Oman National Nutrition Survey

2017

Ministry of Health
Sultanate of Oman

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Foreword by H.E. The Minister of Health

The vision of the Ministry of Health of Oman is to provide optimum health services for all people of Oman. Since the late 1980's, Oman has undergone remarkable improvements in its health and nutrition indicators for women and children, however, despite overall good health in Oman, areas for improvement still remain, such as malnutrition and micronutrient deficiencies.

The most important health issues facing public health authorities in Oman are those related to the epidemiological transition, which pose a double burden of disease. On one side of the spectrum, we continue to fight malnutrition and micronutrient deficiencies in our community, and on the other side, obesity and chronic diseases are on the rise. Continuous and extensive efforts to manage this double burden is the primary goal of the Ministry of Health.

The Oman Ministry of Health has been active in addressing nutritional concerns. In order to prioritize nutrition-related issues and plan for future interventions, a nationwide nutrition survey, the Oman National Nutrition Survey (ONNS), was carried out in 2017. This survey rightly aimed to measure the prevalence and severity of nutrition-related conditions, and provide an understanding of awareness about nutrition among the Oman public. The survey findings will support the prioritization of nutrition-related issues and plan for future interventions that align with our National Health Vision 2050.

I would like to express my happiness at the publication of this report and the valuable recommendations that it puts forth.

We appreciate the dedicated technical and financial support of UNICEF.

I convey my heartfelt gratitude to all staff at the Ministry of Health in the central and regional levels, right from the experts heading the survey to the field workers who worked diligently to collect the vital data upon which this report was built.

Finally, I would like to acknowledge the Directorate General of Primary Health Care (Department of Nutrition) for the diligence, efficiency and professionalism with which this project was handled and for their perseverance for this mission to see the light.

Dr. Ahmed bin Mohammed Al Saidi

Minister of Health

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This survey would not have been possible without the dedicated technical and financial support and efforts of certain organizations and individuals. We express out sincere thanks to UNICEF for their valuable support and guidance along with a special thanks to WHO for their support and cooperation in providing materials and translating questionnaires. We also thank those private companies who contributed the funds without which the survey could not have been carried out. Our gratitude extends to the local community leaders and the Director Generals in the Ministry of Health Directorates of all governorates in Oman where the survey was conducted, for their whole-hearted participation and support. A very special thanks to the media in Oman for highlighting the importance of this survey.

We extend our thanks to all the Ministry of Health staff who were involved in the actual execution and fieldwork, database creation and data management. We have to make a special mention of the colleagues in the Department of Nutrition who worked tirelessly from beginning to end to ensure the optimal analysis and attainment of these report findings, contributing to the national nutrition agenda. We owe them our utmost thanks. Last, but certainly not least, we thank the parents and children who participated in the survey and the field workers (supervisors, interviewers, phlebotomists, anthropometrists, and drivers) who conducted the fieldwork in spite of the many challenges encountered on the ground. A complete list of the teams can be found in appendix 2.

Dr. Samia Al Ghannami,

Director of Nutrition Department

Abbreviations

AGP	α-1-acid glycoprotein
AME	Adult male equivalent
BMI	Body mass index
CI	Confidence Interval
CDC	Centers for Disease Control and Prevention
CRP	C-reactive protein
DHS	Demographic and Health Survey
ELISA	Enzyme-linked immunosorbent assay
HAZ	Height-for-age z-score
HPLC	High-performance liquid chromatography
ID	Iron deficiency
IDA	Iron deficiency anemia
IYCF	Infant and young child feeding
MICS	Multiple Indicator Cluster Survey
MoH	Ministry of Health
MUAC	Mid-upper arm circumference
ONNS	Oman National Nutrition Survey
ppb	Parts per billion
ppm	Parts per million
RERAC	Research and Ethical Review and Approval Committee
RBP	Retinol Binding Protein
TfR	Transferrin receptor
WAZ	Weight-for-age z-score
WHZ	Weight-for-height z-score
WHO	World Health Organization

Executive Summary

Introduction

Ranked amongst the most developed countries in the world, the Sultanate of Oman has undergone very rapid socio-eocnomic development in the past four decades of 1970 to 2010. As a result, the prevalence of various forms of malnutrition have rapidly declined, and Oman has been able to reduce the child mortality rate by 70% since 1990. The health system in the Sultanate is based on effective programs and scientific studies, which included the first malnutrition survey in 1999, the second nutrition survey in 2009 and the national nutrition survey in 2017.

Objectives

The Oman Ministry of Health Department of Nutrition has been active in addressing nutritional concerns. In order to prioritize nutrition-related issues and plan for future interventions, a nationwide nutrition survey, the Oman National Nutrition Survey (ONNS), was carried out in 2017 to measure the prevalence and severity of many nutrition-related conditions. The primary objectives of ONNS were:

1. Evaluation of the dietary pattern of women of childbearing age, pregnant women and children under 5 years of age
2. Estimate the prevalence of anemia in children under the age of 5 and women of reproductive age and pregnant women
3. Estimate the causes of anemia by measuring ferritin in the body and measuring the inflammatory factors (CRP, AGP) to exclude other factors affecting ferritin level in children under the age of 5 years and women of childbearing age
4. Estimate the prevalence of sickle cell anemia and thalassemia for children under the age of 5 years and women of childbearing age
5. Estimate the prevalence of vitamin B12 deficiency and folate deficiency for women of childbearing age
6. Estimate the prevalence of vitamin A deficiency and vitamin D deficiency for children under the age of 5 years and women of childbearing age
7. Estimate the prevalence of underweight, wasting, stunting, overweight and obesity in children less than five years of age
8. Estimate the prevalence of underweight, overweight and obesity in women of childbearing age and underweight for pregnant women.

Methodology

For ONNS, a sample of households was selected from among those Omani households selected for the WHO STEPWISE survey of chronic diseases and risk factors. Although expatriates were included in the STEPWISE survey, they were not selected for the ONNS. Sample sizes were sufficient to make governorate-specific estimates of many nutrition-related conditions. However, because of the relative scarcity of pregnant women in any household survey, the sample size of pregnant women was expected to be sufficient only for national estimates.

In each selected household, data was collected on various household characteristics all children less than 5 years of age, non-pregnant women 15-49 years of age, and pregnant women currently residing in the household. Data collection was done between December 2016 and April 2017. A subsample of children 6-59 months and non-pregnant women 15-49 years of age underwent phlebotomy to collect blood for micronutrient testing. Children and non-pregnant women who did not undergo phlebotomy, as well as all pregnant women, underwent fingerstick to measure hemoglobin concentration. Laboratory testing was done by several laboratories in the Sultanate, Jordan, and Germany.

Results

Household response rates varied from 76.1% in Al-Batinah North to 94.8% in Al-Dhakhlya. Overall, interview and anthropometry data were collected from 92.7% of eligible children and 78.6% of selected eligible women. Response rates for phlebotomy were much lower: 64.6% for children and 86.2% for non-pregnant women. Overall, data was collected on 3,304 households, 3,129 children less than 5 years of age, 4,298 non-pregnant women 15-49 years of age, and 362 pregnant women. The results for major indicators of nutritional status and feeding behaviors are shown in Table 1. The majority of households had fortified cooking oil and wheat flour on hand at the time of the survey interview.

Children less than 5 years of age

Among children, early initiation of breastfeeding is reasonably good, but other indicators of infant and child feeding are suboptimal. The prevalence of wasting and stunting are somewhat elevated given the socio-economic level of the Omani population. Anemia is a moderate public health problem in children. Iron deficiency is less common. On the other hand, sickle cell trait and beta thalassemia are not very common. Vitamin A deficiency is not common, but vitamin D insufficiency is quite common.

Non-pregnant women 15-49 years of age

Most non-pregnant women meet minimum dietary diversity recommendations. Although few had heard of fortified flour, most had heard of iodized salt. Underweight is common, but overweight and obesity is a much bigger public health problem in adult women. As with children, anemia is a moderate public health problem, but iron deficiency is more common in women than in children. Various hemoglobinopathies are also common in women. Vitamin A deficiency is almost unknown, but folate and vitamin B_{12} deficiency are more common. Vitamin D insufficiency is also very common.

Pregnant women

As with non-pregnant women, most pregnant women meet minimum recommendations for dietary diversity. Undernutrition is not common in pregnant women, and the prevalence of anemia is comparable to that in children and non-pregnant women.

Table 1 - Summary of Major Dietary and Nutritional Indicators in Children Less Than 5 Years of Age, Non-pregnant Women 15-49 Years of Age, and Pregnant Women

Indicator[a]	Result	Table or figure[b]
Households		
Has fortified cooking oil	95.4%	Appendix 4. Table 4-1
Has fortified wheat flour	76.1%	Appendix 4. Table 4-1
Children Less Than 5 Years of Age		
Early initiation of breastfeeding (<24 months)	82.0%	Table 13
Exclusive breastfeeding (<6 months)	23.2%	Table 14
Minimum dietary diversity (6-23 months)	80.7%	Table 15
Minimum meal frequency (6-23 months)	64.5%	Table 16
Minimum acceptable diet (6-23 months)	47.0%	Table 17
Stunting	11.4%	Table 26
Wasting	9.3%	Table 27
Overweight or obese	4.2%	Table 28
Underweight	11.2%	Table 29
Anemia (6-59 months)	23.8%	Table 30
Iron deficiency (6-59 months)	10.2%	Table 30
Iron deficiency anemia (6-59 months)	2.9%	Table 30
Sickle cell trait	5.3%	Table 31
Beta thalassemia trait	4.2%	Table 31
Vitamin A deficiency (6-59 months)	9.5%	Table 34
Vitamin D (6-59 months) Deficiency	10.6%	Table 35
Vitamin D (6-59 months) Insufficiency	53.8%	Table 35
Non-pregnant Women		
Meets minimum dietary diversity	85.3%	Table 43
Has heard of fortified flour	19.7%	Table 44
Has heard of iodized salt	61.5%	Table 44
Underweight (low BMI)	9.1%	Table 45
Overweight or obese	59.2%	Table 45
Anemia	27.8%	Table 48
Iron deficiency	24.8%	Table 48
Iron deficiency anemia	13.3%	Table 48
Sickle cell trait	4.7%	Table 50
Beta thalassemia	2.8%	Table 50
Vitamin A deficiency	0.2%	None
Folate deficiency	11.6%	Table 52
Vitamin B^{12} deficiency	8.9%	Table 53
Vitamin D Deficiency	16.2%	Table 54
Vitamin DInsufficiency	41.5%	Table 54
Pregnant Women		
Meets minimum dietary diversity	90.3%	Table 60
Undernutrition (low MUAC)	5.0%	Table 61
Anemia	29.3%	Table 62

a See text of method section for case definitions.

b Refer to the table indicated for more detailed analysis of the outcome, including group-specific results by age, sex, region, residence, wealth quintiles and other variables.

Discussion

A large proportion of Omani households consume fortified cooking oil and wheat flour; however, this survey was unable to measure the concentrations of fortificant in these food vehicles to assess the quality of fortification. Nonetheless, wheat flour fortification with folate and cooking oil fortification with retinol may be, at least in part, responsible for the relatively low prevalence of folate and vitamin A deficiency in women.

Child wasting and stunting are still a problem in Oman, and the prevalence of these conditions has changed little in the past 10 years. On the other hand, overweight and obesity are not currently elevated in young children in Oman. The peak of the age-specific prevalence of wasting in the first year of life may indicate that poor breastfeeding is a major contributor to wasting.

Overweight and obesity are major public health problems in adult women, and the prevalence has steadily increased in recent decades. This may partially explain the high prevalence of diabetes mellitus in Oman, and may result in an increasing problem with cardiovascular disease and cancer.

The prevalence of anemia in children has decreased markedly since 2009. Although anemia is associated with iron deficiency in Omani children, because iron deficiency is relatively rare, anemia may be caused by other contributory factors, such as hemoglobinopathies, inflammation, and others. Anemia in women is a moderate public health problem and may be due more to iron deficiency than anemia in children; however, in both population groups, hemoglobinopathies may play a contributory role.

Vitamin A deficiency is a mild public health problem in children; its prevalence is comparable to other countries in the region. On the other hand, vitamin D insufficiency is common but not associated with outdoor sun exposure as measured in ONNS.

Recommendations

1. Reduce the prevalence of overweight, obesity, folate and vitamin B^{12} in women of reproductive age
2. Reduce the prevalence of stunting and wasting in young children
3. Reduce vitamin D deficiencies in women of reproductive age and young children
4. Measure fortification compliance of flour, bread and oil
5. Prevent further increase in the prevalence of overweight and obesity in young children

1. INTRODUCTION

1.1 Country overview

Over the past four decades, Oman has undergone rapid economic advancement. According to the 2010 United Nations Human Development report, Oman was ranked as the most improved nation in the world in terms of development between 1970 and 2010.[1] As of 2016, Oman ranked 52 out of 188 countries in the Human Development Index and was classified by the United Nations Development Program (UNDP) as having "High Human Development".[2]

As determined by the 2010 census, the population of Oman was 2,773,479, which included 816,143 (29%) non-Omani expatriates. The capital, Muscat, has a population of 775,878 people, and comprises about 28% of the national population. As of 2011, Oman has been divided into eleven administrative governorates, as shown in Figure 1 below.

Figure 1 - Map of Oman showing governorates.

1.2 Nutrition situation in Oman

Economic progress in Oman has been accompanied by a marked change in the nutrition situation. At the national level, undernutrition in children has consistently declined over the past few decades. The prevalence of underweight in children decreased from 24.4% in 1991[3] to 8.6% in 2009.[4] In contrast, stunting prevalence has only declined from 10.6% in 1999[5] to 9.8% in 2009.[4]

Nonetheless, in spite of some improvement, nutritional deficiencies remain. Most notably, recent assessments of the anemia prevalence in Oman indicate severe and moderate public health problems in children and women, respectively. Some micronutrient deficiencies are widespread and others remain unmeasured. Specifically, vitamin D deficiency has been shown to affect one out of four women[6]; however, vitamin D has yet to be assessed on a representative sample of children. Moreover, the high rate of consanguineous marriage in Oman may increase the prevalence of recessively inherited hemoglobinopathies, resulting in an increased prevalence of anemia.[7]

In addition to undernutrition, overnutrition (e.g. overweight and obesity) and its sequelae, are a public health concern in Oman and other countries in the region. A recent study examining global trends between 1980–2013 showed that 73.4% of Omani women are overweight or obese and that Oman has experienced one of the "largest increases in the rate of obesity" worldwide.[8] Non-communicable diseases associated with, and potentially caused by the prevalence of overweight and obesity are of particular concern.

1.3 Programs to combat malnutrition in Oman

Concurrent undernutrition and overnutrition have been termed the "double burden" of malnutrition. To address this double burden, Oman's Ministry of Health (MoH), and its stakeholders, recently developed an action plan to identify the priority areas for the next 5-year health plan. To better formulate this 5-year plan, Oman's MoH and stakeholders have called for a national nutrition assessment to be conducted in 2016 to: provide recent data on those forms of malnutrition known to exist in Oman; assess specific nutrition conditions at a more local level; and to better understand the factors contributing to residual undernutrition and the relatively recent epidemic of overnutrition. The information from this assessment will also be used to evaluate the 8th Five Year Health Development Plan, 2011-2015 and to serve as a base line for the next 9th plan (2016-2020).

In addition to prioritizing nutrition in national health policy, Oman's government has implemented various programs to combat micronutrient malnutrition over the past two decades, including: salt iodization, fortification of wheat flour with iron and folate, and fortification of edible oil with vitamins A and D. In addition, Omani health facilities carry out nutrition screening during well-child checks and Oman's schools routinely collect nutrition and health surveillance data from students.

Oman's flour foritication program, implemented in 1996, mandates the addition of 1.5 ppm of folic acid and 60 ppm of elemental iron.[9] Currently, the program covers more than 75% of Oman's population and has been associated with the reduction in rates of spina bifida.[10] In addition, a prior survey found a lower prevalence of iron deficiency in women living in households in which more fortified flour was consumed.[11]

1.4 Survey goals and hypotheses

There are no *a priori* hypotheses in the ONNS. The goal of this survey is to determine the type, prevalence, and severity of nutritional deficiencies and excesses in the population in order to formulate policy and design appropriate interventions.

The ONNS aims to provide an assessment of several nutritional conditions, including protein-energy malnutrition, overweight and obesity, and micronutrient deficiencies in pre-school children and Omani women. Although several surveys have provided prior assessments, there is very few data about some nutrition conditions and no data available at the governorate level. Moreover, the contribution of various risk factors to both undernutrition and overnutrition have not been systematically assessed. Thus data is needed for program planning for the 9th 5-year Health Development Plan, 2016-2020 as well as for evaluation and revision of existing programs.

1.5 Primary objectives and indicators

From a nationwide sample of households and household members, the ONNS collected data from (i) households, (ii) children 0-59 months of age, (iii) non-pregnant women of child-bearing age (15-49 years of age), and (iv) pregnant women. The ONNS has 10 primary objectives:

1. Estimate the prevalence and severity of anemia in pre-school children, non-pregnant women, and pregnant women by measuring hemoglobin concentration in whole blood.
2. Estimate the prevalence and severity of iron deficiency in pre-school children and non-pregnant women by measuring ferritin and soluble transferrin receptor (TfR) in plasma. Markers of inflammation (C-reactive protein (CRP) and α-1-acid glycoprotein (AGP)) will be measured to correct the ferritin concentration in those survey subjects with spuriously elevated ferritin levels due to inflammation.
3. Estimate the prevalence and severity of vitamin A deficiency in pre-school children and non-pregnant women by measuring retinol-binding protein (RBP) in plasma. RBP values will be corrected for inflammation using CRP and AGP.
4. Estimate the prevalence and severity of folate and vitamin B^{12} deficiency in non-pregnant women by measuring concentrations of both vitamins in plasma.
5. Estimate the prevalence and severity of vitamin D deficiency in pre-school children and non-pregnant women by measuring the concentration of 25-hydroxyvitamin D (25[OH]D).
6. Estimate the current prevalence of acute malnutrition (wasting), chronic malnutrition (stunting), and overweight and obesity in pre-school children by calculation weight-for-height and height-for-age z-scores using the WHO Child Growth Standard.
7. Estimate the current prevalence of chronic energy deficiency and overweight and obesity in non-pregnant women by calculating body mass index (BMI).
8. Estimate the current prevalence of undernutrition in pregnant women by measuring mid-upper arm circumference (MUAC).
9. To estimate the role of various causes of anemia by measuring iron status and inflammation, as described above, in addition to testing for hemoglobinopathies, including sickle cell disease and trait and β-thalassemia.
10. Measure the prevalence and severity of risk factors for obesity related to diet and physical activity in pre-school children and adult non-pregnant and pregnant women.

1.6 Secondary objectives and indicators

Additional variables which may influence malnutrition or play a contributory role will also be assessed, including: evaluation of socio-economic status; household food consumption patterns; infant feeding and breastfeeding practices; intake of micronutrient supplements and; household sanitaion and hygiene.

Figure 2 shows the conceptual framework for acute malnutrition formulated by UNICEF and partners to demonstrate causal chains leading to wasting. ONNS, like all surveys, measures some of these factors more easily with more accuracy than other factors. In general, public health and epidemiology can most easily measure many underlying causes of acute malnutrition, but is poorly equipped to closely examine basic causes.

Figure 2 - UNICEF conceptual framework of the causes of acute malnutrition (adapted from UNICEF nutrition training lesson 2.5[12]).

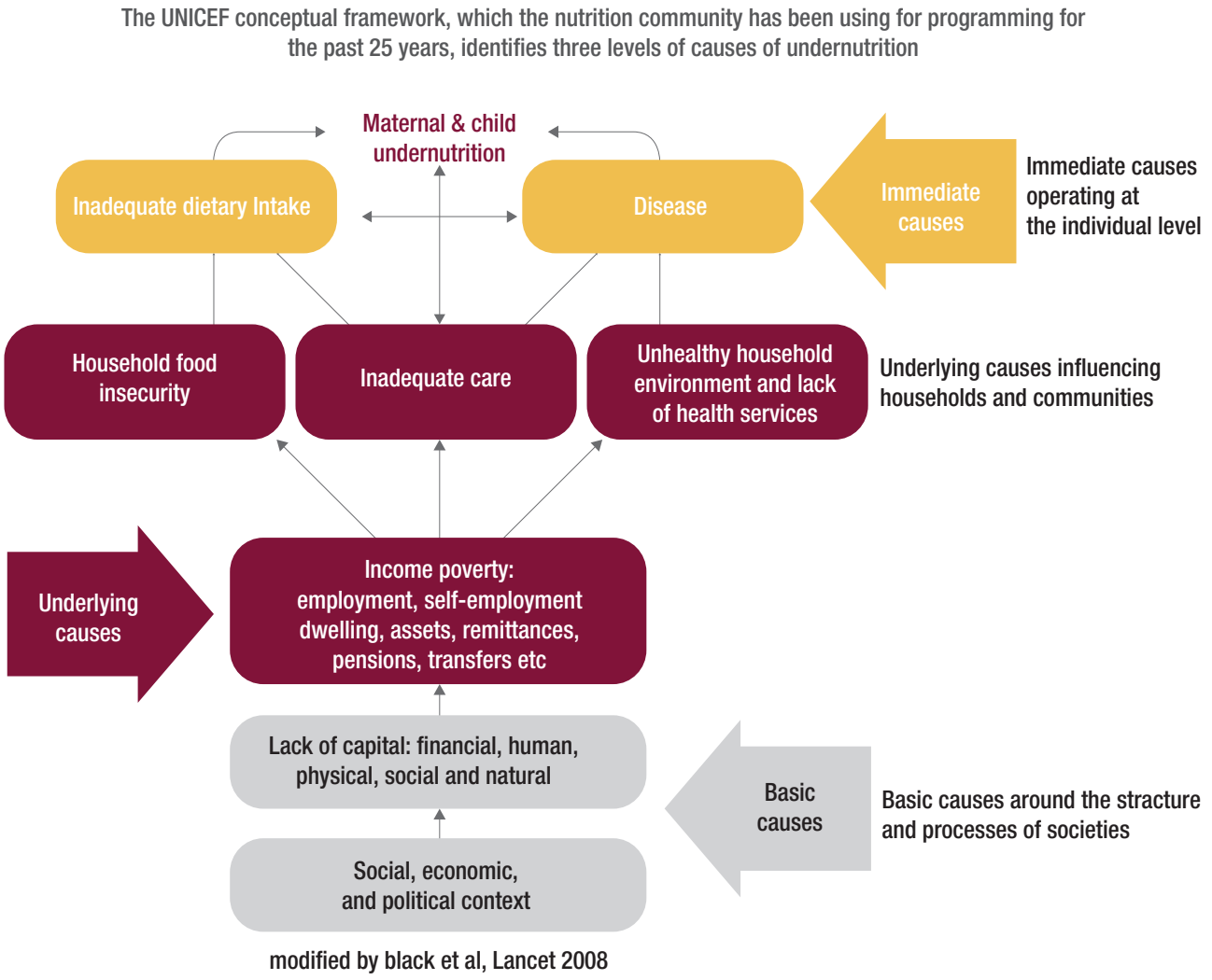
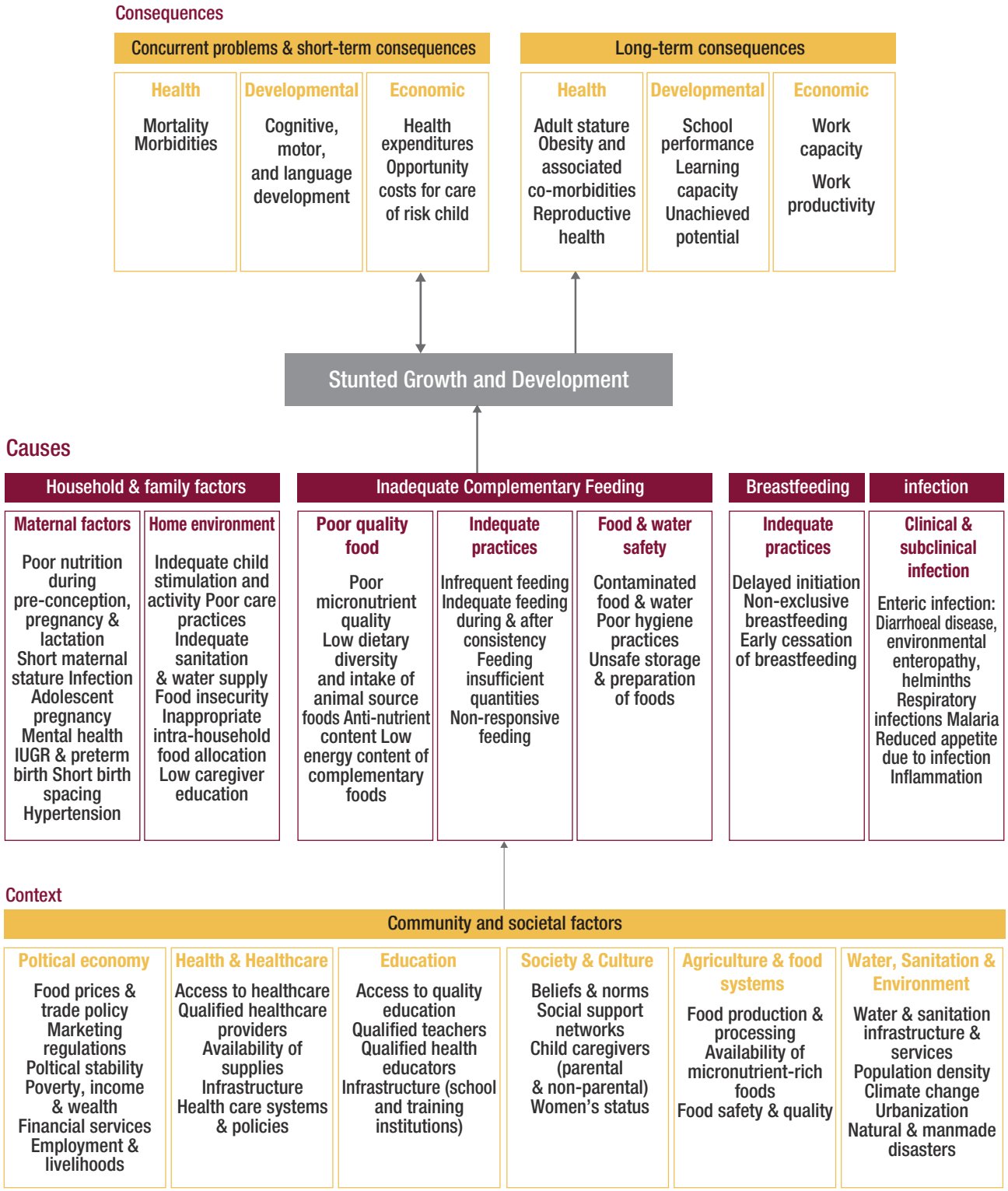


Figure 3 shows a conceptual framework for chronic malnutrition formulated by WHO. The number of variables listed make it very difficult to assess all factors in a single cross-sectional survey, but ONNS included many of those more amenable to data collection during interviews.

Figure 3 - WHO conceptual framework of the causes of chronic malnutrition (from reference Stewart CP, et al.[13]).



2. METHODOLOGY

2.1 Study populations

Households were selected at random within further randomly selected primary sampling units. Individuals fulfilling all inclusion criteria were asked to answer questions related to health and nutrition, have weight and height measured, and to provide blood specimens. Table 2 below lists the inclusion criteria for enrollment into the survey for each of the target groups. Women 18 years of age and older were not enrolled if they did not give consent, and girls 15-17 years of age and children less than 5 years of age were excluded if the child's caretaker refused to give consent on their behalf. However, individuals and caretakers were able to give consent for some components of survey data collection and not others. For example, in some cases, caretakers agreed to respond to the child questionnaire and agreed for the child to be weighed and measured, but refused the blood collection component of the ONNS.

Table 2 - Inclusion criteria by targeted population group

Target population	Inclusion criteria
Household	• At least one Omani citizen lives in the household • Household head or his or her spouse or other adult member gives written consent for survey data collection
Pre-school children	• Currently lives in eligible household • Age less than 5 years at the time of survey data collection (not yet reached fifth birthday) for questionnaire and anthropometry; age between 6 and 59 months for blood sampling • Is an Omani citizen • Parent or guardian provides written informed consent on behalf of the child
Non-pregnant woman	• Currently lives in eligible household • Age 15-49 years at the time of survey data collection • Is currently not pregnant by self-report • Is an Omani citizen • Gives written consent for herself (if less than 18 years of age, parent or guardian gives consent and girl gives assent)
Pregnant woman	• Currently lives in eligible household • Currently pregnant by self-report • Is an Omani citizen • Gives written consent for herself or, if less than 18 years of age, a parent, guardian, or husband gives consent and girl gives assent

2.2 Sampling procedure

For the purposes of conducting census counts, all of Oman was divided into census blocks. Each census consists of about 120 households and was divided into two blocks of about 60 households each. However, some blocks have many more households and may contain more than two blocks, and in small villages some blocks have fewer than 60 households.

The ONNS sample was a sub-sample of the STEPWISE survey, beside thus the sampling procedure of the STEPWISE was integral to the design of the ONNS. The primary sampling unit used for the first stage of sampling of the STEPWISE survey was the census block from the 2010 Oman census. For both the STEPWISE survey and the ONNS 2017, the 11 governorates of Oman were treated as separate strata. Stratified sampling was done; that is, separate samples of equal numbers of census blocks were selected in each of the 11 governorates. For the STEPWISE survey, all census blocks within each governorate were listed, and 50 blocks were selected from each governorate with equal probability. The ONNS 2017 used the same blocks selected for the STEPWISE survey.

Because the national household census dates back to 2010, the household lists for each selected census block were updated before households could be selected. Teams of enumerators traveled throughout each selected block to ensure that households who had left the block since the 2010 census were deleted from the household list and that households which had entered the block since 2010 were added. After this updating was completed, a complete list of all households in selected census blocks in each governorate was made. The number of households required in each governorate were then selected for the STEPWISE survey from the updated governorate household list of selected census blocks. These households were selected without regard to the citizenship of the household members. As a result, the sampling fraction in selected census blocks was the same, and the size of the resulting clusters varied widely.

The ONNS 2017 included only Omani households as Omani citizens are the primary beneficiaries of national public health programs. A subsample of households were selected for the ONNS from those Omani households selected in each governorate for the STEPWISE survey. This lead to selection of Omani households which were grouped into clusters of widely different numbers of households in each block. Moreover, the number of clusters were different in each governorate. However, in Muscat, only 318 Omani households were selected for the STEPWISE survey; all were included in the ONNS. In Muscat, a lower proportion of all households are Omani relative to other governorates.

2.3 Sample size determination

The sample size required for each stratum was calculated after making assumptions about the estimated prevalence, the desired precision around the point estimate of prevalence, and the expected design effect for each indicator and target group. The calculation took into account an expected minimum household response rate of 95%. Individual response rates for interview questions and anthropometric measurements were assumed to be 85%, while response rates for phlebotomy were assumed to be lower (75%). All calculations used Fisher's formula for estimating the minimum sample size for estimating prevalence:

$$n = \frac{Z^2_{\alpha/2} P(1-P)}{d^2} \times DEFF \times \frac{100}{CombinedRR}$$

Where:

Zα/2 = Z-value of 1.96 corresponding to the 95% confidence level
P = the assumed prevalence
d = Desired precision expressed as a half confidence interval
DEFF = Design effect
RR = Response rate (household response x individual response) expressed as a decimal

In addition, the sample size for blood specimens was adjusted to ensure that no more than 3,000 specimens would be selected because selected international laboratories no longer accept more than 3,000 specimens per project. As such, blood specimens were collected from only 50% of pre-school children and only 25% of non-pregnant women. However, because Muscat was the only governorate in its phlebotomy stratum, blood specimens were obtained from children and women in twice as many households (children in all households and women in 50% of households) to ensure sufficient sample size. For selected women and children not recruited for phlebotomy, anemia status was assessed using finger stick because measuring hemoglobin can be done on-site and does not require the collection of a blood specimen.

Households were randomly assigned, *a priori*, to groups: households in which no individuals would be recruited for phlebotomy, households in which only children would be recruited, or households in which both women and children would be recruited. Survey teams were, however, instructed to perform a fingerstick for hemoglobin testing from all pregnant women because pregnant women are relatively scarce and recruitment of all available pregnant women was required to meet sample size requirements for nationwide estimates.

For logistical and financial reasons, a feasible sample size of approximately 4,000 households were recruited for the ONNS 2017. Appendix 1 shows the estimated minimum sample sizes required for each target group and indicator. For several outcomes and target groups, the precision resulting from a sample size of 4000 households falls short of the desired precision; however, calculations showed that this short-fall was not substantial. For pre-school children, non-pregnant women, and pregnant women, the number of households needed to find the desired number of individuals were calculated from the average number of individuals of each target group per household. These sample size calculations do not take into account any potential statistical benefit from the stratified sampling which, if the outcome is associated with the stratification variable, can substantially improve precision.

These precision calculations take into account that those indicators measured in specimens obtained by phlebotomy (deficiencies of iron, vitamin A, vitamin D, folate, and vitamin B_{12}) would only be measured in children in a 50% subsample of households and in women in a 25% subsample of households in most governorates, but children in all households and women in 50% of households in Muscat.

2.4 Ethical considerations

To ensure that the ONNS 2017 followed the principles necessary to protect respondents and prevent unnecessary risk, the protocol was submitted to the Research and Ethical Review and Approval Committee with Oman's Ministry of Health. The protocol was granted ethical approval (Ref: MH/DGP/R&S/PROPOSAL_ APPROVED/45/2015).

The household head or, in his/her absence, the spouse or another adult household member, was asked to provide written consent to participate in the interview. For blood specimen collection and anthropometry, adult women were asked to provide written informed consent for themselves. For pre-school children and girls 15-17 years of age, a parent or legal guardian was asked for written consent. Girls 15-17 years of age also had to give verbal assent before they could be recruited for participation. All respondents were told that they were free to withdraw from participation in the survey at any time, even after written consent had been given. For children younger than 6 months of age, no blood or other biologic specimens were collected.

2.5 Field work and data collection

2.5.1 Training of survey teams

One week prior to the start of ONNS data collection, all field workers (supervisors, team leaders, interviewers, phlebotomists, anthropometrists, and laboratory technicians) were trained on proper data and specimen collection procedures.

The training consisted of two days of theoretical training and two days of role play and practice to familiarize field workers with the survey procedures, instruments, and equipment. All survey questionnaires were developed in English and translated to Arabic prior to the survey training. During the survey training, in-depth discussions were held about each question and response option to ensure that the Arabic translation was clear and match the original English questionnaire. Interviewers practiced interviews during role playing exercises. Phlebotomists drew blood specimens from field workers, and laboratory technicians practiced processing and labeling

samples. Because the measurement of height and weight on children can be more difficult than measurements taken on adult women, an anthropometric standardization exercise for children was undertaken. As part of this exercise, multiple children were measured by each team. Inter-measurer variability and difference from an expert measurement was measured and excess variability corrected.

Following classroom training, two days of field testing were undertaken in two census enumeration areas in Muscat (one urban and one peri-urban), which were not included in the ONNS. Corrections to team members were made during field testing, and each completed questionnaire was reviewed by the trainers. Feedback was provided to the interviewers and team leaders on their completion of questionnaires. In addition, the Arabic translation was further refined based on the experiences during field testing. More trainees were recruited than were needed for the survey to ensure that only the best performing individuals would be selected for actual data collection. Field workers were selected for survey data collection based on their performance on the anthropometry standardization exercise, their perceived understanding during the classroom training, and their quality of work during field testing. The best performing and most experienced interviewers were hired as team leaders. The names and responsibilities of each team are presented in Appendix 2.

2.5.2 Field work

Data collection was conducted between 13 December 2016 and 4 April 2017. Each of the 11 teams were comprised of one team leader, two interviewers, one phlebotomist, one anthropometrist, and one driver. Each team was responsible for data collection of an entire governorate. All teams were compose of more than one-half female staff, and female staff did all anthropometric measurements on children and women.

Survey teams conducted interviews at selected households and administered the household questionnaire first, followed by the child and women questionnaires. Interviews were done in Arabic. To determine an individual's age, interviewers requested adult women to provide their national identity card and/or passport, and for caretakers of children to provide the child's health card.

Following the completion of all interviews in the household, height and weight measurements were taken from recruited non-pregnant women and children in the household. MUAC measurements were taken on pregnant women and children. Following the collection of anthropometric measurements, the team phlebotomist collected blood samples from children and women depending on the households *a priori* designation for phlebotomy. In children, 4ml of blood was collected in an EDTA-coated vacutainer to obtain plasma for the analysis of micronutrient biomarkers and whole blood to measure markers of hemoglobinopathies. In non-pregnant women, blood was collected in two vacutainers: 1) 2ml of blood was collected in an EDTA-coated vacutainer which was used to measure markers of hemoglobinopathies, and 2) 4ml of blood was collected in non-coated vacutainers yielding serum to measure micronutrient biomarkers. Two vacutainers were collected from women because the EDTA-coated vacutainers available in Oman were not of sufficient volume to yield the quantity of plasma required.

While at the household, the phlebotomist used a DIFF-Safe™ device to express a drop of blood onto a weighing boat to measure hemoglobin concentration. For pregnant women, only hemoglobin concentration was measured on fingerstick blood; no additional blood specimen was collected. Individuals were not in a fasting state at the time of blood collection; this was not necessary because no biomarkers sensitive to a fasting state were measured.

Phlebotomists urgently referred women and children with anemia (i.e. hemoglobin <110 g/L for children and pregnant women, <120 g/L for non-pregnant women) and/or severe malnutrition (i.e. MUAC < 11.5 cm for children and <18.5 for pregnant women) to the nearest health facility to receive further diagnosis and treatment. At the end of each day, the team leader reviewed and collated the questionnaires. Interviewers were notified of any errors or omissions and instructed to correct and complete the questionnaire if possible.

2.5.3 Cold chain and processing of blood samples

Blood specimens collected by phlebotomists were temporarily stored in cold boxes at 2-8°C until processed within 24 hours. Cold boxes were refilled with frozen ice packs daily and were equipped with thermometers.

Each phlebotomist completed a specimen transport log which recorded the identification numbers of specimens collected on that day and the temperature prior to transport of the specimens to the regional laboratories for processing. Laboratory technicians were also requested to record the temperature of the specimens upon arrival. Phlebotomists and laboratory technicians were instructed to maintain the temperature in the cold box at ~4°C and to notify the team leader if temperatures in the cold box were below +2°C or above +8°C.

Following the receipt of specimens at the regional laboratories, specimens were temporarily stored in refrigerators at ~4°C until centrifuged and pipetted into separate aliquots in labeled plasma vials. Once prepared, the vials were stored in freezers at -15 to -20°C.

Once the field work was completed, specimens were shipped to the Central Public Health Laboratory located in Muscat. Samples from governorates adjacent to Muscat were shipped using wet ice, whereas samples from governorates farther from Muscat were shipped on dry ice. Specimens were sorted and stored at -20°C until shipped with dry ice to laboratories in Germany and Jordan. The directors of the laboratories in Germany and Jordan reported that all shipments arrived with dry ice remaining in the box and all specimens frozen.

2.6 Measurement and definitions of outcomes

2.6.1 Calculation of wealth index and socio-economic status

A wealth index was calculated using the principal component analysis method commonly employed by UNICEF MICS, the World Bank, and the World Food Programme.[14,15] Characteristics of the dwelling, water and sanitation facilities, and ownership of durable goods were included in the principal component analysis. A wealth index was calculated for each household and split into quintiles on unweighted data to permit the cross-tabulation of various nutrition indicators by household wealth.

2.6.2 Estimations of flour and oil intake per adult male equivalent

The daily quantity of oil and flour consumed in each household was calculated from the quantities purchased or money spent on an average purchase and the reported frequency of purchase. The number of adult male equivalents (AMEs) was calculated from the household roster determined during the household interview using established equivalents.[16,17] The AME is the proportion of an adult male's energy requirement which is needed by each age- and sex-specific group. Age and sex were used to calculate the AME for each household member, then the AMEs for all household members were summed up to determine the total AMEs in each household. The total purchase per unit time of each food commodity was then divided by the number of AMEs in each household to determine the average consumption per AME per unit time in each household.

2.6.3 Anthropometric measurements and indices and indicators of child feeding

Anthropometric indices and measurements were used to determine nutritional status in young children, non-pregnant women, and pregnant women. In children less than 5 years of age, height or length and weight were measured using standard methods.[18] Anthropometric indices, including weight-for-height, height-for-age, and weight-for-age z-scores, were calculated using SPSS programming supplied by WHO. This software uses the WHO Growth Standard as the reference population. All forms of undernutrition were defined as a z-score less than -2.0. Severe forms were defined as a z-score less than -3.0, and moderate was a z-score of -3.0 to -2.01. Wasting was defined using the weight-for-height z-score, stunting used the height-for-age z-score, and underweight used the weight-for-age z-score. Overweight in children was defined as a z-score greater than +2.0 through +3.0. Obesity was a z-score greater than +3.0.

Nutritional status in non-pregnant women 15-49 years of age was assessed using BMI which is the ratio of weight in kilograms divided by the square of height in meters. According to standard recommendations, categories of BMI include severe undernutrition (BMI < 16.0), moderate undernutrition (BMI 16.0-16.9), at risk of undernutrition (BMI 17.0-18.4), normal (BMI 18.5-24.9), overweight (BMI 25.0-29.9), and obese (BMI 30.0+).[19] Women's height was categorized into short stature (<150 cm) vs. normal stature (150 cm and greater) in order to assess maternal height as a risk factors for child stunting.[20]

Because of the additional weight from products of conception, BMI does not reflect nutritional status in pregnant women; therefore, in this group of survey participants, MUAC was used to measure nutritional status. MUAC < 23.0 cm indicates undernutrition.[21,22]

The additional measurements of waist and hip circumference were taken on non-pregnant women 15-49 years of age in a standard fashion.[23] Waist circumference measurements were classified as normal (≤80 cm), increased (80.1-88.0 cm), or substantially increased (>88.0 cm).[24] Waist-hip circumference ratio was calculated by dividing the waist circumference by the hip circumference; normal waist-hip ratio was defined as <0.85.[24]

During interviews with the mother or caretaker, questions were asked to derive all 15 of the standard infant and young child feeding indicators recommended by WHO and UNICEF. These indicators are measured in different age groups; the age group for each indicator is shown in each table presenting infant and young child feeding results. For a detailed description of each indicator, see the WHO/UNICEF recommendations.[25]

2.6.4 Calculation of sun exposure index

As the quantity of vitamin D synthesized by the body is related to sun exposure, we estimated the average sun exposure that women and children were subjected to on a daily basis. The index was comprised of data from several questions and was based on an approach developed by Gannage-Yared et al.[26] Specifically, average sun exposure was estimated as the number of hours spent outside daily. Use of sun protection and sunscreen adjusted the sun index according to the consistency with which such protection was used by multiplying the time spent in the sun by the following factors:

Consistency	Multiplication factor
Never/rarely	1.0
Sometimes	0.8
Most of the time	0.2
Always	0

The index was then multiplied by the percentage of the body exposed to sunlight (4.5 percent for the head, 1 percent for each hand, and 9 percent for each arm).

2.7 Biological testing methods

2.7.1 Anemia

Hemoglobin status was measured on-site using a HemoCue™ portable hemoglobinometer (Hb301, HemoCue AB, Ängelholm, Sweden). Quality control of the HemoCue devices was done daily using both low and normal concentration liquid control specimens as recommended by the device manufacturer. Control specimens were kept in cold boxes throughout the duration of the field work.

2.7.2 Iron, vitamin A, and acute phase proteins

Plasma or serum ferritin and RBP were used to assess individuals' iron and vitamin A status, respectively. Ferritin is a biomarker of iron status recommended by the WHO for population based surveys.[27] While the WHO's recommended biomarker for vitamin A status is plasma retinol, measuring RBP is cheaper, can be done with smaller quantities of plasma, and produces results which are highly correlated with plasma retinol.[28]

Plasma ferritin and RBP were analyzed using an enzyme linked immunosorbent assay (ELISA) technique by the VitMin Laboratory, Willstaett, Germany.[29] The VitMin Laboratory participates regularly and performs well in inter-laboratory comparisons, such as the VITAL-EQA from the Centers for Disease Control and Prevention (CDC) in Atlanta, Georgia, USA.

Because ferritin and RBP levels can be affected by inflammation, the acute phase proteins alpha-1-acid-glycoprotein (AGP) and C-reactive protein (CRP) were also measured by the VitMin Laboratory. These values, were then used to correct the ferritin and RBP values using the technique published by Thurnham et al.[30,31]

Because RBP is not a WHO-recommended biomarker for assessment of vitamin A status, the correlation between the RBP results and serum retinol measured by high-performance liquid chromatography (HPLC) was checked by testing a subset of plasma specimens from children and non-pregnant women at the Khatib Micronutrient Laboratory in Amman, Jordan. The laboratory has repeatedly participated and performed well in this analysis in the CDC external quality assurance program Vital-EQA. Comparisons of retinol and RBP values are presented in Appendix 3. There was strong correlation between retinol and RBP values when compared as continuous values. The kappa coefficient of agreement and the sensitivity were higher when the RBP cut-off defining vitamin A deficiency was adjusted to 0.73 µg/L instead of 0.70 µg/L. For this reason, 0.73 µg/L was used to define vitamin A deficiency.

2.7.3 Vitamin D

Plasma and serum vitamin D concentrations were assessed in children and women using the tandem Mass LC/MS analyzer at the Khatib Micronutrient Laboratory.

2.7.4 Plasma folate and vitamin B_{12}

Plasma folate and vitamin B_{12} concentrations in women were assessed using electro-chemoluminescence with the Cobas e411 automated analyzer (Roche, Switzerland) at the Khatib Micronutrient Laboratory (Amman, Jordan).

2.7.5 Hemoglobinopathies

Whole blood samples from children and women were used to assess the hemoglobin disorders of homozygous or heterozygous sickle cell and β-thalassemia at Sultan Qaboos University Hospital. High performance liquid chromatography (HPLC) was used for the determination of various hemoglobins, including hemoglobin A2, S, and F. The variant II is a fully automated

cation exchange HPLC system which can be used to separate and determine area percentages for hemoglobin A2 and F and to provide qualitative and quantitative determination of abnormal hemoglobins. The samples are automatically mixed and diluted on VARIANT II sampling station and injected to the analytical cartridge. The VARIANT II chromatographic station dual pumps deliver a programmed buffer gradient of increasing ionic strength to the cartridge, where changes in the absorbance at 415 nm are measured. An additional filter at 690 nm corrects the background absorbance. The VARIANT II clinical data management software performs reduction of raw data collected from each analysis. One-level calibration is used for adjustment of the calculated HbA2/F values. A sample report and chromatogram are generated by CDM for each sample. To aid in the interpretation of results, windows (e.g. ranges) have been established for the most frequently occurring hemoglobin, based on their characteristic retention time. Retention time is the elapsed time from injection of the sample to the apex of a hemoglobin peak. Each hemoglobin has a characteristic retention time. The minor differences in the separation efficiency of individual analytical cartridges are corrected by the use of the hemoglobin A2/F calibrator. Sickle cell trait or disease was diagnosed by the presence of hemoglobin S. Carriers of the β-thalassemia gene were diagnosed by having more than 3.4% of all hemoglobin being HbA2.

2.8 Case definitions for blood biomarkers

The cut-off values defining abnormal levels of each biomarker are presented in Table 3 below. For hemoglobin and vitamin D, multiple cut-offs are used to classify severity. For other indicators, a single cut-off is used to identify deficiency or abnormality.

2.9 Data management and analysis

2.9.1 Data entry

Completed questionnaires were entered into a computer database at the MoH office under the supervision of the data entry supervisor using EpiData v. 3.02. To reduce data entry errors, EpiData data-entry screens were programmed to accept only codes within a predetermined range specific to each variable. Data were double-entered, verified, and corrected following the completion of the field work. Completed questionnaires and blood collection sheets were kept in a locked office at the MoH to maintain confidentiality.

Data entry did not include any individuals' names or identifying information to prevent identification of study subjects by dataset users. For laboratory data obtained in electronic form, unique individual identification numbers were used to match the interview information with laboratory testing results.

2.9.2 Data analysis

Data analysis was done using SPSS version 24 with the complex survey module. Standardized statistical weights for household variables were calculated to account for the unequal selection probability in the strata. Moreover, because the sampling fraction for phlebotomy differed among governorates, separate sampling weights for women and children were calculated for use with those analytes tested on blood obtained by phlebotomy. No sampling weights were used to generate governorate-specific estimates.

Table 3 - Clinical cut-off points and classifications for biomarker indicators.

Indicator	Severe	Moderate	Mild	Adequate	Reference for cut-off
Hemoglobin (g/L) a					
Children 6-59 months of age	< 70	70-99	100-109	≥ 110	32
Non-pregnant women	< 80	80-109	110-119	≥ 120	
Pregnant women	< 70	70-99	100-109	≥ 110	
	Cut-off defining deficiency or abnormality				
Retinol-binding protein (µmol/L) [b]					
Children 6-59 months of age	<0.7				33,34
Non-pregnant women	<0.7 Deficiency; <1.05 insufficiency				
Plasma ferritin (µg/L) [b, d]					
Children 6-59 months of age	< 12				35
Non-pregnant women	< 15				
C-reactive protein (mg/L)					
Children 6-59 months of age	>5.0				36
Non-pregnant women	<5.0				
α1-acid-glycoprotein (g/L)					
Children 6-59 months of age	>1.0				36
Non-pregnant women	>1.0				
Vitamin D (nmol/L)					37
Children 6-59 months of age	<30 Deficiency; < 50 Insufficiency				
Non-pregnant women	<30 Deficiency; < 50 Insufficiency				
Plasma Folate (nmol/L)					38
Non-pregnant women	<10.0				
Plasma B_{12} (pmol/L)					38
Non-pregnant women	<150				

a Hemoglobin values were adjusted for altitude according to standard recommendations. Because only 2 (0.05% of the 4,598 women in the ONNS sample reported smoking every day, hemoglobin was not adjusted for smoking.

b The laboratory testing results were adjusted for sub-clinical inflammation using appropriate algorithms.

Data analysis included calculation of proportions to derive the prevalence of nutrition and health outcomes and means as measures of central tendency for continuous variables. These measures were calculated in aggregate (i.e. for the entire sample across all strata), for each stratum, and for the valiables woman's educational status, wealth quintile, and sex (for children only). Results are also presented by specific age sub-groups for pregnant women, non-pregnant women, and children. For pregnant women, no governorate-specific estimates were generated because of the small sample size. No analysis by urban vs. rural residence could be done because this classification does not exist in the Oman census data; therefore, clusters and households could not be classified as urban or rural.

The statistical precision of all point estimates were assessed using 95% confidence limits, which were calculated accounting for the complex sampling used in this survey, including the cluster and stratified sampling. The statistical significance of differences between subgroups was assessed using Chi square, using weighted analysis and adjusted for complex sampling.

3. RESULTS

3.1 Response rates for households, children & women

Response rates were calculated separately for interview and anthropometry together and for phlebotomy. Some households selected for this survey sample, but from which no data was collected, were considered non-response because their selection was due to a problem with the sampling frame. These households included those: 1) where the household members could not be located at the address listed because they had permanently moved out of the census block; 2) for which the address listed in the sampling frame was an empty lot or the house was vacant, demolished, or under construction, and 3) the household members were absentee landlords who permanently lived outside the census block. Such households were not included in the denominator of response rate calculations. Household and individual non-response was included if: 1) household members or targeted individuals usually living in the household were not present when the survey teams could collect data, or 2) the household head or targeted individuals (or their caretakers) refused participation in survey data collection.

Table 4 below shows the overall response rates for households and the interview and phlebotomy response rates for women and children. Because women could not be questioned about current pregnancy status until they had consented to interview, interview response rates could not be calculated separately for pregnant and non-pregnant women. Nationwide, for all but one governorate, household response rates did not achieve the 95% which was assumed in sample size calculations. In several governorates, household response was quite low. On the other hand, once household consent for survey participation was obtained, the individual response rates for children less than 5 years of age for interview and anthropometry were greater than the 85% assumed in sample size calculations, with the exception of Muscat. Individual response rates among children 6-59 months of age in consenting households for phlebotomy were much lower, reaching as low as one-third in Muscat. Among women in consenting households, interview and anthropometry response was lower than the assumed level of 85% in all but three governorates; however, women's individual response rate for phlebotomy was substantially greater than the 75% level assumed in all governorates but Muscat.

From 3,304 participating households data was available on 3,129 children less than 5 years of age, 4,298 non-pregnant women 15-49 years of age and 362 pregnant women.

Table 4 - Results of recruitment for interview and anthropometry and phlebotomy in households, children, and women.

	Households		Children < 5 years of age				All women		Non-pregnant women ONLY	
	Number of eligible house-holds	% of house-holds with complete data	Number of eligible children	% of children with interview and anthropo-metry	Number of children eligible for phlebotomy	% of children with phlebo-tomy	Number of women eligible	% of women with interview and anthropo-metry	Number of women eligible for phlebotomy	% of women with phlebotomy
Total	**3862**	**85.6%**	**3248**	**92.7%**	**1677**	**64.6%**	**5401**	**78.6%**	**1749**	**86.2%**
Muscat	292	**82.9%**	162	**80.9%**	125	**33.6%**	402	**66.2%**	217	**69.1%**
Dhofar	365	**87.1%**	367	**97.0%**	156	**59.6%**	579	**80.5%**	169	**91.7%**
Al-Dhakhlya	343	**94.8%**	336	**97.6%**	155	**77.4%**	525	**88.2%**	98	**94.9%**
Al-Sharqyah North	365	**84.7%**	253	**96.8%**	151	**69.5%**	399	**87.2%**	151	**88.7%**
Al-Sharqyah South	362	**79.6%**	272	**94.9%**	154	**79.2%**	472	**73.5%**	167	**85.6%**
Al-Batinah North	327	**76.1%**	306	**88.6%**	134	**73.9%**	472	**73.1%**	140	**92.1%**
Al-Batinah South	359	**80.5%**	303	**87.1%**	162	**61.7%**	501	**71.5%**	157	**87.9%**
Al-Dhahairah	361	**83.7%**	329	**89.7%**	161	**64.6%**	601	**74.9%**	154	**89.6%**
Al-Buraimy	366	**88.0%**	301	**98.7%**	168	**71.4%**	435	**88.5%**	181	**87.3%**
Musandam	357	**89.9%**	258	**88.4%**	152	**55.3%**	430	**79.1%**	182	**88.5%**
Al-Wusta	365	**92.9%**	361	**93.4%**	159	**59.1%**	585	**81.7%**	133	**81.2%**

3.2 Household characteristics

3.2.1 Demographic characteristics

Table 5 below shows the weighted distribution of characteristics of participating households. The overall average number of household members is somewhat below the 7.5 assumed for sample size calculations. In addition, an average of 1.69 eligible women per household was somewhat lower than the expected 2.0. On the other hand, the average number of 0.95 children less than 5 years of age per household was higher than the expected 0.79.

Table 5 - Demographic characteristics of households.

Characteristic	Number of households	Percent or mean[a]	95% confidence intervals[b]
Number of HH members (mean)	3304	6.94	(6.76, 7.12)
Number of HH with given number of women 15-49 years of age			
0	323	10.0%	(8.5, 11.6)
1	1678	47.7%	(45.0, 50.4)
2	646	20.4%	(18.7, 22.2)
3+	657	22.0%	(20.1, 23.9)
Number of HH with given number of children 0-59 months of age			
0	1370	44.1%	(41.8, 46.5)
1	980	28.3%	(26.0, 30.6)
2	743	20.7%	(18.8, 22.8)
3+	211	6.9%	(5.9, 8.1)

Note: The n's are un-weighted numerators for each subgroup; subgroups that do not sum to the total have missing data.

[a] Percentages weighted for unequal probability of selection between governorates.

[b] CI=confidence interval calculated taking into account the complex sampling design.

3.2.2 Indicators of household wealth

Table 6 below shows various indicators of household wealth. Because the principal component analysis used to calculate the wealth index was done on unweighted data, the weighted proportions of household in each quintile does not equal exactly 20%. Several of the variables intended to be used to calculate the wealth index could not be used because they were almost universally present or absent in households. These variables included the material of the exterior walls of the dwelling; the type of cooking fuel used; owning a freezer, gas cooker, washing machine, or a boat with a motor; a household member having a bank account; and the type of sanitation facility used by household members.

A minority of households owned agricultural land or owned livestock. Among those households which did own animals, the most commonly owned animals were goats and chickens.

Table 6 - Indicators of household wealth.

Characteristic	Number of households	Percent or mean[a]	95% confidence intervals[b]
Wealth quintile			
Poorest	651	13.9%	(12.0, 16.0)
Second	653	19.2%	(17.3, 21.3)
Middle	610	18.4%	(16.3, 20.7)
Fourth	603	19.8%	(17.9, 21.9)
Wealthiest	738	28.7%	(25.4, 32.3)
Monthly HH earnings (Omani Rials)			
<200	246	5.1%	(4.1, 6.2)
200-499	758	21.8%	(19.6, 24.1)
500-999	992	31.9%	(29.6, 34.3)
1000-2999	932	35.2%	(32.3, 38.1)
3000+	135	6.0%	(4.8, 7.7)
Someone in household has bank account			
Yes	3185	97.8%	(97.0, 98.5)
No	58	2.2%	(1.5, 3.0)
Owns dwelling			
Yes	3094	93.4%	(91.8, 94.6)
Rent	204	6.6%	(5.4, 8.2)
Owns agricultural land			
Yes	882	28.3%	(25.6, 31.1)
No	2416	71.7%	(68.9, 74.4)
Owns livestock			
Yes	1547	43.2%	(40.2, 46.2)
No	1742	56.8%	(53.8, 59.8)
Number of animals owned (mean)			
Cattle	356	6.6	(5.4, 7.8)
Goats	1060	15.0	(12.9, 17.2)
Sheep	447	11.3	(8.4, 14.2)
Chickens	594	18.1	(12.2, 24.1)
Camels	380	7.5	(5.5, 9.6)

Note: The n's are un-weighted numerators for each subgroup; subgroups that do not sum to the total have missing data.

[a] Percentages weighted for unequal probability of selection between governorates.

[b] CI=confidence interval calculated taking into account the complex sampling design.

3.2.3 Water and sanitation

Overall, almost 90% of households had a safe water source, as shown in Table 7. Most of these safe water sources consisted of government-supplied piped water. Relatively few households relied on open wells or water tankers for their supply. Many households with unsafe sources used adequate water treatment in the home and therefore drank safe water. Adequate sanitation facilities were present in most households, as were adequate handwashing places.

Table 7 - Indicators of household water and sanitation.

Characteristics	Number of households	Percent or mean[a]	95% confidence intervals[b]
Water source			
Piped in dwelling/yard (governorate water)	1062	32.7%	(29.6, 36.0)
Piped in dwelling/yard (private water)	135	4.2%	(3.3, 5.5)
Tube well or borehole	40	1.9%	(1.3, 2.9)
Protected well	275	7.6%	(6.1, 9.4)
Unprotected well	32	0.7%	(0.4, 1.2)
Tanker-truck	273	8.2%	(6.7, 10.0)
Surface water (damn, pond, falaj)	35	1.3%	(0.8, 2.0)
Bottled water	1447	43.4%	(40.4, 46.4)
Has safe water source			
Yes	2959	89.9%	(88.0, 91.5)
No	340	10.1%	(8.5, 12.0)
Among 158 households without safe water source who treat water in home...			
Boil water	1	0.4%	(0.1, 2.9)
Add bleach or chlorine	0	0%	-
Strain through a cloth	0	0%	-
Use water filter	156	99.0%	95.6, 99.8)
Use solar disinfection	0	0%	-
Let water stand and settle	1	0.7%	(0.1, 4.7)
Drink safe water			
Yes	3118	94.4%	(93.1, 95.5)
No	183	5.6%	(4.5, 6.9)
Type of sanitation facility			
Flush to piped sewer system	1050	25.9%	(21.7, 30.6)
Flush to deep hole	2237	73.9%	(69.2, 78.1)
Flush, but don't know where	5	0.1%	(0.0, 0.4)
No facility, bush, field	6	0.1%	(0.0, 0.5)
Share sanitation facility with another household			
Yes	422	14.7%	(12.5, 17.1)
No	2849	85.3%	(82.8, 87.5)
Adequate sanitation			
Yes	2843	85.2%	(82.8, 87.4)
No	433	14.8%	(12.6, 17.2)
Water and soap at handwashing place			
Yes	3126	97.4%	(96.6, 98.1)
No	81	2.6%	(1.9, 3.4)

Note: The n's are un-weighted numerators for each subgroup; subgroups that do not sum to the total have missing data.

[a] Percentages weighted for unequal probability of selection between governorates.

[b] CI=confidence interval calculated taking into account the complex sampling design.

3.2.4 Household purchases of vegetable oil and wheat flour

Several types of cooking oil, such as olive oil, sunflower oil, corn oil, and ghee, were used in a large proportion of households; however, other types, including sesame oil, canola oil, and coconut oil, were used in very few households (Figure 4). The vast majority of households had fortified cooking oil in the house at the time of data collection (Figure 5). Although a somewhat lower proportion of households had wheat flour in the house at the time of survey data collection, if wheat flour was present, a large proportion was marked as fortified. Other characteristics of household use and purchase of cooking oil, wheat flour, and bread are shown in Table 8 below. More than one-half of households did not reuse oil, and few households reuse oil more than once. The average amount of oil purchased per month was more than 6 liters; however, this is for the entire household, and household size varied considerably in the survey sample.

The most common types of bread consumed in the household was either from a large commercial bakery or home-made. Less than one-fifth of households had bread in packages marked as fortified; however, nearly one-third of households did not have bread at the time of survey data collection, and a large proportion of bread consumed in Oman is sold in unmarked plastic bags.

Figure 4 - Types of cooking oil used in the household (more than one response allowed)

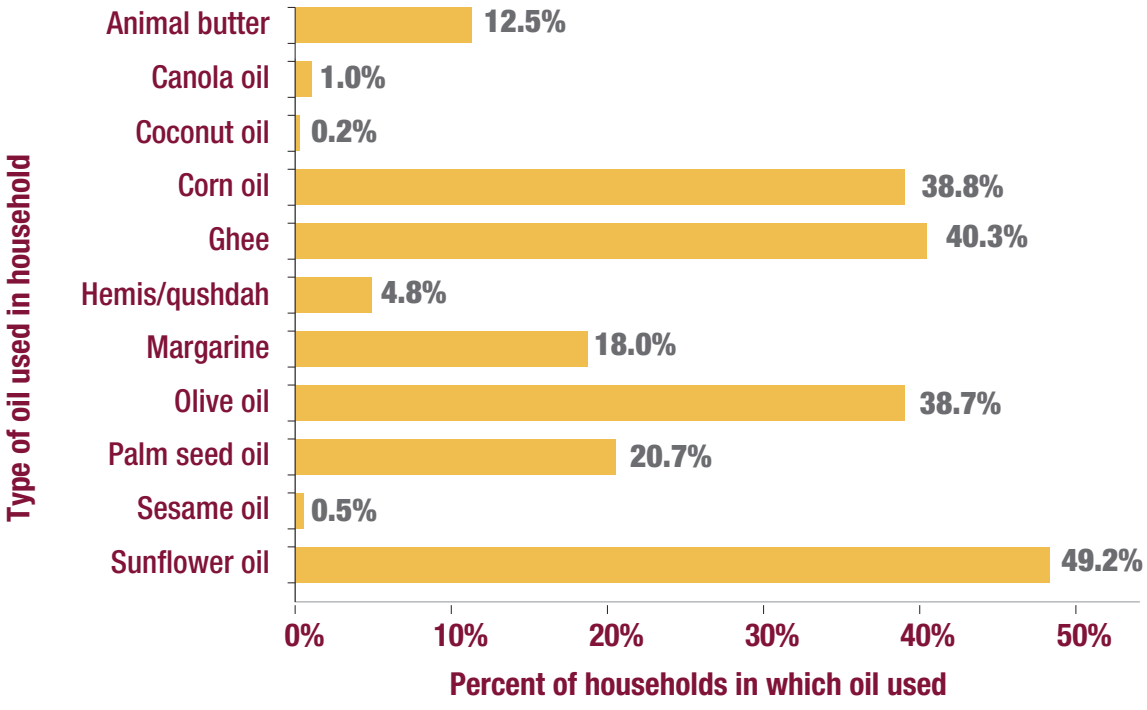


Figure 5 - Percent of households with fortified cooking oil and wheat flour

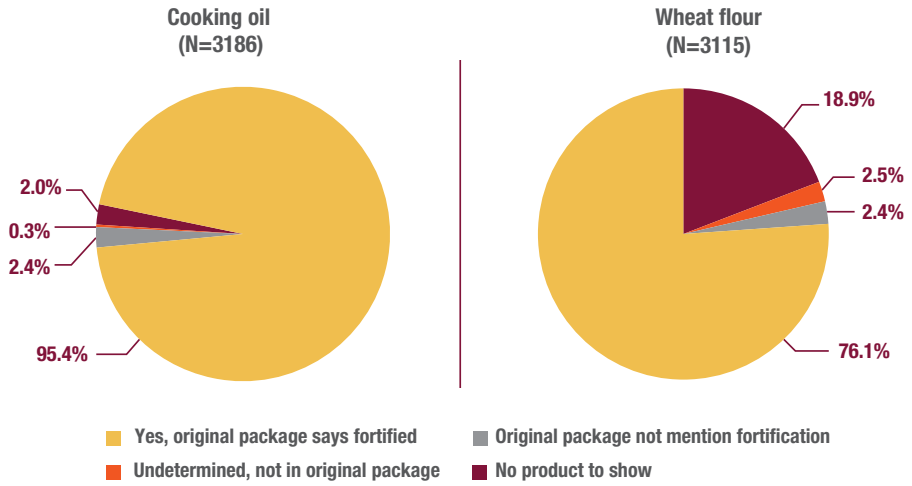


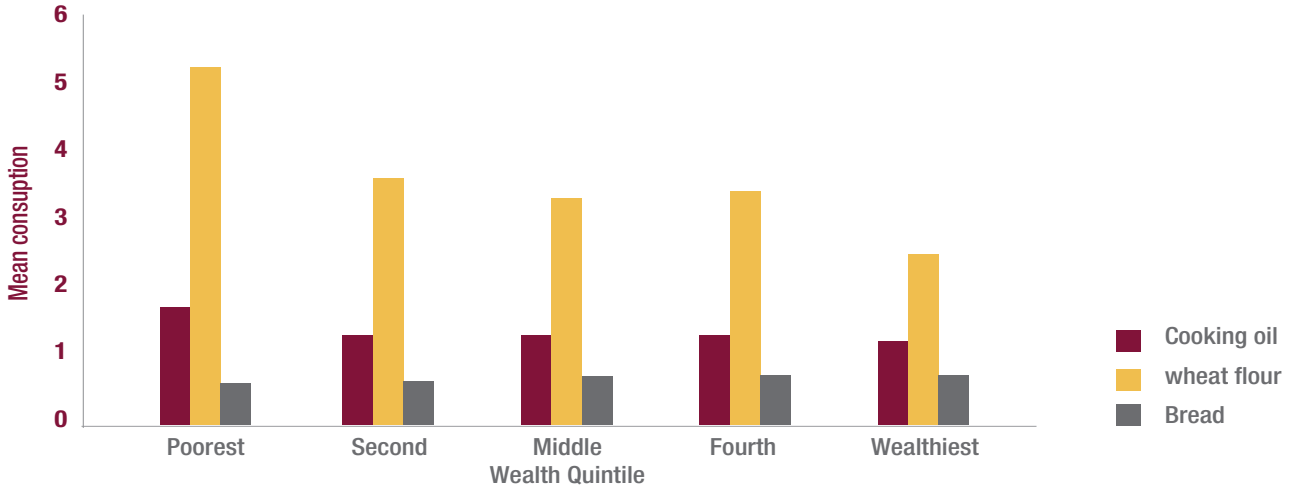
Table 8 - Oil, flour, and bread purchasing variables of households.

Characteristic	Number of households	Percent or mean [a]	95% confidence intervals [b]
OIL AND FAT			
Number of times oil or fat reused			
Used only 1 time	2037	55.0%	(52.1, 58.0)
Used 2 times	1074	41.0%	(38.0, 44.0)
Used 3 times	85	3.8%	(3.0, 4.7)
Used more than 3 times	5	0.2%	(0.1, 0.6)
WHEAT FLOUR AND BREAD			
Type of bread usually purchased			
Bakery white bread	1675	44.7%	(41.5, 47.9)
Bakery brown bread	310	11.2%	(9.5, 13.2)
Other bread from bakery	420	12.7%	(10.7, 15.1)
Local bread	207	12.0%	(9.2, 15.5)
Home-made only (does not buy bread)	1614	47.3%	(44.5, 50.2)
Does not use bread	14	0.3%	(0.2, 0.5)
If purchased, amount of each type of bread purchased per week (mean number of items)[c]			
Loaves of sliced bread	775	3.4	(3.1, 3.8)
Burger rolls or buns	439	0.3	(0.3, 0.4)
Bags of lebnano	1851	2.2	(2.0, 2.3)
Bags samoun	915	1.8	(1.5, 2.0)
Pieces Omani bread	99	0.5	(0.3, 0.7)
Pieces of tanours	220	1.7	(0.8, 2.7)
Pieces of barata	210	0.7	(0.5, 0.9)
Cost of bread in OR / kg (mean)	2027	6.5	(5.9, 7.1)
Fortified bread in household			
Yes, package said fortified	354	18.8%	(16.2, 21.8)
No, package not mention fortified	1024	43.3%	(39.3, 47.4)
Not in original package	164	5.7%	(4.3, 7.5)
No bread in household	484	32.1%	(28.7, 35.8)

[a] Percentages and means are weighted for unequal probability of selection between governorates.
[b] CI=confidence interval calculated taking into account the complex sampling design
[c] Among only those households reporting purchase of that type of bread.

Consumption of cooking oil, wheat flour, and bread differ by wealth quintile; however, only wheat flour shows a definite trend with poor families consuming more than wealthier families (Figure 6). Table 9 below shows purchase of oil, wheat flour, and bread per adult male equivalent by governorate. Estimated oil purchase per AME is highest in Al Wusta and lowest in Musandam, while other governorates are similar. Wheat flour purchases per AME are greatest in Al Wusta, possibly because very little pre-made bread is purchased in this governorate. A summary of other variables concerning purchase and consumption of cooking oil, wheat flour, and bread by governorate is shown in table 4-1 in appendix 4.

Figure 6 - Mean consumption per adult male equivalent of cooking oil (in liters) and wheat flour (in kg) per month and bread (in kg per week), by wealth quintile



(p value for all three foods<0.001)

Table 9 - Oil, wheat flour, and bread consumption per adult male equivalent (AME), by governorate.

	Liters oil per month				Kilograms wheat flour per month				Kilograms bread per week			
Characteristic	**n**	**Mean[a]**	**95% CI[b]**	**P value[c]**	**n**	**Mean[a]**	**95% CI[b]**	**P value[c]**	**n**	**Mean[a]**	**95% CI[b]**	**P value[c]**
Total	2958	1.3	(1.2, 1.4)		2944	3.4	(3.2, 3.6)		3075	0.7	(0.62, 0.73)	
Governorate												
Muscat	204	1.2	(1.1, 1.4)	<0.001	198	2.0	(1.6, 2.4)	<0.001	211	0.6	(0.5, 0.7)	<0.001
Dhofar	251	1.4	(1.2, 1.5)		248	2.0	(1.6, 2.4)		259	1.5	(1.2, 1.8)	
Al-Dhakhlya	307	1.2	(1.1, 1.4)		301	3.7	(3.3, 4.2)		319	0.5	(0.3, 0.6)	
Al-Sharqyah North	293	1.1	(1.0, 1.3)		300	5.2	(4.7, 5.7)		309	0.2	(0.1, 0.4)	
Al-Sharqyah South	211	1.7	(1.4, 2.0)		215	4.8	(4.2, 5.3)		241	0.6	(0.5, 0.8)	
Al-Batinah North	244	1.4	(1.2, 1.5)		247	3.6	(3.2, 4.1)		249	0.8	(0.6, 1.0)	
Al-Batinah South	241	1.3	(1.1, 1.4)		244	2.9	(2.7, 3.2)		253	0.8	(0.7, 1.0)	
Al-Dhahairah	284	1.2	(1.0, 1.3)		279	4.1	(3.6, 4.7)		297	0.4	(0.4, 0.5)	
Al-Buraimy	302	1.4	(1.2, 1.5)		294	3.8	(3.5, 4)		302	1.3	(1.0, 1.5)	
Musandam	285	0.7	(0.6, 0.9)		285	4.8	(3.9, 5.6)		296	0.9	(0.7, 1.0)	
Al-Wusta	336	3.4	(3.1, 3.7)		333	8.2	(7.1, 9.2)		339	0.0	-	

[a] Means by wealth quintile are weighted for unequal probability of selection between governorates.

[b] CI=confidence interval calculated taking into account the complex sampling design.

[c] P value <0.05 indicates that one subgroup is significantly different from the other.

3.3 Preschool children

3.3.1 Characteristics

Characteristics of children included in the survey sample are shown in Table 10 below. The age and sex distributions are fairly even.

Table 10 - Description of children less than 5 years of age.

Characteristic	Number of children	%[a]	95% CI [b]
Age (in months)			
<6	343	10.7%	(9.4, 12.0)
6-11	313	10.6%	(9.4, 12.0)
12-17	355	11.2%	(9.8, 12.8)
18-23	329	10.6%	(9.3, 12.1)
24-29	338	10.9%	(9.5, 12.4)
30-35	300	9.8%	(8.4, 11.4)
36-41	287	9.0%	(7.7, 10.4)
42-47	324	10.6%	(9.4, 12.0)
48-53	298	9.0%	(7.8, 10.3)
54-59	227	7.7%	(6.4, 9.1)
Sex			
Male	1585	49.9%	(47.7, 52.1)
Female	1544	50.1%	(47.9, 52.3)

Note: The n's are un-weighted numerators for each subgroup; subgroups that do not sum to the total have missing data.

[a] Percentages weighted for unequal probability of selection among governorates

[b] CI=confidence interval calculated taking into account the complex sampling design.

3.3.2 Health indicators

Table 11 below shows various health indicators for the children less than 5 years of age included in the survey sample. Although mean birthweight is relatively high, almost 13% of children had low birthweight. Diarrhea and lower respiratory tract infection are relatively uncommon, but the caretakers of almost one-third of children reported that they had a fever sometime in the prior 2 weeks. Relatively few children showed elevated markers of inflammation.

Table 11 - Health indicators in children less than 5 years of age

Characteristic	Number of children	% [a]	95% CI [b]
Birthweight in kilograms (mean)	2976	3.0	(3.0, 3.0)
Low birthweight			
<2500 grams	385	11.7%	(10.1,13.4)
2500+ grams	2591	(88.3%)	(86.6,89.9)
Had diarrhea in past 2 weeks			
Yes	413	15.2%	(13.4, 17.1)
No	2701	84.8%	(82.9, 86.6)
Had fever in past 2 weeks			
Yes	832	30.0%	(27.3, 32.7)
No	2274	70.0%	(67.3, 72.7)
Had lower acute respiratory infection in past 2 weeks			
Yes	191	6.5%	(5.3, 7.8)
No	2900	93.5%	(92.2, 94.7)
Inflammation stage			
None (Neither CRP nor AGP elevated)	858	79.8%	(76.2, 83.1)
Incubation (CPR elevated, AGP normal)	53	4.5%	(3.2, 6.4)
Early convalescence (both CPR and AGP elevated)	84	8.1%	(5.9, 11.0)
Late convalescence (CRP normal, AGP elevated)	88	7.5%	(5.6, 10.0)

Note: The n's are un-weighted numerators for each subgroup; subgroups that do not sum to the total have missing data.

[a] Percentages weighted for unequal probability of selection among governorates

[b] CI=confidence interval calculated taking into account the complex sampling design.

3.3.3 Infant and young child feeding indicators

Figure 7 below shows the standard infant and young child feeding indicators as recommended by UNICEF and WHO.[25] Breastfeeding was common (indicator #9), and early initiation of breastfeeding (indicator #1) was practiced by the caretakers of more than four-fifths of children. The prevalence of exclusive breastfeeding (indicator #2) is very poor in children less than 6 months of age, and even among children less than 4 months of age, exclusive breastfeeding is practiced by fewer than one-third, as shown in Table 14. On the other hand, continued breastfeeding at 1 year and continued breastfeeding at 2 years (indicators # 3 and 10) are common. The median duration of breastfeeding among children less than 24 months (indicator #13) is more than 21 months (Figure 8 below).

Indicators of complementary feeding, including introduction of solid foods, minimum dietary diversity, minimum meal frequency, and minimum dietary acceptability (indicators #4-7) are reasonable but not optimal. A large majority of children had eaten iron-enriched foods or taken iron supplements in the 24 hours prior to data collection (indicator #8). Age-appropriate and predominant breastfeeding (indicators # 11 and 12) are relatively poor, and more than

one-half of children had received food from a bottle in the prior 24 hours (indicator #13). The most commonly consumed liquids in children less than 6 months of age were water and infant formula, and one-half of children 6-23 months of age had eaten sugary foods in the past 24 hours (Table 12). In addition, few of those children not being breastfeed were receiving adequate milk feeding.

Figure 7 - Prevalence of standard WHO/UNICEF infant and young child feeding indicators in children of various ages.

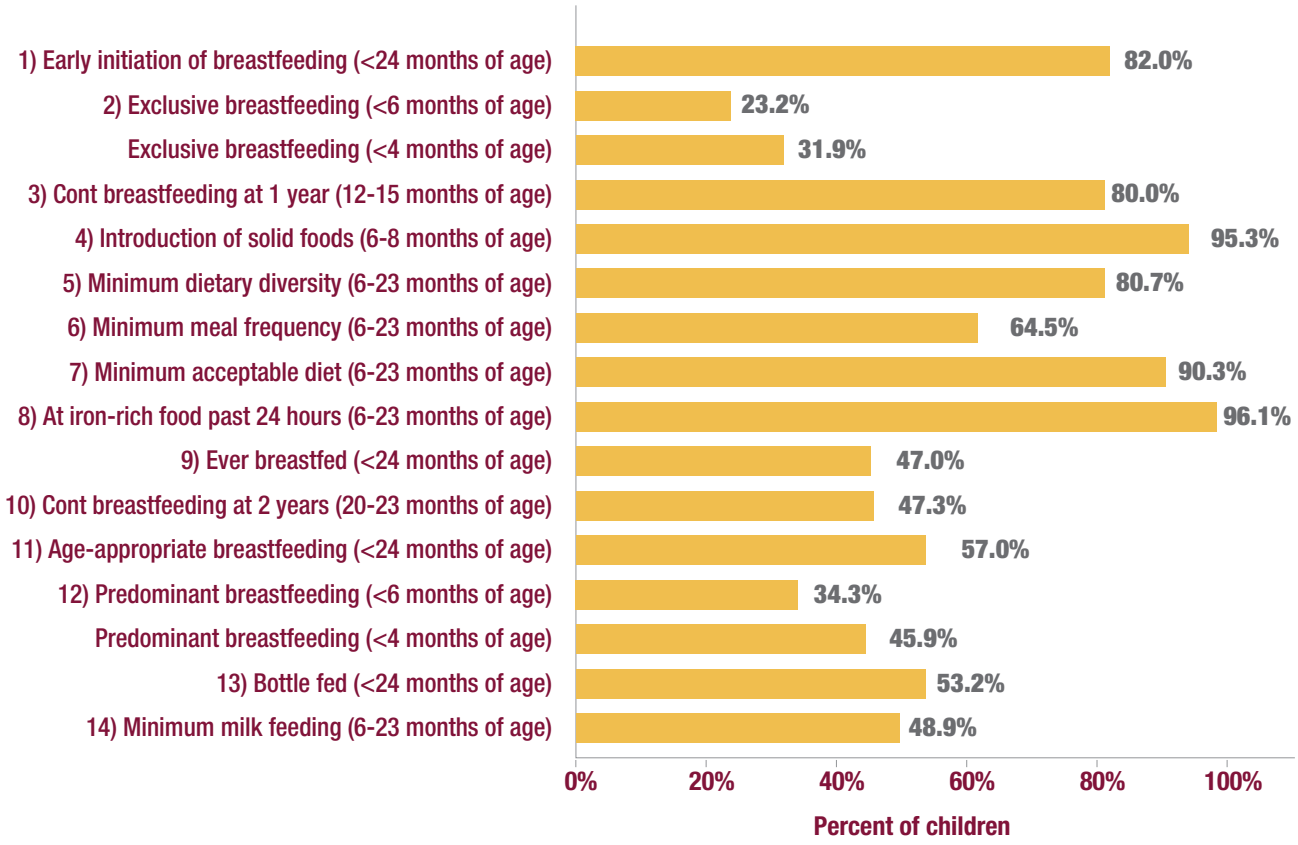


Table 12 - Additional dietary indicators in children less than 24 months of age.

Characteristic	Number of children	% [a]	95% CI [b]
Liquids other than breastmilk consumed in past 24 hours (<6 months of age)			
Plain water	173	55.3%	(48.7, 61.8)
Infant formula	148	52.6%	(45.2, 60.0)
Tinned, powdered, or other non-human milk	14	5.6%	(2.9, 10.6)
Juice or juice drinks	22	7.3%	(4.5, 11.5)
Shourba or soup	34	9.9%	(6.3, 15.2)
Yogurt	25	6.7%	(4.2, 10.6)
Thin porridge	43	15.5%	(10.6, 22.2)
Other liquids	41	14.4%	(9.4, 21.4)

Characteristic	Number of children	% [a]	95% CI [b]
Ate sugary foods in past 24 hours (6-23 months of age)			
Yes	720	51.5%	(48.1, 54.9)
No	608	48.5%	(45.1, 51.9)

Note: The n's are un-weighted numerators for each subgroup; subgroups that do not sum to the total have missing data.

[a] Percentages weighted for unequal probability of selection among governorates

[b] CI=confidence interval calculated taking into account the complex sampling design.

Figure 8 - Three-month smoothed percent currently breastfeeding, by age, to identify median duration of breastfeeding in children less than 24 months of age.

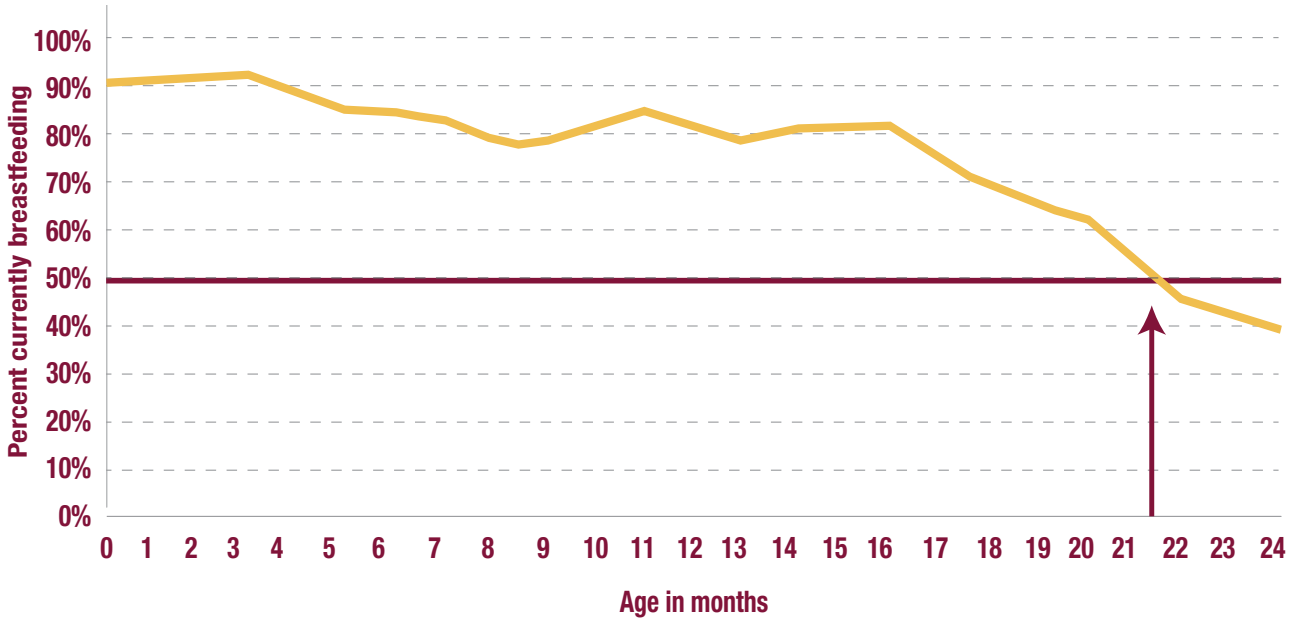


Table 13 through Table 23 show selected major feeding indicators by various demographic variables. Early initiation of breastfeeding (Table 13) is not substantially different by age, sex, governorate of residence, or wealth quintile, in spite of statistical significance for some of the differences. The prevalence of exclusive breastfeeding in children less than 6 months of age (Table 14) is roughly similar in boys and girls, and is especially low in Dhofar and Al-Sharqyah South Governorates. Children in the poorest households have more than three times the prevalence of exclusive breastfeeding than children in the wealthiest households.

Minimum dietary diversity (Table 15) is more common in older children and children in wealthier households. Muscat is the only governorate in which greater than 90% of children meet minimum dietary diversity, and it is especially low in Al-Wusta. Likewise, minimum meal frequency (Table 16) is lowest in Al-Wusta, but also relatively low in Dhofar, Al-Sharqyah South, Al-Dhahairah, and Musandam, but there is no statistically difference by household wealth. The prevalence of overall dietary acceptability (Table 17) is very low in Al-Wusta, and low in Dhofar, Al-Sharqyah South, Al-Dhahairah, and Musandam. As with meal frequency, there is no statistically significant differences by household wealth.

Eating iron-rich or iron-fortified food (Table 18) is more common in older children and is common in all governorates in spite of statistically significant differences among governorates. The prevalence of this practice increases with household wealth, albeit without statistical significance. A large majority of children in all subgroups had breastfed at some time in their lives (Table 19), and although statistically significant differences exist among subgroups, no age, sex, governorate,or wealth subgroup had less than 90% of children ever breastfed. Age-

appropriate breastfeeding (Table 20) was very low in children less than 6 months of age, largely from the low prevalence of exclusive breastfeeding, and declined with household wealth. Substantive differences among governorates were minor. Predominant breastfeeding was also quite low, especially in Dhofar Governorate and among children the wealthiest quintile (Table 21). Bottle feeding (Table 22) was common in all age groups. Dhofar Governorate had the highest prevalence of bottle feeding. Bottle feeding was substantially more common in wealthier households than in poorer households. Among non-breastfeeding children, about ½ did not meet minimum milk feeding frequency (Table 23). Governorate-specific estimates ranged from one-third to slightly more than two-thirds; however, there was little difference by household wealth.

Table 13 - Number and % of children less than 24 months of age with early initiation of breastfeeding (WHO/UNICEF IYCF indicator #1), by various demographic characteristics.

Characteristic	Number of children	% [a]	95% CI [b]	P value [c]
Total	1051	82.0%	(79.0, 84.6)	
Age (in months)				
<6	266	78.9%	(72.0, 84.4)	0.245
6-11	260	85.3%	(79.1, 89.9)	
12-17	258	78.9%	(72.6, 84.1)	
18-23	266	84.8%	(77.8, 89.8)	
Sex				
Male	515	80.0%	(75.9, 83.6)	0.215
Female	536	83.7%	(79.1, 87.5)	
Governorate				
Muscat	57	81.4%	(72.0, 88.2)	<0.001
Dhofar	96	75.6%	(67.0, 82.5)	
Al-Dhakhlya	111	79.9%	(72.2, 85.8)	
Al-Sharqyah North	82	87.2%	(78.9, 92.6)	
Al-Sharqyah South	97	89.8%	(82.9, 94.1)	
Al-Batinah North	87	80.6%	(71.9, 87.0)	
Al-Batinah South	86	77.5%	(68.5, 84.5)	
Al-Dhahairah	123	91.1%	(85.0, 94.9)	
Al-Buraimy	98	81.0%	(73.9, 86.5)	
Musandam	71	76.3%	(66.6, 83.9)	
Al-Wusta	143	94.7%	(88.5, 97.6)	
Wealth quintile				
Poorest	194	89.8%	(82.9, 94.1)	0.426
Second	218	83.4%	(76.2, 88.7)	
Middle	212	80.2%	(72.8, 85.9)	
Fourth	204	81.7%	(75.5, 86.6)	
Wealthiest	206	80.2%	(72.3, 86.3)	

Note: The n's are un-weighted numerators for each subgroup; subgroups that do not sum to the total have missing data.

[a] Percentages weighted for unequal probability of selection among governorates

[b] CI=confidence interval calculated taking into account the complex sampling design.

[c] P value <0.05 indicates that one subgroup is significantly different from the other.

Table 14 - Number and % of children less than 6 months of age with exclusive breastfeeding (WHO/UNICEF IYCF indicator #2), by various demographic characteristics.

Characteristic	Number of children	% [a]	95% CI [b]	P value [c]
Total	86	23.2%	(17.3, 30.3)	
Sex				
Male	35	21.9%	(13.9, 32.8)	0.741
Female	51	24.2%	(16.2, 34.4)	
Governorate				
Muscat	4	22.2%	(9.8, 42.8)	<0.001
Dhofar	1	3.3%	(0.5, 20.1)	
Al-Dhakhlya	9	39.1%	(22.3, 59.1)	
Al-Sharqyah North	4	14.3%	(5.8, 31.1)	
Al-Sharqyah South	1	4.3%	(0.6, 26.0)	
Al-Batinah North	5	20.8%	(9.0, 41.3)	
Al-Batinah South	9	40.9%	(20.7, 64.7)	
Al-Dhahairah	7	21.9%	(10.1, 41.1)	
Al-Buraimy	8	26.7%	(13.5, 45.8)	
Musandam	11	44.0%	(30.7, 58.2)	
Al-Wusta	27	73.0%	(59.3, 83.3)	
Wealth quintile				
Poorest	26	44.6%	(27.0, 63.7)	0.096
Second	13	18.2%	(7.1, 39.2)	
Middle	22	31.3%	(17.9, 48.8)	
Fourth	9	22.9%	(11.2, 41.1)	
Wealthiest	15	14.3%	(7.4, 26.0)	

Note: The n's are un-weighted numerators for each subgroup; subgroups that do not sum to the total have missing data.

[a] Percentages weighted for unequal probability of selection among governorates

[b] CI=confidence interval calculated taking into account the complex sampling design.

[c] P value <0.05 indicates that one subgroup is significantly different from the other.

Table 15 - Number and % of children 6-23 months of age with minimum dietary diversity (WHO/UNICEF IYCF indicator #5), by various demographic characteristics.

Characteristic	Number of children	% [a]	95% CI [b]	P value [c]
Total	688	80.7%	(77.6, 83.5)	
Age (in months)				
6-11	175	66.2%	(59.6, 72.2)	<0.001
12-17	255	84.9%	(79.4, 89.1)	
18-23	257	91.4%	(87.1, 94.4)	
Sex				
Male	351	80.6%	(76.0, 84.5)	0.934
Female	337	80.8%	(76.3, 84.7)	
Governorate				
Muscat	48	90.6%	(81.1, 95.5)	<0.001
Dhofar	69	70.4%	(61.0, 78.3)	
Al-Dhakhlya	81	78.6%	(70.1, 85.3)	
Al-Sharqyah North	55	80.9%	(64.8, 90.7)	
Al-Sharqyah South	57	75.0%	(65.2, 82.7)	
Al-Batinah North	67	82.7%	(74.5, 88.7)	
Al-Batinah South	76	83.5%	(73.4, 90.3)	
Al-Dhahairah	79	75.2%	(66.5, 82.3)	
Al-Buraimy	69	79.3%	(68.7, 87.0)	
Musandam	51	75.0%	(59.8, 85.8)	
Al-Wusta	36	31.3%	(18.5, 47.7)	
Wealth quintile				
Poorest	75	66.8%	(55.7, 76.3)	<0.05
Second	149	82.6%	(76.0, 87.7)	
Middle	154	81.1%	(73.6, 86.9)	
Fourth	135	78.0%	(69.7, 84.6)	
Wealthiest	164	86.2%	(79.3, 91.0)	

Note: The n's are un-weighted numerators for each subgroup; subgroups that do not sum to the total have missing data.

[a] Percentages weighted for unequal probability of selection among governorates

[b] CI=confidence interval calculated taking into account the complex sampling design.

[c] P value <0.05 indicates that one subgroup is significantly different from the other.

Table 16 - Number and % of children 6-23 months of age with minimum meal frequency (WHO/UNICEF IYCF indicator #6), by various demographic characteristics.

Characteristic	Number of children	% [a]	95% CI[b]	P value [c]
Total	357	64.5%	(59.2, 69.5)	
Age (in months)				
6-11	134	64.8%	(57.1, 71.8)	<0.001
12-17	120	57.7%	(49.4, 65.6)	
18-23	103	75.2%	(66.2, 82.4)	
Sex				
Male	181	64.4%	(57.0, 71.1)	0.951
Female	176	64.7%	(57.7, 71.1)	
Governorate				
Muscat	27	79.4%	(58.4, 91.4)	<0.001
Dhofar	24	35.8%	(26.3, 46.6)	
Al-Dhakhlya	40	75.5%	(64.0, 84.2)	
Al-Sharqyah North	46	83.6%	(69.1, 92.1)	
Al-Sharqyah South	22	40.7%	(28.1, 54.7)	
Al-Batinah North	52	74.3%	(61.3, 84.0)	
Al-Batinah South	38	60.3%	(48.9, 70.7)	
Al-Dhahairah	30	38.5%	(27.3, 51.0)	
Al-Buraimy	37	54.4%	(41.1, 67.1)	
Musandam	20	34.5%	(23.6, 47.3)	
Al-Wusta	21	24.4%	(14.6, 38.0)	
Wealth quintile				
Poorest	46	62.1%	(49.9, 72.8)	0.271
Second	84	68.4%	(59.0, 76.5)	
Middle	71	55.9%	(43.2, 67.9)	
Fourth	78	64.0%	(52.6, 73.9)	
Wealthiest	75	70.6%	(60.3, 79.2)	

Note: The n's are un-weighted numerators for each subgroup; subgroups that do not sum to the total have missing data.

[a] Percentages weighted for unequal probability of selection among governorates

[b] CI=confidence interval calculated taking into account the complex sampling design.

[c] P value <0.05 indicates that one subgroup is significantly different from the other.

Table 17 - Number and % of children 6-23 months of age with minimum acceptable diet (WHO/ UNICEF IYCF indicator #7), by various demographic characteristics.

Characteristic	Number of children	% [a]	95% CI [b]	P value [c]
Total	277	47.0%	(42.1, 52.0)	
Age (in months)				
6-11	85	40.5%	(33.5, 47.8)	<0.001
12-17	108	49.0%	(41.2, 56.9)	
18-23	84	54.2%	(44.5, 63.7)	
Sex				
Male	142	46.9%	(39.8, 54.0)	0.946
Female	135	47.2%	(40.7, 53.8)	
Governorate				
Muscat	23	62.2%	(45.8, 76.2)	<0.001
Dhofar	18	20.7%	(13.1, 31.0)	
Al-Dhakhlya	34	50.0%	(39.1, 60.9)	
Al-Sharqyah North	37	64.9%	(47.7, 79.0)	
Al-Sharqyah South	17	25.8%	(18.0, 35.5)	
Al-Batinah North	43	57.3%	(45.1, 68.7)	
Al-Batinah South	32	47.1%	(35.8, 58.6)	
Al-Dhahairah	23	26.7%	(17.8, 38.1)	
Al-Buraimy	31	41.9%	(30.4, 54.4)	
Musandam	15	25.0%	(16.2, 36.5)	
Al-Wusta	4	3.7%	(1.3, 10.6)	
Wealth quintile				
Poorest	27	41.5%	(29.8, 54.3)	0.183
Second	73	57.3%	(47.6, 66.4)	
Middle	56	42.4%	(32.0, 53.6)	
Fourth	59	42.5%	(32.2, 53.5)	
Wealthiest	60	49.0%	(39.2, 58.9)	

Note: The n's are un-weighted numerators for each subgroup; subgroups that do not sum to the total have missing data.

[a] Percentages weighted for unequal probability of selection among governorates

[b] CI=confidence interval calculated taking into account the complex sampling design.

[c] P value <0.05 indicates that one subgroup is significantly different from the other.

Table 18 - Number and % of children 6-23 months of age who ate iron-rich or iron-fortified food in past 24 hours (WHO/UNICEF IYCF indicator #8), by various demographic characteristics.

Characteristic	Number of children	% [a]	95% CI [b]	P value [c]
Total	876	90.3%	(87.8, 92.3)	
Age (in months)				
6-11	257	85.6%	(79.8, 89.9)	<0.001
12-17	316	90.9%	(86.3, 94.1)	
18-23	300	94.8%	(91.6, 96.8)	
Sex				
Male	450	89.7%	(86.0, 92.5)	0.620
Female	426	90.9%	(87.0, 93.7)	
Governorate				
Muscat	52	94.5%	(85.6, 98.1)	<0.05
Dhofar	93	86.1%	(78.3, 91.4)	
Al-Dhakhlya	94	87.0%	(78.7, 92.4)	
Al-Sharqyah North	61	87.1%	(73.2, 94.4)	
Al-Sharqyah South	66	81.5%	(71.3, 88.6)	
Al-Batinah North	82	96.5%	(90.3, 98.8)	
Al-Batinah South	85	89.5%	(80.5, 94.6)	
Al-Dhahairah	95	86.4%	(78.4, 91.7)	
Al-Buraimy	90	95.7%	(89.6, 98.3)	
Musandam	63	91.3%	(85.5, 94.9)	
Al-Wusta	95	80.5%	(70.8, 87.5)	
Wealth quintile				
Poorest	136	82.6%	(73.8, 88.9)	0.069
Second	176	87.4%	(79.9, 92.3)	
Middle	187	91.1%	(85.6, 94.7)	
Fourth	173	90.9%	(84.8, 94.7)	
Wealthiest	193	94.2%	(88.9, 97.0)	

Note: The n's are un-weighted numerators for each subgroup; subgroups that do not sum to the total have missing data.

[a] Percentages weighted for unequal probability of selection among governorates

[b] CI=confidence interval calculated taking into account the complex sampling design.

[c] P value <0.05 indicates that one subgroup is significantly different from the other.

Table 19 - Number and % of children less than 24 months of age who were ever breastfed (WHO/UNICEF IYCF indicator #9), by various demographic characteristics.

Characteristic	Number of children	% [a]	95% CI [b]	P value [c]
Total	1262	96.1%	(94.5, 97.3)	
Age (in months)				
6-11	331	99.2%	(98.0, 99.7)	<0.001
12-17	302	97.2%	(93.1, 98.9)	
18-23	324	95.0%	(91.1, 97.2)	
Sex				
Male	632	96.6%	(93.8, 98.1)	0.548
Female	630	95.7%	(93.2, 97.3)	
Governorate				
Muscat	69	94.5%	(87.9, 97.6)	<0.05
Dhofar	129	90.8%	(80.2, 96.1)	
Al-Dhakhlya	140	98.6%	(94.7, 99.6)	
Al-Sharqyah North	94	93.1%	(85.8, 96.7)	
Al-Sharqyah South	109	99.1%	(94.6, 99.9)	
Al-Batinah North	109	98.2%	(93.0, 99.6)	
Al-Batinah South	111	95.7%	(90.5, 98.1)	
Al-Dhahairah	135	95.7%	(89.9, 98.3)	
Al-Buraimy	121	95.3%	(89.2, 98.0)	
Musandam	96	98.0%	(87.5, 99.7)	
Al-Wusta	149	91.4%	(85.0, 95.2)	
Wealth quintile				
Poorest	210	97.6%	(93.9, 99.0)	<0.05
Second	259	98.3%	(94.1, 99.5)	
Middle	259	93.2%	(87.9, 96.3)	
Fourth	252	98.0%	(95.8, 99.1)	
Wealthiest	262	94.6%	(90.3, 97.0)	

Note: The n's are un-weighted numerators for each subgroup; subgroups that do not sum to the total have missing data.

[a] Percentages weighted for unequal probability of selection among governorates

[b] CI=confidence interval calculated taking into account the complex sampling design.

[c] P value <0.05 indicates that one subgroup is significantly different from the other.

Table 20 - Number and % of children less than 24 months of age with age-appropriate breastfeeding (WHO/UNICEF IYCF indicator #11), by various demographic characteristics.

Characteristic	Number of children	% [a]	95% CI [b]	P value [c]
Total	708	57.0%	(53.3, 60.6)	
Age (in months)				
<6	86	23.2%	(17.3, 30.3)	<0.001
6-11	227	77.8%	(71.3, 83.1)	
12-17	240	75.4%	(68.9, 80.9)	
18-23	154	47.8%	(39.8, 55.9)	
Sex				
Male	353	54.7%	(49.3, 60.1)	0.235
Female	355	59.1%	(54.1, 63.9)	
Governorate				
Muscat	37	54.4%	(44.0, 64.5)	<0.001
Dhofar	62	49.2%	(41.5, 57.0)	
Al-Dhakhlya	57	46.0%	(37.3, 54.9)	
Al-Sharqyah North	58	64.4%	(55.5, 72.5)	
Al-Sharqyah South	54	54.5%	(44.5, 64.2)	
Al-Batinah North	72	67.3%	(56.4, 76.6)	
Al-Batinah South	67	60.4%	(52.7, 67.6)	
Al-Dhahairah	66	49.3%	(41.8, 56.8)	
Al-Buraimy	63	53.4%	(44.5, 62.1)	
Musandam	64	71.1%	(64.5, 77.0)	
Al-Wusta	108	72.5%	(67.1, 77.3)	
Wealth quintile				
Poorest	138	65.8%	(56.6, 74.0)	0.335
Second	149	61.3%	(54.3, 67.8)	
Middle	149	56.7%	(47.7, 65.3)	
Fourth	127	54.4%	(46.9, 61.8)	
Wealthiest	139	54.2%	(46.3, 61.8)	

Note: The n's are un-weighted numerators for each subgroup; subgroups that do not sum to the total have missing data.

[a] Percentages weighted for unequal probability of selection among governorates

[b] CI=confidence interval calculated taking into account the complex sampling design.

[c] P value <0.05 indicates that one subgroup is significantly different from the other.

Table 21 -Number and % of children less than 6 months of age with predominant breastfeeding (WHO/UNICEF IYCF indicator #12), by various demographic characteristics.

Characteristic	Number of children	% [a]	95% CI [b]	P value [c]
Total	137	34.3%	(27.3, 42.1)	
Sex				
Male	61	33.4%	(23.9, 44.4)	0.822
Female	76	35.1%	(25.3, 46.2)	
Governorate				
Muscat	5	27.8%	(10.9, 54.6)	<0.001
Dhofar	3	8.6%	(2.8, 23.1)	
Al-Dhakhlya	14	41.2%	(22.3, 63.0)	
Al-Sharqyah North	15	46.9%	(28.5, 66.2)	
Al-Sharqyah South	6	20.0%	(9.1, 38.6)	
Al-Batinah North	7	28.0%	(15.0, 46.1)	
Al-Batinah South	13	59.1%	(36.1, 78.7)	
Al-Dhahairah	15	46.9%	(30.1, 64.3)	
Al-Buraimy	9	26.5%	(13.7, 44.9)	
Musandam	17	65.4%	(52.7, 76.2)	
Al-Wusta	33	80.5%	(56.1, 93.0)	
Wealth quintile				
Poorest	37	66.4%	(41.0, 84.9)	<0.01
Second	27	35.6%	(22.7, 51.0)	
Middle	34	45.9%	(30.0, 62.8)	
Fourth	17	29.6%	(17.2, 46.0)	
Wealthiest	20	18.8%	(10.9, 30.5)	

Note: The n's are un-weighted numerators for each subgroup; subgroups that do not sum to the total have missing data.

[a] Percentages weighted for unequal probability of selection among governorates

[b] CI=confidence interval calculated taking into account the complex sampling design.

[c] P value <0.05 indicates that one subgroup is significantly different from the other.

Table 22 - Number and % of children less than 24 months of age with bottle feeding in past 24 hours (WHO/UNICEF IYCF indicator #14), by various demographic characteristics.

Characteristic	Number of children	% [a]	95% CI [b]	P value [c]
Total	657	53.2%	(48.8, 57.6)	
Age (in months)				
<6	152	54.7%	(47.0, 62.2)	<0.05
6-11	165	55.9%	(49.4, 62.2)	
12-17	194	58.4%	(50.7, 65.7)	
18-23	144	43.7%	(36.0, 51.7)	
Sex				
Male	324	52.8%	(46.8, 58.6)	0.813
Female	333	53.6%	(48.2, 59.0)	
Governorate				
Muscat	46	63.0%	(47.1, 76.5)	<0.001
Dhofar	130	92.2%	(87.0, 95.4)	
Al-Dhakhlya	53	37.3%	(29.9, 45.4)	
Al-Sharqyah North	41	40.2%	(32.5, 48.4)	
Al-Sharqyah South	57	51.8%	(42.2, 61.3)	
Al-Batinah North	66	59.5%	(49.0, 69.1)	
Al-Batinah South	40	34.5%	(26.3, 43.7)	
Al-Dhahairah	68	48.6%	(39.6, 57.7)	
Al-Buraimy	75	59.5%	(51.5, 67.0)	
Musandam	32	32.7%	(19.4, 49.4)	
Al-Wusta	49	30.1%	(20.1, 42.4)	
Wealth quintile				
Poorest	77	38.8%	(28.6, 50.0)	<0.05
Second	115	47.6%	(39.3, 56.0)	
Middle	127	49.6%	(43.1, 56.1)	
Fourth	150	54.3%	(46.2, 62.2)	
Wealthiest	177	64.2%	(54.4, 73.0)	

Note: The n's are un-weighted numerators for each subgroup; subgroups that do not sum to the total have missing data.

[a] Percentages weighted for unequal probability of selection among governorates

[b] CI=confidence interval calculated taking into account the complex sampling design.

[c] P value <0.05 indicates that one subgroup is significantly different from the other.

Table 23 - Number and % of non-breastfed children 6-23 months of age with adequate frequency of milk feeding (WHO/UNICEF IYCF indicator #15), by various demographic characteristics.

Characteristic	Number of children	% [a]	95% CI [b]	P value [c]
Total	127	48.9	(41.2, 56.7)	
Age (in months)				
6-11	23	41.2%	(26.5, 57.6)	<0.001
12-17	33	57.3%	(39.4, 73.4)	
18-23	71	48.3%	(37.9, 58.7)	
Sex				
Male	66	48.2%	(38.1, 58.5)	0.830
Female	61	50.0%	(37.9, 62.1)	
Governorate				
Muscat	8	50.0%	(28.5, 71.5)	0.226
Dhofar	10	33.3%	(18.5, 52.4)	
Al-Dhakhlya	22	42.3%	(29.7, 56.0)	
Al-Sharqyah North	3	37.5%	(7.6, 81.3)	
Al-Sharqyah South	8	36.4%	(16.0, 63.2)	
Al-Batinah North	8	57.1%	(36.6, 75.5)	
Al-Batinah South	18	64.3%	(41.8, 81.9)	
Al-Dhahairah	15	57.7%	(39.7, 73.8)	
Al-Buraimy	15	68.2%	(47.8, 83.4)	
Musandam	7	70.0%	(39.4, 89.3)	
Al-Wusta	13	48.1%	(30.6, 66.2)	
Wealth quintile				
Poorest	17	39.5%	(20.5, 62.4)	0.937
Second	21	46.3%	(30.1, 63.3)	
Middle	33	48.0%	(32.1, 64.4)	
Fourth	28	52.5%	(38.5, 66.0)	
Wealthiest	27	48.8%	(31.6, 66.2)	

Note: The n's are un-weighted numerators for each subgroup; subgroups that do not sum to the total have missing data.

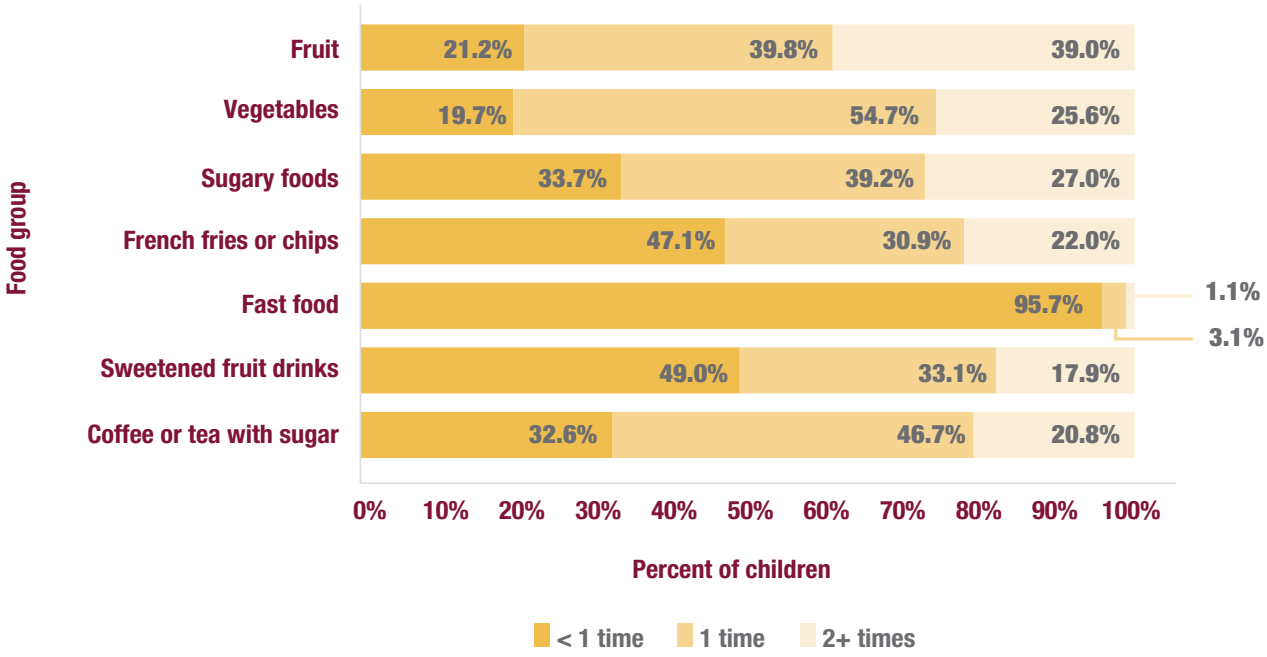
[a] Percentages weighted for unequal probability of selection among governorates

[b] CI=confidence interval calculated taking into account the complex sampling design.

[c] P value <0.05 indicates that one subgroup is significantly different from the other.

Diet quality in older children 24-59 months of age, as measured by the frequency of consumption of various food groups, is shown in Figure 9. Fruit and vegetables were consumed relatively rarely compared to the recommended frequency of 3-4 servings per day. Starchy foods were the most commonly consumed food group. Dairy products and unprocessed meat are somewhat less commonly consumed, but processed meat and cold cereal consumption are relatively rare. Although sugary foods and french fries are eaten frequently, consumption of fast food from restaurants is not common in this age group. Pure fruit juice, drinks with added sugar, and sports and energy drinks are also not commonly consumed, but consumption of sweetened fruit juice drinks and coffee or tea with sugar is somewhat more common.

Figure 9 - Daily frequency of consumption of various food groups in children 24-59 months of age.



Almost one-half of children 24-59 months of age have sunflower oil added to their food regularly (Table 24). Addition of ghee, corn oil, and olive oil is also common.

Table 24 - Number and % children 6-59 months of age who have various types of oils or fats added to their food.

Type of oil or fat	Number of children	% [a]	95% CI [b]
Palm seed oil	292	19.4%	(16.7, 22.5)
Olive oil	469	30.2%	(26.6, 34.0)
Sesame oil	4	0.2%	(0.1, 0.5)
Sunflower oil	770	46.9%	(42.8, 51.0)
Corn oil	653	32.0%	(28.6, 35.7)
Canola oil	15	0.6%	(0.3, 1.3)
Ghee	608	40.0%	(36.1, 43.9)
Animal butter	66	5.6%	(4.1, 7.5)
Margarine	240	13.7%	(11.2, 16.7)
Coconut oil	2	0.2%	(0.0, 1.2)
Hemis/qushdah	4	0.3%	(0.1, 0.8)
Does not add oil or fat	3	0.0%	(0.0, 0.1)

Note: The n's are un-weighted numerators for each subgroup; subgroups that do not sum to the total have missing data.

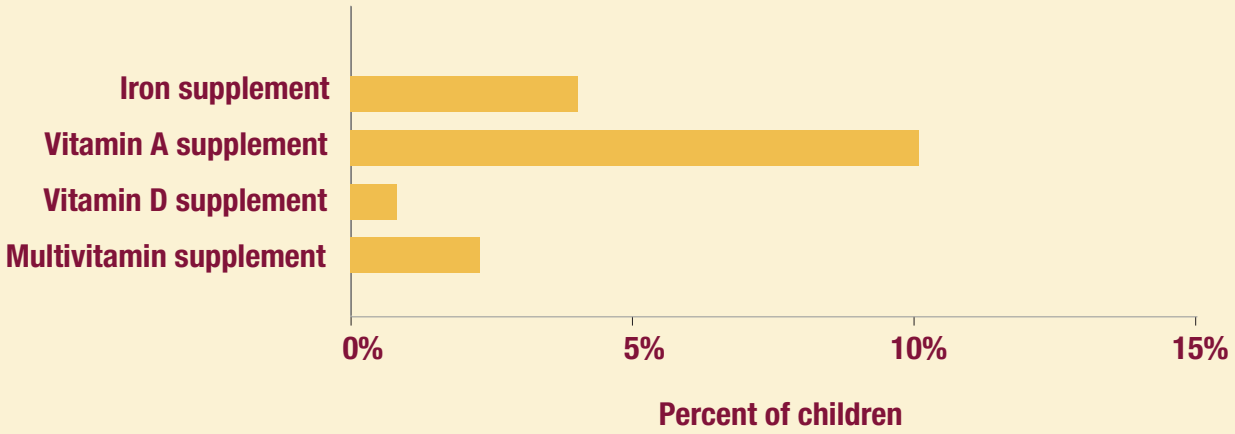
[a] Percentages weighted for unequal probability of selection among governorates

[b] CI=confidence interval calculated taking into account the complex sampling design.

3.3.4 Consumption of vitamins and supplements

Few children less than 5 years of age had taken a vitamin or mineral supplement in the prior 6 months (Figure 10).

Figure 10 - Proportion of children less than 5 years of age who took various supplements in past 6 months.



3.3.5 Parent's perceptions of child's weight and height

In spite of almost three-quarters of parents thinking that their children's weight is about average, almost one-half would like their child to weigh a little more than they do now (Table 25). Almost 80% think their children are of average height.

Table 25 - Parents' perceptions of weight and height of their children less than 5 years of age.

Parent's perception of weight and height	Number of children	% [a]	95% CI [b]
How classify child's weight now			
Very underweight	66	2.4%	(1.7, 3.2)
Underweight	649	22.9%	(20.8, 25.1)
Average	2378	73.7%	(71.2, 76.1)
Overweight	29	0.8%	(0.5, 1.3)
Very overweight	3	0.2%	(0.0, 0.7)
How much want child to weight			
A lot less	5	0.2%	(0.0, 0.6)
A little less	40	1.1%	(0.7, 1.7)
About the same	1790	52.9%	(50.3, 55.6)
A little more	1181	41.8%	(39.2, 44.5)
A lot more	106	3.8%	(2.8, 5.1)
How classify child's height now			
Very small/short	14	0.4%	(0.2, 0.8)
Small/short	357	13.3%	(11.6, 15.3)
Average	2559	79.5%	(77.3, 81.6)
Tall	187	6.4%	(5.2, 7.8)
Very tall	10	0.4%	(0.2, 0.8)

Note: The n's are un-weighted numerators for each subgroup; subgroups that do not sum to the total have missing data.

[a] Percentages weighted for unequal probability of selection among governorates

[b] CI=confidence interval calculated taking into account the complex sampling design.

3.3.6 Stunting

Overall, the prevalence of stunting is somewhat elevated; however, stunting is not substantially more common in Oman than in other Arab countries (Table 26)[39]. The nationwide estimate and every subgroup-specific estimate shown in the table is statistically significantly greater than the 2.3% found in the WHO Growth Standard, as shown by confidence intervals which do not cross 2.3. In addition, the prevalence does not show the progressive increase with age shown in many other countries. Although there are no statistically significant differences among governorates, Al-Sharqiyah North and Al-Wusta have a substantially greater prevalence of stunting than other governorates. Although stunting is somewhat less common in children in the wealthiest households, there is no statistically significant difference by household wealth. Likewise, there is little difference in stunting prevalence by mother's educational level. On the other hand, children of short mothers have a much higher prevalence of stunting than children of taller mothers, and all of this increased prevalence is due to a higher prevalence of moderate stunting. There is little difference in the prevalence of severe stunting.

The distribution of height-for-age z-scores is obviously shifted to the left, as shown in Figure 11, indicating that the population of children in Oman is relatively stunted. In addition, the standard deviation of 1.37 indicates a relative lack of random error in measurement of height and age. The mean height-for-age z-score is -0.63 (95% CI: -0.68, -0.58).

Figure 11 - Distribution of height-for-age z-scores in children less than 5 years of age.

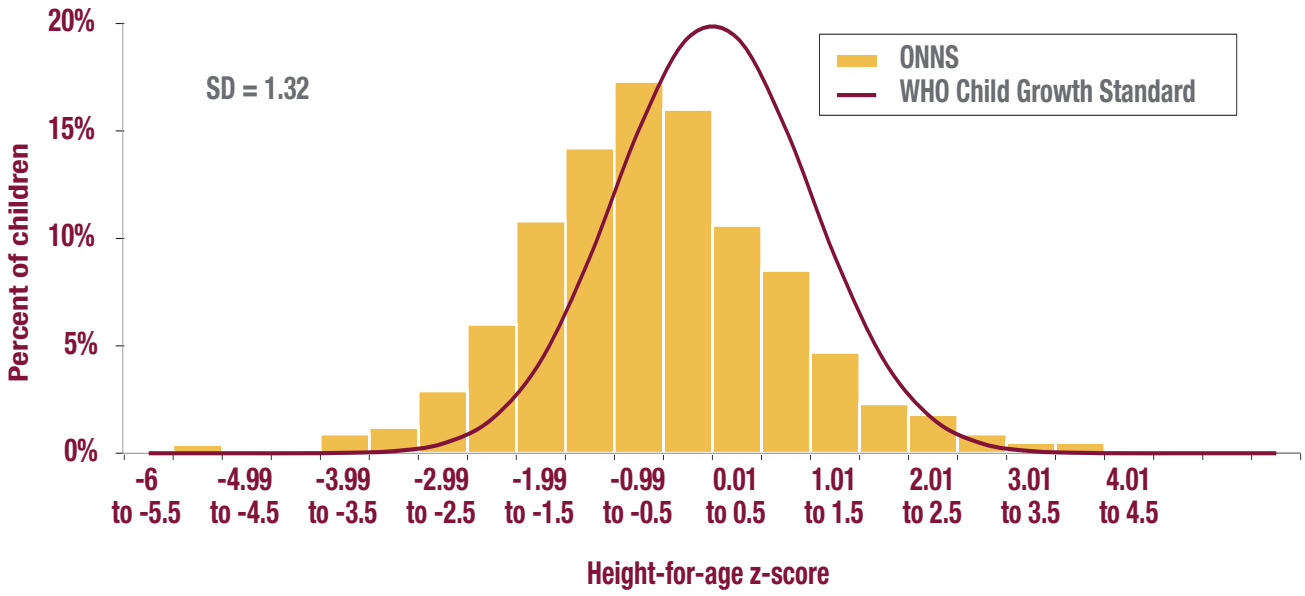


Table 26 - Prevalence of stunting in children 0-59 months, by various demographic characteristics.

	Severely stunted [b]			Moderately stunted [b]			Total stunted [c]			
Characteristic	**n**	**% [a]**	**95%CI**	**n**	**% [a]**	**95%CI**	**n**	**% [a]**	**95%CI**	**Chi-Square p-value [d]**
Total	97	2.7%	(2.1, 3.5)	272	8.7%	(7.4, 10.1)	369	11.4%	(9.8, 13.1)	
Age (in months)										
0-11	36	4.5%	(2.9, 7.0)	41	6.0%	(4.1, 8.8)	77	10.5%	(7.9, 13.9)	0.117
12-23	27	2.8%	(1.6, 4.7)	74	11.6%	(8.5, 15.5)	101	14.3%	(11.0, 18.5)	
24-35	12	2.1%	(1.0, 4.3)	61	9.7%	(7.1, 13.2)	73	11.8%	(9.1, 15.3)	
36-47	15	2.5%	(1.2, 5.1)	61	8.7%	(6.2, 12.1)	76	11.2%	(8.2, 15.1)	
48-59	7	1.3%	(0.4, 3.6)	35	6.7%	(4.4, 10.1)	42	8.0%	(5.4, 11.7)	
Sex										
Male	43	3.4%	(2.4, 4.9)	147	9.3%	(7.6, 11.2)	201	12.7%	(10.7, 15.1)	0.077
Female	54	1.9%	(1.2, 3.0)	125	8.1%	(6.3, 10.2)	168	10.0%	(8.0, 12.4)	
Governorate										
Muscat	2	1.6%	(0.4, 6.0)	10	8.1%	(4.3, 14.5)	12	9.7%	(5.2, 17.2)	0.001
Dhofar	13	3.8%	(2.0, 6.9)	10	2.9%	(1.7, 5.0)	23	6.7%	(4.5, 9.8)	
Al-Dhakhlya	8	2.5%	(1.2, 5.1)	28	8.8%	(6.4, 11.9)	36	11.3%	(8.3, 15.2)	
Al-Sharqyah North	12	5.0%	(2.6, 9.1)	39	16.1%	(12.5, 20.6)	51	21.1%	(16.0, 27.2)	
Al-Sharqyah South	5	2.0%	(0.8, 5.0)	31	12.3%	(7.5, 19.5)	36	14.3%	(8.9, 22.1)	
Al-Batinah North	7	2.6%	(1.4, 4.8)	20	7.5%	(4.7, 11.7)	27	10.1%	(6.9, 14.6)	
Al-Batinah South	6	2.4%	(1.0, 5.6)	20	7.8%	(5.7, 10.7)	26	10.2%	(7.3, 14.1)	
Al-Dhahairah	5	1.7%	(0.9, 3.6)	27	9.4%	(6.7, 13.1)	32	11.2%	(8.2, 15.1)	
Al-Buraimy	15	5.5%	(3.0, 9.8)	20	7.3%	(4.2, 12.5)	35	12.8%	(8.5, 18.9)	
Musandam	9	4.0%	(2.5, 6.2)	24	10.6%	(6.9, 16.0)	33	14.6%	(10.5, 19.9)	
Al-Wusta	15	4.5%	(3.0, 6.7)	43	13.0%	(8.5, 19.2)	58	17.5%	(12.8, 23.4)	
Wealth quintile										
Poorest	19	3.1%	(1.4, 6.6)	57	9.7%	(6.6, 14.0)	76	12.7%	(8.6, 18.4)	0.128
Second	16	2.4%	(1.3, 4.4)	71	10.6%	(7.7, 14.3)	87	13.0%	(10.0, 16.6)	
Middle	24	3.7%	(2.2, 6.0)	55	9.0%	(6.8, 11.8)	79	12.7%	(9.8, 16.2)	
Fourth	19	3.0%	(1.7, 5.3)	46	8.0%	(5.5, 11.4)	65	11.0%	(8.2, 14.7)	
Wealthiest	19	1.6%	(0.9, 2.8)	36	6.2%	(4.0, 9.5)	55	7.8%	(5.4, 11.2)	
Mother's education										
< 5 years	9	2.1%	(0.8, 5.4)	29	11.2%	(6.9, 17.9)	38	13.3%	(8.7, 19.8)	0.557
5 years or more but not complete secondary	24	2.5%	(1.4, 4.5)	63	9.7%	(7.0, 13.3)	87	12.3%	(9.2, 16.2)	
Completed secondary or more	58	2.7%	(1.9, 3.7)	163	8.1%	(6.7, 9.9)	221	10.8%	(9.1, 12.9)	
Mother's stature										
Short (< 150 cm)	9	2.5%	(1.1, 5.6)	61	17.4%	(12.6, 23.6)	70	19.9%	(14.7, 26.3)	<0.001
Normal (> 150 cm)	73	2.7%	(2.0, 3.7)	165	7.0%	(5.7, 8.5)	238	9.7%	(8.1, 11.5)	

Note: The n's are un-weighted numerators for each subgroup; subgroups that do not sum to the total have missing data.

[a] Percentages weighted for unequal probability of selection among governorates.

[b] Severe stunting is defined as having a height-for-age z-score below -3 standard deviations from the WHO Child Growth Standards population median; moderate stunting is defined as having a height-for-age z-score equal to or above -3 standard deviations and less than -2 SD from the WHO Child Growth Standards population median

[c] Total stunting includes both severely and moderately stunted children

[d] P value <0.05 indicates that at least one subgroup is significantly different from the others. Chi-square results are based on total stunting

3.3.7 Wasting

As with stunting, the nationwide and every subgroup-specific estimate of the prevalence of wasting (Table 27) is statistically significantly higher than the 2.3% expected in the WHO Growth Standard. This indicates an elevated level of wasting in the general population as well as in every subgroup of children. The prevalence does not show the usual rise in prevalence up to the second year of life; in fact, the prevalence of wasting, at 15.5%, is the highest in children less than 6 months of age and at 10.7% is the second highest in children 6-11 months of age. However, there is no statically significant difference among governorates nor a progressive change with change in household wealth or mother's educational level.

The distribution of weight-for-height z-score is shifted to the left (Figure 12), indicating relative wasting in the Oman population of children less than 5 years of age. The standard deviation of 1.32 shows a lack of substantial random error in weight and length or height measurements. The mean weight-for-height z-score is -0.40 (95% CI: -0.45, -0.35). As shown in Figure 13, WHZ declines, then rises in the first year of life. A second decline begins in the middle of the second of life and stabilizes in about age 4 years. Figure 13 shows the average HAZ and WHZ by age in months. A 3-month moving average was used to smooth the line because with only 40-60 children in each 1-month age group, the variability from month-to-month would have made trend interpretation more difficult. The HAZ z-score reaches a maximum value late in the first year of life, then precipitously drops until the middle of the second year of life. Thereafter, it is reasonably stable throughout the rest of the pre-school years.

Figure 12 - Distribution of weight-for-height z-scores in children less than 5 years of age.

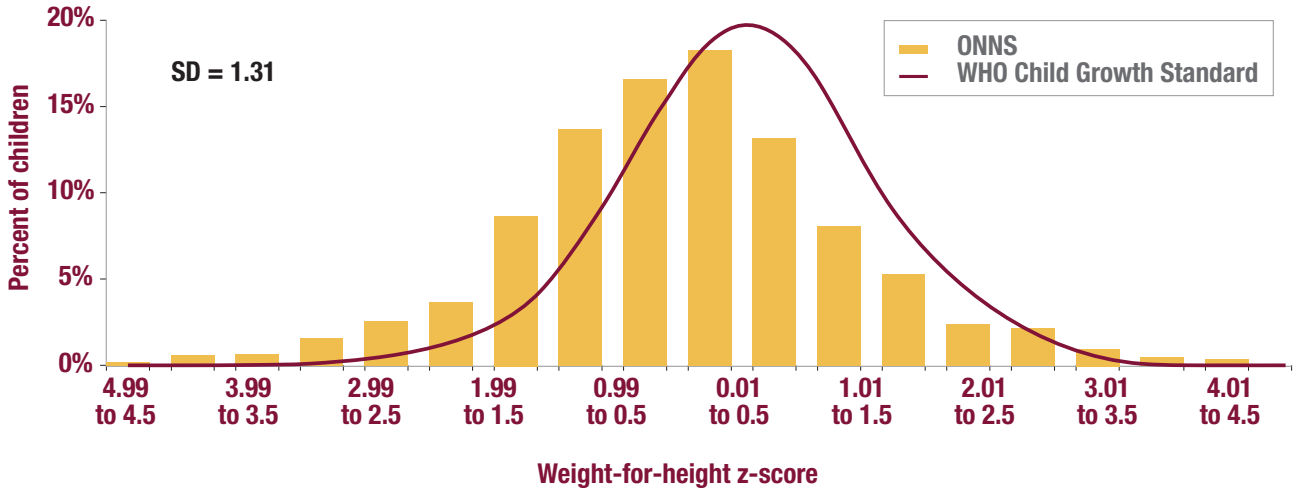


Figure 13 - 3-month moving average HAZ and WHZ by age in months.

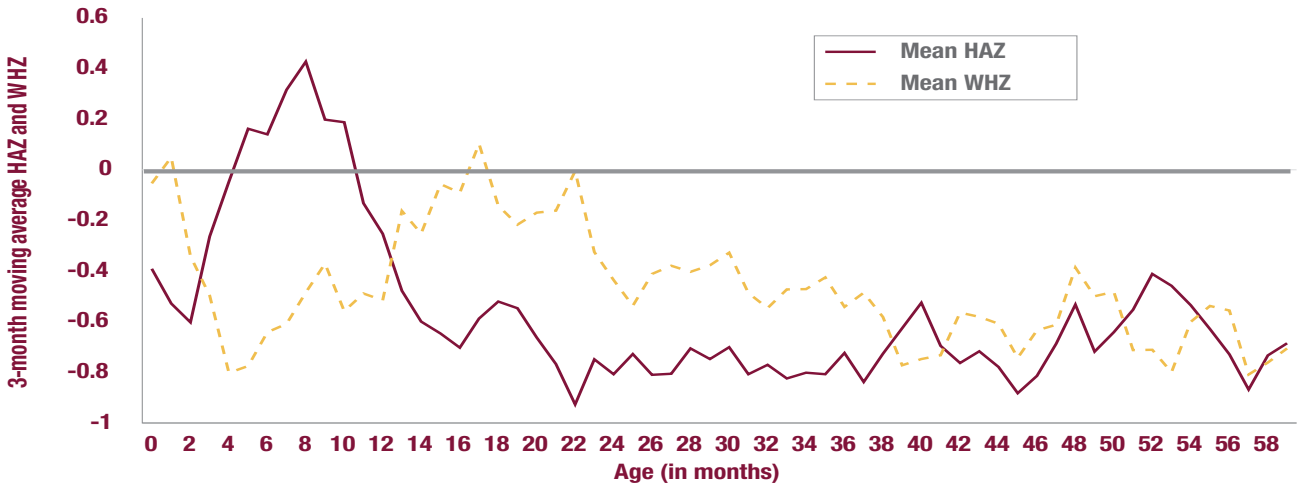


Table 27 - Prevalence of wasting in children 0-59 months, by various demographic characteristics.

	Severely wasted [b]			Moderately wasted [b]			Total wasted [c]			
Characteristic	**n**	**% [a]**	**95% CI**	**n**	**%**	**95% CI**	**n**	**%**	**95% CI**	**Chi-Square p-value [d]**
Total	83	3.1%	(2.3, 4.2)	179	6.2%	(5.1, 7.6)	262	9.3%	(7.9, 11.0)	
Age (in months)										
0-11	32	6.3%	(4.2, 9.5)	35	6.7%	(4.2, 10.3)	67	13.0%	(9.8, 17.1)	<0.05
12-23	21	1.9%	(1.0, 3.4)	30	4.3%	(2.8, 6.6)	51	6.2%	(4.4, 8.7)	
24-35	11	3.0%	(1.5, 6.1)	40	6.5%	(4.4, 9.5)	51	9.6%	(6.9, 13.2)	
36-47	13	2.7%	(1.3, 5.3)	33	6.5%	(4.2, 9.8)	46	9.1%	(6.4, 12.9)	
48-59	6	1.1%	(0.4, 3.4)	41	7.6%	(5.1, 11.1)	47	8.7%	(6.0, 12.3)	
Sex										
Male	36	2.0%	(1.3, 3.1)	91	6.7%	(5.2, 8.6)	127	8.7%	(7.0, 10.7)	0.376
Female	47	4.2%	(2.8, 6.2)	88	5.8%	(4.4, 7.6)	135	10.0%	(7.8, 12.7)	
Governorate										
Muscat	8	6.5%	(3.2, 12.6)	7	5.7%	(2.7, 11.5)	15	12.2%	(7.7, 18.8)	0.332
Dhofar	7	2.1%	(0.8, 5.1)	12	3.6%	(2.3, 5.5)	19	5.7%	(3.3, 9.6)	
Al-Dhakhlya	7	2.3%	(1.1, 4.4)	28	9.0%	(6.0, 13.2)	35	11.3%	(7.9, 15.7)	
Al-Sharqyah North	8	3.4%	(1.9, 5.8)	13	5.5%	(3.1, 9.6)	21	8.8%	(5.8, 13.1)	
Al-Sharqyah South	5	2.0%	(0.7, 5.5)	18	7.2%	(4.2, 12.1)	23	9.2%	(5.7, 14.6)	
Al-Batinah North	9	3.4%	(1.9, 6.0)	11	4.2%	(2.1, 8.2)	20	7.6%	(4.7, 12.0)	
Al-Batinah South	3	1.2%	(0.4, 3.6)	21	8.4%	(5.5, 12.5)	24	9.6%	(6.2, 14.7)	
Al-Dhahairah	3	1.1%	(0.4, 2.9)	23	8.1%	(5.6, 11.6)	26	9.2%	(6.5, 12.7)	
Al-Buraimy	20	7.6%	(4.4, 12.8)	13	4.9%	(2.9, 8.2)	33	12.5%	(7.9, 19.3)	
Musandam	6	2.7%	(1.3, 5.5)	15	6.7%	(4.2, 10.4)	21	9.4%	(5.9, 14.6)	
Al-Wusta	7	2.1%	(1.1, 4.2)	18	5.5%	(4.1, 7.2)	25	7.6%	(6.0, 9.7)	
Wealth quintile										
Poorest	20	6.1%	(2.9, 12.6)	36	8.6%	(5.5, 13.2)	56	14.7%	(9.9, 21.3)	0.063
Second	14	2.2%	(1.2, 4.3)	41	6.4%	(4.3, 9.6)	55	8.7%	(6.2, 12.0)	
Middle	16	2.0%	(1.1, 3.5)	29	4.4%	(2.8, 7.0)	45	6.4%	(4.4, 9.3)	
Fourth	14	2.2%	(1.2, 4.1)	39	7.2%	(5.0, 10.3)	53	9.5%	(6.7, 13.2)	
Wealthiest	19	4.5%	(2.6, 7.7)	29	5.5%	(3.5, 8.7)	48	10.0%	(7.0, 14.2)	

Characteristic	Severely wasted [b]			Moderately wasted [b]			Total wasted [c]			
	n	% [a]	95% CI	n	%	95% CI	n	%	95% CI	Chi-Square p-value [d]
Mother's education										
< 5 years	7	4.1%	(1.4, 11.1)	20	7.2%	(3.8, 13.1)	27	11.2%	(6.3, 19.2)	0.812
5 years or more but not complete secondary	14	2.5%	(1.2, 5.2)	37	6.7%	(4.3, 10.4)	51	9.2%	(6.2, 13.6)	
Completed secondary or more	60	3.2%	(2.3, 4.5)	110	6.0%	(4.7, 7.6)	170	9.2%	(7.6, 11.1)	

Note: The n's are un-weighted numerators for each subgroup; subgroups that do not sum to the total have missing data.

[a] Percentages weighted for unequal probability of selection among governorates.

[b] Severe wasting is defined as having a weight-for-height z-score below -3 standard deviations from the WHO Child Growth Standards population median; moderate wasting is defined as having a weight-for-height z-score equal to or above -3 standard deviations and less than -2 SD from the WHO Child Growth Standards population median

[c] Total wasting includes both severely and moderately wasted children

[d] P value <0.05 indicates that one at least subgroup is significantly different from the others. Chi-square results are based on total stunting

3.3.8 Overweight and obesity

The prevalence of overweight and obesity are low relative to other countries and regions in the world (Table 28).[33] Moreover, only in the nationwide analysis and in a few of the estimates for subgroups defined by age, governorate, household wealth, and mother's education do the confidence not overlap with the 2.3% found in the WHO Growth Reference. Overweight and obesity are substantially more common in younger children, children living in Muscat and Dhofar, children from wealthier households, and children of mothers who have completed secondary school or more. As with wasting, there is a substantial difference in the prevalence of overweight and obesity within the first year of life: 11.5% of children less than 6 months of age are overweight or obese, while only 3.2% of children 6-11 months of age are.

3.3.9 Underweight

As with stunting and wasting, the overall nationwide estimate and every subgroup-specific estimate of the prevalence of underweight is statistically significantly elevated above the 2.3% found in the WHO Growth Reference (Table 29). However, the prevalence of underweight is not associated with age, governorate of residence, household wealth, or mother's educational level with statistical significance.

Table 28 - Prevalence of overweight and obesity in children 0-59 months, by various demographic characteristics

Characteristic	Obese [b]			Overweight [b]			Total overweight or obesity [c]			
	n	% [a]	95% CI	n	%	95% CI	n	%	95% CI	Chi-Square p-value [d]
Total	32	1.1%	(0.7, 1.7)	80	3.1%	(2.4, 4.0)	112	4.2%	(3.4, 5.1)	
Age (in months)										
0-11	14	2.1%	(1.1, 3.9)	28	5.1%	(3.1, 8.3)	42	7.2%	(4.9, 10.5)	<0.01
12-23	8	1.7%	(0.7, 4.2)	23	3.7%	(2.1, 6.3)	31	5.4%	(3.4, 8.4)	
24-35	7	0.7%	(0.3, 1.6)	13	3.0%	(1.5, 5.9)	20	3.7%	(2.1, 6.6)	
36-47	2	0.5%	(0.1, 3.0)	7	1.3%	(0.5, 3.7)	9	1.8%	(0.7, 4.4)	
48-59	1	0.3%	(0.0, 2.0)	9	1.8%	(0.7, 4.3)	10	2.1%	(0.9, 4.6)	
Sex										
Male	17	1.3%	(0.7, 2.3)	37	2.8%	(1.9, 4.3)	54	4.1%	(2.9, 5.7)	0.893
Female	15	1.0%	(0.5, 1.9)	43	3.3%	(2.2, 4.8)	58	4.2%	(3.0, 5.9)	
Governorate										
Muscat	2	1.6%	(0.4, 6.0)	9	7.3%	(4.3, 12.1)	11	8.9%	(5.8, 13.6)	<0.001
Dhofar	9	2.7%	(1.5, 4.8)	24	7.2%	(5.7, 9.0)	33	9.9%	(7.9, 12.1)	
Al-Dhakhlya	2	0.6%	(0.2, 2.4)	3	1.0%	(0.3, 2.9)	5	1.6%	(0.7, 3.6)	
Al-Sharqyah North	3	1.3%	(0.4, 3.7)	6	2.5%	(1.1, 5.8)	9	3.8%	(2.0, 7.0)	
Al-Sharqyah South	1	0.4%	(0.1, 2.7)	2	0.8%	(0.2, 3.1)	3	1.2%	(0.4, 3.5)	
Al-Batinah North	2	0.8%	(0.2, 2.9)	8	3.0%	(1.6, 5.6)	10	3.8%	(2.2, 6.4)	
Al-Batinah South	3	1.2%	(0.4, 3.4)	1	0.4%	(0.1, 2.9)	4	1.6%	(0.6, 4.0)	
Al-Dhahairah	2	0.7%	(0.2, 2.7)	5	1.8%	(0.9, 3.5)	7	2.5%	(1.4, 4.3)	
Al-Buraimy	5	1.9%	(0.9, 3.9)	8	3.0%	(1.5, 6.2)	13	4.9%	(2.6, 9.1)	
Musandam	2	0.9%	(0.3, 3.1)	3	1.3%	(0.4, 4.3)	5	2.2%	(1.0, 5.1)	
Al-Wusta	1	0.3%	(0.1, 1.8)	1	0.3%	(2.0, 5.7)	12	3.7%	(2.1, 6.2)	
Wealth quintile										
Poorest	2	0.1%	(0.0, 0.5)	13	1.5%	(0.5, 4.7)	15	1.6%	(0.6, 4.7)	<0.05
Second	6	0.9%	(0.3, 2.7)	7	0.9%	(0.3, 2.5)	13	1.7%	(0.8, 3.8)	
Middle	10	2.3%	(1.1, 4.8)	13	2.4%	(1.3, 4.5)	23	4.7%	(3.0, 7.3)	
Fourth	3	0.4%	(0.1, 1.1)	22	5.2%	(3.3, 8.2)	25	5.6%	(3.6, 8.5)	
Wealthiest	11	1.5%	(0.7, 3.2)	23	4.1%	(2.5, 6.6)	34	5.5%	(3.7, 8.1)	
Mother's education										
< 5 years	3	0.9%	(0.2, 4.8)	6	1.3%	(0.4, 4.2)	9	2.2%	(0.8, 5.9)	<0.05
5 years or more but not complete secondary	6	1.2%	(0.4, 3.8)	12	0.9%	(0.4, 2.0)	18	2.1%	(1.0, 4.3)	
Completed secondary or more	23	1.2%	(0.8, 2.0)	59	3.8%	(2.8, 5.0)	82	5.0%	(4.0, 6.3)	

Note: The n's are un-weighted numerators for each subgroup; subgroups that do not sum to the total have missing data.

[a] Percentages weighted for unequal probability of selection among governorates.

[b] Overweight is defined as having a weight-for-height z-score greater than +2 but less than or equal to +3 standard deviations from the WHO Child Growth Standards population median; obesity is defined as having a weight-for-height z-score greater than +3 standard deviations from the WHO Child Growth Standards population median

[c] P value <0.05 indicates that one at least subgroup is significantly different from the others. Chi-square results are based on overweight or obese.

Table 29 - Prevalence of underweight in children 0-59 months, by various demographic characteristics.

Characteristic	Severe underweight [b]			Moderately underweight [b]			Total underweight [c]			
	n	% a	95% CI	n	%	95% CI	n	%	95% CI	Chi-Square p-value d
Total	69	2.4%	(1.7, 3.3)	266	8.9%	(7.5, 10.5)	335	11.2%	(9.6, 13.1)	
Age (in months)										
0-11	21	4.0%	(2.2, 7.1)	45	7.3%	(5.1, 10.3)	66	11.3%	(8.5, 14.9)	0.145
12-23	17	2.3%	(1.4, 4.0)	44	5.4%	(3.6, 8.2)	61	7.8%	(5.6, 10.7)	
24-35	11	2.0%	(0.9, 4.5)	65	11.3%	(8.1, 15.6)	76	13.3%	(9.8, 17.8)	
36-47	13	2.2%	(1.1, 4.2)	60	10.4%	(7.5, 14.3)	73	12.6%	(9.4, 16.7)	
48-59	7	0.9%	(0.3, 2.2)	52	10.6%	(7.3, 15.0)	59	11.4%	(8.0, 16.0)	
Sex										
Male	31	1.9%	(1.1, 3.1)	140	9.2%	(7.4, 11.4	171	11.1%	(9.2, 13.4)	0.884
Female	38	2.8%	(1.8, 4.3)	126	8.5%	(6.7, 10.8)	164	11.4%	(9.0, 14.2)	
Governorate										
Muscat	4	3.1%	(1.3, 7.5)	9	7.1%	(3.5, 13.8)	13	10.2%	(5.6, 17.9)	0.087
Dhofar	6	1.7%	(0.7, 4.4)	18	5.2%	(3.4, 7.8)	24	6.9%	(4.8, 9.9)	
Al-Dhakhlya	7	2.2%	(1.0, 4.7)	37	11.7%	(8.1, 16.5)	44	13.9%	(9.8, 19.3)	
Al-Sharqyah North	4	1.7%	(0.6, 4.7)	30	12.4%	(8.1, 18.5)	34	14.0%	(9.2, 20.9)	
Al-Sharqyah South	8	3.1%	(1.5, 6.4)	27	10.6%	(6.5, 16.7)	35	13.7%	(9.2, 20.0)	
Al-Batinah North	6	2.2%	(0.9, 5.4)	21	7.8%	(5.0, 12.1)	27	10.0%	(6.6, 14.9)	
Al-Batinah South	5	2.0%	(0.8, 5.0)	25	9.8%	(6.3, 15.1)	30	11.8%	(7.5, 18.2)	
Al-Dhahairah	7	2.4%	(1.2, 4.9)	22	7.6%	(4.9, 11.8)	29	10.1%	(6.8, 14.6)	
Al-Buraimy	6	2.1%	(1.0, 4.4)	17	5.9%	(3.5, 9.8)	23	8.0%	(5.1, 12.4)	
Musandam	6	2.6%	(1.2, 5.9)	33	14.5%	(9.1, 22.2)	39	17.1%	(10.6, 26.3)	
Al-Wusta	10	3.0%	(2.1, 4.3)	27	8.1%	(6.1, 10.7)	37	11.1%	(9.3, 13.3)	
Wealth quintile										
Poorest	17	4.4%	(2.3, 8.4)	46	10.2%	(6.4, 15.7)	63	14.6%	(9.4, 21.9)	0.693
Second	14	2.1%	(1.0, 4.2)	60	9.0%	(6.7, 12.0)	74	11.1%	(8.4, 14.4)	
Middle	17	2.0%	(1.0, 3.9)	55	9.1%	(6.8, 12.2)	72	11.1%	(8.2, 15.0)	
Fourth	11	2.2%	(1.2, 4.1)	49	8.5%	(5.9, 12.2)	60	10.7%	(7.6, 14.8)	
Wealthiest	9	2.2%	(1.0, 4.6)	51	8.0%	(5.4, 11.9)	60	10.2%	(7.2, 14.4)	
Mother's education										
< 5 years	8	2.1%	(0.7, 5.6)	21	9.6%	(5.1, 17.2)	29	11.6%	(6.8, 19.1)	0.964
5 years or more but not complete secondary	16	2.5%	(1.3, 4.6)	58	8.9%	(6.4, 12.3)	74	11.4%	(8.4, 15.2)	
Completed secondary or more	43	2.3%	(1.5, 3.5)	165	8.7%	(7.1, 10.7)	208	11.0%	(9.1, 13.3)	

Note: The n's are un-weighted numerators for each subgroup; subgroups that do not sum to the total have missing data.

[a] Percentages weighted for unequal probability of selection among governorates.

[b] Underweight is defined as having a weight-for-age z-score less than -2 but greater than or equal to -3 standard deviations from the WHO Child Growth Standards population median; severe underweight is defined as having a weight-for-age z-score less than -3 standard deviations from the WHO Child Growth Standards population median

[c] P value <0.05 indicates that one at least subgroup is significantly different from the others. Chi-square results are based on total underweight.

3.3.10 Anemia, iron deficiency, and iron deficiency anemia

The WHO classifies the population public health severity of anemia as moderate for prevalence rates of 20.0 – 39.9%[40]. Therefore, the prevalence in Oman is on the lower end of the moderate range (Table 30). Prevalence drops with age. Most governorates, with the exception of Dhofar, have a prevalence between 20% and 31%. Although the prevalence appears lower in Muscat, the small number of children recruited produce wide confidence intervals, so that we cannot conclude that the prevalence is lower in Muscat that in other governorates.

Table 30 - Prevalence of anemia, iron deficiency, and iron deficiency anemia in children 6-59 months, by various demographic characteristics.

Characteristic	Anemia				Iron deficiency [e]				Iron deficiency anemia			
	n	% [a, b]	95% CI [c]	p-value [d]	n	% a	95% CI [c]	p-value [d]	n	% [a, f]	95% CI [c]	p-value [d]
Total	599	23.8%	(21.4, 26.4)		125	10.2%	(7.8, 13.3)		42	2.9%	(2.0, 4.3)	
Age (in months)												
6-11	124	40.4%	(32.8, 48.6)	<0.001	6	5.3%	(2.1, 12.5)	<0.01	2	2.2%	(0.5, 8.5)	<0.01
12-23	206	33.4%	(27.8, 39.5)		43	17.4%	(11.9, 25.6)		20	6.2%	(3.6, 10.6)	
24-35	134	23.6%	(19.6, 28.2)		39	12.1%	(7.9, 17.9)		11	3.6%	(1.8, 7.0)	
36-47	80	15.0%	(11.4, 19.5)		21	7.4%	(4.0, 13.4)		5	1.1%	(0.4, 3.0)	
48-59	55	11.9%	(8.3, 16.7)		15	4.9%	(2.6, 9.0)		4	1.2%	(0.4, 3.4)	
Sex												
Male	302	23.8%	(20.6, 27.1)	0.881	74	11.7%	(8.6, 15.7)	<0.05	25	3.7%	(2.3, 6.0)	0.173
Female	297	24.0%	(20.8, 27.5)		51	7.8%	(5.5, 11.0)		17	2.2%	(1.2, 4.1)	
Governorate												
Muscat	13	18.1%	(9.9, 30.7)	<0.01	3	7.3%	(2.4, 20.5)	<0.001	0	0%	-	<0.01
Dhofar	48	15.4%	(11.6, 20.1)		38	41.8%	(29.8, 54.8)		8	8.9%	(4.6, 16.5)	
Al-Dhakhlya	84	29.5%	(25.6, 33.6)		5	4.2%	(1.9, 8.8)		2	1.7%	(0.4, 6.4)	
Al-Sharqyah North	52	25.4%	(18.9, 33.1)		8	7.6%	(3.8, 14.7)		3	2.9%	(1.0, 8.1)	
Al-Sharqyah South	52	23.5%	(17.6, 30.7)		20	16.5%	(10.3, 27.7)		12	9.9%	(5.0, 18.8)	
Al-Batinah North	57	23.0%	(17.0, 30.2)		6	6.1%	(2.6, 13.4)		2	2.0%	(0.6, 7.1)	
Al-Batinah South	55	25.7%	(20.3, 32.0)		4	4.0%	(1.5, 10.2)		1	1.0%	(0.1, 6.9)	
Al-Dhahairah	76	31.3%	(24.6, 38.9)		12	11.8%	(5.8, 22.5)		3	2.9%	(0.7, 11.3)	
Al-Buraimy	54	21.5%	(16.4, 27.7)		4	3.4%	(1.5, 7.4)		1	0.9%	(0.1, 5.7)	
Musandam	43	22.3%	(17.1, 28.5)		8	9.5%	(5.4, 16.3)		2	2.4%	(0.7, 8.3)	
Al-Wusta	65	23.3%	(19.2, 27.9)		16	17.0%	(9.4, 28.8)		8	8.5%	(3.5, 19.0)	
Wealth quintile												
Poorest	106	27.5%	(21.1, 34.8)	0.060	15	4.9%	(2.2, 10.8)	0.099	8	3.3%	(1.1, 9.3)	0.873
Second	126	25.6%	(21.1, 30.6)		25	7.9%	(4.5, 13.3)		9	2.3%	(1.2, 4.7)	
Middle	121	24.0%	(19.6, 28.9)		20	7.7%	(4.7, 12.4)		8	3.8%	(1.7, 8.4)	
Fourth	134	26.6%	(21.0, 33.1)		30	10.3%	(5.7, 17.7)		10	3.3%	(1.6, 6.7)	
Wealthiest	102	17.4%	(13.4, 22.3)		32	15.4%	(9.5, 23.9)		6	2.4%	(1.0, 5.8)	

Characteristic	Anemia				Iron deficiency [e]				Iron deficiency anemia			
Mother's education												
< 5 years	62	23.2%	(16.8, 31.2)	0.888	7	2.1%	(0.7, 6.2)	0.127	4	1.6%	(0.4, 6.1)	0.687
5 years or more but not complete secondary	130	24.7%	(20.2, 29.9)		35	12.4%	(7.3, 20.2)		13	3.5%	(1.6, 7.5)	
Completed secondary or more	367	23.5%	(20.6, 26.8)		76	10.6%	(7.5, 14.8)		23	3.0%	(1.8, 4.9)	

Note: The n's are un-weighted numerators for each subgroup; subgroups that do not sum to the total have missing data.

[a] Percentages weighted for unequal probability of selection among governorates.

[b] Anemia defined as hemoglobin < 110 g/L adjusted for altitude.

[c] CI=confidence interval calculated taking into account the complex sampling design.

[d] P value <0.05 indicates that at least one subgroup is statistically significantly different from the others.

[e] Iron deficiency defined as inflammation-adjusted plasma ferritin < 12 µg/l.

[f] Iron deficiency anemia defined as inflammation-adjusted plasma ferritin < 12.0 µg/L and hemoglobin < 110 g/L.

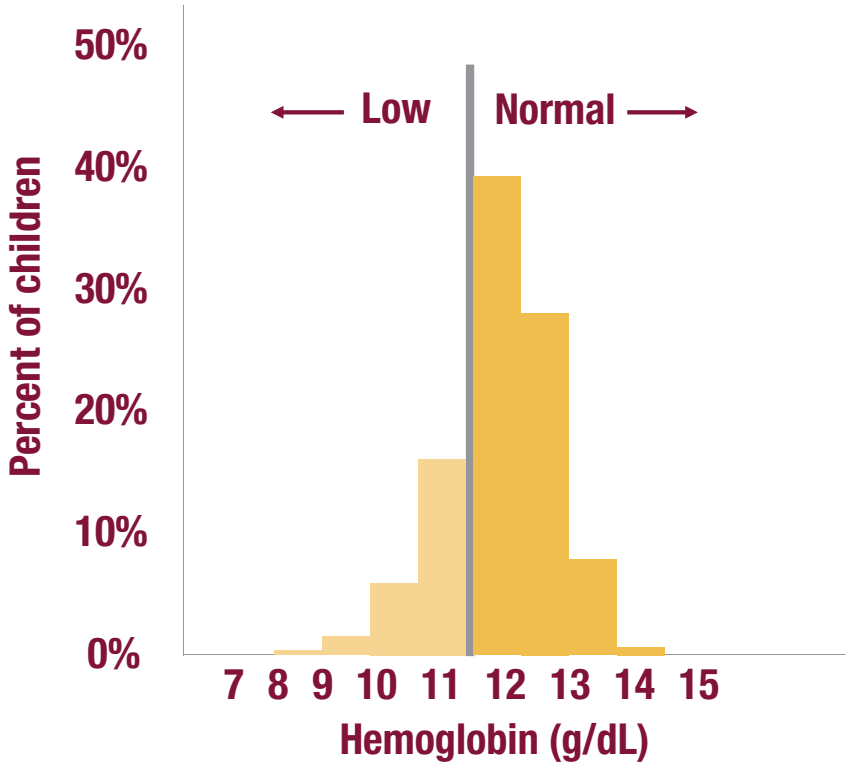
The wealthiest households have a lower prevalence of anemia compared to the other wealth quintiles; however, this difference lacks statistical significance. There is no clear association between mothers' educational level and the prevalence of anemia in their children.

The prevalence of iron deficiency is substantially lower than that of anemia in the nationwide estimate as well as in almost all subgroups. The exceptions are the governorate of Dhofar, where the prevalence of iron deficiency is more than double that of anemia, and in the wealthiest households, where the prevalence rates are similar.

The prevalence rates of iron deficiency anemia are low overall and in all subgroups. This is not surprising given the moderate prevalence of anemia and the low prevalence of iron deficiency. As a result, we can conclude that iron deficiency is not a major contributing factor in the majority of cases of anemia in young children.

The distribution of hemoglobin values for children is shown in Figure 14. It is symmetric with the majority of values above the cut-off point of 11.0 g/dL.

Figure 14 - Distribution of hemoglobin (g/dL) in children 6-59 months



3.3.11 Sickle cell and beta thalassemia

Sickle cell trait or beta thalassemia were found in 4-5% of children (Table 31). For all children with HbS present, the amount of HbS indicated sickle cell trait; no child had sickle cell disease. There were no statistically significant nor substantial differences in the prevalence of either sickle cell trait or beta thalassemia by age or wealth quintile (analysis not shown). Al-Dhakhlya and Al-Sharqyah North had the highest prevalence rates of sickle cell trait, and Dhofar Governorate had a markedly higher prevalence of beta thalassemia than other governorates, although these differences did not reach statistical significance.

Table 31 - Prevalence of sickle cell trait and beta thalassemia trait in children 6-59 months of age, by governorate

	Sickle cell				β-thalassemia			
Governorate	**n**	**%**	**95% CI[a]**	**P value**	**n**	**%**	**95% CI[a]**	**P value**
Total	38	5.3%	(3.4, 8.3)		29	4.2%	(2.3, 7.4)	
Sex								
Male	19	5.3%	(3.0, 9.3)	0.959	17	4.6%	(2.4, 8.9)	0.561
Female	19	5.4%	(3.0, 9.4)		12	3.7%	(1.8, 7.5)	
Governorate								
Muscat	3	8.6%	(2.9, 22.8)		1	2.9%	(0.4, 17.8)	
Dhofar	1	2.4%	(0.3, 16.4)		9	21.4%	(11.3, 36.9)	
Al-Dhakhlya	8	9.3%	(4.8, 17.4)		0	0%	-	
Al-Sharqyah North	12	12.1%	(4.6, 28.5)		3	3.0%	(1.0, 8.6)	
Al-Sharqyah South	3	2.8%	(0.7, 10.7)		0	0%	-	
Al-Batinah North	4	4.1%	(1.2, 13.3)		6	6.2%	(1.8, 18.8)	
Al-Batinah South	2	1.9%	(0.5, 7.6)		5	4.8%	(1.8, 12.4)	
Al-Dhahairah	3	3.4%	(1.1, 9.8)		3	3.4%	(1.1, 9.7)	
Al-Buraimy	2	2.0%	(0.7, 5.4)		0	0%	-	
Musandam	0	0%	-		2	2.6%	(0.8, 8.6)	
Al-Wusta	0	0%	-		0	0%	-	

Note: The n's are un-weighted numerators for each subgroup; subgroups that do not sum to the total have missing data.

a CI=confidence interval calculated taking into account the complex sampling design.

b P value < 0.05 indicates that at least one governorate is statistically significantly different from the others.

3.3.12 Risk factors for anemia

Table 32 shows the association between various factors and anemia in children 6-59 months of age. Anemia was more common in children with recent diarrehea or fever than in children without. There is some suggestion that children with recent lower respiratory infection were also more likely to have anemia, but this association is not statistically significant. Anemia was much more common in children with inflammation or iron deficiency than in children without these conditions. On the other hand, there was little association between anemia and household sanitation facilities, vitamin A deficiency, or beta thalassemia. Although it appears that children with sickle cell trait are less likely to have anemia, this association lacks statistical significance.

Table 32 - Correlation between various factors and anemia in children 6-59 months of age.

Characteristic	n	% [a] anemic	P value
Child had diarrhea			
Yes	108	29.9%	<0.05
No	489	22.4%	
Child had fever			
Yes	199	29.0%	<0.01
No	395	21.6%	

Characteristic	n	% [a] anemic	P value
Child had lower respiratory infection			
Yes	44	30.5%	0.148
No	548	23.3%	
Child's household has adequate sanitation			
Yes	81	24.4%	0.860
No	518	23.7%	
Child has inflammation			
Yes	46	21.8%	<0.01
No	89	9.7%	
Child iron deficient			
Yes	42	29.0%	<0.001
No	93	10.2%	
Child vitamin A deficient			
Yes	18	14.5%	0.567
No	117	11.8%	
Child vitamin D insufficient or deficient			
Yes	85	12.9%	0.058
No	38	8.4%	
Child has sickle cell trait or disease			
Yes	1	2.8%	0.114
No	99	10.9%	
Child has beta thalassemia trait			
Yes	4	10.3%	0.967
No	96	10.5%	

Note: The n's are un-weighted numerators for each subgroup; subgroups that do not sum to the total have missing data.

a Percentages weighted for unequal probability of selection among governorates.

3.3.13 Risk factors for iron deficiency.

Iron deficiency was not statistically significantly associated with most of the factors shown in Table 33. Nonetheless, the prevalence of iron deficiency was somewhat higher in children who had lower respiratory infection in the two weeks prior to the survey than in children who had not. In addition, children with beta thalassemia were significantly more likely to have iron deficiency.

Table 33 - Correlation between various factors and iron deficiency in children 6-59 months of age.

Characteristic	n	% [a] iron deficient	P value
Child had diarrhea			
Yes	19	12.2%	0.472
No	106	9.4%	
Child had fever			
Yes	25	9.3%	0.781
No	100	10.1%	

Characteristic	n	% [a] iron deficient	P value
Child had lower respiratory infection			
Yes	13	17.9%	0.059
No	110	9.2%	
Child's household has adequate sanitation			
Yes	28	12.9%	0.183
No	97	9.0%	
Child has inflammation			
Yes	22	9.6%	0.805
No	103	10.4%	
Child vitamin A deficient			
Yes	19	13.4%	0.301
No	106	9.9%	
Child vitamin D insufficient or deficient			
Yes	77	11.1%	0.185
No	39	7.7%	
Child has sickle cell trait			
Yes	4	14.2%	0.492
No	94	9.3%	
Child has beta thalassemia			
Yes	7	24.0%	<0.05
No	91	8.9%	

Note: The n's are un-weighted numerators for each subgroup; subgroups that do not sum to the total have missing data.

a Percentages weighted for unequal probability of selection among governorates.

3.3.14 Vitamin A deficiency

The ANOVA analysis of mean RBP by inflammation category, as recommended by Thurnham et al[30], resulted in using a cut-off of 0.73 µmol/L to define low RBP. WHO classifies vitamin A deficiency as a mild public health problem with a prevalence of 2-9%, as a moderate problem with a prevalence 10-19%, and a severe problem with a prevalence of 20% or more. According to this classification, vitamin A deficiency is a mild public health problem in Omani children (Table 34). The prevalence is much higher in children 6-11 months of age than in older age groups. In Al-Sharqyah South the prevalence would be classified as a moderate public health problem. In Al-Wusta, the prevalence would be classified as severe. Although not statistically significant, there is a trend of decreasing prevalence of vitamin A deficiency with increasing household wealth and increasing level of mother's education. Figure 15 shows that the distribution of RBP values for children is roughly symmetric.

Table 34 - Prevalence of vitamin A deficiency in children 6-59 months, by various demographic characteristics.

Characteristic	n	% a with VAD [b]	95% CI [c]	Chi-Square p-value [d]
Total	120	9.5%	(7.5, 12.1)	
Age (in months)				
6-11	9	23.5%	(10.8, 43.8)	<0.01
12-23	15	3.0%	(1.6, 5.6)	
24-35	31	8.2%	(5.1, 12.7)	
36-47	36	10.0%	(6.7, 14.8)	
48-59	29	12.9%	(8.0, 20.1)	
Sex				
Male	66	9.9%	(6.8, 14.1)	0.802
Female	54	9.2%	(6.4, 13.1)	
Governorate				
Muscat	4	9.5%	(4.1, 20.6)	<0.001
Dhofar	8	8.6%	(5.5, 13.2)	
Al-Dhakhlya	12	10.0%	(6.1, 16.0)	
Al-Sharqyah North	8	7.6%	(3.6, 15.4)	
Al-Sharqyah South	23	18.9%	(12.9, 26.7)	
Al-Batinah North	8	8.1%	(4.3, 14.8)	
Al-Batinah South	10	10.0%	(3.9, 23.2)	
Al-Dhahairah	1	1.0%	(0.2, 5.1)	
Al-Buraimy	6	5.0%	(2.3, 10.3)	
Musandam	10	11.9%	(7.1, 19.3)	
Al-Wusta	30	31.9%	(22.2, 43.5)	
Wealth quintile				
Poorest	32	11.6%	(6.0, 21.2)	0.081
Second	32	16.1%	(11.0, 22.9)	
Middle	20	8.3%	(4.4, 15.1)	
Fourth	19	7.6%	(4.3, 13.3)	
Wealthiest	16	7.0%	(3.7, 12.8)	
Mother's education				
< 5 years	24	13.6%	(6.6, 25.8)	0.121
5 years or more but not complete secondary	35	12.0%	(7.4, 19.0)	
Completed secondary or more	53	7.4%	(5.3, 10.4)	

Note: The n's are un-weighted numerators for each subgroup; subgroups that do not sum to the total have missing data.

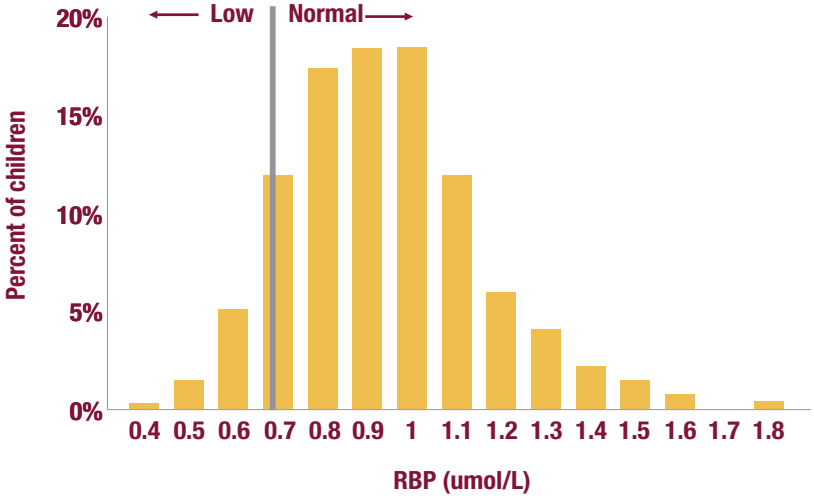
a Percentages weighted for unequal probability of selection among governorates.

b VAD = Vitamin A deficiency, defined as RBP adjusted for inflammation <0.73 µmol/L. This cut-off used because linear regression equation between retinol by HPLC and RBP by ELISA is RBP = 0.03 + 1 x Retinol.

c CI=confidence interval calculated taking into account the complex sampling design.

d P value <0.05 indicates that at least one subgroup is statistically significantly different from the others.

Figure 15 - Distribution of plasma retinol binding protein in children 6-59 months



3.3.15 Vitamin D deficiency and insufficiency

The prevalence of vitamin D deficiency and insufficiency in Omani children is elevated (Table 35). The prevalence of insufficiency seems to increase with age, while the prevalence of deficiency is highest in children 6-11 months of age. However, these differences are not statistically significant. The prevalence of deficiency differs widely among governorates, but, with the exception of the low estimate in Al-Dhahairah, the prevalence of insufficiency is roughly similar in governorates. There is no statistically significant association nor any apparent trend between the prevalence of vitamin D insufficiency and deficiency and household wealth or mother's educational level.

Table 35 - Prevalence of vitamin D deficiency and insufficiency in children less than 5 years of age, by various demographic characteristics

	Deficient [a]			Insufficient [a]			Deficient or insufficient			
Characteristic	**n**	**% [b]**	**95% CI [c]**	**n**	**% [b]**	**95% CI [c]**	**n**	**% [b]**	**95% CI [c]**	**p-value [d]**
Total	88	10.6%	(8.0, 13.5)	553	53.8%	(49.7, 57.9)	641	64.4%	(60.2, 68.4)	
Age (in months)										
6-11	9	23.7%	(10.9, 44.2)	21	38.9%	(25.0, 54.8)	30	62.6%	(47.5, 75.6)	0.420
12-23	21	11.7%	(7.3, 18.2)	104	47.1%	(38.3, 56.0)	125	58.8%	(49.6, 67.3)	
24-35	15	4.1%	(2.4, 6.9)	149	60.0%	(51.8, 67.7)	164	64.1%	(55.6, 71.7)	
36-47	22	12.5%	(7.7, 19.7)	135	52.5%	(44.4, 60.5)	157	64.9%	(56.7, 72.3)	
48-59	20	10.7%	(6.3, 17.5)	143	59.6%	(51.0, 67.6)	163	70.3%	(62.5, 77.0)	
Sex										
Male	35	9.2%	(6.3, 13.3)	268	50.9%	(45.6, 56.1)	303	60.1%	(54.7, 65.2)	<0.005
Female	53	12.0%	(8.5, 16.6)	285	56.7%	(50.8, 62.5)	338	68.7%	(62.8, 74.2)	
Governorate										
Muscat	5	12.2%	(5.2, 26.1)	22	53.7%	(40.5, 66.4)	27	65.9%	(53.1, 76.7)	<0.001
Dhofar	18	22.5%	(14.1, 34.0)	45	56.3%	(44.7, 67.2)	63	78.8%	(68.1, 86.6)	
Al-Dhakhlya	13	11.5%	(6.1, 20.6)	67	59.3%	(48.4, 69.4)	80	70.8%	(59.5, 80.0)	
Al-Sharqyah North	8	7.6%	(3.8, 14.7)	60	57.1%	(48.4, 65.5)	68	64.8%	(55.4, 73.1)	
Al-Sharqyah South	15	12.3%	(6.5, 22.1)	63	51.6%	(43.0, 60.2)	78	63.9%	(53.4, 73.3)	
Al-Batinah North	9	9.1%	(5.3, 15.2)	57	57.6%	(47.2, 67.4)	66	66.7%	(56.4, 75.5)	
Al-Batinah South	11	11.6%	(6.3, 20.5)	48	50.5%	(40.9, 60.1)	59	62.1%	(49.3, 73.4)	
Al-Dhahairah	0	0%	-	29	28.2%	(19.2, 39.3)	29	28.2%	(19.2, 39.3)	
Al-Buraimy	8	7.6%	(3.5, 15.6)	59	56.2%	(47.3, 64.7)	67	63.8%	(53.1, 73.3)	
Musandam	0	0%	-	47	58.0%	(49.7, 65.9)	47	58.0%	(49.7, 65.9)	
Al-Wusta	1	1.1%	(0.2, 6.9)	56	60.9%	(50.3, 70.5)	57	62.0%	(50.2, 72.5)	

Characteristic	Deficient [a]			Insufficient [a]			Deficient or insufficient			
	n	% [b]	95% CI [c]	n	% [b]	95% CI [c]	n	% [b]	95% CI [c]	p-value [d]
Wealth quintile										
Poorest	3	4.7%	(1.2, 16.6)	89	62.1%	(51.9, 71.3)	92	66.8%	(55.6, 76.3)	0.262
Second	18	9.8%	(5.7, 16.2)	103	46.2%	(37.8, 54.8)	121	56.0%	(45.5, 65.9)	
Middle	22	12.5%	(7.6, 20.0)	119	57.0%	(49.0, 64.6)	141	69.5%	(61.3, 76.6)	
Fourth	21	12.1%	(7.3, 19.4)	121	53.9%	(44.8, 62.7)	142	66.0%	(57.5, 73.5)	
Wealthiest	24	10.7%	(6.3, 17.8)	113	55.7%	(46.3, 64.8)	137	66.5%	(57.2, 74.6)	
Mother's education										
< 5 years	3	3.5%	(0.9, 12.4)	69	61.1%	(46.3, 74.0)	72	64.6%	(50.1, 76.8)	0.523
5 years or more but not complete secondary	22	11.9%	(7.9, 17.6)	132	57.9%	(50.5, 64.9)	154	69.8%	(61.3, 77.2)	
Completed secondary or more	57	11.1%	(8.1, 14.9)	323	53.4%	(47.9, 58.8)	380	64.4%	(59.4, 69.2)	

Note: The n's are un-weighted numerators for each subgroup; subgroups that do not sum to the total have missing data.

a Deficient < 30 nmol/L; Insufficient 30-49 nmol/L; Sufficient 50+ nmol/L

b Percentages weighted for unequal probability of selection among governorates

c CI=confidence interval calculated taking into account the complex sampling design.

d Chi-square p-value <0.05 indicates that at least one subgroup is statistically significantly different from the others

3.3.16 Correlation between micronutrient deficiencies and growth indices

As shown in Table 36 below, the only statistically significant associations between a micronutrient deficiency and a growth index are those between vitamin A deficiency and underweight and iron deficiency and overweight.

Table 36 - Correlation between various micronutrient deficiencies and growth indices.

Characteristic	N	% [a] Stunted	P value	% [a] Wasted	P value	% [a] Under-weight	P value	% [a] Overweight or obese	P value
Child anemic									
Yes	581	12.5%	0.179	8.0%	0.700	12.0%	0.418	2.9%	0.899
No	1893	10.3%		8.7%		10.5%		3.0%	
Child iron deficient									
Yes	124	6.4%	0.198	3.4%	0.057	6.2%	0.113	7.3%	<0.01
No	939	9.8%		8.6%		11.3%		2.0%	
Child vitamin A deficient									
Yes	117	4.5%	0.104	5.5%	0.446	3.4%	<0.05	1.0%	0.243
No	946	10.0%		8.2%		11.5%		2.8%	
Child vitamin D insufficient or deficient									
Yes	629	9.5%	0.916	7.0%	0.169	10.0%	0.430	2.1%	0.947
No	388	9.8%		10.2%		12.1%		2.0%	

Note: The N's are un-weighted denominator of all children with characteristic.

a Percentages weighted for unequal probability of selection among governorates.

There is no statistically significant difference in vitamin D status between children with different levels of sun exposure index (Table 37).

Table 37 - Association between sun exposure and vitamin D deficiency in children 6-59 months of age.

Sun exposure	Vitamin D deficient		Vitamin D insufficient		Optimal vitamin D		
index	n	%[a]	n	%[a]	n	%[a]	P value
0	4	13.2%	13	46.1%	12	40.7%	
0.01 – 20.0	28	8.2%	204	55.8%	145	36.0%	0.715
>20	26	9.4%	209	59.1%	127	31.5%	

[a] Percentages weighted for unequal probability of selection in governorates

3.3.17 Physical activity and sleep patterns

Table 38 shows various indicators of physical activity and sleep patterns in children. Overall, children watch somewhat less than 2 hours of television or video per day on average, and play video or computer games for one-half hour. Close to two-thirds watch television never or rarely while eating, and about one-quarter have a television in their bedrooms. Children average more than 10 hours of sleep on both weekdays and weekends. Children walk in their neighborhoods a few days per week and play outdoors for more than 30 minutes on almost 5 days per week. Few children participate in organized physical activities, but the majority are reported to like outdoor activities. Mothers of most children report their children of average physical activity. More than one-half of children are cared for at home, and most others are cared for by friends or family members. An analysis of physical activity and sleep variables by governorate is shown in table 5-1 in Appendix 5.

Table 38 - Physical activity and sleep patterns in children less than 5 years of age

Characteristic	n	Mean or %[a]	95% CI
Hours of television or video watching per day (mean)	1757	1.7	(1.6, 1.9)
Hours of video or computer games per day (mean)	1753	.5	(0.4, 0.6)
Watch television while eating			
No or rarely	1163	64.3%	(60.5, 68.1)
1 meal per day	440	23.4%	(20.3, 26.8)
2 meals per day	98	7.0%	(5.4, 9.1)
3 or more meals per day	63	5.0%	(3.7, 6.7)
Television or computer in bedroom			
Yes	511	27.9%	(24.1, 32.0)
No	1249	72.1%	(68.0, 75.9)
Hours sleep per 24-hour period on weekdays (mean)	1773	10.4	(10.2, 10.5)
Hours sleep per 24-hour period on weekends (mean)	1771	10.8	(10.6, 11.0)
Days in past 7 days walked in neighborhood (mean)	1710	2.9	(2.6, 3.1)
Days in past 7 days played outdoors 30+ minutes (mean)	1705	4.8	(4.6, 5.0)
Organized physical activity in typical week			
Yes	237	13.9%	(11.3, 17.0)
No	1535	86.1%	(83.0, 88.7)
Likes physical activity and outdoor playing			
Does not like	16	1.0%	(0.6, 1.9)
Likes	937	45.9%	(42.3, 49.5)
Likes a lot	806	53.0%	(49.4, 56.7)
Mother ranks child's activities relative to other children			
A lot less active	5	0.1%	(0.0, 0.5)
Less active	57	4.1%	(2.8, 6.0)
Same	1431	76.3%	(73.2, 79.1)
More active	242	17.5%	(14.9, 20.5)
A lot more active	25	2.0%	(1.3, 3.2)
Type of child care facility typically attends			
None, stays at home	908	53.3%	(49.1, 57.5)
Informal (family, friends)	626	32.2%	(28.5, 36.0)
Day care <8 hours	93	5.0%	(3.6, 7.0)
Day care 8+ hours	7	0.6%	(0.2, 1.5)
Preschool	115	8.5%	(6.6, 10.8)
Other [b]	7	0.4%	(0.2, 1.0)

[a] Percentages weighted for unequal probability of selection in governorates

[b] Includes private home, disable care, and Quran school

3.3.18 Sun exposure

Table 39 shows indicators of sun exposure in children. Most children do not usually protect their heads or arms from the sun when outdoors. Slightly less than two-thirds spend 1 hour or more each day outside in the sun, and very few use sunscreen when outdoors. More than one-half had a sun exposure index of 20 or greater. An analysis of sun exposure variables by governorate is shown in table 5-2 in Appendix 5.

Table 39 - Sun exposure in children less than 5 years of age.

Characteristic	n	Mean or %[a]	95% CI
Child's head usually protected from sun when outside			
Never/rarely	1339	76.3%	(73.0, 79.3)
Sometimes	334	18.9%	(16.3, 21.8)
Most of the time	41	1.4%	(1.0, 2.2)
All the time	71	3.3%	(2.4, 4.6)
How usually protect child's head from sun			
Scarf/headcloth	45	8.4%	(5.8, 12.2)
Hat	409	91.6%	(87.8, 94.2)
Child's arms usually protected from sun when outside			
Never/rarely	653	37.4%	(33.7, 41.3)
Sometimes	870	53.5%	(49.4, 57.5)
Most of the time	148	3.8%	(2.8, 5.1)
All the time	114	5.3%	(4.1, 6.9)
How much time per day typically child spend under the sun			
None	59	3.1%	(2.0, 4.7)
1-29 minutes	275	13.9%	(11.6, 16.6)
30-59 minutes	423	20.8%	(18.4, 23.4)
1-2 hours	553	30.7%	(27.8, 33.8)
More than 2 but less than 3 hours	233	12.0%	(10.3, 14.0)
More than 3 hours	233	19.5%	(16.5, 22.9)
Child usually has sunscreen			
Never/rarely	1763	99.2%	(98.6, 99.5)
Sometimes	19	0.6%	(0.4, 1.2)
Most of the time	1	0.1%	(0.0, 0.5)
All the time	2	0.1%	(0.0, 0.5)
Child's skin color			
Very white	5	0.2%	(0.1, 0.6)
White	686	40.0%	(36.3, 43.9)
Olive	899	46.5%	(42.6, 50.3)
Dark	177	11.9%	(9.7, 14.6)
Very dark/black	16	1.4%	(0.6, 3.3)
Sun index			
20+	821	52.6%	(49.0, 56.2)
0.01-19.9	862	43.0%	(39.5, 46.5)
0	94	4.5%	(3.2, 6.1)

a Percentages weighted for unequal probability of selection in governorates

3.3.19 Comparison to 2009 nutrition survey of children less than 5 years of age

Raw data from the 2009 survey assessing the nutritional status in children less than 5 years of age was reformatted for comparison to the results of the ONNS. At the time of the 2009 survey, there were only 10 governorates. For this reason, the ONNS 2017 results from the governorates of Al-Dhahairah and Buraimy were combined into one stratum to match the stratification of the 2009 sample, and sampling weights were recalculated. Because the authors did not have access to the original method of calculating sampling weights for the 2009 survey, they were recalculated from the number of Omani children less than 5 years of age from the 2010 census in each of the 10 governorates using the same method used in the ONNS. Non-Omani households included in the 2009 survey were excluded from this analysis. For the ONNS, the changes in stratification resulted in some minor differences in both the point estimates of prevalence and the measures of precision from the definitive ONNS results presented elsewhere in this report.

Results from the 2009 survey and the 2017 ONNS along with p-values for any differences are shown in Table 40. Stunting, wasting, overweight and obesity, and underweight have increased slightly, albeit without statistical significance. In contrast, the prevalence of anemia in young children has declined substantially. The prevalence of many feeding behaviors has improved, while others have declined. Early initiation of breastfeeding was common in both surveys, and exclusive breastfeeding was uncommon in both. The prevalence of continued breastfeeding at 1 year is unchanged. More children have appropriately-timed introduction of solid foods in the 2017 ONNS than in the 2009 survey. Dietary diversity is somewhat improved, but the minimum meal frequency has deteriorated leading to a decline in the prevalence of minimum acceptable diet.

The prevalence of eating an iron-rich diet has increased between 2009 and 2017. Although the proportion of children who have ever breastfed has declined and this decline is statistical significant, the change is minimal. Like continued breastfeeding at 1 year, the prevalence of continued breastfeeding at 2 years has changed little. In contrast, age-appropriate breastfeeding has become substantially more common; however, predominant breastfeeding has declined. Although it appears that bottle feeding is somewhat more common in the 2017 ONNS, this change is not statistically significant. Adequate milk feeding of non-breastfed children appears to have declined a great deal.

Relatively few governorate-specific estimates of the prevalence of stunting, wasting, or overweight and obesity differed with statistical significance between the 2009 survey and 2017 ONNS (Table 41). Moreover, in most cases the differences were minimal. However, this was not true for anemia, which declined substantially in all governorates except Al-Sharqya South.

Table 40 - Comparison of available indicators in children between 2009 nutrition survey and 2017 ONNS.

	2009 survey (N=8602)			ONNS 2017 (N=3116)			
Indicator	**n**	**Prevalence**	**95% CI**	**n**	**Prevalence**	**95% CI**	**P value**
Anthropometric indices							
Stunting	781	10.0%	(7.5, 13.3)	319	11.0%	(9.5, 12.8)	0.555
Wasting	498	6.7%	(5.3, 8.4)	227	8.7%	(7.3, 10.4)	0.069
Overweight and obesity	185	2.4%	(1.6, 3.8)	80	3.4%	(2.6, 4.4)	0.228
Underweight	633	8.2%	(5.9, 11.1)	297	11.0%	(9.3, 13.0)	0.104
Micronutrient status							
Anemia	3715	53.4%	(44.8, 61.7)	599	23.7%	(21.3, 26.2)	<0.001
Feeding behaviors							
Early initiation of breastfeeding	2577	82.7%	(79.0, 85.9)	1049	81.7%	(78.7, 84.4)	0.662
Exclusive breastfeeding	78	13.9%	(7.4, 24.7)	84	23.2%	(17.3, 30.3)	0.121
Continued breastfeeding at 1 year	458	80.5%	(75.0, 85.0)	175	80.1%	(71.2, 86.8)	0.940
Introduction of solid food	219	85.2%	(75.3, 91.6)	159	95.6%	(91.6, 97.7)	<0.01
Minimum dietary diversity	1996	66.9%	(60.2, 73.0)	688	80.8%	(77.7, 83.6)	<0.001
Minimum meal frequency	2509	84.2%	(74.0, 90.9)	357	64.9%	(59.6, 69.9)	<0.01
Minimum acceptable diet	1716	57.5%	(50.7, 64.0)	277	47.4%	(42.5, 52.3)	<0.05
At iron-rich for fortified food	2421	80.7%	(70.5, 87.9)	875	90.6%	(88.1, 92.6)	<0.01
Ever breastfed	3050	99.2%	(98.2, 99.6)	1256	96.1%	(94.4, 97.3)	<0.001
Continued breastfeeding at 2 years	268	46.2%	(29.9, 63.3)	106	47.4%	(38.4, 56.5)	0.907
Age-appropriate breastfeeding	276	8.4%	(6.1, 11.6)	706	57.1%	(53.4, 60.7)	<0.001
Predominant breastfeeding	434	94.1%	(90.3, 96.5)	133	33.4%	(26.5, 41.1)	<0.001
Bottle fed in past 24 hours	1298	44.0%	(34.4, 54.0)	656	53.6%	(49.2, 57.9)	0.092
Adequate milk feeding	599	80.1%	(71.0, 86.8)	131	44.9%	(37.9, 52.1)	<0.001

Table 41 - Comparison of governorate-specific prevalence rates of stunting, wasting, overweight/obesity, and anemia in children between 2009 nutrition survey and 2017 ONNS.

	Prevalence of stunting			Prevalence of wasting			Prevalence of overweight/obesity			Prevalence of anemia		
Governorate	**2009**	**ONNS 2017**	**P value**	**2009**	**ONNS 2017**	**P value**	**2009**	**ONNS 2017**	**P value**	**2009**	**ONNS 2017**	**P value**
Muscat	5.1%	10.3%	0.118	4.2%	9.5%	0.167	3.7%	8.6%	<0.05	54.9%	18.1%	<0.01
Dhofar	2.7%	6.4%	<0.05	2.0%	5.3%	<0.01	8.3%	9.2%	0.504	44.0%	15.4%	<0.001
Al-Dhakhlya	8.2%	11.5%	0.061	8.9%	10.4%	0.656	0.4%	1.0%	0.075	68.1%	29.5%	<0.001
Al-Sharqyah North	18.2%	21.1%	0.325	10.4%	9.0%	0.630	1.7%	1.9%	0.833	52.7%	25.4%	<0.001
Al-Sharqyah South	20.1%	14.7%	0.462	7.5%	9.6%	0.470	0.6%	1.4%	0.299	21.6%	23.5%	0.776
Al-Batinah North	9.1%	8.7%	0.830	5.2%	7.1%	0.272	2.6%	2.5%	0.940	49.0%	23.0%	<0.001
Al-Batinah South	8.9%	10.3%	0.508	8.1%	8.7%	0.806	1.8%	0.4%	0.125	74.9%	25.7%	<0.001
Al-Dhahairah/ Al-Buraimy	8.9%	10.2%	0.417	7.7%	11.1%	<0.05	1.2%	3.4%	<0.01	58.7%	26.3%	<0.001
Musandam	16.0%	15.5%	0.891	9.8%	10.6%	0.847	8.0%	1.0%	<0.01	62.1%	22.3%	<0.001
Al-Wusta	22.0%	17.0%	0.203	4.9%	6.3%	0.401	7.3%	2.4%	<0.05	52.8%	23.3%	<0.01

3.4 Non-pregnant women of reproductive age

3.4.1 Characteristics

Non-pregnant women 15-49 years of age in the survey sample are described in Table 42. All age groups are approximately equally represented with the exception of the oldest age group 45-49 years of age. Most women had completed secondary school or higher. Although a large number of women had never been pregnant or given birth, one-quarter of women had been pregnant or given birth five times or more. Almost one-half of women had given birth in the past 2 years, and more than one-third were currently breastfeeding a child.

Table 42 - Description of non-pregnant women 15 - 49 years.

Characteristic	Number of women	% [a]	95% CI [b]
Age (in years)			
15-19	767	17.6%	(16.1, 19.1)
20-24	717	16.5%	(15.0, 18.1)
25-29	702	15.7%	(14.1, 17.5)
30-34	637	13.6%	(12.1, 15.2)
35-39	640	15.3%	(13.7, 17.1)
40-44	499	13.2%	(11.9, 14.6)
45-49	325	8.1%	(7.1, 9.3)
Wealth Quintile			
Poorest	682	9.0%	(7.4, 10.9)
Second	796	18.4%	(16.2, 20.9)
Middle	774	18.7%	(16.2, 21.3)
Fourth	858	21.2%	(18.8, 23.8)
Wealthiest	1120	32.7%	(29.1, 36.4)
Mother's education			
< 5 years	520	8.5%	(7.3, 9.8)
5 years or more but not complete secondary	1225	27.5%	(25.6, 29.5)
Completed secondary or more	2534	64.1%	(61.6, 66.4)
Marital Status			
Never married	1607	38.3%	(36.4, 40.3)
Currently married	2506	57.7%	(55.7, 59.6)
Widowed	70	1.7%	(1.3, 2.3)
Divorced or separated	110	2.3%	(1.8, 2.9)
Number of times been pregnant [c]			
0	1781	42.0%	(40.0, 44.0)
1-2	719	15.1%	(13.6, 16.8)
3-4	643	15.3%	(14.0, 16.8)
5-6	516	12.6%	(11.3, 14.2)
7+	617	14.9%	(13.5, 16.5)
Number of times given birth [d]			
0	1625	40.2%	(38.2, 42.3)
1-2	775	17.5%	(15.7, 19.4)
3-4	692	17.3%	(15.6, 19.2)
5-6	506	12.5%	(11.2, 14.0)
7+	505	12.5%	(11.2, 14.0)
Given birth in past 2 years [e]			
Yes	1159	44.9%	(42.5, 47.4)
No	1300	55.1%	(52.6, 57.5)

Characteristic	Number of women	% [a]	95% CI [b]
Currently breastfeeding a child [e]			
Yes	955	37.7%	(35.0, 40.5)
No	1500	62.3%	(59.5, 65.0)

a Percentages weighted for unequal probability of selection between governorates.

b CI=confidence interval calculated taking into account the complex sampling design.

c Among currently married women

d Among currently married women who reported a prior pregnancy

e Among currently married women who reported a prior birth

3.4.2 Dietary diversity and consumption of vitamins and supplements

Women had, on average, eaten more than six food groups in the past 24 hours, and a large majority met the minimum requirements for dietary diversity (Table 43). Women ate fruit and vegetables relatively frequently (Figure 16). However, starchy foods were eaten much more frequently. Beans and other pulses were not frequently eaten. Consumption of dairy products was common. Heavily processed foods, such as processed meat and cold cereals, were not frequently eaten. A relatively small proportion of women frequently ate food from fast food restaurants, or foods such as french fries or sugary foods. Fruit juice, drinks with added sugar, sports drinks, energy drinks, and sweetened fruit drinks were not frequently consumed. Coffee or tea with sugar was consumed more frequently than coffee or tea without sugar. Relatively few women had taken iron, folic acid, vitamin D, calcium, vitamin A or multi-vitamin supplements during the six months prior to the survey (Figure 17).

Table 43 - Measures of dietary diversity in non-pregnant women 15 - 49 years

Characteristic	n (%[a])	Mean or %	95% CI[b]
Number of MDD-W [c] food groups consumed (mean)	4250	6.35	(6.2, 6.4)
Meets minimum dietary diversity (MDD-W, 5+ food groups)			
Yes	3581	85.3%	(83.5, 86.9)
No	669	14.7%	(13.1, 16.5)

Note: The n's are un-weighted denominators for each subgroup; subgroups that do not sum to the total have missing data.

a Percentages weighted for unequal probability of selection between governorates.

b CI=confidence interval calculated taking into account the complex sampling design.

c MDD-W = Minimum dietary diversity for women as recommended in FAO and FHI 360. Minimum Dietary Diversity for Women: A Guide for Measurement. Rome: FAO. 2016.

Figure 16 - Daily frequency of consumption of various food groups in non-pregnant women 15-49 years of age.

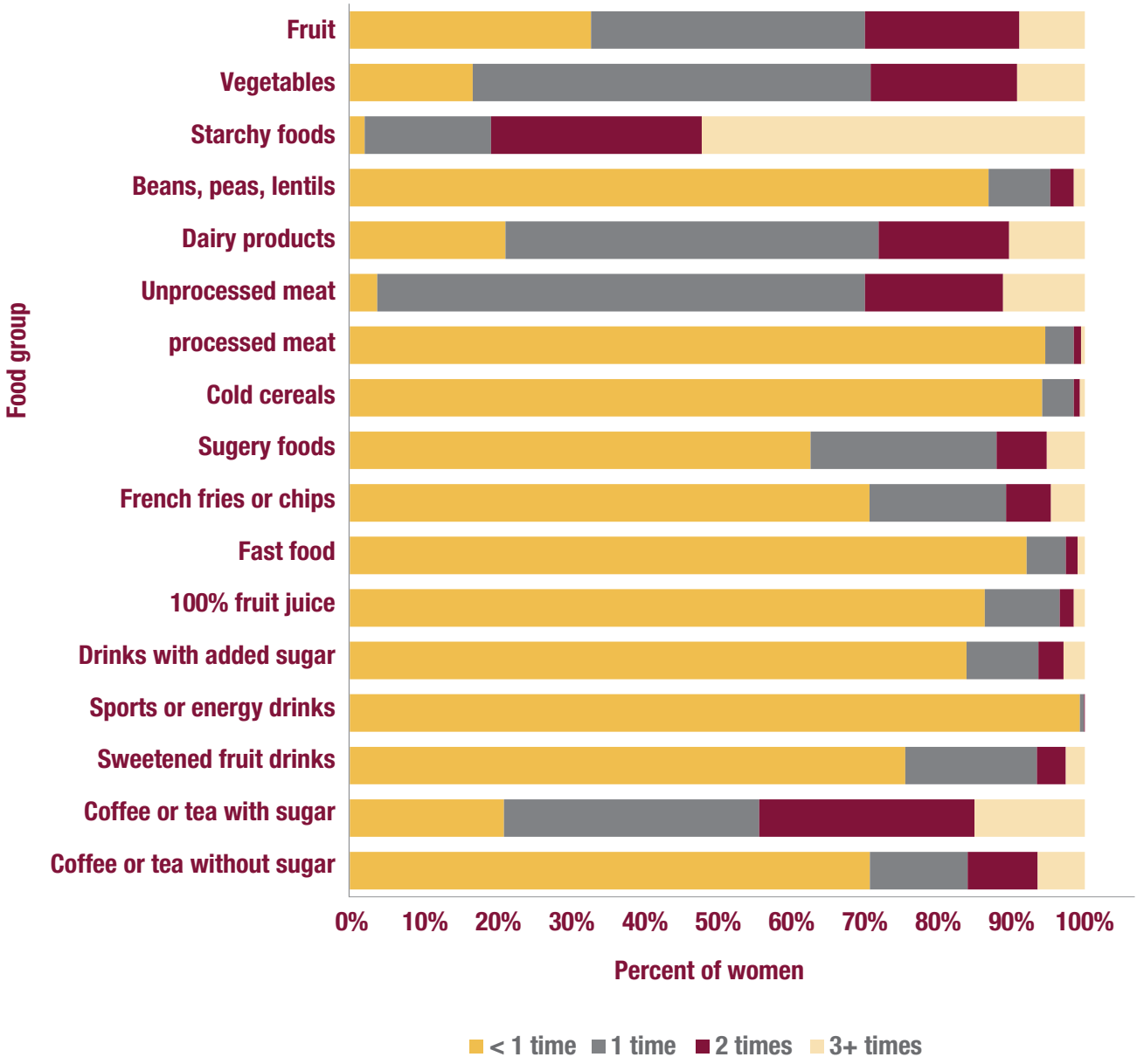
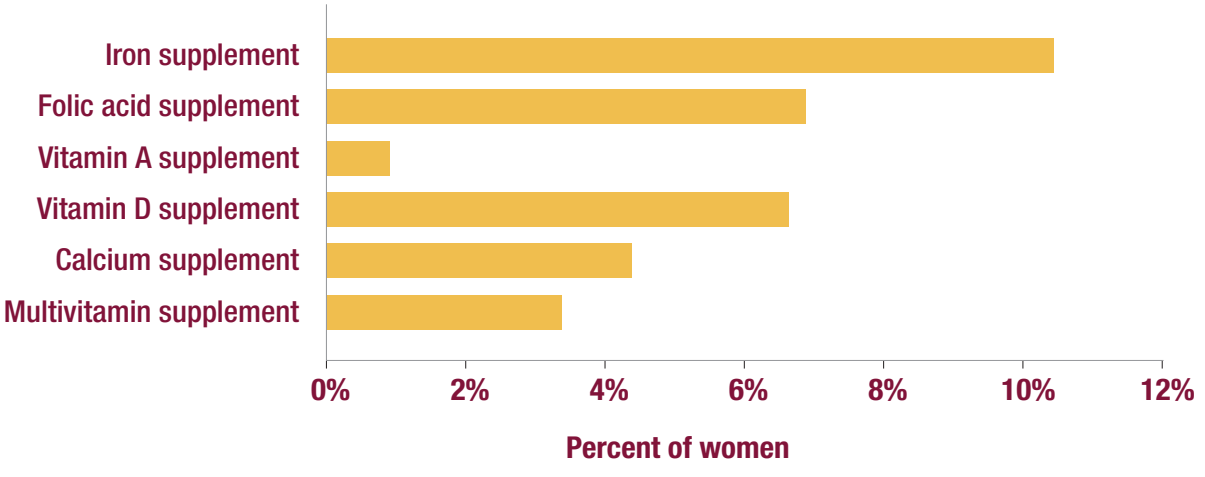


Figure 17 - Proportion of non-pregnant women 15-49 years of age who took various supplements in past 6 months.



3.4.3 Knowledge and use of fortified foods

Only about one-fifth of women reported having heard of fortified flour, but among these women, almost three-quarters reported using fortified flour (Table 44). Half of the women reported a general comment that fortified flour improves health, but much fewer gave the specific answers that fortified flour prevents anemia or iron deficiency. A larger proportion of women had heard of iodized salt, and almost three-quarters reported always using iodized salt. As with the question on flour, the majority of women gave a general comment that iodized salt improves health, but fewer provided specific benefits of the use of iodized salt. A summary of indicators of dietary adequacy, micronutrient supplementation, and knowledge of fortified foods by governorate is given in table 6-1 in Appendix 6.

Table 44 - Knowledge about and use of fortified foods among non-pregnant women 15 - 49 years

Characteristic	n	%[a]	95% CI[b]
Has heard of fortified flour			
Yes	822	19.7%	(18.1, 21.5)
No	3065	69.5%	(67.2, 71.7)
Don't know	404	10.8%	(9.3, 12.4)
Uses fortified flour[c]			
Always	561	71.3%	(66.9, 75.4)
Usually	60	5.9%	(4.2, 8.2)
Sometimes	110	10.9%	(8.3, 14.0)
Never	44	5.7%	(3.9, 8.3)
Don't know	41	6.2%	(4.3, 8.8)
Mention that fortified flour…[c]			
Improves health	480	59.4%	(54.7, 63.9)
Prevents anemia	69	7.7%	(5.6, 10.4)
Prevents iron deficiency	105	11.0%	(8.7, 13.8)
Has heard of iodized salt			
Yes	2389	61.5%	(59.1, 63.9)
No	1677	33.1%	(30.9, 35.4)
Uses iodized salt[c]			
Always	1724	72.0%	(68.9, 74.8)
Usually	130	4.3%	(3.3, 5.4)
Sometimes	252	10.2%	(8.5, 12.2)
Never	147	6.2%	(5.1, 7.6)
Don't know	135	7.3%	(6.0, 9.0)
Mentioned that iodized salt…[c]			
Prevents iodine deficiency	604	20.6%	(18.5, 22.8)
Improves intelligence	66	2.4%	(1.8, 3.3)
Prevents vitamin deficiency	128	4.5%	(3.6, 5.8)
Improves health status	904	34.2%	(31.7, 36.8)
Improves thyroid	61	3.7%	(2.7, 5.0)

Note: The n's are un-weighted denominators for each subgroup; subgroups that do not sum to the total have missing data.

a Percentages weighted for unequal probability of selection between governorates.

b CI=confidence interval calculated taking into account the complex sampling design.

c Denominator includes only women who reporting having heard of fortified flour or salt, respectively

3.4.4 Undernutrition and overweight

The prevalence of undernutrition and overweight, as measured by BMI, is shown in Figure 18. Overall, undernutrition is somewhat elevated in Omani women and is worse in younger women (see Table 45). Although statistically significant, differences among governorates are not pronounced. The prevalence of undernutrition does not show a statistically significant association with household wealth.

Overweight and obesity are very common in Omani women (Figure 18). The prevalence increases with age, but unlike undernutrition, does show some differences by governorate, with governorate-specific estimates ranging from 47.5% to 74.2%. There appears to be no strong correlation of the prevalence of overweight and obesity with household wealth. In general, the indicators of waist circumference and waist-hip ratio show a similar picture of overweight as BMI (Table 46). However, there is a stastistically significant increase in the proportion of women with substantially increased waist circumference and high waist-hip ratio with increasing household wealth.

The distribution of BMI values in women is shown in Figure 19. It is readily apparent how large the proportion of women with elevated BMI is.

Figure 18 - Underweight and overweight based on BMI in non-pregnant women 15-49 years of age.

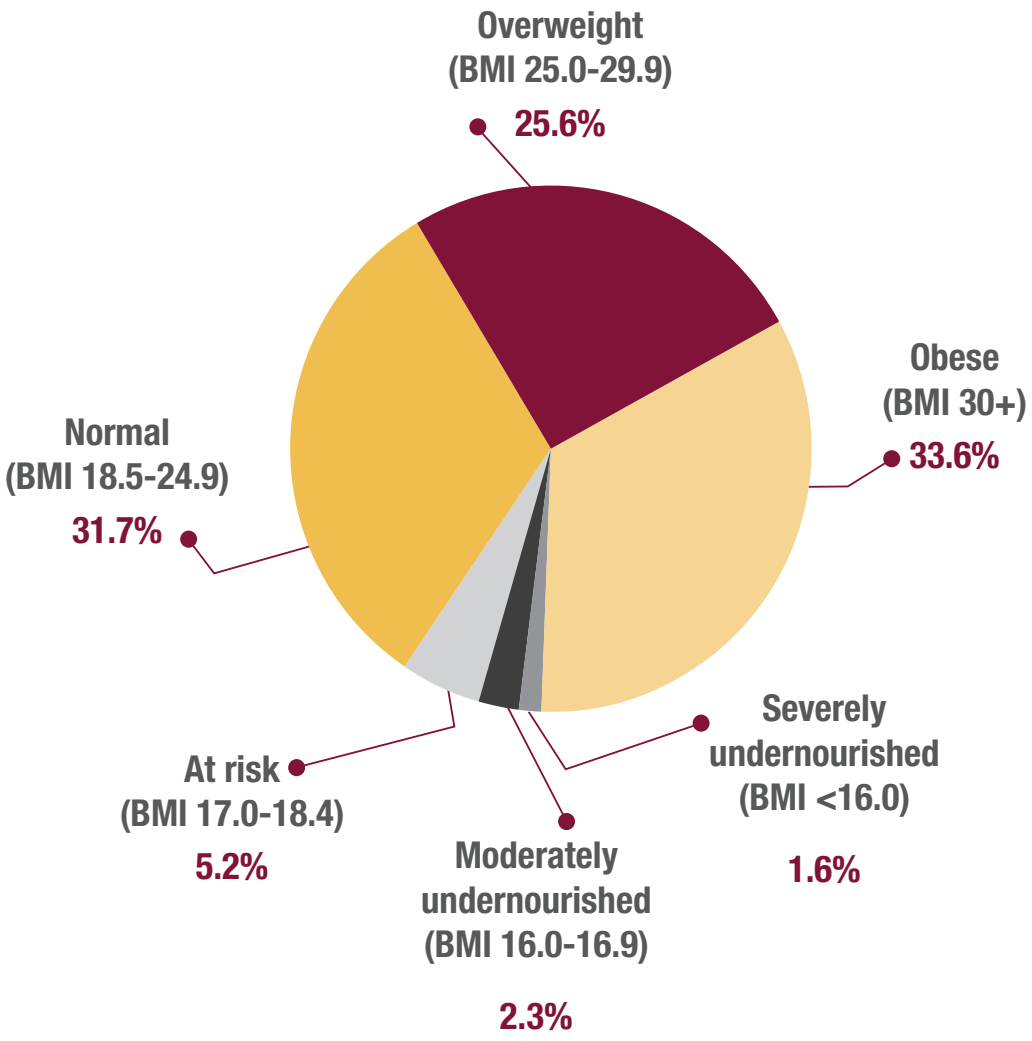


Table 45 - Prevalence of low and high BMI in women 15-49 years of age, by various demographic characteristics.

Characteristic	N	% Severe under-nutrition[a,b]	% Moderate under-nutrition[b]	% At risk of under-nutrition[b]	% Normal[b]	% Over-weight[b]	% Obese[b]	% Low BMI (<18.5)	P value[c]	% Overweight or obese (BMI 25.0+)	P value[c]
Total	4159	1.6%	2.3%	5.2%	31.7%	25.6%	33.6%	9.1%		59.2%	
Age (in years)											
15-19	735	3.4%	6.6%	13.1%	51.2%	16.3%	9.4%	23.2%	<0.001	25.7%	<0.001
20-24	691	3.6%	3.3%	10.0%	43.1%	21.3%	18.8%	16.8%		40.1%	
25-29	682	1.2%	1.8%	2.8%	40.1%	27.5%	26.5%	5.9%		54.0%	
30-34	682	1.0%	1.4%	3.4%	29.0%	27.5%	37.6%	5.8%		65.1%	
35-39	620	0.2%	0.7%	1.8%	19.6%	26.8%	51.0%	2.7%		78.1%	
40-44	621	0%	0.2%	0.9%	12.6%	34.0%	52.2%	1.1%		86.3%	
45-49	487	0.4%	0%	0%	10.8%	30.5%	58.4%	0.4%		88.8%	
Governorate											
Muscat	261	0.8%	2.7%	5.3%	28.6%	29.4%	33.2%	8.8%	<0.01	62.6%	<0.001
Dhofar	453	1.3%	1.1%	2.9%	20.5%	24.7%	49.4%	5.3%		74.2%	
Al-Dhakhlya	461	2.2%	2.4%	6.9%	41.0%	23.6%	23.9%	11.5%		47.5%	
Al-Sharqyah North	329	0.6%	2.7%	6.1%	37.0%	23.9%	29.7%	9.4%		53.6%	
Al-Sharqyah South	342	0.9%	1.2%	4.1%	28.1%	25.4%	40.4%	6.1%		65.8%	
Al-Batinah North	329	2.4%	2.7%	5.5%	33.4%	21.9%	34.0%	10.6%		55.9%	
Al-Batinah South	358	1.4%	2.2%	4.2%	28.8%	27.4%	36.0%	7.8%		63.4%	
Al-Dhahairah	443	2.9%	2.7%	5.2%	33.4%	28.3%	27.6%	10.8%		55.8%	
Al-Buraimy	377	2.1%	2.1%	6.1%	31.6%	28.4%	29.7%	10.3%		58.1%	
Musandam	331	0.6%	1.2%	4.2%	34.1%	23.3%	36.6%	6.0%		59.8%	
Al-Wusta	475	0%	0.6%	3.2%	27.8%	26.5%	41.9%	3.8%		68.4%	
Wealth quintile											
Poorest	663	2.0%	1.5%	7.1%	30.9%	23.5%	35.0%	10.6%	0.826	58.5%	0.897
Second	776	1.7%	1.4%	4.8%	33.4%	20.7%	38.0%	7.9%		58.7%	
Middle	754	1.6%	3.0%	3.9%	30.9%	27.9%	32.7%	8.4%		60.6%	
Fourth	830	1.3%	3.3%	4.9%	32.8%	26.1%	31.5%	9.6%		57.6%	
Wealthiest	1080	1.6%	2.0%	5.8%	30.7%	27.4%	32.6%	9.4%		59.8%	

Note: The N's are un-weighted total number of women included in analysis.

a Percentages weighted for unequal probability of selection among governorates.

b Severe undernutrition defined as BMI <16.0; moderate undernutrition defined as BMI 16.0-16.9; at risk of undernutrition defined as BMI 17.0-18.4; normal BMI defined as BMI 18.5 – 24.9; overweight defined as BMI 25.0-29.9; obese defined as BMI >30.

c P value <0.05 indicates that one subgroup is significantly different from the other.

Table 46 - Prevalence of high waist circumference and waist-hip ratio in women 15-49 years of age, by various demographic characteristics.

Characteristic	N	% with waist circumference substantially increased [a, b]	% with waist circumference increased [a, b]	% with normal waist circumference [a, b]	Total % with high waist circumference [a, b]	P value [c]	% with high waist-hip ratio [a, d]	P value [c]
Total	4172	45.1%	18.4%	36.5%	63.5%		47.5	
Age (in years)								
15-19	736	13.7%	14.2%	72.1%	27.9%	<0.001	21.7%	<0.001
20-24	693	21.6%	19.2%	59.2%	40.8%		29.4%	
25-29	683	36.3%	23.1%	40.6%	59.4%		42.4%	
30-34	622	52.9%	23.4%	23.7%	76.3%		52.9%	
35-39	623	65.1%	18.6%	16.3%	83.7%		62.2%	
40-44	489	72.5%	15.5%	12.0%	88.0%		70.4%	
45-49	321	79.5%	12.9%	7.6%	92.4%		74.0%	
Governorate								
Muscat	262	31.7%	23.3%	45.0%	55.0%	<0.001	32.4%	<0.001
Dhofar	461	55.5%	16.7%	27.8%	72.2%		38.3%	
Al-Dhakhlya	461	44.7%	18.2%	37.1%	62.9%		58.8%	
Al-Sharqyah North	327	46.2%	20.8%	33.0%	67.0%		59.9%	
Al-Sharqyah South	344	45.9%	17.2%	36.9%	63.1%		31.7%	
Al-Batinah North	331	46.8%	16.9%	36.3%	63.7%		48.8%	
Al-Batinah South	356	53.1%	14.0%	32.9%	67.1%		60.8%	
Al-Dhahairah	446	53.4%	18.6%	28.0%	72.0%		63.0%	
Al-Buraimy	380	38.9%	14.7%	46.3%	53.7%		43.8%	
Musandam	327	56.9%	16.5%	26.6%	73.4%		53.7%	
Al-Wusta	477	52.6%	17.0%	30.4%	69.6%		42.4%	
Wealth quintile								
Poorest	667	50.7%	14.4%	34.9%	65.1%	<0.05	52.9%	<0.001
Second	775	50.4%	17.7%	31.9%	68.1%		53.7%	
Middle	755	47.8%	19.5%	32.7%	67.3%		51.8%	
Fourth	834	44.2%	17.3%	38.6%	61.4%		48.4%	
Wealthiest	1086	39.2%	20.1%	40.8%	59.2%		38.8%	

Note: The N's are un-weighted total number of women included in analysis.

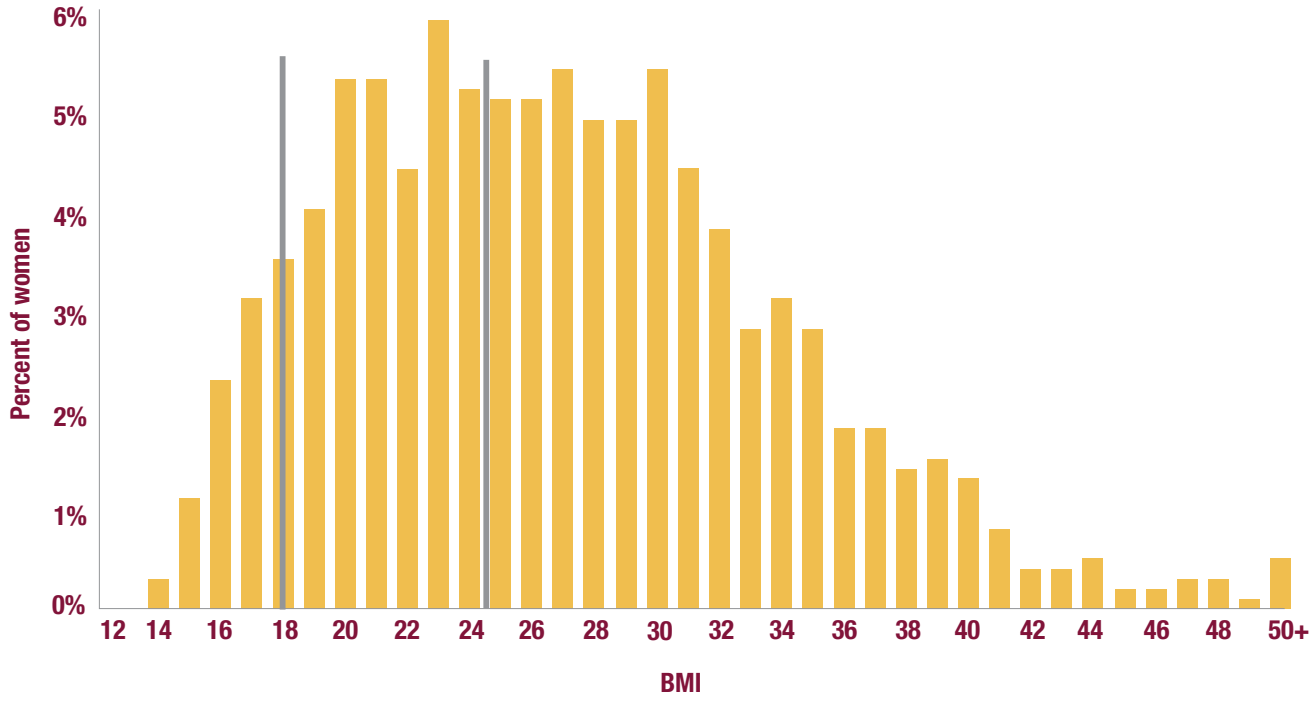
a Percentages weighted for unequal probability of selection among governorates.

b Substantially increased waist circumference is > 88.0 cm; increased waist circumference is > 80.0 but < 88.0; normal waist circumference is < 80.0. High waist circumference is substantially increased or increased (> 80.0 cm).

c P value <0.05 indicates that one subgroup is significantly different from the other.

d High waist-hip ratio is > 0.85.

Figure 19 - Distribution of BMI values in non-pregnant women 15-49 years of age.



3.4.5 Risk factors for overweight and obesity

Although the time spent watching video or playing computer games and participation in organized physical activity are both associated with overweight/obesity with statistical significance, the associations are the opposite of those expected (Table 47). Other possible risk factors, such as watching television while eating, getting insufficient sleep, or sitting more than 4 hours per day, do not show much association.

Table 47 - Correlation between various factors and overweight and obesity in non-pregnant women 15-49 years of age.

Characteristic	N	% [a] overweight or obese	P value
Average hours per day watching video or playing computer games			
>2 hours	1061	56.2%	<0.05
<= 2 hours	1425	61.7%	
Ever watch television while eating			
Yes	587	58.5%	0.668
No	1926	59.6%	
Sleeps < 7 hours per night			
Yes	387	60.0%	0.717
No	2120	59.0%	
Participates in organized physical activity in typical week			
Yes	866	65.0%	<0.001
No	1655	55.7%	
Average hours per day sitting			
>4 hours	1183	59.9%	0.745
<= 4 hours	1245	59.2%	

Note: The n's are un-weighted numerators for each subgroup; subgroups that do not sum to the total have missing data.

a Percentages weighted for unequal probability of selection among governorates.

3.4.6 Anemia, iron deficiency, and iron deficiency anemia

More than one-quarter of non-pregnant women 15-49 years of age are anemic (Table 48). The prevalence of anemia differs by age, but there is no clear trend. There are statistically significant differences in the prevalence of anemia between governorates; however, some of the governorates with the highest prevalence rates of anemia in women are not the same as the governorates with the highest prevalence rates of anemia in children. There is little difference in the prevalence of anemia in women between household wealth quintiles.

In women the prevalence of iron deficiency is much higher than it is in children, and it is more similar to the prevalence of anemia. There is no apparent trend by age, nor are there statistically significant differences among governorates. Although there are statistically insignificant differences among wealth quintiles, there is no clear trend in the association between the prevalence of anemia and household wealth.

Iron deficiency may contribute to up to one-half of anemia in women.

The prevalence of iron deficiency anemia shows no progressive trend with age despite, some statistically significant differences. Governorates also show differences with Al-Dhahairah & Musandam having the highest prevalence rates of iron deficiency anemia. And as with iron deficiency, there are some differences in prevalence by household wealth, but no progressive change in the prevalence of iron deficiency anemia with increasing household wealth.

Figure 20 below shows the distribution of hemoglobin values in non-pregnant women 15-49 years of age. The distribution is normal in shape and shows that very few women have severe anemia.

Table 48 - Prevalence of anemia, iron deficiency, and iron deficiency anemia in non-pregnant women 15-49 years of age, by various demographic characteristics.

	Anemia[a]				Iron deficiency[e]				Iron deficiency anemia[f]			
Characteristic	**n**	**%[b]**	**95% CI[c]**	**p-value[d]**	**n**	**%[b]**	**95% CI[c]**	**p-value[d]**	**N**	**%[b]**	**95% CI[c]**	**p-value[d]**
Total	1096	27.8%	(25.9, 29.8)		406	24.8%	(22.2, 27.6)		197	13.3%	(11.2, 15.8)	
Age (in years)												
15-19	184	28.8%	(24.1, 34.0)	<0.001	73	32.1%	(25.3, 39.8)	<0.01	29	14.3%	(9.7, 20.7)	<0.05
20-24	157	20.5%	(16.8, 24.8)		70	24.3%	(18.2, 31.7)		33	12.8%	(8.1, 19.6)	
25-29	161	23.0%	(19.1, 27.4)		53	13.7%	(9.5, 19.4)		25	6.6%	(3.8, 11.4)	
30-34	166	28.9%	(24.6, 33.6)		56	22.9%	(16.8, 30.4)		22	9.1%	(5.0, 16.1)	
35-39	165	27.2%	(23.1, 32.0)		61	25.4%	(19.2, 32.8)		30	14.3%	(9.4, 21.2)	
40-44	158	33.5%	(28.0, 39.5)		60	32.1%	(23.8, 41.8)		37	21.1%	(14.4, 29.9)	
45-49	101	38.6%	(31.7, 46.0)		33	25.0%	(16.9, 35.4)		21	18.6%	(11.4, 28.9)	
Governorate												
Muscat	65	28.0%	(23.1, 33.5)	<0.001	41	27.2%	(21.1, 34.2)	0.193	25	16.6%	(11.4, 23.4)	<0.05
Dhofar	65	28.0%	(23.1, 33.5)		44	28.2%	(22.5, 34.7)		14	9.0%	(6.2, 12.9)	
Al-Dhakhlya	126	27.5%	(23.2, 32.3)		15	16.1%	(9.4, 26.3)		8	8.6%	(4.3, 16.5)	
Al-Sharqyah North	82	24.6%	(19.5, 30.5)		25	18.5%	(12.7, 26.2)		13	9.6%	(5.8, 15.5)	
Al-Sharqyah South	79	23.0%	(17.5, 29.6)		37	25.5%	(19.6, 32.5)		16	11.0%	(7.3, 16.4)	
Al-Batinah North	108	32.6%	(27.6, 38.1)		29	22.5%	(16.1, 30.5)		19	14.7%	(9.1, 23.0)	
Al-Batinah South	104	29.5%	(24.5, 35.0)		43	30.7%	(24.7, 37.4)		22	15.7%	(10.3, 23.2)	
Al-Dhahairah	137	31.1%	(26.9, 35.8)		46	33.1%	(24.2, 43.4)		25	18.0%	(11.7, 26.7)	
Al-Buraimy	146	38.8%	(32.5, 45.6)		45	28.3%	(19.0, 40.0)		21	13.2%	(9.2, 18.6)	
Musandam	99	30.4%	(25.0, 36.3)		51	31.5%	(20.9, 44.4)		28	17.3%	(10.9, 26.4)	
Al-Wusta	70	15.1%	(10.5, 21.3)		30	27.8%	(20.2, 36.9)		6	5.6%	(3.2, 9.5)	
Wealth quintile												
Poorest	137	29.1%	(23.7, 35.1)	0.931	48	28.8%	(19.5, 40.3)	<0.05	20	19.2%	(10.9, 31.6)	0.086
Second	202	27.3%	(23.0, 32.1)		71	24.0%	(18.4, 30.7)		38	14.6%	(10.2, 20.5)	
Middle	205	26.6%	(22.0, 31.8)		54	15.3%	(10.0, 22.7)		25	6.5%	(3.3, 12.4)	
Fourth	237	27.5%	(23.8, 31.6)		80	23.4%	(18.2, 29.5)		45	13.2%	(9.1, 19.0)	
Wealthiest	305	28.9%	(25.6, 32.5)		146	29.7%	(24.4, 35.7)		68	15.1%	(11.1, 20.3)	

Note: The n's are un-weighted numerators for each subgroup; subgroups that do not sum to the total have missing data.

a Percentages weighted for unequal probability of selection among governorates.

b Anemia defined as hemoglobin < 120 g/L adjusted for altitude.

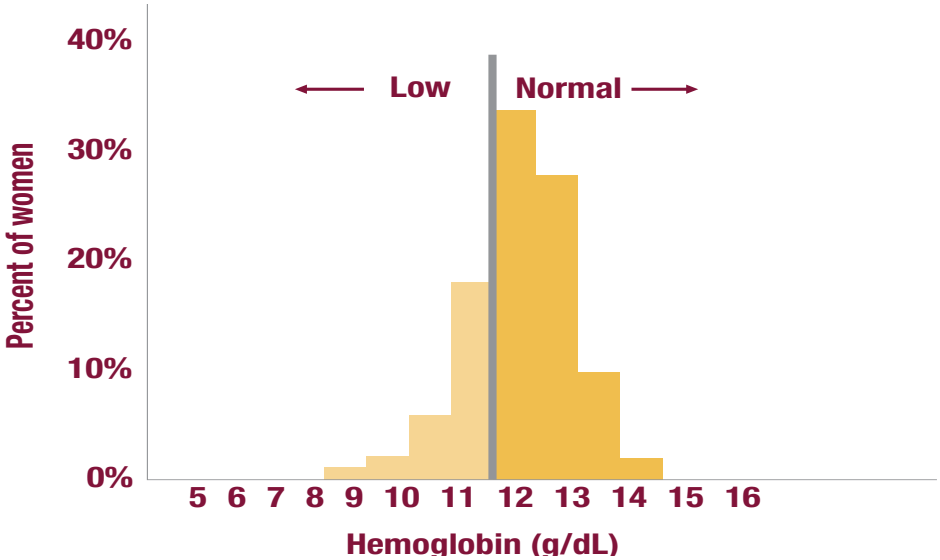
c CI=confidence interval calculated taking into account the complex sampling design.

d P value <0.05 indicates that at least one subgroup is statistically significantly different from the others.

e Iron deficiency defined as plasma ferritin < 12 µg/l after adjustment for inflammation.

f Iron deficiency anemia defined as plasma ferritin < 12 µg/L and hemoglobin < 120 g/L.

Figure 20 - Distribution of hemoglobin values in non-pregnant women 15-49 years of age.



3.4.7 Sickle cell trait and beta thalassemia

Sickle cell trait or beta thalassemia were found in about 3-5% of non-pregnant women (Table 49). There were no statistically significant nor substantial differences in the prevalence of either condition by age or wealth quintile (analysis not shown). As in children, the prevalence rates of sickle cell trait were highest in Al-Dhakhlya and Al-Sharqyah North. Unlike in children, Dhofar Governorate did not have an elevated prevalence of beta thalassemia.

Table 49 - Prevalence of sickle cell trait and beta thalassemia in non-pregnant women 15-49 years of age, by governorate.

	Sickle cell			B thalassemia		
Governorate	**n**	**%**	**95% CI[a]**	**n**	**%**	**95% CI[a]**
Total	53	4.7%	(3.2, 7.0)	43	2.8%	(1.8, 4.4)
Muscat	7	4.6%	(2.1, 9.7)	5	3.3%	(1.2, 8.8)
Dhofar	0	0%	-	7	4.6%	(2.3, 8.9)
Al-Dhakhlya	11	12.0%	(5.9, 22.8)	3	3.3%	(1.2, 8.4)
Al-Sharqyah North	13	9.8%	(4.7, 19.6)	3	2.3%	(0.7, 7.0)
Al-Sharqyah South	2	1.4%	(0.4, 5.2)	0	0%	-
Al-Batinah North	4	3.2%	(1.0, 9.9)	4	3.2%	(1.1, 9.3)
Al-Batinah South	3	2.1%	(0.7, 6.2)	4	2.8%	(0.9, 9.0)
Al-Dhahairah	5	3.6%	(1.4, 8.9)	1	0.7%	(0.1, 5.2)
Al-Buraimy	8	5.2%	(2.5, 10.7)	7	4.6%	(1.8, 11.3)
Musandam	0	0%	-	9	8.4%	(3.9, 17.4)
Al-Wusta	0	0%	-	0	0%	-
P value[b]		0.357			0.378	

Note: The n's are un-weighted numerators for each subgroup; subgroups that do not sum to the total have missing data.

a CI=confidence interval calculated taking into account the complex sampling design.

b P value <0.05 indicates that at least one governorate is statistically significantly different from the others.

3.4.8 Risk factors for anemia

Inflammation was somewhat more common in women than in children: 1018 (67.9%) of women had normal CPR and AGP; 252 (16.5%) had elevated CRP and normal AGP; 146 (8.8%) had both elevated CRP and AGP; and 102 (8.9%) had normal CRP and elevated AGP. Table 50 shows the association between inflammation and other factors and anemia in nn-pregnant women 15-49 years of age. Unlike in children, women with inflammation did not have a statistically significantly higher prevalence of anemia. Surprisingly, women living in households with inadequate sanitation had a lower prevalence of anemia. Anemia is much more common in iron deficient women than in women without iron deficiency and more common in women with folate deficiency than in women without. Although anemia is also substantially more common in women with vitamin A deficiency, the very small number of women with this vitamin deficiency precludes statistical significance. Vitamin D deficiency is not associated with a higher prevalence of anemia. Women with sickle cell trait did not have a higher prevalence of anemia than women without; however, women with beta thalassemia had more than double the prevalence of anemia than women without beta thalassemia.

Table 50 - Correlation between various factors and anemia in non-pregnant women 15-49 years of age.

Characteristic	n	% [a] anemic	P value
Woman's household has inadequate sanitation			
Yes	123	23.2%	0.051
No	973	28.6%	
Woman is overweight or obese			
Yes	608	26.5%	0.124
No	476	29.3%	
Woman has inflammation			
Yes	109	24.3%	0.313
No	228	21.4%	
Woman is iron deficient			
Yes	197	53.6%	<0.001
No	140	12.1%	
Woman is vitamin A deficient			
Yes	3	33.1%	0.541
No	334	22.4%	
Woman is vitamin D deficient or insufficient			
Yes	238	21.8%	0.589
No	98	23.2%	
Woman is folate deficient			
Yes	49	31.2%	<0.1
No	284	21.4%	
Woman is vitamin B_{12} deficient			
Yes	45	20.9%	0.631
No	289	22.9%	
Woman has sickle cell trait or disease			
Yes	9	14.4%	0.328
No	305	22.5%	
Woman has beta thalassemia trait			
Yes	21	48.0%	<0.001
No	293	21.3%	

Note: The n's are un-weighted numerators for each subgroup; subgroups that do not sum to the total have missing data.

a Percentages weighted for unequal probability of selection among governorates.

3.4.9 Risk factors for iron deficiency

Unlike in children, many factors analyzed were statistically significantly associated with iron deficiency in non-pregnant women (Table 51). Overweight and obese women had a substantially lower prevalence of iron deficiency than non-overweight women. Although vitamin A deficiency also appears to be associated with iron deficiency, the number of women with vitamin A deficiency is so small that no statistical significance was demonstrated for this association. Women with vitamin D insufficiency or deficiency, or folate deficiency had higher prevalence rates of iron deficiency. Women with sickle cell trait or beta thalassemia were less likely to have iron deficiency, although this association was statistically significant only for sickle cell trait.

Table 51 - Correlation between various factors and iron deficiency in non-pregnant women 15-49 years of age.

Characteristic	n	% [a] with irondeficiency	P value
Woman's household has adequate sanitation			
Yes	358	26.8%	0.077
No	48	19.4%	
Woman is overweight or obese			
Yes	222	22.7%	<0.05
No	182	30.5%	
Woman has inflammation			
Yes	126	25.5%	0.735
No	280	24.5%	
Woman is vitamin A deficient			
Yes	4	46.6%	0.240
No	402	24.8%	
Woman is vitamin D deficient or insufficient			
Yes	296	28.0%	<0.05
No	108	20.6%	
Woman is folate deficient			
Yes	60	37.2%	<0.01
No	339	23.4%	
Woman is vitamin B_{12} deficient			
Yes	49	24.0%	0.769
No	351	25.2%	
Woman has sickle cell trait			
Yes	9	12.7%	<0.05
No	376	25.5%	
Woman has beta thalassemia			
Yes	5	11.1%	0.103
No	380	25.3%	

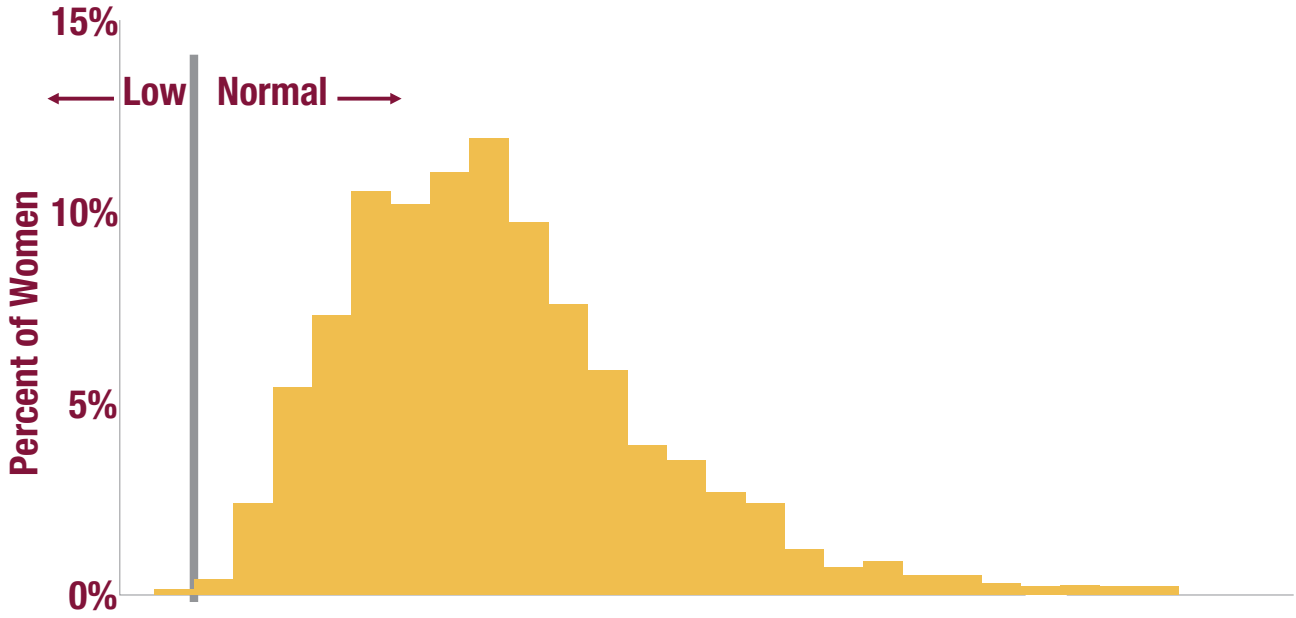
Note: The n's are un-weighted numerators for each subgroup; subgroups that do not sum to the total have missing data.

a Percentages weighted for unequal probability of selection among governorates.

3.4.10 Vitamin A deficiency

Vitamin A deficiency was found in only 8 (0.2%; 95% CI: 0.1, 0.4) non-pregnant women 15-49 years of age. Because it is so rare, no subgroup analysis is warranted. The distribution of RBP values is shown in Figure 21 below.

Figure 21 - Distribution of RBP values in non-pregnant women 15-49 years of age.



3.4.11 Folate deficiency

Folate deficiency is present in roughly one in ten Omani women (Table 52). It is highest in younger women who are most likely to become pregnant. The prevalence also differs widely among governorates, with the highest prevalence in Dhofar and Al-Sharqyah South. However, there is little difference in folate deficiency by household wealth.

Table 52 - Prevalence of folate deficiency[a] in non-pregnant women 15-49 years of age, by various demographic characteristics

Characteristic	n	%[b]	95% CI[c]	p-value [d]
Total	178	11.6%	(9.1, 14.7)	
Age (in years)				
15-19	24	13.7%	(9.0, 20.3)	<0.05
20-24	44	18.8%	(12.5, 27.3)	
25-29	31	11.1%	(7.1, 17.0)	
30-34	27	9.6%	(5.8, 15.5)	
35-39	22	9.3%	(5.3, 15.6)	
40-44	20	10.0%	(6.1, 15.8)	
45-49	10	6.1%	(3.1, 11.7)	

Characteristic	n	%[b]	95% CI[c]	p-value [d]
Governorate				
Muscat	18	11.8%	(6.8, 19.9)	<0.001
Dhofar	74	47.7%	(36.4, 59.3)	
Al-Dhakhlya	6	6.5%	(3.0, 13.3)	
Al-Sharqyah North	4	2.9%	(0.9, 9.2)	
Al-Sharqyah South	32	21.9%	(15.0, 30.8)	
Al-Batinah North	9	7.3%	(3.7, 14.1)	
Al-Batinah South	2	1.6%	(0.4, 6.3)	
Al-Dhahairah	6	4.4%	(1.8, 10.1)	
Al-Buraimy	18	11.4%	(6.0, 20.6)	
Musandam	6	3.7%	(1.6, 8.5)	
Al-Wusta	3	2.8%	(0.9, 8.7)	
Wealth quintile				
Poorest	15	10.8%	(6.0, 18.7)	0.781
Second	23	9.0%	(5.0, 15.6)	
Middle	36	11.3%	(7.2, 17.3)	
Fourth	38	11.5%	(7.5, 17.2)	
Wealthiest	65	13.0%	(8.8, 18.8)	

Note: The n's are un-weighted numerators for each subgroup; subgroups that do not sum to the total have missing data.

a Folate deficiency defined as plasma folate <10 nmol/L

b Percentages weighted for unequal probability of selection among governorates

c CI=confidence interval calculated taking into account the complex sampling design.

d Chi-square p-value <0.05 indicates that at least one subgroup is statistically significantly different from the others

3.4.12 Vitamin B_{12} deficiency

Deficiency in vitamin B_{12} is also not uncommon in Omani women (Table 53). The prevalence shows some difference by age, but no definite trend. Like folate deficiency, the prevalence of vitamin B_{12} deficiency also varies widely by governorate, with the highest prevalence rates in Dhofar, Al-Sharqyah South, and Al-Buraimy. Also, the prevalence appears to be slightly lower in the two higher household wealth quintiles, but these differences are not statistically significant.

Table 53 - Prevalence of vitamin B_{12} deficiency[a] in non-pregnant women 15-49 years of age, by various demographic characteristics.

Characteristic	n	% [b]	95% CI [c]	p-value [d]
Total	185	8.9%	(6.9, 11.4)	
Age (in years)				
15-19	30	9.5%	(5.9, 14.9)	<0.05
20-24	41	12.4%	(8.0, 18.7)	
25-29	35	10.5%	(6.4, 17.0)	
30-34	37	11.1%	(7.5, 16.1)	
35-39	24	8.1%	(4.3, 14.7)	
40-44	15	5.7%	(3.0, 10.6)	
45-49	3	1.3%	(0.4, 4.9)	

Characteristic	n	% [b]	95% CI [c]	p-value [d]
Governorate				
Muscat	3	2.0%	(0.7, 5.5)	<0.001
Dhofar	31	20.0%	(10.2, 35.5)	
Al-Dhakhlya	3	3.2%	(0.8, 12.8)	
Al-Sharqyah North	23	16.9%	(10.5, 26.1)	
Al-Sharqyah South	33	22.6%	(15.5, 31.7)	
Al-Batinah North	9	7.3%	(3.0, 16.4)	
Al-Batinah South	12	9.5%	(5.8, 15.3)	
Al-Dhahairah	6	4.4%	(1.1, 15.7)	
Al-Buraimy	34	21.5%	(14.6, 30.6)	
Musandam	17	10.6%	(7.9, 13.9)	
Al-Wusta	14	13.0%	(6.1, 25.3)	
Wealth quintile				
Poorest	22	9.3%	(5.2, 16.1)	0.144
Second	35	11.1%	(6.7, 17.9)	
Middle	41	12.8%	(8.2, 19.4)	
Fourth	43	8.6%	(5.4, 13.4)	
Wealthiest	44	6.3%	(3.9, 9.8)	

Note: The n's are un-weighted numerators for each subgroup; subgroups that do not sum to the total have missing data.

a Vitamin B_{12} deficiency defined as plasma B_{12} <150 pmol/L

b Percentages weighted for unequal probability of selection among governorates

c CI=confidence interval calculated taking into account the complex sampling design.

d Chi-square p-value <0.05 indicates that at least one subgroup is statistically significantly different from the others

3.4.13 Vitamin D deficiency and insufficiency

Vitamin D deficiency and insufficiency are common in Omani women (Table 54). Overall, more than one-half of women are either deficient or insufficient. The prevalence of vitamin D deficiency seems to decline somewhat with increasing age, albeit without statistical significance. The prevalence of vitamin D insufficiency is also higher in women younger than 25 years of age, than in older women. The combined prevalence of deficiency and insufficiency shows a significant positive association with age. The prevalence rates of both vitamin D deficiency and vitamin D insufficiency vary widely among governorates. The range of governorate-specific prevalence rates of deficiency is especially wide, from 0% to 54.5%. In addition, the governorate with the highest prevalence of vitamin D insufficiency has a prevalence 3 times higher than the governorate with the lowest prevalence. There are no statistically significant differences among wealth quintiles, and no progressive increase or decrease in the prevalence of vitamin D deficiency or insufficiency with increasing household wealth. As with children, there is little association between the sun exposure index and the prevalence of vitamin D deficiency or insufficiency in Omani women (Table 55).

Table 54 - Prevalence of vitamin D deficiency and insufficiency in non-pregnant women 15-49 years of age, by various demographic characteristics.

	Deficient			Insufficient			Deficient or insufficient			
Characteristic	**n**	**% [a]**	**95% CI [b]**	**n**	**% [a]**	**95% CI [b]**	**n**	**% [a]**	**95% CI [b]**	**p-value [c]**
Total	350	16.2%	(13.1, 19.9)	684	41.5%	(37.7, 45.4)	1032	57.7%	(52.7, 62.6)	
Age (in years)										
15-19	67	21.1%	(15.1, 28.6)	115	52.9%	(44.6, 61.0)	182	73.9%	(65.3, 81.0)	<0.001
20-24	72	20.8%	(15.1, 28.0)	105	48.0%	(39.1, 57.1)	176	68.8%	(58.9, 77.1)	
25-29	58	14.8%	(10.0, 21.2)	116	39.3%	(32.4, 46.7)	174	54.1%	(45.2, 62.7)	
30-34	56	17.3%	(12.1, 24.1)	104	36.8%	(29.0, 45.4)	160	54.1%	(44.3, 63.6)	
35-39	42	14.0%	(9.6, 19.8)	104	38.1%	(30.1, 46.8)	146	52.1%	(41.9, 62.1)	
40-44	37	12.1%	(7.7, 18.5)	80	34.8%	(26.9, 43.6)	116	46.7%	(38.0, 55.6)	
45-49	17	10.6%	(6.2, 17.7)	60	40.5%	(30.7, 51.2)	77	51.2%	(40.0, 62.2)	
Governorate										
Muscat	0	0	-	67	44.1%	(35.2, 53.4)	67	44.1%	(35.4, 53.1)	<0.001
Dhofar	85	54.5%	(42.0, 66.5)	47	30.1%	(24.6, 36.4)	132	84.6%	(75.0, 91.0)	
Al-Dhakhlya	0	0	-	46	49.5%	(38.3, 60.7)	46	49.5%	(38.6, 60.3)	
Al-Sharqyah North	38	27.9%	(21.6, 35.3)	84	61.8%	(54.7, 68.4)	121	89.6%	(82.3, 94.1)	
Al-Sharqyah South	50	34.5%	(25.6, 44.7)	73	50.3%	(43.3, 57.4)	123	84.8%	(75.5, 91.0)	
Al-Batinah North	0	0	-	25	19.4%	(13.6, 26.9)	25	19.4%	(13.7, 26.6)	
Al-Batinah South	62	44.3%	(34.0, 55.1)	62	44.3%	(33.1, 56.1)	124	88.6%	(81.3, 93.3)	
Al-Dhahairah	37	26.6%	(18.4, 36.9)	76	54.7%	(44.7, 64.3)	112	81.2%	(72.7, 87.5)	
Al-Buraimy	34	21.7%	(11.2, 37.8)	77	49.0%	(39.1, 59.0)	111	70.7%	(61.5, 78.4)	
Musandam	44	27.2%	(16.6, 41.1)	87	53.7%	(44.9, 62.3)	131	80.9%	(72.9, 86.9)	
Al-Wusta	0	0	-	40	37.0%	(29.9, 44.8)	40	37.0%	(30.1, 44.5)	
Wealth quintile										
Poorest	25	16.5%	(10.1, 25.7)	69	36.7%	(24.4, 51.0)	93	52.9%	(39.3, 66.1)	0.943
Second	53	15.1%	(9.8, 22.7)	130	44.7%	(35.2, 54.6)	183	59.8%	(48.2, 70.4)	
Middle	64	16.1%	(10.8, 23.5)	125	41.0%	(32.9, 49.6)	188	57.0%	(46.6, 66.9)	
Fourth	94	21.5%	(15.6, 28.8)	133	37.5%	(29.1, 46.7)	227	59.0%	(48.3, 68.9)	
Wealthiest	108	13.2%	(9.0, 19.1)	221	43.5%	(37.5, 49.6)	329	56.7%	(49.2, 63.9)	

Note: The n's are un-weighted numerators for each subgroup; subgroups that do not sum to the total have missing data.

a Percentages weighted for unequal probability of selection among governorates

b CI=confidence interval calculated taking into account the complex sampling design.

c Chi-square p-value <0.05 indicates that at least one subgroup is statistically significantly different from the others

Table 55 - Association between sun exposure and vitamin D deficiency in non-pregnant women 15-49 years of age.

Sun exposure	Vitamin D deficient		Vitamin D insufficient		Optimal vitamin D		P value
index	n	%[a]	n	%[a]	n	%[a]	
0	90	17.1%	133	40.6%	98	42.4%	
0.01 – 0.99	130	15.0%	274	41.7%	211	43.2%	0.945
1+	127	16.9%	272	41.6%	172	41.5%	

a Percentages weighted for unequal probability of selection in governorates

3.4.14 Physical activity and sleep patterns

Omani women watch about as much television per day as children less than 5 years of age, but spend much more time playing computer games (Table 56). Almost three-quarters rarely or never watch television while eating, and about one-third have a television in the bedroom. On average, women sleep more than 8 hours on weekdays and slightly more on weekends, and the large majority get an average of 7 hours or more sleep per night as recommended.[34] More than one-third participate in organized physical activity.

Fewer than one-fifth of women work outside the home for money. Vigorous activity is required at work for only a small proportion of these women. For those few women whose work requires vigorous physical activity, such activity occurs on a majority of work days and lasts about 3 hours per day. A higher proportion of women working outside the home are required to do moderate activity, which is practiced on most work days for an average of more than 3 hours per day. Few women walk or ride a bicycle to work, school, or to run errands. The average length of time sitting on weekdays and weekends exceeds 7 hours. An analysis of indicators of physical activity and sleep patterns by governorate is given in table 6-2 in Appendix 6.

Table 56 - Physical activity and sleep patterns in non-pregnant women 15-49 years of age.

Characteristic	n	%[a]	95% CI[b]
Hours of television or video watching per day (mean)	4279	1.6	(1.5, 1.7)
Hours of video or computer games per day (mean)	4254	1.7	(1.5, 1.8)
Watch television while eating			
No or rarely	3198	72.6%	(70.5, 74.7)
1 meal per day	842	19.7%	(17.9, 21.6)
2 meals per day	141	4.5%	(3.7, 5.4)
3 or more meals per day	94	3.2%	(2.5, 4.2)
Television or computer in bedroom			
Yes	1557	35.2%	(32.9, 37.6)
No	2713	64.8%	(62.4, 67.1)
Hours sleep per 24-hour period on weekdays (mean)	4275	8.03	(7.8, 8.1)
Hours sleep per 24-hour period on weekends (mean)	4272	8.82	(8.7, 8.9)
Sleeps <7 hours per night, on average in entire week			
Yes	648	17.4%	(15.5, 19.4)
No	3628	82.6%	(80.6, 84.5)
Organized physical activity in typical week			
Yes	1383	38.1%	(35.6, 40.7)
No	2909	61.9%	(59.3, 64.4)
Work outside the home for money			
Yes	588	16.1%	(14.0, 18.4)
No	3701	83.9%	(81.6, 86.0)

Characteristic	n	%[a]	95% CI[b]
Work involve vigorous activity			
Yes	33	6.2%	(4.0, 9.5)
No	544	93.8%	(90.5, 96.0)
Days in week work involves vigorous activity (mean) [c]	32	3.38	(2.6, 4.1)
Hours per day in vigorous activity at work (mean) c	32	3.2	(2.0, 4.4)
Work involve moderate activity			
Yes	229	40.3%	(34.4, 46.4)
No	352	59.7%	(53.6, 65.6)
Days in week work involves moderate activity (mean)c	221	4.38	(4.1, 4.6)
Hours per day in moderate activity at work (mean)c	222	3.7	(3.3, 4.1)
Walk to bike to work, school, or errands			
Yes	45	7.8%	(5.2, 11.6)
No	499	92.2%	(88.4, 94.8)
Hours on weekdays spent sitting (mean)	4129	7.27	(6.6, 7.8)
Hours on weekends spent sitting (mean)	4120	7.81	(7.1, 8.4)

a Weighted for unequal probability of selection among governorates

b CI=confidence interval calculated taking into account the complex sampling design.

c Only including those women who mentioned work involved vigorous or moderate activity.

3.4.15 Sun exposure

A large majority of Omani women protect their heads with a headscarf when they are outdoors in the sun (Table 57). Protecting arms when outside is also very common; however, few women protect their hands. The common reason for being outside under the sun is performing household duties and watching children. Fewer women are exposed to the sun while walking or working outside. Almost two-thirds of women spend 30 minutes or more outside under the sun, and very few get no sun exposure at all. Sunscreen is used by only 23.9% of women. In general, women had a much lower sun exposure index that did children; for this reason, the highest category presented in the table below is 1 or greater, compared to the 20 or greater in the table above for children. Even then, almost two-thirds of women had a sun exposure index less than 1.0. An analysis of these sun exposure variables by governorate is contained in table 6-3 in Appendix 6.

Table 57 - Sun exposure in non-pregnant women 15-49 years of age.

Characteristic	n	%[a]	95% CI
Usually protect head from sun when outside			
Never/rarely	57	1.1%	(0.7, 1.6)
Sometimes	74	1.2%	(0.8, 1.9)
Most of the time	259	5.5%	(4.3, 7.0)
All the time	3899	92.2%	(90.6, 93.6)
How usually protect head from sun			
Scarf/headcloth	4227	99.9%	(99.8, 100)
Hat	1	<0.1%	(0.0, 0.2)
Umbrella	2	<0.1%	(0.0, 0.2)
Usually cover arms when outside			
Never/rarely	53	1.3%	(0.9, 1.9)
Sometimes	137	2.0%	(1.5, 2.7)
Most of the time	414	6.3%	(5.1, 7.9)
All the time	3683	90.3%	(88.5, 91.9)
Usually cover hands when outside			
Never/rarely	3600	85.9%	(83.9, 87.8)
Sometimes	168	3.3%	(2.6, 4.2)
Most of the time	205	4.7%	(3.6, 6.0)
All the time	314	6.1%	(5.0, 7.5)
Activities leading to sun exposure:			
Walking to bus/taxi	590	13.7%	(12.3, 15.4)
Walking to market and/or work	263	6.6%	(5.6, 7.8)
Working outside	524	12.1%	(10.6, 13.8)
Watching children outside	1186	24.6%	(22.5, 26.7)
Doing household duties outside	2528	52.1%	(49.2, 55.0)
How much time per day spend under the sun			
None	261	6.6%	(5.3, 8.2)
1-29 minutes	1287	30.1%	(28.1, 32.2)
30-59 minutes	1152	20.9%	(19.5, 22.4)
1-2 hours	924	22.0%	(20.2, 23.9)
More than 2 but less than 3 hours	289	7.7%	(6.6, 9.0)
More than 3 hours	347	12.7%	(10.8, 14.9)
Usually use sunscreen			
Never / rarely	3325	76.2%	(74.0, 78.3)
Sometimes	444	10.2%	(9.0, 11.6)
Most of the time	110	2.3%	(1.8, 3.0)
All the time	408	11.3%	(9.8, 12.9)
Sun exposure index			
1.0+	1482	37.1%	(34.7, 39.6)
0.01-0.99	1892	41.1%	(39.0, 43.3)
0	881	21.7%	(19.7, 23.9)

a Weighted for unequal probability of selection in governorates

3.5 Adolescent women

Table 58 shows various characteristics and outcomes in adolescent non-pregnant women 15-19 years of age. Among the 776 women in this age group, only 9 (1.1%) were pregnant at the time of the survey. These nine women are not included in the table below. Few of the non-pregnant adolescents had given birth in the prior 2 years or were currently breastfeeding.

The average number of food groups consumed and the proportion meeting minimum dietary diversity were somewhat lower than in all non-pregnant women 15-49 years of age, and relatively few had consumed vitamin or mineral supplements. As seen above in Table 45 above, low BMI in non-pregnant women has the highest prevalence in adolescents, but overweight or obesity, high waist circumference, and high waist-hip ratio have the lowest prevalence in this age group. Nonetheless, more than one-quarter of adolescent women were classified as overweight or obese by BMI.

The prevalence rates of anemia, iron deficiency, and iron deficiency anemia are also elevated among non-pregnant adolescents. Other micronutrient deficiencies, such as those of folate, vitamin B_{12}, and vitamin D, are common in adolescents. As with older non-pregnant women, vitamin A deficiency is quite rare.

Table 58 - Characteristics and outcomes in non-pregnant adolescent women 15 - 19 years of age.

Characteristic	n	% [a]	95% CI [b]
Given birth in past 2 years	19	0.8%	(0.4, 2.0)
Currently breastfeeding a child	17	0.5%	(0.3, 1.0)
Number of MDD-Wc food groups consumed (mean)	755	5.68	(5.5, 5.9)
Meets minimum dietary diversity (MDD-W, 5+ food groups)	570	74.1%	(69.2, 78.4)
Consumed iron tablets or syrup in past six months	32	4.3%	(2.8, 6.5)
Consumed folic acid tablets or syrup in past six months	8	1.1%	(0.4, 3.1)
Consumed vitamin D tablets in past six months	17	2.6%	(1.3, 4.8)
Consumed calcium tablets in past six months	7	0.9%	(0.3, 2.6)
Consumed vitamin A tablets in past six months	5	0.1%	(0.0, 0.5)
Consumed multivitamin tablets in past six months	6	0.9%	(0.3, 2.6)
Low BMI	145	23.2%	(19.1, 27.8)
Overweight or obese by BMI	221	25.7%	(21.8, 30.0)
High waist circumference	233	27.9%	(23.8, 32.5)
High waist-hip ratio	178	21.7%	(18.1, 25.8)
Anemia	184	28.8%	(24.1, 34.0)
Iron deficiency	73	32.1%	(25.3, 39.8)
Iron deficiency anemia	29	14.3%	(9.7, 20.7)
Vitamin A deficiency	1	<0.1%	(0.0, 0.3)
Folate deficiency	24	13.7%	(9.0, 20.3)
Vitamin B_{12} deficiency	30	9.5%	(5.9, 14.9)
Vitamin D			
Deficient	67	21.1%	(15.1, 28.6)
Insufficient	115	52.9%	(44.6, 61.0)

a Percentages weighted for unequal probability of selection between governorates.

b CI=confidence interval calculated taking into account the complex sampling design.

3.6 Pregnant women

3.6.1 Characteristics

A description of the pregnant women in the survey sample is provided by Table 59 below. Most pregnant women were younger than 40 years of age, and more than three-quarters had completed secondary school or more. About one-half were in their second trimester of pregnancy, but more than one-quarter were in their first trimester. Two-thirds of pregnant women had had 4 or fewer prior pregnancies or had four or fewer deliveries.

Table 59 - Description of pregnant women.

Characteristic	n	% [a]	95% CI[b]
Age (in years)			
15-19	9	2.4%	(1.0, 5.6)
20-29	177	47.9%	(41.0, 54.9)
30-39	150	40.3%	(34.0, 47.0)
40+	26	9.4%	(6.2, 13.9)
Wealth Quintile			
Poorest	56	9.4%	(6.2, 14.1)
Second	78	20.4%	(16.1, 25.4)
Middle	72	21.3%	(15.4, 28.7)
Fourth	83	25.8%	(19.3, 33.7)
Wealthiest	72	23.0%	(16.7, 30.8)
Woman's education			
< 5 years	31	6.0%	(3.5, 10.0)
5 years or more but not complete secondary	69	18.2%	(13.5, 24.1)
Completed secondary or more	261	75.8%	(69.6, 81.1)
Trimester of pregnancy			
1	99	27.3%	(21.2, 34.4)
2	145	42.9%	(37.1, 49.0)
3	114	29.7%	(24.0, 36.2)
Number of times been pregnant			
1-2	130	33.9%	(28.5, 39.8)
3-4	125	34.4%	(29.0, 40.2)
5-6	53	16.1%	(11.9, 21.4)
7+	54	15.6%	(10.8, 22.0)
Number of times given birth			
0	60	16.2%	(12.4, 20.9)
1-2	142	39.2%	(32.5, 46.4)
3-4	91	25.4%	(19.7, 32.2)
5-6	36	11.8%	(7.9, 17.2)
7+	28	7.4%	(4.7, 11.5)

Note: The n's are un-weighted numerators for each subgroup; subgroups that do not sum to the total have missing data.

a Percentages weighted for unequal probability of selection among governorates

b CI=confidence interval calculated taking into account the complex sampling design.

3.6.2 Dietary diversity and consumption of vitamins and supplements

Pregnant women's dietary diversity is similar to that of non-pregnant women (Table 60). In contrast, a much greater proportion have taken iron or folate supplements during the 6 months prior to the survey (Figure 22). Consumption of other supplements was less common than consumption of iron or folate.

The frequency with which specific food groups were consumed by pregnant women was roughly similar to non-pregnant women (Figure 23).

Table 60 - Dietary diversity in pregnant women.

Characteristic	Number of women	% [a] or mean	95% CI[b]
Number of food groups consumed (mean) (MDD-W)	357	6.68	(6.5, 6.9)
Meet minimum dietary diversity (5+ food groups)			
Yes	320	90.3%	(85.0, 93.9)
No	37	9.7%	(6.1, 15.0)

Note: The n's are un-weighted numerators for each subgroup; subgroups that do not sum to the total have missing data.

a Percentages weighted for unequal probability of selection among governorates

b CI=confidence interval calculated taking into account the complex sampling design.

Figure 22 - Proportion of pregnant women who took various supplements in past 6 months.

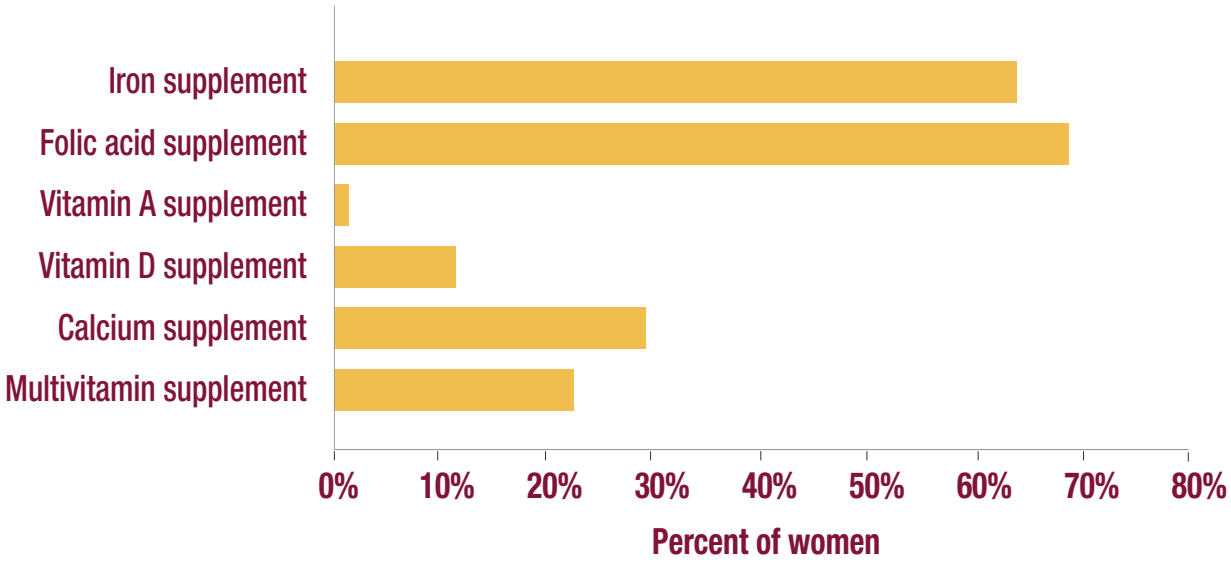
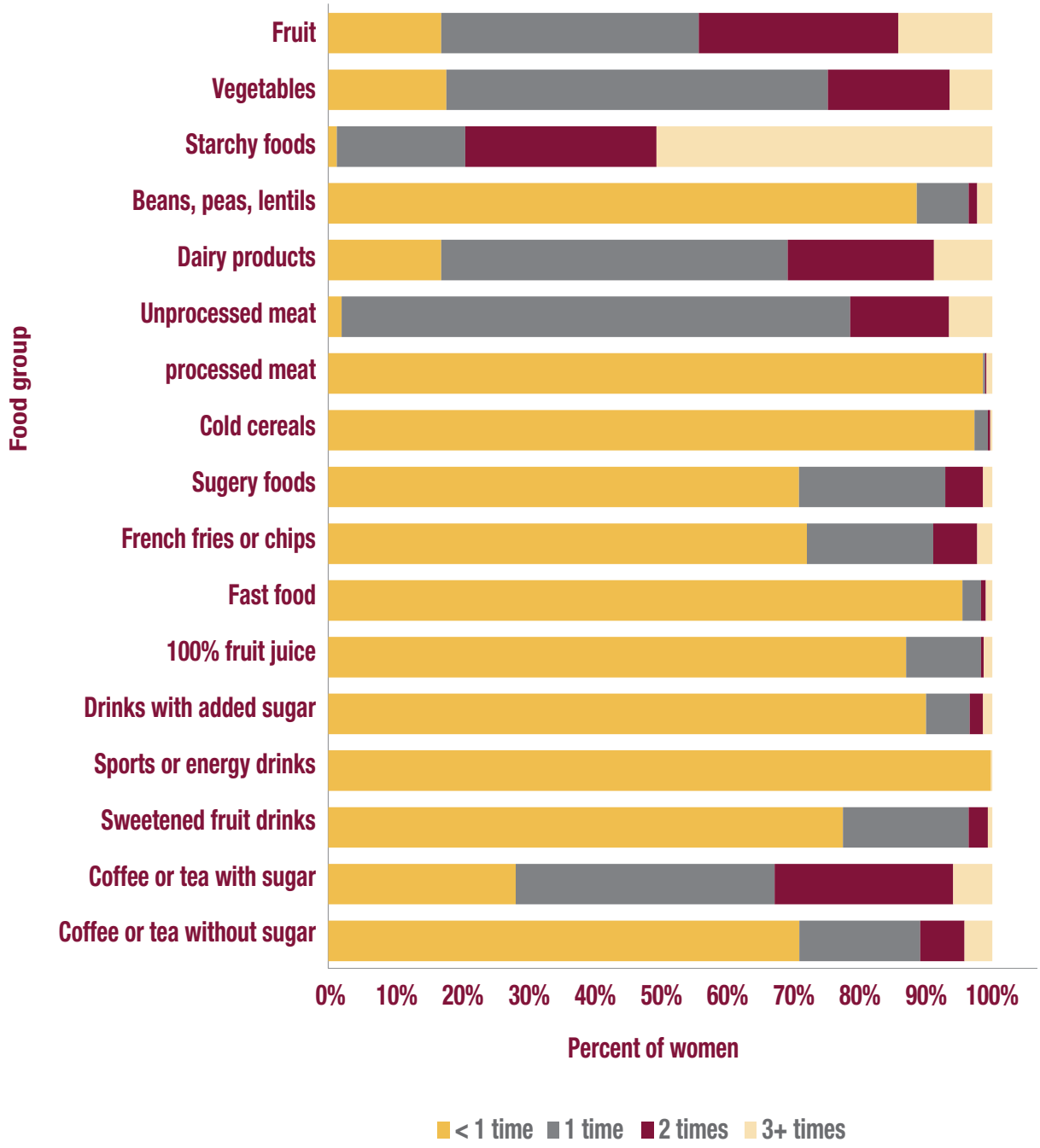


Figure 23 - Daily frequency of consumption of various food groups in pregnant women.



3.6.3 Underweight

Few pregnant women were underweight as measured by MUAC (Table 61). Although not statistically significant, there is a suggestion that pregnant adolescents 15-19 years of age may have a higher prevalence of underweight than older pregnant women. Household wealth and trimester of pregnancy showed little association with underweight. Figure 24 shows the distribution of the MUAC values in pregnant women and demonstrates the small number of pregnant women falling below the cut-off of 23.5 cm.

Table 61 - Prevalence of low MUAC (<23 cm) in pregnant women, by various demographic characteristics

Characteristic	n	%[a] with low MUAC	95% CI [b]	p-value [c]
Total	16	5.0%	(2.8, 9.0)	
Age (in years)				
15-19	2	28.3%	(4.3, 77.8)	0.065
20-29	7	4.7%	(1.8, 11.7)	
30-39	4	3.3%	(1.2, 8.4)	
40+	3	7.9%	(2.3, 23.5)	
Wealth quintile				
Poorest	1	0.3%	(0.0, 2.2)	0.758
Second	4	5.2%	(1.7, 15.1)	
Middle	2	6.2%	(1.6, 20.8)	
Fourth	5	4.7%	(1.4, 14.7)	
Wealthiest	4	6.2%	(2.0, 17.6)	
Trimester of pregnancy				
1	3	2.8%	(0.8, 9.7)	0.447
2	8	6.9%	(3.1, 14.5)	
3	5	4.4%	(1.4, 13.0)	

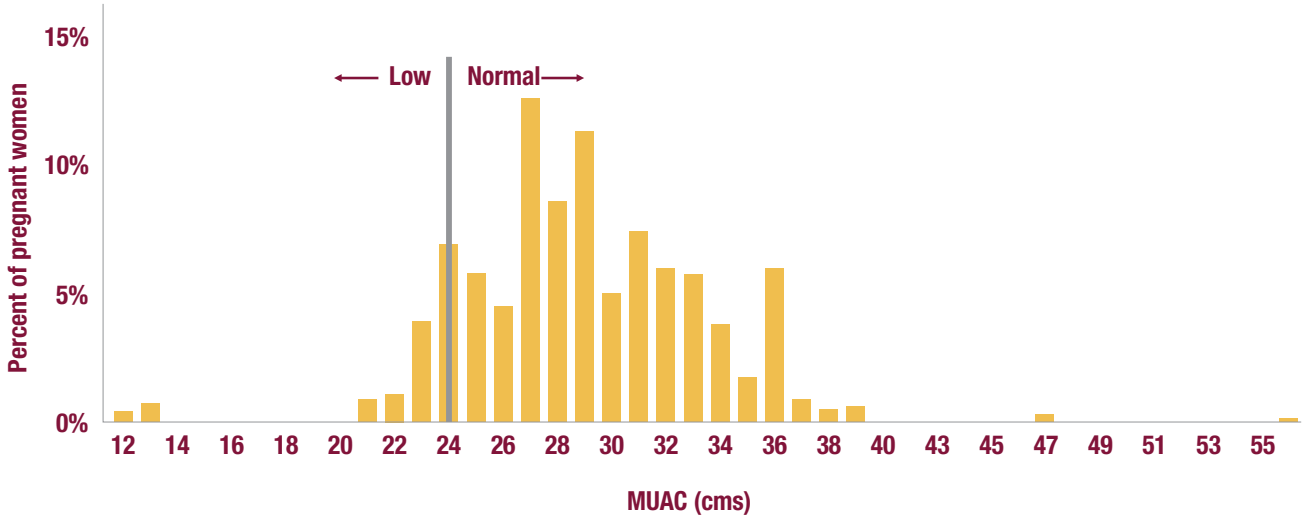
Note: The n's are un-weighted numerators for each subgroup; subgroups that do not 16sum to the total have missing data.

a Percentages weighted for unequal probability of selection among governorates.

b CI=confidence interval calculated taking into account the complex sampling design.

c P value <0.05 indicates that at least one subgroup is statistically significantly different from the others.

Figure 24 - Distribution of MUAC values in pregnant women.



3.6.4 Anemia

The overall prevalence of anemia in pregnant women is comparable to that in non-pregnant women (Table 62). Pregnant adolescents had a substantially and statistically significantly higher prevalence of anemia than older pregnant women. No statistically significant association was found between anemia and household wealth or trimester of pregnancy. The prevalence of anemia does increase markedly from the first trimester to the second, but then remains largely the same in the third trimester.

The distribution of hemoglobin values in pregnant women is symmetrical and normal in shape (Figure 25). There are no women with severe anemia (hemoglobin < 7.0 g/dL).

Table 62 - Prevalence of anemia in pregnant women, by various demographic characteristics

Characteristic	n	%[a] with anemia[b]	95% CI [c]	p-value [d]
Total	101	29.3%	(23.1, 36.3)	
Age (in years)				
15-19	4	80.9%	(39.8,96.4)	<0.05
20-29	45	26.2%	(18.7, 35.5)	
30-39	43	27.9%	(19.2, 38.6)	
40+	9	38.3%	(16.9, 65.4)	
Wealth quintile				
Poorest	12	19.2%	(7.2, 42.0)	0.754
Second	18	26.6%	(15.4, 41.8)	
Middle	23	35.0%	(21.9, 50.8)	
Fourth	27	30.7%	(18.9, 45.8)	
Wealthiest	21	29.4%	(18.7, 42.9)	
Trimester of pregnancy				
1	14	10.3%	(5.2, 19.5)	<0.001
2	46	37.0%	(27.1, 48.2)	
3	41	36.3%	(26.0, 48.0)	
Number of times pregnant				
1-2	31	29.8%	(20.4, 41.2)	0.945
3-4	34	27.1%	(17.8, 39.0)	
5-6	19	29.7%	(16.9, 46.7)	
7+	17	32.8%	(18.3, 51.6)	

Note: The n's are un-weighted numerators for each subgroup; subgroups that do not sum to the total have missing data.

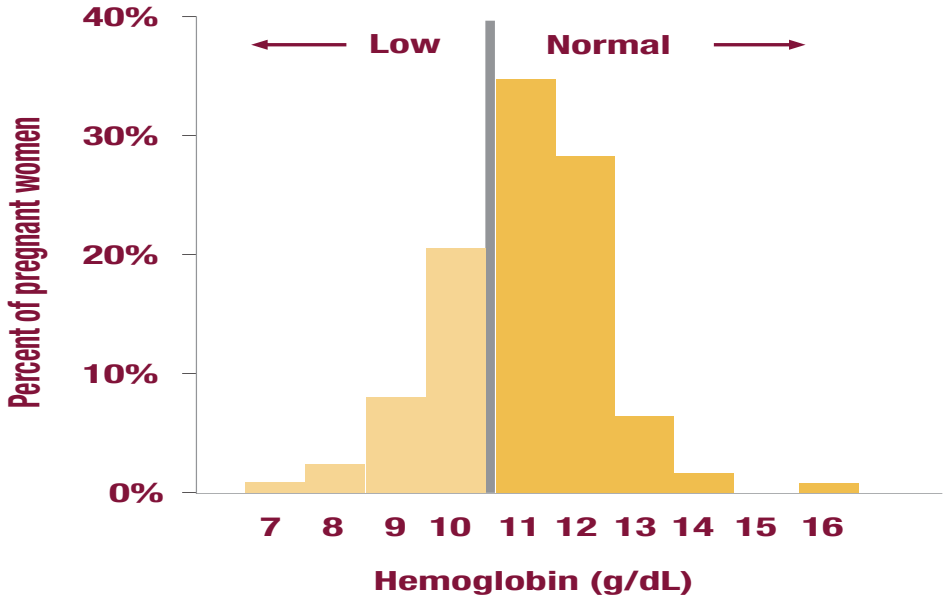
a Anemia defined as hemoglobin < 110 g/L adjusted for altitude.

b Percentages weighted for unequal probability of selection among governorates.

c CI=confidence interval calculated taking into account the complex sampling design.

d P value <0.05 indicates that at least one subgroup is statistically significantly different from the others.

Figure 25 - Distribution of hemoglobin (g/dL) in pregnant women.



4. DISCUSSION

Household consumption of vegetable oil and wheat flour

Our household-level analysis showed that a high proportion of households consumed vegetable oil and wheat flour, which were labeled as fortified. This suggests that Oman's food fortification programs continue to be well implemented. However, because the ONNS did not measure the micronutrient content of these food vehicles, we are unable to determine if foods labeled as "fortified" indeed met Oman's national fortification standards. While there is evidence showing that birth defects in Oman decreased following the implementation of wheat flour fortification in Oman[10], the Department of Nutrition does not have access to the proprietary data from manufacturers on level of production of fortified foods, nor the data from municipalities on market share and proportion of retail product which is fortified.

Our results estimate that consumption of wheat flour (either purchased as wheat flour or bread) is approximately 140 grams per day per AME. The average Omani household has 1.45 times as many people as AMEs, so 140 grams per AME per day is equivalent to 97 grams per person per day (140 grams per AME / 1.45 people per AME). This level of wheat flour consumption is considerably lower than that of the United Arab Emirates and Saudi Arabia, which consumed an estimated 278 and 245 grams of wheat flour per person per day in 2013, respectively.[41] Even if the amount of iron added to flour is sufficient for this relatively low level of consumption, iron absorption may be suboptimal because the Oman flour fortification program uses electrolytic iron. Other iron compounds commonly used for fortification, such as ferrous sulfate, ferrous fumarate, and NaFeEDTA, are more bio-available and result in gut absorption of a greater proportion of ingested iron.[42]

In addition to wheat flour, Omanis consumed approximately 155 grams of rice per day per capita in 2013 [41], and according to the US Department of Agriculture [43], Oman's domestic rice consumption has nearly doubled from 180,000 MT in 2010 to 330,000 MT in 2016. Although possibly due, at least in part, to an increase in the number of rice-consuming expatriate workers, if Omani citizens are substituting rice for wheat in their diet, the effect of wheat flour fortification may decline over time as wheat flour consumption drops.

For vegetable oil, the ONNS estimated that approximately 43 mL of oil is consumed per AME per day, which is very close to the FAO's 2013 estimate of 39ml (35.9 g) oil per day per capita. Oman's fortification program mandates that all cooking oil and margarine be fortified, so this consumption likely contributes to the low prevalence of vitamin A deficiency in children and especially in Omani women. Cooking oil could also serve an effective food vehicle for vitamin D fortification and, because of the high consumption of oil, such a fortification program could contribute substantially to vitamin D intake. Moreover, Oman's low-income households consume significantly more wheat flour and cooking oil than wealthier households. As a result, fortification of these foods may be an effective strategy to preferentially address micronutrient deficiencies in low-income households.

Child stunting, wasting and overweight

Although the prevalence rates of stunting, wasting, overweight/obesity, and underweight in children less than 5 years of age have not significantly increased since 2009, there is some suggestion of a mild increase. Stunting is classified as a mild health problem according to WHO standards.[44] The prevalence of wasting would be classified as "poor" if the population were involved in a humanitarian emergency.[40] The prevalence of overweight and obesity are still quite low. Infant and young children feeding indicators show mixed changes since 2009. Although the proportions of children with timely introduction of solid food and dietary diversity have increased, the proportions meeting minimum meal frequency and minimum acceptability of the diet have declined. These findings highlight many specific gaps in young children feeding in Oman which are opportunities for additional program intervention.

Although classified as a mild public health problem at the national level, stunting is somewhat more elevated for certain sub-groups, such as children 12-23 months of age. Moreover, HAZ reaches a low point at this age. This possibly demonstrates that poor feeding in early childhood may contribute to the stunting observed in this age group. Complementary feeding later in childhood is better, possibly leading to a decline in stunting with age, although the average HAZ shows only sporadic improvement. However, the rise in HAZ seen in the first year of life is different from the age-specific pattern seen in other populations which show a steady decline in HAZ throughout the first 2 years.[45] The specific reasons for this difference should be investigated further. In addition, the association between mother's height and child's stunting demonstration intergenerational transfer of short stature in Oman, as has been seen in other populations.[20,46]

Wasting is most common in the first year of life of Omani children, unlike in other countries where the average WHZ begins to fall later in the first year of life and remains low throughout the second year of life due, in part, due to poor complementary feeding.[45] In addition, in other populations, WHZ tends to recover from the third birthday onward, but in Oman, the average WHZ remains low throughout the pre-school years. The early decline in WHZ in Oman may be due to poor breastfeeding practices, especially the lack of exclusive breastfeeding, playing a greater contributory role in Oman than elsewhere. On the other hand, widespread use of infant formula would tend to make infants fatter after the first few months of life, but young children in Oman are thinner than average.[47,48] The lack of strong associations between stunting and wasting and household wealth or mother's educational status demonstrate that the distribution of interventions and preventive factors, as well as the distribution of risk factors, is more equitable in Oman than in other countries.

The prevalence of overweight and obesity in children has increased since 2009. Although the prevalence is still not high, efforts should be made to prevent further increases in overweight and obesity in childhood. Overweight and obesity have been associated with type 2 diabetes in children and adolescents in Kuwait and Saudi Arabia[49,50], and could become a public health problem in Oman in the near future if overweight and obesity prevalence continue to increase.

Overweight and obesity in women

The ONNS estimates that nearly 60% of non-pregnant women 15-49 years of age are overweight or obese, and that prevalence clearly increases with age. More than 75% of women 35-49 years of age were either overweight or obese. The prevalence of overweight and obesity has steadily increased in Oman over the past few decades, and Oman has experienced one of the sharpest increases in obesity prevalence worldwide.[8] Overweight and obesity is a key risk factor of type-2 diabetes mellitus, which has risen dramatically in Middle Eastern countries in the past two decades.[51] In Oman, a recent study estimated that between 10-20% of Omani adults have type-2 diabetes mellitus.[52] In addition to diabetes, overweight and obesity is a risk factor of cardiovascular diseases and various cancers.[53] As a result, Oman may expect a rise in the incidence of several chronic diseases associated with overweight.

Anemia and micronutrient deficiencies

The prevalence rates of anemia in Omani children and women are similar and denote a moderate public health problem in both groups according to the WHO thresholds.[54] The prevalence of anemia in children less than 5 years of age has decreased significantly since 2009[11]; unfortunately, the 2009 survey did not assess adult women.[11] While the prevalence rates in children and women are similar, the main risk factors for anemia in these population groups appear to be different. To illustrate, the prevalence of iron deficiency in children is only

half that of anemia. Even though iron deficiency is strongly associated with anemia in children, its contribution must be relatively small since the prevalence of iron deficiency anemia is low. Recent illnesses and inflammation were also associated with anemia in children, which suggests that inflammation and illness may also contribute to anemia in children. Approximately 20% of Omani children had inflammation (i.e. elevated CRP or AGP), and inflammation has been identified as a risk factor of anemia in other countries.[55] On the other hand, the prevalence of iron deficiency in Omani women is similar to the prevalence of anemia and more strongly associated with anemia than in children. Bivariate analyses showed that anemia in Omani women may largely be driven by iron and folate deficiencies, and less by inflammation or deficiencies of vitamin A, vitamin B_{12}, or vitamin D. Although sickle cell trait or beta thalassemia may be associated with anemia and/or iron deficiency, because neither condition are very common, they probably do not make a major contribution to anemia in children or women.

The algorithm applied to the results of HPLC hemoglobin testing assumed that a proportion of hemoglobin made up of hemoglobin A2 greater than 3.4% indicates beta thalassemia. This cut-off was defined by the testing laboratory. However, there is no cut-off point for hemoglobin A2 below which no patients have beta thalassemia and above which all patients have beta thalassemia. Therefore, the cut-off point can be varied to change the sensitivity and specificity of HPLC testing. Other authors have recommended cut-off points as high as 4.0% to maximize specificity.[56] Using this higher cut-off point in our ONNS data resulted in a decline in the estimated prevalence of beta thalassemia in children from 4.2% to 2.6% and in women from 2.8% to 2.4%.

Anemia is more common in pregnant adolescents than in older women who are pregnant. This result supports the findings of Machado et al who found in a case-control study that among women delivering at Sultan Qaboos University Hospital, adolescents were more likely to be anemic than older women.[57] This population group may merit enhanced screening and intervention during routine pre-pregnancy care and ante-natal care.

Nationally, vitamin A deficiency is almost non-existent in women and considered a mild public health problem in children. Few women and children consume vitamin A supplements or multi-vitamins; therefore, dietary vitamin A must come from vitamin A-rich foods and/or fortified vegetable oil. Although the national prevalence of vitamin A deficiency only denotes a mild public health problem, in Al-Sharqyah South and Al-Wusta governorates, the deficiency suggests a moderate and severe public health problem, respectively. Vitamin A deficiency is a major cause of preventable childhood blindness and morbidity and accounts for about 2% of all deaths in children < 5 years of age.[58] As such, interventions targeted at children in these regions that aim to increase consumption of vitamin A-rich foods and vitamin A fortified foods should be explored to further decrease the prevalence of deficiency.

Vitamin D deficiency in children and women is low compared to other countries in the region. This may be due to the ongoing vitamin D fortification program in Oman. A national survey in Jordan in 2010 showed that 19.8% of children 12-59 months of age and 60.3% of women of reproductive age were vitamin D deficient. This Jordan study also found associations between skin exposure to sunlight and vitamin D deficiency.[37,59] In contrast, sun exposure was associated with vitamin D deficiency in neither Omani children or women. While vitamin D is primarily obtained through sun exposure, the lack of association in Oman may be related to the consistent clothing (i.e. abaya & hijab) worn by most women outside the home, which limits the variability in the amount of skin exposed to sunlight. This is shown by the narrow range of the sun exposure index in adult women.

Limitations and Strengths

There are a few notable limitations of the ONNS. First and foremost, as a cross-sectional survey, the ONNS is not able to determine the cause of various nutrition outcomes, but rather can only measure associations at a single point in time between outcomes (e.g. anemia, overweight/obesity) and commonly-measured risk factors. Second, the household response rate was relatively low, particularly in Muscat, due to absenteeism and refusal to participate. These low response rates could have injected bias into the ONNS; however, because we have no information from non-responding households, it is unfortunately not possible to determine the existence or the extent of this bias. Third, the data quality of anthropometry of children could be better. For example, many teams showed a strong digit preference in length and height measurements. Although probably insufficient to cause a large bias, we cannot identify whether any systematic bias in anthropometric measurements exists.

Despite these limitations, the ONNS has multiple strengths. First, sampling was designed to achieve reasonable precision for many important health and nutrition outcomes at both the national and governorate level. Second, a broad range of nutrition and nutrition-related outcomes were measured in several population groups. Third, as a comprehensive nutrition assessment that included questionnaire, anthropometry and blood biomarkers, the ONNS was able to explore the associations of many health outcomes and common risk factors. Fourth, many biomarkers of micronutrient status were measured for the first time in Oman on a national level. Lastly, the laboratories measuring micronutrients and inflammation participated in external quality assurance program VITAL-EQA on a routine basis, and have been used to measure micronutrient concentrations in serum/plasma samples from many countries. Thus, the results of the ONNS are comparable to those used for many other national surveys.

5.RECOMMENDATIONS

Using the findings presented in this report and an understanding of Oman›s programmatic and research environment, the MoH, UNICEF, and GroundWork developed the following programmatic and research recommendations. These recommendations have been structured by health problem or deficiency and ordered by priority based on the magnitude of the health problem as measured by the ONNS.

1. Reduce the prevalence of overweight and obesity in adult women

Overweight and obesity is a serious public health concern in Oman and should be addressed through governmental policies and programs. According to the WHO, though numerous societal and environmental factors influence weight gain and retention, “dietary factors and physical activity patterns are considered to be the major modifiable factors underlying excessive weight gain that, if corrected, can serve to prevent obesity”.[60]

Programs targeted to pregnant and lactating women are also an entry point for reducing overweight and obesity in adult women, as postpartum weight retention is a risk factor of long term overweight and obesity.[61] It is therefore recommended that antenatal and postnatal care be expanded to include behavior change messages and counseling for mothers.

As breastfeeding behaviors are inadequate in Oman and improper breastfeeding and complementary feeding is associated with postpartum weight retention, messages encouraging exclusive and continued breastfeeding should be stressed in behavior change materials and during training of medical professionals who should in turn encourage, support and protect breastfeeding.

2. Reduce the prevalence of folate and vitamin B_{12} deficiency in women of reproductive age

According to Oman’s current fortification standards, 1.5 ppm of folic acid is added to wheat flour. This fortification level is below WHO guidelines that recommend that 2.6 ppm of folic acid should be added if wheat flour consumption is between 75-149 grams per day.[42] The ONNS estimated that consumption of wheat products is 97 grams per person per day. In addition, folate deficiency affects about one out of ten women. Therefore, increasing the quantity of folic acid added to wheat flour should be considered.

Oman currently does not mandate the fortification of wheat flour with vitamin B_{12}, and including vitamin B_{12} in the wheat flour fortification standards should also be considered as a strategy to reduce the vitamin B_{12} deficiency prevalence.

3. Reduce the prevalence of stunting and wasting in young children

As the ONNS results cannot be used to determine the causes of stunting and wasting in children in Oman, further research should be done to identify these causes so that targeted interventions can be implemented. Such research could include detailed investigation of ante-natal factors, dietary habits, morbidity and risk factors for morbidity, and general child-caring practices in a cohort of normal children, a cohort of stunted children, and a cohort of wasted children. ONNS results can be used to target governorates and regions of Oman for which targeted interventions and more in-depth assessments can be undertaken.

4. Reduce vitamin D deficiencies in women of reproductive age and children

The fortification of vegetable oil with vitamin D is a potential strategy to reduce vitamin D deficiency and insufficiency in Oman. Due to high consumption of vegetable oil and the existing oil fortification policy, vitamin D fortification would be an effective approach to reach the majority of the Omani population by using an existing public health program and infrastructure. As a next step, a feasibility study should be conducted to determine what specific policy changes would be required and what fortification levels would safely and effectively reduce vitamin D deficiency. Fortification of foods with vitamin D has been successfully implemented in the United States and Canada[62] and was added to Jordan's wheat flour fortification program in 2010[63].

5. Measure fortification compliance of flour, bread and oil

As there has not been a recent evaluation of Oman's food fortification program, it is recommended that the government conduct an assessment of the compliance and consumption study of adequately fortified wheat flour and vegetable oil. Such an exercise should quantitatively measure fortificant levels in flour, bread, and vegetable oil samples obtained from manufacturers, retailers, and households to ensure that these foods are adequately fortified according to the government standard. This exercise can also be used to identify specific food producers that do not comply to national standards and describe geographic differences in the coverage of fortified foods.

6. Prevent further increase in the prevalence of overweight and obesity in children

Although the prevalence of overweight and obesity in children is currently low in Oman, it has increased slightly, albeit without statistical significance, since the 2009 nutrition survey. Moreover, given the prevalence of overweight and obesity in adult women and the changes in dietary and lifestyle changes in Oman in recent years, it might be expected that overweight and obesity will likely become a much bigger problem in children in the near future. Interventions to this end could include health education regarding diet and exercise, encouraging exclusive breastfeeding in children less than 6 months of age, and infrastructure developments and changes encouraging physical activity in children.

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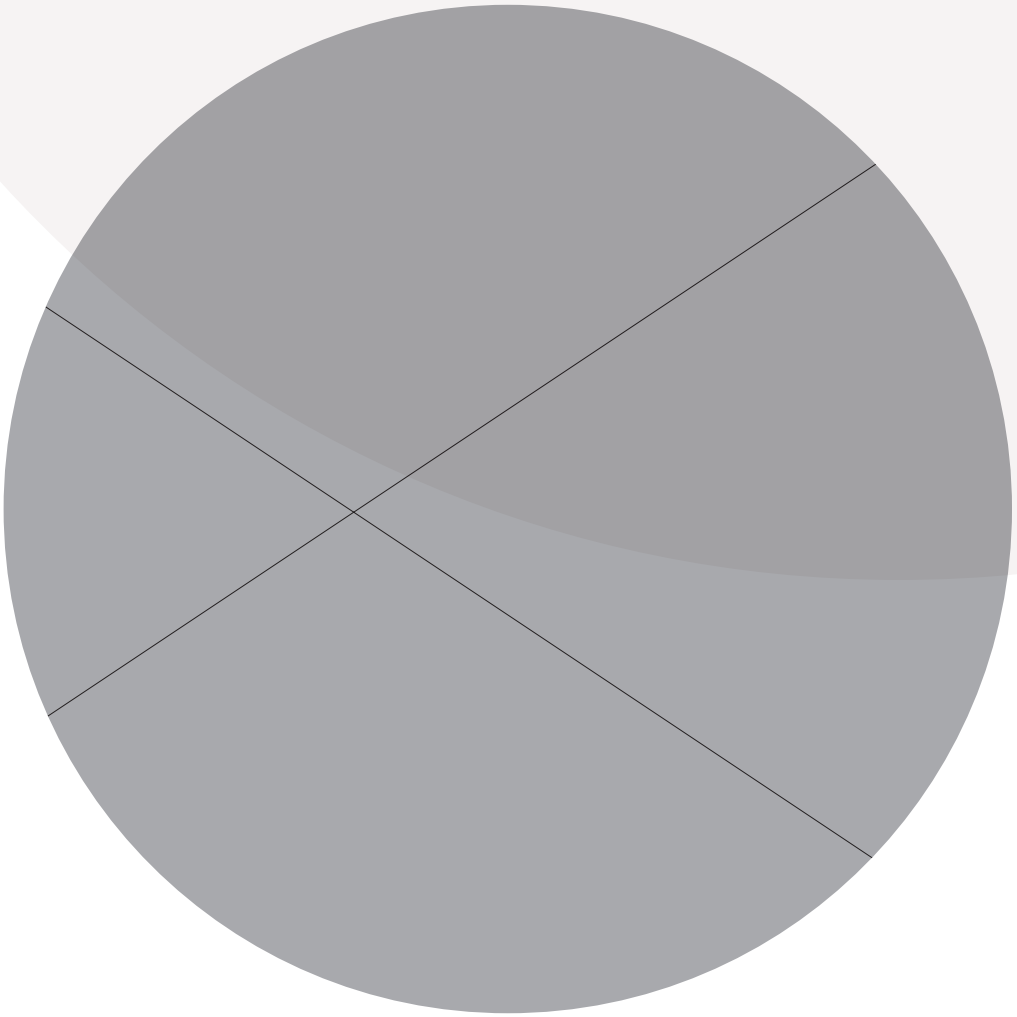

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Appendix 1. A priori sample size calculations

Sample size for ONNS (in number of individuals and number of households) for pre-school children, non-pregnant women, and pregnant women, and for key indicators, and assumptions used for calculation to result in the desired precision

Target group	Indicator	Assumed prevalence	Desired prec-ision	Assumed design effect	Assumed Indiv-idual response	Number of persons to select in each governorate	Number of persons to select in all governorates	Number of HHs to select in each governorate	Number of HHs to select in all governorates
Pre-school Children	Wasting	7%	±3.0%	1.5	85%	497	5,467	665	7,315
	Stunting	10%	±3.0%	1.5	85%	666	7,326	891	9,801
	Overweight	2%	±3.0%	1.5	85%	177	1,947	237	2,607
	Anemia	61%	±10.0%	1.5	75%	184	2,024	246	2,706
	Iron deficiency	19%	±5.0%	1.5	75%	464	5,104	621	6,831
	Vit A deficiency	6%	±3.0%	1.5	75%	482	5,302	645	7,095
	Vit D deficiency	25%	±5.0%	1.5	75%	577	6,347	772	8,492
Non-pregnant women	BMI <18.5	10%	±3.0%	1.5	85%	678	7,458	354	3,894
	BMI >25	54%	±5.0%	1.5	85%	674	7,414	352	3,872
	Anemia	32%	±5.0%	1.5	75%	671	7,381	351	3,861
	Iron deficiency	33%	±5.0%	1.5	75%	683	7,513	357	3,927
	Vit A deficiency	5%	±3.0%	1.5	75%	406	4,466	212	2,332
	Vit D deficiency	21%	±5.0%	1.5	75%	517	5,687	270	2,970
	Folate deficiency	50%	±5.0%	1.5	75%	769	8,459	402	4,422
	B_{12} deficiency	50%	±5.0%	1.5	75%	769	8,459	402	4,422
Pregnant women	Low MUAC	25%	±5.0%	1.5	85%	*	509	*	4,330
	Anemia	61%	±10.0%	1.5	75%	*	184	*	1,566

* No governorate-level estimates will be made. Only a single nation-wide estimate will be calculated

Appendix 2. Teams, team members, and supervisors

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Mrs. Maryam Mohammed Al Harami	Mr. Salim Said Al Tobi
	Mrs. Merfat Ashour Ahmed
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	Ms. Muna Khalfan Al Hassani
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Ms. Tufool Muslim Al Amri	Ms. Jameela Masuad Nasser Al Hussaini
Ms. Shaima Saeed Bait Faraj	Ms. Asma Mohammed Saif Al Fahdi
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Ms. Basma Fayil Raidaan	Mr. Talib Saleh Mohammed Al Aghbari
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Ms. Ghalia Mohammed Al Mamari	Ms. Hind Hilal Al Shuaibi
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Mr. Obaid Sadeq Obaid	Mr. Abdullah Nasser Al Harsusi
Mr. Salah Abu Sareea	Mr. Mahmoud Ali Muslim Al Hakmani
Ms. Nabila Hussai n Ali Al Saadi	Ms. Lahia Humaid Said Al Hakmani
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Ms. Aysh Mohammed Ali Al Shehi	

Appendix 3. Comparison of plasma retinol and retinol binding protein

Because retinol binding protein is not recommended by WHO for the assessment of vitamin A status, extra plasma from a subsample of specimens from children and non-pregnant women were analyzed for plasma retinol as validation of the RBP testing. Plasma retinol was analyzed using by high-performance liquid chromatography (HPLC) by the Khatib Micronutrient Laboratory (Affiliate of Najdawi Laboratory) in Amman, Jordan, and as mentioned above, RBP was measured using the ELISA technique at the VitMin Lab, Willstaett, Germany.

The subsample of specimens to be tested for retinol were selected from 53 children and 53 women. Figure 3-1 below presents the scatterplot and regression equation for these 106 specimens. When children's and women's specimens were regressed separately, the regression lines were exactly parallel and very close together. For this reason, children and women were combined into a single regression analysis. The correlation between RBP and retinol appears linear with a very strong correlation (R2=0.939). The y intercept demonstrates that, on average, RBP levels are 0.03 µmol/L higher than retinol levels.

The kappa coefficient was calculated to compare the prevalence of vitamin A deficiency defined using retinol <0.70 µmol/L and two values of RBP: <0.70 µmol/L and <0.73 µmol/L, as shown in tables 3-1 and 3-2 below. Using the RBP cut-off point of 0.73 µmol/L results in better agreement with retinol by HPLC and better sensitivity; however, the number of specimens showing vitamin A deficiency is quite low.

Figure 3-1 - Scatterplot of RBP and retinol HPLC values and regression equation.

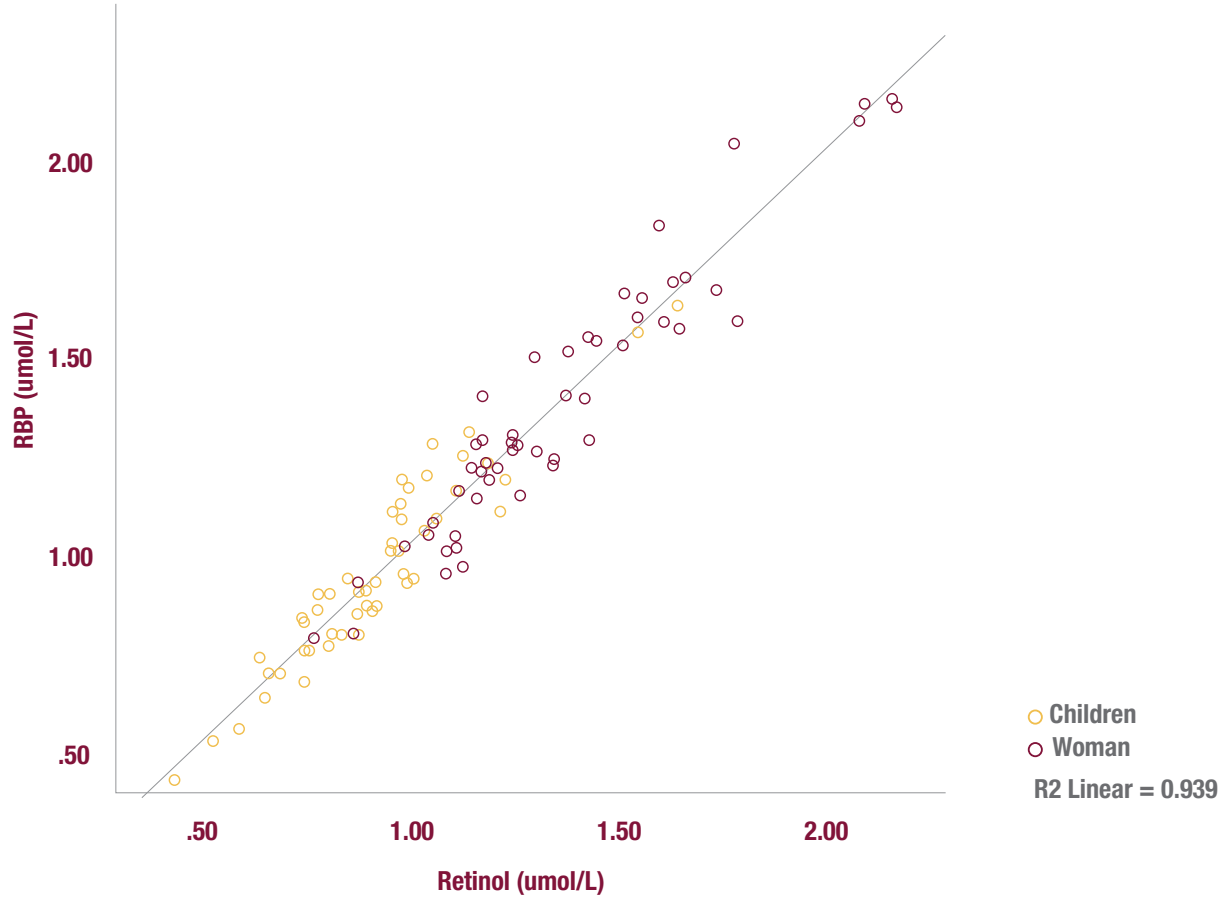

Table 3-1 - Comparison of RBP < 0.73 µmol/L.

	Retinol by HPLC		
RBP<0.73	**Low**	**Normal**	**Total**
Low	6	1	7
Normal	1	98	99
Total	7	99	106
Kappa statistic = 0.847			
Sensitivity = 85.7%			
Specificity = 99.0%			

Table 3-2 - Comparison of RBP < 0.70 µmol/L.

	Retinol by HPLC		
RBP<0.70	**Low**	**Normal**	**Total**
Low	4	1	5
Normal	3	98	101
Total	7	99	106
Kappa statistic = 0.647			
Sensitivity = 57.1%			
Specificity = 99.0%			

Appendix 4. Additional household tables

Table 4-1 - Various oil, flour, and bread consumption indicators, by governorate.

Characteristic	Muscat	Dhofar	Al-Dhakhlya	Al-Sharqyah North	Al-Sharqyah South	Al-Batinah North	Al-Batinah South	Al-Dhahairah	Al-Buraimy	Musan-dam	Al-Wusta	P value*	Total
OIL AND FAT													
Oils and fats used for cooking													
Palm seed oil	9.9%	23.6%	18.8%	18.1%	73.6%	25.7%	9.7%	7.3%	1.9%	1.6%	24.8%	<0.001	20.7%
Olive oil	21.9%	0.9%	27.4%	14.6%	49.3%	62.7%	67.5%	85.1%	18.6%	12.8%	4.7%	<0.001	38.7%
Sesame oil	0%	0%	0.3%	0%	0.7%	1.6%	0.3%	0.7%	0.6%	0.3%	0.3%	0.768	0.5%
Sunflower oil	43.8%	46.2%	76.6%	62.8%	52.1%	36.1%	48.1%	44.7%	50.9%	24.0%	3.8%	<0.001	49.2%
Corn oil	46.3%	28.6%	7.7%	19.1%	21.9%	62.2%	40.8%	45.7%	66.5%	41.4%	85.5%	<0.001	38.8%
Canola oil	1.7%	0$%	0.3%	0.3%	1.4%	0.8%	1.4%	0.7%	0.9%	0.9%	0%	0.677	1.0%
Ghee	15.3%	4.4%	38.8%	38.5%	63.5%	46.6%	84.1%	80.5%	3.4%	0%	22.4%	<0.001	40.3%
Animal butter	5.8%	0.6%	10.8%	11.3%	10.1%	32.9%	14.9%	3.6%	0.6%	0%	0.3%	<0.001	12.5%
Margarine	5.8%	0.3%	42.5%	1.9%	0.7%	4.8%	63.7%	39.1%	1.2%	37.1%	0.3%	<0.001	18.0%
Coconut oil	0.8%	0%	0%	0%	0%	0%	0%	0%	0.3%	0%	0%	0.992	0.2%
Hemis/qushdah	2.1%	0%	2.8%	0.6%	0%	18.5%	4.8%	0%	0%	0%	0%	<0.05	4.8%
Number of times oil or fat reused													
Used only 1 time	35.5%	69.9%	48.9%	38.2%	69.0%	71.7%	57.7%	59.0%	65.2%	84.5%	92.8%	<0.01	55.0%
Used 2 times	57.1%	27.7%	48.3%	55.6%	29.2%	25.8%	38.7%	37.9%	33.5%	14.9%	6.6%		41.0%
Used 3 times	6.9%	1.7%	2.5%	6.3%	1.8%	2.5%	3.2%	3.1%	1.3%	0.6%	0.6%		3.8%
Used more than 3 times	0.4%	0.7%	0.3%	0%	0%	0%	0.4%	0%	0%	0%	0%		0.2%
Liters oil purchased per month (mean or median)	5.7	7.3	5.0	4.0	7.9	7.4	6.2	5.4	5.1	2.3	15.0	<0.001	6.175
Cost of oil (mean or median)	1.0	1.3	0.9	1.2	0.8	0.9	1.1	1.0	1.0	2.1	1.0	<0.001	1.010

Characteristic	Muscat	Dhofar	Al-Dakhlya	Al-Sharqyah North	Al-Sharqyah South	Al-Batinah North	Al-Batinah South	Al-Dhahairah	Al-Buraimy	Musan-dam	Al-Wusta	P value*	Total
Fortified oil in household													
Yes, package say fortified	96.1%	90.1%	97.4%	85.9%	97.6%	98.4%	95.0%	96.2%	95.3%	92.2%	99.1%	<0.01	95.4%
No, package not mention fortified	3.5%	7.1%	1.0%	1.3%	1.6%	0.4%	2.5%	3.4%	4.7%	0.7%	0		2.4%
Not in original package	0	0.6%	0	0	0	0.8%	0.4%	0.3%	0	0	0.3%		0.3%
No oil in household	0.4%	2.2%	1.6%	12.8%	0.8%	0.4%	2.2%	0	0	7.2%	0.6%		2.0%
WHEAT FLOUR AND BREAD													
Kilograms wheat flour purchased per month (mean or median)	8.9	9.0	15.3	19.6	23.4	18.3	14.2	20.0	13.5	16.3	35.7	<0.001	15.282
Cost of wheat flour (mean or median)	0.9	1.3	0.3	0.3	0.3	0.4	0.4	0.3	0.5	0.4	0.4	<.001	.55857
Fortified wheat flour in household													
Yes, package say fortified	76.1%	83.9%	93.5%	58.9%	91.6%	69.4%	53.4%	92.1%	94.5%	43.7%	100%	<0.001	76.1%
No, package not mention fortified	0.9%	14.5%	1.6%	0.3%	4.0%	1.7%	0.7%	6.5%	4.8%	2.3%	0		2.5%
Not in original package	0	0.4%	0	0	0.7%	11.6%	0.4%	1.0%	0.3%	1.7%	0		2.4%
No oil in household	22.9%	1.2%	4.9%	40.8%	3.6%	17.4%	45.6%	0.3%	0.3%	52.3%	0		18.9%
Type of bread usually purchased													
Bakery white bread	24.8%	77.7%	40.6%	8.7%	69.8%	35.7%	73.7%	73.2%	57.1%	93.5%	0.3%	<0.001	44.7%
Bakery brown bread	9.9%	28.9%	6.8%	1.0%	3.1%	4.4%	38.8%	6.0%	3.1%	2.8%	0	<0.001	11.2%
Other bread from bakery or bakery	2.9%	19.5%	9.8%	5.5%	0.3%	18.1%	45.7%	0%	3.4%	34.6%	0.6%	<0.001	12.7%
Local bread	37.6%	13.2%	0.9%	0.6%	0%	6.0%	2.1%	8.3%	0.9%	6.2%	0	<0.001	12.0%
Home-made only (does not buy bread)	33.9%	17.6%	57.2%	92.9%	26.0%	44.6%	85.1%	18.9%	52.2%	3.1%	99.1%	<0.001	47.3%
Does not use bread	0	0.9%	0	0	1.0%	0	0	2.0%	0.3%	0.3%	0	0.578	0.3%
Kilograms of bread purchased per month (mean or median)	2.6	6.4	2.0	0.8	2.5	4.3	3.9	2.3	4.3	2.7	0.0		3.1

Characteristic	Muscat	Dhofar	Al-Dakhlya	Al-Sharqyah North	Al-Sharqyah South	Al-Batinah North	Al-Batinah South	Al-Dhahairah	Al-Buraimy	Musan-dam	Al-Wusta	P value*	Total
Amount of each type of bread purchased per month (mean or median)													
Loaves of sliced bread	2.6	7.0	3.3	4.8	4.3	7.1	2.3	5.2	6.9	2.4	0.0	<0.001	3.4
Burger rolls or buns	0.2	0.6	0.2	0.6	0.2	0.8	0.3	0.3	0.5	0.2	0.0	<0.001	0.3
Bags of lebnano	1.2	3.0	1.3	1.8	3.0	4.1	1.6	1.9	2.7	0.9	4.9	<0.001	2.2
Bags samoun	1.0	3.0	1.1	1.9	2.6	3.7	1.1	1.5	3.4	1.5	0.0	<0.001	1.9
Pieces Omani bread	0.0	0.8	0.5	0.0	0.0	0.2	0.7	0.5	0.3	0.2	0.9	<0.001	0.5
Pieces of tanours	0.4	5.4	0.8	0.0	0.0	8.6	1.3	0.0	3.2	0.7	0.0	<0.001	1.3
Pieces of barata	0.2	2.0	0.5	0.4	0.0	1.2	0.7	0.1	0.6	0.1	0.0	<0.001	0.9
Cost of bread (mean OR/ kg)	1.6	9.9	1.0	2.0	5.6	7.7	4.8	3.3	7.6	2.3	0.1	<0.001	4.1
Fortified bread in household													
Yes, package say fortified	23.0%	1.5%	5.0%	20.9%	2.9%	6.0%	46.1%	34.3%	10.2%	12.3%	66.7%	<0.001	18.8%
No, package not mention fortified	6.2%	95.9%	54.3%	23.3%	94.7%	55.7%	12.2%	63.3%	87.6%	3.6%	0		43.3%
Not in original package	2.5%	2.2%	29.3%	0	0	6.7%	3.0%	1.0%	1.1%	29.2%	0		5.7%
No oil in household	68.3%	0.4%	11.4%	55.8%	2.4%	31.5%	38.7%	1.4%	1.1%	54.9%	33.3%		32.1%

Appendix 5. Additional child tables

Table 5-1 - Physical activity and sleep patterns in children less than 5 years of age, by governorate

Characteristic	Muscat	Dhofar	Al-Dhakhlya	Al-Sharqyah North	Al-Sharqyah South	Al-Batinah North	Al-Batinah South	Al-Dhahairah	Al-Buraimy	Musan-dam	Al-Wusta	P value	Total
Hours television or video per day (mean)	1.84	1.79	1.47	1.41	1.93	1.86	1.61	1.63	1.88	2.27	1.38	<0.01	1.73
Hours video or computer games per day (mean)	.79	1.04	.23	.28	.31	.57	.57	.29	.70	.96	.14	<0.001	.53
Watch television while eating													
No or rarely	55.7%	74.9%	66.1%	76.8%	66.0%	60.9%	62.4%	74.1%	35.5%	46.9%	91.3%	0.001	64.3%
1 mean per day	20.0%	17.7%	25.4%	19.9%	22.7%	27.0%	21.2%	18.8%	45.0%	51.0%	7.1%		23.4%
2 meals per day	14.3%	3.0%	5.3%	2.6%	5.3%	8.0%	7.9%	1.8%	16.0%		1.6%		7.0%
3 or more meals per day	10.0%	3.9%	2.6%	0.7%	6.0%	4.0%	8.5%	4.1%	3.0%	0	0		5.0%
Television or computer in bedroom													
Yes	20.0%	52.5%	26.5%	7.3%	17.0%	34.7%	27.4%	31.1%	11.9%	32.2%	44.3%	<0.001	
No	80.0%	47.5%	73.5%	92.7%	83.0%	65.3%	72.6%	68.9%	88.1%	67.8%	55.7%		
Hours sleep per 24-hour period on weekdays (mean)	10.5	11.1	10.2	10.0	10.1	10.2	10.7	10.0	9.8	9.7	13.3	<0.01	10.4
Hours sleep per 24-hour period on weekends (mean)	10.8	11.2	11.1	10.4	10.9	10.4	10.9	10.3	11.7	9.9	13.3	<0.01	10.8
Days in past 7 days walked in neighborhood (mean)	2.6	2.4	4.5	2.6	4.6	2.0	2.1	2.1	3.2	5.4	3.0	<0.001	3.2
Days in past 7 days played outdoors 30+ minutes (mean)	4.4	4.8	4.6	3.4	4.5	5.6	5.7	2.9	3.3	5.9	5.7	<0.001	4.7

Characteristic	Muscat	Dhofar	Al-Dhakhlya	Al-Sharqyah North	Al-Sharqyah South	Al-Batinah North	Al-Batinah South	Al-Dhahairah	Al-Buraimy	Musan-dam	Al-Wusta	P value	Total
Organized physical activity in typical week													
Yes	10.0%	0.5%	1.6%	2.0%	3.3%	6.3%	48.5%	70.6%	0.6%	4.1%	0	<0.001	13.9%
No	90.0%	99.5%	98.4%	98.0%	96.7%	93.7%	51.5%	29.4%	99.4%	95.9%	100%		
Likes physical activity and outdoor playing													
Does not like	0%	0.5%	0.5%	0.7%	3.3%	1.1%	1.8%	1.2%	0%	0%	0.5%	<0.001	1.0%
Likes	22.1%	49.8%	42.2%	30.5%	75.3%	47.7%	44.2%	63.9%	44.6%	66.2%	82.0%		45.9%
Likes a lot	77.9%	49.8%	57.2%	68.9%	21.3%	51.1%	53.9%	34.9%	55.4%	33.8%	17.5%		53.0%
Mother ranks child's activities relative to other children													
A lot less active	0%	0%	0.5%	0%	0%	0%	0%	0%	0%	0%	2.2%	0.120	0.1%
Less active	8.8%	4.5%	3.2%	2.6%	4.7%	4.6%	1.2%	1.2%	3.0%	1.4%	3.3%		4.1%
Same	66.2%	71.6%	68.3%	88.1%	80.7%	69.5%	91.5%	92.3%	82.4%	93.1%	87.4%		76.3%
More active	22.1%	21.4%	25.4%	9.3%	14.0%	22.4%	6.7%	6.5%	11.5%	5.5%	7.1%		17.5%
A lot more active	2.9%	2.5%	2.6%		0.7%	3.4%	0.6%		3.0%				2.0%
Type of child care facility typically attends													
None, stays at home	30.9%	87.1%	13.8%	85.3%	51.7%	89.1%	14.0%	55.6%	51.5%	84.9%	0%	<0.001	53.3%
Informal (family, friends)	42.6%	7.0%	60.1%	2.7%	40.3%	2.3%	73.2%	32.5%	25.5%	2.1%	100%		32.2%
Day care <8 hours	7.4%	1.5%	13.8%	3.3%	4.7%	1.1%	1.2%	7.1%	10.3%	9.6%	0%		5.0%
Day care 8+ hours	2.9%		0.5%	0	0.7%	0	0	0.6%	0.6%	0.7%	0%		0.6%
Preschool	16.2%	2.0%	11.2%	8.7%	2.7%	6.9%	11.6%	4.1%	12.1%	2.7%	0%		8.5%
Other [a]		2.5%	0.5%	0%	0%	0.6%	0%	0%	0%	0%	0%		0.4%

a Includes private home, disable care, and Quran school

Table 5-2 - Sun exposure in children less than 5 years of age, by governorate

Characteristic	Muscat	Dhofar	Al-Dakhlya	Al-Sharqyah North	Al-Sharqyah South	Al-Batinah North	Al-Batinah South	Al-Dhahairah	Al-Buraimy	Musandam	Al-Wusta	P value	Total
Child's head usually protected from sun when outside													
Never/rarely	85.7%	95.7%	66.3%	82.1%	87.4%	84.5%	54.2%	42.9%	71.2%	61.7%	94.0%	<0.001	76.3%
Sometimes	12.9%	1.4%	26.8%	14.6%	8.6%	13.2%	42.8%	34.1%	12.9%	34.2%	6.0%		18.9%
Most of the time	0	0.5%	1.1%	1.3%	2.6%	0.6%	1.8%	5.3%	9.4%	2.0%	0		1.4%
All the time	1.4%	2.4%	5.8%	2.0%	1.3%	1.7%	1.2%	17.6%	6.5%	2.0%	0		3.3%
How usually protect child's head from sun													
Scarf/headcloth	25.0%	40.0%	3.1%	3.7%	20.0%	6.9%	5.2%	7.9%	20.4%		72.7%	<0.001	8.4%
Hat	75.0%	60.0%	96.9%	96.3%	80.0%	93.1%	94.8%	92.1%	79.6%	100%	27.3%		91.6%
Child's arms usually protected from sun when outside													
Never/rarely	25.7%	76.2%	15.3%	51.0%	38.4%	54.0%	18.7%	19.4%	44.1%	5.4%	38.0%	<0.001	37.4%
Sometimes	68.6%	12.9%	71.6%	43.7%	57.6%	42.0%	77.7%	43.5%	32.4%	74.5%	34.8%		53.5%
Most of the time	0	4.8%	8.4%	0.7%	1.3%	1.7%	0.6%	8.8%	21.2%	18.8%	19.6%		3.8%
All the time	5.7%	6.2%	4.7%	4.6%	2.6%	2.3%	3.0%	28.2%	2.4%	1.3%	7.6%		5.3%
How much time per day typically child spend under the sun													
None	5.9%	19.1%	2.1%		2.0%		0.6%	1.2%		2.0%	1.1%		
1-29 minutes	19.1%	25.4%	20.5%	30.5%	9.9%	4.0%	7.3%	7.8%	14.7%	10.1%	20.1%	<0.001	3.1%
30-59 minutes	30.9%	10.5%	17.4%	33.1%	30.5%	12.6%	15.2%	31.3%	32.4%	18.2%	38.0%		13.9%
1-2 hours	25.0%	27.8%	28.9%	29.1%	40.4%	37.4%	23.6%	23.5%	34.1%	42.6%	29.3%		20.8%
More than 2 but less than 3 hours	7.4%	12.0%	11.1%	5.3%	13.2%	10.3%	21.2%	16.3%	15.9%	21.6%	8.2%		30.7%
More than 3 hours	11.8%	5.3%	20.0%	2.0%	4.0%	35.6%	32.1%	19.9%	2.9%	5.4%	3.3%		12.0%
Sun index													
20+	39.7%	41.6%	43.7%	30.5%	52.3%	77.0%	63.0%	31.7%	44.1%	44.6%	36.4%	<0.001	52.6%
0.01-19.9	54.4%	38.8%	53.2%	68.2%	45.0%	23.0%	35.8%	52.1%	54.7%	52.7%	62.5%		43.0%
0	5.9%	19.6%	3.2%	1.3%	2.6%		1.2%	16.2%	1.2%	2.7%	1.1%		4.5%

Appendix 6. Additional women tables

Table 6-1 - Dietary and knowledge characteristics and indicators in non-pregnant women 15-49 years of age, by governorate

Characteristic	Muscat	Dhofar	Al-Dakhlya	Al-Sharqyah North	Al-Sharqyah South	Al-Batinah North	Al-Batinah South	Al-Dhahairah	Al-Buraimy	Musan-dam	Al-Wusta	P value	Total
Number of MDD-W* food groups consumed (mean)	5.9	5.7	6.7	7.3	6.0	6.1	6.7	6.8	6.9	6.2	4.9	<0.001	6.35
Meets minimum dietary diversity (MDD-W, 5+ food groups)													
Yes	80.3%	77.3%	91.7%	97.1%	82.2%	80.8%	94.2%	90.2%	91.3%	81.4%	64.8%	<0.001	85.3%
No	19.7%	22.7%	8.3%	2.9%	17.8%	19.2%	5.8%	9.8%	8.7%	18.6%	35.2%		14.7%
Consumed iron tablets or syrup in past six months													
Yes	12.5%	13.6%	14.0%	9.4%	2.8%	9.6%	9.4%	12.4%	9.8%	17.1%	1.6%	<0.001	10.8%
No	87.5%	86.4%	86.0%	90.6%	97.2%	90.4%	90.6%	87.6%	90.2%	82.9%	98.4%		89.2%
Consumed folic acid tablets or syrup in past six months													
Yes	5.7%	8.1%	8.8%	9.1%	2.2%	7.0%	9.4%	4.4%	6.2%	11.3%	2.9%	<0.001	6.9%
No	94.3%	91.9%	91.2%	90.9%	97.8%	93.0%	90.6%	95.6%	93.8%	88.7%	97.1%		93.1%
Consumed vitamin D tablets in past six months													
Yes	15.7%	13.2%	3.7%	2.3%	2.5%	3.8%	3.1%	3.1%	8.0%	8.1%	0.2%	<0.001	6.8%
No	84.3%	86.8%	96.3%	97.7%	97.5%	96.2%	96.9%	96.9%	92.0%	91.9%	99.8%		93.2%
Consumed calcium tablets in past six months													
Yes	7.1%	5.1%	3.0%	2.8%	1.7%	4.1%	3.3%	4.5%	4.9%	10.4%	0.2%	<0.001	4.4%
No	92.9%	94.9%	97.0%	97.2%	98.3%	95.9%	96.7%	95.5%	95.1%	89.6%	99.8%		95.6%
Consumed vitamin A tablets in past six months													
Yes	0.4%	0.2%	0.2%	1.1%	0.3%	1.5%	0.6%	2.4%	2.6%	0.3%	6.0%	<0.001	0.9%
No	99.6%	99.8%	99.8%	98.9%	99.7%	98.5%	99.4%	97.6%	97.4%	99.7%	94.0%		99.1%
Consumed multivitamin tablets in past six months													
Yes	5.6%	15.8%	5.3%	5.3%	10.3%	2.6%	6.3%	5.0%	3.1%	3.6%	0%	0.366	5.9%
No	94.4%	84.2%	94.7%	94.7%	89.7%	97.4%	93.8%	95.0%	96.9%	96.4%	100%		94.1%
Has heard of fortified flour													
Yes	14.3%	13.8%	20.6%	13.1%	4.8%	19.7%	42.7%	33.3%	20.2%	26.1%	4.3%	<0.001	19.8%
No	76.4%	80.6%	68.0%	82.6%	91.6%	64.1%	44.9%	48.2%	65.8%	65.2%	94.9%		69.4%

Characteristic	Muscat	Dhofar	Al-Dakhlya	Al-Sharqyah North	Al-Sharqyah South	Al-Batinah North	Al-Batinah South	Al-Dhahairah	Al-Buraimy	Musan-dam	Al-Wusta	P value	Total
Don't know	9.3%	5.5%	11.4%	4.3%	3.7%	16.2%	12.5%	18.4%	14.0%	8.7%	0.8%		10.8%
Uses fortified flour													
Always	76.3%	26.6%	58.3%	52.2%	87.5%	72.1%	90.8%	69.3%	56.4%	85.6%	47.6%	<0.001	71.3%
Usually	5.3%	23.4%	9.4%	10.9%		1.5%	3.3%	4.0%	9.0%	3.3%	33.3%		5.8%
Sometimes	5.3%	28.1%	19.8%	15.2%	6.3%	5.9%	3.3%	21.3%	15.4%	8.9%	19.0%		11.0%
Never	7.9%	9.4%	10.4%	15.2%	6.3%	4.4%	0.7%	3.3%	9.0%	1.1%	0%		5.7%
Don't know	5.3%	12.5%	2.1%	6.5%		16.2%	2.0%	2.0%	10.3%	1.1%	0%		6.2%
Has heard of iodized salt													
Yes	65.0%	42.1%	67.5%	63.8%	33.4%	64.1%	77.3%	65.3%	64.0%	68.1%	16.3%	<0.001	61.5%
No	30.7%	55.3%	27.3%	33.0%	65.2%	28.7%	16.6%	21.2%	26.2%	29.0%	82.9%		33.1%
Don't know	4.3%	2.6%	5.2%	3.1%	1.4%	7.2%	6.1%	13.6%	9.8%	2.9%	0.8%		5.4%
Uses iodized salt													
Always	59.7%	62.1%	74.2%	71.0%	33.6%	76.9%	93.5%	88.8%	53.8%	89.4%	37.5%	<0.001	72.0%
Usually	7.7%	6.6%	3.8%	6.3%	3.4%	1.4%	1.1%	1.7%	11.7%	5.5%	25.0%		4.2%
Sometimes	11.6%	9.6%	11.5%	18.3%	30.3%	8.1%	1.4%	3.4%	15.8%	3.8%	23.8%		10.2%
Never	11.0%	9.6%	4.1%	4.0%	31.1%	1.8%	0.4%	3.1%	9.3%	0.4%	13.8%		6.2%
Don't know	9.9%	12.1%	6.4%	0.4%	1.7%	11.8%	3.6%	3.1%	9.3%	0.9%	0%		7.3%

* MDD-W = Minimum dietary diversity for women as recommended in FAO and FHI 360. Minimum Dietary Diversity for Women: A Guide for Measurement. Rome: FAO. 2016.

Table 6-2 - Physical activity and sleep patterns in non-pregnant women 15-49 years of age, by governorate

Characteristic	Muscat	Dhofar	Al-Dhakhlya	Al-Sharqyah North	Al-Sharqyah South	Al-Batinah North	Al-Batinah South	Al-Dhahairah	Al-Buraimy	Musandam	Al-Wusta	P value	Total
Hours of television or video watching per day (mean)	1.3	2.4	1.3	1.7	1.7	1.7	1.8	1.4	1.4	2.3	1.9	<0.001	1.6
Hours of video or computer games per day (mean)	2.4	3.0	1.1	0.3	0.4	2.4	1.4	0.7	0.3	3.4	0.1	<0.001	1.7
Watch television while eating													
No or rarely	68.1%	84.4%	69.8%	76.1%	82.5%	73.0%	63.8%	79.5%	59.5%	61.9%	93.6%	<0.001	72.6%
1 meal per day	19.7%	11.7%	26.7%	14.8%	12.4%	20.1%	22.3%	17.4%	33.9%	37.8%	5.7%		19.7%
2 meals per day	7.9%	2.8%	2.2%	6.6%	2.8%	2.9%	7.5%	0.9%	4.7%	0.3%	0.6%		4.5%
3 or more meals per day	4.3%	1.1%	1.3%	2.6%	2.3%	4.1%	6.4%	2.2%	1.8%	0%	0%		3.2%
Television or computer in bedroom													
Yes	33.2%	55.6%	36.0%	16.2%	26.3%	39.7%	31.4%	37.7%	33.9%	45.5%	38.4%	<0.001	35.2%
No	66.8%	44.4%	64.0%	83.8%	73.7%	60.3%	68.6%	62.3%	66.1%	54.5%	61.6%		64.8%
Hours sleep per 24-hour period weekdays (mean)	7.8	8.1	7.7	8.1	8.8	7.9	7.9	8.0	7.9	7.7	9.6	<0.001	8.0
Hours sleep per 24-hour period weekends (mean)	8.5	9.2	9.0	8.6	9.3	8.6	8.8	8.5	9.2	8.2	9.7	<0.001	8.8
Organized physical activity in typical week													
Yes	38.2%	22.8%	34.3%	24.8%	29.8%	41.4%	64.3%	47.3%	22.5%	32.8%	6.2%	<0.001	38.1%
No	61.8%	77.2%	65.7%	75.2%	70.2%	58.6%	35.7%	52.7%	77.5%	67.2%	93.8%		61.9%
Work outside the home for money													
Yes	27.5%	13.8%	18.1%	9.4%	8.4%	13.6%	7.8%	14.7%	24.6%	11.6%	4.9%	<0.001	16.1%
No	72.5%	86.2%	81.9%	90.6%	91.6%	86.4%	92.2%	85.3%	75.4%	88.4%	95.1%		83.9%

Characteristic	Muscat	Dhofar	Al-Dhakhlya	Al-Sharqyah North	Al-Sharqyah South	Al-Batinah North	Al-Batinah South	Al-Dhahairah	Al-Buraimy	Musandam	Al-Wusta	P value	Total
Work involve vigorous activity													
Yes	5.2%	10.9%	6.0%	3.0%	10.0%	8.5%	7.1%	1.7%	1.1%	12.5%	0%	.165	6.2%
No	94.8%	89.1%	94.0%	97.0%	90.0%	91.5%	92.9%	98.3%	98.9%	87.5%	100%		93.8%
Days in week work involves vigorous activity (mean)	2.7	2.8	3.4	5.0	4.0	4.2	2.5	5.0	4.0	5.0	-	<0.05	3.4
Hours per day in vigorous activity at work (mean)	2.8	3.9	4.1	0.5	4.0	3.0	1.2	6.0	0.0	3.3	-	<0.01	3.2
Work involve moderate activity													
Yes	37.3%	10.8%	67.9%	69.7%	17.2%	36.2%	10.7%	52.4%	36.6%	55.0%	0%	<0.001	40.3%
No	62.7%	89.2%	32.1%	30.3%	82.8%	63.8%	89.3%	47.6%	63.4%	45.0%	100%		59.7%
Days in week work involves moderate activity (mean)	3.9	4.1	4.8	4.6	3.0	4.3	4.6	4.6	4.9	4.5	0	<0.05	4.4
Hours per day in moderate activity at work (mean)	2.9	3.7	3.7	3.7	3.8	3.0	6.3	6.5	6.6	4.6	0	<0.001	3.7
Walk to bike to work, school, or errands													
Yes	10.5%	4.9%	4.8%	15.6%	3.6%		23.1%	18.9%		22.5%	4.2%	0.001	7.8%
No	89.5%	95.1%	95.2%	84.4%	96.4%	100%	76.9%	81.1%	100%	77.5%	95.8%		92.2%
Hours on weekdays spent sitting (mean)	6.9	10.7	6.8	9.0	5.9	5.0	11.4	4.5	2.9	10.1	13.6	<0.001	7.3
Hours on weekends spent sitting (mean)	7.4	11.5	8.6	11.2	5.7	4.8	11.2	4.6	3.3	9.7	14.0	<0.001	7.8

Table 6-3 - Sun exposure in non-pregnant women 15-49 years of age, by governorate

Characteristic	Muscat	Dhofar	Al-Dhakhlya	Al-Sharqyah North	Al-Sharqyah South	Al-Batinah North	Al-Batinah South	Al-Dhahairah	Al-Buraimy	Musandam	Al-Wusta	P value	Total
Usually protect head from sun when outside													
Never/rarely	2.5%	1.5%		2.0%	0.8%	0.3%	0.3%	0.2%	0.5%	7.8%	0.2%	<0.001	1.1%
Sometimes	1.4%		0.4%	9.7%	0.3%	0.3%			2.6%	6.4%			1.2%
Most of the time	5.0%	0.9%	0.4%	1.7%	45.2%	0.9%		0.2%	4.4%	14.5%	0.2%		5.5%
All the time	91.1%	97.7%	99.1%	86.6%	53.7%	98.5%	99.7%	99.6%	92.5%	71.3%	99.6%		92.2%
How usually protect head from sun													
Scarf/ headcloth	100%	100%	100%	100%	99.4%	100%	99.7%	100%	100%	100%	100%	.958	99.9%
Hat	0%	0%	0%	0%	0%	0%	0.3%	0%	0%	0%	0%		0%
Umbrella	0%	0%	0%	0%	0.6%	0%	0%	0%	0%	0%	0%		0%
Usually cover arms when outside													
Never/rarely	1.8%	0.9%	1.9%	1.1%	0.3%	0.6%	1.9%	0.7%	1.6%	3.2%	0.2%	<0.001	1.3%
Sometimes	1.8%	0.2%	1.3%	9.1%	0.8%	2.0%		0.7%	7.3%	14.8%	0.2%		2.0%
Most of the time	4.3%	1.5%	1.5%	2.6%	46.9%	0.9%	0%	0%	26.2%	31.3%	0%		6.3%
All the time	92.1%	97.4%	95.3%	87.2%	52.0%	96.5%	98.1%	98.7%	64.9%	50.7%	99.6%		90.4%
Usually cover hands when outside													
Never/rarely	90.4%	73.0%	90.9%	85.1%	49.9%	97.4%	97.0%	64.7%	85.5%	92.8%	99.6%	<0.001	85.9%
Sometimes	3.2%	11.5%	4.1%	3.4%	3.4%	1.5%	0.8%	0.9%	10.4%	2.9%	0.2%		3.4%
Most of the time	1.4%	3.0%	0.6%	0.6%	45.9%	0.6%	0%	0%	2.8%	1.7%	0%		4.6%
All the time	5.0%	12.6%	4.3%	10.9%	0.8%	0.6%	2.2%	34.4%	1.3%	2.6%	0.2%		6.1%
How much time per day spend under the sun													
None	12.3%	27.8%	3.0%	4.6%	2.5%	2.6%	0.8%	1.1%	2.6%	8.0%	0.8%	<0.001	6.6%
1-29 minutes	43.0%	36.1%	37.5%	41.4%	18.4%	18.3%	18.1%	19.5%	35.2%	34.7%	31.1%		30.1%
30-59 minutes	13.4%	15.8%	25.6%	32.5%	26.6%	15.1%	20.1%	29.8%	34.5%	30.6%	45.9%		20.9%
1-2 hours	16.6%	15.4%	19.4%	16.1%	37.0%	25.9%	25.1%	25.3%	24.1%	18.7%	17.5%		22.0%

Characteristic	Muscat	Dhofar	Al-Dhakhlya	Al-Sharqyah North	Al-Sharqyah South	Al-Batinah North	Al-Batinah South	Al-Dhahairah	Al-Buraimy	Musandam	Al-Wusta	P value	Total
> 2 but < 3 hours	16.6%	15.4%	19.4%	16.1%	37.0%	25.9%	25.1%	25.3%	24.1%	18.7%	17.5%		7.7%
More than 3 hours	11.6%	2.1%	9.5%	2.3%	3.1%	25.6%	21.2%	14.5%	1.0%	1.5%	1.0%		12.7%
Activities leading to sun exposure:													
Walking to bus/taxi	6.8%	24.9%	12.3%	5.4%	20.5%	19.4%	10.5%	16.2%	13.5%	21.4%	0.2%	<0.001	13.7%
Walking to market and/or work	8.6%	5.7%	4.1%	0.6%	3.7%	5.8%	14.4%	4.4%	10.9%	11.9%	0.6%	<0.001	6.6%
Working outside	14.6%	3.4%	8.4%	8.5%	5.6%	20.9%	6.4%	12.0%	24.9%	20.3%	12.9%	<0.001	12.1%
Watching children outside	5.0%	18.7%	18.3%	47.0%	36.8%	39.1%	29.3%	15.7%	26.4%	28.1%	39.6%	<0.001	24.5%
Doing household duties outside	26.1%	21.5%	58.9%	82.9%	76.1%	47.2%	81.2%	56.3%	60.6%	45.5%	86.4%	<0.001	52.2%
Usually use sun screen													
Never / rarely	62.1%	76.8%	75.1%	79.5%	88.7%	84.6%	80.0%	75.1%	62.6%	73.6%	90.1%	<0.001	76.1%
Sometimes	11.1%	12.1%	11.0%	10.0%	7.1%	9.0%	11.9%	7.1%	17.7%	10.7%	7.2%		10.3%
Most of the time	4.3%	3.6%	1.7%	1.7%	3.4%	0.6%	0.8%	1.6%	4.9%	4.6%	1.6%		2.3%
All the time	22.5%	7.4%	12.3%	8.8%	0.8%	5.8%	7.2%	16.2%	14.8%	11.0%	1.0%		11.3%
Sun exposure index													
1.0+	19.5%	13.5%	28.2%	27.1%	63.6%	58.4%	56.1%	28.1%	37.2%	43.8%	21.2%	<0.001	37.2%
0.01-0.99	44.4%	46.0%	53.9%	52.2%	32.7%	32.6%	33.4%	25.8%	44.0%	36.4%	76.7%		41.1%
0	36.1%	40.5%	17.9%	20.7%	3.7%	9.0%	10.5%	46.1%	18.8%	19.8%	2.1%		21.7%

Appendix 7. Analysis of data quality

Anthropometrists on the data collection teams were trained to measure both height and weight to the nearest 0.1 cm. The height boards had a measuring tape attached to them, so that the anthropometrists had to estimate the level of the head piece of the height board during measurements. Weight was measured with digital scales with a numeric readout, so anthropometrists only had to copy the number from the scale readout to the data collection form. Ideally, an equal number of measurements should end in x.1, x.2, x.3, etc. The distribution of decimals gives an assessment of how much anthropometrists rounded off their measurements to the nearest cm or ½ cm.

Figures 7-1 through 7-4 show the distribution of the decimal for measurements in children and women. Height measurements are heavily biased toward numbers ending in .0 and to lesser extent .5, showing that anthropometrists did not measure the height of either children or women to the nearest millimeter. It cannot be determined if anthropometrists routinely rounded measurements to the nearest centimeter, thus adding only random error, or if they consistently rounded down, thus adding bias to these data.

The decimals of weight measurements were much more even; however, there is still a preference for the decimal 0. The cause of this is a mystery; presumably the anthropometrists just recorded what was displayed on the digital readout of the scale. An investigation of the scales used may be warranted to determine if the scales, for some reason, more frequently measured weights ending in .0. As shown in table 7-1, preference for the digits 0 and 5 among the measurement of children's length and height varied widely by governorate.

The distribution of children's ages is reasonably evenly spread throughout the target age range of 0 – 59 months (Figure 7-5). The light bars show the whole year ages of 12, 24, 36, and 48 months. In populations in which mother's do not know their child's age or date of birth, the ages of survey subjects are often clumped at these ages; however, ONNS data show no such clumping.

Figure 7-1 - Distribution of the decimals of children's height measurements.

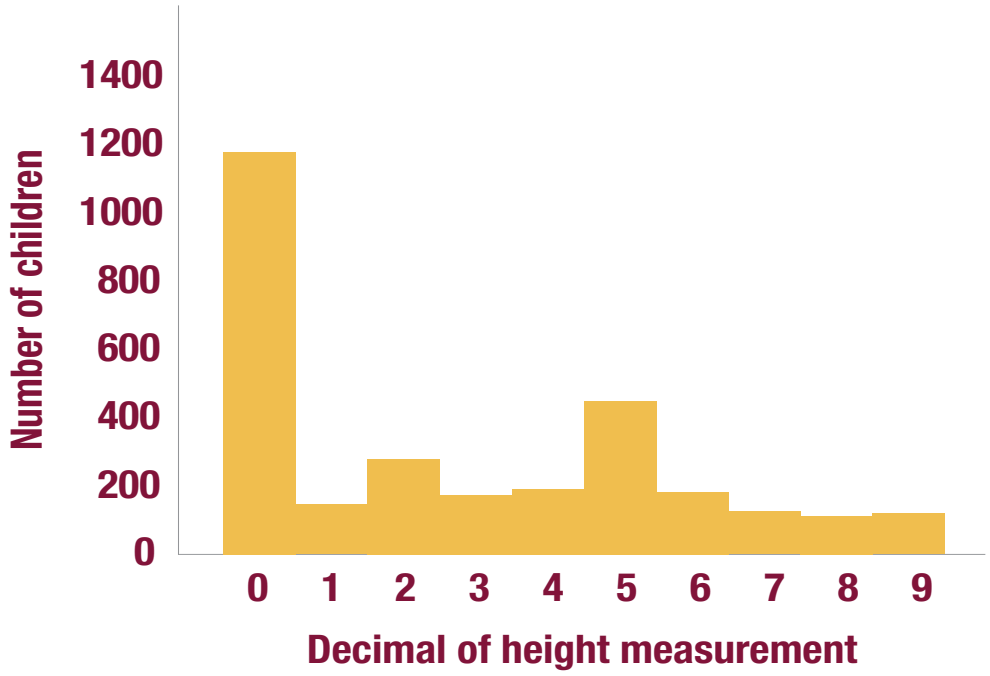

Figure 7-2 - Distribution of the decimals of children's weight measurements.

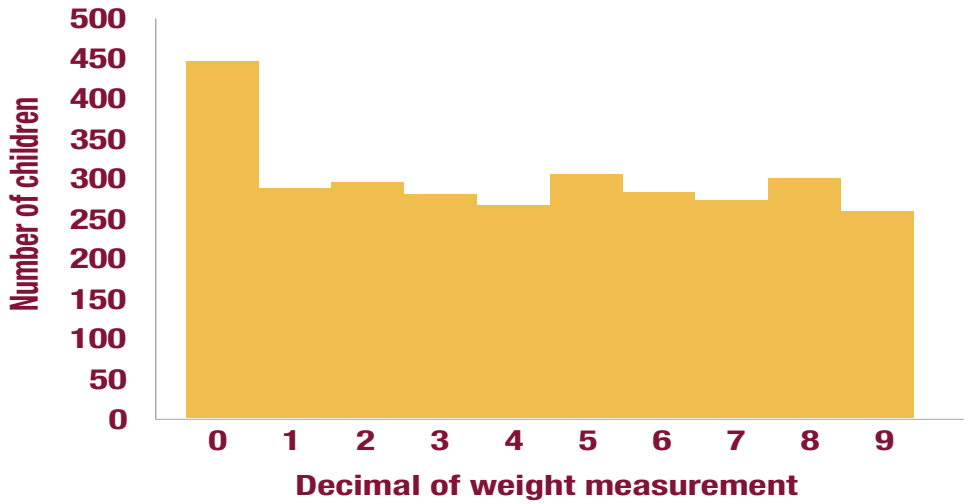

Figure 7-3 - Distribution of the decimals of women's height measurements.

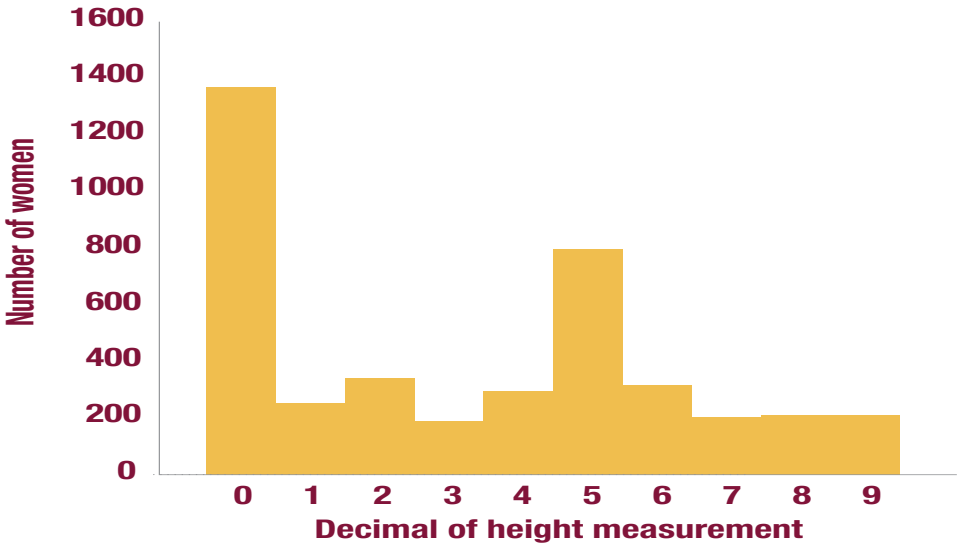

Figure 7-4 - Distribution of the decimals of women's weight measurements.

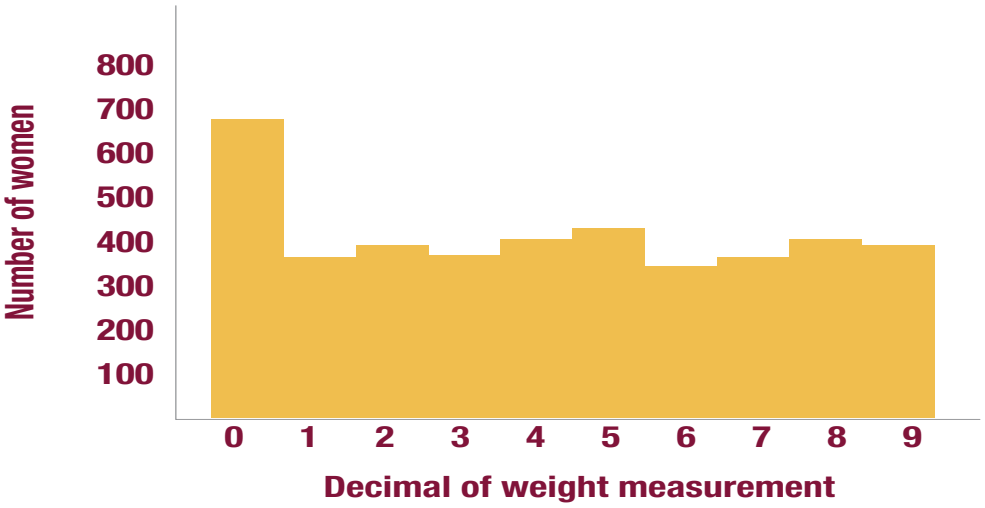

Figure 7-5 - Distribution of children's ages

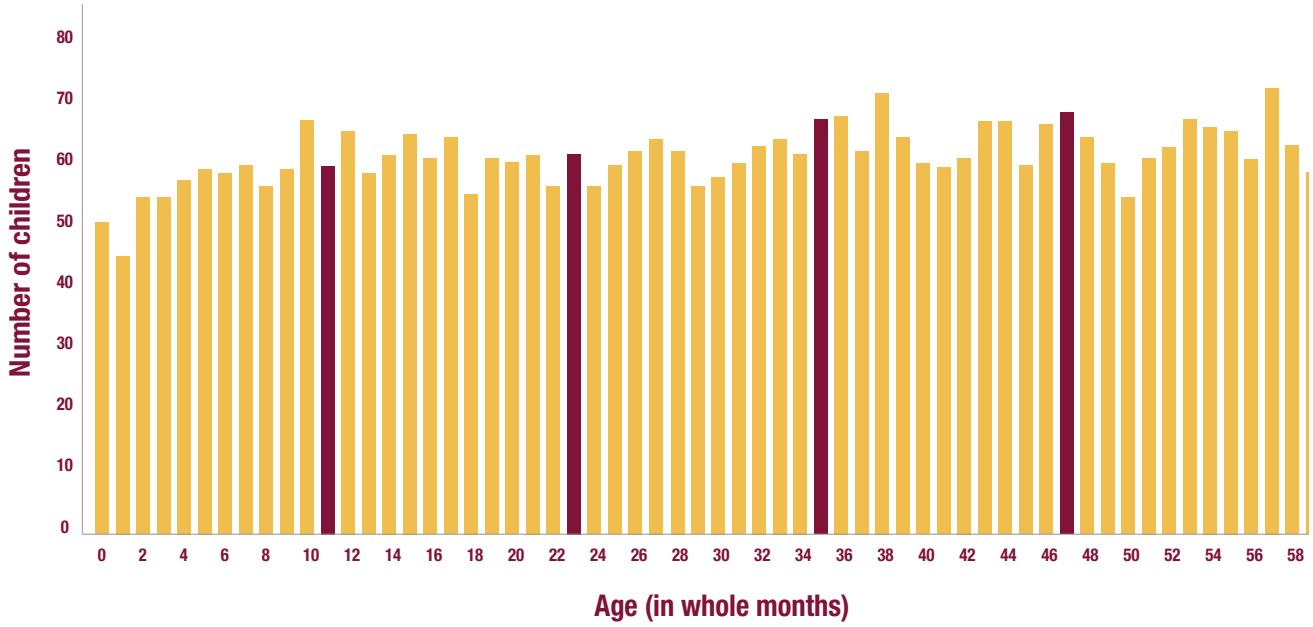

Table 7-1 - Number and percent of child length and height measurements ending in the decimals 0, 5, or another decimal

Governorate	Decimal 0		Decimal 5		Other decimal	
	n	%	n	%	n	%
IDEAL		10%		10%		80%
Muscat	69	53.5%	22	17.1%	38	29.5%
Dhofar	115	32.7%	45	12.8%	192	54.5%
Al-Dhakhlya	65	20.2%	47	14.6%	210	65.2%
Al-Sharqyah North	148	60.2%	43	17.5%	55	22.4%
Al-Sharqyah South	69	27.0%	24	9.4%	163	63.7%
Al-Batinah North	105	39.2%	35	13.1%	128	47.8%
Al-Batinah South	76	29.2%	47	18.1%	137	52.7%
Al-Dhahairah	173	59.2%	76	26.0%	43	14.7%
Al-Buraimy	238	81.0%	36	12.2%	20	6.8%
Musandam	55	24.1%	32	14.0%	141	61.8%
Al-Wusta	69	20.7%	45	13.5%	220	65.9%

Table 7-2 shows the statistics for the anthropometric indices calculated from the measurements. The standard deviations of height-for-age and weight-for-height are both within the acceptable range, showing the absence of large amounts of random error. The measurements of skewness and kurtosis demonstrate that the distributions of z-scores are generally normal.

Table 7-2 - Z-score statistics in children less than 5 years of age

Z-score	Mean	Median	Standard deviation	Skewness	Kurtosis
Height-for-age	-0.63	-0.67	1.32	0.351	1.634
Weight-for-height	-0.40	-0.41	1.31	0.126	1.042
Weight-for-age	-0.64	-0.67	1.15	0.141	0.542

Appendix 8: Survey Questionnaires (English)

OMAN NATIONAL NUTRITION SURVEY 2016 HOUSEHOLD QUESTIONNAIRE

Affix HOUSE- HOLD label here (starts with «H»)

h1. Region

Muscat	1	h2. Waliyate/Place: .....
Dhofar	2	
Al-Dhakhlya	3	
Al-Sharqyah North	4	
Al-Sharqyah South	5	h3. Family Card Number ..... ☐☐☐☐☐
Al-Batinah North	6	
Al-Batinah South	7	
Al-Dhahairah	8	h4. Altitude of this location .....meters ☐☐☐☐
Al-Buraimy	9	(if known)
Musandam	10	
Al-Wusta	11	

h5. Cluster number ..... ☐☐☐ h6. HH number ..... ☐☐

h7. Name of head of household .....

h8. Team number ..... ☐☐

h9. Household selected for women/ and or children venipuncture	Household selected for children and women venipuncture	1
	Household selected for children venipuncture ONLY	2
	Household not selected for venipuncture	3

		Visit 1	Visit 2	Visit 3
Date		__ __ / __ __	__ __ / __ __	__ __ / __ __
Interviewer no.		_____	_____	_____
Next visit:	Date	__ __ / __ __	__ __ / __ __	__ __ / __ __
	Time	__ __ / __ __	__ __ / __ __	__ __ / __ __
Result		_____	_____	_____

h10. Final visit _ _ _ / _ _ _ / _ _ _ (Day / Month / Year) h11.Interviewer .....

h12. Number of visits ..... h13. Final result .....

FINAL RESULT CODES:	
Completed ..... 1 No household member or no competent respondent	Refused 4
	Dwelling vacant / Address not a dwelling 5
at home at time of visit 2	Dwelling destroyed 6
Entire household absent for long period or moved away 3	Dwelling not found 7
	Other (specify) 8
h17. Number of children (<12 yrs) in the household	h18. Number of children below 5 years .....
h19. Number of women (≥12 yrs) in the household	h20. Number of women age 15-49 years .....

We are from the Ministry of Health. We are working on a project concerned with nutrition and health. I would like to talk to you about this. The interview will take about 30 minutes. All the information we obtain will remain strictly confidential and your answers will never be identified. After these questions to you, I will speak with some of the women in your household and the women who take care of the children 0-59 months.

May I start now?

☐ YES, PERMISSION IS GIVEN -> bEGIN THE INTERVIEW.
☐ NO, PERMISSION IS NOT GIVEN -> COMPLETE THIS COVER PAGE. DISCUSS RESULT WITH TEAM LEADER.

First, I would like to ask you some general questions about the people who live in this household

Please tell me the name of each person who usually lives here, starting with the head of the household.
List the head of the household in line 01. List all household members, their relationship to the household head, their sex in columns hH22-H24. Then ask: Are there any others who live here, even if they are not at home now? If yes, complete the household listing in columns H22-H24. When all HH members listed, ask questions starting with column H25 for each person at a time. Use an additional questionnaire if all rows in the household listing form have been used.

List of household members							Women age 15-49 years	Children age 0-59 months	Children < 5 years
h21.	h22.	h23.	h24.	h25.		h26.	h27.	h28.	h29.
Line No	Name	What is the relationship of (name) to the head of house-hold?	Is (name) male or female?	What is (name)'s date of birth? 99 DK 9999 DK		How old is (name)? Record in completed years. If age is 95 or above, record '95'	Circle line no. if woman is age	Circle line no. if child is age	Who is the mother or primary caretaker of this child? Record line no. of mother or caretaker
Line	Name	Relation*	M F	Month	Year	Age in years	15-49	0-59	Mother
01		01	1 2	.....	.....	.....	01	01	.....
02		.....	1 2	.....	.....	.....	02	02	.....

03		.....	1 2	.....	.....	.....	03	03	.....
04		.....	1 2	.....	.....	.....	04	04	.....
05		.....	1 2	.....	.....	.....	05	05	.....
06		.....	1 2	.....	.....	.....	06	06	.....
07		.....	1 2	.....	.....	.....	07	07	.....
08		.....	1 2	.....	.....	.....	08	08	.....
09		.....	1 2	.....	.....	.....	09	09	.....
10		.....	1 2	.....	.....	.....	10	10	.....
11		.....	1 2	.....	.....	.....	11	11	.....
12		.....	1 2	.....	.....	.....	12	12	.....
13		.....	1 2	.....	.....	.....	13	13	.....
14		.....	1 2	.....	.....	.....	14	14	.....
15		.....	1 2	.....	.....	.....	15	15	.....
16		.....	1 2	.....	.....	.....	16	16	.....
17		.....	1 2	.....	.....	.....	17	17	.....
18		.....	1 2	.....	.....	.....	18	18	.....
19		.....	1 2	.....	.....	.....	19	19	.....
20		.....	1 2	.....	.....	.....	20	20	.....

Tick here if household listing continuation form used ☐

* Codes for question 19: Relationship to head of household:			
01 Head of household 02 Wife / husband 03 Son / daughter 04 Step-son / step-daughter	05 Grandchild 06 Parent 07 Parent-in-law 08 Brother / sister	09 Brother-in-law or sister-in-law 10 Uncle / aunt 11 Niece / nephew 12 Son-In-law or daughter-in-law	13 Adopted / Foster child 14 Not related 88 Other (specify_____) 99 Don't know

Probe for additional household members. Probe especially for any infants or small children not listed, and others who may not be members of the family (such as servants, friends) but who usually live in the household. Insert names of additional members in the household list and complete form accordingly.

Every women 15-49 years and child < 5 years on the household roster should be recruited for participation into the ONNS 2017. For each women 15-49 years and child < 5 years, "open" an individual questionnaire: Use the line number on the household roster as the individual's number. You should now have a separate questionnaire for each eligible woman and each child under five in the household.

HOUSEHOLD CHARACTERISTICS			
h30.	How many rooms in this house/ apartment are used for sleeping?	Rooms	
h31.	Main material of the dwelling floor Record observations	Ceramic tiles / Marble..... 1 Cement..... 2 Carpet covering..... 3 Other (specify:.....) 8	
h32.	Main material of the roof Record observations	Palm ..... 1 Metal / Tin..... 2 Wood ..... 3 Cement ..... 4 Other (specify:.....) 8	

h33.	Main material of the exterior walls Record observations	Cane/ Palm / Trunks ..... 11 Stone with mud ..... 21 Reused wood ..... 22 Stone with lime / cement ..... 31 Cement blocks (with NO façade) ..... 32 Cement blocks (with cement façade ..... 33 Other (specify:.....) 88		
h34.	What type of fuel does your household mainly use for cooking?	Electricity ..... 1 Liquified petroleum gas (LPG) ..... 2 Kerosene ..... 3 Coal, lignite ..... 4 No food cooked in household ..... 5 Other (specify:.....) ..... 8 Don't know 9		
h35.	Is the cooking usually done in the house, a separate building, or outdoors?	In a separate room used as a kitchen ..... 1 Elsewhere in the house ..... 2 In a separate building ..... 3 Outdoors ..... 4 Other (specify:.....) ..... 8 Don't know 9		
h36.	Does any member of this household have.....? Ask about each item separately.		Yes	No
		A. Non-mobile telephone? B. Freezer? C. Gas cooker? D. Washing machine? E. Personal computer or laptop? F. Internet subscription? G. Flat screen television H. Smart devices (iPad, iPhone, tablet computer)?	1 1 1 1 1 1 1 1	2 2 2 2 2 2 2 2
h37.	Does any member of this household own .....? Ask about each item separately.		Yes	No
		A. A car or pickup truck or bus B. A motorbike/scooter C. A boat with motor	1 1 1	2 2 2
h38.	Do you or someone living in this household own this dwelling? If "No", then ask: Do you rent this dwelling from someone not living in this household? If "Rented from someone else", circle "2". For other responses, circle "8".	Own ..... 1 Rent ..... 2 Other (specify: .....) ..... 8 Don't know 9		

h39.	Does any member of this household own any agricultural land?	Yes ..... 1 No ..... 2 Don't know 9	-> Next Q -> Qh41 -> Qh41
h40.	If yes, how much agricultural land do members of this household own? Enter either acres or square meters, but NOT both.	Acres ..... ☐☐☐☐ OR Square meters ..... ☐☐☐☐ Don't know 9999	
h41.	Does this household own any livestock, herds, other farm animals, or poultry?	Yes ..... 1 No ..... 2 Don't know 9	-> Next Q -> Qh43 -> Qh43
h42.	How many of the following animals does this household own? Ask about each item separately. If none, enter ‹000› If more than 995, enter ‹995› If unknown, enter ‹999›	A. Cattle B. Goats C. Sheep D. Chickens E. Camels F. Other (.....)	
h43.	Does any member of this household have a bank account?	Yes ..... 1 No ..... 2 Don't know 9	

WATER AND SANITATION

h44.	What is the main source of drinking water for members of your household?	Piped in dwelling/yard (governorate water) .... 1 Piped in dwelling/yard (private water) ..... 2 Tubewell or borehole ..... 3 Protected well ..... 4 Unprotected well ..... 5 Tanker-truck ..... 6 Surface water (damn, pond, falaj) ..... 7 Bottled water ..... 8 Other (specify) ..... 88 Don't know 99	
h45.	Do you do anything at home to the water to make it safer to drink?	Yes ..... 1 No ..... 2 Don't know 9	-> Next Q -> Qh47 -> Qh47
h46.	What do you usually do to make the water safer to drink? Probe: Anything else? Record all responses mentioned.	Boil ..... A Add bleach or chlorine ..... B Strain it through a cloth ..... C Use water filter ..... D (ceramic, sand, composite, etc.) ..... E Solar disinfection ..... F Let it stand and settle ..... X Other (specify) ..... Y Don't know ..... Z	

h47.	What kind of toilet facility do members of your household usually use? If “flush”, probe: Where does it flush to?	Flush to piped sewer system ..... 1 Flush to deep hole ..... 2 Flush, but Don’t know to where ..... 3 No facility, Bush, Field ..... 4 Other (specify) ..... 8 Don’t know 9			Next Q Next Q Next Q -> Qh49 -> Qh49 -> Qh49
h48.	Do you share this toilet facility with others who are not members of your household?	Yes ..... 1 No ..... 2 Don’t know 9			
h49.	Please show me where members of your household most often wash their hands.	Observed ..... 1 Not in dwelling / plot / yard ..... 2 No permission to see 3			Next Q -> Qh52 -> Qh52
h50.	Observe presence of running water at the specific place for handwashing. Verify by checking the tap/pump, basin, bucket, water container or similar objects for presence of water.	Water is available ..... 1 Water is not available ..... 2 Did not observe 9			
h51.	Record if soap or detergent is present at the specific place for handwashing. Circle Yes for each type of soap seen. Skip to Q54if any soap or detergent code (A, B, or C) is YES. If D and E is is circled YES, continue with next question		Yes	No	
		A. Bar soap B. Detergent (Powder / Liquid / Paste) C. Liquid soap D. Ash / Mud / Sand E. None	1 1 1 1 1	2 2 2 2 2	1-> Qh54 1-> Qh54 1-> Qh54 -> Next Q -> Next Q
h52.	Do you have any soap or detergent (or other locally used cleansing agent) in your household for washing hands?	Yes No Don’t know	1 2 9		-> Next Q -> Qh54 -> Qh54

			Yes	No	
h53.	Can you please show it to me? Circle Yes for each type of soap seen.	A. Bar soap B. Detergent (Powder / Liquid / Paste) C. Liquid soap D. Ash / Mud / Sand E. None	1 1 1 1 1	2 2 2 2 2	

HOUSEHOLD INCOME

h54.	In the average month, what are the total household earnings? Record ONLY ONE, not all 3	A. per week..... ☐☐☐☐ OR B. per month..... ☐☐☐☐ OR C. per year ..... ☐☐☐☐ OR Refused Don't know	 88888 99999	 -> QhH56 -> QhH56 -> QhH56 -> Next Q -> Next Q
h55.	If you don't know the amount, can you give an estimate of the monthly household income if I read some options to you? Is it [INSERT RANGES IN RIALS]? Read options to respondent	< 200 O.R ..... 1 200-499 O.R ..... 2 500-999 O.R ..... 3 1000-2999 O.R ..... 4 3000-4999 O.R ..... 5 ≥ 5000 O.R ..... 6 Refused ..... 8 Don't know 9		

OIL AND BREAD PURCHASE

h56.	What type of oil and fat is used for cooking in the house? Record all responses mentioned.	Palm seed oil ..... A Olive oil ..... B Sesame oil ..... C Sunflower oil ..... D Corn oil ..... E Canola oil ..... F Ghee ..... G Animal butter ..... H Margarine ..... I Coconut oil ..... J Hemis/qustha ..... K Other (specify) ..... X Don't know ..... Z	
h57.	How many times is the same oil or fat reused for frying?	Used only one time, not reused ..... 1 Two times ..... 2 Three times ..... 3 More than three times ..... 4 Don't know 9	

h58.	On average, how often is cooking oil purchased in this household? Fill in number of times for ONLY 1 TIME PERIOD.	Number of times per: Week ..... ☐☐ Month ..... ☐☐ I don't use it / I Don't buy ..... 00 Don't know / not sure 99	 ->Qh62 ->Qh62
h59.	What quantity is usually obtained whenever some cooking oil is bought? Fill in amount for either millilitres or litres, but NOT BOTH.	Millilitres ..... ☐☐☐☐ Don't know / not sure ..... 9999 OR Litres ..... ☐☐	
h60.	How much does such a quantity of cooking oil cost?	Rial ..... ☐☐.☐☐ Don't know / not sure 99.9	
h61	Ask to see the container of cooking oil. Does the container show that it is fortified?	Yes, original package says fortified ..... 1 Original package not mention fortification ..... 2 Undetermined, not in original package ..... 3 No oil to show 9	
h62.	On average, how often is wheat flour purchased in this household? Fill in number of times for ONLY 1 TIME PERIOD.	Number of times per: Week ..... ☐☐ Month ..... ☐☐ I don't use it / I Don't buy ..... 00 Don't know / not sure 99	 ->Qh66 -> Next Q
h63.	What quantity is usually obtained whenever some wheat flour is bought? Fill in amount for either grams or kilograms, but NOT BOTH.	Grams ..... ☐☐☐☐ Don't know / not sure ..... 9999 OR Kilograms .....,..... ☐☐	
h64.	How much does such a quantity of wheat flour cost?	Rial ..... ☐☐.☐☐ Don't know / not sure 99	
h65.	Ask to see the package of wheat flour. Does the package show that it is fortified?	Yes, original package says fortified ..... 1 Original package not mention fortification ..... 2 Undetermined, not in original package ..... 3 No wheat flour to show 9	

h66.	What type of bread do you buy most often in this household?	Factory white bread ..... 1 Factory brown bread ..... 2 Other bread from bakery or factory ..... 3 Local bread ..... 4 Home-made only (HH does not buy bread) ..... 5 Don't use bread ..... 6 Other (specify _____) ..... 8 Unknown 9	-> STOP -> STOP
h67.	On average, how often and in what quantity are different is breads purchased for consumption in this household? Fill in number of items for all bread types usually bought for 1 time period only.	per day per week A. Number of loaves of sliced bread .... ☐☐ ☐☐ B. Number of burger rolls / buns ..... ☐☐ ☐☐ C. Number of bags of lebnano ..... ☐☐ ☐☐ D. Number of bags of samoun ..... ☐☐ ☐☐ E. Number of pieces of omani bread .... ☐☐ ☐☐ F. Number of pieces of tanours ..... ☐☐ ☐☐ G. Number of pieces of barata ..... ☐☐ ☐☐ Don't know / not sure 99	
h68.	How much does such a quantity of bread cost?	Rial ..... ☐☐.☐☐ Don't know 99.9	
h69.	Does bread packaging show that it is fortified?	Yes, original package says fortified ..... 1 Original package not mention fortification ..... 2 Undetermined, not in original package ..... 3 No bread to show 9	

h70.	Field Editor's Observations ..... ☐☐☐
h71.	Interviewer's Observations ..... ☐☐☐
h72.	Supervisor's Observations ..... ☐☐☐

OMAN NATIONAL NUTRITION SURVEY 2016 WOMAN QUESTIONNAIRE			
Affix HOUSE- HOLD label here (starts with «H»)			
w73.	Cluster number ..... ☐☐☐	w74.	HH number ..... ☐☐☐
w75.	Name of this woman:.....	w76.	Woman line number from HH roster ☐☐
w77.	Civil number	w78.	Interviewer number
w79.	Date of data collection	..... / ..... / 201 Day Month Year.	
w80.	Women in this household selected for venipuncture? Consult question H9 in the household questionnaire	Yes .....1 No 2	
w81.	Final result of woman data collection	(enter code from below)	☐

FINAL RESULT CODES:			
Completed all data collection (interview, anthropometry and blood collection)	1	Refused interview and all data collection	5
Completed interview, accepted anthropometry, refused blood collection	2	Woman not at home at time of visit	6
Completed interview, refused anthropometry and refused blood collection	3	Other (specify)	8
Completed interview, completed anthropometry, and NOT selected for blood collection	4		

Woman questionnaire should be administered to all women15-49 years identified by the household roster. Repeat greeting if not already read to this respondent. We are working with the Ministry of Health. We are conducting a national nutrition survey to better understand the various nutritional conditions, such as such as overweight and obesity, anemia, vitamin and mineral deficiencies in women and children. This information will help the government to plan for better health in the future. All the information we obtain will remain strictly confidential and your answers will never be shared with anyone other than our project team..	If greeting at the beginning of the household questionnaire has already been read to this woman, then read the following: Now I would like to talk to you more about your health and other topics. This interview will take about 30 minutes to complete and includes answering questions and taking weight/height measurements and a blood sample from your arm.
May I start now? YES, PERMISSION IS GIVEN -> BEGIN THE INTERVIEW. NO, PERMISSION IS NOT GIVEN -> COMPLETE THIS COVER PAGE. DISCUSS THIS RESULT WITH YOUR TEAM LEADER.	Yes .....1 No 2

I would first like to ask you some questions about yourself.

WOMAN'S AGE AND EDUCATION			
W82.	WHAT IS YOUR DATE OF BIRTH? Don't know or women does not want to say, enter ‹99› or ‹9999›	Day ..... ☐☐ Month ..... ☐☐ Year ..... ☐☐☐☐	
W83.	HOW OLD ARE YOU? PROBE: HOW OLD WERE YOU AT YOUR LAST BIRTHDAY? COMPARE MONTH AND YEAR OF BIRTH AND STATED AGE; CORRECT ONE IF NECESSARY	Age ..... ☐☐ (in completed years) (enter ‹99› if unknown)	
w84.	Have you ever attended school or preschool?	Yes ..... 1 No 2	->Next Q ->QW88
w85.	IN TOTAL, HOW MANY YEARS HAVE YOU SPENT AT SCHOOL AND IN FULL-TIME STUDY (EXCLUDING PRE-SCHOOL)?	Years ..... ☐☐ Don't know, enter ‹99›	
w86.	What is the last grade/class you successfully completed?	Circle code 0 1 2 3 4 5 6 7 8 9 10 11 12	
w87.	DID YOU CONTINUE YOUR STUDIES AFTER GRADE 12? IF SO, WHAT OTHER DEGREE DID YOU COMPLETE?	Diploma degree .....1 Bachelors degree..... 2 Master degree and more .....3 Don't know 9	

MARRIAGE AND PREGNANCY			
w88.	What is your marital status now?	Never married ..... 1 Currently married ..... 2 Widowed ..... 3 Divorced 4	-> Qw97 -> Next Q -> Next Q -> Next Q
W89.	ARE YOU PREGNANT NOW?	Yes ..... 1 No ..... 2 Unsure 9	-> Next Q -> Qw92 -> Qw92

W90.	HOW MANY MONTHS PREGNANT ARE YOU?	Number of months ..... ☐	‹99› if unknown
W91.	WHEN DID YOUR LAST MENSTRUAL PERIOD START? IF RESPONDENT KNOWS THE EXACT DATE, MARK DAY, MONTH, AND YEAR. IF RESPONDENT DOES NOT KNOW THE DATE, THEN ASK HER TO ESTIMATE HOW MANY DAY, WEEKS, OR MONTHS AGO HER LAST MENSTRUAL PERIOD STARTED.	☐☐/☐☐/☐☐ Day Month Year OR 1. Days ago ..... ☐☐ 2. Weeks ago ..... ☐☐ 3. Months ago ..... ☐☐ 4. Don't know 99	
W92.	HOW MANY TIMES, IN TOTAL, HAVE YOU BEEN PREGNANT? IF PREGNANT NOW, INCLUDE THIS PREGNANCY. IF NEVER PREGNANT, ENTER «00»	Number of times ..... ☐☐	00-> QW97
W93.	HOW MANY TIMES, IN TOTAL, HAVE YOU GIVEN BIRTH TO A BABY? (INCLUDE STILL BIRTHS AND LIVE BIRTHS)	Number of times ..... ☐☐	00-> Qw95
w94.	Have you given birth to a live baby in the past 2 years?	Yes ..... 1 No 2	
w95.	Are you currently breastfeeding a child?	Yes ..... 1 No 2	-> Next Q -> Qw97
w96.	For how long have you been breastfeeding this child (or children)?	Number of times ..... ☐☐	

DIET – 24-HOUR DIETARY DIVERSITY				
Now I would like to ask you some questions about your typical diet and eating habits				
w97.	Please describe everything you ate yesterday during the day or night, whether at home or outside the home a) Think about when you first woke up yesterday. Did you eat anything at that time? If yes: Please tell me everything you ate at that time. Probe: Did you eat more than 15 grams or 1 tablespoon full of this food? Anything else? Until respondent says nothing else. If no, continue to Question b). b) What did you do after that? Did you eat anything at that time? If yes: Please tell me everything you ate at that time. Probe: Anything else? Until respondent says nothing else. Repeat question b) above until respondent says the women went to sleep until the next day. If respondent mentions mixed dishes like a PORRIDGE, sauce or stew, probe: c) What ingredients were in that (MIXED DISH)? Probe: Anything else? Until respondent says nothing else. As the respondent recalls foods, confirm that the amount eaten was greater than 15 grams or 1 tablespoon (15 ml). If yes, underline the corresponding food and circle '1' in the column next to the food group. If the food is not listed in any of the food groups below, write the food in the box labeled 'other foods'. If foods are used in small amounts less than 15 grams or only for seasoning or as a condiment, include them under the condiments food group. Once the respondent finishes recalling foods eaten, read each food group where '1' was not circled, ask the following question and Circle '1' if respondent says yes, '2' if no and '9' if don't know: **Yesterday during the day or night, did you drink/eat any (FOOD GROUP ITEMS)?**			
		Yes	No	DK
A	Corn/maize, rice, wheat, sorghum, millet, or other foods made from these grains or any other grains (e.g. bread, noodles, porridge or other grain products, other local grains)?	1	2	9
B	White potatoes, white yams, manioc, cassava, or any other foods made from roots?	1	2	9
C	Beans, peas, lentils?	1	2	9
D	Nuts or seeds, including peanuts, cashews, sunflower seeds, etc?	1	2	9
E	Milk, cheese, yoghurt or other milk products? Do NOT include butter, ice cream, cream or sour cream.	1	2	9
F	Liver, kidney, heart, or other organ meats?	1	2	9

G	Any meat, such as beef, lamb, goat, chicken, or duck? If “Yes”, confirm that respondent actually consumed meats and not just sauce cooked with meat. If only sauce consumed, mark “No”.	1	2	9
H	Fresh or dried fish, shellfish, or seafood? If “Yes”, confirm that respondent actually consumed fish etc, and not just sauce cooked with fish etc. If only sauce consumed, mark “No”.	1	2	9
I	Eggs?	1	2	9
J	Any dark green leafy vegetables, such as parsley, coriander, romaine, or molokhia?	1	2	9
K	Pumpkin, carrots, squash, or orange-flesh sweet potatoes or other vegetables that are yellow or orange inside?	1	2	9
L	Ripe mangos, papaya, orange melon or other orange or yellow fruit?	1	2	9
M	Any other vegetables, such as onions, eggplant, cucumber, capsicum, tomato, or okra?	1	2	9
N	Any other fruits, such as oranges, apples, dates, water melon, bananas, grapes, pineapple, pears, figs, or guava?	1	2	9
O	Oils, fats or butter added to food or used for cooking	1	2	9
P	Savory and fried snacks, such as crisps, chips, fried dough, and other fried snacks.	1	2	9
Q	Any sugary foods such as chocolates, sweets, candies, pastries, cakes, or biscuits?	1	2	9
R	Any sugar-sweetened beverages, such as sweetened fruit juices and “juice drinks”, soft drinks/fizzy drinks, chocolate drinks, malt drinks, yoghurt drinks or sweet tea or coffee with sugar?	1	2	9
S	Condiments, such as tumeric, black pepper, or red pepper?	1	2	9
T	Sauces, such as soy sauce or hot sauce	1	2	9
U	Other Beverages or Foods:	1	2	9

DIET – TYPICAL WEEK FREQUENCY			
Now I would like to ask you questions about some specific types of foods you may eat. These questions ask about a typical week; that is, a normal 7-day period, and about a typical day. Please think about how many days you usually eat the following foods, and about how many times per day you usually eat these foods.			
Next I would like to ask you about some foods and drinks that you eat in a typical week. In a typical week, on how many days and times per day do you eat any (item from the list)?:		w98. How many times per day typically consuming? If Less than one time, ask Qw99	w99. Number of days in a typical week consuming?
A.	Fruit?	Less than one time ..... 0 One time ..... 1 Two times ..... 2 Three or more times ..... 3 Don't know 9	Number of days ..... ☐ Don't know 9
B.	Vegetables? Include salads, cooked vegetables, etc.	Less than one time ..... 0 One time ..... 1 Two times ..... 2 Three or more times ..... 3 Don't know 9	Number of days ..... ☐ Don't know 9
C.	Starchy foods? Include porridge, bread, rice, noodles, or other foods made from grains	Less than one time ..... 0 One time ..... 1 Two times ..... 2 Three or more times ..... 3 Don't know 9	Number of days ..... ☐ Don't know 9
D.	Beans, peas, lentils?	Less than one time ..... 0 One time ..... 1 Two times ..... 2 Three or more times ..... 3 Don't know 9	Number of days ..... ☐ Don't know 9
E.	Dairy products? Include milk, cheese, yogurt, etc.	Less than one time ..... 0 One time ..... 1 Two times ..... 2 Three or more times ..... 3 Don't know 9	Number of days ..... ☐ Don't know 9
F.	Un-processed meat? Include beef, lamb, poultry, eggs, fish, seafood.	Less than one time ..... 0 One time ..... 1 Two times ..... 2 Three or more times ..... 3 Don't know 9	Number of days ..... ☐ Don't know 9
G.	Processed meat? Include lunch meat, salami, mortadella, pepperoni, hot dogs, local products such as "salty fish and dry fish "	Less than one time ..... 0 One time ..... 1 Two times ..... 2 Three or more times ..... 3 Don't know 9	Number of days ..... ☐ Don't know 9
H.	Cold cereals? Include box cereals like cheerios, frosted flakes, honey grams, kinfolks etc.	Less than one time ..... 0 One time ..... 1 Two times ..... 2 Three or more times ..... 3 Don't know 9	Number of days ..... ☐ Don't know 9
I.	Sugary foods? Include chocolates, sweets, candies, pastries, cakes, or biscuits	Less than one time ..... 0 One time ..... 1 Two times ..... 2 Three or more times ..... 3 Don't know 9	Number of days ..... ☐ Don't know 9

J.	French fries or chips? Include french fries, potato chips, tortilla chips, Cheetos®, corn chips, or other local snack chips.	Less than one time ..... 0 One time ..... 1 Two times ..... 2 Three or more times ..... 3 Don't know 9	Number of days ..... ☐ Don't know 9
K.	A meal from a fast food restaurant like McDonald's, Taco Bell, Pizza Hut, Shwarma, etc, including take-out?	Less than one time ..... 0 One time ..... 1 Two times ..... 2 Three or more times ..... 3 Don't know 9	Number of days ..... ☐ Don't know 9
L.	100% fruit juice? Include orange, grape, apple, mango, pineapple, etc	Less than one time ..... 0 One time ..... 1 Two times ..... 2 Three or more times ..... 3 Don't know 9	Number of days ..... ☐ Don't know 9
M.	Soda that contains sugar or other beverages that contain added sugar? Include Coca Cola, Sprite, local soda names, etc. DO NOT include diet soda or sugar-free drinks, or fruit juices	Less than one time ..... 0 One time ..... 1 Two times ..... 2 Three or more times ..... 3 Don't know 9	Number of days ..... ☐ Don't know 9
N.	Sports or energy drinks? Include Kool-aid, Hi-C, Gatorade, Red Bull, Vitamin Water, etc	Less than one time ..... 0 One time ..... 1 Two times ..... 2 Three or more times ..... 3 Don't know 9	Number of days ..... ☐ Don't know 9
O.	Sweetened fruit drinks? Include Tange, Sun Top, Vimto Lemonade, sweet iced tea, Lulu, Ahlen, ice lolly lop, etc.	Less than one time ..... 0 One time ..... 1 Two times ..... 2 Three or more times ..... 3 Don't know 9	Number of days ..... ☐ Don't know 9
P.	Coffee or tea with sugar?	Less than one time ..... 0 One time ..... 1 Two times ..... 2 Three or more times ..... 3 Don't know 9	Number of days ..... ☐ Don't know 9
Q.	Coffee or tea without sugar?	Less than one time ..... 0 One time ..... 1 Two times ..... 2 Three or more times ..... 3 Don't know 9	Number of days ..... ☐ Don't know 9

SUPPLEMENT CONSUMPTION			
Now I would like to ask you some questions about vitamins you may be taking or have recently taken.			
w100.	During the last six months did you take any iron tablets or syrup? Show iron tablets & syrup.	Yes ..... 1 No ..... 2 Not sure if it was iron 9	-> Next Q -> QwH36 -> QwH36
w101.	Are you still taking iron tablets or syrup?	Yes ..... 1 No 2	-> Next Q -> Qw103
w102.	How long have you taken iron tablets or syrup?	One week or less ..... 1 More than 1 week, ... Less than 1 month ..... 2 One month or more 3	-> QwH36 -> QwH36 -> QwH36
w103.	When did you stop taking iron tablets or syrup?	Less than 3 months ago ..... 0 3 months ago or more 1	
w104.	During the last six months did you take any folic acid tablets or syrup? Show folic acid tablets and syrup.	Yes ..... 1 No ..... 2 Not sure if it was folic acid 9	-> Next Q -> Qw108 -> Qw108
w105.	Are you still taking folic acid tablets or syrup?	Yes ..... 1 No 2	-> Next Q -> QW107
w106.	How long have you taken folic acid tablets or syrup?	One week or less ..... 1 More than 1 week, ... less than 1 month ..... 2 One month or more 3	-> Qw108 -> Qw108 -> Qw108
w107.	When did you stop taking folic acid tablets or syrup?	Less than 3 months ago ..... 0 3 months ago or more 1	
w108.	During the last six months did you take any vitamin D tablets? Show vitamin D tablets.	Yes ..... 1 No ..... 2 Not sure if it was Vitamin D 9	-> Next Q -> Qw110 -> Qw110
w109.	How long have you taken vitamin D tablets?	One week or less ..... 1 More than 1 week, ... Less than 1 month ..... 2 One month or more 3	
w110.	During the last six months did you take any Calcium tablets? Show Calcium tablets.	Yes ..... 1 No ..... 2 Not sure if it was Calcium 9	-> Next Q -> Qw112 -> Qw112
w111.	How long have you taken Calcium tables?	One week or less ..... 1 More than 1 week, ... Less than 1 month ..... 2 One month or more 3	
w112.	During the last six months did you take any vitamin A capsules? Show vitamin A capsule.	Yes ..... 1 No ..... 2 Not sure if it was vitamin A 9	

w113.	During the last six months did you take any Multi-Vitamin supplements?	Yes ..... 1 No ..... 2 Not sure if it was a Multi-Vitamin 9			-> Next Q -> Qw43 -> Qw43
w114.	What are the vitamins included in the multivitamins supplements? Ask for each vitamin/mineral separately Mark yes for each vitamin contained in the multi-vitamin supplements mentioned.		Yes	No	
		A. Iron B. Folic Acid C. Zinc D. Vitamin A E. Vitamin D F. Vitamin B_{12} G. Calcium H. Don't know	1 1 1 1 1 1 1 9	2 2 2 2 2 2 2	
w115.	Have you taken any other vitamin or mineral supplement in the past 6 months?	Yes ..... 1 No ..... 2 Not sure or Don't know 9			-> Next Q -> Qwh45 -> Qwh45
w116.	What was the name of this supplement?	Specify:			

KNOWLEDGE OF FORTIFIED FOODS

Now I would like to ask you about some foods which may contain extra nutrients.

w117.	Have you heard about fortified flour?	Yes ..... 1 No ..... 2 Don't know 9	-> Next Q -> Qwh49 -> Qwh49
w118.	Do you use fortified flour?	Always ..... 1 Usually ..... 2 Sometimes ..... 3 Never ..... 4 Don't know 9	
w119.	What do you think are the benefits of fortified flour? Mark all responses mentioned.	Improves health ..... A Prevents anemia ..... B Prevents iron deficiency ..... C Other Y (specify: .....) Don't know ..... Z	
w120.	Have you heard about iodized salt?	Yes ..... 1 No ..... 2 Don't know 9	-> Next Q -> QwH54 -> QwH54
w121.	Do you use iodized salt?	Always ..... 1 Usually ..... 2 Sometimes ..... 3 Never ..... 4 Don't know 9	
w122.	Why do you think iodized salt is important? Mark all responses mentioned.	Prevents iodine deficiency ..... A Improves intelligence ..... B Prevents vitamin deficiency ..... C Improve health status ..... D Other Y (specify: .....) Don't know ..... Z	

WOMEN'S ATTITUDES AND BEHAVIOURS			
w123.	Do you currently smoke any tobacco products, such as cigarettes, cigars or pipes and shisha?	Yes ..... 1 No ..... 2 Don't know 9	-> Next Q -> QW127 -> Qw127
w124.	Do you currently smoke tobacco products every day?	Yes ..... 1 No ..... 2 Don't know 9	
w125.	Do you smoke cigarettes or inhale shisha?	Yes ..... 1 No ..... 2 Don't know 9	-> Next Q -> QW127 -> QW127
w126.	On average, how many cigarettes or bowls of shisha do you smoke each day?	Each day ..... ☐☐ Don't know 99	
w127.	During the past 12 months, have you tried to stop smoking?	Yes ..... 1 No ..... 2 Don't know 9	
w128.	When you leave your house or go outside, do you usually protect your head against the sun?	Never / rarely ..... 1 Sometimes ..... 2 Most of the time ..... 3 All the time 4	-> Qw54 -> Next Q -> Next Q -> Next Q
w129.	When you leave your house or go outside, how do you usually protect your head against the sun?	Scarf / headcloth ..... 1 Hat ..... 2 Umbrella ..... 3 Other (specify .....) 8	
w130.	When you leave your house or go outside, do you usually cover your arms?	Never / rarely ..... 1 Sometimes ..... 2 Most of the time ..... 3 All the time 4	
w131.	When you leave your house or go outside, do you usually cover your hands?	Never / rarely ..... 1 Sometimes ..... 2 Most of the time ..... 3 All the time 4	
w132.	During which activities are you directly exposed to the sun? Probe: Any other activity? Mark all that apply	Walking to bus/taxi ..... A Walking to market and/or work ..... B Working outside ..... C Watching children outside ..... D Doing household duties outside ..... E Other (specify .....) ..... X Don't Know ..... Y	
w133.	Approximately how much time do you pass under the sun each day? Use your behaviour over the last 2 weeks to answer this question.	No sun exposure ..... 1 1-29 minutes ..... 2 30-59 minutes ..... 3 1-2 hours ..... 4 >2-3 hours ..... 5 >3 hours ..... 6 Don't know 9	
w134.	Do you habitually use sunscreen to protect your skin when you are under the sun?	Never / rarely ..... 1 Sometimes ..... 2 Most of the time ..... 3 All the time 4	
W135.	Respondent skin color? Completed by the enumerator based on observation	Very White ..... 1 White ..... 2 Olive ..... 3 Dark ..... 4 Very dark/black ..... 5 Unable to observe 8	

PHYSICAL ACTIVITY AND SLEEPING PATTERNS			
Now I would like to ask you some questions about your typical physical activity. If respondent does not a job outside the home or is retired, they may count the physical activity or exercise they spend the most time doing in a typical week.			
w136.	On average, about how much time per day do you watch TV programs or videos per day?	1. Hours ..... ☐☐ OR 2. Minutes ..... ☐☐ None .....00 Don't know 99	
w137.	On average, about how much time per day do you play video or computer games per day? Include games played on a hand-held device, like i-phone, tablet, or similar.	1. Hours ..... ☐☐ OR 2. Minutes ..... ☐☐ None .....00 Don't know 99	
w138.	Do you typically watch television while you eating food?	Not at all / rarely ..... 0 1 meal a day ..... 1 2 meals a day ..... 2 3 or more meals a day ..... 3 Don't know 9	
w139.	Is there a television or computer in the room where you sleep?	Yes ..... 1 No ..... 2 Don't know 9	
w140.	On average, how much time do you typically sleep during a usual 24-hour period? Please include night time sleep and day time naps and answer separately for weekdays and for weekend days.	1. Hours Weekdays ..... ☐☐ 2. Hours Weekends ..... ☐☐ Don't know 99	
w141.	In a typical week, do you attend an organized physical activity, such as exercise class or playing sports?	Yes ..... 1 No ..... 2 Don't know 9	-> Next Q -> Qw71 -> Qw71

w142.	In a typical week, what physical activity do you participate in?	Circle code # days DK	
w143.	How many do you spend in these activities?	Walking .....1 1 2 3 4 5 6 7 9 Gym-type program ....2 1 2 3 4 5 6 7 9 Dance .....3 1 2 3 4 5 6 7 9 Running .....4 1 2 3 4 5 6 7 9 Other .....8 1 2 3 4 5 6 7 9 (specifY .....) 1 2 3 4 5 6 7 9 Don't know 9	
w144.	Do you work outside the home for money?	Yes ..... 1 No ..... 2 Don't know 9	-> Next Q -> Qw80 -> Qw80
w145.	Does your work involve vigorous-intensity activity that causes large increases in breathing or heart rate like carrying or lifting heavy loads, digging or construction work for at least 10 minutes continuously?	Yes ..... 1 No ..... 2 Don't know 9	-> Next Q -> Qw76 -> Qw76
w146.	In a typical week, on how many days do you do vigorous-intensity activities as part of your work?	Number of days ..... ☐ Don't know 9	
w147.	How much time do you spend doing vigorous-intensity activities at work on a typical day? Fill in either hours OR minutes, but not both.	1. Hours ..... ☐☐ 2. Minutes ..... ☐☐ Don't know 9	
w148.	Does your work involve moderate-intensity activity that causes small increases in breathing or heart rate such as brisk walking or carrying light loads for at least 10 minutes continuously?	Yes ..... 1 No ..... 2 Don't know 9	-> Next Q -> Qw79 -> Qw79
w149.	In a typical week, on how many days do you do moderate-intensity activities as part of your work?	Number of days ..... ☐ Don't know 9	
w150.	How much time do you spend doing moderate-intensity activities at work on a typical day?	1. Hours ..... ☐☐ 2. Minutes ..... ☐☐ Don't know 9	
w151.	Do you usually walk or bike to work, school, or to do errands?	Yes ..... 1 No ..... 2 Unable to walk or bike ..... 3 Don't know 9	

w152.	How many hours do you spend per day during the WEEKDAYS sitting?	1. Hours ..... ☐☐ Don't know 99	
w153.	How many hours do you spend per day during the WEEKENDS sitting?	1. Hours ..... ☐☐ Don't know 99	

ANTHROPOMETRIC MEASUREMENTS			
W154.	Measurer's code number:	Number ..... ☐☐☐	
w155.	Woman's MUAC (pregnant women only)	MUAC (cm) ..... ☐☐.☐	
Non-pregnant women ONLY			
W156.	Woman's weight	Kilograms (kg) ..... ☐☐☐.☐ Weight not measured 999.9	
W157.	Did the woman remove shoes and heavy clothing?	Yes ..... 1 No 2	
W158.	Woman's height	Centimetres (cm) ..... ☐☐☐.☐ Height not measured..... 999.9	
W159.	Woman's hip circumference	Centimetres (cm) ..... ☐☐☐.☐ Hip circum not measured..... 999.9	
W160.	Woman's waist circumference	Centimetres (cm) ..... ☐☐☐.☐ Waist circum not measured..... 999.9	
W161.	Reason why not missing measurement	Disabled, ... 1 Refused ..... 2 Other (specify .....) 8	

BLOOD SAMPLE COLLECTION			
Selected non-pregnant women: Collect blood from vein. Pregnant women and not selected non- pregnant women: Collect blood from finger to measure anemia.			
w162.	Women is this household have been selected for venipuncture? This information is available from question w80 on the first page of this questionnaire.	Yes ..... 1 No 2	Affix WOMAN label here (starts with "W")
w163.	Now we would like to take some blood from your finger or vein. Do you give your permission?	Yes ..... 1 No 2	-> Next Q -> STOP
w164.	Hemoglobin concentration (g/L)	Hb ..... ☐☐.☐	
w165.	Approximate volume of blood collected (ml)	ml ..... ☐.☐ No blood, pregnant woman and not selected non-pregnant women 99	
W166.	Interviewer's Observations ..... ☐☐☐		

w167.	Field Editor's Observations ..... ☐☐☐
w168.	Supervisor's Observations ..... ☐☐☐
w169.	Measurer's Observations ..... ☐☐☐

OMAN NATIONAL NUTRITION SURVEY 2016 CHILD QUESTIONNAIRE			
Affix HOUSE-HOLD label here (starts with «H»)			
c1.	Cluster number ..... ☐☐☐	c2.	HH number ..... ☐☐☐
c3.	Name of this child:	c4	Child line number from HH roster
c5.	Interviewer number	c6.	Date data collected / / 201 Day Month Year
c7.	Final result of child data collection: ..... ☐		

FINAL RESULT CODES: Completed all data collection (interview, anthropometry and blood collection) .....1 Completed interview, accepted participation in anthropometry, refused participation in blood collection 2	Completed interview, refused participation in anthropometry and refused blood collection ...3 Refused interview and all data collection ...4 Child not at home at time of visit .....5 Other (specify .....) 8

c8.	Children in this household selected for venipuncture? Consult question h9 in the household questionnaire	Yes .....1 No 2

Child questionnaire should be administered to the child's caregiver as identified by the household roster: Repeat greeting if not already read to this respondent. We are from the Ministry of Health. We are conducting a national nutrition survey to better understand the various nutritional conditions, such as such as overweight and obesity, anemia, vitamin and mineral deficiencies in women and children. This information will help the government to plan for better health in the future. Again, all the information we obtain will remain strictly confidential and your answers will never be shared with anyone other than our project team.	If greeting at the beginning of the household questionnaire has already been read to this woman, then read the following: Now I would like to talk to you more about (child's name)'s health and other topics. When I ask about (child's name), please think only of this child and answer only about this child. Try not to mix up other children in the household. This interview will take about 20 minutes to complete and includes answering questions and taking weight/ height measurements and a blood sample from (child's name).
May I start now? Yes, permission is given -> Begin the interview. No, permission is not given -> Complete this cover page and discuss result with your team Leader.	Yes .....1 No 2

CHILD SEX AND AGE – ALL CHILDREN			
c9.	Is (NAME) a boy or girl?	Male ..... 1 Female 2	
C10.	On what day, month and year was (NAME) BORN? Ask for document and copy date of birth from document, if available, or probe:	D. Date ..... ☐☐ (enter ‹99› if unknown) M. Month ..... ☐☐ Y. Year .....2 0 1 ☐	
c11.	How old is (NAME)? Probe: How old was (NAME) at his / her last birthday? Record '0' if less than 1 month. Record ‹99› if unknown. Compare date of birth and stated age; correct one if necessary.	Age ..... ☐☐ (in completed months) (enter ‹99› if unknown)	

CHILD BIRTH HISTORY – ALL CHILDREN			
c12.	Was (NAME) weighed at birth?	Yes ..... 1 No ..... 2 Don't know 9	-> Next Q -> QC183 -> QC183
c13.	How much did (NAME) weigh? Record weight from health card, if available	A. From card (kg) ..... ☐☐.☐☐☐ . OR B. From recall (kg) ..... ☐☐.☐☐☐ . Don't know .....9.999 in B	
c14.	Did you give birth to this child?	Yes ..... 1 if "Yes", note her line number on the household roster (Qh18) A. Mother›s number No 2	-> Qw93 -> Next Q
c15.	IS THE woman WHO GAVE BIRTH TO (NAME) ALIVE?	Yes ..... 1 No ..... 2 Don't know 9	-> Next Q -> Qw93 -> Qw93
c16.	Does (NAME's) biological mother live in this household?	Yes ..... 1 if "Yes", note her line number on the household roster (Qh18) A. Mother›s number No 2	
c17.	IS (NAME'S) father alive?	Yes ..... 1 No 2	-> Next Q -> QCh22
c18.	Does (NAME›s) father live in this household?	Yes ..... 1 if "Yes", note his line number on the household roster (Qh18) A. Father›s number ..... ☐☐ No 2	

CHILD ILLNESS – ALL CHILDREN			
Now I would like to ask you about illnesses (NAME) may have had in the past 2 weeks. Please keep in mind only this time period; do not include any illnesses (NAME) had before 2 week ago.			
c19.	At any time in the last 2 weeks, has (NAME) had diarrhoea? Diarrhoea = watery stool at least three times per day	Yes ..... 1 No ..... 2 Don't know 9	
c20.	At any time in the last 2 weeks, has (NAME) had a been ill with a fever at any time?	Yes ..... 1 No ..... 2 Don't know 9	
c21.	At any time in the last 2 weeks, has (NAME) had an illness with a cough?	Yes ..... 1 No ..... 2 Don't know 9	-> Next Q -> Qc95 -> Qc95
c22.	When (NAME) had an illness with a cough, did he/she breathe faster than usual with short, rapid breaths or have difficulty breathing?	Yes ..... 1 No ..... 2 Don't know 9	-> Next Q -> Qc95 -> Qc95

c23.	Was the fast or difficult breathing due to a problem in the chest or a blocked or runny nose?	Problem in chest only ..... 1 Blocked or runny nose only ..... 2 Both ..... 3 Other (specify .....) ..... 8 Don't know 9	

DIET - CHILDREN UNDER 2 YEARS

*NOTE: Dietary questions 97 - 103 are to be asked ONLY about children less than 2 years of age. Check the child›s date of birth and age above. If the child is 24 months of age or older, skip to question cw107.
Now I will ask you questions about (NAME)›s diet. Please answer only for (NAME). Do not confuse (NAME) with other young children in the household.

c24.	Has (NAME) ever been breastfed? Include giving breastmilk by spoon or bottle or breastfeeding by other women.	Yes ..... 1 No ..... 2 Don't know 9	-> Next Q -> Qc196 -> Qc196
c25.	How long after birth was (NAME) first breast fed ? If respondent reports she breast fed the baby immediately after birth, circle '00' for 'immediately'. If less than 1 hour, circle '1' for hours and record '00' hours. If 1 hour or more, circle '1' and record number of hours. If response is in days, circle ‹2› for days and record number of days.	1. Hours ..... ☐☐ Immediately .....00 OR 2. Days ..... ☐☐ Don't know 99	
c26.	Was (NAME) breastfed yesterday during the day or at night?" Include giving breast milk by spoon or bottle or breastfeeding by other women.	Yes ..... 1 No ..... 2 Don't know 9	
c27.	Yesterday, during the day or night, did (NAME) drink anything from a bottle with a nipple?	Yes ..... 1 No ..... 2 Don't know 9	
c28.	Did (NAME) drink ORS (oral rehydration solution) yesterday, during the day or night	Yes ..... 1 No ..... 2 Don't know 9	
c29.	Did (NAME) drink or eat vitamin or mineral supplements or any medicines yesterday, during the day or night?	Yes ..... 1 No ..... 2 Don't know 9	

c30.	Next I would like to ask you about some liquids that (NAME) may have had yesterday during the day or at night. Did (NAME) have any (item from the list)?: Read the list of liquids starting with 'plain water'.	Yes	No	DK	C31.	How many times yesterday during the day or at night did (NAME) consume any (items B, C, and F)? If 7 or more times, record ‹7›. If unknown, record '9'.
A.	Plain water?	1	2	9		
B.	Infant formula, such as Nan, Similac, Progress, or Aptamil?	1	2	9		B. ..... ☐
C.	Milk such as tinned, powdered, or fresh animal milk?	1	2	9		C. ..... ☐
D.	Juice or juice drinks?	1	2	9		
E.	Shourba or soup?	1	2	9		
F.	Yogurt?	1	2	9		F. ..... ☐
G.	Thin porridge?	1	2	9		
H.	Other liquids, such as yanson, herbel tea, glucose, grap water, or Dar al dwaa?	1	2	9		
I.	Any other liquids?	1	2	9		

C32.

Please describe everything that (NAME) ate yesterday during the day or night, whether at home or outside the home.

a) Think about when (NAME) first woke up yesterday. Did (NAME) eat anything at that time? If yes: Please tell me everything (NAME) ate at that time. Probe: Anything else? Until respondent says nothing else. If no, continue to Question b).
b) What did (NAME) do after that? Did (NAME) eat anything at that time?
If yes: Please tell me everything (NAME) ate at that time. Probe: Anything else? Until respondent says nothing else.
Repeat question b) above until respondent says the child went to sleep until the next day.
If respondent mentions mixed dishes like a PORRIDGE, sauce or stew, probe:
c) What ingredients were in that (MIXED DISH)? Probe: Anything else? Until respondent says nothing else.
As the respondent recalls foods, underline the corresponding food and circle '1' in the column next to the food group. If the food is not listed in any of the food groups below, write the food in the box labeled 'other foods'. If foods are used in small amounts for seasoning or as a condiment, include them under the condiments food group.
Once the respondent finishes recalling foods eaten, read each food group where '1' was not circled, ask the following question and Circle '1' if respondent says yes, '2' if no and '9' if don't know:

Yesterday during the day or night, did (NAME) drink/eat any (FOOD GROUP ITEMS)?

		Yes	No	DK
A	Bread, rice, noodles, porridge, or other foods made from grains?	1	2	9
B	Pumpkin, carrots, squash, or sweet potatoes that are yellow or orange inside?	1	2	9
C	White potatoes, white yams, manioc, cassava, or any other foods made from roots?	1	2	9
D	Any dark green leafy vegetables?	1	2	9
E	Ripe mangos, papaya, melon?	1	2	9
F	Any other fruits or vegetables?	1	2	9

G	Liver, kidney, heart, or other organ meats?	1	2	9
H	Any meat, such as beef, lamb, goat, chicken, or duck?	1	2	9
I	Eggs?	1	2	9
J	Fresh or dried fish, shellfish, or seafood?	1	2	9
K	Any foods made from beans, peas, lentils, nuts, or seeds?	1	2	9
L	Cheese, laban, or other food made from milk?	1	2	9
M	Oils, fats or butter added to food or used for cooking?	1	2	9
N	Any sugary foods such as chocolates, sweets, candies, pastries, cakes, or biscuits?	1	2	9
O	Honey?	1	2	9
P	Condiments?	1	2	9

Check categories A-P above.	If all ‹NO›, go to QH36 If at least 1 ‹YES› or all ‹DK› go to Q203

c33.	Did (NAME) eat solid or semi-solid (soft, mushy) food yesterday, during the day or night? If ‹1› for this question and all foods above = NO, go back to probe.	Yes ..... 1 No ..... 2 Don't know 9	-> Next Q -> Qc220 -> Qc220
c34.	How many times did (NAME) eat solid or semi-solid (soft, mushy) food yesterday, during the day or night?	Number of times ..... ☐	-> Qc220

DIET – CHILDREN 2-5 YEARS

*NOTE: Dietary questions cw107 - c108 are to be asked ONLY about children 2 years of age and older. Check the child›s date of birth and age above. If the child is less than 24 months of age, be sure that questions 97 - 103 have been asked, then skip to question c220.

Now I would like to ask you questions about what (NAME) eats. Most of these questions ask about a typical week; that is, a normal 7-day period. Please think about how many days (NAME) usually eats the following foods, and about how many times (NAME) usually eats these foods.

Next I would like to ask you about some foods and drinks that (NAME) eats in a typical week.
In a typical week, on how many days does (NAME) have any (item from the list)?:

c35.	How many times per day does (NAME) typically consume any (item from list)?. How many times per day does (NAME) typically consume any (item from list)? If Less than one time, ask Qc36		
c36.	Number of days in a typical week consuming?		
R.	Fruit?	Less than one time ..... 0 One time ..... 1 Two times ..... 2 Three or more times ..... 3 Don't know 9	Number of days... ☐ Don't know .....

S.	Vegetables? Include salads, cooked vegetables, etc.	Less than one time ..... 0 One time ..... 1 Two times ..... 2 Three or more times ..... 3 Don't know 9	Number of days... ☐ Don't know .....
T.	Starchy foods? Include porridge, bread, rice, noodles, or other foods made from grains Less than one time	Less than one time ..... 0 One time ..... 1 Two times ..... 2 Three or more times ..... 3 Don't know 9	Number of days... ☐ Don't know .....
U.	Dairy products? Include milk, cheese, yogurt, etc	Less than one time ..... 0 One time ..... 1 Two times ..... 2 Three or more times ..... 3 Don't know 9	Number of days... ☐ Don't know .....
V.	Un-processed meat? Include beef, lamb, poultry, eggs, fish, seafood and legumes.	Less than one time ..... 0 One time ..... 1 Two times ..... 2 Three or more times ..... 3 Don't know 9	Number of days... ☐ Don't know .....
W.	Processed meat? Include lunch meat, salami, mortadella, pepperoni, hot dogs, local products such as "salty fish and dry fish"	Less than one time ..... 0 One time ..... 1 Two times ..... 2 Three or more times ..... 3 Don't know 9	Number of days... ☐ Don't know .....
X.	Cold cereals? Include box cereals like cheerios, frosted flakes, honey grams, etc.	Less than one time ..... 0 One time ..... 1 Two times ..... 2 Three or more times ..... 3 Don't know 9	Number of days... ☐ Don't know .....
Y.	Sugary foods? Include chocolates, sweets, candies, pastries, cakes, or biscuits	Less than one time ..... 0 One time ..... 1 Two times ..... 2 Three or more times ..... 3 Don't know 9	Number of days... ☐ Don't know .....
Z.	French fries or chips? Include french fries, potato chips, tortilla chips, Cheetos®, corn chips, or other local snack chips.	Less than one time ..... 0 One time ..... 1 Two times ..... 2 Three or more times ..... 3 Don't know 9	Number of days... ☐ Don't know .....
AA.	A meal from a fast food restaurant like McDonald's, KFC, Pizza Hut, etc., including take-out?	Less than one time ..... 0 One time ..... 1 Two times ..... 2 Three or more times ..... 3 Don't know 9	Number of days... ☐ Don't know .....
BB.	100% fruit juice? Include orange, grape, apple, mango, pineapple, etc	Less than one time ..... 0 One time ..... 1 Two times ..... 2 Three or more times ..... 3 Don't know 9	Number of days... ☐ Don't know .....

CC.	Soda that contains sugar or other beverages that contain added sugar? Include Coca Cola, Sprite, local soda names, etc. DO NOT include diet soda or sugar-free drinks, or fruit juices	Less than one time ..... 0 One time ..... 1 Two times ..... 2 Three or more times ..... 3 Don't know 9	Number of days... ☐ Don't know .....
DD.	Sports or energy drinks? Include Kool-aid, Hi-c,Gatorade,Red Bull, Vitamin Water, etc	Less than one time ..... 0 One time ..... 1 Two times ..... 2 Three or more times ..... 3 Don't know 9	Number of days... ☐ Don't know .....
EE.	Sweetened Fruit drinks? Include tange, sun top, vimto Lemonade, sweet iced tea, lulu, Ahlen, ice lolly lop etc	Less than one time ..... 0 One time ..... 1 Two times ..... 2 Three or more times ..... 3 Don't know 9	Number of days... ☐ Don't know .....
FF.	Coffee or tea with sugar?	Less than one time ..... 0 One time ..... 1 Two times ..... 2 Three or more times ..... 3 Don't know 9	Number of days... ☐ Don't know .....
C37.	What type of oil or fat is added to the (NAME)›s food? Mark all all types of fat mentioned by the respondent.	Palm seed oil ..... A Olive oil ..... B Sesame oil ..... C Sunflower oil ..... D Corn oil ..... E Canola oil ..... F Ghee ..... G Animal butter ..... H Margarine ..... I Coconut oil ..... J Hemis/qustha ..... K Does not add oil/fat ..... X Don't know ..... Z	

PHYSICAL ACTIVITY AND SLEEP PATTERNS – CHILDREN 2-5 YEARS			
c38.	On average, about how much time per day does (NAME) watch TV programs or videos per day?	1. Hours ..... ☐☐ OR 2. Minutes ..... ☐☐ None .....3 Don't know 99	
c39.	On average, about how much time per day does (NAME) play video or computer games per day? Include games played on handheld devices, such as i-phones, tablet computers, hand-held games	1. Hours ..... ☐☐ OR 2. Minutes ..... ☐☐ None .....3 Don't know 99	
c40.	Does (NAME) typically watch television while he/she is eating food?	Not at all / rarely ..... 0 1 meal per day ..... 1 2 meals per day ..... 2 3 or more meals per day ..... 3 Don't know 9	
c41.	Is there a television or computer in the room where (NAME) sleeps?	Yes ..... 1 No ..... 2 Don't know 9	
c42.	On average, how much time does (NAME) sleep during a usual 24-hour period? Please include night time sleep and day time naps and answer separately for weekdays and for weekend days.	1. Hours Weekdays ..... ☐☐ 2. Hours Weekends ..... ☐☐ Don't know 99	
c43.	In the past 7 days, since this day last week, how many days did your child walk (e.g. to friends, shops, park, child care etc) to get around your neighborhood?	Number of days..... ☐ Don't know 9	
c44.	In the past 7 days, since this day last week, how many days did (NAME) play outdoors for at least 30 minutes or more?	Number of days..... ☐ Don't know 9	
c45.	In a typical week, does (NAME) attend an organized physical activity?	Yes ..... 1 No ..... 2 Don't know 9	-> Next Q -> Qc217 -> Qc217

c46.	In a typical week, what physical activity does (NAME) participate in? Circle all that apply		
c47.	How many hours does (NAME) participate in these activities in a typical week? Note the number of hours for all codes marked as part of the above question		

	QcH45 Yes	QcH45 No	Qc49 # hours	Qc49 DK
A. Swimming	1	2	1 2 3 4 5 6	9
B. Gym-type program	1	2	1 2 3 4 5 6	9
C. Running	1	2	1 2 3 4 5 6	9
D. Football	1	2	1 2 3 4 5 6	9
E. Use bicycle	1	2	1 2 3 4 5 6	9
F. Other	1	2	1 2 3 4 5 6	9

(specify.....)

c48.	How does (NAME) feel about physical activities and outdoor playing?	Does not like ..... 1 Likes ..... 2 Likes a lot ..... 3 Don't know 9	
c49.	How active would you rank (NAME) compared to other children his/her age?	A lot less active ..... 1 Less active ..... 2 Same ..... 3 More active ..... 4 A lot more active ..... 5 Don't know 9	
c50.	What type of child care facilities does your child typically attend?	None, stays at home ..... 1 Informal child care (grandparents, friends, etc ..... 2 Day care up to 8 hours ..... 3 Day care more than 8 hours ..... 4 Preschool ..... 5 Other (specify_____) ..... 8 Don't know 9	

FORTIFIED FOODS AND MICRONUTRIENT SUPPLEMENTS – ALL CHILDREN

Now I would like to ask you about some other foods (NAME) may have eaten. I am interested in whether your child had the item even if it was combined with other foods.

c51.	Yesterday, during the day or night, did (NAME) consume any local iron-fortified cookies or other foods which have added iron?	Yes ..... 1 No ..... 2 Don't know 9	
c52.	Yesterday, during the day or night, did (NAME) consume any infant formula containing extra iron?	Yes ..... 1 No ..... 2 Don't know 9	
c53.	Yesterday, during the day or night, did (NAME) eat any commercially fortified baby cereal, e.g. Cerelac?	Yes ..... 1 No ..... 2 Don't know 9	
c54.	During the last six months was (NAME) given any iron tablets or syrup? Show iron tablets and syrup.	Yes ..... 1 No ..... 2 Not sure if it was iron ..... 3 Don't know 9	-> Next Q -> Qch47 -> Qch47 -> Qch47

c55.	Is (NAME) still taking iron tablets or syrup?	Yes ..... 1 No 2	-> Next Q -> Qc226
c56.	For how long has (NAME) taken iron tablets or syrup?	One week or less ..... 1 More than 1 week, less than 1 month ..... 2 1 month or more ..... 3 Don't know 9	-| | |-> Qch47 | -|
c57.	When did (NAME) stop taking iron tablets or syrup?	Less than 3 months ago ..... 1 3 months ago or more ..... 2 Don't know 9	
c58.	During the last six months was (NAME) given a vitamin A capsule? Show vitamin A capsule.	Yes ..... 1 No ..... 2 Not sure if it was vitamin A ..... 3 Don't know 9	
C59.	During the last six months was (NAME) given a vitamin D capsule? Show vitamin D capsule.	Yes ..... 1 No ..... 2 Not sure if it was vitamin D ..... 3 Don't know 9	
C60.	During the last six months was (NAME) given any Multi-Vitamin supplements?	Yes ..... 1 No ..... 2 Not sure if it was a Multi-Vitamin 9	-> Next Q -> Qc231 -> Qc231
C61.	What vitamins are included in the multivitamins supplements? Show multivitamin.	Yes No A. Iron 1 2 B. Folic Acid 1 2 C. Zinc 1 2 D. Vitamin A 1 2 E. Vitamin D 1 2 F. Vitamin B_{12} 1 2 G. Calcium 1 2	

PARENTAL PERCEPTIONS OF CHILD WEIGHT – ALL CHILDREN			
c62	Please indicate how you would classify (NAME)'s weight right now?	Very underweight ..... 1 Underweight ..... 2 Average ..... 3 Overweight ..... 4 Very Overweight ..... 5 Don't know 9	
c63.	Thinking about (NAME), how would you like him or her to weigh?	A lot less ..... 1 A little less ..... 2 About the same ..... 3 A little more ..... 4 A Lot more ..... 5 Don't know 9	
c64.	Please indicate how you would classify (NAME)'s height right now?	Very small/short ..... 1 Small/short ..... 2 Average ..... 3 Tall ..... 4 Very tall ..... 5 Don't know 9	

SUN EXPOSURE – ALL CHILDREN			
C65.	When (NAME) goes outside the house, do you usually protect his/her head against the sun?	Never / rarely ..... 1 Sometimes ..... 2 Most of the time ..... 3 All the time 4	-> QcH41 -> Next Q -> Next Q -> Next Q
C66.	When (NAME) leaves your house or goes outside, how do you usually protect his/her head against the sun?	Scarf / headcloth ..... 1 Hat ..... 2 Umbrella ..... 3 Other (specify .....) 8	
C67.	When (NAME) goes outside the house, do you usually cover his/her arms?	Never / rarely ..... 1 Sometimes ..... 2 Most of the time ..... 3 All the time 4	
C68.	On a typical day, approximately how much time does (NAME) pass under the sun? Use his/her behaviour over the last 2 weeks to answer this question.	No Sun Exposure ..... 1 0-29 minutes ..... 2 30-59 minutes ..... 3 1-2 hours ..... 4 >2-3 hours ..... 5 >3 hours ..... 6 Don't Know 9	
C69.	Do you habitually use sunscreen to protect (NAME)'s skin when he/she is under the sun?	Never / rarely ..... 1 Sometimes ..... 2 Most of the time ..... 3 All the time 4	
C70.	(NAME)'s skin color? Completed by the enumerator based on observation	Very White ..... 1 White ..... 2 Olive ..... 3 Dark ..... 4 Very dark/black ..... 5 Unable to observe 9	

ANTHROPOMETRIC MEASUREMENTS – ALL CHILDREN			
C71.	Measurer's code number:	Number of days..... ☐☐☐	
C72.	Child's MUAC	MUAC (cm) ..... ☐☐.☐	
C73.	ADULT'S weight Any adult can be weighed as long as the child accepts him/her.	Kilograms (kg) .. ☐☐☐.☐ Weight not measured 999.9	
C74.	Adult's weight and child`s weight together This is the combined weight of the adult and child. The adult should hold the child in his/her arms	Kilograms (kg) .. ☐☐☐.☐ Weight not measured 999.9	
C75.	Was the child mostly undressed (i.e. wearing only light under clothes)	Yes ..... 1 No 2	

C76.	Child's length or height Child <2 years old ... Measure length (lying down). Child >2 years old ... Measure height (standing up).	Centimeters (cm).. ☐☐☐.☐ Weight not measured 999.9	
C77.	How was the child actually measured lying down or standing up?	Lying down ..... 1 Standing up 2	
C78.	Result of weight and length/ height measurements	Either or both measured ..... 1 Child not present ..... 2 Child or mother/caretaker refused .. 3 Child uncooperative / uncontrollable 4 Other (specify .....) 8	

BLOOD SAMPLE COLLECTION - CHILDREN 6-59 MONTHS OF AGE			
C79.	Children is this household have been selected for venipuncture This information is available from question C7 on the first page of this questionnaire	Yes ..... 1 No 2	
C80.	Now we would like to take some blood for hemoglobin from (NAME)'s heel/finger or some blood from (NAME)'s vein for testing for vitamins. Do you give your permission?	Yes ..... 1 No 2	-> Next Q -> STOP
C81.	Hemoglobin concentration (g/L)	Hb .....☐☐.☐	
C82.	Approximate volume of blood collected (ml) Only in case of venipuncture	ml .....☐.☐	
C83.	What time did (NAME) last eat anything? Use the 24-hour clock (for example, 13:00 is 1:00 pm)	Time ..... ☐☐:☐☐ Did not yet eat today ..... 77:77 Don't know 99:99	
C84.	Time of blood collection Use the 24-hour clock (for example, 13:00 is 1:00 pm)	Time ..... ☐☐:☐☐	
C85.	Interviewer's Observations		

C86.	Field Editor’s Observations
C87.	Supervisor’s Observations
C88.	Measurer’s Observations

Appendix 9: Survey Questionnaires (Arabic)

المسح الوطني العُماني للتغذية ٢٠١٦ إستمارة الأسرة	
الرجاء إلصاق ملصق رقم الأسرة هنا يبدأ بحرف "H"	
H 1. المحافظة	H 2. الولاية / القرية
مسقط ..... 1 ظفار ..... 2 الداخلية ..... 3 شمال الشرقية ..... 4 جنوب الشرقية ..... 5 شمال الباطنة ..... 6 جنوب الباطنة ..... 7 الظاهرة ..... 8 البريمي ..... 9 مسندم ..... 10 الوسطى 11	H 3. الرقم الخاص بالاسرة ☐☐☐☐☐ H 4. إرتفاع الموقع ☐☐☐☐ متراً إن كان معلوماً
H 5. رقم المربع السكنية ☐☐	H 6. رقم المنزل ☐☐☐
H 7. أسم رب الأسرة	H 8. رقم الفريق ☐☐
H 9. تم أختيار المنزل لسحب عينة الدم من الوريد باليد للنساء و/أو الاطفال ؟	تم أختيار المنزل لسحب عينة الدم من وريد اليد الاطفال و النساء .....1 تم أختيار المنزل لسحب عينة الدم من وريد اليد الاطفال فقط .....2 لم يتم أختيار المنزل لسحب عينة الدم من وريد اليد.....3

	الزيارة الأولى	الزيارة الثانية	الزيارة الثالثة	H 10. الزيارة النهائية
التاريخ	/	/	/	☐☐/☐☐/☐☐☐☐ اليوم الشهر السنة
رقم القائم بالزيارة				H 11. رقم الباحث: ☐☐☐
الزيارة التالية التاريخ	/	/	/	H 12. عدد الزيارات ☐
التوقيت	:	:	:	
النتيجة				H 13. النتيجة النهائية ☐

رموز النتيجة النهائية المسكن مكتمل ..... 1 لا يوجد أحد بالمسكن أو لم نتلق أي أستجابة ..... 2 المسكن غير موجود منذ فترة طويلة أو تم نقلة 3	رفض ..... 4 المسكن خال / العنوان لا يخص المسكن المذكور ..... 5 المسكن متهدم ..... 6 لم يستدل على المسكن ..... 7 آخر أذكره (----------) 9
H 14. عدد الأطفال في المسكن أقل من 12 سنة ☐	H 15. عدد الأطفال دون سن خمس سنوات ☐
H 16. عدد النساء في المسكن أعلى من 12 سنة ☐	H 17. عدد النساء في الفئة العمرية (15-49) سنة ☐

نحن تابعون لوزارة الصحة، ونعمل ضمن مشروع معني بالتغذية والصحة، وأود أن أتحدث معك بشأن ذلك في مدة ما يقارب 30 دقيقة، مع التعهد بأن المعلومات الخاصة بك ستظل في سرية تامة، كما أود أن أتحدث لعدد من ذويك من النساء وممن يقمن على رعاية الأطفال ممن تتراوح أعمارهم ما بين يوم و59 شهراً (أقل من خمس سنوات)
هل يمكننا البدء الآن؟

☐ نعم : أوافق – لنبدأ.
☐ لا: لا أوافق – أكمل بيانات هذه الصفحة ثم ناقش الأمر مع قائد الفريق.

أولاً، أود أن أطرح عليك عدداً من الأسئلة العامة التي تخص ساكني هذا المسكن.
ولنبدأ بذكر أسمائهم بدءاً من رب الأسرة.
أذكر أسماءهم وصلة القرابة التي تربطهم برب الاسرة، ثم أعمارهم بالجدول التالي، وبعد ذلك أطرح عليهم السؤال التالي: "هل هناك من يسكن هذا المسكن معك حتى ولم يكن متواجداً الآن؟" إذا كانت الإجابة بالإيجاب، فأكمل البيانات اللازمة في الأعمدة من 19 إلى 21 ثم أستكمل الأسئلة الواردة بالعمود 22 وما يليه لكل شخص على حدة، ويمكنك الاستعانة بنسخة إضافية من الأستمارة إذا لم تسع الصفوف لكل البيانات المدرجة.

نموذج قائمة الأسرة				النساء في عمر 15-49 عاماً	الأطفال في عمر 0-59 شهراً		الأطفال أقل من 5 سنوات
H.18 رقم الصف	H. 19 الأسم	H. 20 ما صلة القرابة بين (الأسم) و رب الأسرة؟	H. 21 هل (الاسم) ذكر أم أنثى؟	H. 22 متى ولد (الاسم)؟		H. 23 كم عمر (الاسم)؟ يسجل العمر بالسنوات المكتملة، وفي حال بلوغ أحدهم سن 95 فما فوق، يكتفى ب "95" فقط؟	H. 24 ضع دائرة حول رقم الصف المقابل لعمر المرأة	H. 25 ضع دائرة حول رقم الصف المقابل لعمر الطفل	H. 26 من هي أم هذا الطفل أو حاضنته الأساسية؟ يسجل رقم الصف المقابل لحاضنة الطفل.
				99 DK	9999 DK				

الصف	الاسم	صلة القربة*	ذكر	أنثى	شهر	سنة	العمر بالسنة	15-49 عاماً	0-59 شهراً	الأم
01			1	2				01	01	
02			1	2				02	02	
03			1	2				03	03	
04			1	2				04	04	
05			1	2				05	05	
06			1	2				06	06	
07			1	2				07	07	
08			1	2				08	08	
09			1	2				09	09	
10			1	2				10	10	
11			1	2				11	11	

12			1	2				12	12	
13			1	2				13	13	
14			1	2				14	14	
15			1	2				15	15	
16			1	2				16	16	
17			1	2				17	17	
18			1	2				18	18	
19			1	2				19	19	
20			1	2				20	20	
ضع علامة هنا في حال أستخدام أستمارة تكميلية ☐										

رموز السؤال رقم 20: صلة القرابة برب الأسرة *

01 رب الأسرة	05 حفيد(ة)	09 أخ/أخت الزوج/الزوجة	13 ابن/ابنة بالتبني
02 الزوج/الزوجة	06 والد/والدة	10 عم/خال/عمة/خالة	14 لا توجد صلة قرابة
03 الابن/الابنة	07 والد/والدة الزوج/الزوجة	11 ابن/ابنة الأخ/الأخت	99 غير معروف
04 ابن/ابنة الزوج/الزوجة من زواج آخر	08 أخ/أخت	12 زوجة الابن\زوج الابنة	88 اخر

تحقق من وجود أي أفراد آخرين، وخاصة الأطفال غير المدرجين بالجدول وغيرهم ممن ليس لهم صلة قرابة لهم ويسكنون معهم (مثل الخدم والأصدقاء) اكتب هذه الأسماء الإضافية بالقائمة وأكمل بياناتهم.

يجب إشراك كل النساء اللواتي يتراوح أعمارهن ما بين 15 49- سنة، وكذا الأطفال الذين تقل أعمارهم عن خمس سنوات والمدرجة أسماؤهم بقائمة الأسرة في المسح الوطني العُماني لعام 2016، من خلال أستمارة فردية مستخدماً رقم الصف الوارد بالقائمة الأسرية كرقم فردي، وفي هذه الحال ينبغي أستخدام أستمارة منفصلة لكل من تنطبق عليه الشروط من النساء والأطفال.

مواصفات المسكن

H 27. كم عدد غرف النوم الموجودة في هذا المسكن؟	غرفة ☐☐	
H 28. المادة الأساسية المستخدمة في أرضيات الغرف من خلال الملاحظة فقط	سيراميك/رخام/قاشي ..... 1 أسمنت ..... 2 مغطى بسجادة ..... 8 أخرئ (يحدد _____) 9	
H 29. المادة الأساسية المستخدمة في الأسقف من خلال الملاحظة فقط	سعف النخل ..... 1 معدن/صفيح ..... 2 خشب ..... 3 أسمنت ..... 4 أخرى (يحدد: _____) 8	
H 30. المادة الأساسية المستخدمة في الجدران الخارجية من خلال الملاحظة فقط	أعواد/نخيل/جذوع النخل (دعون) ..... 11 حجارة مخلوطة بطين ..... 21 خشب معاد أستخدامه (صندقة) ..... 22 حجارة مخلوطة بأسمنت ..... 31 طابوق إسمنتية غير مغطاه بأسمنت ..... 32 طابوق إسمنتية مغطاه بأسمنت ..... 33 أخرى (يحدد: _____) 88	

H 31. ما نوع الوقود المستخدم في الطهي غالبا؟	الكهرباء ..... 1 اسطوانة الغاز (سلندر) ..... 2 الكيروسين ..... 3 فحم/ فحم حجري ..... 4 لا يطهى طعام بالمنزل ..... 5 أخرى (يحدد: _____) ..... 8 لا أعرف 9				
H 32. أين يتم طهي الطعام غالبا ؟ يطبخ داخل المنزل , في بناء مستقل أو خارج المنزل	في غرفة منفصلة تستخدم كمطبخ ..... 1 في مكان آخر بالمنزل ..... 2 في مبنى منفصل ..... 3 خارج المنزل ..... 4 أخرى (يحدد _____) ..... 8 لا أعرف 9				
H 33. هل يوجد بالمنزل _____؟ اسأل عن كل عنصر على حدة	تلفون ثابت؟	A	نعم 1	لا 2	
	مجمد/فريزر	B	1	2	
	موقد غاز؟	C	1	2	
	غسالة ملابس أوتوماتيكية ؟	D	1	2	
	حاسب آلي/حاسب محمول	E	1	2	
	اشتراك أنترنت	F	1	2	
	شاشة تلفاز مسطحة	G	1	2	
	أجهزة ذكية (أيباد، آيفون، حاسب لوحي)	H	1	2	
H 34. هل يمتلك أي من ساكني هذا المنزل_____؟ اسأل عن كل عنصر على حدة.	سيارة أو بيكيب أو باص	A	نعم 1	لا 2	
	دراجة / سكوتر	B	1	2	
	قارب بمحرك	C	1	2	
H 35. هل المنزل ملكك أو ملك لاحد ساكني هذا المنزل ؟	ملك ..... 1 إيجار ..... 2 أخرى (يحدد _____) ..... 8 لا أعرف 9				
H 36. هل يمتلك أي من ساكني المنزل مزرعة؟	نعم ..... 1 لا ..... 2 لا أعرف 9				-> H 38 -> H 38
H 37. إذا كانت الإجابة ب (نعم)، كم مساحة المزرعة التي يمتلكها؟	□□□□ ..... فدان. □□□□ ..... أو متر مربع لا أعرف..... 9999				
H 38. هل هذه الاسرة تمتلك أي ماشية , قطعان , وغيرها من حيوانات المزرعة أو دواجن؟	نعم ..... 1 لا ..... 2 لا أعرف 9				-> H 40 -> H 40
H 39. كم عدد الحيوانات التي تمتلكها هذه الاسرة ؟ أطرح سؤالاً عن كل عنصر على حدة أدخل رقم 000 في حال عدم وجود البند أدخل رقم 995 في حال زيادة العدد عن 995 أدخل رقم 999 في حال الجهل بالعدد	أبقار	A	□□□		
	ماعز	B	□□□		
	خراف	C	□□□		
	دجاج	D	□□□		
	جمال	E	□□□		
	أخرى (_____)	F	□□□		
H 40. هل يمتلك أي من ساكني المسكن حساباً بنكياً؟	نعم ..... 1 لا ..... 2 لا أعرف 9				

الماء والصرف الصحي					
H 41. ما مصدر مياه الشرب الرئيسي بالمسكن؟	1	محطة مياه حكومية (انبوبية ممدة بالمسكن)			
	2	محطة مياه خاصة (انبوبية ممدة بالمسكن)			
	3	آبار أنبوبية			
	4	بئر محمي			
	5	بئر غير محمي			
	6	شاحنة بخزان			
	7	مصدر ماء سطحي (سد، بركة، فلج)			
	8	ماء معبأ في زجاجات			
	88	أخرى (يحدد)			
	99	لا أعرف			
H 42. هل تقوم بأي إجراء داخل المنزل لجعل ماء الشرب أكثر أماناً؟	1	نعم			
	2	لا			H 44 <-
	9	لا أعرف			H 44 <-
H 43. ما الذي تقوم به داخل المنزل لجعل ماء الشرب أكثر أماناً؟ تحقق من أي إجراء آخر سجل أنطباعك	A	غلي الماء			
	B	إضافة مبيض أو كلور			
	C	ترشيحه بقطعة قماش			
	D	أستخدام منقي مياه (سيراميك، رملي، تجميعي ...إلخ)			
	E	التعقيم الشمسي			
	F	ترك الماء ليستقر وتترسب الشوائب			
	X	أخرى (يحدد)			
	Z	لا أعرف			
H 44. ما هونوع المرحاض الذي يستخدمه افراد اسرتك عادة إذا كان الصرف بضخ الماء أو بصبه، اسأل عن المكان الذي يصرف إليه.		مرحاض بسيفون متصل بشبكة مجاري صرف			
	1	الصحي			
	2	مرحاض بسيفون بحفرة (البالوعة)			
	3	لا أعرف أين يضخ			
	4	لايوجد مرحاض (الخلاء)			H 46 <-
	8	أخرى (يحدد)			H 46 <-
	9	لا أعرف			H 46 <-
H 45. هل تشترك في هذا المرحاض مع اشخاص لا يسكنون بالمنزل؟	1	نعم			
	2	لا			
	9	لا أعرف			
H 46. هل يمكنني الاطلاع على المكان الذي يغسل فيه ساكنو المنزل أيديهم	1	تمت المعاينة			H 46 <-
	2	لا يوجد بالمنزل أو حوله أو بالفناء			H 46 <-
	3	لم نحصل على الإذن بالاطلاع			H 46 <-
H 47. لاحظ وجود ماء في مكان غسيل الأيدي تحقق من خلال فحص مصادر المياة لغسل الأيدي مثل صنبور/مضخ أو حوض أو دلو أو حاوية ماء أو ما شابه ذلك.	1. يتوفر الماء 2. لا يتوفر الماء 9. لم نستطع الملاحظة				
H 48. لاحظ وجود صابون أو مادة منظفة في مكان غسيل الأيدي.			نعم	لا	
	A	قوالب صابون	1	2	H 51 <-
	B	منظف (مسحوق/سائل/معجون)	1	2	H 51 <-
	C	صابون سائل	1	2	H 51 <-
	D	رماد/طين/رمل	1	2	
	E	لا يوجد	1	2	
H 49. هل يوجد بالمنزل صابون أو أي مادة منظفة (أو غيرها من مواد التنظيف المحلية) لغسيل الأيدي؟	1	نعم			
	2	لا			H 51 <-
	9	لا أعرف			H 51 <-
H 50. هل يمكنني الأطلاع على مواد التنظيف؟ ضع دائرة حول (نعم) لكل نوع صابون تراه.			نعم	لا	
	A	قوالب صابون	1	2	
	B	منظف (مسحوق/سائل/معجون)	1	2	
	C	صابون سائل	1	2	
	D	رماد/طين/رمل	1	2	
	E	لا يوجد	1	2	

دخل الأسرة			
H 51. كم يبلغ متوسط إجمالي دخل الأسرة؟ يكتفى بتسجيل بند واحد وليس الثلاثة	أسبوعياً □□□□□ شهرياً □□□□□ سنوياً □□□□□ أرفض الإفصاح عن الدخل لا أعرف	A B C 88888 99999	H 53 <- H 53 <- H 53 <-
H 52. إذا كنت لا تعرف متوسط الدخل، هل يمكنك إعطاء قيمة تقديرية شهرية من بين القيم التالية. [أدخل القيمة بالريال]؟ اقرأ الاختيارات.	أقل من 200 ريال عُماني ..... من 200 إلى 499 ريال عُماني ..... من 500 إلى 999 ريال عُماني ..... من 1000 إلي 2999 ريال عُماني .... من 3000 إلى 4999 ريال عُماني .... 5000 ريال عُماني فأكثر ..... رفض الإفصاح عن الدخل ..... لا أعرف	1 2 3 4 5 6 8 9	

معدل الشراء زيت الطعام والخبز			
H 53. ما نوع زيت الطعام والدهن المستخدم في الطهي بهذا المنزل؟ بالامكان الاختيار اكثر من اجابة	زيت بذور النخيل ..... زيت زيتون ..... زيت سمسم ..... زيت دوار الشمس ..... زيت ذرة ..... زيت كانيولا ..... سمن ..... زبده حيوانية ..... زبده نباتية /مرجرين ..... زيت جوز الهند ..... حميس/ قشدة ..... أخرى (يحدد) ..... لا أعرف	A B C D E F G H I J K X Z	
H 54. كم مرة يعاد أستخدم نفس الزيت لأغراض القلي؟	يستخدم مرة واحدة فقط, لا يعاد أستخدامه ... مرتان ..... ثلاث مرات ..... أكثر من ثلاث مرات ..... لا أعرف	1 2 3 4 9	
H 55. كم متوسط شراء زيت الطعام في هذا المنزل غالبا ؟ أدخل عدد المرات لمدة زمنية واحدة فقط.	عدد المرات: أسبوعياً □□ شهرياً □□ لا يستخدم \ لا يشتراء لا أعرف	 A B 00 99	H 59 <- H 59 <-
H 56. ما كمية زيت الطعام المستهلك في المتوسط؟ تذكر القيمة بالملليلتر أو باللتر وليس بهما معاً.	□□□□ □□ لا أعرف/ غير متأكد	ملليلتر لتر 9999	
H 57. كم تنفق على كمية زيت الطعام المستهلك غالبا؟	□□□□ ريال 9999. لا أعرف/ غير متأكد		
H 58. هل تشير عبوة الزيت أنه مدعوم بالفيتامينات؟	نعم تشير العبوة الأصلية أنه مدعوم بالفيتامينات ..... لا تشير العبوة الأصلية أنه مدعوم بالفيتامينات ..... غير محدد وليس في العبوة الاصلية ..... العبوة غير موجودة	1 2 3 9	

H 59. كم متوسط شراء دقيق القمح في هذا المنزل غالبا؟ أدخل عدد المرات لمدة زمنية واحدة فقط.	عدد المرات: أسبوعياً ☐☐ A شهرياً ☐☐ B لا يستخدم \ لا يشتراء 00 لا أعرف 99		H 63 <-
H 60. كم كمية طحين القمح المستخدمة في الغالب؟ أدخل الكمية بالجرام أو الكيلوجرام وليس بكليهما.	☐☐☐☐ جرام ☐☐ كيلوجرام 9999 أو99 لا أعرف/ غير متأك		
H 61. كم تنفق على دقيق القمح للكمية المذكورة سابقا؟	☐☐☐ ريال 9999 أو99 لا أعرف/ غير متأك		
H 62. هل تظهرعبوة طحين القمح أنه مدعوم بالفيتامينات؟	نعم تشير العبوة الأصلية أنه مدعوم بالفيتامينات ..... 1 لا تشير العبوة الأصلية أنه مدعوم بالفيتامينات ..... 2 غير محدد وليس في العبوة الاصلية ..... 3 العبوة غير موجودة 9		
H 63. ما نوع الخبز المشتراء غالبا في هذا المنزل؟	خبز جاهز أبيض ..... 1 خبز جاهز اسمر ..... 2 خبز آخر من المخبز أو المصنع ..... 3 خبز محلي جاهز ..... 4 خبز معد منزلياً فقط \ ولم يشتراء ..... 5 لا يستخدم الخبز ..... 6 أخرى (يحدد) ..... 8 لا أعرف 9		-> توقف -> توقف

H 64. في المتوسط كم مرة وباي كمية مختلفة من الخبز شراؤها للاستهلاك في هذا المنزل ؟
الخبز غالبا في هذا المنزل و كم كمية الخبز المشتراة في كل مرة غالبا حسب نوع الخبز المستخدم ؟
سجل عدد نوع الخبز المشتراة في مرة الواحدة فقط في اليوم أو في الاسبوع

	في اليوم	في الاسبوع
(A)عدد أكياس خبز المقصص		
(B)عدد أكياس خبز البرجر		
(C)عدد أكياس خبز لبناني		
(D) عدد أكياس خبز الصمون		
(E) عدد أكياس خبز العماني		
(F) عدد ارغفة خبز التنور		
(G) عدد أرغفة خبز البراتا		
لا أعرف	99	

H 65. كم تنفق على كمية الخبز المذكورة سابقا ؟ حسب اليوم أو الاسبوع في H64	.....ريال لا أعرف/ غير متأكد ☐☐.☐ 99.9
H 66. هل تظهرعبوة الخبز أنه مدعوم بالفيتامينات؟	نعم تشير العبوة الأصلية أنه مدعوم بالفيتامينات ..... 1 لا تشير العبوة الأصلية أنه مدعوم بالفيتامينات ..... 2 غير محدد وليس في العبوة الاصلية ..... 3 العبوة غير موجودة 9

H 67. **ملاحظات الباحث** ☐☐☐

H 68. **ملاحظات المراقب الميداني** ☐☐☐

H 69. **ملاحظات المشرف** ☐☐☐

المسح الوطني العُماني للتغذية ٢٠١٦ أستمارة المرأة

الرجاء إلصاق ملصق رقم الأسرة هنا يبدأ بحرف «H»

11 w. رقم المربع السكني : ☐☐☐	12 w. رقم المنزل : ☐☐☐
13 w. إسم المرأة:	14 w. الرقم المرأة المتسلسل المدون بقائمة الاسرة: ☐☐
15 w. رقم البطاقة الشخصية للمراة : ☐☐☐☐☐☐☐☐	16 w. رقم الباحث: ☐☐☐
H 5. رقم المربع السكنية: ☐☐	H 6. رقم المنزل ☐☐☐
17 w. تاريخ جمع البيانات 20☐☐ / ☐☐ / ☐☐ السنة الشهر اليوم	
18 w. تم أختيار النساء في هذا المنزل لسحب عينة الدم من وريد الذراع ؟ أرجع للسؤال H19 في أستمارة المنزل	نعم ..... 1 لا 2
19 w. النتيجة النهائية لجمع بيانات المرأة: ..... أدخل أحد الرموز المدرجة أسفله ☐	

رموز النتيجة النهائية: 1. أكتملت كافة البيانات (المقابلة والقياسات الجسمانية وأخذ عينة الدم) 2. أكتملت المقابلة وأخذ القياسات الجسمانية ورفضت أخذ العينة 3. أكتملت المقابلة ورفضت أخذ القياسات الجسمانية ورفضت أخذ العينة	4. رفضت المقابلة وباقي البيانات 5. المرأة لم تكن بالمنزل وقت الزيارة 9. أخرى

يشمل أستمارة المرأة كل من تبلغ من العمر ما بين 15-49 سنة وفق قائمة الأسرة. كرر العبارة الافتتاحية على المشاركة إن لم تجد رداً.
نحن نتبع وزارة الصحة ونجري مسح وطنياً للتغذية لنصل لفهم أفضل لكافة القضايا المتعلقة بالتغذية والسمنة والوزن الزائد والأنيميا وحالات نقص الفيتامينات والمواد المعدنية لدى النساء في عمرما بين 15-49 سنة والأطفال دون الخمس سنوات، الأمر الذي يساعد السلطات الرسمية على وضع خطة مستقبلية لتحسين الأوضاع الصحية.
ونؤكد لكم على بقاء معلوماتكم في سرية تامة وألا يطلع على إجاباتكن أي شخص سوى فريق المشروع.بعد رد المشاركة على عبارتك الافتتاحية، انتقل للعبارة التالية:
والآن سنتحدث قليلاً بشأن الوضع الصحي الخاص بك وغيرها من الموضوعات ذات الصلة، وستستغرق الأستمارة حوالي 30 دقيقة، ستقومين خلالها بالرد على مجموعة من الأسئلة وأخذ قياسات الطول والوزن وعينة دم من ذراعك.

هل يمكننا البدء الآن؟ أوافق – لنبدأ.. لا أوافق – أكمل بيانات هذه الصفحة ثم ناقش الأمر مع قائد الفريق.	نعم لا	1 2

سنبدأ بطرح عدد من الأسئلة عن بياناتك الشخصية

عمر المرأة ومؤهلاتها الدراسية

10 w. ما هو تاريخ ميلادك؟ في حالة عدم معرفتها بالتاريخ سجل "99" أو "9999"	اليوم ☐☐ الشهر ☐☐ السنة ☐☐☐☐	
11 w. كم عمرك؟ تحقق من الاتساق بين عمر المرأة المشاركة وتاريخ ميلادها، وصحح ما به أخطاء إن لزم الأمر. (سجل "99" في حالة عدم معرفة عمرها)	العمر ☐☐ (بالسنوات المكتملة) عدم معرفتها سجل "99"	
12 w. هل تلقيت تعليماً في مدرسة أو ماقبل مدرسة؟	نعم ..... 1 لا 2	W > -16
13 w. ما العدد الإجمالي لسنوات الدراسة التي قضيتيها في المدرسة النظامية (بأستثناء سنوات ماقبل المدرسة)؟	سنة ☐☐ عدم معرفتها سجل "99"	

14 w. ما آخر مرحلة تعليمية وصلت إليها؟
15 w. ما أعلى مستوى تعليمي وصلت إليه في هذه المرحلة؟
في حالة عدم إكمال المشاركة للمستوى الأول، ضع دائرة حول "0"

	ضع دائرة حول الرمز	سنوات الدراسة المكتملة	لا أعرف
ماقبل المدرسة	0		99
الابتدائي (عام/أساسي)	1	0،1،2،3،4،5،6	99
أعدادي (عام/أساسي)	2	7،8،9	99
الثانوي (التعليم العام)	3	10،11،12	99
دبلوم	4		
بكالوريوس	5		
درجة الماجستير وما فوقها	6		
لا أعرف	9		

الزواج والحمل		
W 16. ما حالتك الأجتماعية الحالية؟	1 ..... لم يسبق لها الزواج 2 ..... زوجة 3 ..... أرملة 4 ..... مطلقة	w25 >-
W 17. هل أنت حامل الآن؟	1 ..... نعم 2 ..... لا 9 ..... غير متأكدة	w 20 >- w 20 >-
W 18. في أي شهر حملك ؟ ((سجل "99" إن كانت لا تعرف))	عدد الشهور ☐☐	
W 19. متى كانت بداية آخر دورة شهرية لديك؟ وفي حالة جهلها بالتاريخ، أطلب منها تقدير عدد الأيام أو الأسابيع أو الشهور التي بدأت فيها آخر دورة شهرية لديها. ((بالامكان طلب الأطلاع على بطاقة الحمل الخضراء إن وجدت))	☐☐ / ☐☐ / ☐☐☐☐ اليوم الشهر السنة أو: 1. منذ كم يوم ☐☐ 2. منذ كم أسبوع ☐☐ 3. منذ كم شهر ☐☐ 9. لا أعرف 99	
W 20. كم عدد مرات حملك؟ إن كانت حاملاً في الوقت الحالي، أحسب هذا الحمل ضمن العدد. وإن لم يسبق لها الحمل، سجل "00".	عدد مرات الحمل ☐	W25 > -00
W 21. كم عدد المرات التي وضعت فيها طفلاً؟ (يشمل من مات منهم قبل الولادة ومن عاش بعدها)	عدد مرات الولادة ☐	W00 -> 23
W 22. هل أنجبتي مولود خلال العامين الماضيين؟	1 ..... نعم 2 ..... لا	
W 23. هل ترضعين طفلاً رضاعة طبيعية في الوقت الحالي؟	1 ..... نعم 2 ..... لا	W25 <--
W 24. كم المدة التي أستمرت فيها الرضاعة الطبيعية لطفلك (أطفالك)؟	عدد الشهور ☐☐	

التغذية – التنوع الغذائي على مدار ٢٤ ساعة
أود أن أطرح عليك الآن بعض الأسئلة الخاصة بغذائك المعتاد وعاداتك الغذائية

W 25. يرجى ذكر كل ما تناولته من طعام أمس أثناء نهار أو مساء سواء داخل المنزل أو خارجه.

(أ) منذ أستيقاظك من النوم أمس؟ وهل تناولت أية طعام حينئذ؟ إذا كانت الإجابة بـ (نعم)، فماذا تناولت بالتفصيل؟ تحقق /هل أكلتي أكثر من 15 جرام أو ملعقة طعام واحدة ممتلئة من هذا الطعام ؟ هل أكلتي شي أخر ؟ حتى تقول المشاركة أنها لم تتناول شيئاً آخر.
وإن كانت الإجابة بـ (لا)، انتقل الي (ب).
(ب) ماذا فعلت بعد ذلك؟ وهل أكلتي اي شي أخر وقتها ؟ إذا كانت الإجابة بـ (نعم)، فماذا تناولت بالتفصيل؟ تحقق من كل ما تناولته المرأة حتى تقول أنها لم تتناول شيئاً آخر.
كرر السؤال السابق حتى تخبرك المشاركة بأنها بعد ذلك خلدت للنوم حتى اليوم التالي.

في حال ذكر المشاركة لتناول أطعمة مختلفة المكونات مثل العصيدة أوالحساء، أطرح عليها السؤال التالي.
(ج) ما مكونات هذا الطبق؟ وتحقق من وجود أي مكون آخر حتى تقول المشاركة لا توجد مكونات أخرى.

بينما تسرد المشاركة الاطعمة التي تناولتها أكد عليها أن الكمية التي تناولتها أكثر من 15 جرام أو ملعقة طعام واحدة ممتلئة.
ضع خطاً تحت كل طعام ودائرة حول الرقم «1» في العمود المجاور لفئة الطعام، وإذا ذكر طعام غير مدرج بالقائمة، دونه تحت «أطعمة أخرى». إذا كان الطعام المتناول أقل من 15 جرام أوأستخدمت كبهارات أو منكهات، فدونها تحت فئة «البهارات والمنكهات».
وحال انتهاء المشاركة من سرد الأطعمة التي تناولتها المراة، أطرح عليها كل سؤال لم يتم وضع دائرة حول الرقم «1»
اطرح الاسئلة التاليه ضع دائره حول الرقم «1» إذا كانت الإجابة بـ (نعم)، وحول «2» إذا كانت بـ (لا)، وحول «9» إن كانت لا تعرف:
هل تناولت أي من مجموعات الأغذية التالية أمس أثناء النهار أو الليل؟

	نعم	لا	لا اعرف
A. الذرة , الأرز , القمح , الذرة الحلوة , الدخن أو الأطعمة الأخرى المجهزة من هذه الحبوب أو أي من الحبوب ألاخرى (مثل الخبز , المعكرونة , العصيدة , وغيرها من المنتجات المجهزة من الحبوب والحبوب المحلية).	1	2	9
B. البطاطس البيضاء , الفندال الابيض من الداخل , المهوجو , الكاسافا أوأي أطعمة مجهزة من الجذرو الأخرى	1	2	9
C. الفول , الحمص , العدس	1	2	9
D. المكسرات والبذور وتشمل الفستق , الكازو و بذور دوار الشمس , الخ			

E. الحليب , الجبن , الروب أوغيرها من الأطعمة المصنعة من الحليب	1	2	9
F. الكبد أو الكلى أو القلب أو ما شابهها من لحوم أعضاء الحيوانات.	1	2	9
G. أي لحوم مثل لحم العجل أو الضأن أو الماعز أو الدجاج أو البط. إذا كانت الإجابة بـ»نعم» تأكد من تناول المشاركة للحوم ذاتها وليس الحساء المطهي باللحم. أما إن كانت قد تناولت حساءً، فسجل الإجابة بـ «لا».	1	2	9
H. الأسماك الطازجة أو المجففة أو أسماك المحار أو المأكولات البحرية إذا كانت الإجابة بـ»نعم» تأكد من تناول المشاركة الأسماك ذاتها وليس الحساء المطهي ب الأسماك. أما إن كانت قد تناولت حساءً، فسجل الإجابة بـ «لا».	1	2	9
I. البيض.	1	2	9
J. الخضروات الورقية ذات اللون الأخضر الداكن؟ مثل البقدونس, والجلجلان , الملوخية سبانخ	1	2	9
K. اليقطين أو الجزر أو القرع أو البطاطا الحلوة أو الخضروات الاخرى ذات اللون الأصفر أو البرتقالي من الداخل.	1	2	9
L. المانجو الناضج أو البابايا أو الشمام أو الفواكة الاخرى ذات اللون الاصفر من الداخل.	1	2	9
M. الخضروات الاخرى مثل البصل , البذنجان , الخيار , الفلفل الرومي , الطماط أو الباميا ...ألخ	1	2	9
N. الفواكة الاخرى مثل البرتقال , التفاح , التمر , البطيخ , الموز , العنب , الاناناس , البرقوق , الخوخ , الجوافة	1	2	9
O. الزيوت أو الدهون أو الزبد المضاف للطعام أو المستخدم للطهي.	1	2	9
P. الوجبات الخفيفة المقلية و المقرمشات مثل شبس , المينو , المعجنات المقلية	1	2	9
Q. الأطعمة الغنية بالسكريات مثل الشيكولاتة والحلويات والمعجنات والكعك والبسكويت.	1	2	9
R. المشروبات المحلاه مثل العصائر الفاكهه المحلاه والمشروبات الغازية و مشروب الشوكلاته , مشروبات الشعير, مشروبات الروب , الشاي بالسكر أو القهوة بالسكر	1	2	9
S. بهارات (بزارات) مثل الكركم , الافلفل الاسود , الافلفل الاحمر , الخ	1	2	9
T. الصلصات مثل (الصويا صوس و الشطة الحارة ..الخ)	1	2	9
U. أطعمة أو مشروبات أخرى	1	2	9

التغذية – الأغذية المتكررة على مدار أسبوع

والآن أود أن أطرح عليك عدداً من الأسئلة الخاصة بغذائك المعتاد على مدار سبعة أيام، والآن أسمحي لي بطرح عدد من الأسئلة الخاصة بغذاء على مدار أسبوع كامل في المعتاد والذي يتكون من ٧ ايام. لذا أرجو أن ينصب أهتمامك على عدد الأيام التي تتناول فيها الأغذية التالية ومرات تكرار تناولها.

والآن أود أن أعرف الأطعمة التي تعتادين تناولها على مدار أسبوع. كم عدد الأيام التي تتناولين فيها ومرات تكرار تناولها (سرد الأطعمة الواردة بالقائمة)	26 w. ما عدد المرات في اليوم التي تستهلكين الغذاء)؟ أذا أقل من مرة واحدة , أسال27w	27 w. كم عدد الأيام التي تستهلكين فيها الغذاء؟
A. الفاكهة ؟	إقل من مرة واحدة ..... 0 مرة واحدة ..... 1 مرتان ..... 2 ثلاث مرات أو أكثر ..... 3 لا أعرف 9	عدد الأيام ☐ غيرمعروف 9
B. الخضراوات؟ تشمل السلطات والخضراوات المطهية...إلخ.	إقل من مرة واحدة ..... 0 مرة واحدة ..... 1 مرتان ..... 2 ثلاث مرات أو أكثر ..... 3 لا أعرف 9	عدد الأيام ☐ غيرمعروف 9
C. النشويات وتشمل الثريد والخبز والأرز والمعكرونة والبطاطا وغيرها من الأغذية المجهزة من الحبوب.	إقل من مرة واحدة ..... 0 مرة واحدة ..... 1 مرتان ..... 2 ثلاث مرات أو أكثر ..... 3 لا أعرف 9	عدد الأيام ☐ غيرمعروف 9

D. البقوليات مثل الفول والعدس والحمص	0 إقل من مرة واحدة ..... 1 مرة واحدة ..... 2 مرتان ..... 3 ثلاث مرات أو أكثر ..... 9 لا أعرف	عدد الأيام ☐ غير معروف 9
E. منتجات الألبان وتشمل الحليب والكريمة والجبن واللبن الزبادي...إلخ.	0 إقل من مرة واحدة ..... 1 مرة واحدة ..... 2 مرتان ..... 3 ثلاث مرات أو أكثر ..... 9 لا أعرف	عدد الأيام ☐ غير معروف 9
F. اللحوم طازجة أو المجمدة وتشمل لحم العجل والضأن والدجاج والبيض والسمك والمأكولات البحرية.	0 إقل من مرة واحدة ..... 1 مرة واحدة ..... 2 مرتان ..... 3 ثلاث مرات أو أكثر ..... 9 لا أعرف	عدد الأيام ☐ غير معروف 9
G. اللحوم المصنعة وتشمل اللانشون والنقانق والسجق ونجت وفيلية والمنتجات المحلية مثل "الأسماك المملحة والمجففة".	0 إقل من مرة واحدة ..... 1 مرة واحدة ..... 2 مرتان ..... 3 ثلاث مرات أو أكثر ..... 9 لا أعرف	عدد الأيام ☐ غير معروف 9
H. الحبوب الباردة وتشمل حبوب الافطار الجاهزة مثل (كورن فلكس) "دوائر تشيريوس" و"رقائق فروستد" و"كرات العسل"...إلخ.	0 إقل من مرة واحدة ..... 1 مرة واحدة ..... 2 مرتان ..... 3 ثلاث مرات أو أكثر ..... 9 لا أعرف	عدد الأيام ☐ غير معروف 9
I. الأطعمة الغنية بالسكريات وتشمل الشكولاتة والحلويات والسكاكر والمعجنات والكعك والبسكويت.	0 إقل من مرة واحدة ..... 1 مرة واحدة ..... 2 مرتان ..... 3 ثلاث مرات أو أكثر ..... 9 لا أعرف	عدد الأيام ☐ غير معروف 9
J. البطاطس المقلية أو المعبأة وتشمل أصابع البطاطس المقلية أو رقائق البطاطس ورقائق خبز التورتيلا ورقائق "تشيتوس" والذرة وغيرها من رقائق المقبلات المحلية.	0 إقل من مرة واحدة ..... 1 مرة واحدة ..... 2 مرتان ..... 3 ثلاث مرات أو أكثر ..... 9 لا أعرف	عدد الأيام ☐ غير معروف 9
K. وجبة من مطاعم الوجبات السريعة مثل "ماكدونالدز" و"كنتاكي" و"بيتزا هت" و شوارما سواء داخل المطعم أو تناولها خارج.	0 إقل من مرة واحدة ..... 1 مرة واحدة ..... 2 مرتان ..... 3 ثلاث مرات أو أكثر ..... 9 لا أعرف	عدد الأيام ☐ غير معروف 9
L. عصائر طبيعية 100% بدون أضافة شي وتشمل البرتقال والعنب والتفاح والمانجو والأناناس.	0 إقل من مرة واحدة ..... 1 مرة واحدة ..... 2 مرتان ..... 3 ثلاث مرات أو أكثر ..... 9 لا أعرف	عدد الأيام ☐ غير معروف 9
M. الصودا المحلاة والمشروبات الغازية المحتوية على السكر وتشمل "كوكاكولا" و"سبرايت" ومثيلاتها من العلامات التجارية المحلية... إلخ، لكنها لا تشمل الصودا والمشروبات الخالية من السكر أو العصائر الطبيعية.	0 إقل من مرة واحدة ..... 1 مرة واحدة ..... 2 مرتان ..... 3 ثلاث مرات أو أكثر ..... 9 لا أعرف	عدد الأيام ☐ غير معروف 9
N. مشروبات الطاقة أو الرياضة وتشمل "كول آيد" و"هاي سي" و"غاتوريد" و"ريد بول" و"شراب الفيتامينات" و بوكاري...إلخ.	0 إقل من مرة واحدة ..... 1 مرة واحدة ..... 2 مرتان ..... 3 ثلاث مرات أو أكثر ..... 9 لا أعرف	عدد الأيام ☐ غير معروف 9

O. مشروبات الفاكهة المحلاة وتشمل "صن توب" و "تانج" و "فيمتو" و "الليموناده" و"الشاي المثلج والمحلى" و"لولو" و"أهلا" و"لولي لوب المثلج"...إلخ.	0 ..... إقل من مرة واحدة 1 ..... مرة واحدة 2 ..... مرتان 3 ..... ثلاث مرات أو أكثر 9 ..... لا أعرف	عدد الأيام ☐ غيرمعروف 9
P. الشاي أو القهوة بالسكر	0 ..... إقل من مرة واحدة 1 ..... مرة واحدة 2 ..... مرتان 3 ..... ثلاث مرات أو أكثر 9 ..... لا أعرف	عدد الأيام ☐ غيرمعروف 9

المكملات الغذائية

أود أن أطرح عليك الآن عدداً من الأسئلة حول الفيتامينات التي يحتمل أنك تتناولينها حاليا أو تناولتها مؤخرا.

W 28. هل تناولت أية أقراص أو شراب أو ابرة حديد على مدار الشهور الستة الماضية؟ اعرض أقراص أو شراب أو ابرة الحديد	1 ..... نعم 2 ..... لا 9 ..... غير متأكدة من أنها حديد	W->32 W->32
W 29. هل مازلت تتناولين أقراص أو شراب الحديد	1 ..... نعم 2 ..... لا	W->31
W 30. كم المدة التي أستمر فيها تناولك لأقراص أو شراب أو ابرة الحديد؟	1 ..... أسبوع أو أقل 2 ..... أكثر من أسبوع وأقل من شهر 3 ..... شهر أو أكثر	W->32 W->32
W 31. متى توقفت عن تناول أقراص أو شراب الحديد؟	1 ..... أقل من 3 شهور مضت 2 ..... منذ أكثر من 3 شهور	
W 32. هل تناولت أية أقراص أو شراب أو ابرة حمض الفوليك على مدار الأشهر الستة الماضية؟ اعرض كبسولات أقراص أو شراب أو ابرة حمض الفوليك	1 ..... نعم 2 ..... لا 9 ..... غير متأكدة من أنها حمض الفوليك	W->36 W->36
W 33. هل مازلت تتناولين أقراص أو شراب أو ابرة حمض الفوليك؟	1 ..... نعم 2 ..... لا	
W 34. كم أستمر تناولك لأقراص أو شراب أو ابرة حمض الفوليك؟	1 ..... أسبوع أو أقل 2 ..... أكثر من أسبوع وأقل من شهر 3 ..... شهر أو أكثر	W->36 W->36 W->36
W 35. متى توقفت عن تناول أقراص أو شراب أو ابرة حمض الفوليك؟	1 ..... أقل من 3 شهور مضت 2 ..... منذ أكثر من 3 شهور	
W 36. هل تناولت أية أقراص فيتامين " د " على مدار الأشهر الستة الماضية؟ اعرض أقراص فيتامين " د ".	1 ..... نعم 2 ..... لا 9 ..... غير متأكدة من أنها فيتامين "د"	W->38 W->38
W 37. كم أستمر تناولك لأقراص فيتامين " د "؟	1 ..... أسبوع أو أقل 2 ..... أكثر من أسبوع وأقل من شهر 3 ..... شهر أو أكثر	
W 38. هل تناولت أية أقراص الكالسيوم على مدار الأشهر الستة الماضية؟ اعرض أقراص الكالسيوم.	1 ..... نعم 2 ..... لا 9 ..... غير متأكدة من أنها كالسيوم	W->40 W->40
W 39. كم أستمر تناولك لأقراص الكالسيوم؟	1 ..... أسبوع أو أقل 2 ..... أكثر من أسبوع وأقل من شهر 3 ..... شهر أو أكثر	
W 40. هل تناولت أية كبسولات فيتامين " أ " على مدار الشهور الستة الماضية؟ أعرض كبسولات فيتامين " أ ".	1 ..... نعم 2 ..... لا 9 ..... غير متأكدة من أنها فيتامين "أ"	
W 41. هل تناولت أية مكملات متعددة الفيتامينات على مدار الشهور الستة الماضية؟	1. نعم 2. لا 9. غير متأكدة من أنها متعددة الفيتامينات	W->43 W->43

W 41. هل تناولت أية مكملات متعددة الفيتامينات على مدار الشهور الستة الماضية؟	1 ..... نعم 2 ..... لا 9 ..... غير متأكدة من أنها متعددة الفيتامينات	 W->43 W->43
W 42. ما الفيتامينات التي أشتملت عليها المكملات متعددة الفيتامينات؟ أطرح سؤالاً منفصلاً عن كل فيتامين/معدن. ضع علامة عند "نعم" لكل فيتامين مذكور بالقائمة.	A الحديد 2 1 B حمض الفوليك 2 1 C الزنك 2 1 D فيتامين "أ" 2 1 E فيتامين "د" 2 1 F فيتامين "ب 12" 2 1 G كالسيوم 2 1 H لا أعرف 9 9	
W 43. هل تناولت أية فيتامينات أخرى أو مكملات معادن على مدار الشهور الستة الماضية؟	1 ..... نعم 2 ..... لا 9 ..... غير متأكدة من أنها متعددة الفيتامينات	 W->45 W->45
W 44. ما هو اسم هذه المكملات ألاخرى	حدد----------	

المعرفة بالأغذية المدعمة بالفيتامينات

سأطرح عليك الآن أسئلة تتعلق ببعض الأطعمة التي قد تحتوي على مغذيات إضافية.

W 45.هل تعلمين بوجود الدقيق المدعم بالفيتامينات؟	1 ..... نعم 2 ..... لا 9 ..... لا أعرف	 W->48 W->48
W 46. هل تستخدمين الدقيق المدعوم بالفيتامينات؟	1 ..... دائماً 2 ..... عادةً 3 ..... أحياناً 4 ..... أبداً 9 ..... لا أعرف	
W 47. ما فوائد الدقيق المدعوم بالفيتامينات في رأيك؟ حدد كافة إجابات المشاركة.	A ..... تحسن الحالة الصحية B ..... تمنع الأنيميا C ..... تمنع نقص الحديد Y ..... أخرى (تحدد) Z ..... لا أعرف	
W 48. هل تعلمين بوجود ملح مدعم باليود؟	1 ..... نعم 2 ..... لا 9 ..... لا أعرف	 W->51 W->51
W 49. هل تستخدمين الملح المدعم باليود؟	1 ..... دائماً 2 ..... عادةً 3 ..... أحياناً 4 ..... أبداً 9 ..... لا أعرف	
W 50. لماذا يُعَد الملح المدعم باليود هاماً في رأيك؟ حدد كافة إجابات المشاركة.	A ..... يمنع نقص اليود B ..... يحسن من معدل الذكاء C ..... يمنع نقص الفيتامينات D ..... يحسن الحالة الصحية Y ..... أخرى (تحدد) Z ..... لا أعرف	

الاتجاهات والسلوكيات النسائية		
W 51. هل تدخنين أي من منتجات الدخان مثل السجائر أو البايب أو الشيشة؟	1 ..... نعم 2 ..... لا 9 ..... لا أعرف	W->55 W->55
W 52. هل تدخنين حاليا التبغ بأستمرار وبصورة يومية؟	1 ..... نعم 2 ..... لا 9 ..... لا أعرف	
W 53. هل تدخنين السجائر أو الشيشة؟	1 ..... نعم 2 ..... لا 9 ..... لا أعرف	W->55 W->55
w 54. في المعدل/ كم سجارة أو أرجيلة شيشة تدخنين كل يوم ؟	كل يوم ..... ☐ 99 لاأعرف	W->51 W->51
w 55. هل حاولت الإقلاع عن التدخين على مدار العام الماضي؟	1 ..... نعم 2 ..... لا 9 ..... لا أعرف	
W 56. عندما تكونين خارج المنزل، هل تحرصين على حماية رأسك من أشعة الشمس؟	1 ..... أبداً/نادراً 2 ..... أحياناً 3 ..... معظم الوقت 4 ..... دائماً	W->58
W 57. عندما تكونين خارج المنزل، كيف تحمين رأسك من أشعة الشمس؟	1 ..... وشاح/ غطاء رأس 2 ..... قبعة 3 ..... شمسية 4 ..... غيرها (يحدد)	
W 58. عندما تكونين خارج المنزل، هل تحرصين على حماية ذراعيك من أشعة الشمس؟	1 ..... أبداً/نادراً 2 ..... أحياناً 3 ..... معظم الوقت 4 ..... دائماً	
W 59. عندما تكونين خارج المنزل، هل تحرصين على تغطية يديك؟	1 ..... أبداً/نادراً 2 ..... أحياناً 3 ..... معظم الوقت 4 ..... دائماً	
W 60. ما الأنشطة التي تمارسينها وتعرضك لأشعة الشمس مباشرا؟ تحقق من وجود أية أنشطة أخرى. حدد كافة الأنشطة التي تنطبق على الحالة.	A ..... المشي لاستقلال الحافلة/التاكسي B ..... المشي للمحال التجارية/العمل C ..... العمل خارج المنزل D ..... متابعة الأطفال خارج المنزل E ..... قضاء الإحتياجات المنزلية خارج المنزل. X أخرى (يحدد) Y ..... لا أعرف	
W 61. كم عدد الساعات التي تتعرضين فيها لأشعة الشمس في المتوسط؟ يرجى الإجابة في ضوء سلوكياتك على مدار الأسبوعين الماضيين.	1 ..... لا أتعرض للشمس 2 ..... 0-29 دقيقة 3 ..... 30-59 دقيقة 4 ..... 1-2 ساعة 5 ..... 2-3< ساعات 6 ..... 3< ساعات 9 ..... لا أعرف	
W 62. هل تستخدمين في المعتاد كريم واقي ضد الشمس لحماية بشرتك حين التعرض لأشعة الشمس؟	1 ..... شديد البياض 2 ..... أبيض 3 ..... قمحي 4 ..... أسمر 5 ..... شديد السمرة/أسود 6 ..... عجز عن الملاحظة	

النشاط البدني وعادات النوم

والآن أود أن أطرح عليك عدداً من الأسئلة الخاصة بنشاطك البدني المعتاد.

W 64. ما متوسط وقت مشاهدتك لبرامج التلفاز أو أفلام الفيديو يومياً؟	ساعات ☐☐ دقائق ☐☐	1 2 3 99	لا أشاهد لا أعرف
W 65. ما معدل الوقت الذي تمارسين فيه ألعاب الفيديو أو الحاسب الآلي يومياً؟ تشمل الألعاب المحملة على الأجهزة الذكية مثل "آيفون" والحواسيب اللوحية وأجهزة ألعاب الفيديو المحمولة.	ساعات ☐☐ دقائق ☐☐	1 2 3 99	لا أمارس لا أعرف
W 66. هل عادة ما تتناولين طعاماً وأنت تشاهدين التلفاز؟	مطلقاً/نادراً ..... وجبة واحدة يومياً ..... وجبتان يومياً ..... ثلاث وجبات أو أكثر ..... لا أعرف	0 1 2 3 9	
W 67. هل يوجد جهاز تلفاز أو حاسب آلي في غرفة نومك؟	نعم ..... لا ..... لا أعرف	1 2 9	
W 68. ما متوسط ساعات النوم التي يستغرقينها يومياً؟ الرجاء ذكر ساعات النوم في الليل أو القيلولة أو ما شابهها من إغفاءات، مع مراعاة ضرورة التفرقة بين أيام الأسبوع العادية وعطلات نهاية الأسبوع	عدد ساعات الأسبوع العادية ☐☐ عدد ساعات العطلة الأسبوعية ☐☐ لا أعرف	1 2 99	
W 69. هل تمارسين نشاطًا بدنياً منظماً بشكل أسبوعي مثل حصة تمارين أو ممارسة رياضة ؟	نعم ..... لا ..... لا أعرف	1 2 9	W->71
W 70. ما النشاط البدني المنظم الذي تمارسينه بشكل أسبوعي؟ W 71. ما مدة ممارسة هذا النشاط أسبوعياً	ضع دائرة حول الرمز / الأيام / لا أعرف		
	1. المشي	7 6 5 4 3 2 1	9
	2. برنامج لياقة بدنية	7 6 5 4 3 2 1	9
	3. ايروبك	7 6 5 4 3 2 1	9
	4. الركض	7 6 5 4 3 2 1	9
	8. أخرى	7 6 5 4 3 2 1	9
	9. لا أعرف	7 6 5 4 3 2 1	9
W 72 . هل تعملين خارج المنزل مقابل أجر مادي؟	نعم ..... لا ..... لا أعرف	1 2 9	W->80 W->80
W 73 . هل يتضمن عملك القيام بمجهود بدني عنيف مما يتسبب في زيادة معدل تنفسك أو نبضات القلب مثل (حمل أوزان ثقيلة أو الحفر أو أعمال التشييد والبناء) لمدة لا تقل عن عشر دقائق مستمرة؟	نعم ..... لا ..... لا أعرف	1 2 9	W->76 W->76
W 74 . كم عدد أيام الأسبوع التي تقومين فيها بنشاط بدني عنيف كجزء من عملك؟	عدد الأيام ☐ لاأعرف 9		
W 75 . ما مدة النشاط البدني العنيف الذي تقومين به خلال العمل اليومي؟	الساعات ☐☐ الدقائق ☐☐ لا أعرف	1 2 99	
W 76 . هل يتضمن عملك نشاطاً بدنياً معتدلاً لا يتسبب في زيادة التنفس أو نبضات القلب بصورة كبيرة (مثل الهرولة أو حمل أوزان خفيفة) لمدة لا تقل عن عشر دقائق مستمرة	نعم ..... لا ..... لا أعرف	1 2 9	W->79 W->79
W 77 . كم عدد أيام الأسبوع التي تقومين فيها بنشاط بدني متوسط كجزء من عملك؟	عدد الأيام ☐ لاأعرف 9		

W 78. ما مدة النشاط البدني المتوسط الذي تقومين به يومياً كجزء من عملك؟	ساعات □□ دقائق □□ لا أعرف	1 2 99	
W 79. هل تمشين عادة على قدميك أم تقودين الدراجة لمقر عملك أو مدرستك أو لقضاء شؤونك؟	نعم ..... لا ..... غير قادرة على السير أو ركوب الدراجة . لا أعرف	1 2 3 9	
W 80. ما المدة التي تقضينها جالسة يومياً طوال أيام الاسبوع؟	ساعات □□ لا أعرف	1 99	
W 81. ما المدة التي تقضينها جالسة يومياً طوال أيام العطلة الأسبوعية؟	□ لاأعرف	كل يوم 99	
القياسات الجسمانية للمرأة			
W 82. رقم آخذ القياس:	الرقم □□□		
W 83. مقياس محيط العضد (للحوامل فقط)	سم □□□		
خاص بغير الحوامل فقط			
W 84 . وزن المرأة	كغ □□□□ لم يؤخذ القياس 99		
W 85. هل خلعت المرأة حذاءها وتحللت من ملابسها الثقيلة عند قياس الوزن؟	نعم ..... لا	1 2	
W 86. طول المرأة	سم □□□□ لم يؤخذ القياس 99		
W 87. محيط الورك	سم □□□□ لم يؤخذ القياس 999.9		
W 88. محيط الخصر	سم □□□□ لم يؤخذ القياس 999.9		
W 89. سبب عدم أخذ القياس	معاقة ..... رفضت ..... أخرى(يحدد)	1 2 8	
أخذ عينة الدم **النساء المختارات الغير حوامل : تؤخذ العينة من الوريد** **النساء الحوامل و(النساءالغير مختارات والغير حوامل): تؤخذ العينة من الأصبع لقياس مستوى الأنيميا**			
W 90. تم أختيار المرأة في هذا المنزل لسحب عينة الدم من وريد الذراع ؟ أرجع للسؤال w8 في الصفحة الاولى	نعم ..... لا	1 2	الرجاء إلصاق ملصق رقم المراة هنا (يبدأ بحرف "w")
W 91. هل تأذنين لنا بأخذ عينة دم من أصبعك (للحوامل والنساءالغير حوامل الغيرمختارات في العينة) أو الوريد (النساءالغير حوامل مختارات في العينة)؟	نعم ..... لا	1 2	توقف ->
W 92. تركيز الهيموجلوبين (ج/ل)	هيموجلوبين..... □□□		
W 93. المعدل التقريبي للعينة المأخوذة (ملم)	ملم..... □□□□ لا يوجد دم، المرأة حامل والمراة الغيرحامل الغيرمختارة في العينة 99		

H 94. ملاحظات الباحث ☐☐☐
H 95. ملاحظات المشرف الميداني ☐☐☐
H 96. ملاحظات المشرف ☐☐☐
H 97. ملاحظات آخذ القياسات ☐☐☐

المسح الوطني العُماني للتغذية ٢٠١٦ أستمارة الطفل

الرجاء إلصاق ملصق رقم الأسرة هنا يبدأ بحرف «H»

C 275. رقم المربع السكني : ☐☐☐	C 276. رقم المنزل : ☐☐☐
C 277. إسم الطفل:	C 278. رقم الطفل المتسلسل المدون بقائمة الاسرة: ☐☐
C 6. تاريخ جمع البيانات 20☐☐ / ☐☐ / ☐☐ (السنة / الشهر / اليوم)	C 5. رقم الباحث: ☐☐☐
C 7. النتيجة النهائية لجمع بيانات الطفل: ..... أدخل أحد الرموز المدرجة أسفله ☐	
رموز النتيجة النهائية: 1. أكتملت كافة البيانات (المقابلة والقياسات الجسمانية وأخذ عينة الدم) 2. أكتملت المقابلة وأخذ القياسات الجسمانية ورفض أخذ العينة 3. أكتملت المقابلة ورفض أخذ القياسات الجسمانية ورفض أخذ العينة	4. رفض المقابلة وباقي البيانات 5. الطفل لم يكن بالمنزل وقت الزيارة 8. أخرى
C 8. تم أختيار الاطفال في هذا المنزل لسحب عينة الدم من وريد الذراع ؟ أرجع للسؤال H9 في أستمارة المنزل	نعم ..... 1 لا 2
نحن نتبع وزارة الصحة ونجري المسح الوطني للتغذية لكي نقف على الفهم الصحيح لقضايا التغذية المختلفة مثل السمنة والوزن الزائد والأنيميا وحالات نقص الفيتامينات والمواد المعدنية لدى النساء ما بين عمر (15-49) سنة والأطفال دون سن الخمس سنوات، الأمر الذي يعين السلطات الرسمية على وضع خطة مستقبلية لتحسين الأوضاع الصحية.	بعد رد ولى أمر الطفل على عبارتك الافتتاحية، انتقل للعبارة التالية: والآن دعينا نتحدث قليلاً بشأن الوضع الصحي الخاص ب(اسم الطفل) وغيرها من الموضوعات، مع الأخذ في الاعتبار الاقتصار على ما يتعلق بهذا الطفل فقط، لكي لا تختلط بياناته ببيانات أقرانه المقيمين معه في المنزل. ستستغرق الاستبانة حوالي عشرين دقيقة، ستقومين خلالها بالرد على مجموعة من الأسئلة وأخذ قياسات الطول والوزن وعينة دم للطفل (اسم الطفل).
هل يمكننا البدء الآن؟	1. نعم : أوافق – لنبدأ 2. لا أوافق – أكمل بيانات هذه الصفحة ثم ناقش الأمر مع قائد الفريق.

بيانات الطفل		
C 9. هل (أسم الطفل) ذكر أم أنثى؟	ذكر ..... 1 أنثى 2	
C 10. ما تاريخ ميلاد (أسم الطفل) التفصيلي باليوم والشهر والسنة؟ أطلب بطاقة صحة الطفل الوردية وتأكد من تاريخ ميلاد الطفل .	اليوم ☐☐ الشهر ☐☐ السنة ☐☐ ان كان غير معروف سجل "99"	
C 11. كم عمر (أسم الطفل)؟ تحقق :كم كان عمر الطفل في اخر عيد ميلاد له سجل "00" إن كان عمر الطفل أقل من شهر واحد. سجل "99" إن كان العمر غير معروف. قارن بين تاريخ الميلاد مع العمر المسجل ، وصحح ما يحويه أيهما من أخطاء	العمر ☐☐ (بالشهور كاملة) ان كان غير معروف سجل "99"	
بيانات تخص ميلاد الطفل		
C 12. هل سجل وزن الطفل بعد ولادتة ؟	نعم ..... 1 لا ..... 2 لا أعرف 9	C->14 C->14
C 13. كم بلغ وزن (اسم الطفل) بعد ولادتة ؟ سجل الوزن من واقع البطاقة الصحية إن أمكن ذلك.	من واقع البطاقة الصحية ☐☐☐☐ كجم. A من الذاكرة ☐☐☐☐ كجم. B لا أعرف 99 C	
C 14. هل أنت أم هذا الطفل؟	نعم 1 إن كانت الإجابة بـ (نعم)، سجل الرقم المسلسل الخاص بالأم في قائمة الأسرة.(السؤال رقم H18) رقم الأم ☐☐ لا 2	
C 15. هل أم هذا الطفل على قيد الحياة؟	نعم ..... 1 لا ..... 2 لا أعرف 9	C->17 C->17
C 16. هل تعيش أم هذا الطفل في هذا المنزل؟	نعم 1 إن كانت الإجابة بـ (نعم)، سجل الرقم المسلسل الخاص بالأم في قائمة الأسرة.(السؤال رقم H18) رقم الأم ☐☐ لا 2	
C 17. هل والد (أسم الطفل) على قيد الحياة؟	نعم ..... 1 لا 2	C->19
C 18. هل والد (أسم الطفل) يعيش في هذا المنزل ؟	1. نعم ..... 1 إن كانت الإجابة بـ (نعم)، سجل الرقم المسلسل الخاص بالأب في قائمة الأسرة.(السؤال رقم H18) رقم الأب ☐☐ 2. لا 2	
الأمراض التي أصيب بها الطفل		
والآن أود أن أطرح عليك عددًا من الأسئلة الخاصة بالأمراض التي أصيب بها (اسم الطفل) خلال الأسبوعين الماضيين فقط، وأرجو التركيز على هذه الفترة وعدم ذكر ما قبل ذلك.		
C 19. هل أصيب (اسم الطفل) بالإسهال خلال الأسبوعين الماضيين؟ يقصد بالإسهال نزول البراز على شكل سائل ثلاث مرات يومياً على الأقل.	نعم ..... 1 لا ..... 2 لا أعرف 9	
C 20. هل أصيب (اسم الطفل) بالحمى خلال الأسبوعين الماضيين؟	نعم ..... 1 لا ..... 2 لا أعرف 9	

C 21. هل أصيب (اسم الطفل) بمرض مصحوب بالسعال خلال الأسبوعين الماضيين؟	نعم ..... 1 لا ..... 2 لا أعرف 9	C->24 C->24
C 22. عندما أصيب (اسم الطفل) بالسعال، هل زاد معدل تنفسه عن المعتاد مع ملاحظة تقطع أنفاسه أو وجود صعوبة في التنفس؟	نعم ..... 1 لا ..... 2 لا أعرف 9	C->24 C->24
C 23. هل كان سبب سرعة أو صعوبة التنفس تعرض الطفل لمشاكل في الصدر أم لانسداد الأنف أو سيلانه؟	وجود مشكلة في الصدر ..... 1 إنسداد الأنف أو سيلانها ..... 2 كلاهما ..... 3 غيرها (يحدد) ..... 8 لا أعرف 9	

التغذية – الطفل دون عمر السنتين

* ملاحظة: الأسئلة من C24إلى C34 خاصة بغذاء الطفل دون عمر السنتين لذا يرجاء التحقق من عمر الطفل المدون أعلى ، وفي حال بلوغ عمر الطفل 24 شهرًا أو أكثر، أنتقل إلى السؤال رقم C35 .
والآن اسمحي لي بطرح عدد من الأسئلة الخاصة بغذاء (اسم الطفل)، مع الاقتصار على ما يخص هذا الطفل بعينه وعدم الخلط بينه وبين أقرانه ممن يسكنون هذا المنزل

C 24. هل رضع (أسم الطفل) طبيعياً؟ بما في ذلك تناول حليب الأم بالملعقة أو بالزجاجة، أو الرضاعة الطبيعية من قبل امرأة أخرى.	نعم ..... 1 لا ..... 2 لا أعرف 9	C->27 C->27
C 25. متى رضع (أسم الطفل) لأول مرة بعد ولادته؟ إذا رضع الطفل مباشرا بعد الولاده ضع دائرة حول مباشرا إذا رضع الطفل فأقل من ساعة سجل 00 في مربع الساعة إذا رضع الطفل فأكثر من ساعة سجل عدد الساعات في مربع الساعة إذا رضع الطفل فأيام سجل عدد الايام في مربع الايام	مباشرا 0 الساعات 1 ☐☐ الأيام 2 ☐☐ لا أعرف 99	
C 26. هل (اسم الطفل) رضع يوم أمس أثناء النهار أو الليل ؟ بما في ذلك تناول حليب الأم بالملعقة أو بالزجاجة، أو الرضاعة الطبيعية من قِبَل امرأة أخرى.	نعم ..... 1 لا ..... 2 لا أعرف 9	
C 27. هل تناول (اسم الطفل) أي شيء أمس أثناء النهار أو الليل باستخدام الزجاجة ذات الحلمة ؟	نعم ..... 1 لا ..... 2 لا أعرف 9	
C 28. هل تناول (اسم الطفل) محلول معالجة الجفاف أمس أثناء النهار أو الليل ؟	نعم ..... 1 لا ..... 2 لا أعرف 9	
C 29. هل تناول (اسم الطفل) أية مكملات غذائية من فيتامينات ومعادن أو أية أدوية أمس أثناء النهار أو الليل ؟	نعم ..... 1 لا ..... 2 لا أعرف 9	

C 30. أود أن أطرح عليك أسئلة تتعلق بالسوائل التي تناولها (اسم الطفل) أمس أثناء النهار أو الليل. هل تناول (اسم الطفل) (أحد بنود القائمة)؟ اسرد قائمة السوائل بدءاً من الماء العادي.	نعم	لا	لا أعرف	C 31. كم عدد المرات التي تناول (اسم الطفل) فيها أمس أثناء النهار أو الليل. إن كان العدد 7 فأكثر، سجل 7، وإن كان غير معروف، سجل 9.
A. الماء العادي	1	2	9	☐
B. تركيبة خاصة بالأطفال مثل نان , سيملاك , بروجرس أو أبتميل	1	2	9	☐
C. حليب مثل حليب معلب أو مسحوق أو حليب حيوانات	1	2	9	☐
D. عصائر/مشروبات	1	2	9	☐
E. شربة أو سوب/ الحساء	1	2	9	☐
F. روب	1	2	9	☐
G. عصيدة رقيقة	1	2	9	☐
H. سوائل أخرى مثل اليانسون أو الشاي العشبي أو الجلوكوز أو ماء غريب المهدئ أو دار الدواء	1	2	9	☐
I. سوائل أخرى	1	2	9	☐

C 32. الرجاء ذكر ما تناوله (أسم الطفل) أمس أثناء النهار أو الليل سواء داخل المنزل أو خارجه.

أ) تذكري متى أستيقظ (أسم الطفل) من النوم أمس؟ وهل تناول أية طعام حينئذ؟ إذا كانت الإجابة بـ (نعم)، فماذا تناول بالتفصيل؟ تحقق من كل ما تناوله الطفل حتى تقول المشاركة أنه لم يتناول شيئاً آخر. وإن كانت الإجابة بـ (لا)، انتقل للسؤال B.
ب) ماذا فعل (اسم الطفل) بعد ذلك؟ وهل تناول أية أطعمة وقتها؟ كانت الإجابة بـ (نعم)، فماذا تناول بالتفصيل؟ تحقق من كل ما تناوله الطفل حتى تقول المشاركة أنه لم يتناول شيئاً آخر.
كرر السؤال السابق

(ت) حتى تخبرك المشاركة بأن الطفل بعد ذلك خلد للنوم حتى اليوم التالي.
في حال ذكر المشاركة لتناول الطفل أطعمة مختلفة المكونات مثل العصيدة أوالحساء، اطرح عليها السؤال التالي.

ث) ما مكونات هذا الطبق؟ وتحقق من وجود أي مكون آخر حتى تقول المشاركة لا توجد مكونات أخرى.
بينما تسرد المشاركة المكونات، ضع خطاً تحت كل طعام ودائرة حول الرقم "1" في العامود المجاور لفئة الطعام، وفي حال ذكر طعام غير مدرج بالقائمة، دونه تحت "أطعمة أخرى". أما بالنسبة للمكونات المستخدمة لتزيين الطعام وكبهارات أو منكهات، فيتم تدوينها تحت فئة "البهارات والمنكهات".
وحال انتهاء المشاركة من سرد الأطعمة التي تناولها الطفل، أطرح عليها كل سؤال لم يتم وضع دائرة حول الرقم "1",
اطرح الاسئلة التاليه ضع دائره حول الرقم "1" إذا كانت الإجابة بـ (نعم)، وحول "2" إذا كانت بـ (لا)، وحول "9" إن كانت لا تعرف:

هل أكل او شرب (أسم الطفل) أي من مجموعات الأغذية التالية أمس أثناء النهار أو الليل ؟

	نعم	لا	لا أعرف
A. الخبز أو الأرز , المعكرونة أو العصيدة أو غيرها من الأطعمة المجهزة من الحبوب.	1	2	9
B. اليقطين أو الجزر أو القرع أو الفندال أو البرتقالي من الداخل؟	1	2	9
C. البطاطس البيضاء أو الفندال أو المهوجوا أو الكاسافا أو الأطعمة المجهزة من الجذور الأخرى؟	1	2	9
D. الخضروات الورقية ذات اللون الأخضر الداكن؟	1	2	9
E. المانجو الناضج أو البابايا أو الشمام؟	1	2	9
F. أي من الخضراوات والفاكهة الأخرى؟	1	2	9
G. لحم الكبد أو الكلى أو القلب أو ما شابهها من لحوم أعضاء الحيوانات؟	1	2	9
H. أية لحوم مثل لحم العجل أو الضأن أو الماعز أو الدجاج أو البط؟	1	2	9
I. البيض؟	1	2	9
J. الأسماك الطازجة أو المجففة أو أسماك المحار أو المأكولات البحرية؟	1	2	9
K. الأطعمة المجهزة من البقوليات كالفول أو الحمص أو العدس أو المكسرات أو البذور؟	1	2	9
L. الجبن , اللبن أو غيره من الأطعمة المصنعة من الحليب؟	1	2	9
M. الزيوت أو الدهون أو الزبد المضاف للطعام أو المستخدم للطهي؟	1	2	9
N. الأطعمة الغنية بالسكريات مثل الشيكولاتة والحلويات والمعجنات والكعك والبسكويت؟	1	2	9
O. العسل؟	1	2	9
P. البهارات أو المنكهات	1	2	9

تأكد من المجموعات A-O في الاعلى	اذا كانت كل الاجابات "لا" انتقل الي C33 , اذا كان على الاقل واحد "نعم" أو كل لا "أعرف" أنتقل الي C34	
C 33. هل تناول (أسم الطفل) طعاماً صلباً أو شبه صلب (لين أو مهروس) أمس أثناء النهار أو الليل ؟ إن كانت الإجابة على هذا السؤال بـ (نعم) وكانت الإجابات على الأطعمة السابقة كلها (لا)، وجب عليك التوقف للتحقق من الأمر	نعم ..... 1 لا ..... 2 لا أعرف 9	C->51 C->51
C 34. كم عدد المرات التي تناول فيها (أسم الطفل) طعاماً صلباً أو شبه صلب (لين أو مهروس) أمس أثناء النهار أو الليل ؟	عدد المرات ☐☐	C->51

التغذية – الطفل ما بين سن سنتين إلى خمس سنوات

* ملاحظة: يختص السؤالان C35 و C36 بغذاء الطفل في عمر السنتين وأكثر، لذا يرجاء التحقق من عمر الطفل المدون أعلى، وفي حال بلوغ عمر الطفل أقل من 24 شهراً، تأكد من إجابة المشاركة عن الأسئلة من C24 إلى C34، وبعدها انتقل للسؤال رقم C51.
والآن أسمحي لي بطرح عدد من الأسئلة الخاصة بغذاء (أسم الطفل)، والتي تختص بما يتناوله الطفل من غذاء على مدار أسبوع كامل في المعتاد والذي يتكون من 7 ايام. يرجاء التفكر في عدد الأيام التي يتناول فيها (اسم الطفل) الأطعمة التالية في المعتاد، وكذا عدد مرات تناولها.

والآن أود أن أعرف لأطعمة التي يتناولها (اسم الطفل) على مدار أسبوع في المعتاد. كم عدد الأيام التي يتناول فيها (اسم الطفل) (اسرد الأطعمة الواردة بالقائمة)	C 35. كم عدد المرات في اليوم التي يستهلك فيها (أسرد قائمة الغذاء)؟ أذا أقل من مرة واحدة , أسال C36	C 36. كم عدد الأيام التي يستهلك فيها الغذاء خلال اسبوع؟
A. الفاكهة	إقل من مرة واحدة ..... 0 مرة واحدة ..... 1 مرتان ..... 2 ثلاث مرات أو أكثر ..... 3 لا أعرف 9	عدد الأيام ☐ لاأعرف 9
B. الخضراوات بما في ذلك السلطات والخضار المطبوخ...إلخ.	إقل من مرة واحدة ..... 0 مرة واحدة ..... 1 مرتان ..... 2 ثلاث مرات أو أكثر ..... 3 لا أعرف 9	عدد الأيام ☐ لاأعرف 9
C. النشويات وتشمل الثريد والخبز والأرز والمعكرونة و بطاطا وغيرها من الأغذية المجهزة من الحبوب.	إقل من مرة واحدة ..... 0 مرة واحدة ..... 1 مرتان ..... 2 ثلاث مرات أو أكثر ..... 3 لا أعرف 9	عدد الأيام ☐ لاأعرف 9
D. منتجات الألبان وتشمل الحليب والكريمة والجبن واللبن الزبادي...إلخ.	إقل من مرة واحدة ..... 0 مرة واحدة ..... 1 مرتان ..... 2 ثلاث مرات أو أكثر ..... 3 لا أعرف 9	عدد الأيام ☐ لاأعرف 9
E. اللحوم الطازجة أو المجمدة وتشمل لحم العجل والضأن والدجاج والبيض والسمك والمأكولات البحرية والبقوليات .	إقل من مرة واحدة ..... 0 مرة واحدة ..... 1 مرتان ..... 2 ثلاث مرات أو أكثر ..... 3 لا أعرف 9	عدد الأيام ☐ لاأعرف 9
F. اللحوم المصنعة وتشمل اللانشون والنقانق والسجق والمنتجات المحلية مثل "الأسماك المملحة والمجففة".	إقل من مرة واحدة ..... 0 مرة واحدة ..... 1 مرتان ..... 2 ثلاث مرات أو أكثر ..... 3 لا أعرف 9	عدد الأيام ☐ لاأعرف 9
G. الحبوب الباردة وتشمل حبوب الافطار مثل (كورن فلكس) "دوائر تشيريوس" و"رقائق فروستد" و"كرات العسل"...إلخ.	إقل من مرة واحدة ..... 0 مرة واحدة ..... 1 مرتان ..... 2 ثلاث مرات أو أكثر ..... 3 لا أعرف 9	عدد الأيام ☐ لاأعرف 9
H. الأطعمة الغنية بالسكريات وتشمل الشكولاتة والحلويات والسكاكر والمعجنات والكعك والبسكويت.	إقل من مرة واحدة ..... 0 مرة واحدة ..... 1 مرتان ..... 2 ثلاث مرات أو أكثر ..... 3 لا أعرف 9	عدد الأيام ☐ لاأعرف 9
I. البطاطس المقلية أو المعبأة وتشمل أصابع البطاطس المقلية أو رقائق البطاطس ورقائق خبز التورتيلا ورقائق "تشيتوس" والذرة وغيرها من رقائق المقبلات المحلية.	إقل من مرة واحدة ..... 0 مرة واحدة ..... 1 مرتان ..... 2 ثلاث مرات أو أكثر ..... 3 لا أعرف 9	عدد الأيام ☐ لاأعرف 9

J. وجبة من مطاعم الوجبات السريعة مثل "ماكدونالدز" و "كنتاكي" و"بيتزا هت" سواء داخل المطعم أو تناولها خارجه.	إقل من مرة واحدة ..... 0 مرة واحدة ..... 1 مرتان ..... 2 ثلاث مرات أو أكثر ..... 3 لا أعرف 9	عدد الأيام ☐ لاأعرف 9
K. عصائر طبيعية ١٠٠٪ بدون اضافة شي وتشمل البرتقال والعنب والتفاح والمانجو والأناناس.	إقل من مرة واحدة ..... 0 مرة واحدة ..... 1 مرتان ..... 2 ثلاث مرات أو أكثر ..... 3 لا أعرف 9	عدد الأيام ☐ لاأعرف 9
L. الصودا المحلاة والمشروبات الغازية المحتوية على السكر وتشمل "كوكاكولا" و"سبرايت" ومثيلاتها من العلامات التجارية المحلية... إلخ، لكنها لا تشمل الصودا والمشروبات الخالية من السكر أو العصائر الطبيعية.	إقل من مرة واحدة ..... 0 مرة واحدة ..... 1 مرتان ..... 2 ثلاث مرات أو أكثر ..... 3 لا أعرف 9	عدد الأيام ☐ لاأعرف 9
M. مشروبات الطاقة أو الرياضة وتشمل "كول آيد" ز "هاي سي" و"غاتوريد" و"ريد بول" و"شراب الفيتامينات"و بوكاري ..إلخ.	إقل من مرة واحدة ..... 0 مرة واحدة ..... 1 مرتان ..... 2 ثلاث مرات أو أكثر ..... 3 لا أعرف 9	عدد الأيام ☐ لاأعرف 9
N. مشروبات الفاكهة المحلاة وتشمل "صن توب" و"تانج" و"فيمتو" و"الليمونادة" و"الشاي المثلج والمحلى" و"لولو" و"أهلا" و"لولي لوب المثلج"...إلخ.	إقل من مرة واحدة ..... 0 مرة واحدة ..... 1 مرتان ..... 2 ثلاث مرات أو أكثر ..... 3 لا أعرف 9	عدد الأيام ☐ لاأعرف 9
O. الشاي أو القهوة بالحليب والسكر	إقل من مرة واحدة ..... 0 مرة واحدة ..... 1 مرتان ..... 2 ثلاث مرات أو أكثر ..... 3 لا أعرف 9	عدد الأيام ☐ لاأعرف 9
C 37. ما نوع زيت الطعام أوالدهن المضاف الي طعام الطفل ؟	زيت بذور النخيل ..... A زيت زيتون ..... B زيت سمسم ..... C زيت دوار الشمس ..... D زيت الذره ..... E زيت كانيولا ..... F سمن ..... G زبده حيوانية ..... H زبده نباتية /مرجرين ..... I زيت جوز الهند ..... J حميس/قشدة ..... K لايضاف زيت \ دهن ..... X لا أعرف ..... Z	

النشاط البدني وعادات النوم – الطفل ما بين عمر سنتين والخمس سنوات

C 38. ما معدل مشاهدة (اسم الطفل) برامج التلفاز وأفلام الفيديو يومياً؟	ساعات ☐☐ دقائق ☐☐ لا أشاهد 3 لا أعرف 99	1 2
C 39. ما معدل الوقت الذي يمارس فيه (اسم الطفل) ألعاب الفيديو أو الحاسب الآلي يومياً؟ تشمل الألعاب المحملة على الأجهزة الذكية مثل "آيفون" والحواسيب اللوحية وأجهزة ألعاب الفيديو المحمولة.	ساعات ☐☐ دقائق ☐☐ لا يمارس 3 لا أعرف 99	1 2
C 40. هل يشاهد عادة (اسم الطفل) التلفاز أثناء تناوله للطعام؟	مطلقاً/نادراً ..... 0 وجبة واحدة يومياً ..... 1 وجبتان يومياً ..... 2 ثلاث وجبات أو أكثر ..... 3 لا أعرف 9	

C 41. هل يوجد جهاز تلفاز أو حاسب آلي بالغرفة التي ينام فيها (اسم الطفل)؟	1 نعم 2 لا 9 لا أعرف	
C 42. ما متوسط ساعات النوم التي يستغرقها (اسم الطفل) يومياً؟ الرجاء ذكر ساعات النوم الليلية والقيلولة النهارية أو ما شابهها من إغفاءات، مع مراعاة ضرورة التفرقة بين أيام الأسبوع العادية وعطلات نهاية الأسبوع.	عدد ساعات الأسبوع العادية ☐☐ عدد ساعات العطلة الأسبوعية ☐☐ 1 2 99 لا أعرف	
C 43. كم عدد الأيام التي سار فيها طفلك بالجوار (إلى الأصدقاء أو المحال التجارية أو المنتزه أو دار الحضانة) على مدار الأسبوع الماضي؟	عدد الأيام ☐ 9 لاأعرف	
C 44. كم عدد الأيام التي لعب فيها (اسم الطفل) خارج المنزل لمدة لا تقل عن نصف ساعة على مدار الأسبوع الماضي؟	عدد الأيام ☐ 9 لاأعرف	
C 45. هل يمارس (أسم الطفل) نشاطاً بدنياً منظماً بشكل أسبوعي؟	1 نعم 2 لا 99 لا أعرف	C->48 C->48

C 46. ما النشاط البدني المنظم الذي يمارسه (اسم الطفل) بشكل أسبوعي؟

ضع دائرة حول النشاط المناسب.

C 47. كم مدة ممارسة (اسم الطفل) لهذا النشاط أسبوعياً؟

	QC46	QC47		
	نعم	لا	عدد الساعات	لا أعرف
A. السباحة	1	2	1,2,3,4,5,6	9
B. برنامج للياقة البدنية	1	2	1,2,3,4,5,6	9
C. الركض	1	2	1,2,3,4,5,6	9
D. كرة القدم	1	2	1,2,3,4,5,6	9
E. ركوب الدراجة	1	2	1,2,3,4,5,6	9
F. أخرى (حدد)	1	2	1,2,3,4,5,6	9

C 48. ما شعور (أسم الطفل) حيال الأنشطة البدنية واللعب خارج المنزل؟	1 لا يحبه 2 يحبه 3 يحبه بشدة 9 لا أعرف	
C 49. ما مدى نشاط (اسم الطفل) مقارنة بمن هم في نفس عمره؟	1 نشاطه قليل جدا 2 نشاطه قليل 3 نفس النشاط 4 نشاطه كثير 5 نشاطه كثير جدا 9 لا أعرف	
C 50. ما هي أنشطة رعاية الأطفال التي يعتاد طفلك حضورها؟	1 لا شئ يمكث في المنزل أنشطة غير رسمية (لدى أجداده أوأصدقائه... إلخ) 2 3 دار حضانة لفترة تصل إلى 8 ساعات 4 دار حضانة لفترة تصل إلى أكثر من 8 ساعات ... 5 دار ما قبل المدرسة 8 أخرى (حدد) 9 لا أعرف	

الأغذية المعززة والمكملات الغذائية الدقيقة – جميع الأطفال الأقل من خمس سنوات

الآن أود أن أسأل عن بعض الأغذية التي قد يكون (اسم الطفل) تناولها، ويعنينا في هذا الصدد تناول الطفل للمادة حتى ولو كان ذلك مصاحباً لتناوله للأغذية الأخرى.

C 51. هل تناول (اسم الطفل) أمس أثناء النهار أو الليل أية بسكويت معزز بالحديد أو غيره من الأغذية المضاف لها عنصر الحديد؟	1 نعم 2 لا 9 لا أعرف	

C 52. هل تناول (أسم الطفل) أمس أثناء النهار أو الليل أية تركيبة للأطفال معززة بمزيد من الحديد؟	1 نعم 2 لا 9 لا أعرف	
C 53. هل تناول (أسم الطفل) أمس أثناء النهار أو الليل أية حبوب غذائية معززة للأطفال مثل "سيريلاك"؟	1 نعم 2 لا 9 لا أعرف	
C 54. هل تناول (اسم الطفل) أية أقراص أو شراب حديد على مدار الأشهر الستة الماضية؟ أعرض أقراص أو شراب الحديد	1 نعم 2 لا 3 لست متأكدة من أنها حديد 9 لا أعرف	C->58 C->58 C->58
C 55. هل ما زال (أسم الطفل) يتناول الحديد؟	1 نعم 2 لا	C->57
C 56. كم المدة التي أستمر فيها (أسم الطفل) في تناول الحديد؟	1 أسبوع أو أقل 2 أكثر من أسبوع وأقل من شهر 3 شهر أو أكثر 9 لا أعرف	C->58 C->58 C->58 C->58
C 57. متى توقف (أسم الطفل) عن تناول أقراص أو شراب الحديد؟	1 أقل من 3 شهور مضت 2 منذ3 شهور او أكثر 9 لا أعرف	
C 58. هل تناول (اسم الطفل) أية كبسولات فيتامين " أ " على مدار الأشهر الستة الماضية؟ اعرض شراب فيتامين " أ ".	1 نعم 2 لا 3 لست متأكدة من أنها فيتامين "أ" 9 لا أعرف	
C 59. هل تناول (اسم الطفل) شراب فيتامين " د " على مدار الأشهر الستة الماضية؟ أعرض شراب فيتامين " د ".	1 نعم 2 لا 3 لست متأكدة من أنها فيتامين "د" 9 لا أعرف	
C 60. هل تناول (اسم الطفل) أية مكملات متعددة الفيتامينات على مدار الأشهر الستة الماضية؟	1 نعم 2 لا 9 لست متأكدة من أنها متعددة الفيتامينات	C->62 C->62
C 61. ما هي الفيتامينات المدرجه في المكملات متعددة الفيتامينات؟		

	نعم	لا	
A. الحديد	1	2	
B. حمض الفوليك	1	2	
C. الزنك	1	2	
D. فيتامين " أ	1	2	
E. فيتامين " د	1	2	
F. فيتامين " ب 12	1	2	
G. كالسيوم	1	2	

وعي الآباء بوزن الطفل – جميع الأطفال الأقل من خمس سنوات

C 62. الرجاء إيضاح تصنيفك لـ (اسم الطفل) من حيث وزنه في الوقت الحالي.	1 نحيف جداً 2 نحيف 3 متوسط 4 زائد الوزن 5 سمين 9 لا أعرف	
C 63. حينما تفكر في وزن (اسم الطفل)، ما الذي تريد أن يكون عليه وزنه؟	1 أقل بكثير 2 أقل قليلاً 3 نفس الوزن تقريبًا 4 أكثر قليلاً 5 أكثر بكثير 9 لا أعرف	

C 64. الرجاء إيضاح تصنيفك لـ (اسم الطفل) من حيث طوله في الوقت الحالي.	1 صغير/قصير جداً 2 صغير/قصير 3 متوسط 4 طويل 5 طويل جداً 9 لا أعرف	
التعرض للشمس – جميع الأطفال الأقل من خمس سنوات		
C 65. عندما يكون (اسم الطفل) خارج المنزل، هل تحرصين على حماية رأسه من الشمس؟	1 أبداً/نادراً 2 أحياناً 3 معظم الوقت 4 دائماً	C->67
C 66. عندما يكون (اسم الطفل) خارج المنزل، كيف تحمين رأسه ضد أشعة الشمس؟	1 وشاح/ غطاء رأس 2 قبعة 3 شمسية 8 غيرها (يحدد)	
C 67. عندما يكون (اسم الطفل) خارج المنزل، هل تحرصين على تغطية ذراعيه؟	1 أبداً/نادراً 2 أحياناً 3 معظم الوقت 4 دائماً	
C 68. كم المدة التي يتعرض لها (اسم الطفل) للشمس يومياً في المعتاد؟ للاجابة على هذا السؤال ارجع إلى سلوكه على مدار الأسبوعين الماضيين.	1 لا يتعرض للشمس 2 صفر- 29 دقيقة 3 30-59 دقيقة 4 1-2 ساعة 5 2<-3 ساعات 6 3< ساعات 9 لاأعرف	
C 69. هل من عادتك استعمال كريم واقي ضد الشمس لحماية جلد (اسم الطفل) حينما يتعرض لأشعة الشمس؟	1 أبداً/نادراً 2 أحياناً 3 معظم الوقت 4 دائماً	
C 70. ما لون بشرة (اسم الطفل)؟ بالملاحظة.	1 شديد البياض 2 أبيض 3 قمحي 4 أسمر 5 شديد السمرة/أسود 9 عجز عن الملاحظة	
القياسات الجسمانية – جميع الأطفال من عمر الولادة إلى عمر ٥٩ شهر		
C 71. رقم أخذ للقياس:	□□□ الرقم	
C 72. مقياس محيط العضد:	□□□ سم	
C 73. وزن الشخص البالغ ممكن ان يكون اي شخص بالغ مادام يتقبله الطفل	□□□□ بالكيلوجرام لم يؤخذ القياس	(كج) 999.9
C 75. هل كان الطفل شبه عارياً (يرتدي ملابسه الداخلية فقط)	1 نعم 2 لا	
C 76. طول الطفل واقف او مستلقي • الطفل أقل من سنتين ← يقاس الطول وهو مستلقي • الطفل من سنتين فأكثر ← يقاس الطول وهو قائم (واقف)	□□□□ سم 999.9 لم يؤخذ القياس	
C 77. كيف أخذت قياسات الطفل فعلياً؟ مستلقياً أم قائماً؟	1 مستلقي 2 قائم	
C 78. نتائج قياسات الطول والوزن	1 أخذ القياسين 2 الطفل لم يكن موجوداً 3 رفض الطفل/ولي الأمر أخذ القياسات 4 الطفل غير متعاون/لا يمكن السيطرة عليه 5 أخرى (يحدد)	

أخذ عينات الدم – للأطفال من عمر ستة أشهر إلى ٥٩ شهر		
C 79. تم أختيار الاطفال في هذا المنزل لسحب عينة الدم من وريد الذراع ؟ هذه المعلومه موجوده في السؤال C8 في الصفحة الاولى من هذه الاستمارة.	نعم ..... 1 لا 2	الرجاء إلصاق ملصق رقم الطفل هنا (يبدأ بحرف "C")
C 80. والآن نود أن نأخذ عينة دم من أصبع/كعب (اسم الطفل) لقياس مستوى الهيموجلوبين أو سحب بعض الدم من ذراع (اسم الطفل) لقياس مستوى الفيتامينات هل تأذنين لنا؟	نعم ..... 1 لا 2	-> توقف
C 81. تركيز الهيموجلوبين (جم/ل)	هيموجلوبين ☐☐☐	
C 82. حجم كمية الدم التقريبية في العينة (مل). في عينة السحب من الذراع فقط	☐☐ مل	
C 83. متى كانت آخرمره تناول (اسم الطفل) الطعام ؟ باستخدام صيغة 24 ساعة (الساعة الواحدة بعد الظهر هي 13)	الوقت : ☐☐ : ☐☐ لم يتناول شيء بعد 77:77 لا أعرف 99:99	
C 84. وقت أخذ عينة الدم باستخدام صيغة 24 ساعة (الساعة الواحدة بعد الظهر هي 13)	الوقت : ☐☐ : ☐☐	

C85. رقم ملاحظات الباحث ☐☐☐
C86. رقم ملاحظات المشرف الميداني ☐☐☐
C87. رقم ملاحظات المشرف ☐☐☐
C88. رقم ملاحظات آخذ القياسات ☐☐☐

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