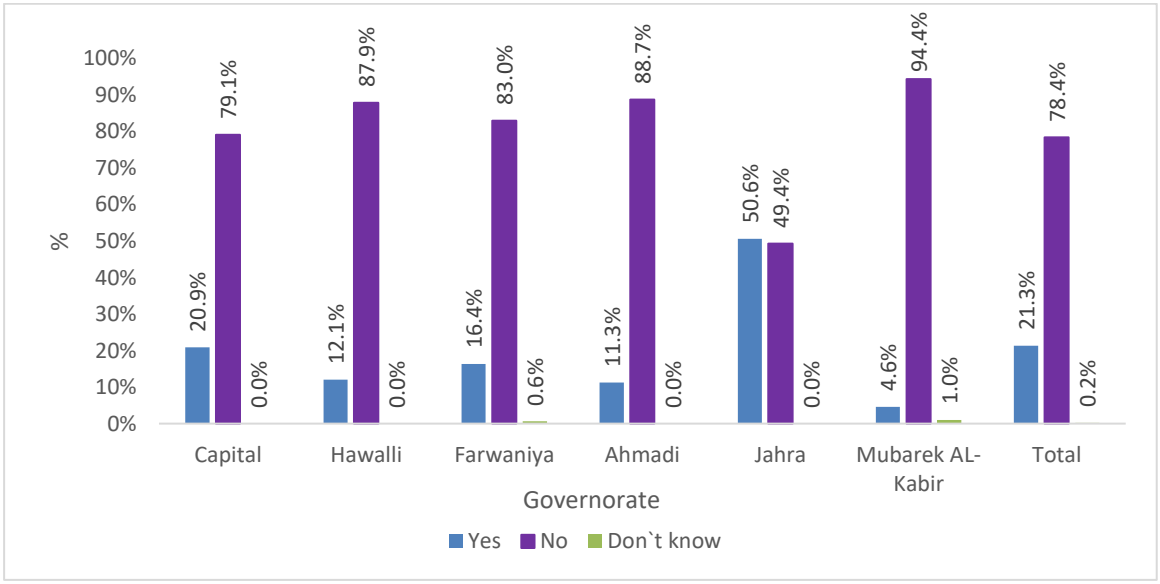
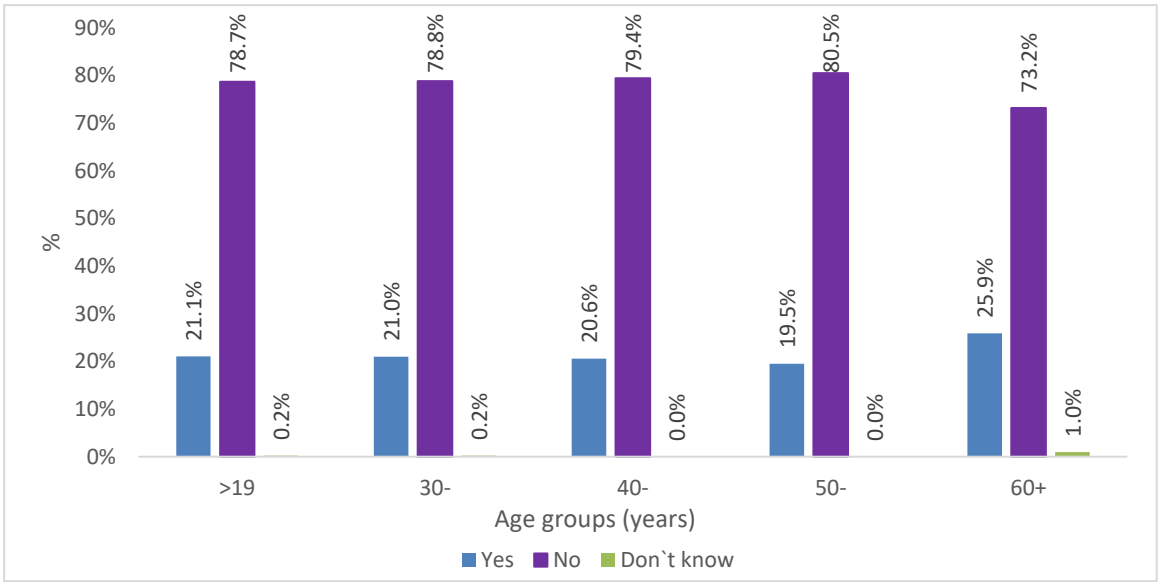


Figure 23: Proportion of Kuwaiti adults who self-reported high blood glucose level by age. (Kuwait Nutrition Surveillance, 2021)



4.5. High blood pressure (self-reported)

Figure 24 depicts the surveillance findings regarding the prevalence of self-reported elevated blood pressure among Kuwaiti adults. High blood pressure was reported by 16.4%; the surveillance indicates 97% of these adults were taking medication to treat their condition. The data revealed a positive correlation between the prevalence of self-reported hypertension and age increasement, with a statistically significant trend ($p<0.001$). In addition, 49.6% of participants who reported having elevated blood pressure also reported having high cholesterol levels.

Figure 24: Proportion of Kuwaiti adults who self-reported high blood pressure by governorate. (Kuwait Nutrition Surveillance, 2021)

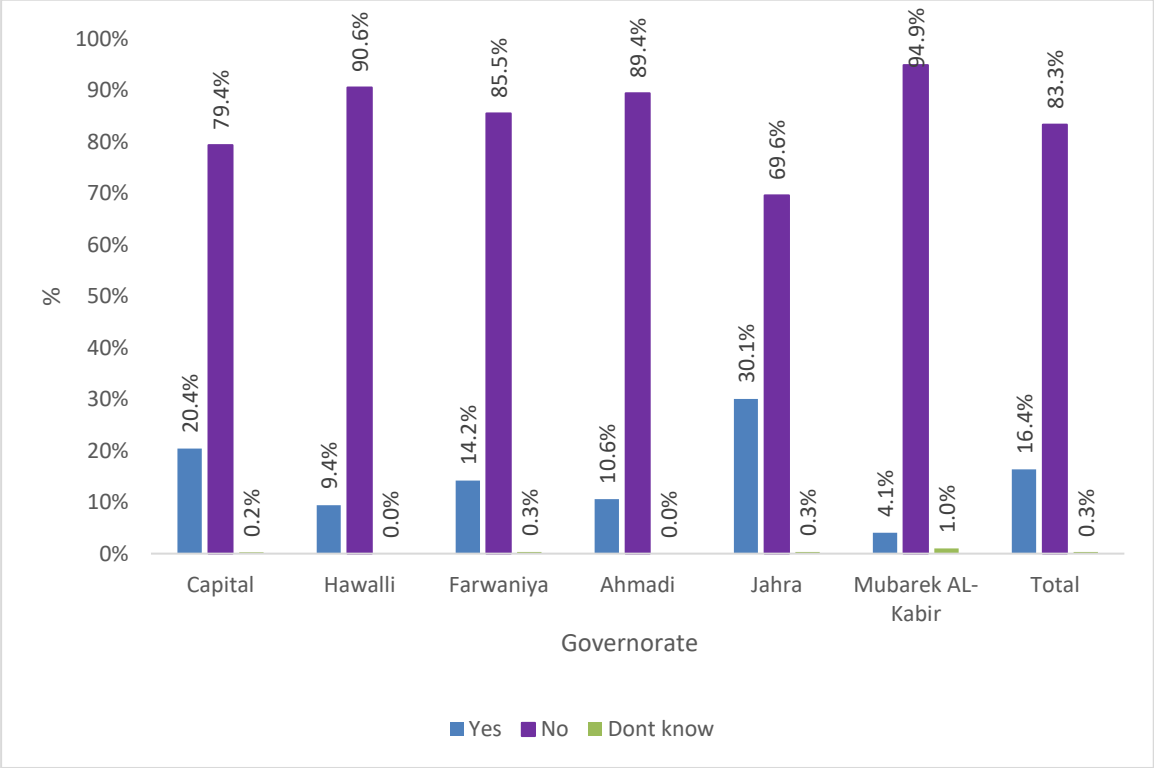
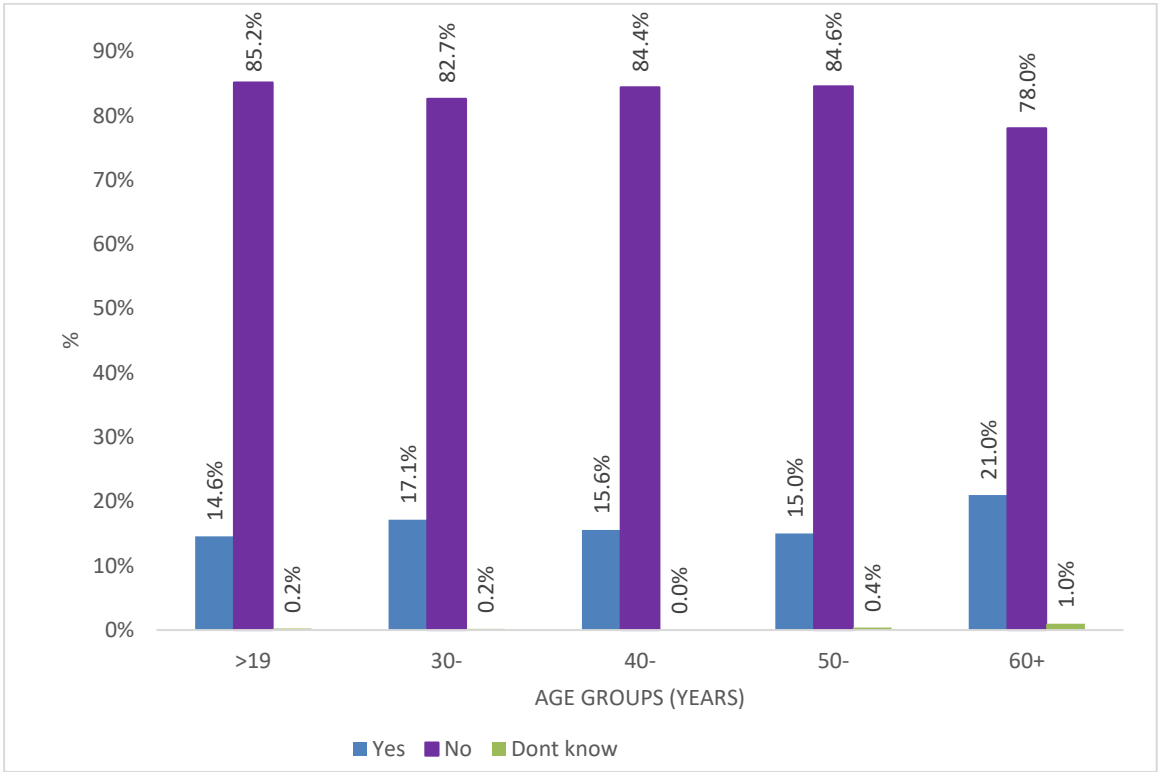


Figure 25: Proportion of Kuwaiti adults who self-reported high blood pressure by age. (Kuwait Nutrition Surveillance, 2021)

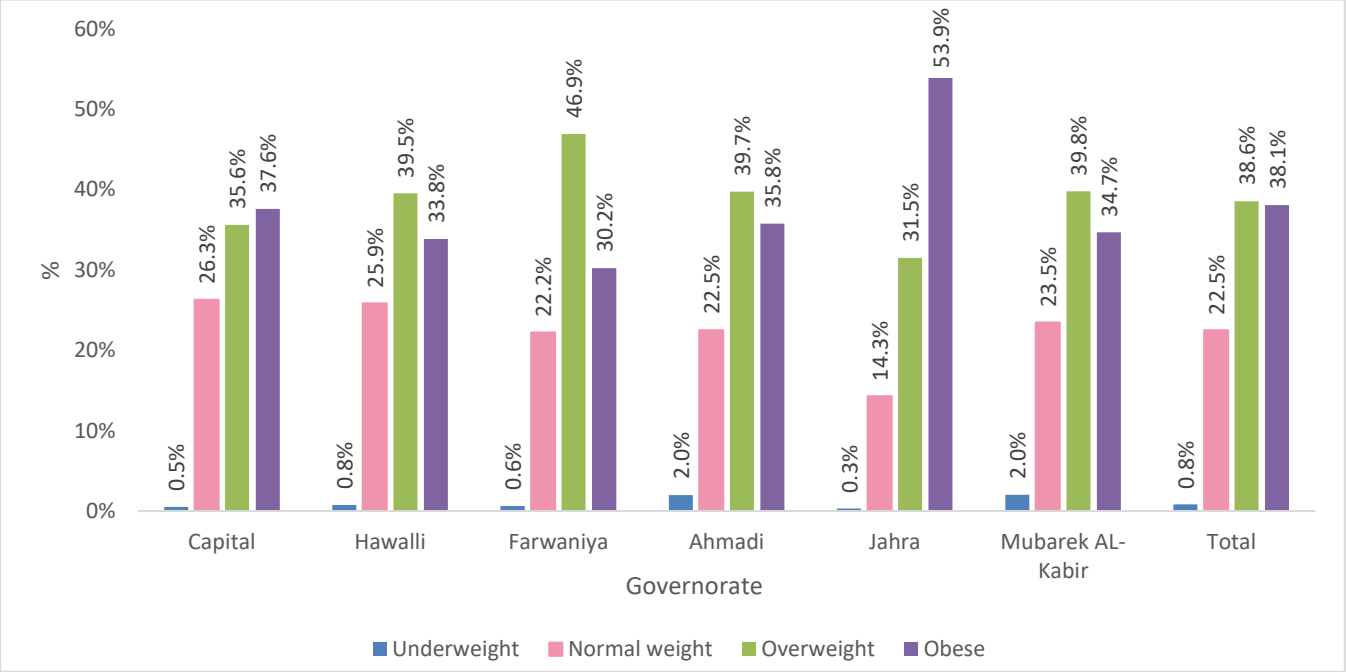


4.6. Obesity and overweight among Kuwaiti adults

The mean (standard deviation) Body Mass Index (BMI) among the participants was 29.00 (5.35).

Figure 26 depicts the prevalence of obesity and overweight in each governorate. While 38.1% were classified as obese, a further 38.5% were classified as being overweight. The prevalence of obesity and overweight among Kuwaiti adults was 76.65%. Obesity was substantially higher among females than males, with 39.6% of females and 35.8% of males classified as obese. The prevalence of adults with normal weight decreased with age.

Figure 26: Prevalence of obesity and overweight among Kuwaiti adults by governorate. (Kuwait Nutrition Surveillance, 2021)



The participants were queried regarding their utilization of weight management and reduction methods. Nearly one third of the participants reported using multiple weight management methods. Among these participants, 21.5% reported utilizing dietary approaches, 13.7% reported engaging in physical exercise, 2.6% reported the use of herbal remedies, less than 1% reported the utilization of pharmaceuticals, and 4.7% reported undergoing surgical procedures.

Figure 27: Prevalence of obesity and overweight among Kuwaiti adults by age. (Kuwait Nutrition Surveillance, 2021)

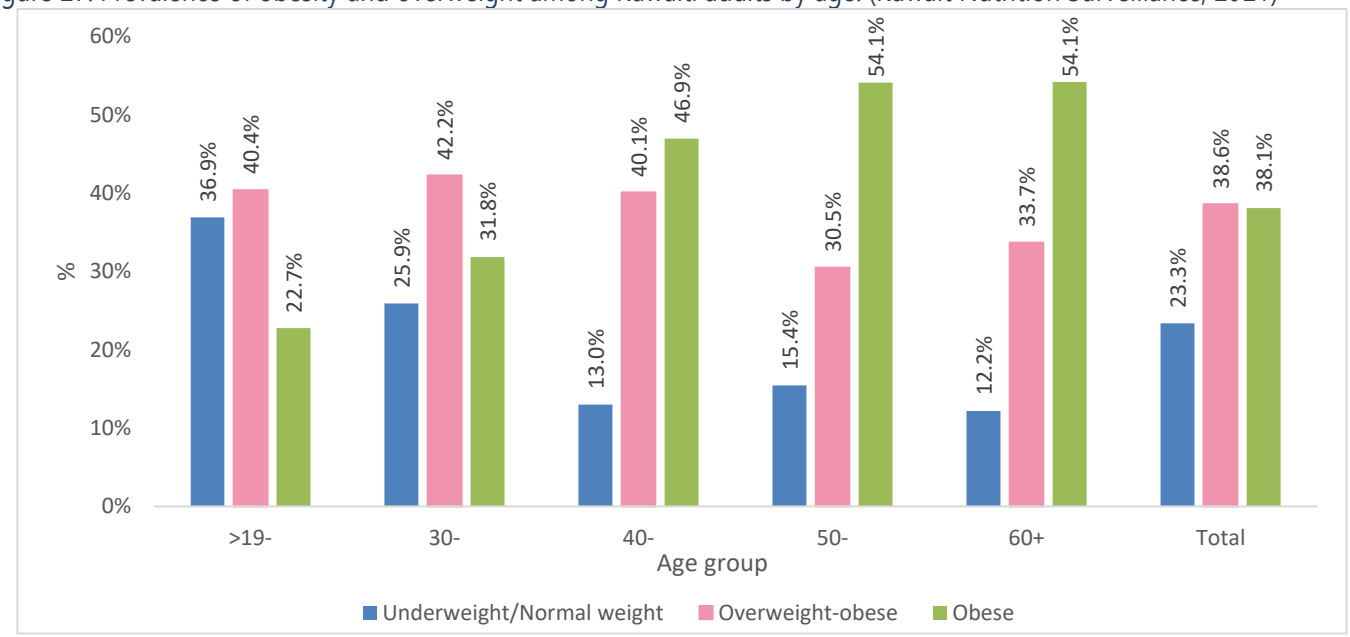
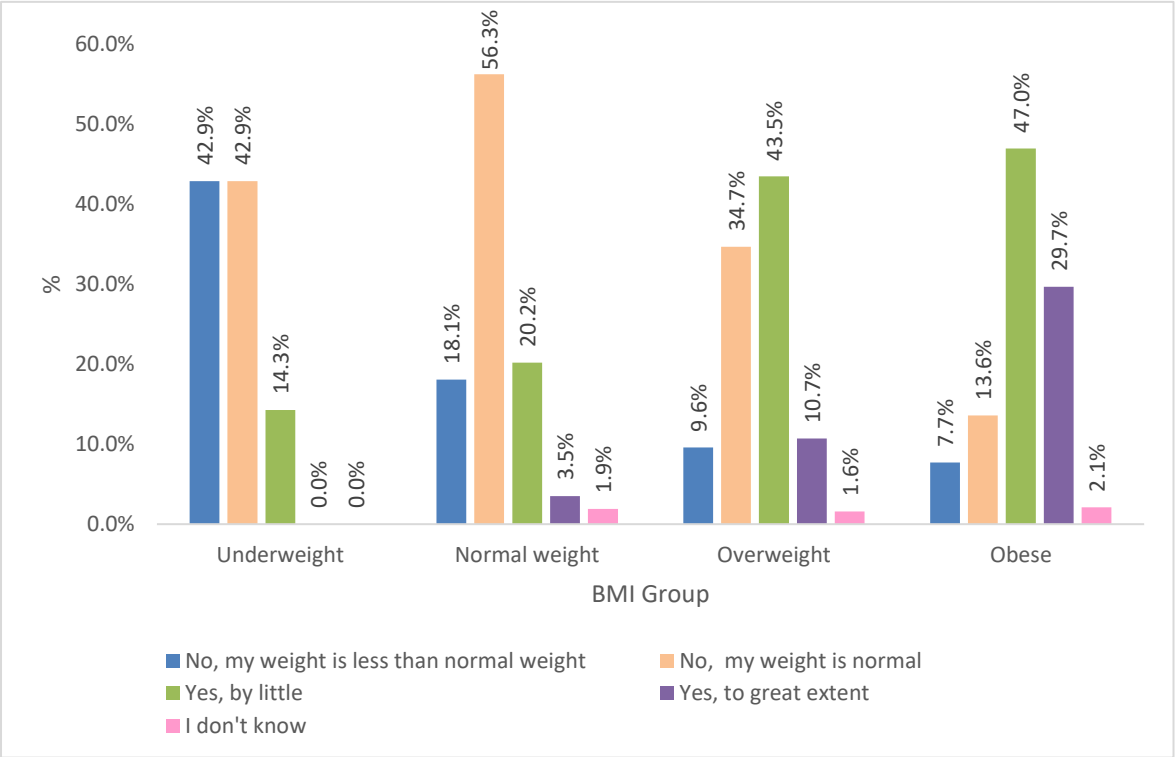


Figure 28 depicts the participants' self-perceived weight status with their actual weight classification (normal weight, overweight, obese). According to the data, 76.7% of obese participants acknowledged that their weight was above normal.

Figure 28: Self-perception of body weight among Kuwaiti adults by body mass index status, (Kuwait Nutrition Surveillance, 2021)



4.7. Fruit and vegetable intake

This surveillance used the STEPwise approach developed by the World Health Organization to analyze risk factors to improve global information (Bonita *et al*, 2001). Four indicators are used to assess fruit and vegetable consumption with this method. To assure the accuracy of the KNSS survey data, we designed photo cards specifically for the KNSS to estimate the fruit and vegetables portion size. Among 1651 participants, 4.7% either did not know or did not respond to the questions about their fruit consumption frequency. Therefore, data were available for 1,573 participants, of whom 29.0% reported daily fruit consumption. Similarly, 2.8% either did not know or declined to respond to the questions regarding the frequency of their vegetable consumption. Thus, data were available for 1,604 participants, of whom 52.1% reported daily consumption of vegetables. Table 7 provides the average number of days per week that fruits or vegetables were ingested, whereas Table 8 provides the average number of fruit and vegetable servings. The median frequency of fruit and vegetable consumption among male and female participants was identical.

Table 7: Mean number of days in which fruits and vegetables are consumed by Kuwaiti adults in a typical week by gender (Kuwait Nutrition Surveillance, 2021)

Gender	Fruits			Vegetables		
	n	Median (IQR)	Mean (SD)	n	Median (IQR)	Mean (SD)
Male	639	3.0 (1.0-7.0)	3.4 (2.7)	645	7.0 (3.0-7.0)	4.9 (2.5)
Female	934	3.0 (1.0-7.0)	3.3 (2.7)	959	7.0 (3.0-7.0)	5.0 (2.6)
Total	1,573	3.0 (1.0-7.0)	3.4 (2.7)	1,604	7.0 (3.0-7.0)	4.9 (2.5)

Table 8: Mean number of servings of fruits and/or vegetables on average day by gender (Kuwait Nutrition Surveillance, 2021)

Gender	Fruits			Vegetables		
	n	Median (IQR)	Mean (SD)	n	Median (IQR)	Mean (SD)
Male	653	1.5 (1.0-3.2)	2.1 (2.1)	660	1.0 (1.0- 2.0)	1.8 (1.7)
Female	970	1.5 (1.0-3.0)	2.2 (2.3)	982	1.0 (1.0- 2.0)	1.9 (2.0)
Total	1,623	1.5 (1.0-3.0)	2.2 (2.2)	1,642	1.0 (1.0- 2.0)	1.9 (1.9)

Conclusion and recommendations from the data of Kuwaiti adults

The surveillance results revealed a high prevalence of self-reported elevated cholesterol, blood glucose and high blood pressure levels. In addition to the poor physical health and fitness of Kuwaitis adults;. These findings indicate that comprehensive health promotion programmes and initiatives are required to improve their physical health and fitness. The KNSS advises the following recommendations for implementation:

Dietary/Nutrition Recommendation: Based on the results of the surveillance, it is recommended that individuals adopt healthy eating patterns and limit their consumption of high-fat and high-calorie foods. This can be accomplished by increasing their consumption of fruits, vegetables, whole grains, and lean proteins. Additionally, reducing meal portions and avoiding high-calorie beverages, such as sugary drinks, can aid in maintaining a healthy weight.

Physical Health and Physical Fitness Recommendation: To enhance their physical health and fitness, individuals should engage in regular physical activity, such as brisk walking or structured exercise programmes. Additionally, ceasing smoking can reduce the risk of developing chronic health conditions. In addition, individuals should seek medical attention and adhere to the recommendations of their healthcare provider for the treatment of elevated cholesterol, blood glucose, and excessive blood pressure.

Legislation Recommendation: Implementation of Industry Levy or 'Sugar Tax' on Carbonated Beverages, High-Sugar Foods, and Mandatory Nutritional Labeling. It is recommended that a law must be enforced mandating that all food manufacturers and food service establishments designate their products with comprehensive nutritional labelling information. Additionally, restaurants and caterers should be required to include caloric information on their menus to promote healthier food options and facilitate informed consumer decision-making.

5. References

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6. Appendix

Indicator	*Definition*
Breastfeeding indicators	
Ever breastfed	Percentage of children born in the last 24 months who were ever breastfed
Early Initiation of breastfeeding (EIBF)	Percentage of children born in the last 24 months who were put to the breast within one hour of birth
Mixed milk feeding under six months (MixMF)	Percentage of infants 0–5 months of age who were fed formula and/or animal milk in addition to breast milk during the previous day
Continued breastfeeding among children aged 12-23 months (CBF)	Percentage of children 12–23 months of age who were fed breast milk during the previous day.
Complementary feeding indicators	
Introduction of solid, semi-solid or soft foods 6–8 months (ISSSF)	Percentage of infants 6–8 months of age who consumed solid, semi-solid, or soft foods during the previous day
Minimum dietary diversity 6 – 23 months (MDD)	Percentage of children 6–23 months of age who consumed foods and beverages from at least five out of eight defined food groups during the previous day.
Sweet beverage consumption 6 – 23 months (SwB)	Percentage of children 6–23 months of age who consumed a sweet beverage during the previous day.
Other indicators	
Infant feeding area graphs	The standard recommended area graph classifies IYC into one of six categories: • exclusively breastfed; • breastfed and plain water only; • breastfed and non-milk liquids (no solid or semi-solid foods and no animal milk-based liquids or infant formula); • breastfed and animal milk or formula (no solid or semi-solid foods); • breastfed and solid or semi-solid foods; or • not breastfed. The percentage of children entering each of these categories is calculated by two-month age groups and graphed for infants under six months of age.

WHO. Indicators for assessing infant and young child feeding practices: Definitions and measurement methods. 2021.