وزارة الصحة

برنامج الترصد التغذوي

Kuwait Nutrition Surveillance System

التقرير السنوي 2022

Annual Report

إدارة التغذية والإطعام
Food and Nutrition Administration

التقرير السنوي

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برنـامج الـترصـد الـتغـذوي

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October 2023

إدارة الـتـغذيـة والإطـعـام

Food and Nutrition Administration

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Abbreviations

BMI	Body Mass Index
BW	Birth Weight
CS	Caesarean Section
FNA	Food and Nutrition Administration
gm/dl	grams per deciliter
Hb	Hemoglobin
KNSS	Kuwait Nutrition Surveillance System
LBW	Low Birth Weight
mmol/l	millimoles per liter
MOH	Ministry of Health
WHO	World Health Organization

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Preface

The State of Kuwait initiated the Kuwait Nutrition Surveillance System (KNSS) over 20 years ago to guide and shape healthy policy making and practice. The KNSS is managed by the Food and Nutrition Administration and is under the umbrella of the Ministry of Health. The report helps shed light on the nutritional status and health behaviors of the Kuwaiti population, offering a comprehensive overview of health status intended for long-term monitoring. The KNSS gathers a myriad of data: infant feeding and breastfeeding practices, anthropometric measurements, behavioral, nutritional, and numerous biomedical indicators. These indicators include hypertension, diabetes, high cholesterol, dietary habits, smoking, and physical activity among both Kuwaiti children and adults. The analysis of secular trends and the distribution of annual reports to pertinent Departments and Ministries are undertaken. The final report is made available on the Ministry of Health's website

Summary

The Kuwait Nutritional Surveillance System (KNSS) employs a systematic approach to gather data on the nutritional status of Kuwaiti citizens. Its primary objectives are to contribute to policy development, nutrition research, identification of high-risk groups, monitoring of trends, and the creation of intervention programs.

Data collection is conducted by trained field workers who follow standardized questionnaire that are administered through personal interviews across various age groups. These age groups encompass children aged 0 – 23 months, 24 – 60 months, 5 – 19 years (school-aged children), and adults aged 19 years and older. Key findings for each age group are summarised below.

Children aged 0 – 23 months

Data were collected from 1841 children, of which 49.6% were female and 50.4% were male. According to reports from mothers, 16.7% of children were born with a low birth weight (defined as less than 2,500 grams). The majority (82.9%) were delivered in private hospitals, and 31.6% were born via caesarean section.

Kuwaiti mothers reported that 61.3% initiated breastfeeding within the first hour of birth or upon recovery from a caesarean section. The remaining mothers delayed breastfeeding for unspecified reasons. Among all the children in this age group, 89.9% had been breastfed at some point. The rate of exclusive breastfeeding for children aged 0-6 months was 9.5%. The minimum dietary diversity stood at 54.2%. Mothers or guardians reported that approximately 23.2% of children in this age group were exposed to passive smoke at home.

In this age group, the prevalence of stunting was 9.6%, while wasting was below 5%. Concurrently, the prevalence of being overweight was 5.9%, and obesity was 2.1%. The prevalence of anemia among children aged 6-23 months was 30%.

Children aged 24 – 60 months.

Data were collected from a sample of 1,393 children aged 24-60 months, of which 50.1% were male, and 49.9% were female. The analysis revealed that 29.4% of these children were exposed to passive smoke at home. Furthermore, 50.5% of the children consumed canned, non-fresh sweet juice six or more times per week. In this age group, the rates of obesity and overweight were 2.3% and 4.7%, respectively. Stunting was observed in 1.8% of the children, while wasting was at 3.1%. The overall prevalence of anemia stood at 24.7%.

School-aged children aged 5 - 19 years.

Data were collected from 12,585 participants, of which 49.2% were males, and 50.8% were female. The overall prevalence of overweight in this age group was 19.5%, while obesity stood at 26.6%. The prevalence of anemia was 22.5%, with 17.1% among males and 27.2% among females.

Adults (>19 years)

The present report analyses data from a sample of 2,194 Kuwaiti adults, of which 62.3% were female. The mean Body Mass Index (BMI) was determined to be 28.4 kg/m^2. The findings revealed that 35.3% of the participants were classified as obese, while 36.1% were overweight. This suggests that a substantial 71.4% of the Kuwaiti adult population falls into either the obese or overweight categories. Furthermore, a significant 62.4% of Kuwaiti adults reported not engaging in any physical exercise.

1. Introduction

The KNSS was established with the primary objective of offering up-to-date information on the nutritional status of the Kuwaiti population, from infants to adults, and the factors influencing their nutritional health. By monitoring nutritional status over time, the system aims to produce nationwide data on trends across all age groups. This data is intended to be a cornerstone for policymakers, administrators, and program managers responsible for improving the nutritional health of Kuwaitis. The purposes of KNSS data collection include:

- Identifying prevalent nutritional issues.
- Recognizing high-risk groups.
- Monitoring trends over time.
- Allocating resources for program planning.
- Evaluating the effectiveness of interventions and programs.

Data were systematically gathered from various age groups across all six Kuwaiti governorates. Trained field researchers conducted comprehensive face-to-face interviews using a structured questionnaire. All anthropometric measurements across the age groups, including weight and height, are taken using standardized equipment and procedures.

Children aged up to 23 months are approached during vaccinations at health centers in their corresponding governorate. Given Kuwait's high vaccination rate, this recruitment method is believed to yield a representative sample of Kuwaiti children. Data on breastfeeding, complementary feeding practices, illness history, type of delivery, birth weight, and exposure to smoking are also collected. Children aged 24 to 60 months are sourced from various health centers across the Kuwaiti governorates. Data on meal times, dietary variety, mother's perception of her child's weight, screen time, and passive smoking are collected.

School-aged children and adolescents are recruited from public schools in all Kuwaiti governorates. Height, weight, and hemoglobin levels are recorded. Weight is measured using a digital scale to the nearest 100 gm, while height is measured to the nearest 0.1 cm using a portable scale. Finger prick samples are administered by trained assistant dietitians.

Adults aged 19 and above are approached in diverse settings, including health centers and the Public Authority for Social Security, after obtaining their consent. Data on gender, education, occupation, smoking habits, physical activity, weight management methods, and chronic diseases like hypertension, elevated blood glucose, and hypercholesterolemia are collected, along with information on fruit and vegetable consumption.

Before being incorporated into the Food and Nutrition Administration (FNA) database in Kuwait, data forms undergo a thorough check for completeness and consistency. Data analysis and reporting adhere to WHO guidelines and are executed by trained staff. The Body Mass Index (BMI) is calculated using WHO growth standards and references for children or adult benchmarks, defining underweight, overweight, and obesity.

2. Indicators for Children Aged 0 – 23 Months

The total sample size for children aged 0 – 23 months was 1841, of which 49.6% were female and the remaining 50.4% were male. For the majority (82.2%) of these children, the mother was the primary informant. The key surveillance indicators derived from this sample includes:

2.1. Birth Weight

Surveillance results show that 91.1% of parents could recall their infants' birth weight (BW). The average BW stood at 2877.6 grams. **Figure 1** illustrates the BW distribution between male and female infants. **Table 1** indicates that 16.7% of infants aged 0 to 23 months were categorized as having low birth weight (LBW) or very low birth weight.

Low birth weight (LBW) is a recognized predictor of fetal and perinatal mortality and morbidity, stunted growth and cognitive development, as well as chronic diseases later in life (UNICEF, 2004). Moreover, the widespread availability of antenatal care in Kuwait rules out factors like physical labor and infections during pregnancy as primary causes. Other determinants, such as maternal fetal growth history, diet from infancy through pregnancy (Malhotra *et al*., 2014), and body composition at conception (Farah *et al*., 2011), also contribute to LBW. These findings underscore the need for a comprehensive study to determine the prevalence of LBW and its associated risk factors.

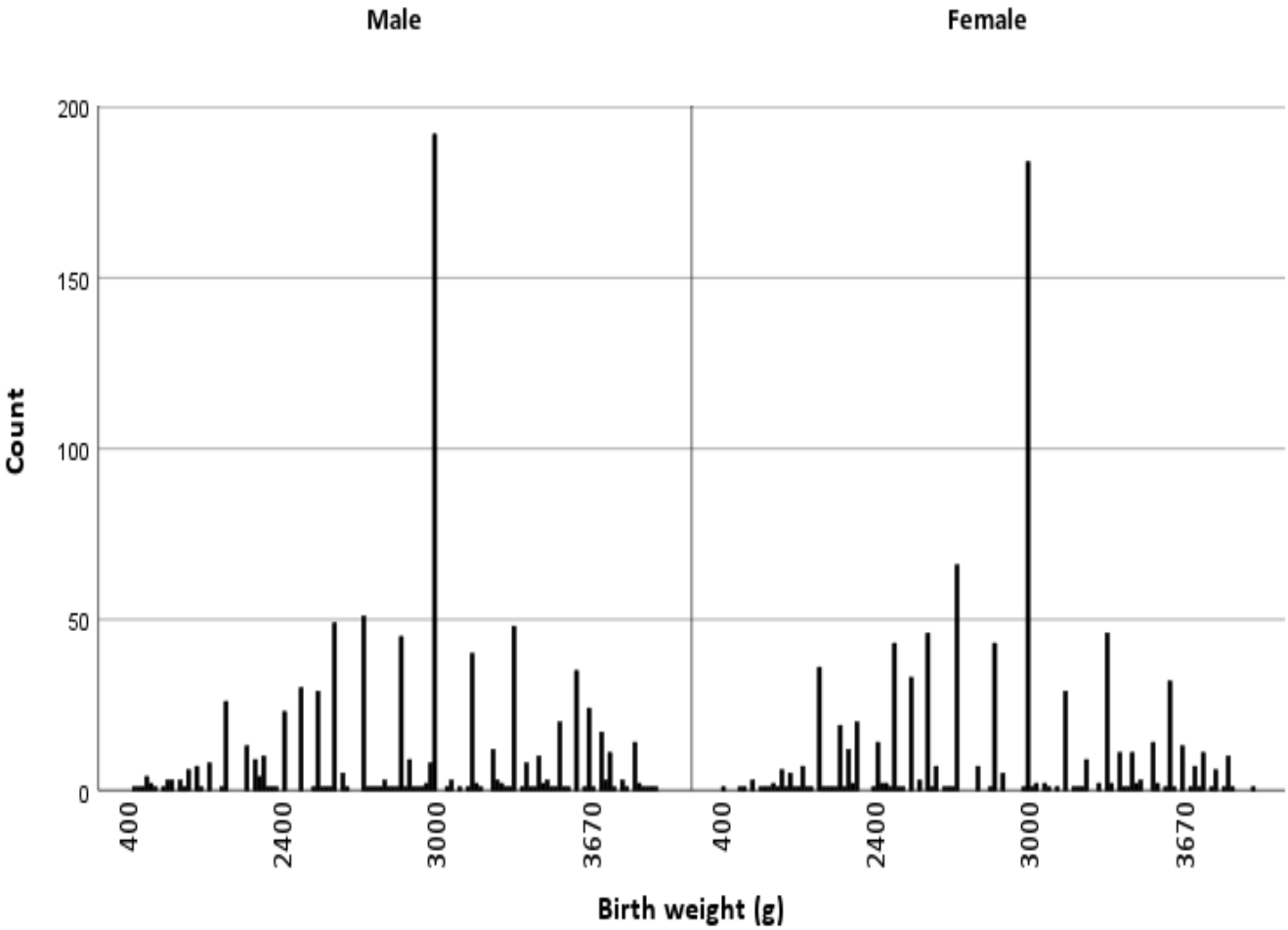

Figure 1: Histogram showing birth weight for males and female children aged 0 - 23 months.

Table 1: Birth weight categories of Kuwaiti children as reported by their parents

Birth weight categories	Sample size (n)	Prevalence (%)
VLBW <1500 g	26	1.6
LBW ≥1500 to <2500 g	255	15.2
NBW ≥2500 to <4000 g	1361	81.3
HBW ≥ 4000 g	32	1.9

Abbreviations: VLBW, very low birth weight; LBW, low birth weight; NWB, normal birth weight; HBW, high birth weight.

2.2. Antenatal Care, Type of Delivery, Place of Delivery, and Prematurity

In terms of antenatal care, 74.5% of mothers opted for private clinics, 24.6% chose government clinics, and 17.3% visited both. However, only 0.4% of Kuwaiti mothers did not receive any form of antenatal care. The surveillance data indicates that 82.9% of infants aged 0 to 23 months were delivered in private hospitals, 15.5% in government hospitals, and 0.5% were born outside of Kuwait. Of all births within Kuwait, 31.6% were delivered via caesarean section (CS). The data further reveals that 73.6% of CS deliveries occurred in private hospitals, while 24.1% took place in government hospitals. Based on maternal reports, 6.3% of all neonates were born prematurely, defined as births occurring before 35 weeks (or 8 months) of gestation.

2.3. Advice to Breastfeed Child in the Hospital

Most mothers reported that they received advice on breastfeeding during their hospital stay post-delivery (91.4%). The data showed no noticeable difference between government and private hospitals in this regard. This trend is depicted in **Figure 2**.

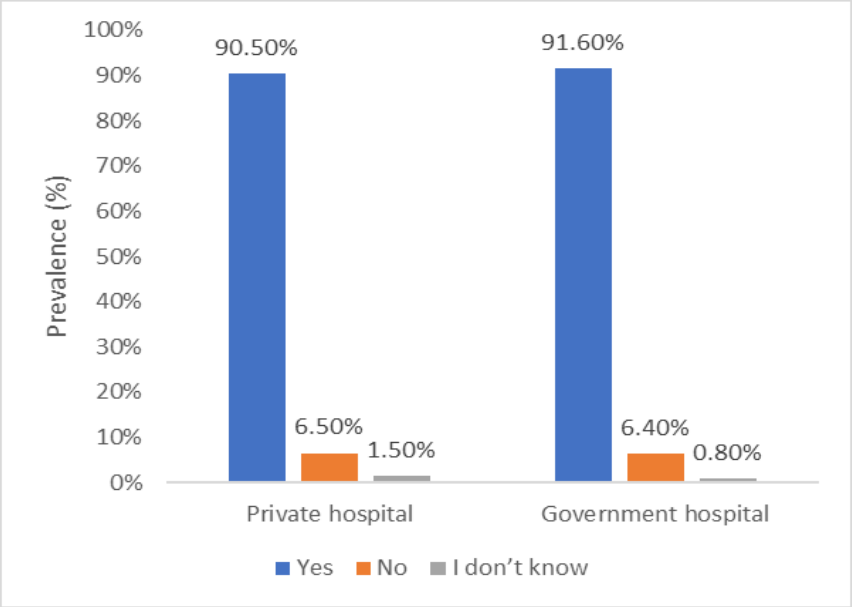

Figure 2: Proportion of mothers who received advice to breastfeed their child in private and governorate hospitals

2.4. Early Initiation of Breastfeeding

Based on the data gathered, 61.30% of Kuwaiti mothers initiated breastfeeding early. A disparity was observed between government and private hospitals: government hospitals reported a higher rate of 62.5%, compared to 60.2% in private hospitals. This trend is illustrated in **Figure 3**. Mothers cited several reasons for delayed initiation of breastfeeding, including postpartum fatigue, insufficient milk supply, and the need to place the infant in an incubator.

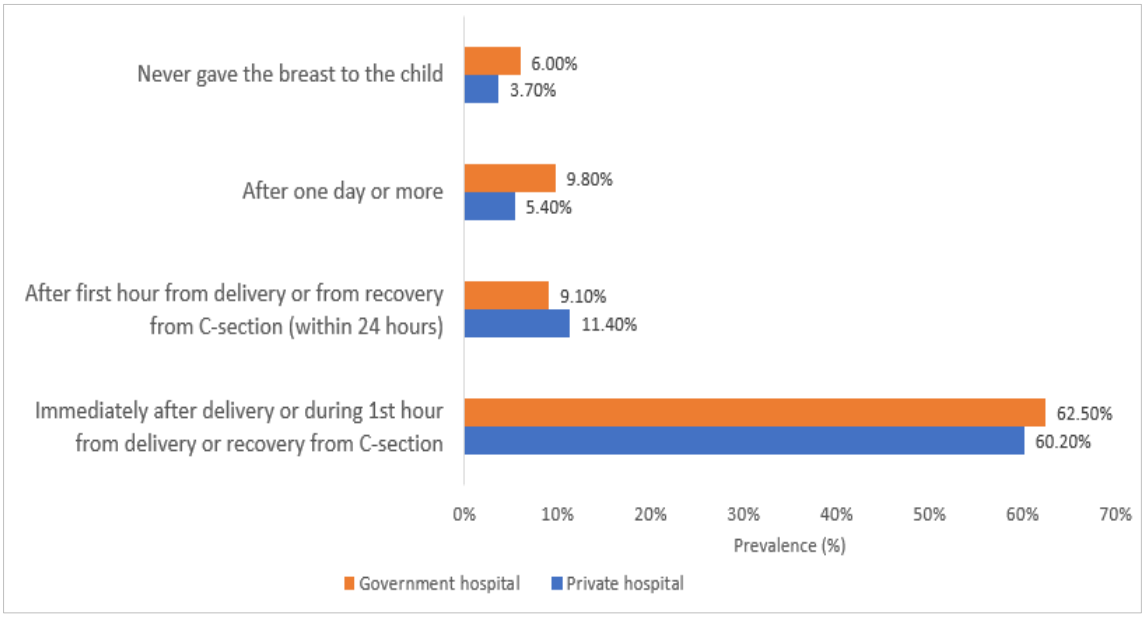

Figure 3: Early initiation of breastfeeding in governmental and private hospitals.

2.5. Children Ever Breastfed

Analysis of the data reveals that 89.9% of children aged 0 – 23 months were reported to have been breastfed at some point. However, variations were noted across different governorates. Specifically, the governorates of Hawalli and Jahra exhibited lower rates of children with a history of breastfeeding compared to other governorates. This distribution is illustrated in **Figure 4**.

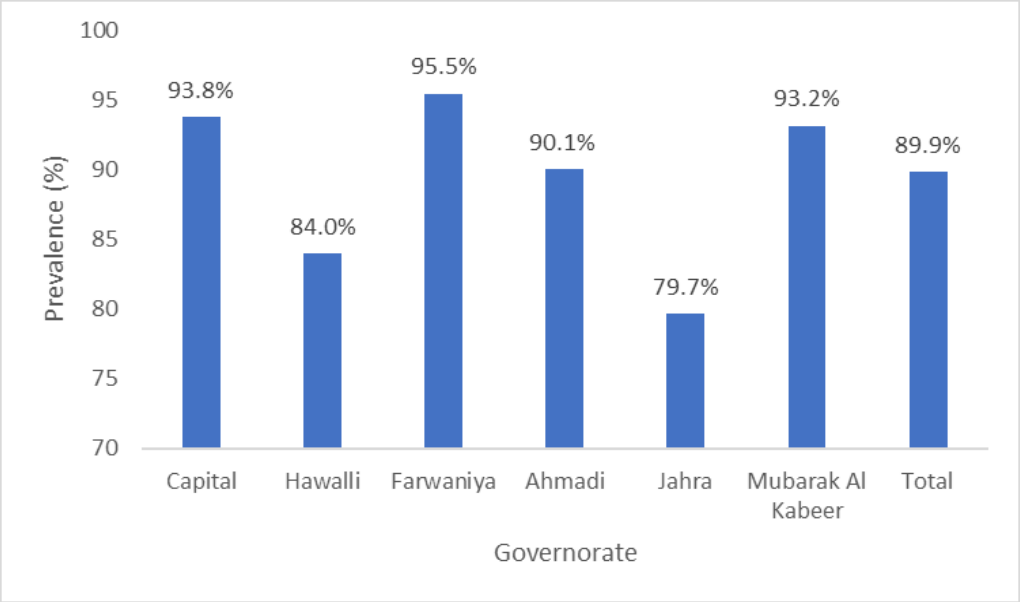

Figure 4: Proportion of children (0-23 months) ever breastfed in each governorate.

2.6. Mixed Milk Feeding and Continued Breastfeeding

Among children under six months, the rate of mixed milk feeding was 9.87%. The proportion of children aged 12-15 months who were still being breastfed was 6.06%. This lower rate of continued breastfeeding at one year can be attributed to the generally low rates of breastfeeding observed even at earlier ages.

2.7. Exclusive Breastfeeding

The prevalence of exclusive breastfeeding for infants under 6 months is presented in **Table 2**. The data reveals that only 9.50% of infants aged less than 6 months were exclusively breastfed.

Table 2: Prevalence of exclusive breastfeeding[1] among children under six months

Characteristic	Sample size (n)	Prevalence (%)[2]
Children < 6 months	631	NA[3]
Gender		
Exclusively breastfed	60	9.5
Male	26	4.1
Female	34	5.4
Governorate		
Capital	23	3.6
Hawalli	16	2.5
Farwania	11	1.7
Ahmadi	2	0.4
Jahra	4	0.6
Mubarak Al Kabeer	4	0.6

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

[2] Prevalence calculated based on total sample of children < 6 months

[3] Not Applicable

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

The World Health Organization (WHO) advocates for the initiation of complementary foods for infants starting at six months of age, alongside continued breastfeeding (WHO, 2021). According to the surveillance findings, 88.2% of children within the 6-8 months age group had consumed solid, semi-solid, or soft foods the day before the survey. Notably, 10.4% of infants aged 0-5 months had already been introduced to complementary foods.

2.9. Minimum Dietary Diversity

According to the surveillance data, 54.2% of children aged 6 – 23 months consumed foods from at least five different food groups. These groups encompassed grains, roots and tubers, legumes and nuts, dairy products, flesh foods, eggs, vitamin A-rich fruits and vegetables, and other fruits and vegetables. This distribution is illustrated in **Figure 5**.

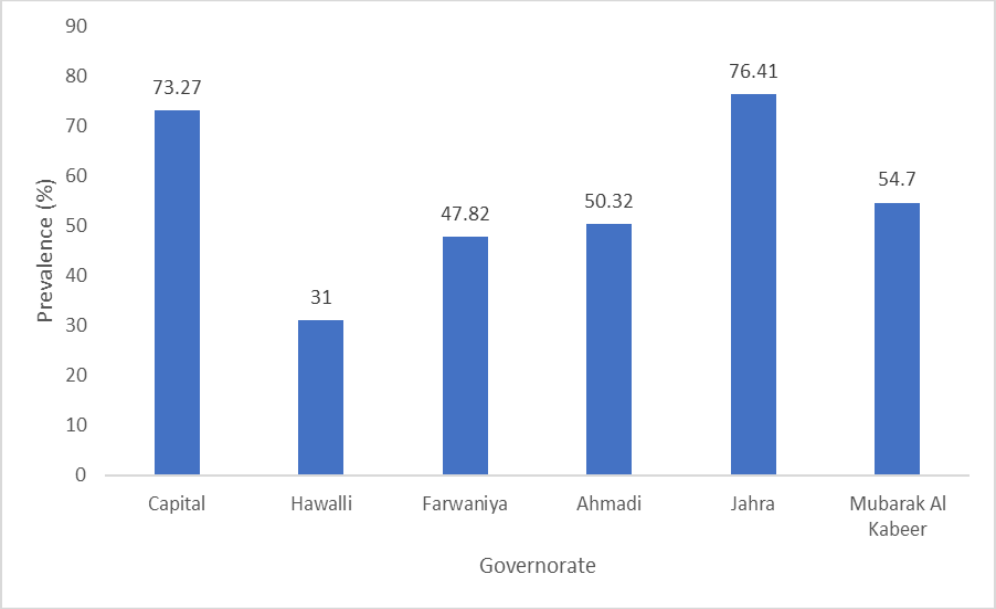

Figure 5: Children (6-23 months) with minimum dietary diversity in each governorate.

2.10. Bottle Feeding in Children Aged 0-23 Months

The surveillance data highlights the feeding practices of infants aged 0 to 23 months. It reveals that 86.0% of infants within this age group were fed using a bottle. As illustrated in **Figure 6**, there is variation in the prevalence of bottle feeding across different governorates. In the Ahmadi governorate, the prevalence of infants being bottle-fed was notably high at 98.5%. In contrast, the Jahra governorate reported the lowest prevalence at 60.6%.

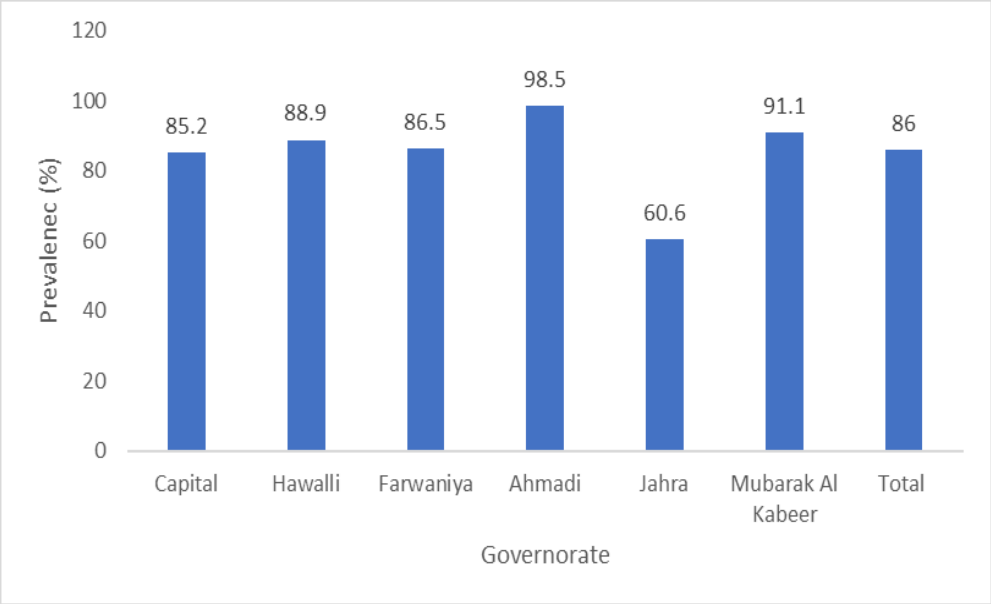

Figure 6: Children (0-23 months) with bottle feeding in each governorate.

2.11. Illness during the Last 3 Months among Children Aged 0 - 23 Months

The surveillance data analyzed the incidence of illnesses requiring medical consultation, either in the government or private sector, among children aged 0 to 23 months 44.9% experienced an illness that necessitated medical attention within the last 3 months. The incidence of illness was 30.1% among infants aged 0 to 5 months and 54.5% among those aged 6 to 23 months. **Figure 7** provides a graphical representation of the distribution of illnesses across different governorates. Of the children who had a recent illness, 36.4% experienced a single episode, while 6.3% reported two episodes. Fever emerged as the most reported ailment among this age group.

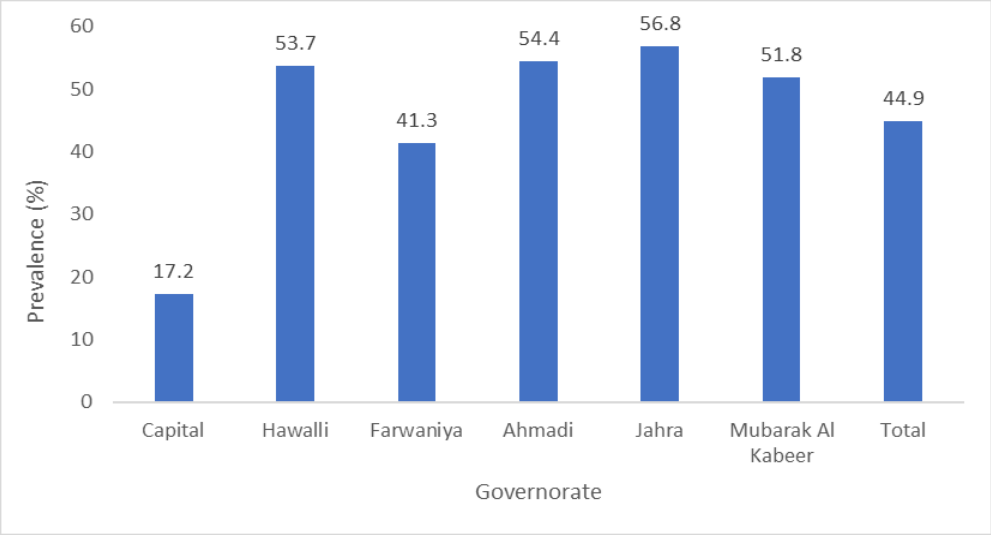

Figure 7: Children (0-23 months) with illness during the last 3 months in each governorate.

2.12. Exposure to Smoking in Household Among Children Aged 0-23 Months

According to the surveillance data, 23.2% of children aged 0 to 23 months were exposed to one or more sources of smoke within their households. **Figure 8** illustrates a significant variation in exposure levels across different governorates. The child's father was predominantly identified as the primary smoker within the household. To counteract the detrimental effects of smoking on both children and their parents, it's crucial to educate parents about the risks associated with passive smoke exposure. Such awareness could potentially reduce the prevalence of smoking in households, benefiting the health of both children and adults.

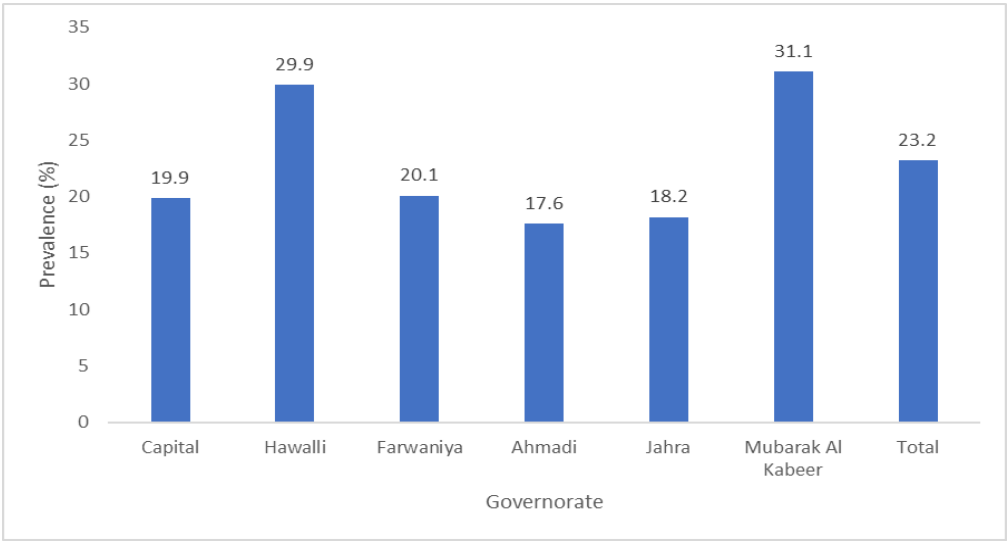

Figure 8: Children (0-23 months) exposed to smoking in each governorate.

3. Indicators for Children Aged 24 – 60 Months

A sample of 1393 children, aged between 24 to 60 months (2 to 5 years), was analysed, with 50.1% being male. Data was collected through interviews with the mothers or guardians of these children, who were approached at health centres.

3.1. Children Aged 24 – 60 Months Ever Breastfed

The data suggests that 87.2% of children in this age group had been breastfed at least once in their lives, as illustrated in **Figure 9**. Among the various governorates, Capital and Farwaniya reported the highest percentages of children who were ever breastfed, with rates of 92.1% and 92.7% respectively. Conversely, Jahra had the lowest prevalence at 71.4%.

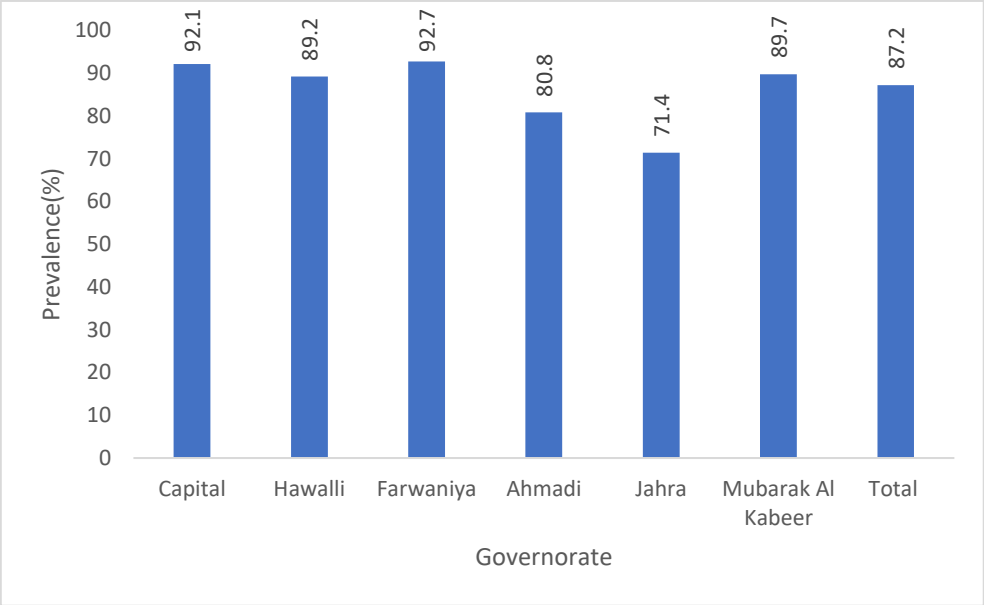

Figure 9: Children (24 to 60 months) ever breastfed in each governorate.

3.2. Bottle Feeding in Children Aged 24 to 60 Months

According to the surveillance data, 24.3% of children aged 24 to 60 months are still being fed using a bottle.

3.3. Illness During the Last 3 Months Among Children Aged 24 to 60 Months

The surveillance indicates that 36.8% of children aged 24 to 60 months sought medical consultation for an illness, either in the government or private sector. **Figure 10** illustrates the variation in this prevalence across different governorates, showing considerable disparities. Within the last three months, Jahra reported the highest incidence of childhood illnesses at 49%, whereas Farwaniya had the lowest incidence rate at 24.7% for children within this age group.

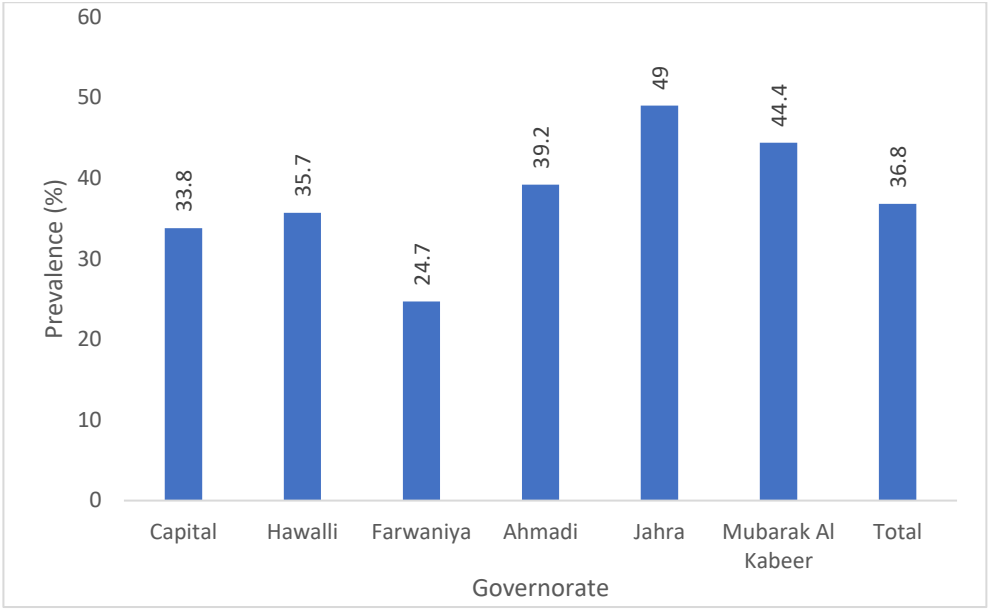

Figure 10: Children (24 to 60 months) who had illness during the last 3 months in each governorate.

3.4. Exposure to Smoking in Household Among Children Aged 24 – 60 Months

According to the surveillance data, 29.4% of children aged 24 to 60 months are exposed to cigarette, shisha, or both types of smoke within their homes. **Figure 11** illustrates the variation in the proportion of children exposed to passive smoke across different governorates.

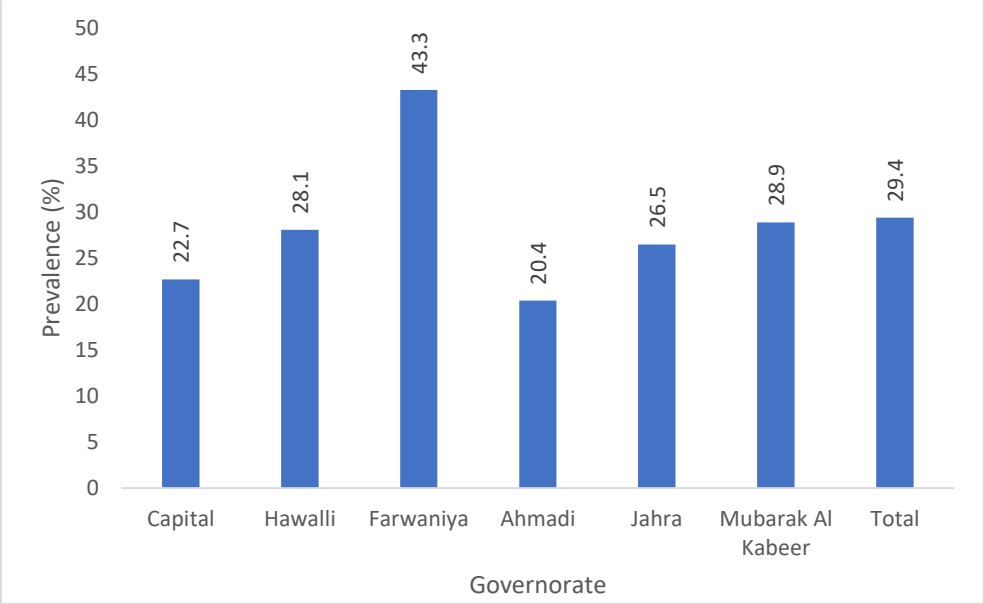

Figure 11: Children (24 to 60 months) exposed to smoking at home in each governorate.

3.5. Screen Time Among Children Aged 24 to 60 Months

According to the WHO Guidelines on Physical Activity, Sedentary Behavior, and Sleep for children under 5 years of age, screen time should not exceed 1-hour (WHO, 2019) **Table 3** provides a breakdown of the daily media usage patterns for children aged 24 to 60 months (2 - 5 years) on weekdays and weekends, covering television and computer game usage. Most children (65.8%) limited the screen time to 2 hours or less for television viewing, the rising engagement with computer games and other electronic devices has led to an overall media exposure that surpasses the recommended daily maximum of two hours.

Table 3: Screen time among children 24 to 60 months.

	Days	Screen Time	Sample size (n)	Prevalence (%)
TV watching	Weekdays	Less than 2 hours	916	(65.8)
		2-3 hours	312	(22.4)
		More than 3 hours	155	(11.1)
	Weekends	Less than 2 hours	924	(66.3)
		2-3 hours	306	(22.0)
		More than 3 hours	154	(11.1)
Computer, games/video games	Weekdays	Less than 2 hours	866	(62.2)
		2-3 hours	303	(21.8)
		More than 3 hours	193	(13.9)
	Weekends	Less than 2 hours	879	(63.1)
		2-3 hours	296	(21.2)
		More than 3 hours	187	(13.4)

3.6. Consumption of Soft Drinks Among Children Aged 24 to 60 Months

According to the surveillance data, 69.1% of children aged 24 to 60 months do not consume carbonated drinks, as illustrated in **Figure 12**. However, 50.5% of children within this age group regularly consume non-fresh, sweetened juices—consuming them six times or more per week, as depicted in **Figure 13**.

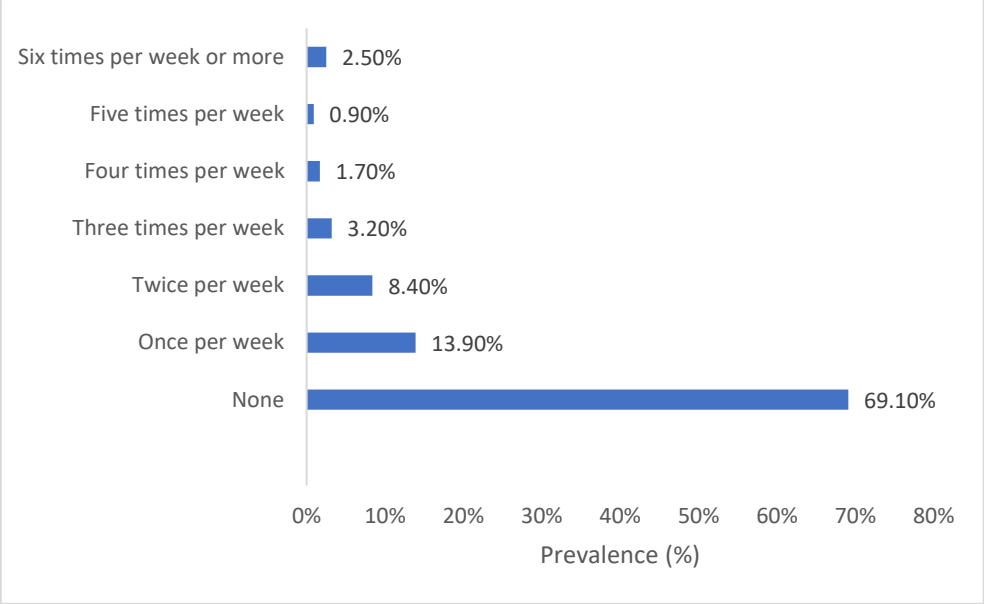

Figure 12: Consumption of carbonated drinks among children (24 to 60 months)

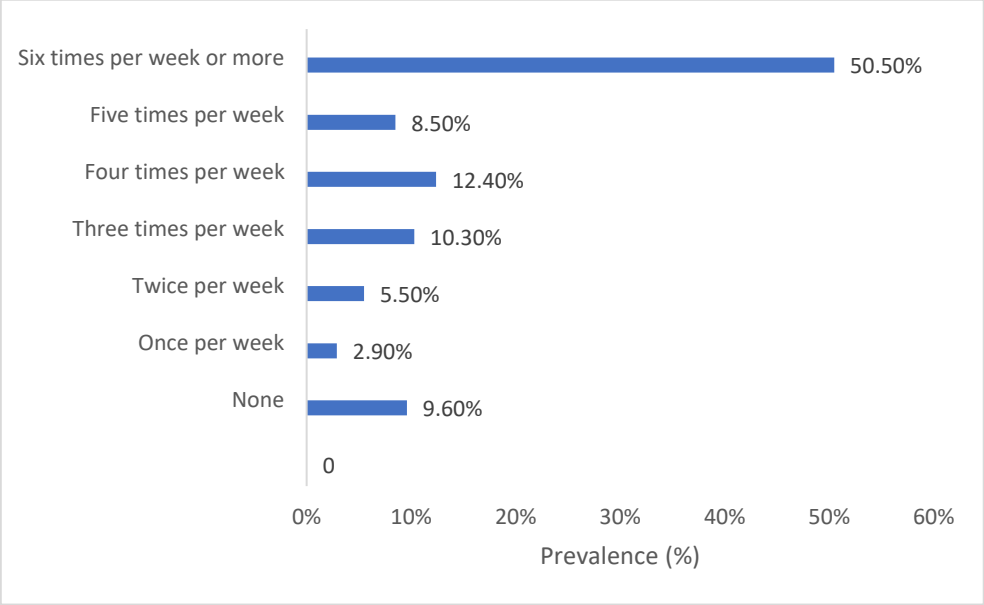

Figure 13: Consumption of canned non-fresh sweet juice among children (24 to 60 months)

3.7. Perceptions of Mothers/Guardian about their Child's Weight (24 – 60 Months) Compared to the Actual Weight

Based on self-reported data from mothers or guardians, the weight status of children aged 24 to 60 months was evaluated. **Table 4** presents the actual weight for age classification. For the 3.6% of children classified as underweight, 63% of their parents or guardians mistakenly perceived them as having a normal weight. While 89.4% of the children were of normal weight, 76% of their parents correctly identified their weight status. Of the 4.7% classified as overweight, 67% of parents or guardians misperceived them as being of normal weight. Interestingly, for the 2.3% of children identified as obese, over half (53%) of their parents or guardians incorrectly believed they were of normal weight.

Table 4: Actual weight for age classification

Actual weight for age classification (24-60months)	
Underweight	3.6%
Normal	89.4%
Overweight	4.7%
Obesity	2.3%

The surveillance report highlights that a significant number of mothers have varying perceptions regarding their child's weight status. **Figure 14** shows children with a weight within the normal range, 76% of mothers perceived their child's weight was normal with their age. In contrast, 16% felt their child was underweight. Interestingly, among children identified as obese, a mere 35% of mothers perceived their child's weight as exceeding the norm, while a significant 53% perceived their child's weight as normal.

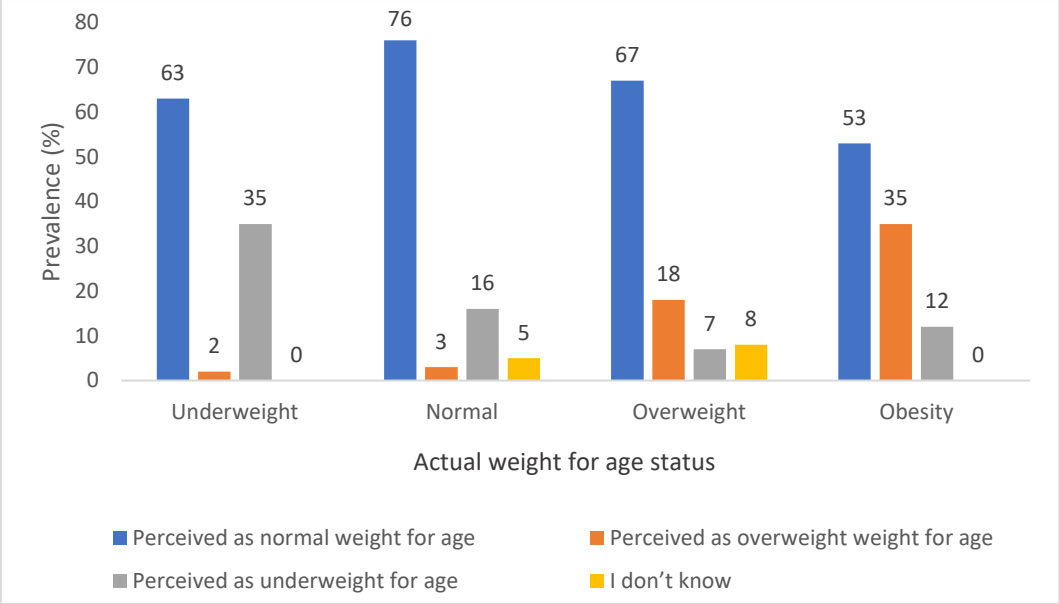

Figure 14: Perceptions of mothers about the weight of their child (24 to 60 months) in comparison to the actual

3.8. Reported Time of The First Meal Among Children 24 – 60 Months

The surveillance data indicates that 45.1% of children aged 24 to 60 months typically begin their first meal between 9 am – 11 am, while 22.6% commence their first meal after 11 am. **Figure 15** illustrates the regional variations in the timing of the first meal across different governorates.

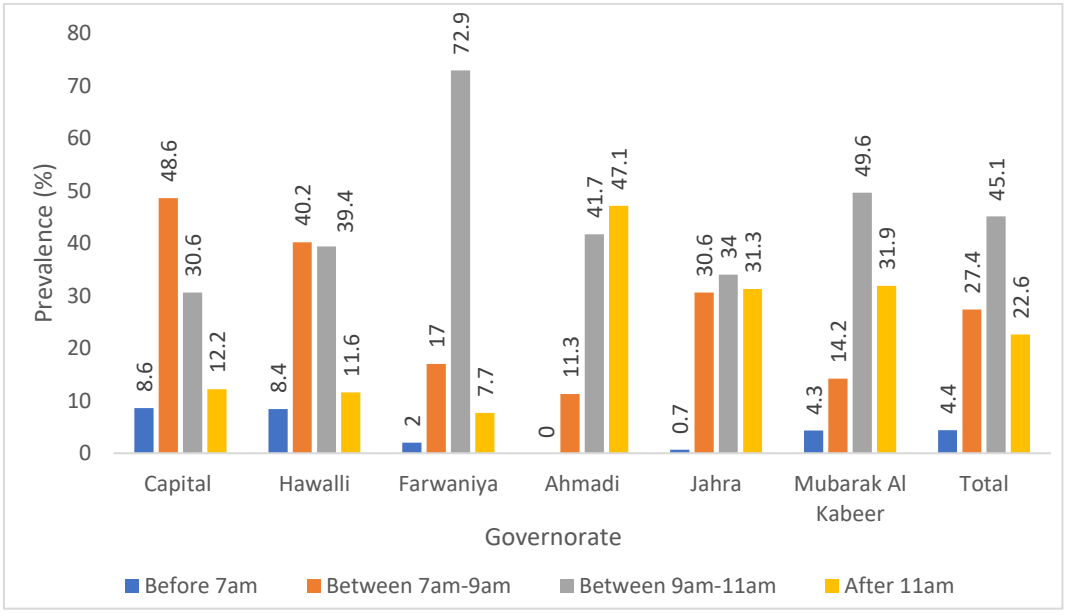

Figure 15: Time of the first meal among children (24 to 60 months) by governorate.

Anthropometric Measurements for Children Aged 0 – 60 Months

Table 5 indicates that 2.3% of children aged 24 to 60 months and 2.1% of children aged 0 to 23 months were classified as obese. Kuwait's wasting rate (weight-to-height ratio) consistently remained well below the expected 5%. Additionally, less than 10% of children in both age groups (0 to 23 months and 24 to 60 months) exhibited stunting (height-for-age).

Table 5: Prevalence of stunting, wasting, overweight and obesity among children (0-60 months).

Age (Months)	Sex	Sample (n)	Stunting* (%)	Wasting$ (%)	Overweight (%)	Obesity (%)
0-23	All	1841	9.6	3.6	5.9	2.1
	Male	928	10.3	4.2	6.6	2.4
	Female	913	8.9	3.1	5.7	1.8
24-60	All	1393	1.8	3.1	4.7	2.3
	Male	699	1.4	3.3	4.4	2.6
	Female	694	2.3	2.9	4.8	2.2

*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. Numbers may vary due to excluding biologically implausible z-score (There were 40 flags for length- or height-for-age, 14 flags for weight-for-age, 34 flags for body mass index-for-age and 31 flags for weight-for-length or height).

Prevalence of Anemia Among Children Aged 6 – 60 Months

Table 6 displays the prevalence of anemia across various governorates. The overall prevalence of anemia was 30% for children aged 6-23 months while children aged 24-60 months, the overall prevalence of the condition was 24.7%. In the 6-23 months age group Mubarak Al Kabeer exhibited the highest prevalence at 57.6% while Capital had the lowest prevalence of 10.5%. In the 24 – 60 months age group, Mubarak Al Kabeer exhibited the highest prevalence at 29.1%, followed by Ahmadi at 38.1%, and Hawalli at 30.8%. Consistent with global trends, anemia remains a significant concern among Kuwaiti children aged 6-23 months. As a point of reference, the WHO Global Health Observatory data suggests that anemia affects 39.8% of children between the ages of 6 months and 5 years (WHO, 2019). A thorough exploration of the scope and root causes of this health challenge is imperative for Kuwait.

Table 6: Prevalence of anemia* among children 6 to 60 months.

Governorate	Anemia (%)	
	6-23 months	24-60 months
Capital	10.5	12.9
Hawalli	32.0	30.8
Farwania	29.5	23.1
Ahmadi	31.9	38.1
Jahra	17.8	10.6
Mubarak Al-Kabeer	57.6	29.1
Total	30.0	24.7

*WHO defines anemia among children <5 years as hemoglobin concentration <110 g/L (<11.0g/dl)

Conclusion and recommendations based on the data of children 0 - 60 months

The surveillance data on children aged 0-5 years in Kuwait provides a comprehensive insight into various health and nutritional aspects of this age group. The data underscores the importance of early nutritional habits, with a significant number of children being introduced to breastfeeding and solid foods at recommended ages. However, concerns arise with the high prevalence of anemia, especially in children aged 6-23 months, and the exposure of a considerable percentage of children to passive smoke in their households. Additionally, while most children are not classified as obese, the increasing engagement with electronic devices and potential media overexposure is a growing concern.

Recommendations

i. Promotion of Exclusive Breastfeeding: While many children are breastfed at some point, efforts should be intensified to promote exclusive breastfeeding for the first six months, as recommended by health authorities worldwide.

ii. Anemia Awareness and Intervention: Given the high prevalence of anemia among children, especially those aged 6-23 months, there's a need for public health campaigns to raise awareness about the importance of iron-rich foods and supplements. Regular health check-ups and blood tests should be encouraged to detect and treat anemia early.

iii. Reduce Passive Smoke Exposure: Public health campaigns should also target smoking within households, emphasizing the risks of passive smoke exposure to children. Offering smoking cessation programs and resources to parents can be beneficial.

iv. Limit Screen Time: Parents should be educated about the potential risks of excessive screen time for young children. Recommendations from health organizations, such as the WHO, can be promoted to guide parents on appropriate screen time limits.

v. Continued Surveillance: Regular health and nutrition surveillance should continue to monitor trends, identify emerging issues, and assess the effectiveness of interventions.

vi. Research on Anemia's Underlying Causes: further research should be conducted to understand its causes in this demographic.

vii. Promote Healthy Dietary Habits: With a significant number of children consuming sweetened juices regularly, there's a need for campaigns promoting healthy dietary habits, emphasizing the importance of fresh juices and water over sweetened beverages.

4. School-Age Children (5 – 19 years)

Data were collected from 12,585 school children, of whom 6,196 (49.2%) were males.

4.1. Overweight and Obesity Among School-Aged Children

The prevalence of overweight and obesity according to age group is presented in **Figure 16** and **Figure 17** for males and females, respectively. Among the male school aged children, the highest prevalence (39.2%) of overweight and obesity was recorded in the 11- years age group. The female school aged children also showed the highest prevalence (29.7%) of overweight and obesity among the 11- years age group. Thus, the prevalence of obesity is higher (39.2%) among male children than female (29.7%) school age children in the 11- years age group.

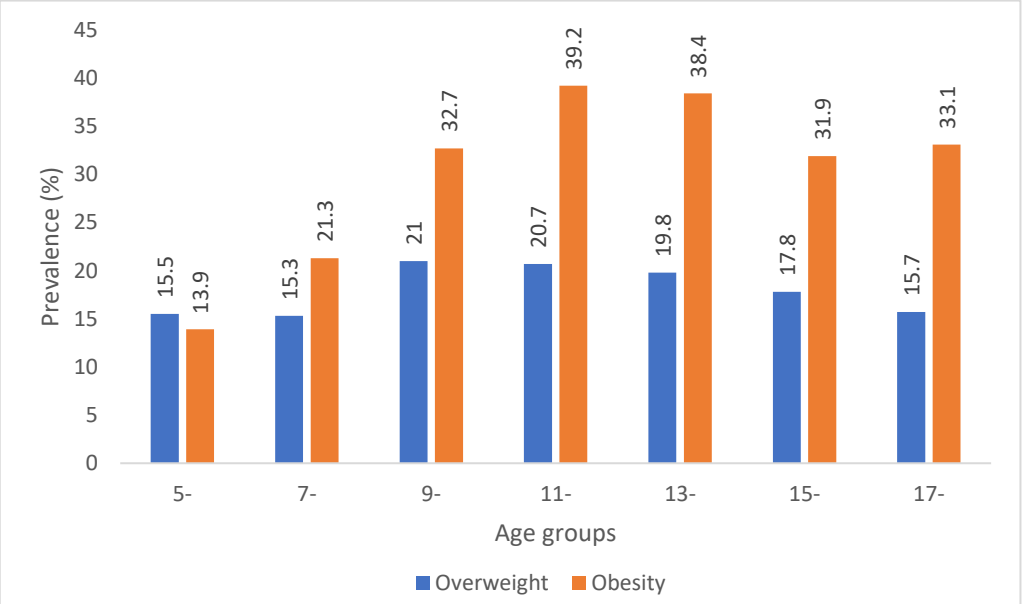

Figure 16: Prevalence of overweight and obesity among male school aged-children.

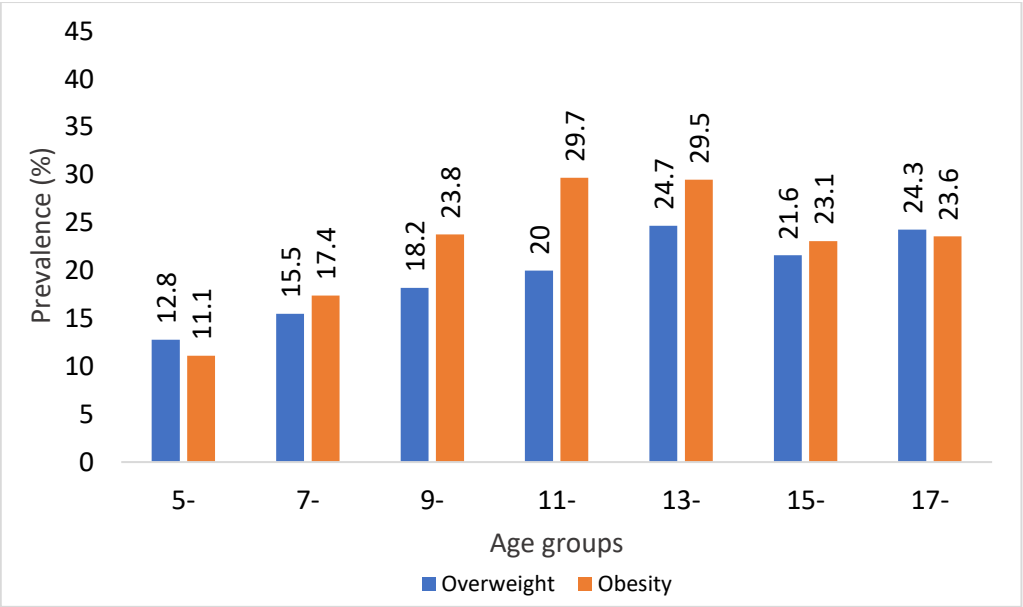

Figure 17: Prevalence of overweight and obesity among female school aged-children

Figure 18 shows the prevalence of overweight and obesity among the different governorates. Ahmadi recorded the lowest prevalence 18.7% of overweight. Capital showed the highest prevalence of both overweight 19.6% and obesity 29.1%. Overall, the prevalence rates for overweight and obesity stood at 19.5% and 26.6%, respectively.

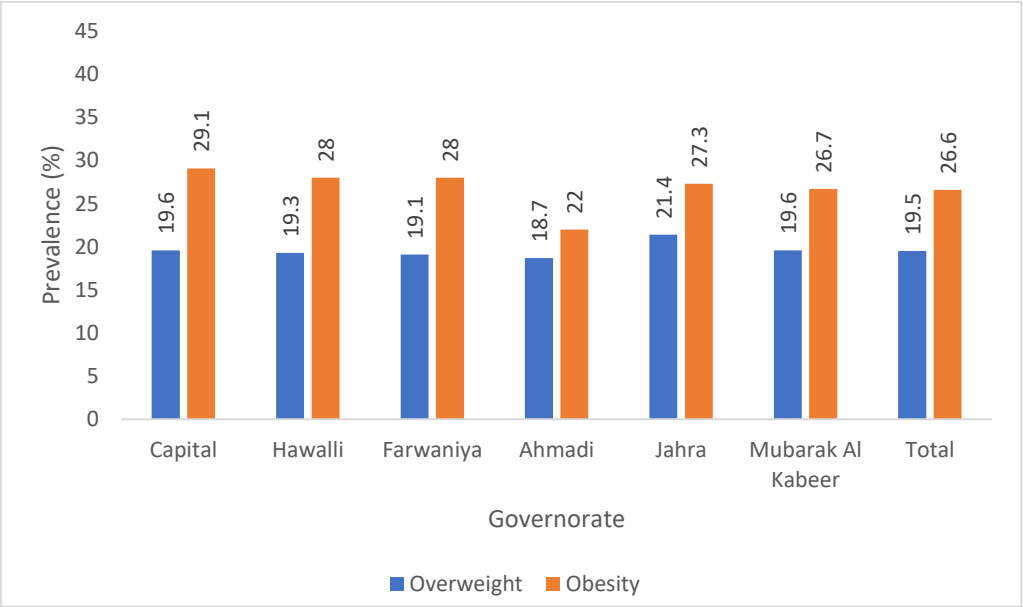

Figure 18: Prevalence of overweight and obesity according to governorate.

4.2. Anemia Among School-Aged Children

Hemoglobin (Hb) levels of 12,463 students were evaluated. The findings revealed an overall anemia prevalence of 22.56%. **Figure 19** delineates the distribution of anemia across the six Kuwaiti governorates, with Ahmadi governorate registering the highest prevalence for both male and female school-aged children. Specifically, 17.13% of male students and 27.27% of female students were diagnosed with anemia. As depicted in **Figure 20**, there was a pronounced prevalence of anemia among children in the 5- year age group, with female students in the 15- year age group exhibiting the most significant prevalence. The prevalence of anemia was determined based on the criteria set forth by the World Health Organization (WHO, 2017).

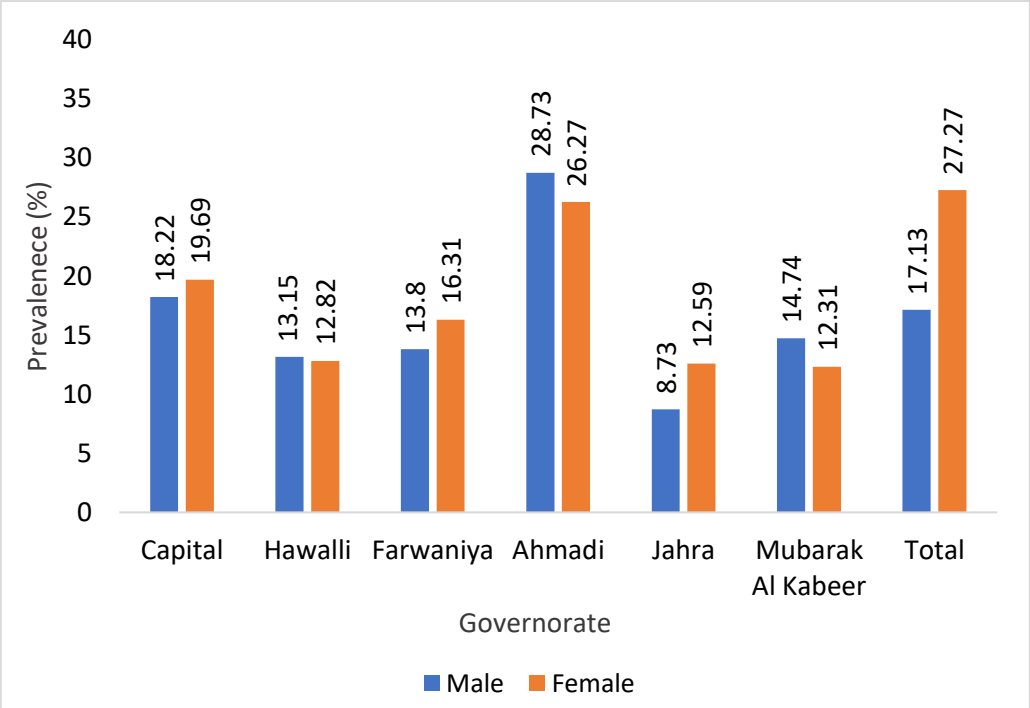

Figure 19: Prevalence of anemia among school children by gender of students in each governorate.

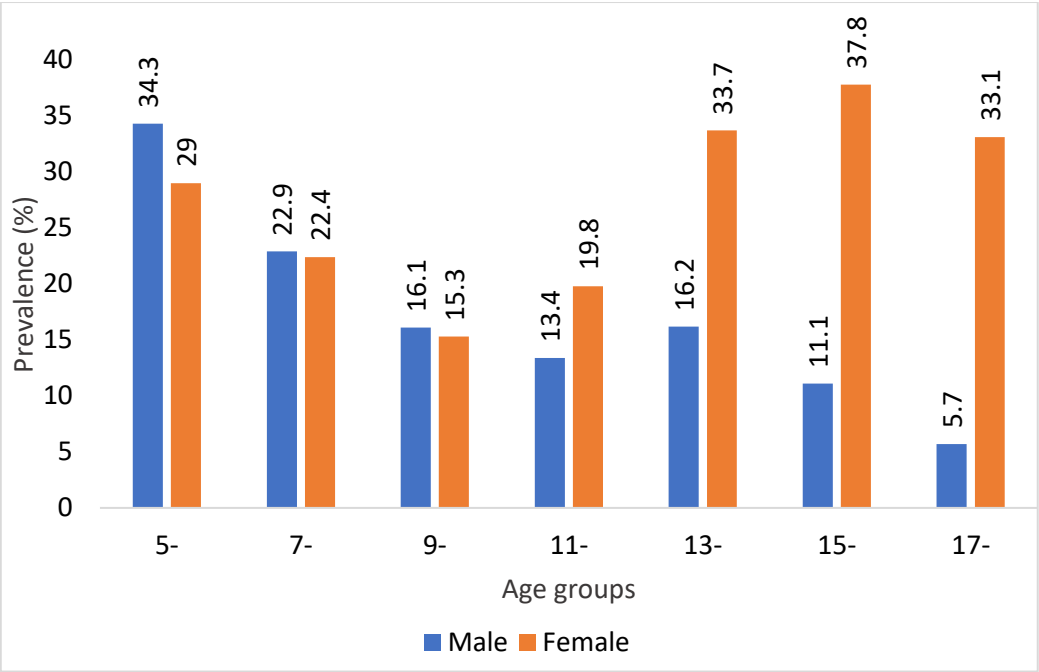

Figure 20: Prevalence of anemia among school children by gender and age of students.

Conclusion and recommendations based on the data of school age children (5 – <19 years):

The data gathered from 12,585 school children aged 5-19 years offers a detailed understanding of the health landscape for this age group in Kuwait. The findings highlight pressing health concerns, particularly the notable prevalence of overweight and obesity, with the Capital governorate registering the highest figures for both. Furthermore, the considerable prevalence of anemia, especially in the Ahmadi governorate and more so among females, underscores the need for targeted health interventions and strategies.

Recommendations:

i. Nutrition and Physical Activity Programs: Schools, especially in the Capital and Ahmadi governorates, should introduce or strengthen nutrition education and physical activity programs. These programs can educate students about the importance of a balanced diet and regular exercise, potentially curbing the rising rates of overweight and obesity.
ii. Regular Health Screenings: Schools should conduct regular health screenings to identify students at risk of obesity, overweight, or anemia early on. Early detection can lead to timely interventions and better health outcomes.
iii. Collaboration with Parents: Schools should collaborate with parents to ensure that healthy habits are reinforced at home. Workshops and informational sessions can be organized to educate parents about the importance of a balanced diet and the risks associated with obesity and anemia.
iv. Gender-Specific Interventions: Given the higher prevalence of anemia among female students, gender-specific interventions, such as iron supplementation programs, should be considered, especially for those in the high-risk 15-year age group.
v. Research on Underlying Causes: Further research should be conducted to understand the underlying causes of these health concerns, especially in the most affected governorates. This can help in tailoring interventions more effectively.
vi. Public Awareness Campaigns: The government, in collaboration with health organizations, should launch public awareness campaigns highlighting the risks associated with obesity, overweight, and anemia, and the importance of early detection and intervention.

5. Kuwaiti Adults (> 19 years)

The surveillance study analyzed data from a sample of 2,194 participants, all of whom were aged 19 or above. The female participants constituted 62.3% of this sample, and the median age was determined to be 37 years. Further details encompassing the age distribution, highest level of education achieved, and current employment status of the participants are elaborated upon in **Table 7**.

Table 7: Demographic characteristics of adult participants.

Demographics	Sample Size (n)	Prevalence (%)
Gender		
Female	1367	62.3
Male	827	37.7
Age (years)		
19 – 29	570	26.0
30 – 39	706	32.2
40 – 49	345	15.7
50 – 59	341	15.5
≥60	232	10.6
Education level		
No formal education	36	1.6
Primary	30	1.4
Intermediate	130	5.9
Secondary	296	13.5
Diploma	647	29.5
University	941	42.9
Masters/Doctorate	74	3.4
Employment Status		
Doesn't work/Able to work	21	1.0
Doesn't work/Unable to work	5	0.2
Government employee	1327	59.9
Non-government employee	148	6.7
Self-employed	2	0.1
Student	98	4.5
Housewife	74	3.4
Retired	263	12.0
Other	6	0.3
Governorate		
Capital	708	32.3
Hawalli	265	12.1
Farwania	308	13.9
Ahmadi	159	7.2
Jahra	332	15.1
Mubarak Al-Kabeer	425	19.4

5.1. Physical Activity Among Kuwaiti Adults

Figure 21 illustrates the percentage of Kuwaiti adults who reported engaging in physical activity, segmented by governorate. Mubarak Al Kabeer governorate exhibited the highest rate of inactivity at 86.5%, while Ahmadi reported the lowest at 39%. The surveillance findings indicate that a substantial 62.4% of the participants abstain from any form of physical activity. For those who are active, walking is the most favored form of exercise, with 67.2% of participants choosing it as their primary activity. **Figure 22** delineates the distribution of physical activity across various age groups. Notably, the age group of 19-29 years displayed the highest percentage of regular physical activity at 14.1%. Conversely, the age group above 60 years registered the highest prevalence of inactivity at 72.5%.

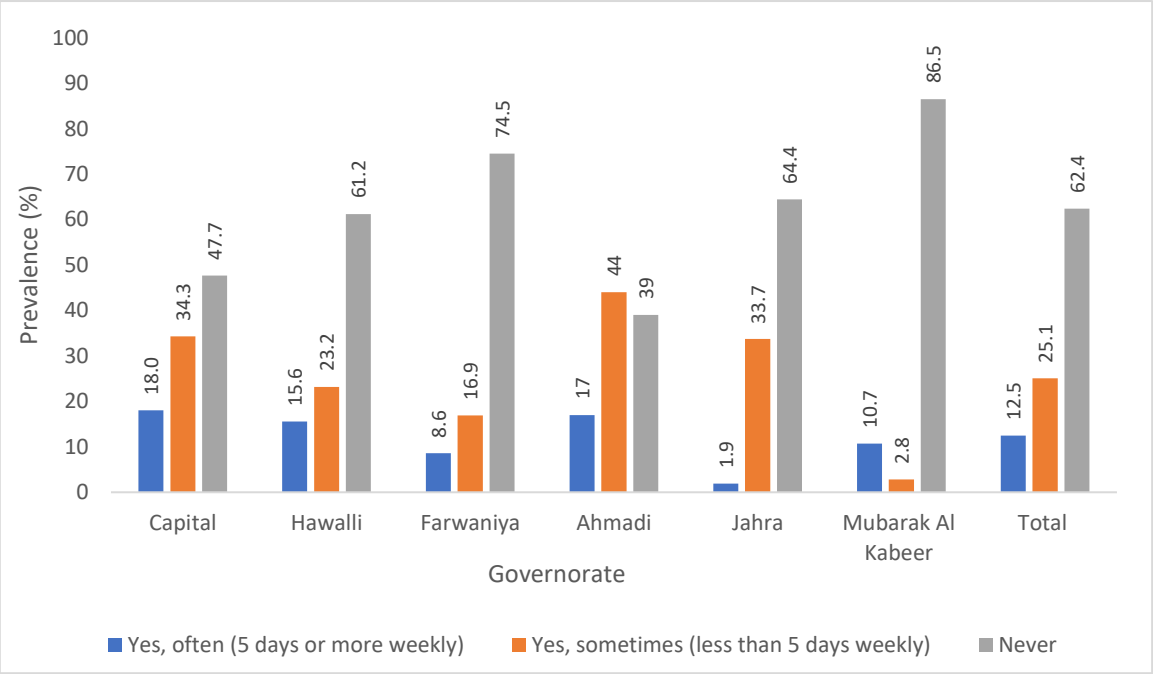

Figure 21: Participation in Physical activity among Adults according to governorate

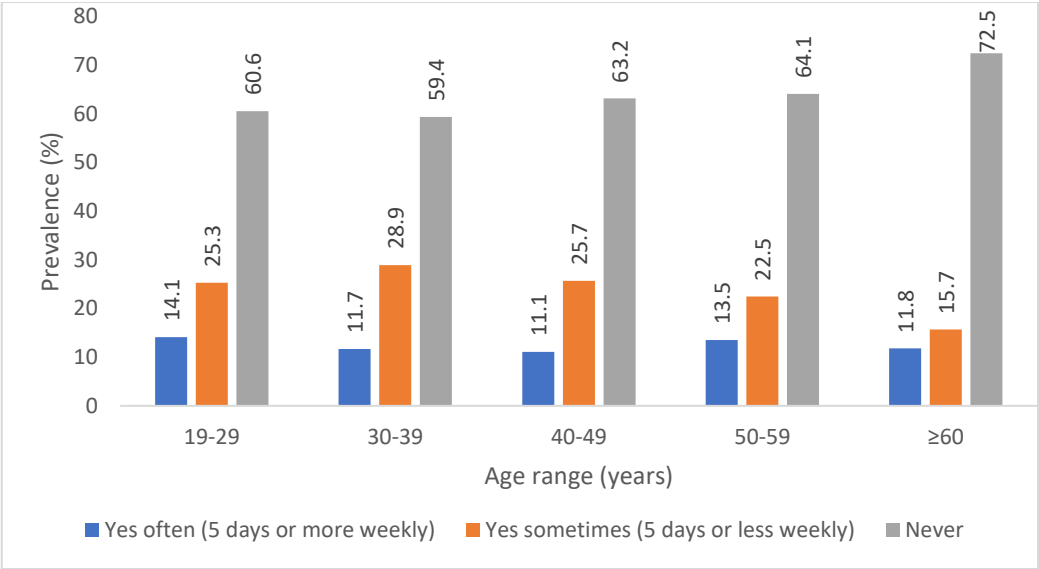

Figure 22: Participation in Physical activity among Kuwaiti adults according to age

5.2. Smoking Cigarettes and Shisha

Of the participants, 12.7% reported exclusively smoking cigarettes, less than 1% reported using both cigarettes and shisha, and 3.6% reported only smoking shisha. There were pronounced gender disparities in smoking habits. Among males, the prevalence of cigarette smoking stood at 33.1%, whereas it was less than 1% among females. Similarly, 8.1% of males reported exclusively smoking shisha, in contrast to less than 1% of females. **Figure 23** illustrates the gender distribution of cigarette, shisha, or combined consumption across different governorates. Notably, among young males, there was a heightened proportion of current smokers, whether they smoked cigarettes, shisha, or both, as depicted in **Figure 24**.

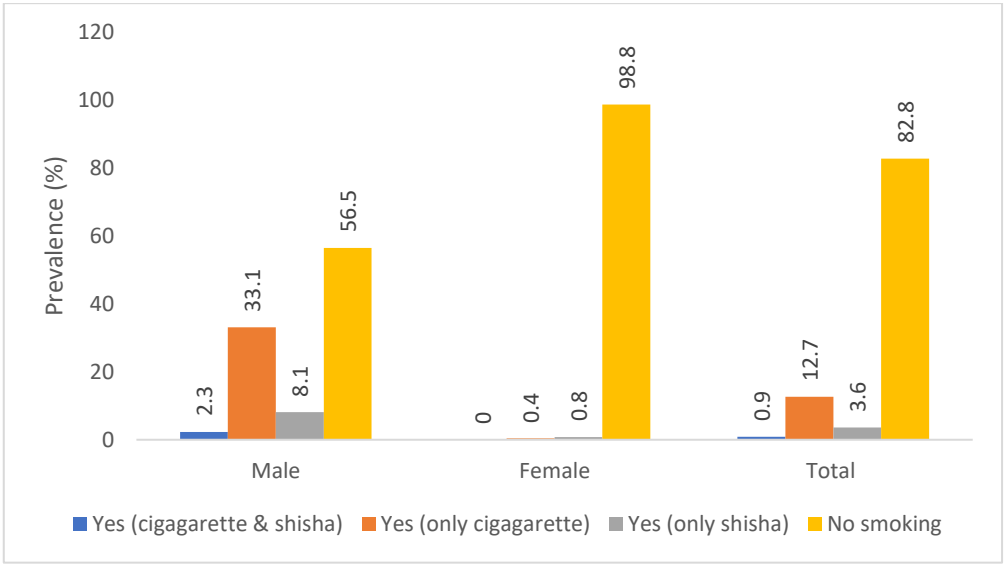

Figure 23: Proportion of Kuwaiti adults who currently smoke cigarettes, Shisha or both by gender.

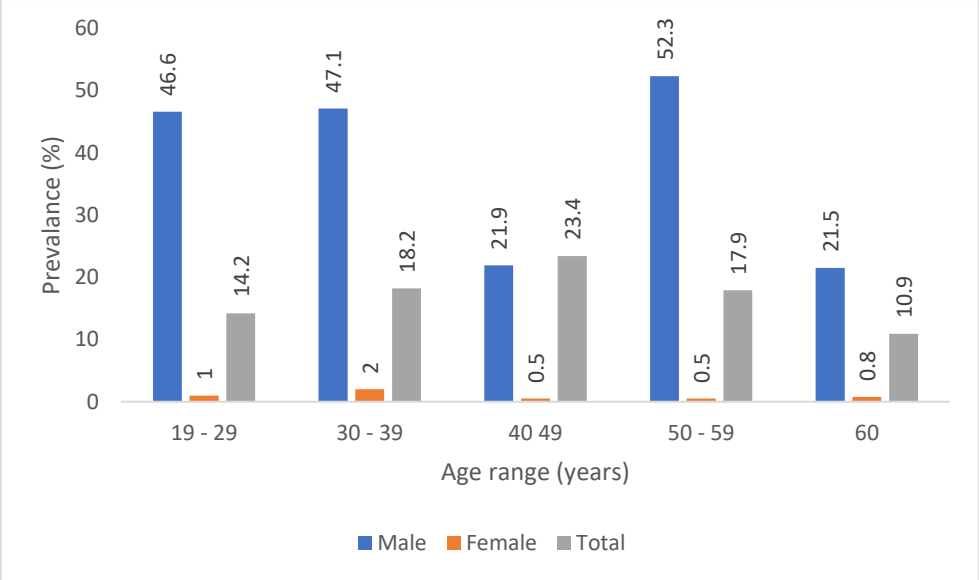

Figure 24: Proportion of Kuwaiti adults who smoke by age group and gender.

5.3. High Level of Cholesterol (Self-Reported)

Figure 25 illustrates the geographical distribution of Kuwaiti adults who self-reported elevated cholesterol levels. A significant 16.6% of the population indicated having high cholesterol. Among these adults, 78.6% confirmed they were on medication to manage their condition. The distribution of Kuwaiti adults who self-reported high cholesterol levels, segmented by age groups, is showcased in **Figure 26**.

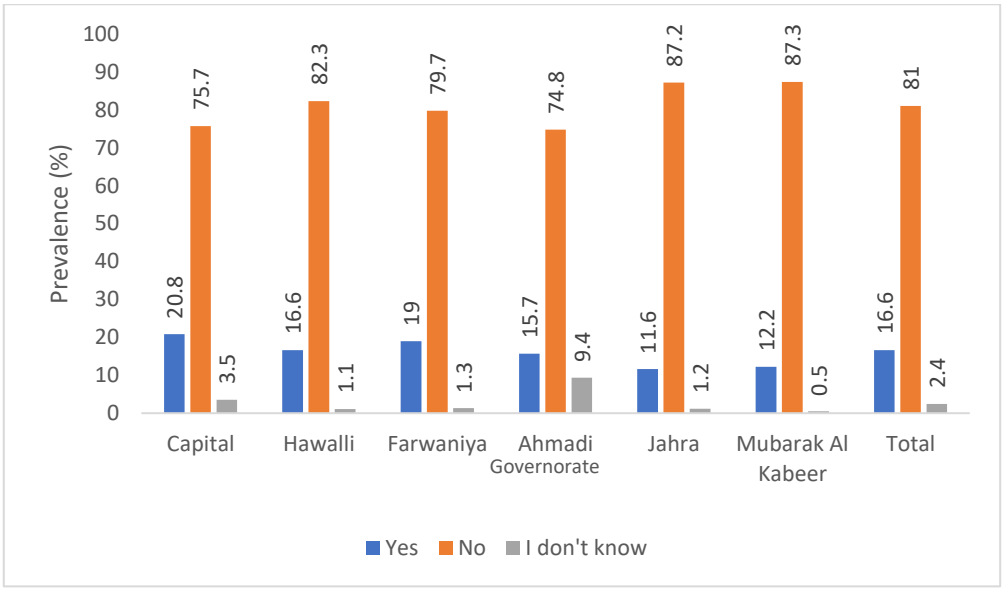

Figure 25: Proportion of Kuwaiti adults who self-reported high cholesterol level by governorate.

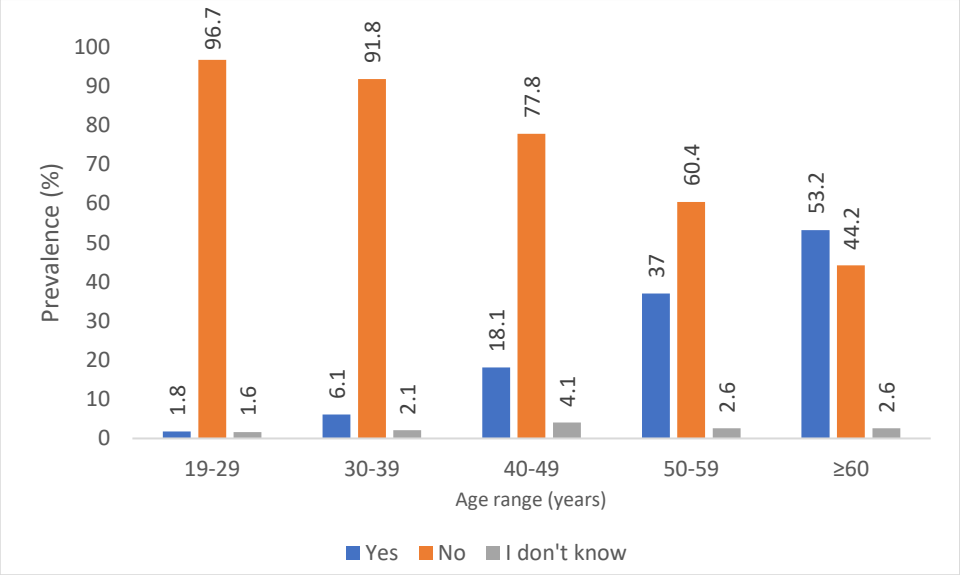

Figure 26: Proportion of Kuwaiti adults who self-reported high cholesterol level by age.

5.4. Blood Glucose (measured)

The surveillance report, as detailed in **Table 8**, highlights the prevalence of high blood glucose levels among the adult population. The findings indicate that 19.9% of the surveyed adults exhibit elevated blood glucose levels (fasting). A deeper gender-based analysis reveals a significant disparity: approximately one-third of the male respondents are affected by high blood glucose, compared to 14.3% of the female participants. The random blood glucose analysis reveals that a significant (99.1%) had normal blood glucose level.

Table 8: Prevalence of High Blood Glucose among Adults

Fasting blood glucose [Δ*]		**Male (%)**	**Female (%)**	**Total (%)**
Normal	<5.6 mmol/L	68.8	82.5	77.5
High Blood Glucose	>5.6 mmol/L	29.6	14.3	19.9
Random blood glucose [Δ ¢]				
Normal	<11.0 mmol/L	98.5	99.4	99.1
Diabetes	>11.0 mmol/L	1.5	0.6	0.9

[Δ] WHO definition. [*] Only those with fasting blood glucose who reported having no diabetes and were not currently taking medication for diabetes. [¢] Only those who have a meal within 12 hours and who reported no diabetes and were not taking medication for diabetes.

5.5. High Blood Pressure (Self-Reported)

Figures 27 presents the surveillance findings on the prevalence of self-reported high blood pressure among Kuwaiti adults according to governorate. The incidence of self-reported blood pressure was highest in Farwaniya at 19.1%, while Hawalli reported the lowest incidence at 10.6%. **Figure 28** presents the proportion of high blood pressure by age, notably ≥60 age group of Kuwaiti adults exhibited the highest (58.4%) self-reported high blood pressure. The overall prevalence of self-reported high blood pressure was 15.3%. Among these individuals, a significant 88% confirmed they were on medication to manage their condition.

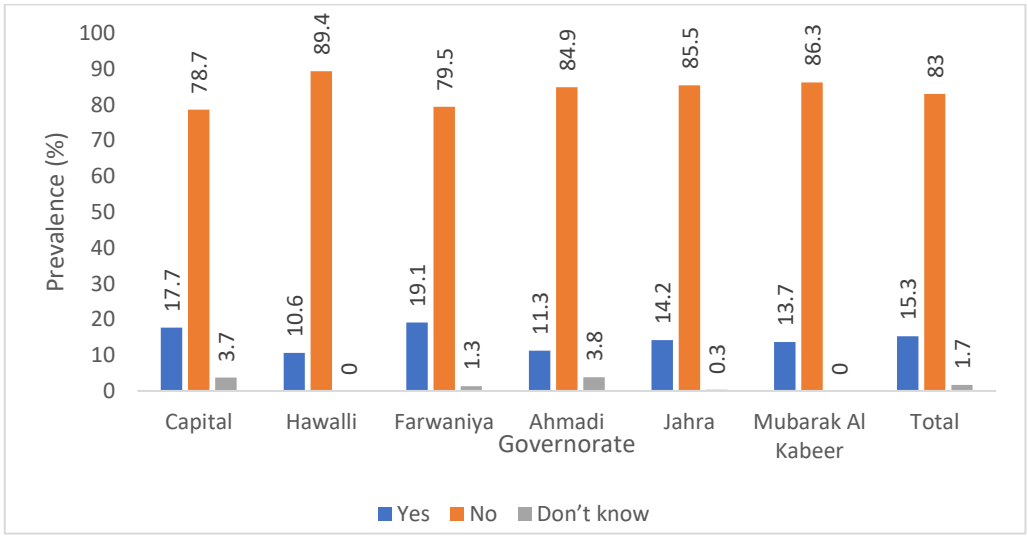

Figure 27: Proportion of Kuwaiti adults who self-reported high blood pressure according to governorate.

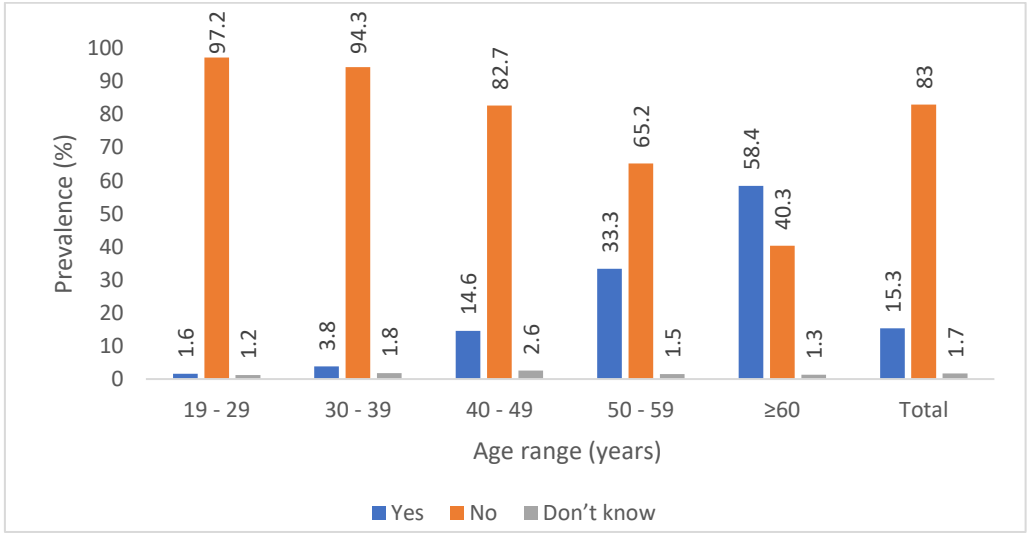

Figure 28: Proportion of Kuwaiti adults who self-reported high blood pressure according to age.

5.6. Obesity and Overweight among Kuwaiti Adults

The average Body Mass Index (BMI) among the participants was 28.4 kg/m^2, with a standard deviation of 5.72. **Figure 29** illustrates the prevalence of obesity and overweight across different governorates. A significant 35.3% of the participants were classified as obese, while an additional 36.1% were categorized as overweight. This means that a combined total of 71.4% of Kuwaiti adults were either obese or overweight. Notably, obesity was more prevalent among females than males: 36.9% of females were classified as obese compared to 32.6% of males. The prevalence of overweight was most pronounced in Farwaniya, registering at 49.5%. In contrast, the Capital, Hawalli, and Mubarak Al Kabeer all reported a relatively lower prevalence, each at approximately 32.5%. When examining obesity rates, Hawalli had the highest prevalence at 38.5%, while Farwaniya exhibited the lowest at 25.2%. **Figure 30** presents the prevalence of obesity and overweight by age. Individuals above 50 years had the highest incidence of obesity.

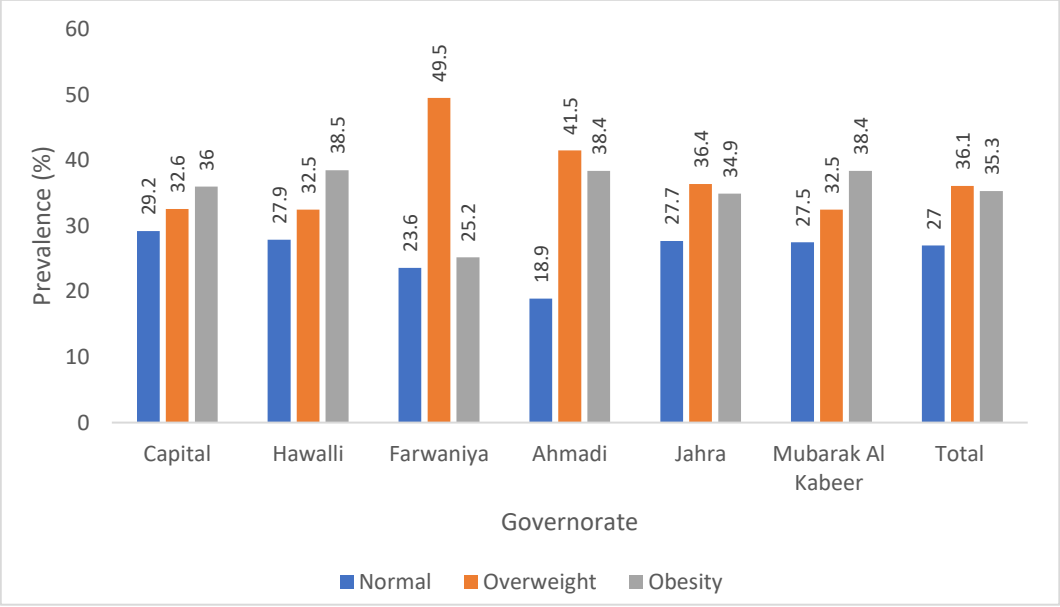

Figure 29: Prevalence of obesity and overweight among Kuwaiti adults by governorate.

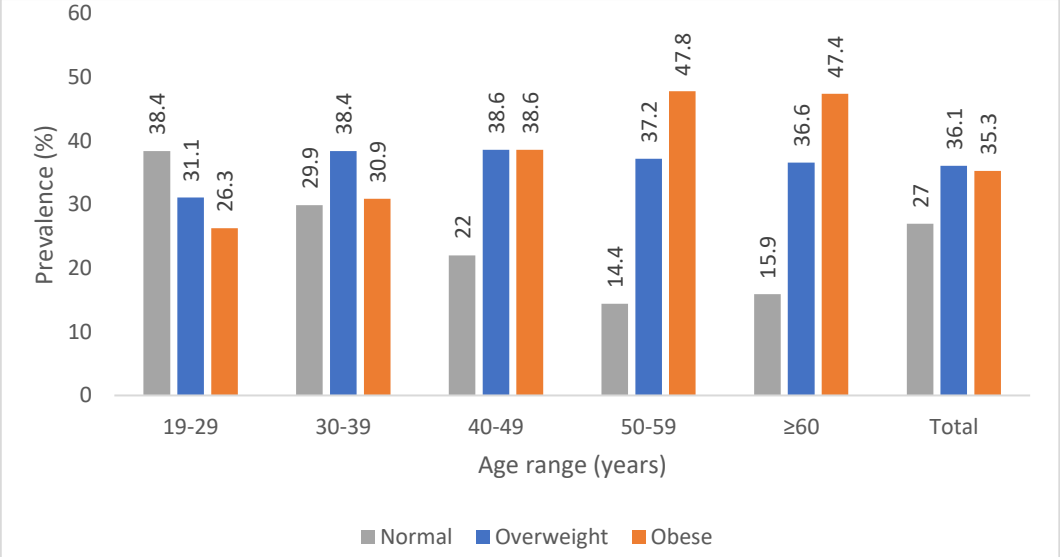

Figure 30: Prevalence of Obesity and Overweight Among Kuwaiti Adults by Age

Participants were asked about their approaches to weight management and reduction. Of those surveyed, 23.4% reported using multiple weight management strategies. Upon analyzing the responses, it was found that 72.4% of participants adopted dietary approaches, 55.3% incorporated physical exercise, 10.9% resorted to herbal remedies, 5.1% relied on pharmaceutical interventions, and 13.0% opted for surgical procedures.

Figure 31 contrasts participants' self-perception of their weight status with their actual weight classification, categorized as normal weight, overweight, or obese. From the data, it's evident that 75.1% of participants who were classified as obese recognized their weight as being above normal.

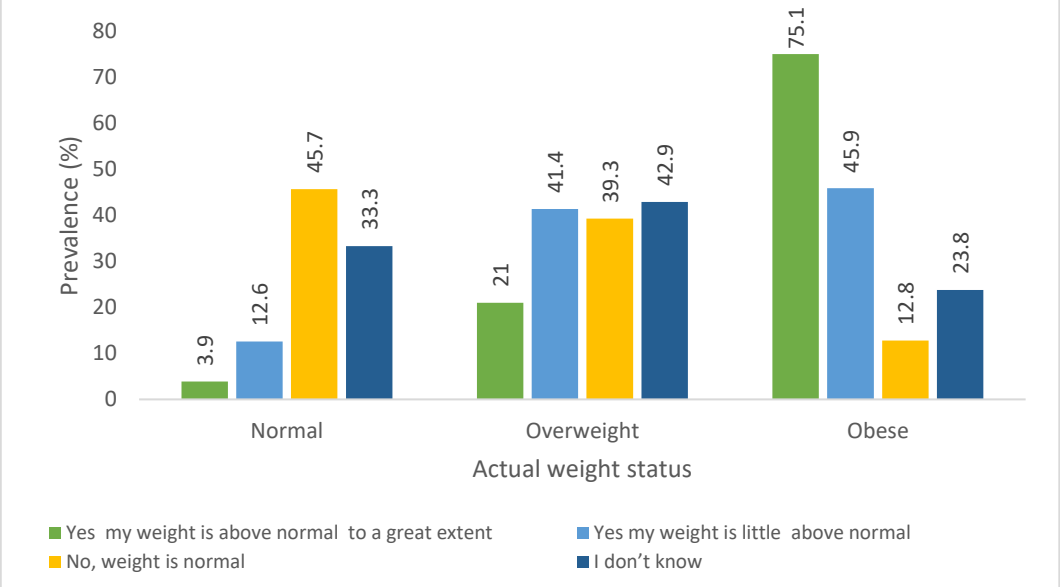

Figure 31: Self-perception of body weight among Kuwaiti adults by actual body mass index status.

5.7. Prevalence of Anemia

The total prevalence of anemia among male and female was 15.5% and 41.0% respectively. **Figure 32** shows the prevalence among the different governorates. The prevalence of anemia is high among the female population across all the governorates. Ahmadi governorate exhibited the most significant prevalence of anemia among female adults at 53.3%. In contrast, the Farwaniya governorate had the highest prevalence for male adults, standing at 31.7%. Upon analyzing anemia by age (**Figure 33**), female adults within the 40-49 years age group showed the most pronounced prevalence of anemia at 45.9%. For male adults, the age group of 50-59 years recorded the highest prevalence at 38.3%. The prevalence of anemia is assessed based on the guidelines provided by the World Health Organization (WHO, 2017).

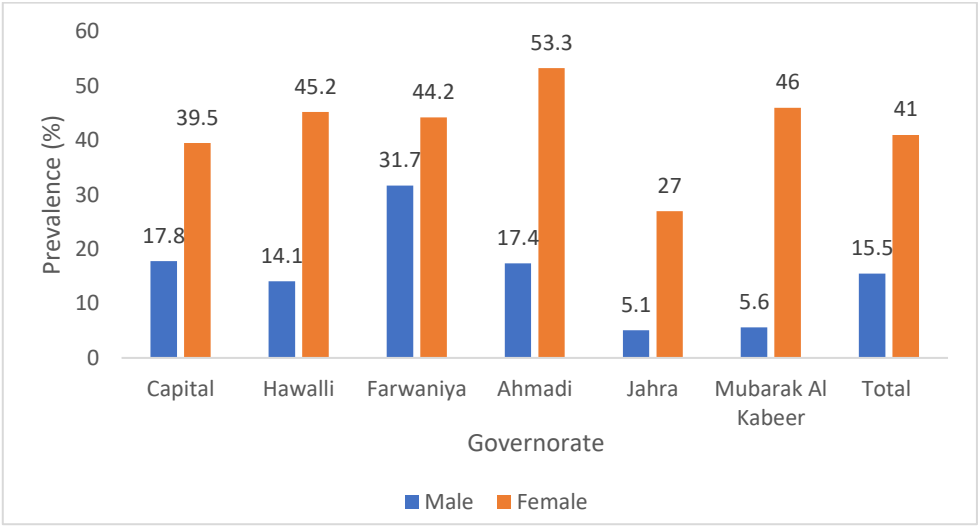

Figure 32: Prevalence of Anemia among Kuwaiti adults according to governorate.

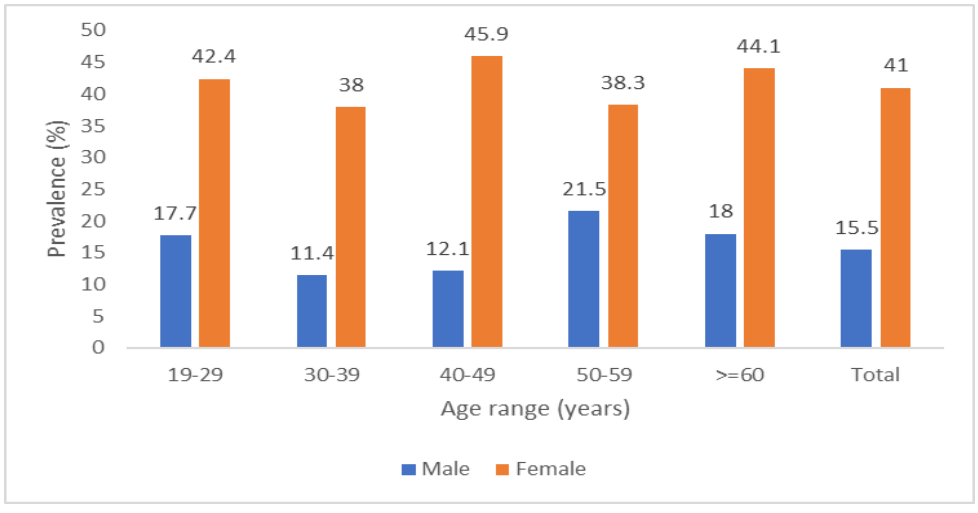

Figure 33: Prevalence of Anemia Among Kuwaiti Adults Segmented by Age

5.8. Fruit and Vegetable Intake

The surveillance employed the STEPwise approach, a methodology developed by the World Health Organization, to analyze risk factors. This approach aims to enhance global data quality and understanding (Bonita *et al*, 2001). Within this method, four indicators are utilized to evaluate fruit and vegetable consumption. To ensure the precision of the KNSS survey data, we crafted specific photo cards for the KNSS to help participants estimate portion sizes for fruits and vegetables.

Out of the 2,194 participants, 27.16% either were unsure or did not answer questions related to the frequency of their fruit consumption. Consequently, data from 1,598 participants was available for analysis, with 28.70% of them reporting daily fruit consumption. In a similar vein, 16.13% either did not know or chose not to answer questions about their vegetable consumption frequency. This left data from 1,840 participants, with 47.60% of them indicating daily vegetable consumption. **Table 9** details the average number of days per week participants consumed fruits or vegetables, while **Table 10** presents the average number of servings per day for both fruits and vegetables. Notably, the median frequency of fruit and vegetable consumption was consistent between male and female participants.

Table 9: Mean number of days in which fruits and vegetables are consumed by Kuwaiti adults in a typical week according to gender.

Gender	Fruits			Vegetables		
	Median (IQR)	Mean (SD)	Sample Size (n)	Median (IQR)	Mean (SD)	Sample Size (n)
Male	5.00	4.68	602	7.00	5.72	705
Female	4.00	4.40	996	7.00	5.34	1135
Total	4.00	4.50	1598	7.00	5.49	1840

Table 10: Mean number of servings of fruits and/or vegetables on average day according to gender.

Gender	Fruits			Vegetables		
	Median (IQR)	Mean (SD)	Sample Size (n)	Median (IQR)	Mean (SD)	Sample Size (n)
Male	1.50	1.77	578	2.00	2.62	687
Female	1.00	1.75	974	2.00	2.67	1114
Total	1.50	1.76	1552	2.00	2.65	1801

Conclusion and recommendations based on the data of Adults (> 19 years):

The surveillance report on Kuwaiti adults provides a comprehensive insight into the health and lifestyle patterns of the population. A significant proportion of the adult population is either overweight or obese, with females being slightly more affected than males. The prevalence of self-reported high cholesterol and high blood pressure further underscores the potential cardiovascular risks facing this population. Additionally, the high prevalence of anemia, especially among females, is a pressing concern. The data also highlights a sedentary lifestyle pattern, with a majority not engaging in regular physical activity. Smoking, particularly among males, remains a significant health risk. The dietary habits, as indicated by the consumption of fruits and vegetables, suggest room for improvement in daily nutritional intake.

Recommendations:

i. Public Health Campaigns: Launch public health campaigns focusing on the importance of a balanced diet, regular exercise, and the risks associated with obesity and smoking.

ii. Regular Health Screenings: Encourage regular health screenings for early detection and management of conditions like high cholesterol, high blood pressure, and anemia.

iii. Nutritional Education: Collaborate with community centers and educational institutions to provide nutritional education, emphasizing the importance of consuming adequate fruits and vegetables daily.

iv. Promote Physical Activity: Develop community-based programs that promote physical activity, such as community walks, fitness classes, and sports events.

v. Smoking Cessation Programs: Introduce and promote smoking cessation programs, especially targeting young males, given the high prevalence of smoking in this demographic.

vi. Research on Anemia: Given the high prevalence of anemia, especially among females, further research should be conducted to understand its root causes and develop targeted interventions.

vii. Dietary Interventions: Considering the low daily intake of fruits and vegetables, interventions to promote their consumption should be prioritized. This can include community-based workshops, school programs, and media campaigns.

viii. Awareness on Weight Management: Given the discrepancy between self-perception and actual weight status, awareness campaigns should be designed to educate the public on healthy weight ranges and the risks associated with obesity.

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