التقرير السنوي

Annual Report

2024

برنـامج الـترصـد الـتغـذوي

Kuwait Nutrition Surveillance System

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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 falls under the umbrella of the Ministry of Health. The report helps shed light on the nutritional status and health behaviors of the population in Kuwait, offering a comprehensive overview of health status intended for long-term monitoring. The KNSS gathers a myriad of data, covering: 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 and non-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 and non-Kuwaiti residents. 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 questionnaires that are administered through personal interviews across various age groups. The questionnaires cover various topics including, anthropometric measurements, breastfeeding practices, dietary intake, health assessments, and physical activity. They are also age-based, and focus on children aged 0 – 23 months, 24 – 60 months, 5 – 19 years (school-aged children), and adults aged 19 years and above. Key findings for each age group are summarized below. The data gathered through the KNSS is vital for informing evidence-based health policies and interventions within Kuwait.

Children aged 0 - 23 months.

Surveillance data unveils significant health concerns for Kuwaiti and non-Kuwaiti infants and toddlers. Data was collected from 1543 children (48.61% female, 51.39% male).

Key findings include:

- **Suboptimal Infant Feeding:** Only 31.07% of infants are exclusively breastfed, as recommended. Additionally, 16.14% are exposed to harmful passive smoke within their home environment.
- **High Anemia:** A concerning 25.34% of children aged 6 - 23 months suffer from anemia.
- **Other Health Indicators:** 12.05% of infants are born with a low birth weight, while a modest, yet increasing percentage are either overweight or obese, at 5.58% and 1.51%, respectively.

Children aged 24 - 60 Months.

Surveillance data exposes several health risks for this age group. Data was collected from 1809 Kuwaiti and non-Kuwaiti children (51.13% male, 48.87% female).

- **Unhealthy Beverage Consumption:** An alarming 50.23% of children consume sugary, non-fresh juice six or more times per week.
- **Passive Smoke Exposure:** Nearly one-quarter (24.43%) of children are exposed to harmful passive smoke at home.
- **Persistent Anemia:** Anemia remains a concern, affecting 12.94% of children in this age group.
- **Emerging Overweight:** While undernutrition rates are low, 2.40% of children are obese and 5.37% are overweight, signalling a need for early intervention programs on healthy dietary habits and physical activity.

School-aged Children (5 - 19 years)

Surveillance data exposes an urgent public health crisis. Data was collected from 17,879 Kuwaiti and non-Kuwaiti participants (51.79% male, 48.21% female).

- **Childhood Obesity Epidemic:** Nearly half (46.90%) of schoolchildren were overweight or obese.
- **Anemia Persists:** Anemia remains a concern, affecting 12.38% of children. There is a higher prevalence among females (15.32%) compared to males (8.92%).

Adults (>19 years)

Surveillance data on adults suggest that most were either overweight or obese. Data was collected from 1,006 Kuwaiti and non-Kuwaiti adults (67.79% female), and had a mean Body Mass Index (BMI) of 28.98 kg/m^2. Of this population sample, 41.35% were categorised as overweight and 33.80% as obese. Over half (67.79%) the sample reported that they did not engage in any form of physical activity.

Introduction

The KNSS was established with the primary objective of offering up-to-date information on the nutritional status of the Kuwaiti and non-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 nutritional health. 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 Kuwait governorates. Consent was obtained from all participants or their guardians. Trained field researchers conducted comprehensive in-person interviews using standardized questionnaires. All anthropometric measurements across the age groups, including weight and height, were taken using standardized equipment and procedures.

The parents or guardians of children aged up to 60 months were approached during periodical vaccinations at health centers per governorate. Given Kuwait's high vaccination rate, this recruitment method is believed to yield a representative sample of Kuwaiti children. For children aged less than 23 months, data on breastfeeding, complementary feeding practices, illness history, birth weight, and exposure to smoking were collected. For children aged 24 to 60 months, data on meal times, dietary variety, mother's perception of her child's weight, screen time, and passive smoking were collected.

School-aged children and adolescents' data were collected from public schools in all governorates, and included height, weight, and hemoglobin levels. Weight was measured

using a digital scale to the nearest 100 gm, while height was measured to the nearest 0.1 cm using a portable scale. Finger prick samples were administered by trained assistant dietitians.

Adults aged 19 and above were namely approached at health centers and the Public Authority for Social Security. Data on gender, education, occupation, smoking habits, physical activity, weight management methods, fruit and vegetable consumption, and chronic diseases (i.e., hypertension, elevated blood glucose, and hypercholesterolemia were collected).

All collected questionnaire forms were checked for completeness and consistency, before digital entry. Data analysis and reporting adhere to WHO guidelines. The BMI is calculated according WHO growth standards and follows references for children or adult benchmarks (i.e., underweight, overweight, or obese).

Limitations

The surveillance reliance on health centers as the primary data collection point for population may limit the generalizability of findings for adult participants. While health centers effectively capture data on children due to mandatory vaccination programs, their suitability for collecting data on the broader adult population is limited. Current protocols restrict access to a select number of health centers, hindering data collection from adults residing in other areas. This may introduce selection bias.

Expanding data collection to encompass a wider range of facilities and geographic locations is crucial for obtaining a representative sample of the adult population, but this is currently constrained by these restrictive protocols. Therefore, fostering collaborations and advocating for less restrictive access to health centers across Kuwait is essential for improving the comprehensiveness of surveillance data.

Future iterations of the surveillance component should explore alternative data collection settings, such as community centers, workplaces, or mobile clinics in special events. Furthermore, collaboration with the Ministry of Health's primary care network, the Ministry of Higher Education, and the private sector would significantly enhance data collection efforts. This multi-faceted approach would enrich the data, provide a more comprehensive understanding of nutritional status and health behaviors across the entire adult population, and ultimately contribute to a more robust surveillance system.

2. Indicators for Children Aged 0 – 23 Months

The total sample size for children aged 0 – 23 months was 1543, of which 48.61% were female and the remaining 51.39% were male. For the majority (77.71%) of these children, the mother was the primary informant. The key surveillance indicators derived from this sample are reported below:

2.1. Birth Weight

Surveillance results show that 94.88% of parents could recall their infants' birth weight (BW). The average BW stood at 2952.08 grams. **Figure 1** illustrates the BW distribution between male and female infants.

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). Determinants, such as maternal fetal growth history, diet of the mother from infancy through pregnancy (Malhotra *et al.*, 2014), and body composition at conception (Farah *et al.*, 2011), also contribute to LBW. **Table 1** shows that 12.05% of infants aged 0 to 23 months were categorized as having low birth weight (LBW) or very low birth weight. These findings underscore the need for a comprehensive study to determine the prevalence of LBW and its associated risk factors, within the population.

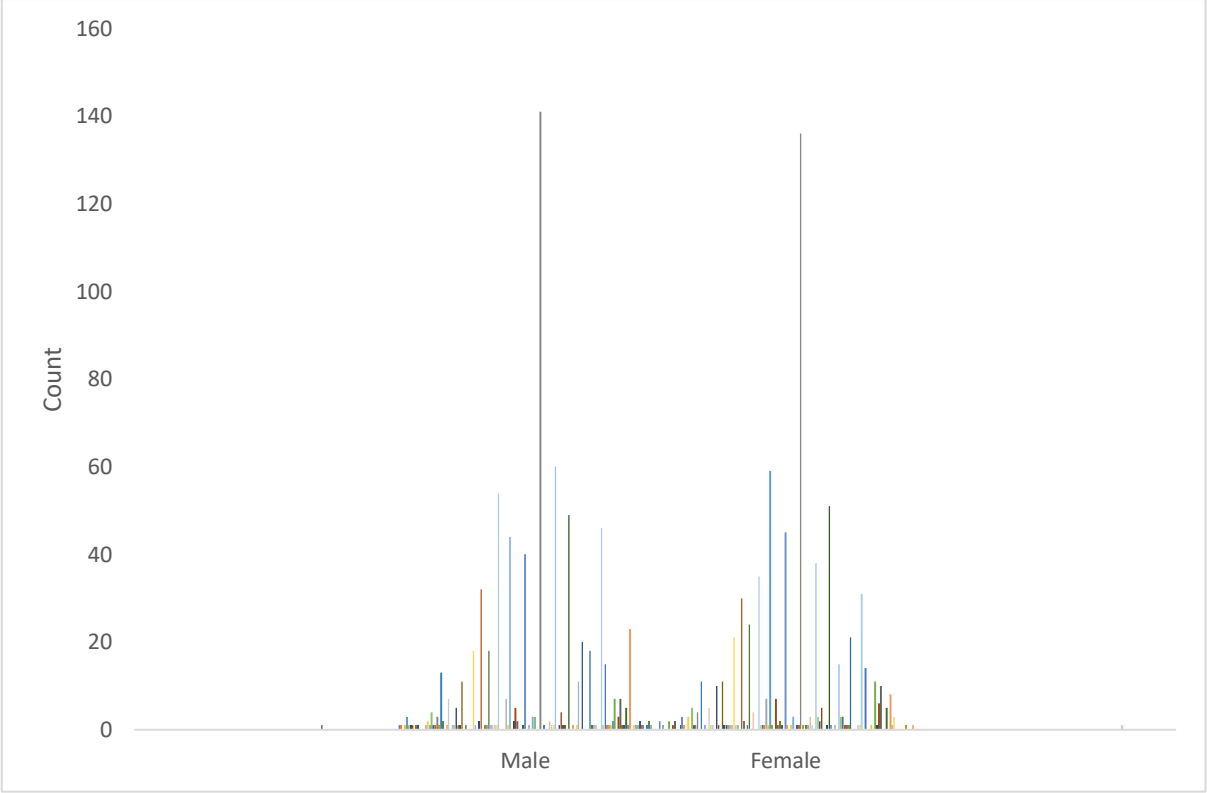

Figure 1: Comparative Distribution of Birth Weights in Kuwaiti and Non-Kuwaiti Male and Female Infants Aged 0-23 Months

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

Birth weight categories	Sample size (n)	Prevalence (%)
VLBW <1500 g	20	1.37
LBW ≥1500 to <2500 g	166	11.34
NBW ≥2500 to <4000 g	1230	84.02
HBW ≥ 4000 g	48	3.28

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

Antenatal care was sought from most mothers, with 58.46% opting for private clinics, 45.43% from government clinics, and 27.39% from both. However, only 0.45% of Kuwaiti and non-Kuwaiti mothers reported receiving any form of antenatal care. The surveillance data

indicates that 61.52% of infants aged 0 to 23 months were delivered in private hospitals, and 38.93 % in government hospital. Of all births within Kuwait, 35.30% were delivered via caesarean section (CS). The data further reveals that 54.18% of CS deliveries occurred in private hospitals, while 42.64% took place in government hospitals. Based on maternal reports, 6.15% 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 (92.66%), with no comparable difference between government and private hospitals. This trend is depicted in **Figure 2**.

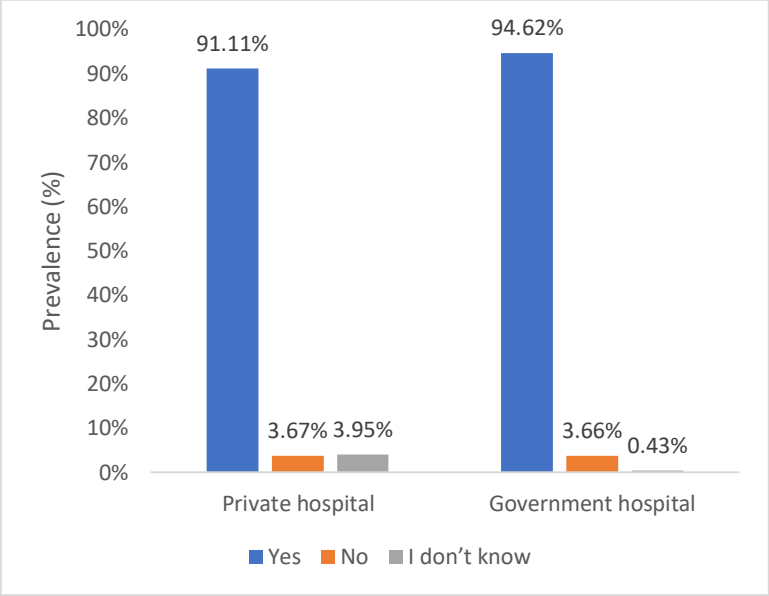

Figure 2: Proportion of Kuwaiti and non-Kuwaiti mothers who received advice to breastfeed their child in private and governorate hospitals

2.4. Early Initiation of Breastfeeding

Based on the data gathered, 75.15% of Kuwaiti and non-Kuwaiti mothers initiated breastfeeding early. Government hospitals reported a higher rate of breastfeeding within an hour of delivery at 76.43%, compared to 74.19% in private hospitals (**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.

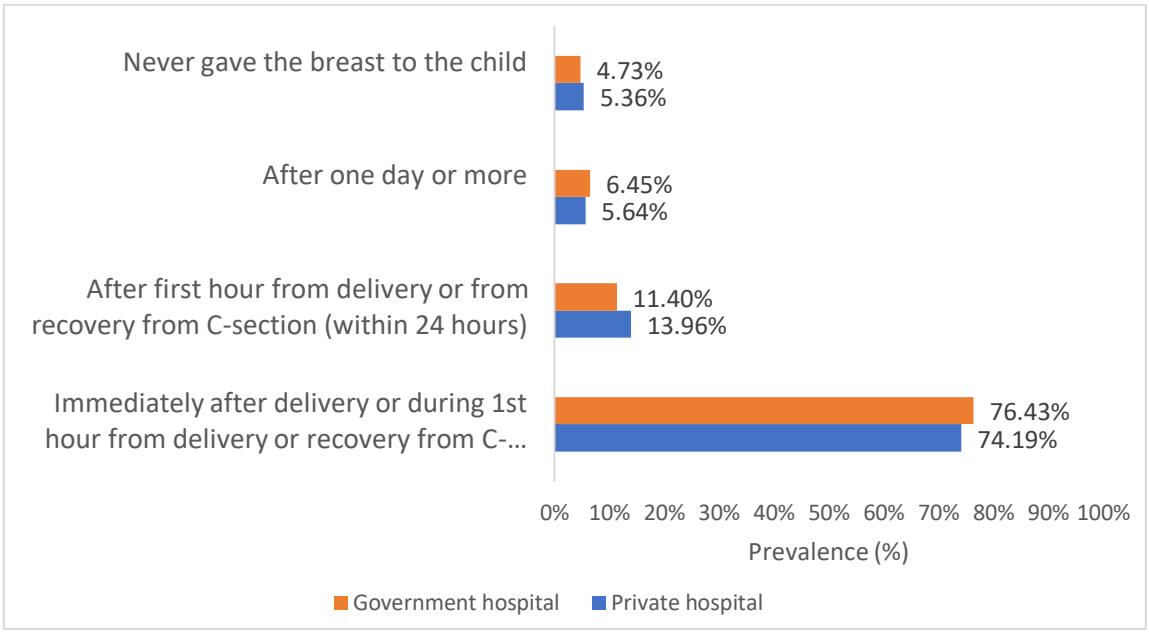

Figure 3: Early initiation of breastfeeding in governmental and private hospitals.

2.5. Children Ever Breastfed

Most Kuwaiti and non-Kuwaiti mothers (94.16%) reported breastfeeding their children at least once between 0 - 23 months of age. This ranged from 86.21% (Farwaniya) to 98.81% (Capital). The proportion of children ever breastfed according to governorates is shown in **Figure 4**.

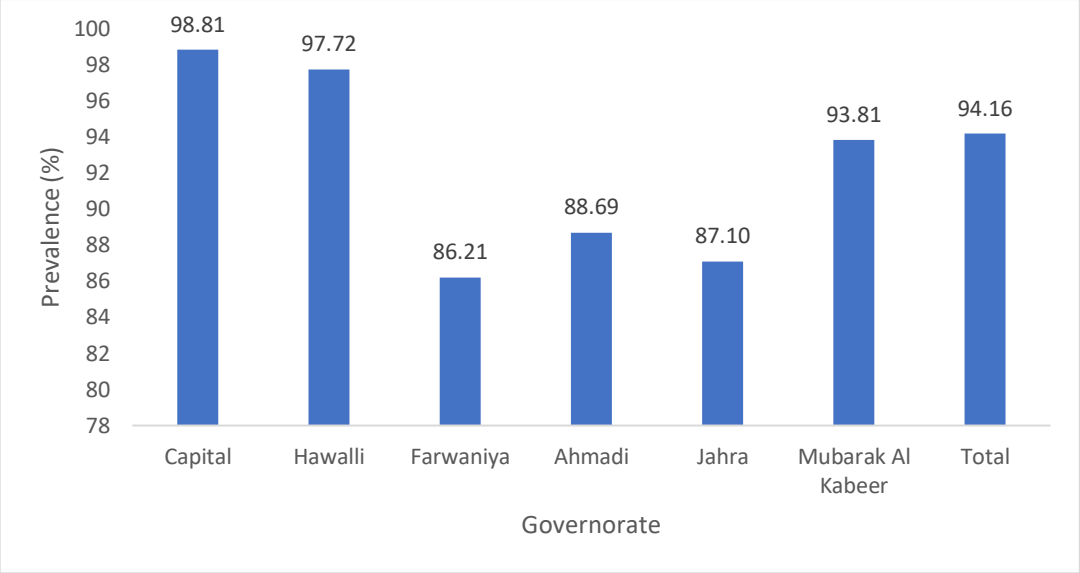

Figure 4: Proportion of Kuwaiti and non-Kuwaiti children (0-23 months) ever breastfed in each governorate.

2.6. Exclusive Breastfeeding

As reported by Kuwaiti and non-Kuwaiti mothers, the prevalence of exclusive breastfeeding (EBF) among infants aged less than 6 months old was 31.07%. There were no gender differences observed. However, the prevalence according to governorates suggested a higher adherence to exclusive breastfeeding in the Capital (20.18%) compared to the remaining governorates. **Table 2** offers a summary of the prevalence of exclusive breastfeeding among children aged 6 months or below.

2.7. Mixed Milk Feeding and Continued Breastfeeding

Data reveals a concerning pattern regarding breastfeeding practices in Kuwait. Among Kuwaiti and non-Kuwaiti infants under six months, 13.40% received mixed milk feeding. Additionally, only 14.28% of children aged 12-15 months continue to be breastfed. These findings suggest a steady increase in breastfeeding rates, impacting the potential benefits of exclusive breastfeeding in early infancy and continued breastfeeding throughout the first year of life.

Table 2: Prevalence of exclusive breastfeeding[1] among Kuwaiti and non-Kuwaiti children under six months

Characteristic	Sample size (n)	Prevalence (%)[2]
Children < 6 months	634	NA[3]
Gender		
Exclusively breastfed	197	31.07
Male	103	16.24
Female	94	14.82
Governorate		
Capital	128	20.18
Hawalli	22	3.47
Farwania	0	0
Ahmadi	7	1.10
Jahra	17	2.68
Mubarak Al Kabeer	23	3.62

[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. Bottle Feeding in Children Aged 0 - 23 Months

The surveillance data highlights the feeding practices of Kuwaiti and non-Kuwaiti infants aged 0 to 23 months. It reveals that 81.27% of infants within this age group were fed using a bottle. **Figure 6** illustrates the prevalence of bottle feeding across different governorates. The highest prevalence was reported in the Ahmadi governorate at 92.20%, and the lowest was in the Capital governorate, at 70.84%.

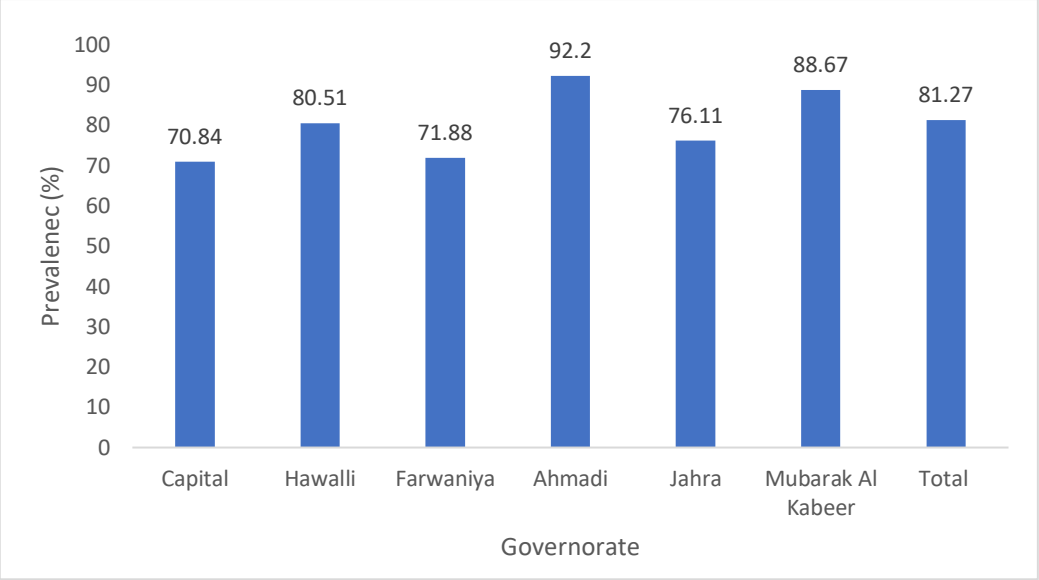

Figure 5: Kuwaiti and non-Kuwaiti children aged 0-23 months who are bottle-fed are distributed according to governorate.

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

The 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 80.45% of Kuwaiti and non-Kuwaiti children within the 6 - 8 months age group had consumed solid, semi-solid, or soft foods the day before the survey. Notably 4.57% of infants aged 0 - 6 months had already been introduced to complementary foods.

2.10. Minimum Dietary Diversity

Minimum dietary diversity is defined as children 6 – 23 months old who consumed at least 5 of the following 8 food groups yesterday during the day or night (WHO, 2017):

1. Breastmilk
2. grains, roots and tubers
3. legumes and nuts
4. dairy products
5. flesh foods
6. eggs
7. Vitamin A-rich fruits and vegetables
8. other fruits and vegetables.

According to the surveillance data, 43.50% of children consumed food from at least 5 out of the 8 food groups. This distribution is illustrated in **Figure 5** according to governorates.

Children in Jahra (74.29%) recorded the highest minimum dietary diversity, while Hawalli recorded the lowest (22.14%).

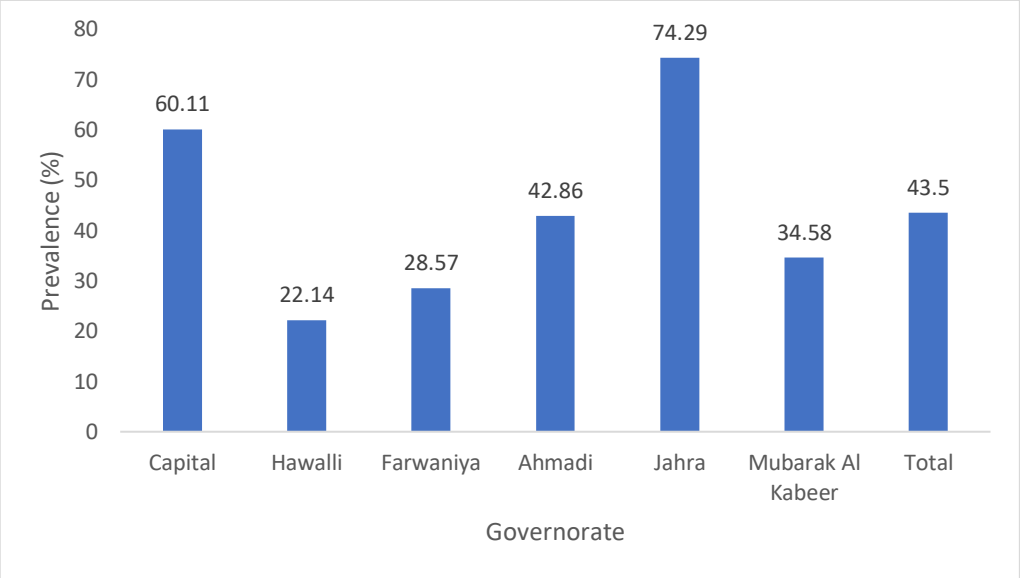

Figure 6: Kuwaiti and non-Kuwaiti children (6-23 months) with minimum dietary diversity in each governorate.

2.11. Incidence of illness requiring medical consultation 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 Kuwaiti and non-Kuwaiti children aged 0 to 23 months. 30.46% experienced an illness that necessitated medical attention within the last 3 months. The incidence of illness was 21.23% among infants aged 0 to 5 months and 39.95% among those aged 6 to 23 months. **Figure 7** illustrates the distribution of illnesses across different governorates. Of the children who had a recent illness, 23.33% experienced a single episode, while 5.90% reported two episodes. Fever emerged as the most reported ailment among this age group.

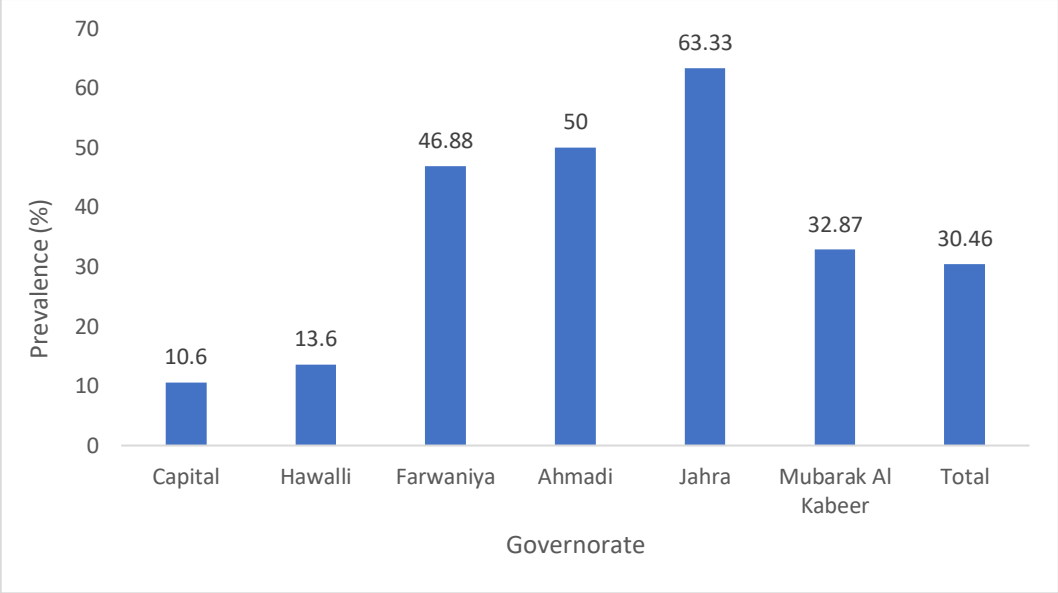

Figure 7: Incidence of illness requiring medical consultation during the last 3 months among Kuwaiti and non-Kuwaiti children (0-23months) in each governorate

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

According to the surveillance data 16.14% of Kuwaiti and non-Kuwaiti 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.

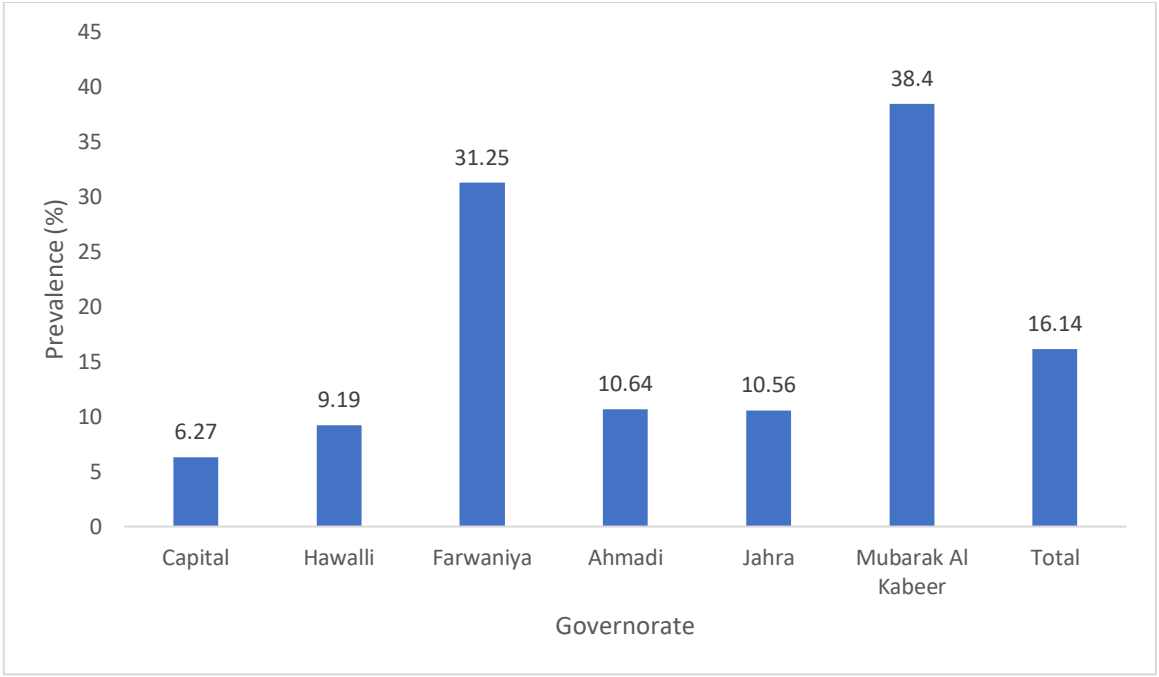

Figure 8: Kuwaiti and non-Kuwaiti children (0-23 months) exposed to smoking in each governorate.

3. Indicators for Children Aged 24 – 60 Months

A sample of 1809 Kuwaiti and non-Kuwaiti children, aged between 24 to 60 months (2 to 5 years), was analysed, with 51.13% 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 88.11% of children in this age group had been breastfed at least once in their lives, as illustrated in **Figure 9**. Among the various governorates, Hawalli and Capital reported the highest percentages of children who were ever breastfed, with rates of 94.67 % and 91.15 % respectively. Conversely, Jahra had the lowest prevalence at 77.57%.

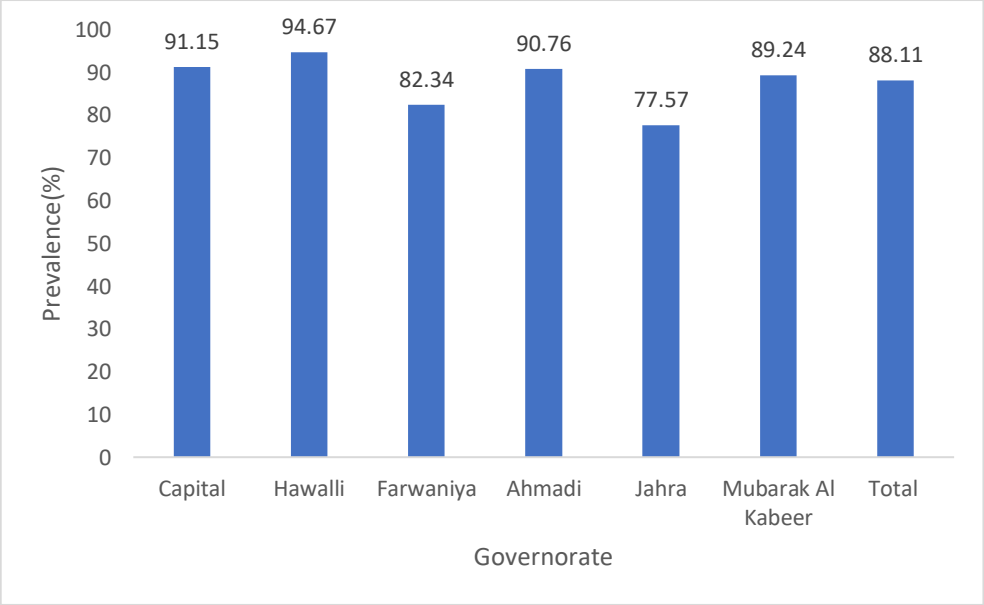

Figure 9: Kuwaiti and non-Kuwaiti children (24 to 60 months) ever breastfed in each governorate.

3.2. Incidence of illness requiring medical consultation during the last one month among children aged 24 to 60 Months

The surveillance indicates that 27.75% of Kuwaiti and non-Kuwaiti 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. Within the last one month, Jahra reported the highest incidence of childhood illnesses at 59.81%, whereas Hawalli had the lowest incidence rate at 9% for children within this age group.

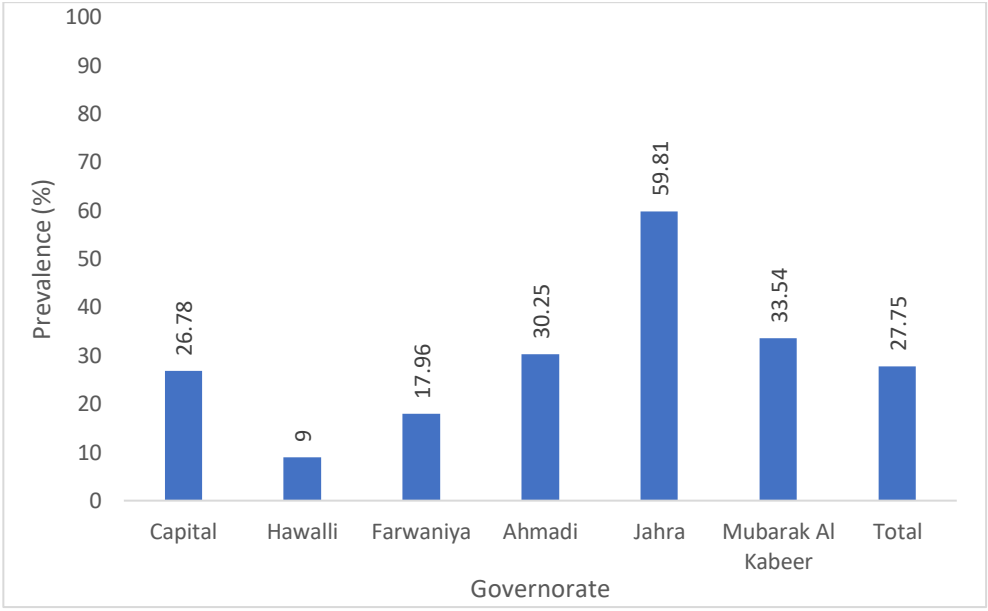

Figure 10: Incidence of illness requiring medical consultation during the last one month among Kuwaiti and non-Kuwaiti children (24 to 60 Months) in each governorate.

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

According to the surveillance data, 24.43% of Kuwaiti and non-Kuwaiti children aged 24 to 60 months were exposed to cigarette, shisha, or both within their homes. **Figure 11** illustrates the variation in the proportion of children exposed to passive smoke across different governorates. The exposure to household smoking was the highest in Farwaniya (36.53%) and lowest in Jahra (7.01%).

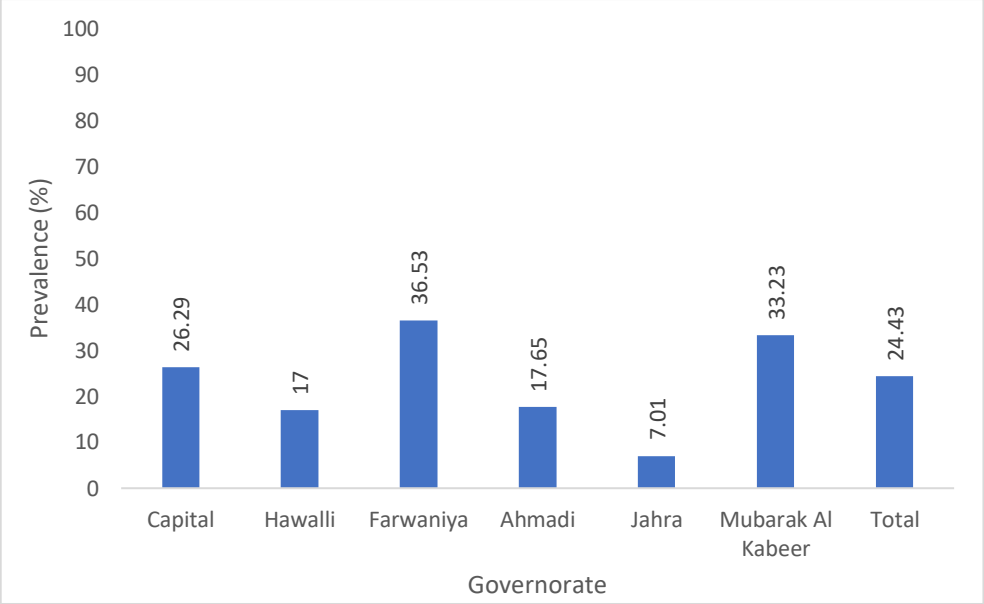

Figure 11: Kuwaiti and non-Kuwaiti children (24 to 60 months) exposed to smoking at home in each governorate.

3.4. 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 daily media usage (i.e., television, gaming and other devices) for Kuwaiti and non-Kuwaiti children aged 24 to 60 months (2 - 5 years) according to weekdays and weekends. Most children (65.02%) limited the screen time to 2 hours or less across the different platforms (TV and computer gaming combined). 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 Kuwaiti and non-Kuwaiti children 24 to 60 months.

	Days	Screen Time	Sample size (n)	Prevalence (%)
TV watching	Weekdays	Less than 2 hours	1198	66.22
		2-3 hours	368	20.34
		More than 3 hours	236	13.05
		Not answered	7	0.39
	Weekends	Less than 2 hours	1196	66.11
		2-3 hours	369	20.40
		More than 3 hours	237	13.10
		Not answered	7	0.38
Computer, games/video games	Weekdays	Less than 2 hours	1259	69.60
		2-3 hours	320	17.69
		More than 3 hours	216	11.94
		Not answered	14	7.40
	Weekends	Less than 2 hours	1264	69.87
		2-3 hours	316	17.47
		More than 3 hours	218	12.05
		Not answered	11	0.60

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

According to the surveillance data, 61.06% of Kuwaiti and non-Kuwaiti children aged 24 to 60 months did not consume carbonated drinks (**Figure 12)**. However, 50.23% of children within this age group regularly consume non-fresh, sweetened juices—consuming them six times or more per week (**Figure 13)**.

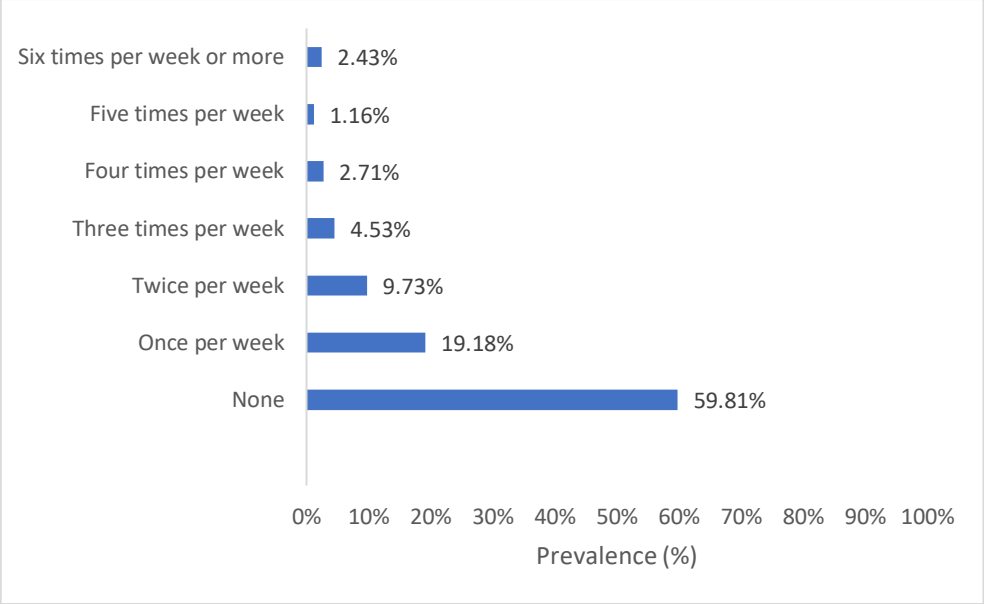

Figure 12: Consumption of carbonated drinks among Kuwaiti and non-Kuwaiti children (24 to 60 months)

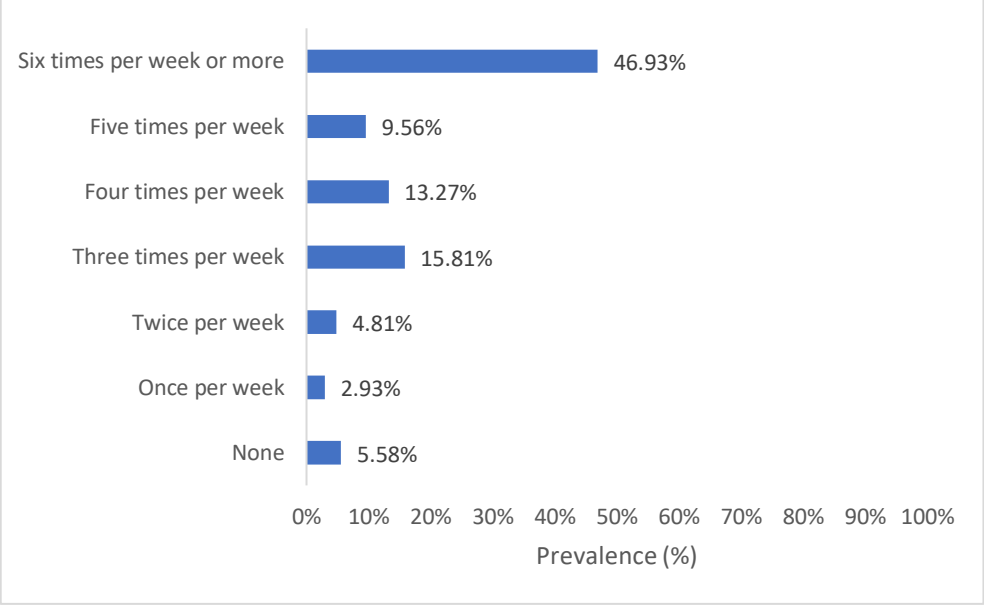

Figure 13: Consumption of canned non-fresh sweet juice among Kuwaiti and non-Kuwaiti children (24 to 60 months)

3.6. 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 Kuwaiti and non-Kuwaiti children aged 24 to 60 months was evaluated. **Table 4** presents the actual weight for age classification. 3.67% of children are classified as underweight, while 89.41% of the children were of normal weight. 4.74% of the children were classified as overweight and 2.18% were classified as obese.

Table 4: Actual weight for age classification

Actual weight for age classification (24-60months)	
Underweight	9.85%
Normal	82.38%
Overweight	5.37%
Obesity	2.40%

The surveillance report highlights that a significant number of mother/guardians have varying perceptions regarding their child's weight status as depicted in **Figure 14.** The weight classification of the children was as follows: a) Among children of underweight status, 72.80% were perceived as normal, while 10.40% were perceived correctly; b) For children with normal weight status, 82.38% of them were perceived as normal, 8.03% were perceived as underweight; c) For overweight children, 72.92% of parents or guardians misperceived them as normal weight, while 12.50% perceived them correctly; d) For obese children 66.07% were misperceived as normal, while 17.86% were perceived as being overweight.

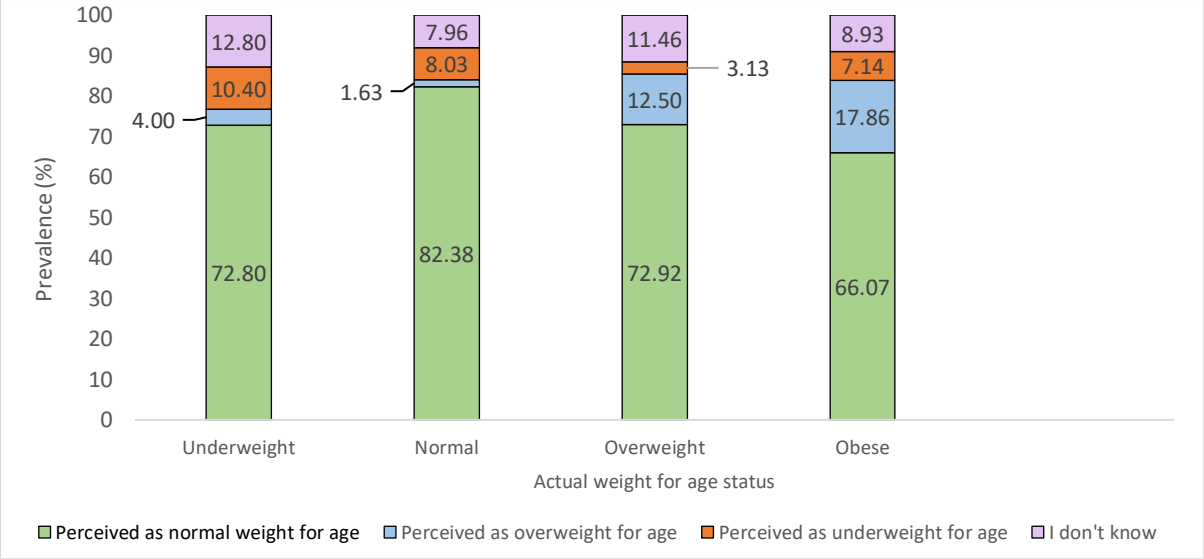

Figure 14: Perceptions of Kuwaiti and non-Kuwaiti mothers about the weight of their child (24 to 60 months) in comparison to the actual weight status

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

The surveillance data indicates that 43.24% of Kuwaiti and non-Kuwaiti children typically begin their first meal between 7 – 9 am, while 35.17% commence their first meal between 9 – 11 am. **Figure 15** illustrates the regional variations in the timing of the first meal across different governorates.

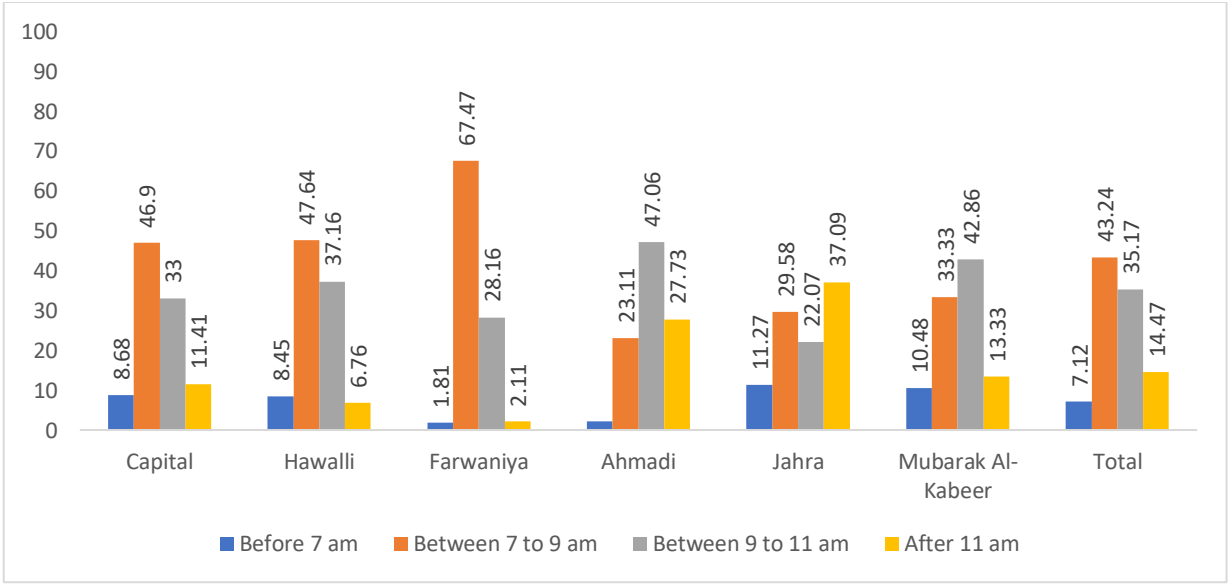

Figure 15: Time of the first meal among Kuwaiti and non-Kuwaiti children (24 to 60 months) by governorate.

Anthropometric Measurements for Children Aged 0 – <60 Months

Table 5 indicates that 1.51% of Kuwaiti and non-Kuwaiti children aged 0 to 23 months and 2.40% of children aged 24 to <60 months were classified as obese. The wasting rate for 0 – 23 months (weight-to-height ratio) consistently remained well below the expected 5%, however, children aged 24 - <60 months showed wasting at 5.66%. 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 Kuwaiti and non-Kuwaiti children (0-<60 months).

Age (Months)	Sex	Sample (n)Δ	Stunting (%)	Wasting (%)	Overweight (%)	Obesity (%)
0 – 23	All	1543	7.55	4.59	5.58	1.51
	Male	793	8.08	5.24	5.24	1.66
	Female	750	7.00	3.90	5.94	1.35
24 – <60	All	1809	1.72	5.66	5.37	2.40
	Male	925	2.17	5.07	4.94	2.31
	Female	884	1.25	6.27	5.80	2.50

Key Terms and Definitions according to WHO growth reference median

- **Stunting (Height-for-age):** A child is considered stunted if their height-for-age is less than -2 standard deviations (SD).
- **Wasting (Weight-for-height):** A child is considered wasted if their weight-for-height is less than -2 SD.
- **Overweight (BMI-for-age):** A child is considered overweight if their Body Mass Index (BMI)-for-age is between 2 and 3 SD.
- **Obesity (BMI-for-age):** A child is considered obese if their BMI-for-age is above 3 SD.

Δ the sample size may vary due to excluding biologically implausible z-score.

Prevalence of Anemia Among Children Aged 6 – 60 Months

Table 6 displays the prevalence of anemia for Kuwaiti and non-Kuwaiti children across various governorates. The overall prevalence of anemia was 25.34% for children aged 6-23 months and 12.94% for children aged 24-60 months. In the 6-23 months age group Mubarak al-Kabeer exhibited the highest prevalence at 36.51%. In the 24 – 60 months age group Mubarak Al-Kabeer exhibited the highest prevalence at 18.67%, followed by Capital at 16.46%. Consistent with global trends, anemia remains a significant concern among 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 5: Prevalence of anemia* among Kuwaiti and non-Kuwaiti children 6 to 60 months.

Governorate	Anemia (%)	
	6-23 months	24-60 months
Capital	23.29	16.46
Hawalli	26.52	5.67
Farwania	20	11.98
Ahmadi	0	7.56
Jahra	25.42	15.42
Mubarak Al-Kabeer	36.51	18.67
Total	25.34	12.94

*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

Conclusion

The Kuwait Nutritional Surveillance System (KNSS) provides valuable insights into the nutritional status of Kuwaiti and non-Kuwaiti children from birth to 60 months of age. Key findings and areas of concern include:

- **Childhood Obesity & Dietary Habits:** A significant proportion of children have unhealthy dietary patterns, including high consumption of sweetened beverages. This is likely contributing to rising rates of overweight and obesity, even in very young children.
- **Anemia:** Anemia remains a major public health problem, particularly within the younger age group (6-23 months).
- **Health Disparities:** Significant variations exist across governorates in factors such as illness rates, breastfeeding, smoke exposure, and anemia prevalence.
- **Parental Misperceptions:** Many parents underestimate their child's weight status, particularly if the child is overweight or obese. This could hinder healthy interventions.

Recommendations

Based on this surveillance data, the following targeted recommendations are crucial:

1. **Intensify Breastfeeding Support:**
    - Promote exclusive breastfeeding for the first six months, with continued breastfeeding alongside appropriate complementary foods.
    - Address governorates disparities in breastfeeding rates through tailored support.
    - Develop campaigns to counter the early introduction of solid foods.

2. **Combat Childhood Obesity:**
    - Implement educational campaigns focused on healthy eating habits, emphasizing fruits, vegetables, and limiting sugary drinks.
    - Consider policy-level interventions, such as taxes on sugary beverages.

- Develop programs to increase physical activity among young children.

3. **Reduce Anemia Burden:**
    - Investigate the root causes of anemia in Kuwait, including dietary iron deficiency, infectious diseases, etc.
    - Design targeted interventions, such as iron supplementation or fortification programs, based on the identified causes.
4. **Tackle Health Disparities:**
    - Analyse the reasons behind governorate-level variations and implement place-based interventions to address the specific needs of high-risk areas.
5. **Parent & Care giver Education:**
    - Launch campaigns to improve parental recognition of healthy weight, signs of malnutrition, and age-appropriate feeding practices.
    - Train health professionals to counsel parents effectively on these issues.

Further Research

The KNSS should continue to monitor trends, allowing for the evaluation of policy and program effectiveness. Additional research is needed to explore the specific factors driving governorates disparities and to guide the most impactful interventions within Kuwait.

4. School-Age Children (5 – 19 years)

Data were collected from 17879 Kuwaiti and non-Kuwaiti school children, of whom 7,354 (51.79%) 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 (38.90%) of overweight and obesity was recorded in the 13- years age group. The female school aged children also showed the highest prevalence (27.50%) of obesity among the 11- years age group. Thus, the prevalence of obesity is higher (38.90%) among male children than female (27.50%) school age children in the 11- years age group.

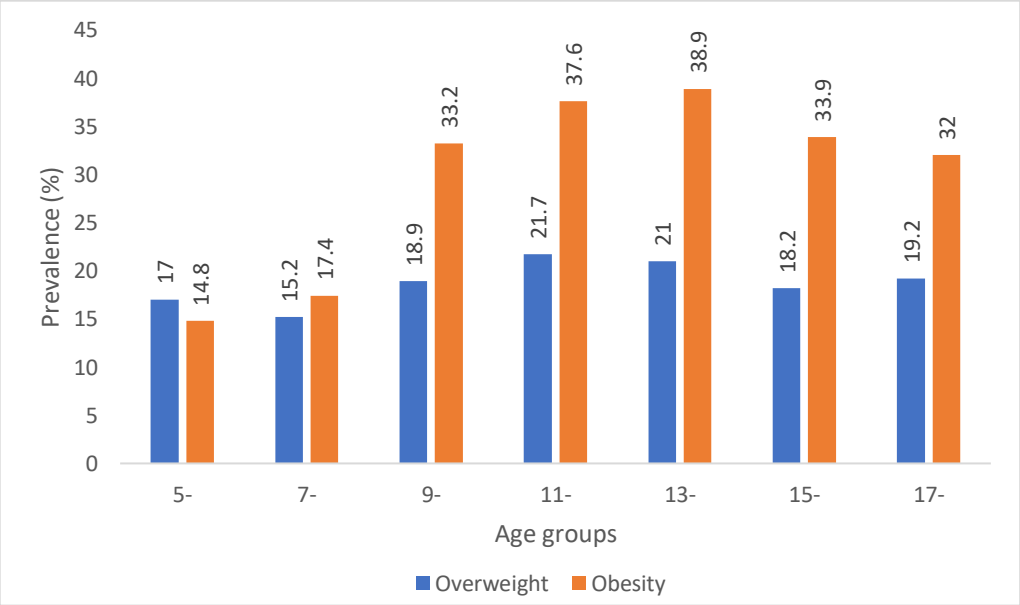

Figure 16: Prevalence of overweight and obesity among Kuwaiti and non-Kuwaiti male school aged-children.

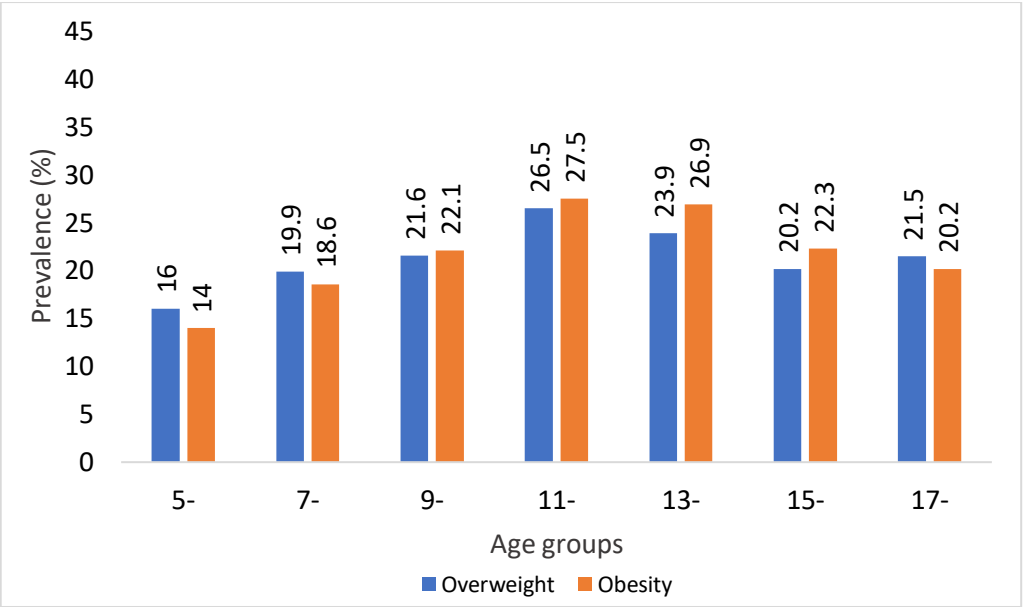

Figure 17: Prevalence of overweight and obesity among Kuwaiti and non-Kuwaiti female school aged-children

Analysis of **Figure 18** reveals a complex picture of childhood overweight and obesity across Kuwait's governorates. Jahra has the lowest overall prevalence of overweight children (18.9%). Farwaniya demonstrates the highest prevalence of overweight (21.80%). Nationwide, the combined prevalence of both overweight (20.30%) and obesity (26.60%) is alarmingly high, demonstrating a critical need for interventions.

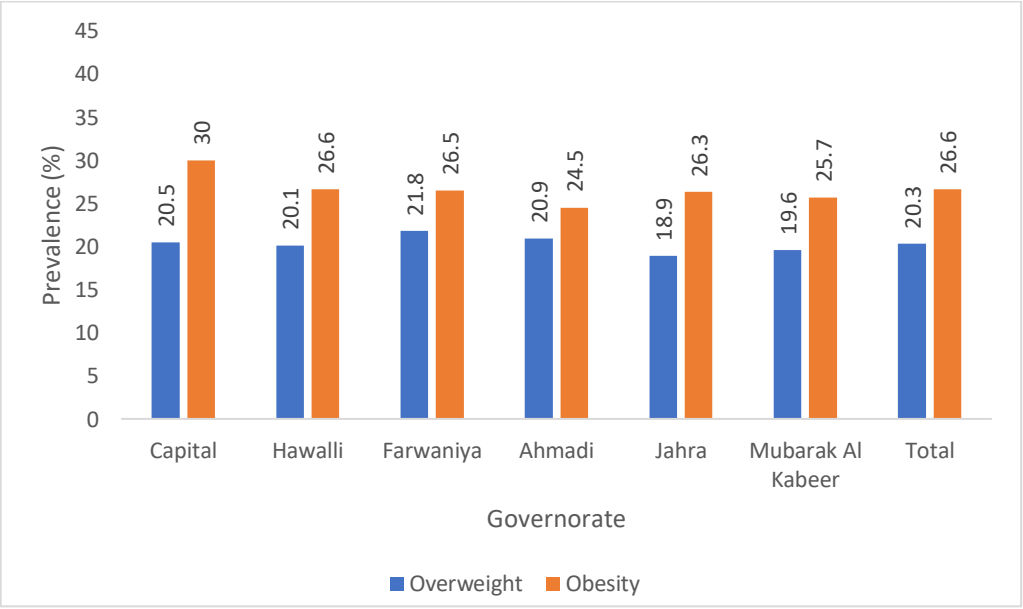

Figure 18: Regional variation in Overweight and Obesity among Kuwaiti and non-Kuwaiti school children

4.2. Anemia Among School-Aged Children

Hemoglobin (Hb) levels of 17,663 Kuwaiti and non-Kuwaiti students were evaluated. The findings revealed an overall anemia prevalence of 12.38%. **Figure 19** delineates the distribution of anemia across the six governorates, with Jahra governorate registering the highest prevalence for female school-aged children and Capital registered the highest prevalence for male school-aged children. Specifically, 8.92% of male students and 15.32% 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 17- 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).

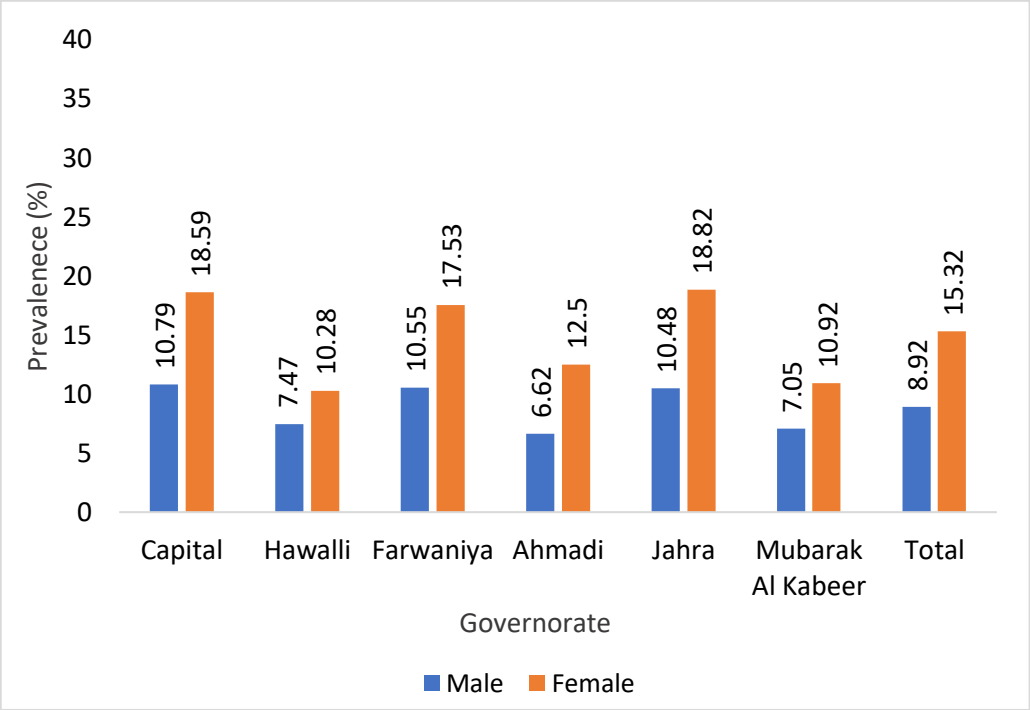

Figure 19: Prevalence of anemia among Kuwaiti and non-Kuwaiti school children by gender of students in each governorate.

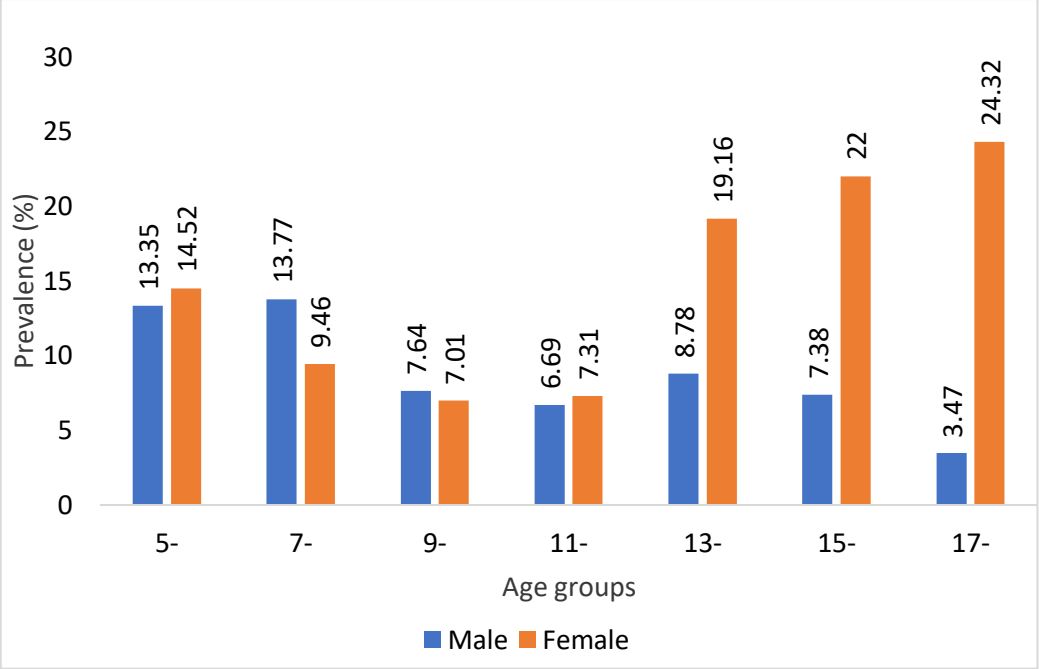

Figure 20: Prevalence of anemia among Kuwaiti and non-Kuwaiti school children by gender and age of students.

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

Conclusion

The Kuwait Nutritional Surveillance System (KNSS) reveals critical health challenges facing Kuwaiti and non-Kuwaiti school-aged children (5 – <19 years):

- **Alarming Obesity Epidemic:** Overweight and obesity rates are extremely high, peaking in 11-13-year-olds for both genders. Significant regional variations exist, with areas like Farwaniya, Hawalli, and Jahra demonstrating a worrying progression from overweight to obesity.
- **Persistent Anemia:** Anemia remains a concern, especially among female students. Prevalence increase starting from age 13 onwards, requiring a targeted approach on females in these age groups.
- **Need for Deeper Understanding:** The drivers of these trends – dietary habits, physical inactivity, and other potential factors – need thorough investigation to inform specific interventions.

Recommendations

1. **Multi-Level Obesity Interventions:**
    - School-based programs promoting healthy eating, emphasizing fruits and vegetables, and limiting sugary drinks and processed foods.
    - Policy initiatives to enhance the food environment, such as regulating unhealthy food marketing to children.
    - Built environment changes to promote safe and accessible physical activity for children on a community-wide scale.
2. **Anemia Reduction Strategies:**
    - Investigate and address the root causes of anemia in different age groups and genders.
    - Consider targeted approaches, such as iron supplementation, fortification of staple foods, or addressing infectious disease burdens, as appropriate.
3. **Address governorates Disparities:**
    - Analyse why governorates differ in obesity and anemia rates to design place-based interventions for high-risk areas.

Further Research

Continued KNSS surveillance is vital to track progress and assess intervention effectiveness. Additional research should investigate into the specific social, behavioural, and environmental factors shaping these health outcomes in children.

5. Adults (> 19 years)

The surveillance study analyzed data from a sample of Kuwaiti and non-Kuwaiti 1,006 participants, all of whom were aged 19 or above. The female participants constituted 67.79% of this sample, and the median age was determined to be 39 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 6: Demographic characteristics of Kuwaiti and non-Kuwaiti adult participants.

Demographics	Sample Size (n)	Prevalence (%)
Gender		
Male	324	32.21
Female	682	67.79
Age (years)		
19 – 29	260	25.64
30 – 39	386	38.37
40 – 49	180	17.89
50 – 59	80	7.95
≥60	100	9.94
Education level		
No formal education	20	1.99
Primary	11	1.09
Intermediate	109	10.83
Secondary	150	14.91
Diploma	220	21.87
University	445	44.23
Masters/Doctorate	42	4.17
Employment Status		
Doesn't work/Able to work	4	0.43
Doesn't work/Unable to work	10	1.09
Government employee	633	68.73
Non-government employee	43	4.67
Self-employed	4	.43
Student	41	4.45
Housewife	125	13.57
Retired	17	1.85
Other	44	4.78
Governorate		
Capital	193	19.18
Hawalli	318	31.61
Farwania	71	7.06
Ahmadi	43	4.27
Jahra	259	25.75
Mubarak Al-Kabeer	122	12.13

5.1. Physical Activity Among Adults

Figure 21 illustrates the percentage of Kuwaiti and non-Kuwaiti adults who reported engaging in physical activity, segmented by governorate. Jahra governorate exhibited the highest rate of inactivity at 84.71%, while Capital reported the lowest at 50.79%. The surveillance findings indicate that a substantial 67.76% of the participants abstain from any form of physical activity. For those who are active, walking is the most favored form of exercise, with 72.20 of participants choosing it as their primary activity. **Figure 22** delineates the distribution of physical activity across various age groups. Notably , the age group above 19 years registered the highest prevalence of inactivity at 70.82%.

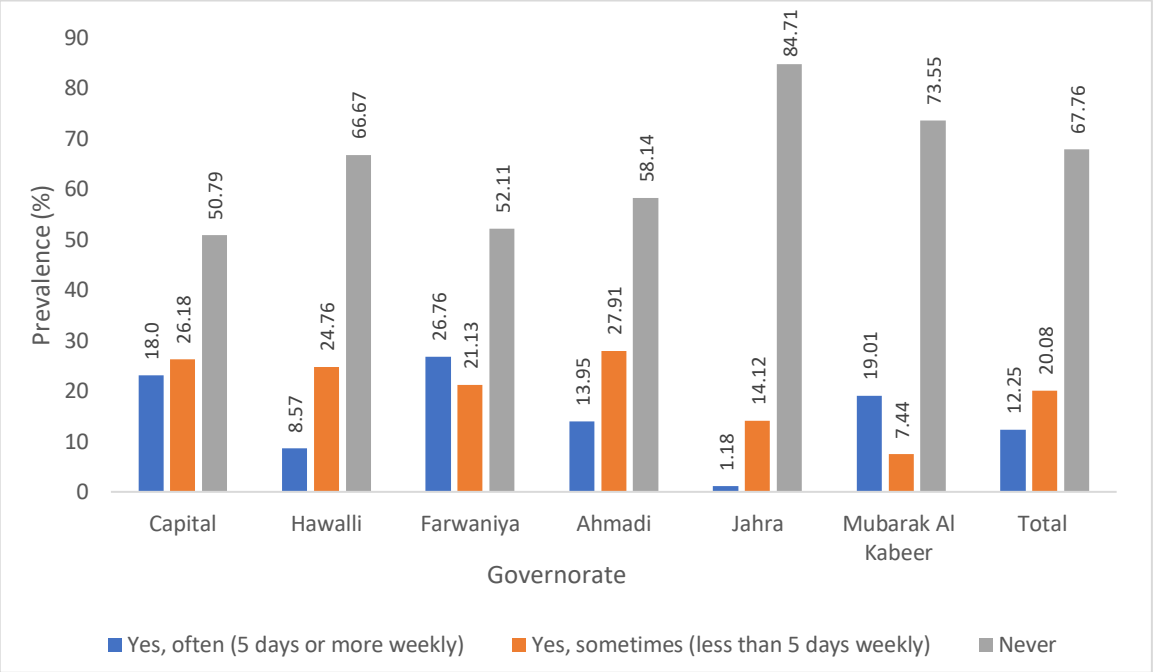

Figure 21: Participation in Physical activity among Kuwaiti and non-Kuwaiti Adults according to governorate

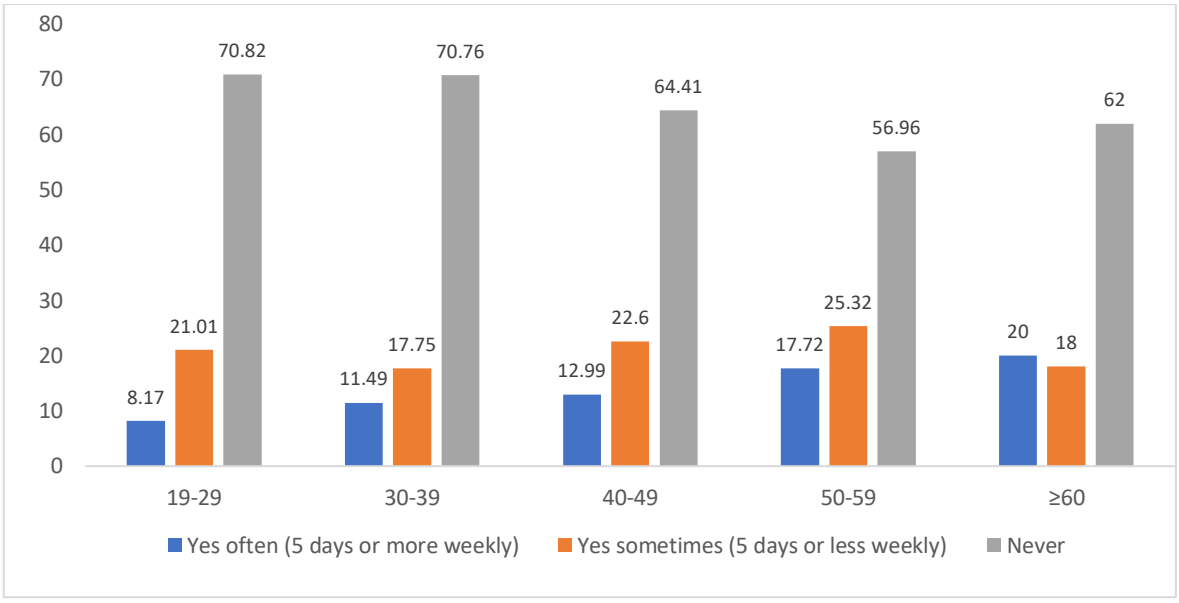

Figure 22: Participation in Physical activity among Kuwaiti and non-Kuwaiti adults according to age

5.2. Smoking Cigarettes and Shisha

Of the participants, 7.88% reported exclusively smoking cigarettes, 0.50% reported using both cigarettes and shisha, and 2.89% reported only smoking shisha. There were pronounced gender disparities in smoking habits. Among males, the prevalence of cigarette smoking stood at 21.91% whereas it was less than 2% among females. Similarly, 7.10% of males reported exclusively smoking shisha, in contrast to less than 1.00% of females. **Figure 23** illustrates the gender distribution of cigarette, shisha, or combined consumption. Notably, among young males, there was a heightened proportion of current smokers, whether they smoked cigarettes, shisha, or both, as depicted in **Figure 24**.

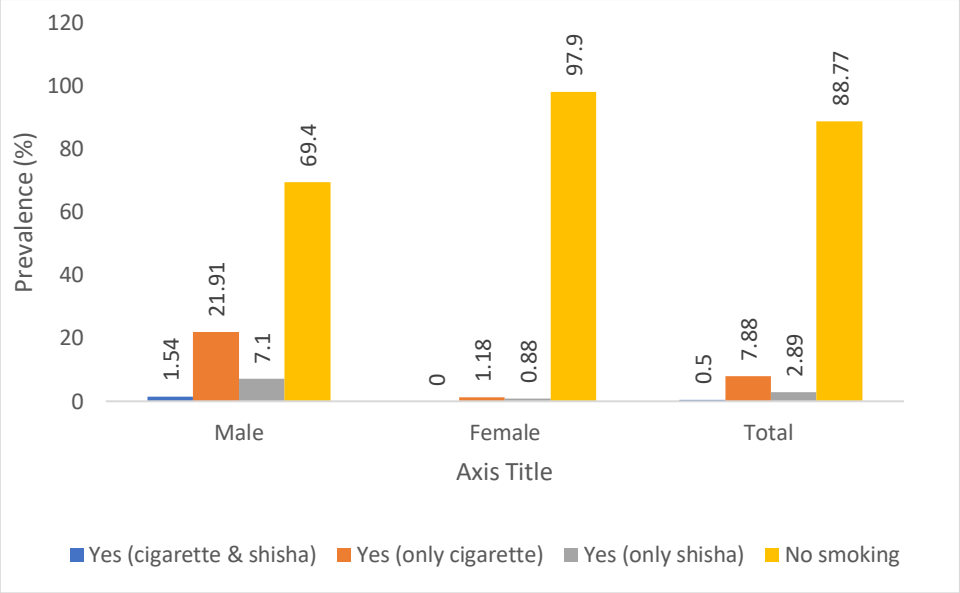

Figure 23: Proportion of Kuwaiti and non-Kuwaiti adults who currently smoke cigarettes, Shisha or both by gender.

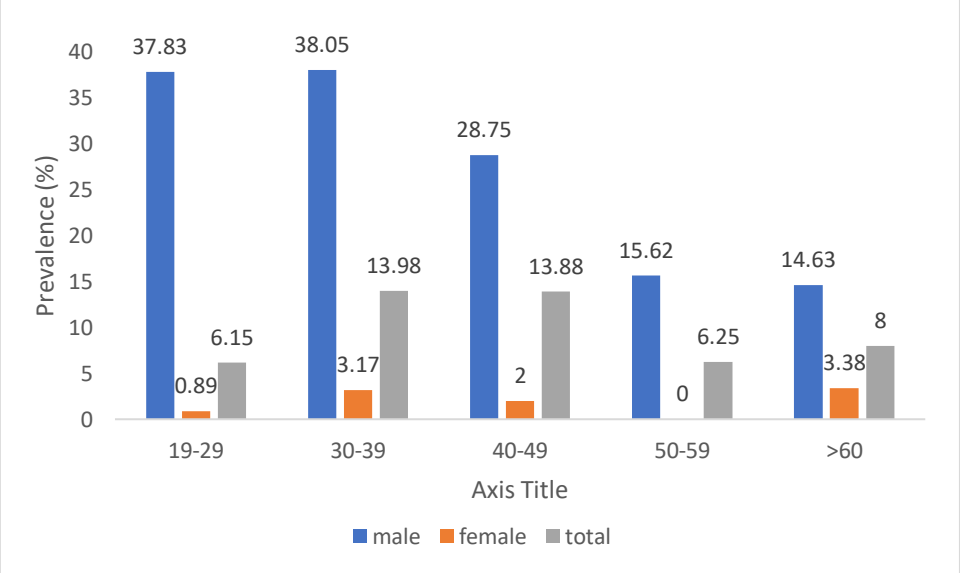

Figure 24: Proportion of Kuwaiti and non-Kuwaiti adults who smoke by age group and gender.

5.3. High Level of Cholesterol (Self-Reported)

Figure 25 illustrates the geographical distribution of Kuwaiti and non-Kuwaiti adults who self-reported elevated cholesterol levels. A significant 11.53% of the population indicated having high cholesterol. Among these adults, 78.45% confirmed they were on medication to

manage their condition. The distribution of adults who self-reported high cholesterol levels, segmented by age groups, is showcased in **Figure 26**.

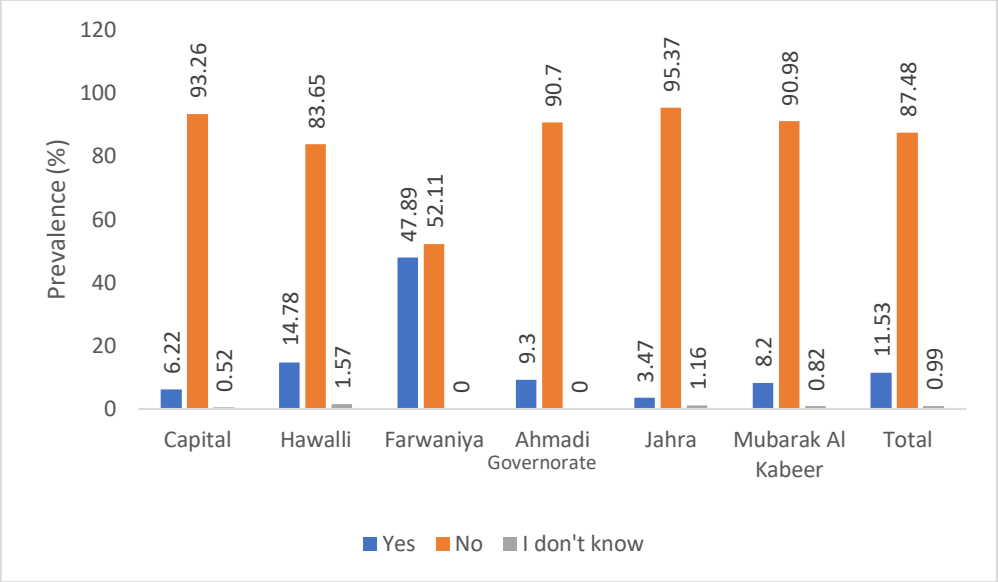

Figure 25: Proportion of Kuwaiti and non-Kuwaiti adults who self-reported high cholesterol level by governorate.

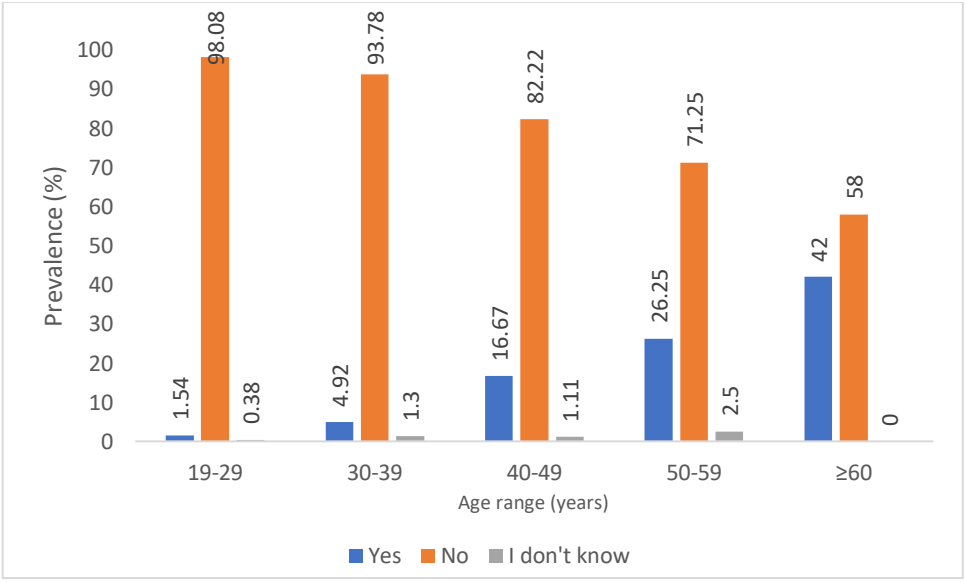

Figure 26: Proportion of Kuwaiti and non-Kuwaiti adults who self-reported high cholesterol level by age.

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 8.33% of the surveyed adults exhibit elevated blood glucose levels (fasting). A deeper gender-based analysis reveals

a significant disparity. 11.59% of the male respondents are affected by high blood glucose, compared to 7.25% of the female participants. The random blood glucose analysis reveals that a significant (96.98%) had normal blood glucose level.

Table 7: Prevalence of High Blood Glucose among Kuwaiti and non-Kuwaiti Adults

Fasting blood glucose [Δ*]		**Male (%)**	**Female (%)**	**Total (%)**
Normal	<5.6 mmol/L	88.41	92.75	91.67
High Blood Glucose	>5.6 mmol/L	11.59	7.25	8.33
Random blood glucose [Δ ¢]				
Normal	<11.0 mmol/L	96.39	97.28	96.98
Diabetes	>11.0 mmol/L	3.61	2.72	3.02

[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 adults according to governorate. The incidence of self-reported high blood pressure was highest in Farwaniya at 56.34%, while Jahra reported the lowest incidence at 2.32%**. Figure 28** presents the proportion of high blood pressure by age, notably ≥60 age group of adults exhibited the highest (44%) self-reported high blood pressure. The overall prevalence of self-reported high blood pressure was 9.05% Among these individuals, a significant 90.11% confirmed they were on medication to manage their condition.

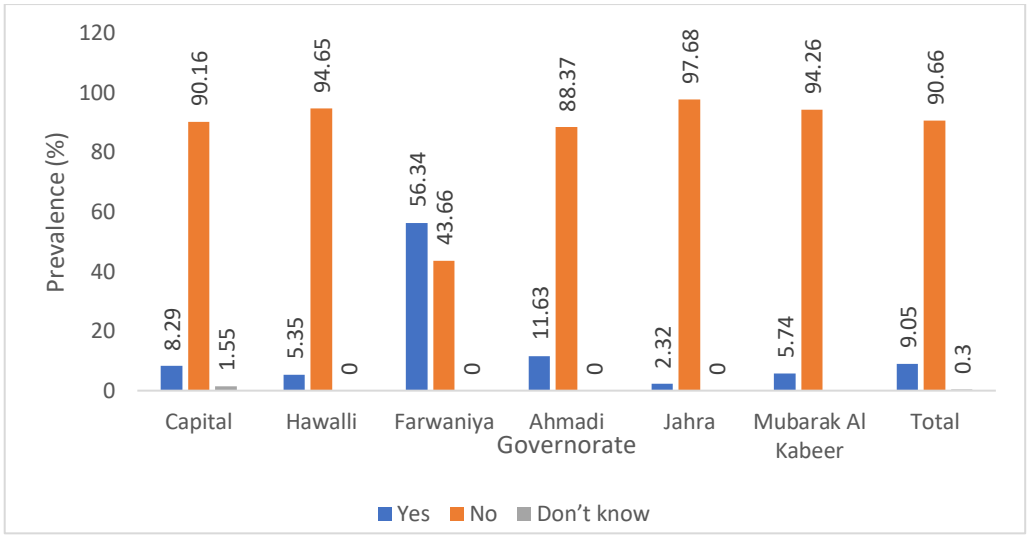

Figure 27: Proportion of Kuwaiti and non-Kuwaiti adults who self-reported high blood pressure according to governorate.

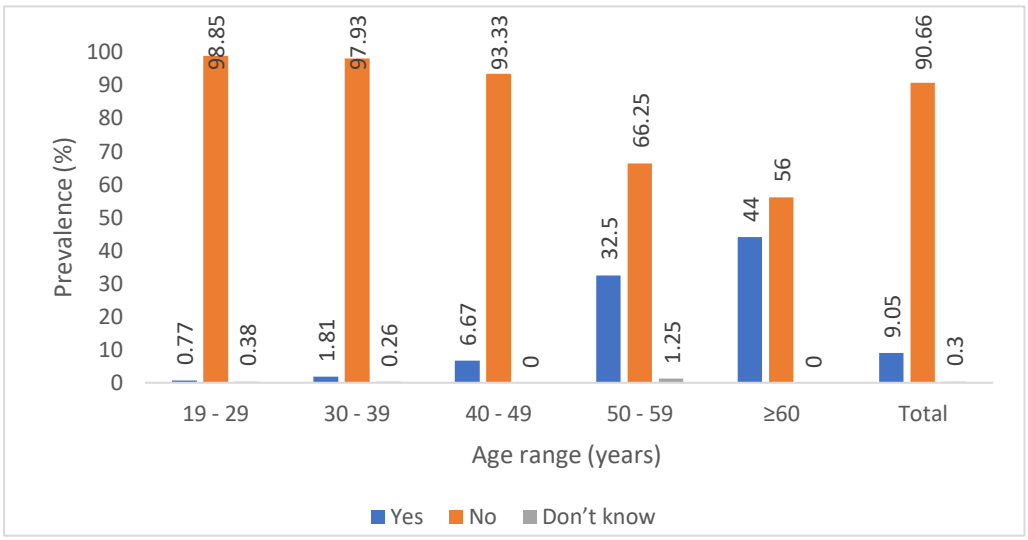

Figure 28: Proportion of Kuwaiti and non-Kuwaiti adults who self-reported high blood pressure according to age.

5.6. Obesity and Overweight among Adults:

The average Body Mass Index (BMI) among the participants was 28.98kg/m^2, with a standard deviation of 5.19. **Figure 29** illustrates the prevalence of obesity and overweight across different governorates. A significant 33.8% of the participants were classified as obese, while an additional 41.35% were categorized as overweight. This means that a combined total of 75.15% of adults were either obese or overweight. Notably, obesity was more prevalent among females than males: 35.48% of females were classified as obese compared to 30.25% of males. The prevalence of overweight was most pronounced in Hawalli, registering at

49.37%. In contrast, the Ahmadi, Jahra, and Farwaniya all reported a relatively lower prevalence. When examining obesity rates, Capital and Farwaniya had the highest prevalence at 37.31% and 40.85% respectively. Hawalli exhibited the lowest at 27.99%. **Figure 30** presents the prevalence of obesity and overweight by age. Individuals between 40-49 years had the highest incidence of obesity.

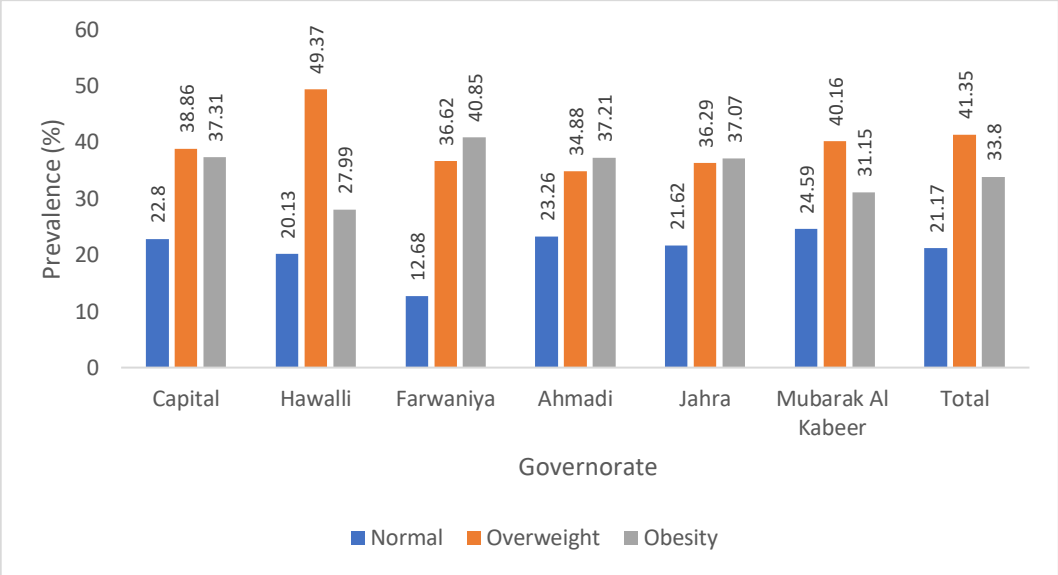

Figure 29: Prevalence of obesity and overweight among Kuwaiti and non-Kuwaiti adults by governorate.

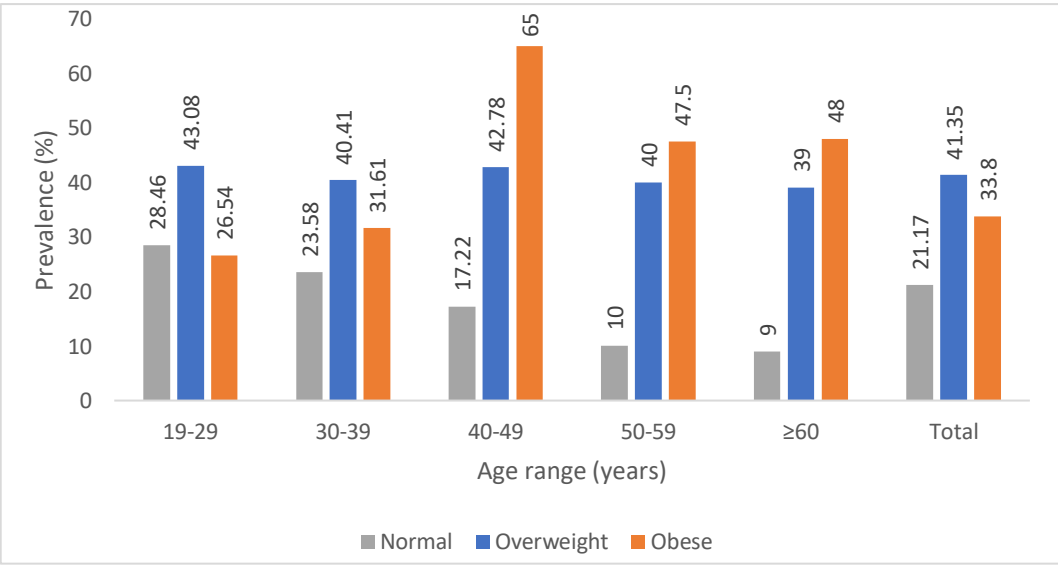

Figure 30: Prevalence of Obesity and Overweight Among Kuwaiti and non-Kuwaiti Adults by Age

Participants were asked about their approaches to weight management and reduction. Of those surveyed, 15.01% reported using multiple weight management strategies. Upon

analyzing the responses, it was found that 67.54% of participants adopted dietary approaches, 46.35% incorporated physical exercise, 3.31 % resorted to herbal remedies, 3.31% relied on pharmaceutical interventions, and 7.94 % 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 52.82% of participants who were classified as obese recognized their weight as being above normal.

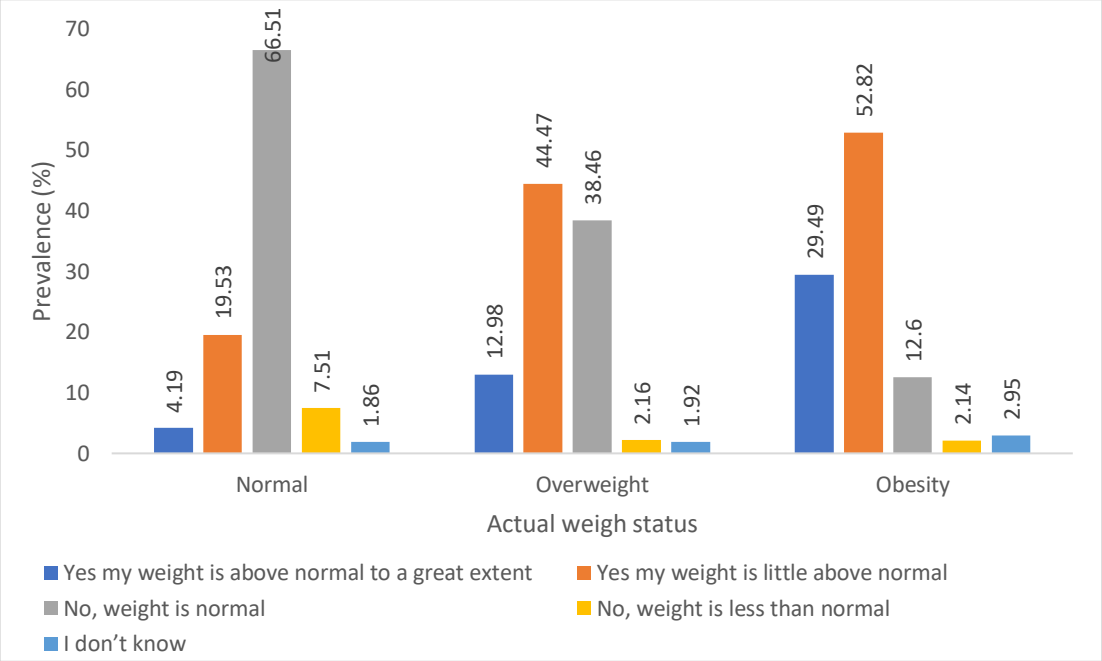

Figure 31: Self-perception of body weight among Kuwaiti and non-Kuwaiti adults by actual body mass index status.

5.7. Prevalence of Anemia

The total prevalence of anemia among male and female was 11.73% and 27.86% 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 41.38%. In contrast, the Farwaniya governorate had the highest prevalence for male adults, standing at 22.73%. Upon analyzing anemia by age (**Figure 33**), female adults within the ≥60 age group showed the most pronounced prevalence of anemia at 37.29%. For male adults, the age group of 50-59 years recorded the highest prevalence at 15.63 %. The prevalence of anemia is assessed based on the guidelines provided by the World Health Organization (WHO, 2017).

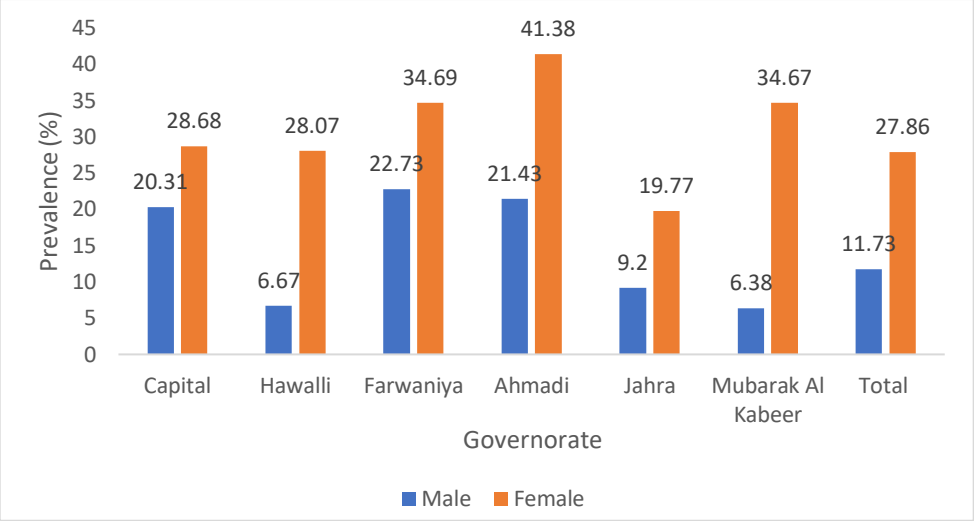

Figure 32: Prevalence of Anemia among Kuwaiti and non-Kuwaiti adults according to governorate.

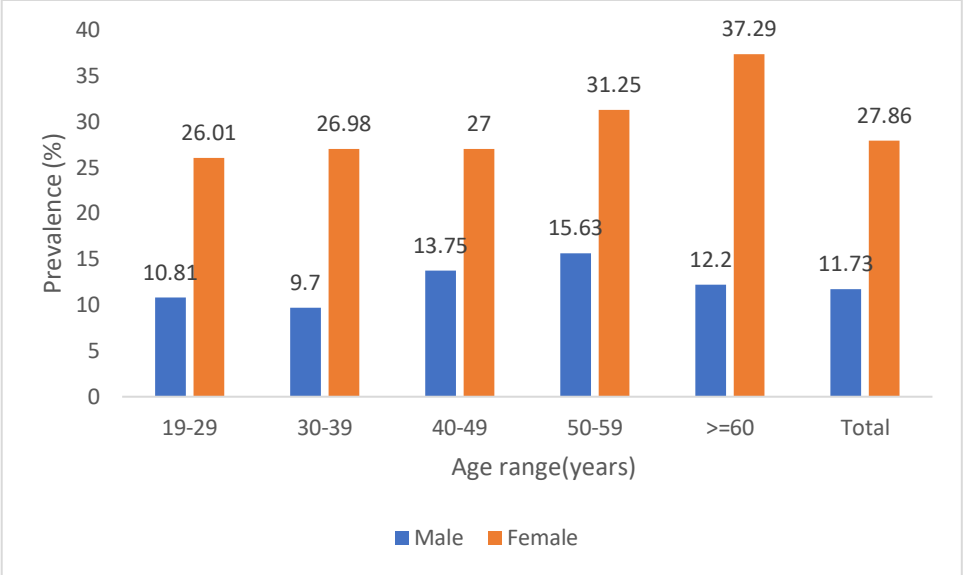

Figure 33: Prevalence of Anemia Among Kuwaiti and non-Kuwaiti adults Segmented by Age

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 1,006 participants, 10.54% either were unsure or did not answer questions related to the frequency of their fruit consumption. Consequently, data from 900 participants was available for analysis, with 23.46% of them reporting daily fruit consumption. Only 1.09% either did not know or chose not to answer questions about their vegetable consumption frequency. This left data from 995 participants, with 54.87% 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 8: Mean number of days in which fruits and vegetables are consumed by Kuwaiti and non-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	3.00	3.75	293	7.00	5.20	319
Female	3.00	3.86	607	7.00	5.40	676
Total	3.00	3.82	900	7.00	5.33	995

Table 9: 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	1.0	1.95	278	2.00	3.36	303
Female	1.00	1.63	570	1.0	3.08	644
Total	1.00	1.73	848	1.50	3.17	947

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

Conclusion

The Kuwait Nutritional Surveillance System (KNSS) paints a troubling picture of adult health in Kuwait. Key findings include:

- **Obesity Crisis:** An alarming 75.15% of adults are overweight or obese, with higher rates in women. This epidemic drive numerous chronic health problems.
- **Lifestyle Challenges:** Physical inactivity is widespread, especially among older adults. Fruit and vegetable consumption are far below recommended levels.
- **Widespread Health Risks:** High blood pressure, high cholesterol, and high blood glucose are highly prevalent, particularly in older individuals.
- **Anemia Burden:** Anemia is unacceptably common, especially among women of childbearing age, impacting both maternal and child health.

Recommendations

The KNSS data highlights urgent needs for multi-level interventions:

1. **Tackling the Obesity Epidemic**
    - Policies to transform the food environment, such as taxes on unhealthy foods, front-of-package labelling, and marketing restrictions.
    - Community-level programs promoting healthy eating and physical activity, with a focus on high-risk areas.
2. **Reducing Chronic Disease Risk Factors**
    - Expand screening and management programs for high blood pressure, high cholesterol, and diabetes.
    - Promote lifestyle changes through public health campaigns and healthcare provider counselling.
3. **Combatting Anemia**
    - Investigate the specific causes of anemia in different population groups.
    - Design targeted interventions such as fortification of staple foods, supplementation programs, and addressing any underlying disease burdens.

Further Research

Continued KNSS surveillance is critical to monitor progress and assess intervention effectiveness. Additional research should focus on:

- Social, economic, and behavioural drivers of unhealthy lifestyles
- Best practices for obesity prevention and chronic disease management in this context

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