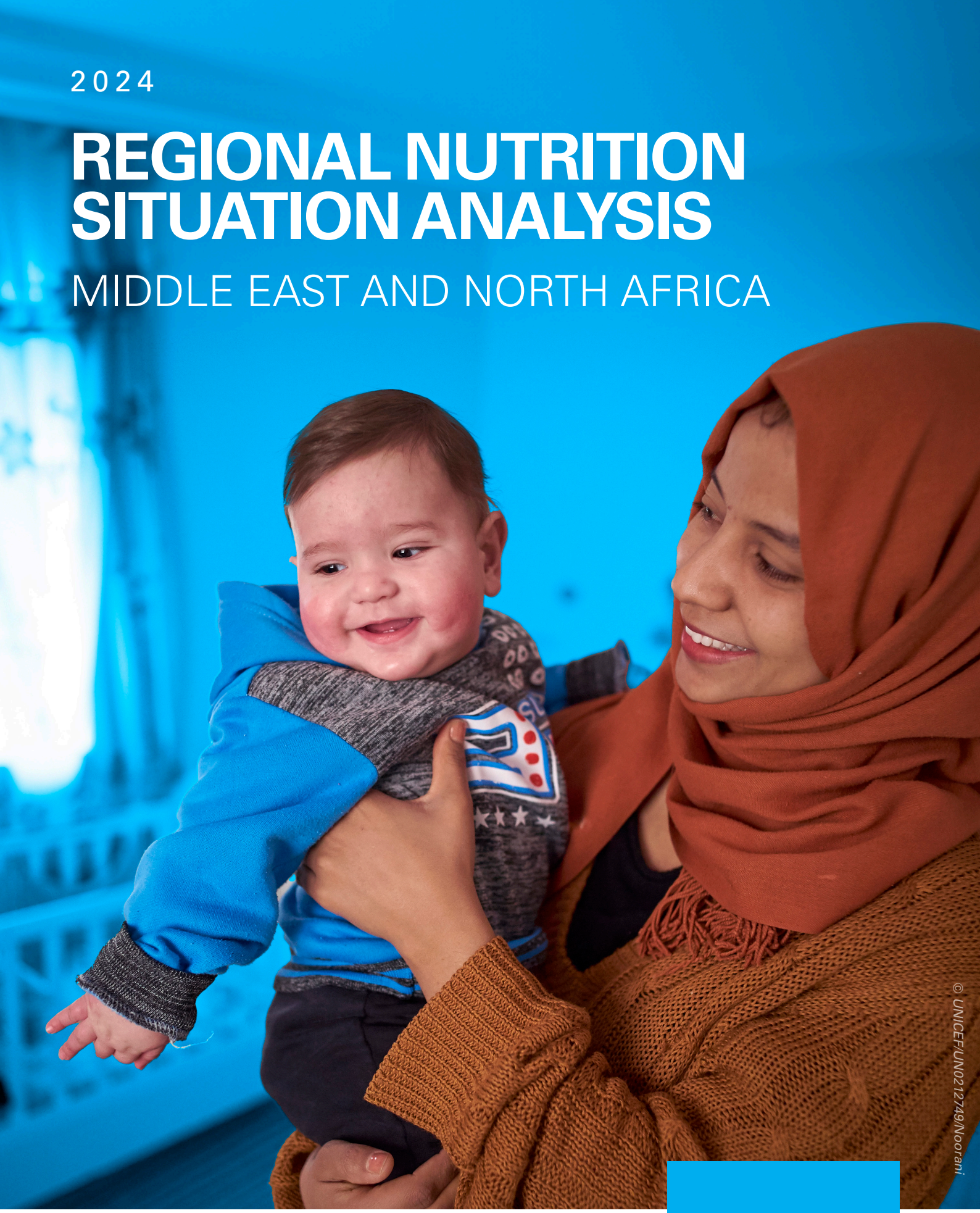
2024

REGIONAL NUTRITION SITUATION ANALYSIS

MIDDLE EAST AND NORTH AFRICA



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EXECUTIVE SUMMARY

The MENA region currently faces multiple nutrition challenges across all key life stages for healthy growth, development, and well-being. Childhood stunting and wasting are of high public health significance, particularly in conflict-affected countries like Yemen, Syria, Libya and Sudan. Underlying dietary practices contribute to all forms of undernutrition. Currently, exclusive breastfeeding and appropriate complementary feeding were achieved by less than a third of infants 0 – 6 months and just a quarter of children 6 – 23 months, respectively. Regionally, MENA faces a double burden of under- and over-nutrition given the diverse range of socio-economic contexts and food environments spanning the 20 countries.

Overweight and obesity levels have been continually increasing among most children under five years of age, school-aged children, adolescents, and adult women and in nearly all MENA countries as economic development results in changing food environments becoming saturated with processed food choices. The increasing rate of overweight and obesity across life stages in some of the low-income and lower-income MENA countries suggests rapid nutrition transition in the region.

Although diverse data sources had suggested a changing nutrition situation regionally, much was still unknown about up-to-date trends, indicators, and contributing factors. This report summarizes findings from a mixed-methods landscape analysis that was conducted between 2021 – 2023 by Pennsylvania State University, in collaboration with UNICEF and partners at both regional and national levels, to serve as a blueprint for subsequently improving MENA's nutrition situation through up-to-date evidence and tailored recommendations.

The report contents reflect findings from a regional-level analysis and synthesis covering all 20 MENA countries (Algeria, Bahrain, Djibouti, Egypt, Iran, Iraq, Jordan, Kuwait, Lebanon, Libya, Morocco, Oman, Qatar, Saudi Arabia, State of Palestine, Sudan, Syria, The United Arab Emirates, Tunisia, Yemen) as well as a country-level analysis focused on eight specific country case studies (Djibouti, Egypt, Jordan, Lebanon, Oman, Sudan, Syria, Yemen). Two country case studies, Lebanon and Sudan, also included primary qualitative data collection among nutrition stakeholders and community members across key life stages.

Regionally, complex, multi-level factors have shaped the contemporary nutrition situation of the MENA region, which is now experiencing lower levels of undernutrition but rising overweight and obesity in nearly all countries. Regionally, the prevalence of stunting has decreased from 26% in 2000 to 18% in 2022, which is similar to the global trend. However, the SDG target of halfing the number of children with stunting by 2030 may not be met in MENA given the current reduction rate. Key infant and young child feeding indicators remain sub-optimal. Less than one third (31%) of mothers practiced EBF between 0 – 6 months. Less than one half (43%) and less than one third (25%) of children aged 6 -23 months in MENA had minimum dietary diversity and minimum acceptable diets (MAD). The reduction of undernutrition prevalence has been concurrent to a worsening overnutrition situation in the region. Overweight and obesity in children 5 -19 y and in women aged 18 y or older increased and reached to 28% and 66%, respectively.

The warning increasing trend of overnutrition has been shaped by differential policy commitments, economic situations, changing food enivornments, longstanding cultural norms, and resulting behavior change patterns influenced by an interplay of community, institutional, interpersonal, and individual-level determinants. Regional stakeholders call for greater investments in maternal child health and nutrition services, improved trainings to enhance health capacities, stronger government commitments and support for nutrition, increased population-level nutrition awareness, and taking systems-based approaches providing universal coverage of essential nutrition services.

At national levels, this report summarizes the nutrition situations of eight countries (Djibouti, Egypt, Jordan, Lebanon, Oman, Sudan, Syria, Yemen) where trends and risk factors of key maternal, infant, child, and adolescent nutrition indicators are presented. Additionally, secondary analysis findings reflecting those country-level policies, strategies, and programs that both exist and are absent provide insights into the range of enabling enviroments throughout the region. Findings are summarized using a multi-sectoral and multi-systems framework considering governance and initiatives spanning the food, health, WASH, and social protection systems. In Lebanon and Sudan, specificially, a community perspective on the two nutrition situations is presented using primary qualititative data collected from caregivers, adolescents, and young children who were interviewed to share their experiecnes and perspectives during country case study development. Overall, eight challenging nutrition situations that reflect just as many unique socio-economic country contexts with varying levels of security are presented and in reflection of the diverse MENA region at large.

Current projections suggest that the MENA region is neither on track to reach SDG#2 targets related to Zero Hunger nor 2025 World Health Assembly targets. This changing and highly diverse nutrition landscape necessitates political will, adequate investment, and careful coordination at both regional and national levels for better population-level health and nutrition both now and in future generations.

Overarching recommendations:

The key findings of the landscape analysis provide the following strategic and programmatic recommendations to guide UNICEF MENA Nutrition Strategic Direction (2024–2030).

1. Greater efforts are needed to drive reductions in stunting and wasting, particularly in low- and middle-income countries. These efforts must consider regional disparities and how the burden of undernutrition in MENA differs by context.

2. Double-duty actions are needed to address rising overweight and obesity – while simultaneously tackling persistent undernutrition. Actions to improve diets, access to nutrition services and positive practices include creating healthier food environments, with the support of policies, regulatory frameworks, and monitoring and enforcement measures.

3. A multi-systems approach to nutrition programming is critical given the complexity, breadth and persistence of nutrition challenges throughout the region. The food, health, education, social protection and water and sanitation systems must be leveraged to improve access to nutritious diets, essential nutrition services and positive care practices. Increased government commitment for nutrition programming and financing is crucial.

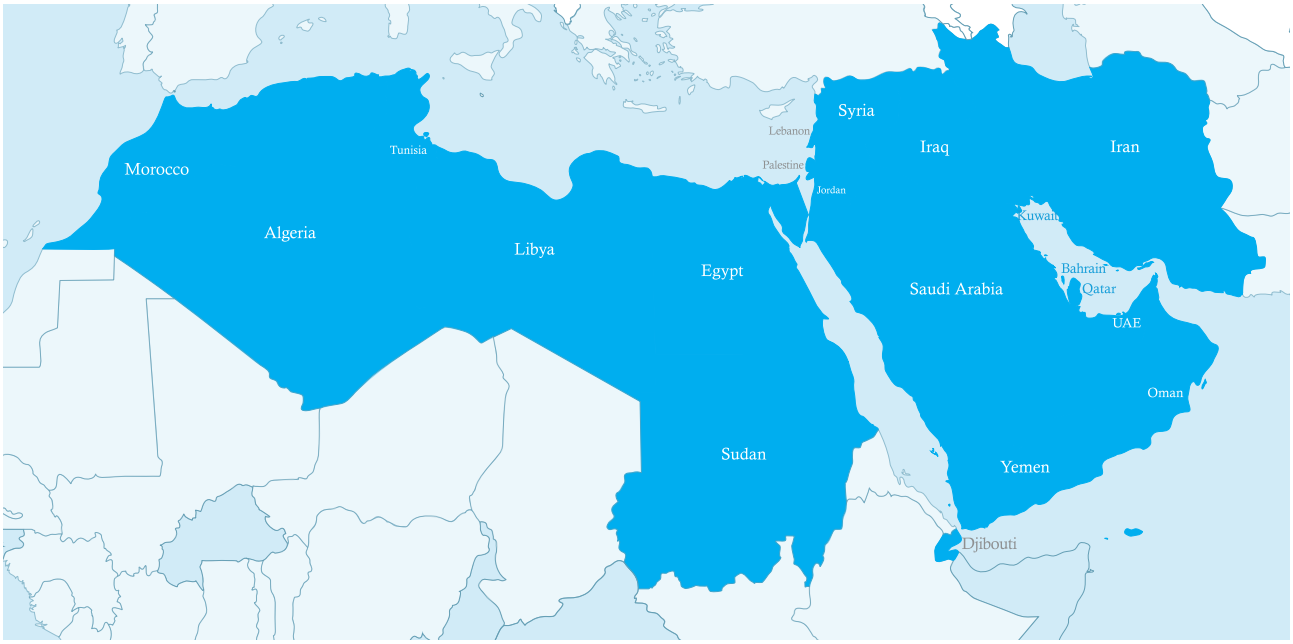
4. Proven nutrition interventions must be scaled-up to reach more people over a wider geographic area in order to achieve long-term nutrition development goals. Nutrition interventions must expand while maintaining high levels of quality, equity and sustainability. Maintaining high-quality services can be achieved by leveraging enabling factors such as engaged community platforms, strong country leadership, managerial and technical capacity and robust monitoring and evaluation systems.

5. Increased investment in nutrition data generation and access is needed across the region. These investments are critical to address the lack of nationally-representative, reliable and up-to-date nutrition data. Data must also be collected on multisystem actions and services to allow for more informed and evidenced-based policy and programme decisions.

6. Context-specific programming is required to respond to the diversity of nutrition situations across MENA countries. This is crucial to tackle the diverse and complex nutrition challenges faced across a region with a range of political, economic, and sociocultural contexts. Consider clustering countries into groups to allow programming to be tailored to address context-specific challenges.

INTRODUCTION

The UNICEF Middle East and North Africa (MENA) region is one of the most volatile and food insecure regions in the world, given the economic, political and environmental challenges, including the COVID-19 pandemic, economic crises, and escalating food prices due to the ongoing Ukraine crisis, all of which continue to threaten regional food security and nutrition status (1 – 3). In 2020, the regional prevalence of moderate-to-severe food insecurity, based on the Food Insecurity Experience Scale, was about 30% with projections that it would only worsen over time as a result of dependencies on food imports, water shortages and environmental degradation, high unemployment rates, and unprecedented currency devaluation in countries such as Lebanon, Syria, and Libya (4 – 5).



Recent estimates in 2019 -2020 of key malnutrition indicators among children under five in MENA countries reflect concurrent existence of both undernutrition and overnutrition (5 – 6). In the past two decades between 2000 to 2019-2020, while the prevalence of stunting (26% to 18%; by 31%) at a comparable pace with the global trend (33% to 22%, by 33%), prevalence of overweight in children under five increased rapidly in the region (MENA: 8.7% to 9.4%, by 8%; global: 5% to 6%, by 20%). Regionally, child stunting and wasting are still of high public health significance, particularly in conflict-affected countries like Yemen, Syria, Libya and Sudan. Meanwhile, overweight and obesity levels are increasing among nearly all life stages and in most MENA countries (5 – 6), including children under five (10% to 12%), school-aged children and adolescents (20% to 28%), and women of reproductive age (56% to 66%). Current projections suggest that the region, which is now facing both double- and triple burdens of malnutrition, is neither on track to reach Sustainable Development Goal (SDG) 2 targets related to Zero Hunger nor 2025 World Health Assembly targets.

Given the complexity and diversity of countries across the MENA region, a comprehensive landscape analysis using multiple forms of quantitative and qualitative data to draw context-specific interpretations was needed for accurately informing regional policies, programs, and intervention strategies to improve the nutrition situation for vulnerable populations and life stages.

OBJECTIVES

Goal. To synthesize and validate findings from a regional situation analysis to provide evidence-based recommendations for the development of tailored nutrition strategies for MENA region.

Aim 1: To document the status and trends of nutritional indicators of infants, children, adolescents, and women through statistical analysis of available national survey data

Aim 2: To summarize what is known about the nutrition situation at multiple levels of influence (policies, programs) by conducting a regional-level scoping review (peer reviewed publications and regional reports) and an in-depth desk review for selected countries

Aim 3: To understand the facilitators and barriers of achieving optimal nutrition throughout the region and across multiple life stages

Aim 4: To synthesize region- and country-level findings using multiple forms of data (quantitative, qualitative, literature review)

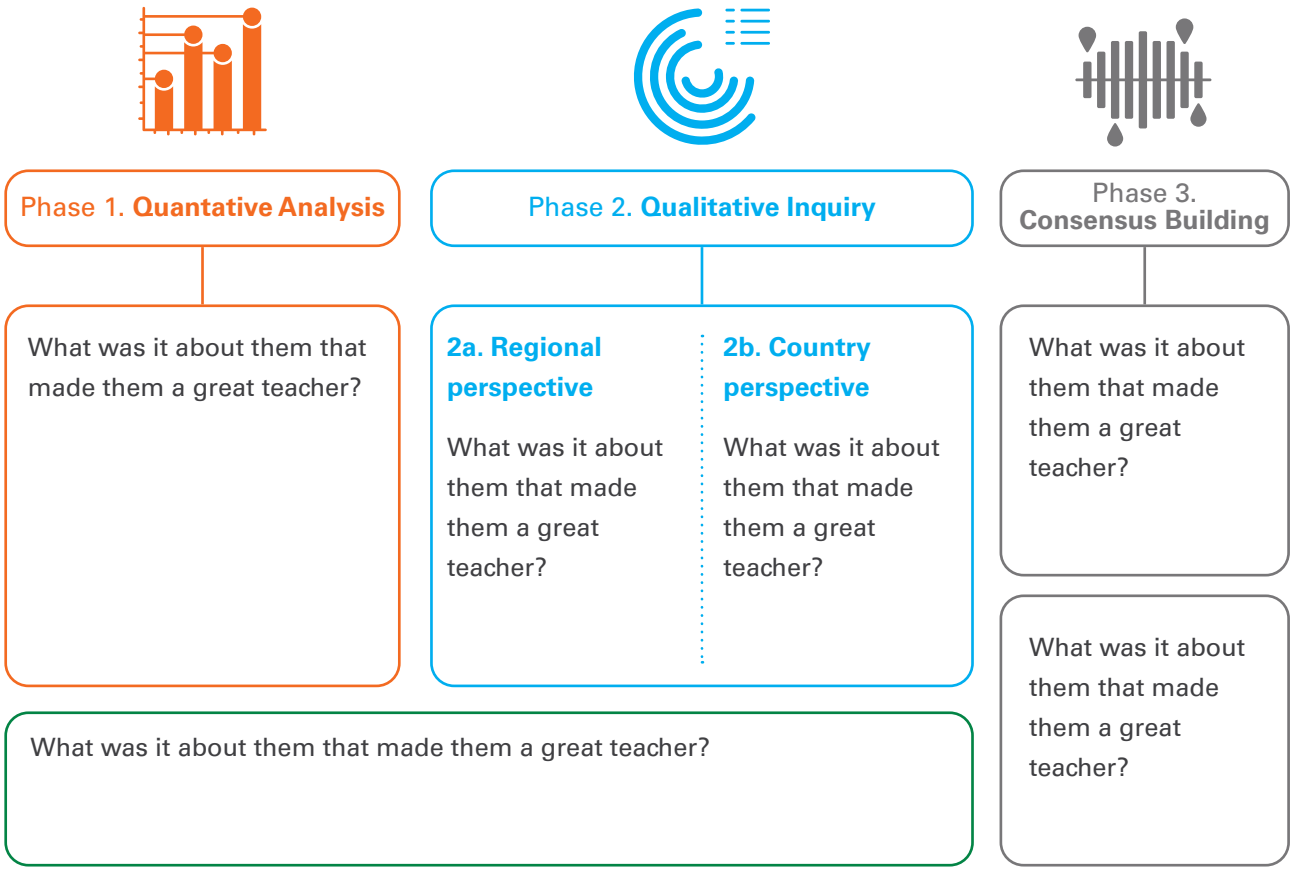
Aim 5: To build consensus on effective and feasible program and intervention strategies among regional stakeholders based on study finding

METHODS

DESIGN

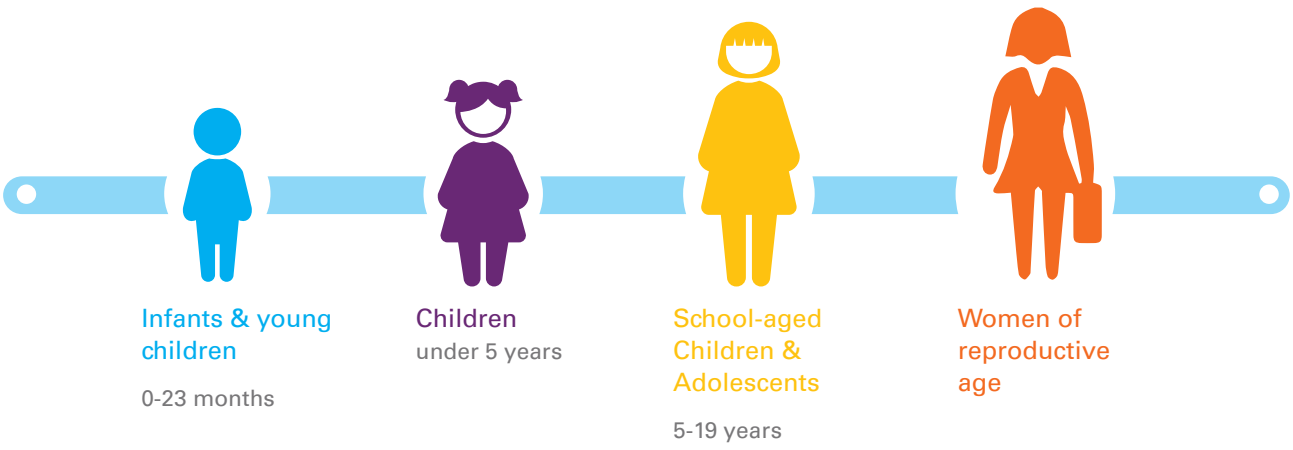
We designed this mixed methods study to include both secondary analyses and primary data collection conducted over three iterative phases between May 2022 – January 2023 (Figure 1).

Figure 1. Mixed-methods study design for MENA nutrition situation analysis



Using a life stage approach (Figure 2), the situational analysis included a regional-level analysis and synthesis covering all 20 MENA countries (Algeria, Bahrain, Djibouti, Egypt, Iran, Iraq, Jordan, Kuwait, Lebanon, Libya, Morocco, Oman, Qatar, Saudi Arabia, State of Palestine, Sudan, Syria, The United Arab Emirates, Tunisia, Yemen) as well as a country-level analysis focused on eight specific country case studies (Djibouti, Egypt, Jordan, Lebanon, Oman, Sudan, Syria, Yemen. Two country case studies, Lebanon and Sudan, also included primary qualitative data collection among nutrition stakeholders and community members across key life stages.

Figure 2. Life stages of focus during MENA nutrition situation analysis



PHASE 1
Quantitative Analysis

Data sources

For the region-level analysis, we searched and extracted country-level estimates of the key nutritional indicators that have been summarized and published by credible sources. We also manually extracted or recalculated the indicators, when there are new data available or when the indicators have not been summarized elsewhere for the MENA countries, including the recent DHS, MICS, and SMART survey data in the region. To analyze the trends by income level and food security status, we further categorize the countries in to high-, upper-middle-, lower-middle-, and low-income countries according to the FY2022 national income level per the World Bank classification. The Status of Food Insecurity 2021 report summarized the prevalence of undernourishment in two periods between 2000 – 2006 and 2018 – 2020 (31), which represents the study period of our situational analysis.

Countries were defined as high food security, moderate food security, or low food security countries if the average prevalence of the two periods were < 5%, 5-10%, or >10%, respectively. All existing and new data sources that have been identified and utilized in our analysis are included in the appendices (Appendix 1 Table 1.1 and 1.2).

For the country-level analysis, the risk factor analysis was conducted in the following four countries with two rounds of nationally representative survey data between 2006 and 2020: Egypt (2008 and 2014), Sudan (2010 and 2014), Yemen (2006 and 2013), and Jordan (2012, and 2017 – 2018 for maternal nutrition outcomes; 2009 and 2012 for child nutrition outcomes). Jordan DHS 2017 -2018 has unreliable data for child nutrition and was not used for child-level risk factor analysis.

Statistical analysis

For both region- and country-level trends analysis, to include the most up-to-date national data available, we have reanalyzed the available data by extracting the published data of key nutrition indicators. When recalculating the national prevalence, we accounted for complex sampling methods to estimate the nationally representative proportions. Specific approaches are described below by life stage.

Infants and young children

For the IYCF and anemia indicators, we extracted data from the Global IYCF database and WHO Nutrition Landscape Information System, respectively. Using the population weighted methods, we pooled the available country-level estimates within the MENA region to estimate regional trends or calculated the regional average (7). For low birth weight, we extracted data from the UNICEF 2023 estimates at both country and regional level. We also extracted the most recent country level prevalence from national surveys to present the current low birth weight situation. For child wasting, due to the seasonal changes, we fitted a smooth trend line to see a non-linear trend over the years. For stunting and overweight, we plotted the JME 2023 modeled trend against the available survey data that we extracted from national surveys.

School-aged children, adolescents, and women

In each country, the age- and sex-specific underweight and overweight rates were estimated for children and adolescents aged 5 – 19 years as well as for women of reproductive age. To estimate trends of nutritional status of these life stages, we first extracted all age- and sex-specific rates reported for the available MENA countries. We then extracted the UN country-age-specific population data and estimated the population size within each country by age group and by year (8). We multiplied the estimate, lower bound, and upper bound of 95%CI of the underweight/overweight rate by the population size to calculate the number affected, which were then summed for the entire population group to calculate country-level prevalence: total affected divided by the total population of the age group. Regional nutritional status trends were then calculated by aggregating country-level estimates and population data. Country- and regional-level trends were plotted using the corresponding rate estimates and 95%CI.

Country-level risk factor analyses were conducted using the UNICEF conceptual framework to select known risk factors across the domains of diets, care, food, practices, and services from DHS/MICS surveys to understand maternal and child nutrition outcomes (9). The adapted conceptual framework using available DHS/MICS data is presented in Appendix 1 Figure 1.1.

Using the most recent two rounds of data in Egypt, Jordan, Sudan and Yemen, we first conducted bivariate linear (for continuous outcomes)/logistic (for binary outcomes) regression models. Significant risk factors at p=0.10 level were introduced to the multivariable linear/logistic regression models and risk factors with variance inflation factor (VIF) > 5 were later excluded to avoid potential collinearity. Similar methods have been used in similar risk factor analyses in both South Asia (10 – 13) and West and Central Africa (7).

PHASE 2
Qualitative Inquiry

Regional-level methods and analysis

Structured interviews using free lists and pile sorts were used to identify, rank order, and categorize perceived barriers/facilitators to optimal nutrition among regional stakeholders. To generate a list of barriers and facilitators to optimal nutrition in MENA region, we first conducted structured interviews among 17 senior-level regional stakeholders. These stakeholders were purposefully sampled and represent individuals who could speak not only about nutrition in their own country contexts, but also about the region at large. This diverse group of individuals included senior-level health, social protection, food system, and nutrition stakeholders, including those from government, civil society, and multi-lateral organizations including donor organizations. To do so, UNICEF MENA regional office created a list of potential stakeholders for recruitment. The study team then recruited participants for structured interviews that utilized free listing, which is a qualitative method from cognitive anthropology (14). Each participant was asked to list as many regional barriers as possible, and separately facilitators, to optimal nutrition that they could.

Using Anthropac software, free list data were analyzed to identify the most salient barriers and facilitators based on a salience using Smith's S statistic (15 – 16). The top barriers/facilitators were presented to regional participants during a second data collection period when they were asked to sort each top barrier based its level of modifiability and its importance for population-level nutrition. Multi-dimensional analysis techniques were used to statistically categorize the barriers/facilitators into groupings that represent consensus among stakeholders (16).

Country-level methods and analysis

Qualitative data collection occurred in both Lebanon (July – September 2022) and Sudan (August – September, 2022) using semi-structured interviews among national stakeholders and community members to develop case studies (17 – 18). Lebanon and Sudan were chosen as case studies to highlight using additional primary data collection given their unique country profiles. Semi-structured interviews were conducted first among national stakeholders who were working professionally in roles that would allow them to speak about country-specific nutrition challenges and opportunities in light of current policies and programs. Stakeholders were recruited with the assistance of UNICEF, after which 60 – 90-minute interviews were conducted either in person or virtually using semi-structured guides in each country.

Semi-structured interviews were also conducted among pairs of school-aged children (7 – 10 years of age), pairs of adolescents (11 – 18 years of age), adult women (>18 years of age), and caregivers of young children to understand country-specific health and nutrition experiences across life stages. In Lebanon, community members were recruited at three primary health care centers with permission from the Lebanese Ministry of Public Health (MOPH) and support from UNICEF. The health centers were purposively selected considering socio-economic diversity within the greater Beirut area. In Sudan, community members were recruited using a similar approach but from two health care centers in different areas of Khartoum.

Sample sizes for both stakeholder and community member interviews were determined by considering the number of interviews needed to reach data saturation of key themes, as well as feasibility at the time of fieldwork (19). All interviews were conducted in English or Arabic, depending on participant preference, and were digitally recorded.

Data management and analysis

Data management procedures included regular meetings between research team members and interviewers in Sudan and Lebanon throughout the fieldwork period. Digital recordings of interviews were continuously uploaded to password-protected computers for verbatim translation and transcription into English. Transcribed interviews with stakeholders and community members were then thematically analyzed drawing from established qualitative procedures in a step-wise process (20). First, the research team reviewed each transcript to understand data quality and overall content. Second, analytic codebooks were created using a priori categories reflective of the interview guides. Third, transcripts and codebooks were used to create analytic projects in Dedoose software (21). Fourth, codes were applied to emergent themes and sub-themes relevant to the guiding research questions using a team-based analytic approach. Fifth, coded data were extracted and interpreted for triangulation with nutrition trends and influencing factors specific to Lebanon and Sudan (22).

PHASE 3
Regional and Country Literature Review

Regional-scoping review

Inclusion and exclusion criteria

The search strategy was initiated in May 2022 and focused on the last 5 years. The database searches were also limited to human studies only. Language restrictions (English, Arabic and French) were applied. The search strategy and screening of publications/reports were assessed following the PICO (Participants, Intervention/Comparison, and Outcome) criteria presented in the appendices.

Data sources and search terms

Medline Ovid, Scopus, Web of Science, Google Scholar, and UNC Food Policy were the databases used for the scoping review. In addition, the research team coordinated with the UNICEF regional office to acquire grey literature not publicly accessible. A combination of relevant indexing terms (keywords; or medical subject headings; or MeSH terms) were used to find scientific research articles and reports relevant to interventions and programs for optimal diets and nutrition in the MENA region. Keywords were used with different variations across all databases to strengthen the search strategy.

Through the search process, we identified 6,745 records. After removing duplicates and screening the titles and abstracts, we included 272 articles from the peer-reviewed and grey literature sources published within the past 5 years. The PRISMA flow chart details the extraction and screening results in the report appendices.

Country-level literature review

Inclusion and exclusion criteria

In eight selected countries, we conducted an in-depth literature review of peer-reviewed articles as well as grey literature outlining country-specific policies, strategies, and programs across agriculture, health, nutrition, social protection, and WASH sectors.

Data sources

In addition to the same databases used for the regional scoping review, government websites (e.g., ministries of health, education, agriculture, and social welfare), United Nations country websites (e.g., UNICEF, WFP, FAO), NGO country office websites (e.g., IRC, Save the Children), and global databases (e.g., GINA, Global Breastfeeding Collective) were searched for country-specific literature. The literature review search resulted in 557 publications, including 271 from peer-reviewed sources and 286 from the grey literature. The included literature at country level ranged 9 – 62 articles for the peer-reviewed publications and 25 – 45 articles for the grey literature. The detailed search strategy and search results are presented in the report appendices (Appendix 1: tables 1.3 and 1.4, figure 1.2).

Ethics

Prior to primary data collection commenced in Lebanon and Sudan, ethics approvals were granted by both the American University of Beirut (Lebanon) and the HML Research and Ethics IRB (Sudan). All adults provided their verbal informed consent to be interviewed while both adult consent and child assent were provided for child/adolescent participation. All study procedures were conducted in accordance with the approved study protocols by the aforementioned ethics review boards.

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REGIONAL NUTRITION SITUATION

Regional overview of findings

1. Complex, multi-level factors have shaped the contemporary nutrition situation of the MENA region between 2000 - 2021, which is now experiencing lower levels of undernutrition (child stunting and maternal underweight) but rising overnutrition (overweight and obesity in school-aged children and women) in nearly all countries

2. Fifteen MENA countries have experienced reductions in stunting among children under 5 years of age while key infant and young child feeding indicators, such as exclusive breastfeeding and children under 2 years of age minimum acceptable diet, remain low compared to global averages

3. Regional stakeholders call for greater investments in maternal child health and nutrition services, improved trainings to enhance health capacities, stronger government commitments and support for nutrition, increased population-level nutrition awareness, and taking systems-based approaches providing universal coverage of essential nutrition services

The MENA region has great political, economic, and socio-cultural diversity both within and among the twenty countries that comprise it, thus creating challenges associated with generalizing region-level findings to specific country contexts and vice versa. Despite country-level and context-specific differences regionally, the MENA nutrition situation is characterized by a unique combination of opportunities for improvement yet faces pressing challenges that have yet to be overcome.

This chapter provides a detailed summary of the MENA nutrition situation using a synthesis of mixed methods findings from quantitative trend analyses, qualitative interviews with regional stakeholders, and a scoping review. In this regional chapter and following country-specific chapters, nutrition trends and influencing factors are presented by life stage beginning with infants and young children under two years (U2) and under five (U5) years, followed by those of school-aged children, adolescents, and adult women.

"The MENA region has long been one of the most unstable regions in the world. This instability has resulted in numerous long-term socio-economic and institutional challenges that reflected poorly on people's access to essential nutritional needs."

- Regional nutrition stakeholder

Infants and young children under 2 years of age

Low birthweight (LBW). Based on national data that were available, the LBW estimate in MENA region was 11.3% in 2015 with a 1 percentage point decrease since 2000 (1). The 2023 UNICEF estimates showed that there was a steady regional trend of LBW with an averaged prevalence of 12.9% from 2000 – 2020 (Figure 1)(2). The regional trend and average are very similar to the global trend and average (12.7%).

Consistent with the regional trend, most countries' LBW rate changed within +/-1 percentage point in the past two decades. Bahrain, Jordan and Kuwait were the three countries that showed increasing LBW prevalence by 2.3, 4.3, 4.3 percentage points, respectively, while Morocco achieved to reduce the rate by 3.5 percentage points. The mean LBW rate over the period 2000 – 2020 are similar by income level defined in FY2022 around 11.6% - 12.3%. However, there were slightly higher variation in the average LBW rate in the same period in upper-middle (ranges 6.9% - 16.6%) and lower-middle income countries (ranges 8.0% – 16.5%), as compared to high income countries (9.7% - 13.5%). No modeled trend data is available in low-income countries (Syria and Yemen), due to lack of national survey data (Figure 2, left panel). By food security level, the mean rate was 10.7% in high food security countries and 14.0% in moderate food security countries. Only one (Iraq) out of 5 low food security countries had trend data (Libya, Sudan, Djibouti, and Yemen are low food security countries with no LBW trend data), therefore no comparisons can be made (Figure 2, right panel).

Figure 1. Estimated trend of LBW in MENA between 2000 – 2020

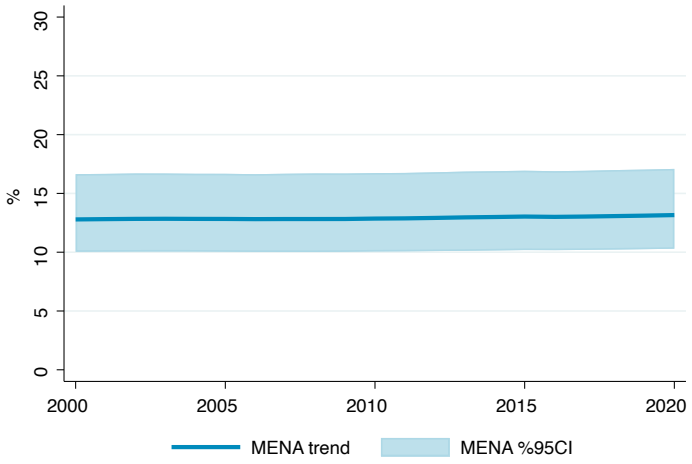
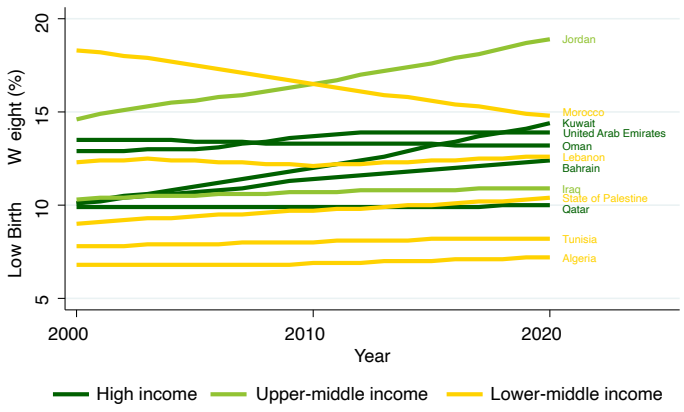
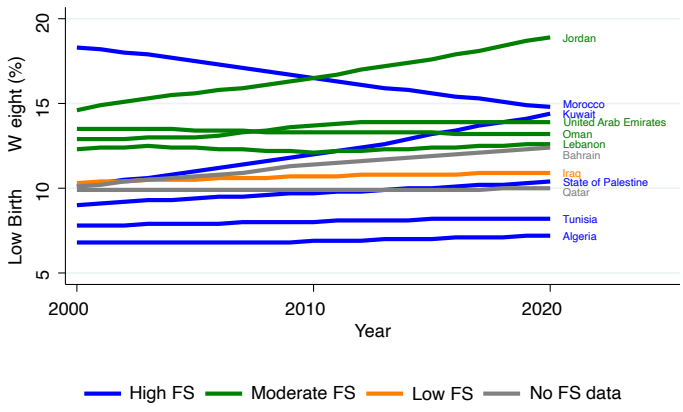


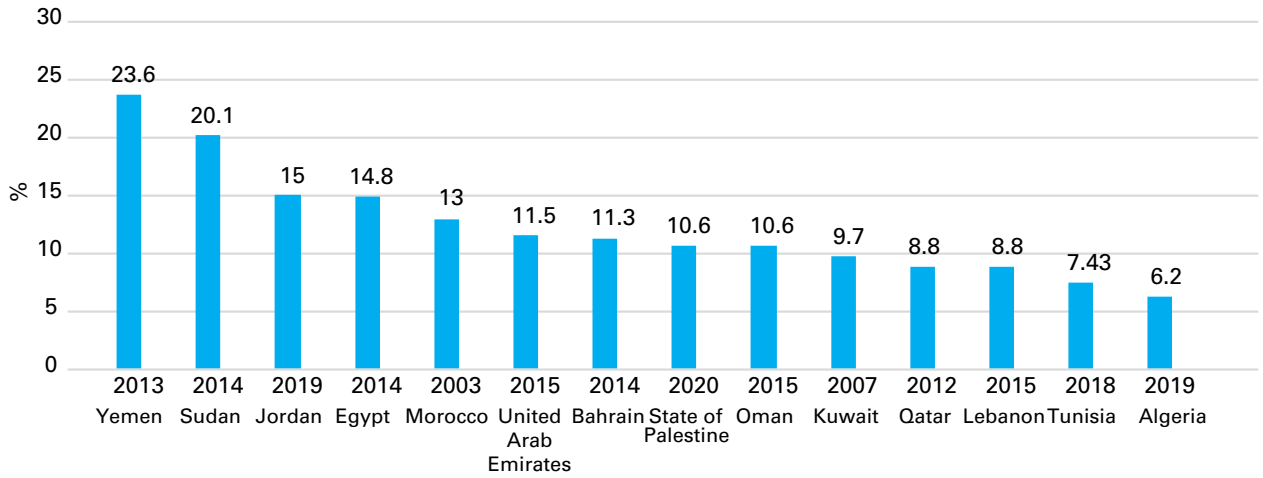
Figure 2. The trend of LBW between 2000 – 2020 in MENA by FY2022 income (left) and by food security status (right). FS, food security. FS was defined as the period averaged prevalence of undernourishment between the subperiod 2000 – 06 and 2018 – 2020: <5% as high FS; 5 – 10% as moderate FS; and >10% as low FS. The reference data can be found in SOFI 2021 report (31))





Despite the relatively stable trend of LBW in MENA, there were quite some disparities in terms of the current LBW rate based on the most recent survey data, ranging from 23.7% in Yemen (2013) to 6.2% in Algeria (2019).

Figure 3. The current LBW rate in MENA countries using the most-recent-available data.



Preterm birth and small-for-gestational age (SGA) are two direct causes of LBW. In MENA, the estimated prevalence of pre-term births was 8 – 9% regionally (3). The corresponding prevalence for SGA was more variable: 9.6% in North African and 21.8% in Middle Eastern countries (4). Both maternal under- and over-nutrition have been associated with increased preterm birth and/or SGA in the region (5-7). Chronic diseases among mothers, such as gestational diabetes and increased blood pressure, are additional contributors of LBW (8). The rising prevalence of maternal overweight and obesity may help explain increasing LBW trends and the complexities associated with double and triple burdens of regional malnutrition that require both heightened financial resources and improved human capacities to address effectively.

Socio-cultural factors unique to MENA have also been associated with LBW. For example, tobacco smoking and khat chewing, both of which are associated with LBW, are normative practices among large segments of the population, including women of reproductive age (9-12) .

In addition, Cesarean sections are not uncommon in countries such as Iran (60%), Egypt (57%), and Tunisia (44%) where the practice can induce preterm birth and associated LBW (13). Stakeholders underscored the importance of better integration of nutrition with the health system.

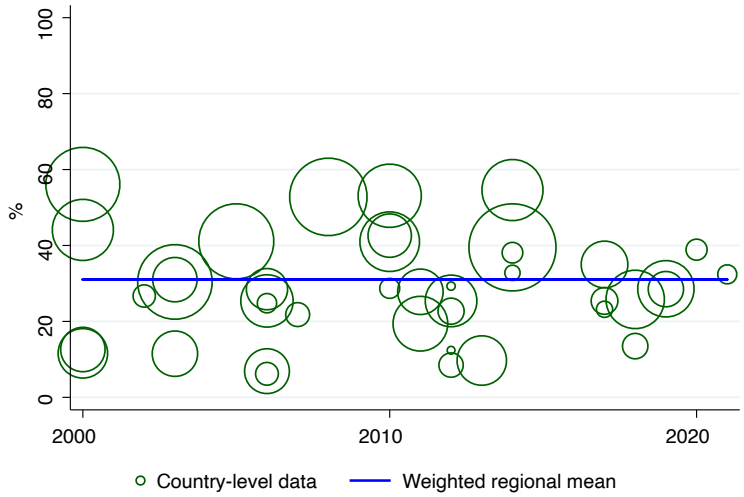
Within countries, LBW prevalence varies by education and household income levels (11, 14-16. Consanguinity, which may result from marriages between close kin or blood relations, is another risk factor of LBW in some countries such as Oman and Jordan, but likely also occurring elsewhere throughout MENA (11, 17, 18). Most recently, a growing body of literature has pointed to the impact of COVID-19 on LBW risk both globally and regionally in MENA (19, 20).

> *"The nutrition interventions…promotive, preventive and curative…need to be gradually integrated within existing health systems till they are fully integrated."*
>
> **- Regional nutrition stakeholder**

Exclusive breastfeeding (EBF)

Data on EBF was available in 15 MENA countries and revealed that between 2000 – 2020, less than one-third (31.0%) of mothers practiced EBF between 0 – 6 months, a proportion currently below the world average of 42%(21) (Figure 4).

Figure 4. Regional population weighted average of exclusive breastfeeding in MENA. Bubbles represent individual country data. The relative size of the bubble represents the population size.

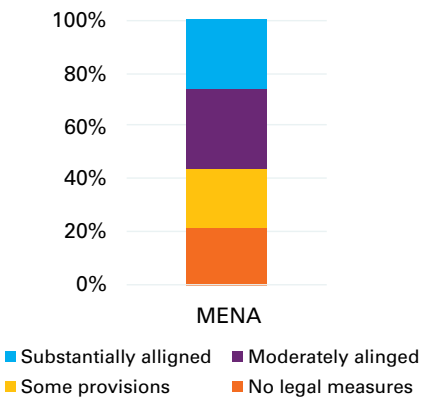


A variety of risk factors have been established in the regional MENA literature. For example, delivery by Cesarean section is a known risk factor of non-EBF globally, as well as among MENA-specific studies (22). Associations between maternal employment and non-EBF have also been well established (22-27). In MENA, specifically, workplace policies intended to protect new mothers have not been implemented as successfully as planned. Studies have found that differential maternal leave policies and low access to breastfeeding facilities in the workplace make EBF more challenging for employed mothers in MENA countries (22, 28). Cultural norms and beliefs also determine how EBF may practice in the specific context, which were discussed in more details in the country chapters.

In 1981, The World Health Assembly adopted the WHO International Code of Marketing Breastmilk Substitutes to promote safe and adequate nutrition to infants by protecting and promoting breastfeeding. In MENA, the legal status of the Code varies considerably (28, 29), with some countries without any legal enforcement associated with it and others substantially aligned (Figure 5).

Regional stakeholders indicated that 'gaps in policies to control the marketing of breastmilk substitutes (and infant/child foods)' is an important factor that the region needs to address together.

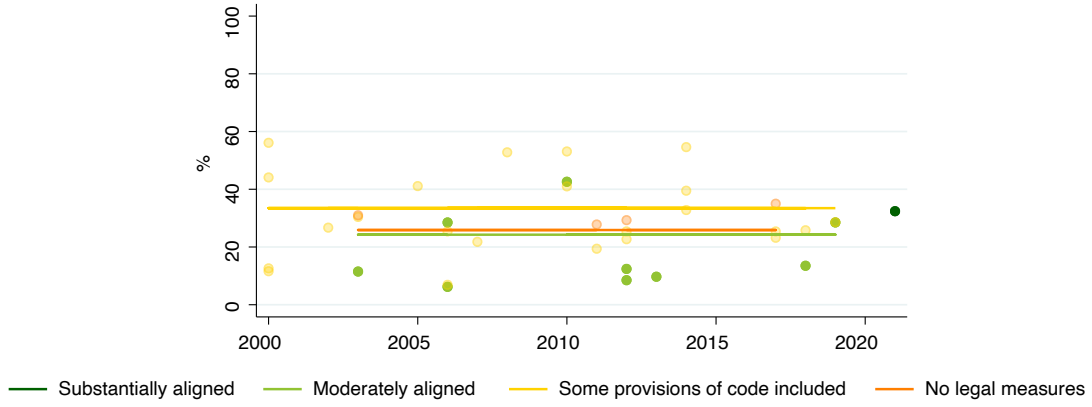
Figure 5. Proportion of MENA countries with legal measures pertaining to The International Code of Marketing Breastmilk Substitutes, by level of alignment (28, 29)



> *"The breastmilk substitute companies have large space to advertise and communicate with health workers, provide free and low-priced samples. Converting all code regulations to laws with clear penalties and obligations [is needed]."*
>
> **- Regional nutrition stakeholder**

EBF rates in countries over time do not vary by legal status, however, likely due to gaps in available data, as well as differential levels of Code implementation, monitoring, and enforcement by country (28, 29) (Figure 6).

Figure 6. Exclusive breastfeeding trends by country-specific level of alignment with The International Code of Marketing Breastmilk Substitutes over time. Dots represent individual country data colored-coded according to the most recent implementation level of the Code. Lines are the population-weighted average of exclusive breastfeeding rate of the countries with the same implementation level of the Code.



Stunting

In MENA region, the estimated regional prevalence was 18% in 2022 and reflects a 31% decrease (8 percentage points) since 2000 (3, 30). Sixteen MENA countries have experienced reductions in stunting among children under 5 years of age. The decreasing trend in MENA is similar to the global trend, which decreased from 33% in 2000 to 22% in 2022 (a 33% decrease or by 11 percentage points) (Figure 7). Region disparity does exist: MENA countries that are high-income or food secure have less stunting than those that are low- and middle-income, or less food secure (Figure 8).

Figure 7. Estimated global and MENA's trend of stunting in children under 5 years of age between 2000 – 2020

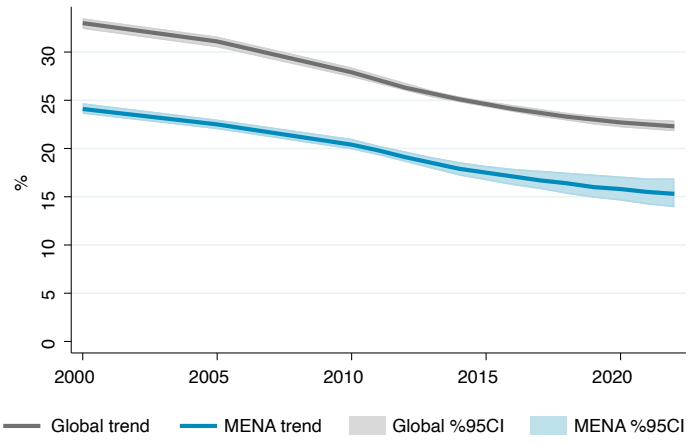
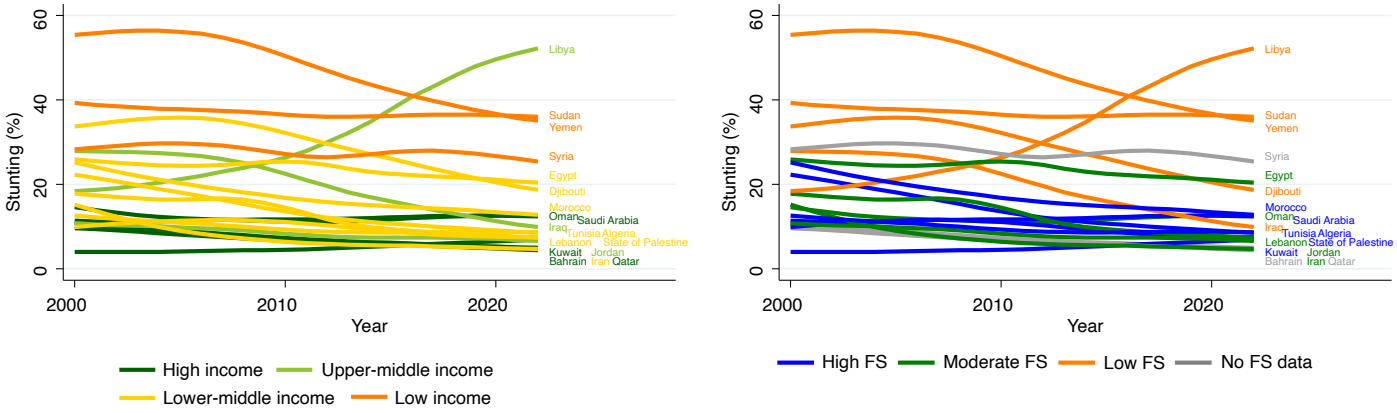


Figure 8. Stunting prevalence in children under five in MENA by income (left) and by the food security status (right) between 2000 – 2022. Lines are JME 2023 estimates. FS, food security. FS was defined as the period averaged prevalence of undernourishment between the subperiod 2000 – 06 and 2018 – 2020: <5% as high FS; 5 – 10% as moderate FS; and >10% as low FS. The reference data can be found in SOFI 2021 report (31))



One exception to this trend is Libya, which represents an upper-middle income country per FY2022 income level and a low food security country during the period 2000 – 2018 that has seen a substantial increase of stunting likely due to country instability in recent years.

Poor maternal nutrition and inadequate infant and young child feeding practices are underlying factors associated with children under 5 years of age stunting (32, 33). Poor maternal nutrition also increases the risk of LBW and contributes to intergenerational malnutrition in many MENA countries (21). Other underlying determinants of child stunting include household food insecurity, poor hygiene and inadequate sanitation, inadequate water supply, poor maternal education, as well as contaminated food and water that increase risk of child infection (32-36).

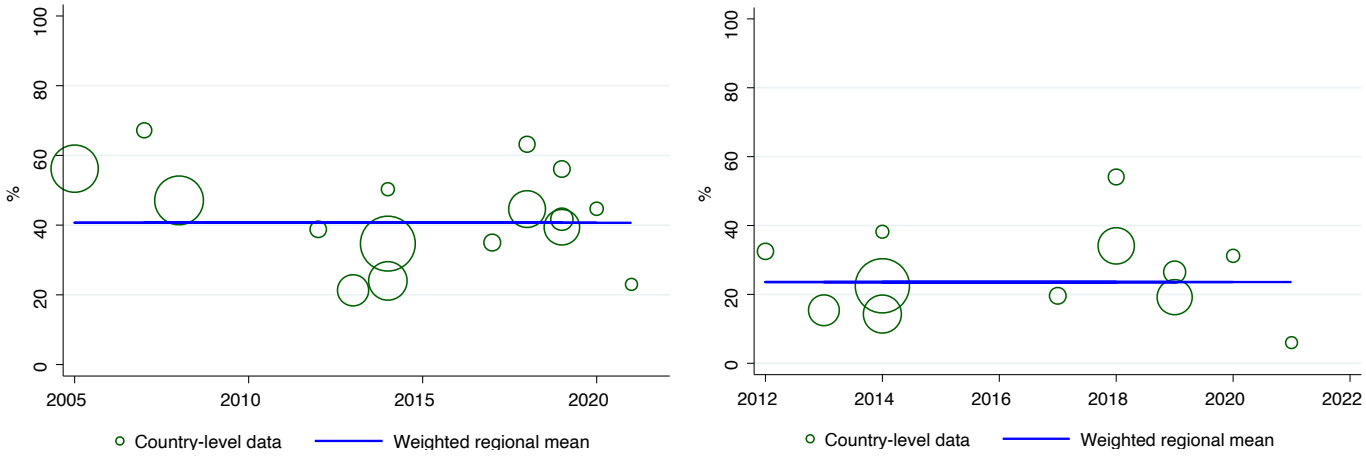
Complementary feeding

In MENA region, less than one half (42.9%) and less than one third (25.1%) of children aged 6 – 23 months had minimum dietary diversity (MDD) and minimum acceptable diets (MAD), respectively. These estimates are slightly different from what had been reported in the Fed to Fail report (37), where regional MDD and MAD was 39% and 26%. In our analysis, we included the Sudan 2014 MICS data and did not include any data from Djibouti due to data unavailability. We also included two more recent round of survey data collected in State of Palestine (2020) and Lebanon (2021) that were not included in the Fed to Fail report. Complementary feeding data were scarce so the estimated regional trends should be interpreted with caution (Figures 9).

"In the MENA region the context of countries varies. I think poverty, food insecurity and conflict are among the main determinant of malnutrition in [some of the countries], such as Yemen, Sudan, Syria and Djibouti."

- Regional nutrition stakeholder

Figures 9. Average regional proportion of children 6 – 23 months meeting MDD (left) and MAD (right). Solid dots represent regional average proportion given available data for that year. Bubbles represent individual country data. The relative size of the bubble represents the population size.



Most immediately, the high prevalence of child illness, inadequate antenatal/postnatal care, suboptimal breastfeeding practices, and low caregiver knowledge of proper feeding practices are documented barriers to optimal complementary feeding throughout MENA (38). Among the barriers to appropriate complementary feeding practices, nutrition stakeholders not only pointed to low purchasing power, but also low community nutrition knowledge, especially among more rural communities and among senior individuals in positions to enact population-level change.

Low maternal education and precarious employment status of women in the region underlie immediate factors listed above (38-40). Specifically, sub-optimal IYCF practices were more prevalent among those living in poverty and facing food insecurity (38, 39). Regional stakeholders underscored this finding during interviews as well.

IYCF practices are, in part, culturally bound as well: studies have found that the norms on age-appropriate young child foods may further influence MDD and MAD in the region (38, 39). The recent political, social, and economic turbulence contributing to rising food and non-food prices throughout MENA have further contributed to sub-optimal diets and nutritional status of children in the region (41). Stakeholders explained that some upstream factors, such as the ongoing crises, economic situations, and food insecurity, influencing the regional nutrition situation are less modifiable, if at all, than others.

"The Ukraine crisis has had a lot of consequences for food security and inflation and purchasing power of people. Also, in Yemen, Sudan and Syria…a lot of the displacement and the conditions of people are due to conflict and insecurity, and the difficulty for populations to be autonomous and have access to health and nutrition services. This is really an issue. At the beginning it was an availability issue, but now even though the grain will arrive to countries, people will not be able to purchase it – a shift from availability to economic access issues…households will have to make [difficult] choices."

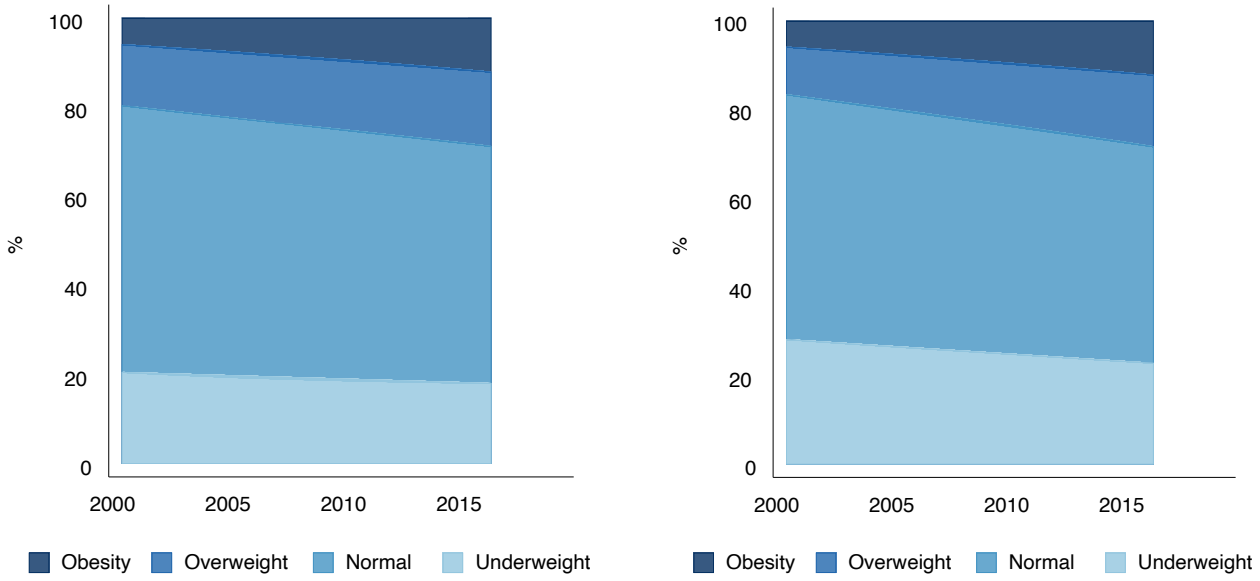
"One important cause [of poor nutrition] is low awareness of senior policy and decision makers of the economic, social, and health consequences of malnutrition and food insecurity."

- Regional nutrition stakeholder

School-aged children and adolescents

Children and adolescents throughout MENA experience less underweight than in the past but increasingly suffer from rising levels of overweight/obesity among both boys and girls in nearly all countries (Figures 10).

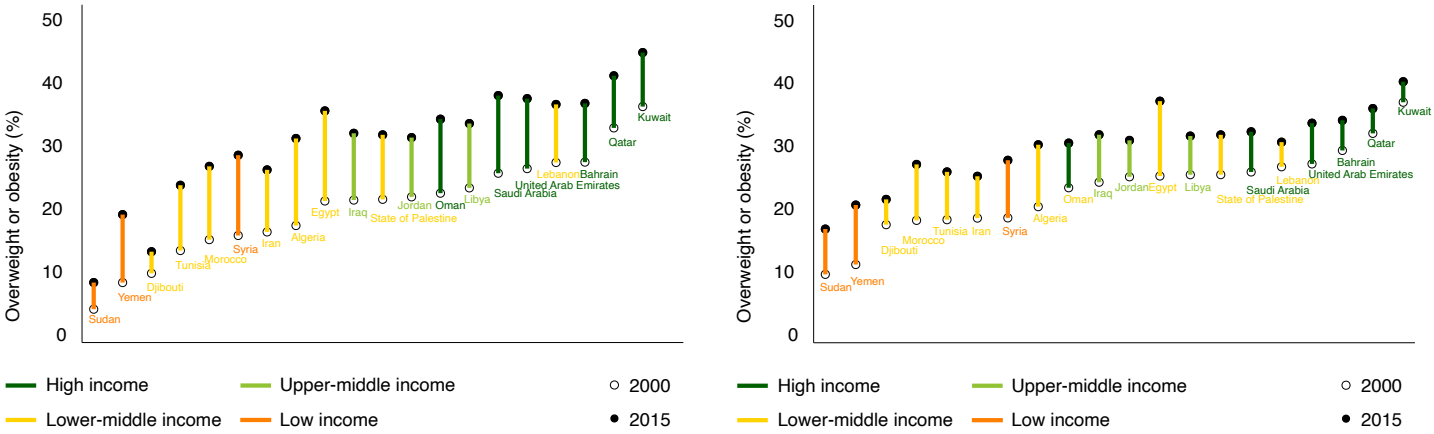
Figures 10. Regional nutrition trends among girls (left) and boys (right) aged 5 – 19 yrs



Underweight, overweight, obesity

The prevalence of underweight among both girls and boys steadily decreased in all MENA countries between 2000 – 2015 (Figure 10). The regional burden of underweight is higher among boys than girls. For instance, while the underweight prevalence of boys was >20% in 12 countries by 2015, it was only that high among girls in three countries: Yemen (25.6%), Iran (22.4%), and Oman (20.1%). During the same period that child and adolescent underweight prevalence decreased below the global average in MENA, overweight and obesity increased to 27.5% of boys and 28.1% of girls in the region. Despite the relatively lower prevalence in 2000, few low-income and lower-middle income MENA countries (e.g. Egypt, Algeria, Morocco) had the highest increment in overweight and obesity between 2000 – 2015. (Figures 11).

Figures 11. Regional overweight/obesity among boys (left) and girls (right) aged 5 – 19 yrs by country income status



Child and adolescent dietary patterns have been changing as the region experiences a changing food environment characterized by greater availability and access to energy-dense, processed foods and drinks (35, 42). Among school-aged children, increased intakes of energy, fat, saturated fat, added sugars, salt, and sugar-sweetened beverages, have coincided with inadequate consumption of nutritious alternatives (42). For example, less than one-third of school-aged children consumed the recommended fruits and vegetables in Saudi Arabia while approximately half of all children in the six Gulf Cooperation Council countries consumed sugar-sweetened beverages or sweets on a daily basis (42). Stakeholders suggested the need for national investments in behavior change interventions to improve health and nutrition behaviors throughout the region.

At the same time, youth are becoming less physically active, further contributing to rising overweight and obesity in MENA (43, 44). Increased screen time related to TV, computer, and mobile phone use are particularly problematic behaviors among youth in most MENA countries (44). Diet and physical activity behaviors cannot be understood without acknowledging the role that longstanding, traditional gender norms play in enabling more optimal behaviors among boys. In general, girls have fewer opportunities for physical activity across the region, as well as face societal pressures to maintain larger body sizes that may reflect fertility and beauty but not always health (45).

The region is also characterized by having an obesogenic environment where aggressive marketing strategies that promote highly processed, energy-dense foods and drinks are commonplace (46, 47). Regional stakeholders explained how critical government support is for overcoming structural challenges inherent to current food environments that make it difficult to practice healthy behaviors. According to our case studies of the 8 selected countries, the level of implementation of policies on limiting unhealthy foods and promoting healthy eating behaviors vary. Details and summaries of the available policies and programs in these countries are available in the country chapters.

Just as disposable incomes have been rising among a greater proportion of households in several MENA countries, including Kuwait, Qatar, and Oman, for instance, so too do obesity rates. Large body size is also a culturally-bound indicator of wealth and social status in many cultural contexts of the region (44).

"Increased investment on tailored and context specific communication and behavior changes intervention for increased awareness and promotion of optimal dietary practices."

"Government support is invaluable to provide policy, law, regulations, guidelines, resources, and technical expertise. Also, for facilitating meaningful engagement with a range of stakeholders and community leaders, [for example] forming a high council with the high-level actors in relevant sectors for food and nutrition improvement. Also, government support is necessary for sustainability of interventions."

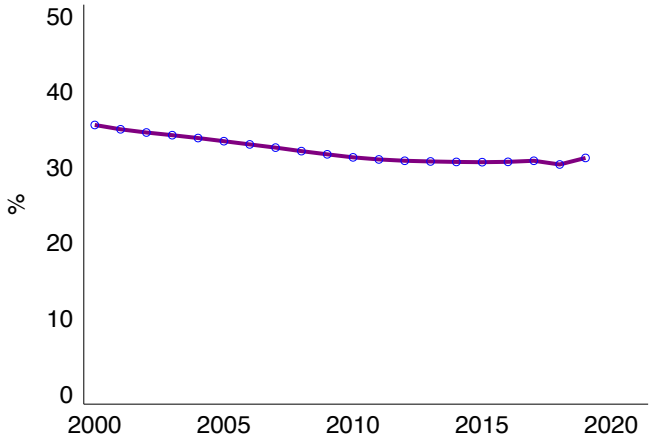
- Regional nutrition stakeholder

Maternal nutrition

Maternal anemia

The regional prevalence of maternal anemia has largely not changed in MENA, despite a slight decreasing trend (Figure 12). Most recently in 2019, regional prevalence was 31.2% and 7 out of 20 countries had the burden remained higher than 30%.

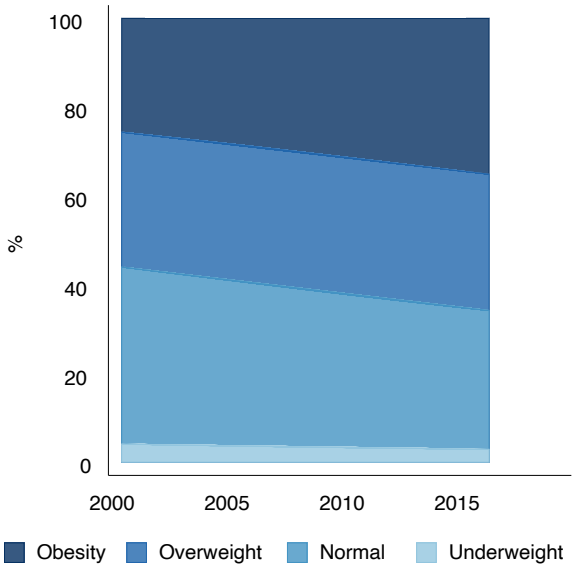
Figure 12. Regional anemia trend among women of reproductive age in MENA countries



Maternal underweight, overweight, and obesity

There is an indirect relationship between maternal underweight and overweight/obesity throughout the region: the estimated prevalence of underweight decreased over time, while overweight/obesity worsens among women, reaching to 65.7% in the region (Figure 13).

Figure 13. Regional nutrition trends among adult women



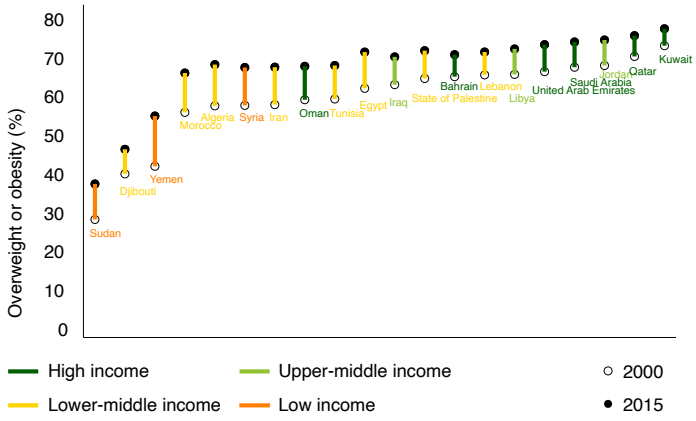
A similar combination of multi-level factors that contribute to rising obesity among youth also help explain trends among adult women living in the region (47). At the most immediate level, maternal diets are increasingly unhealthy and comprised of foods and drinks that were once characteristic of 'Western' diets (43, 47). Now a days, energy-dense, high-fat diets are commonplace despite the hugely diverse range of traditional cuisines found throughout the region (47). MENA has experienced a decline in food availability due to limited food supplies and higher volatility of agricultural production, with a wide range of proportion of household expenditure spent in food (48). The concerning food affordability and food accessibility may worsen the access and utilization of healthy food choices, which may make the cheaper energy-dense nutrient-sparse foods more appealing.

Unhealthy dietary changes, coupled with increased sedentary lifestyles and higher levels of maternal stress in many areas of the region, can be attributed to a complex interplay of inter-related societal and cultural factors that manifest distinctly depending on each unique regional context (49).

In general, though, food environments that once offered more locally-available, nutritious food options now encompass fast-food chains and related vendors selling less expensive, processed options (49). Some food choices may be related to sub-optimal levels of maternal nutrition knowledge, but are more likely influenced by widespread food marketing throughout the region (46, 49). Given such complexities of this nutrition situation, regional stakeholders emphasized the need for sustained political commitments as a starting point for positive change.

Higher levels of national wealth are associated with greater overweight and obesity prevalence in 2000; however, a "catch-up" phenomenon is observed in some low-income and lower-middle income countries, including Yemen, Algeria, and Morocco, where more than 10 percentage points increase of the overweight and obesity prevalence were observed (Figure 14).

Figure 14. Maternal overweight and obesity in MENA by country income status (FY2022) (2000 – 2015)



For instance, increasing urbanization in many MENA countries has resulted in lower physical activity levels and higher fast food availability among women in urban compared to rural settings (46). Employment patterns are also changing regionally, with a greater proportion of women now in the formal workforce, with possible implications for nutritional status. For example, obesity risk was higher among women not formally employed in one Saudi Arabia study (50). Conversely, formal maternal employment, which typically requires higher education levels, was associated with higher obesity risk among women in Iran, underscoring the complexity of a rapidly-changing nutrition situation (51).

Cultural factors may also help explain the greater proportion of adult women with obesity than men in the MENA region (52). Individual factors, including pregnancy-related weight gain, may explain some sex-related differences. However, conceptions of maternal beauty that value larger body sizes, traditional clothing that hides body size, and shared-plated eating that may make portion control more difficult are cultural examples further influencing maternal nutrition throughout the region (45, 49, 53).

"All of these challenges can be reversed and solved if strong coordination between, collaboration of, and participation of all stakeholders in nutrition and other related sectors fulfilled. One regional strategic plan with commitment from all stakeholders can make the change happen."

"It is because of the conflict and instability we cannot have robust political commitment to food and nutrition security...this also makes nutrition compete with other priorities and appear less important. For that, little funds go to nutrition as there is not enough resource mobilization from the decision-makers."

- Regional nutrition stakeholder

Conclusion

The MENA region faces many health and nutrition challenges as a result of upstream factors associated with global and regional policy and economics, as well as downstream factors more closely related to community, household, and individual characteristics. Acknowledging the diverse situation in MENA countries, MENA as region, on average, is seeing reductions in infant and young child undernutrition while experiencing rising overweight and obesity among all segments of the population in most countries (Appendix 3). The lack of recent data limited the situational analysis to further look a t impacts of COIVD-19 pandemic, the war in Ukraine, and the recent within-country conflicts. This changing nutrition landscape necessitates political will, adequate investment, and careful coordination at both regional and national levels for better nutritional status of children, adolescents and women both now and in future generations.

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RECOMMENDATIONS

Overarching recommendations:

The following recommendations are informed by the key findings of this regional landscape analysis. These recommendations are intended to guide country programming via the UNICEF MENA Nutrition Strategic Direction Recommendations may be operationalized differently according to country context.

4. **Greater efforts are needed to drive reductions in stunting and wasting, particularly in low- and middle-income countries.** The burden of undernutrition in MENA differs by context and there are significant regional disparities. Although there has been significant progress in reducing stunting in the region, countries that are low- and middle-income or less food secure have higher levels of stunting than countries that are high-income or food secure. Countries in conflict-affected and fragile contexts are also experiencing persistently high levels of wasting that must be addressed.

5. **Double-duty actions[1] are needed to address rising overweight and obesity, while simultaneously tackling persistent undernutrition.** Overweight and obesity are rising among all age groups in the region. To address these overlapping burdens and tackle all forms of malnutrition, there is a need to invest in double-duty actions that improve children's and women's diets, access to nutrition services, and positive practices. This includes building healthier food environments, with the support of policies, regulatory frameworks and strategies, and accompanying monitoring and enforcement measures.

6. **A multi-systems approach to nutrition programming is critical** given the complexity, breadth, and persistence of nutrition challenges throughout the region. This approach requires strengthening and leveraging the food, health, education, social protection and water and sanitation systems to address the key determinants of all forms of malnutrition and improve access to nutritious diets, essential nutrition services and positive care practices. Along with strong multisectoral coordination, this approach offers greater impact than delivering through one system alone. Increased government commitment for nutrition programing and financing is also crucial.

7. **Proven nutrition interventions must be scaled-up to reach more people over a wider geographic area in order to achieve long-term nutrition development goals.** Nutrition interventions[2] must expand while maintaining high levels of quality, equity and sustainability, with continued efforts to expand programmes via multiple systems and platforms. Maintaining high-quality services can be achieved by leveraging enabling factors such as engaged community platforms, strong country leadership, managerial and technical capacity (i.e., skilled and competent staff) and robust monitoring and evaluation systems.

8. **Increased investment in nutrition data generation and access is needed across the region.** These investments are critical to address the lack of nationally-representative, reliable and up-to-date nutrition data. Data must also be collected on multisystem actions and services to allow for more informed and evidenced-based policy and programme decisions.

1 Corinna Hawkes , Marie T Ruel, Leah Salm , Bryony Sinclair , Francesco Branca, Double-duty actions: seizing programme and policy opportunities to address malnutrition in all its forms. Lancet. 2020 Jan:142 155. https://pubmed.ncbi.nlm.nih.gov/31852603/

2 The Lancet's Maternal and Child Undernutrition Series in 2008, for example, called for 99 percent coverage of eight core interventions for children and pregnant women in countries with high burdens of undernutrition (Bhutta et al. 2008); the 2013 update of the series recommended ten interventions at 90 percent coverage (Bhutta et al. 2013).

9. **Context-specific programming is required to respond to the diversity of nutrition situations across MENA countries.** This is crucial to tackle the diverse and complex nutrition challenges faced across a region with a range of political, economic, and sociocultural contexts. Consider clustering countries into groups to allow programming to be tailored to address context-specific challenges.

Programmatic recommendations

Specific programmatic recommendations based on the key findings of the landscape analysis are as follows:

1. **Maternal nutrition**
    a. **Increase investments in maternal nutrition programming linked to the first 1,000 days,** leveraging multiple platforms. This includes advocating for and supporting: policies, strategies and programmes that aim to make nutritious foods more available and affordable; nutrition counselling; micronutrient supplementation; and social and behaviour change communication.
    b. **Address the challenge of low birthweight by investing in improved access to antenatal care services,** including integrated maternal and newborn services. This includes facilitating universal access to and compliance with iron/folate or multiple micronutrient supplementation during pregnancy and providing guidance and services to support mothers in the nutritional management of children under 6 months of age with poor growth and development.
2. **Early childhood nutrition**
    a. **Advocate for and support the adoption of policies and programmes to protect and promote breastfeeding,** such as maternity leave, family-friendly workplace policies and the Baby-Friendly Hospital Initiative; skilled counselling and breastfeeding support; and evidence-informed social and behaviour change interventions to address social norms.
    b. **Address the key underlying determinants of poor diets in early childhood** to improve their quality (minimum dietary diversity) and quantity/frequency (minimum meal frequency). Actions should be implemented through multiple systems, specifically the food, health, water and sanitation and social protection systems, to improve the availability and affordability of diverse nutritious diets. Systematic social and behaviour change interventions are also critical to address norms related to age-appropriate foods for young children. UNICEF's regional action framework for improving young children's diets could serve as a tool for countries in designing context-specific actions.
    c. **Consider the use of locally-produced complementary food and/or specialized products and supplements to fill nutrient gaps in children's diets.** There is growing evidence for the efficacy and cost-effectiveness of these products to improve population-level nutritional status. Improved training for health workers and enhanced monitoring and evaluation at subnational and national levels are critical to implement such programmes effectively.

3. **Nutrition of school-age children and adolescents**
    a. Support the scale-up of initiatives to improve the school food environment and school curricula and develop guidance on school food provision.
    b. Adopt national social and behaviour change interventions to promote the consumption of nutritious foods and discourage high intake of foods and beverages high in fat, salt and sugar.
4. **Enabling food and nutrition environment**
    a. Support the strengthening of fiscal and legislative measures to discourage the consumption of foods and beverages high in energy, fats, added sugars and salt. Some of these policy measures include consumer-friendly front-of-pack nutrition labelling, and taxation of unhealthy foods and beverages.
    b. Advocate for and support policies that protect infants, children and families from harmful food and beverage marketing practices. This includes effective implementation, monitoring and enforcement of the International Code of Marketing of Breast-milk Substitutes.
5. **Data, advocacy and communications**
    a. Invest in generating data and build national capacities for nutrition monitoring to tackle the underlying determinants of malnutrition, address inequalities and reach the most vulnerable children and families.
    b. Advocate for national commitments to and investments in maternal and child nutrition, with services delivered via multiple systems.

DJIBOUTI

DJIBOUTI NUTRITION SITUATION

The Republic of Djibouti is a lower-middle-income country located in the Horn of Africa along the Gulf of Aden. Djibouti is considered to be one of the smallest African countries with an approximate one million people, of whom 78% live in urban areas (1 – 2). The environment of Djibouti can be harsh, especially in rural areas where little arable soil and low water availability are characteristic of the desert-like conditions that span 90% of the country's topography (3). In fact, just 4% of Djibouti's total land surface is arable (4). Coupled with recurring but unpredictable climactic shocks, such as frequent drought conditions leading to water scarcity and less common but just as impactful flooding, poor water management practices and insufficient land-use planning are additional complications of an already-challenging environment for maintaining optimal health and nutrition (5 – 6). Drivers of food insecurity are not only environmental but also structural, as 60% of the population is unemployed and 17% live in extreme poverty. Currently, Djibouti meets up to 90% of its food needs through imports from nearby Ethiopia and other countries (4). As traditional livelihoods consisting of animal husbandry and vegetable farming have been increasingly disappearing and migration has moved from rural to urban centers of the country, this percentage may only increase in coming years, further exacerbating an already-vulnerable Djibouti population.

Infants and young children under 2 years of age

Exclusive breastfeeding

In 2012, just 12.4% of infants aged 0 – 6 months exclusively breastfed in Djibouti. The SMART 2019 survey reported a of 51.5% rate of exclusive breastfeeding in children 0 – 5 months, based on the sample size of 260 children (7).

Low EBF rates in Djibouti may be a result of, in part, maternal perceptions that water-based solutions (e.g., sugar water) is the best solution to address infant thirst in Djibouti's year-round hot and dry weather (8). Low maternal knowledge and limited support for EBF are additional contributing factors of low EBF in Djibouti (9 – 10). Culturally, boys are weaned earlier than girls in Djibouti and thus organizational efforts to improve EBF, such as IFAD's use of mother counsellors and UNICEF's implementation of grandmother counselors, have aimed to improve breastfeeding using culturally-appropriate and community-based approaches. However, their effectiveness on improving national EBF rates requires more investigation (11 – 14). Similarly, the limited implementation of Baby Friendly Hospital Initiatives across health facilities of Djibouti may be hindering breastfeeding progress nationally but more evidence is needed (15). The regulation of the manufacturing, supply, and distribution of breastmilk substitutes is an example of an existing law (Law N89) for breastfeeding protections in Djibouti (16).

Complementary feeding

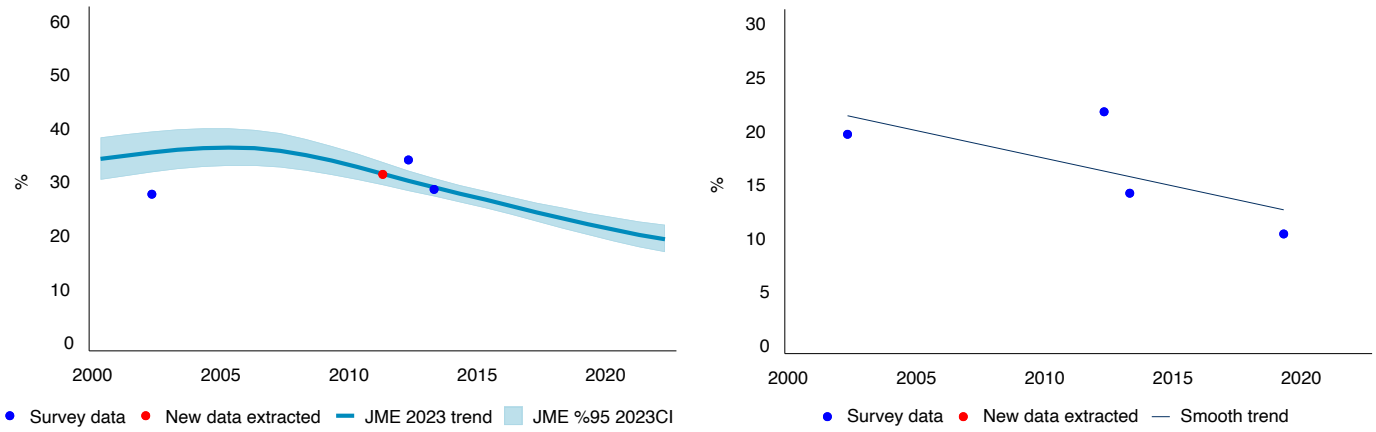
Neither LBW nor complementary feeding (MMF, MDD, MAD) data were available for this trend analysis in Djibouti. However, the 2022 Djibouti Food Security and Nutrition Monitoring survey indicated that while 44.5% of children under 2 years of age met MMF, just 10.9% met MDD, with disparity by rural (1.7%) and urban (14.2%) areas (4). No MAD data was reported. The inadequacy of children under 2 years of age diets has been ascribed to low food availability and access, as well as low maternal knowledge of optimal IYCF practices (4, 17). Environmental factors likely play

a role in sub-optimal IYCF practices in Djibouti, as frequent droughts have negatively impacted usual livelihoods and resulted in both a greater scarcity of natural resources and a worsening financial situation for households (18). Moreover, the drought-prone climate conditions of Djibouti have shaped a WASH environment that is not conducive for optimal complementary feeding practices (10, 17, 18).

Children under 5 years of age

Stunting and wasting. The prevalence of stunting among children under 5 years of age children in Djibouti has remained at approximately 30%, with a decreasing trend based on the new JME 2023 estimates. The SMART 2019 survey, which was incorporated into the JME 2023 estimate, reported a stunting prevalence of 20.9% in children between 6 -59 months of age (7). Wasting prevalence has also shown a decreasing trend in the past two decades. The current wasting rate is 10.3% according to the SMART 2019 survey (7). Some of the fluctuation may be due to seasonal changes and the wasting trend depicting in the figure should be read with caution (Figures 1.1 – 1.2).

Figures 1.1 – 1.2. Stunting (left) and wasting (right) prevalence of children under 5 years of age in Djibouti



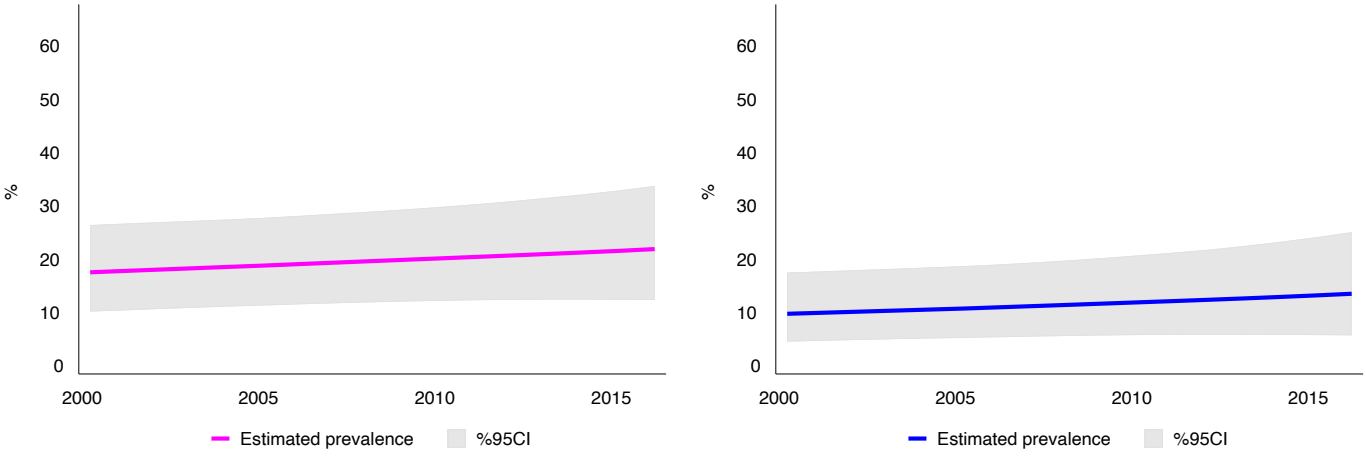
The diets of children under 5 years of age in Djibouti are characteristically low in proteins but high in fats and refined carbohydrates (4). Sub-optimal diets are influenced by the persistently high levels of food insecurity and poverty throughout the country, with rural communities experiencing the greatest proportion of children under 5 years of age acute malnutrition cases (4, 11). Djibouti's wasting and stunting trends can be explained, in part, by poor WASH practices and recurrent child illness (e.g., diarrhea, fever, respiratory disease, measles) that negatively affect nutritional status of infants and young children (10, 17, 19). Throughout the country, children under 5 years of age nutrition services including facility-based growth monitoring, nutrition counseling and support, and nutrition rehabilitation for acute malnutrition do exist throughout the country (10, 12, 14). However, Djibouti is a country that faces frequent and continuous drought conditions that not only influences the quality of children under 5 years of age diets through reduced food security, but also greater demand on those already resource-constrained nutrition services described above (19).

School-aged children and adolescents

Overweight and obesity

The overweight and obesity prevalence estimates among children and adolescents aged 5 – 19 years old in Djibouti reflect a worsening nutrition situation.

Figures 1.3 – 1.4. Overweight and obesity prevalence (95% CI) of girls (left) and boys (right) 5 – 19 yrs between 2000 - 2016



The diets of children and adolescents in Djibouti are increasingly characterized by foods that are high in fats and sweetened with sugars while low in essential nutrients, namely proteins, vitamins, and minerals, which are important for healthy growth and development (4, 20). In fact, Djibouti has one of the highest consumption rates of trans fat in the MENA region (20). Underlying dietary practices are not only based on personal preference, but also a result of weak family support and high levels of food insecurity as a result of climate and economic shocks that Djibouti frequently experiences (4, 21). The education system offers an opportunity to reach youth in Djibouti, for example by promoting community gardening in school curricula and by continuing to implement the National School Feeding Program that offerings a healthy meal during school and take-home rations to those in need (12, 22). However, longstanding social norms contribute to school drop-out, especially among girls who are expected leave school prematurely for marriage. Djibouti is among just 23 countries lacking laws or policies that specifically protect the rights of adolescent mothers to education (23).

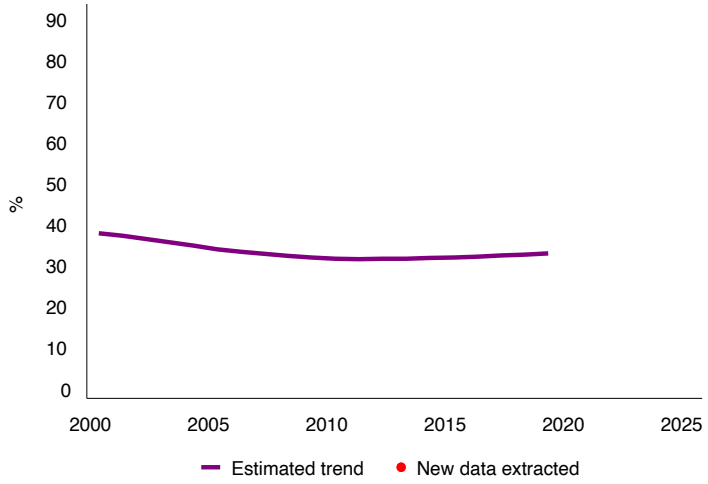
Maternal nutrition

Maternal anemia

No national data exist for more precisely determining maternal anemia trends in Djibouti, but the 2022 Global Nutrition Report estimates the current prevalence to be 32.3% (24, 25). Since 2000, the prevalence of maternal anemia may be between 30 – 40% (Figure 1.5).

Inadequate consumption of iron-rich foods among Djiboutian women is a proximal determinant of maternal anemia in Djibouti (24). To be sure, 75% of adult women (86.2% rural: 68.3% urban) do not consume a diet that is diverse enough to meet all of their nutrient needs, including those that contribute to the current anemia prevalence (4, 26). Currently, antenatal care programs do offer IFA supplementation for pregnant women in Djibouti (12).

Figure 1.5. Prevalence of anemia among woman aged 15 – 49 years in Djibouti

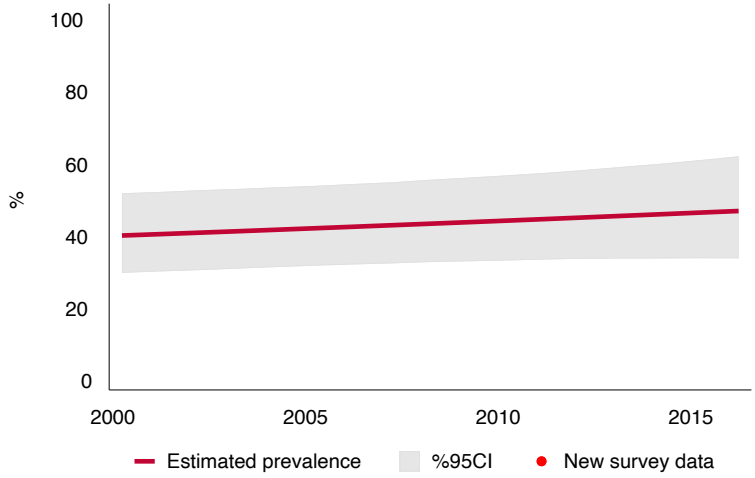


Overweight and obesity

Maternal overweight/obesity has been steadily increasing in Djibouti in the past twenty years (Figure 1.6).

Maternal diets that include high intakes of saturated fats, energy-dense cereals, and added sugars are an immediate dietary factor of overweight/obesity in Djibouti (4, 20). Underlying levels of food insecurity related to international supply chain disruptions, coupled with existing poverty levels, may contribute to sub-optimal dietary choices that favor more affordable, less nutritious dietary options for adult women, among others, who live in Djibouti (27). There have been recent spillover effects of insecurity and conflict in Ethiopia that have decreased employment opportunities in and around the Port of Djibouti (4). As a result, typical households are increasingly spending a higher share of their disposable income on food – a challenge for nutrition across all life stages (4).

Figure 1.6. Prevalence (95%CI) of overweight and obesity among woman aged >18 years in Djibouti



Policies, strategies, and programs to improve nutrition in Djibouti

Djibouti has been a SUN movement member since 2021 and in recent years has enacted a variety of policies, strategies, and laws in place to address population-level nutrition through multiple sectors (28). For example, an on-going order since 2013 that has promoted the fortification of wheat flour with iron, zinc, and folic acid, and a law that has been protecting, promoting, and supporting breastfeeding through the regulation of breastmilk substitutes has been in place since 2010 (16). The import and marketing of iodized salt is also regulated through the **food system** (16). Strategic support from partners, including a 2020 – 2024 plan by WFP in collaboration with the Ministry of Social Affairs and Solidarity, aims to ensure access to adequate and nutritious food throughout the year (29).

Djibouti's Ministry of Health, with support from partners, has several on-going initiatives to improve child nutrition through the **health system**. The National Nutrition Program (2019), the Towards Zero Stunting in Djibouti Project (2018), and the Djibouti Health System Strengthening Project (2022) are three such examples (10, 11, 30). In addition to existing growth monitoring, IFA provision, breastfeeding and counseling programs, the Djibouti Social Development Agency and partners recently launched Empowering Communities for Better Nutrition to prevent child malnutrition through increased community nutrition access through 2025 (12, 31).

Although Djibouti's health service is provided by the public sector free-of-charge to its people, inaccessibility and disparities in accessibility remain a significant issue (32).

The 2018 – 2022 National Strategy for Social Protection is an example of another national framework for supporting the nutrition, health, and education of children from households experiencing severe poverty (33). Recently finished cash transfer programs (e.g., National Family Solidarity Program (2016 – 2021) are examples of other initiatives to address child nutrition through the social protection system (34, 35). USAID and UNICEF are currently supporting efforts to ensure more sustainable affordable access to improved water sources, but other national initiatives are more limited in the WASH sector than in others (36).

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EGYPT

EGYPT NUTRITION SITUATION

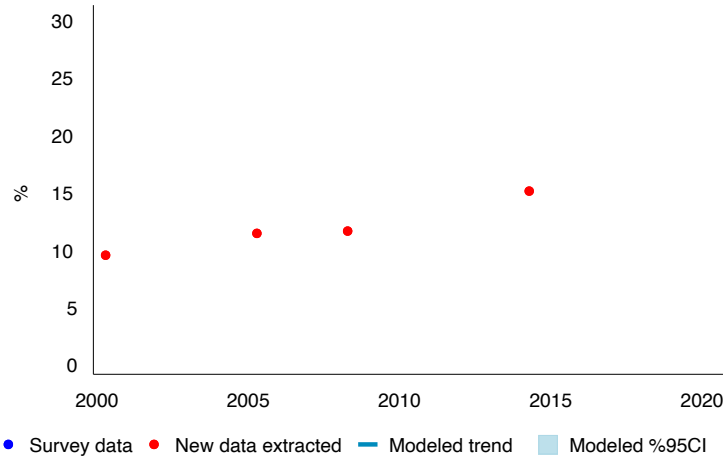
Egypt is a large, lower-middle-income country with approximately 100 million inhabitants that have experienced turbulent economic, social, and political conditions for more than a decade (1). Egypt had been seeing progress in some population-level health indicators, namely maternal and infant mortality rates that improved during the past few decades (2). Recently, though, approximately one-third of Egyptians still live in poverty with low labor force participation (42%) and low formal employment (39%) (1). The recent Russia-Ukraine war has further challenged the situation in Egypt by affecting global food production at the international level. At the national-level, political turmoil, and recurring financial crises has shaped the present-day economic situation characterized by low purchasing power and rising consumer costs for a large proportion of Egyptian households (3). Disparities in poverty exist geographically throughout Egypt, with urban areas and frontier governorates where the poorest households reside. The rural Upper Egypt region is home to more than 50% of Egypt's population living in poverty, for instance (1). However, this situation is not new: Egypt's economy has been hit with both external and internal shocks for more than a decade and by 2022, the country's food security designation was ranked 77th in the world (4).

Infants and young children under 2 years of age

Low birthweight

Between 2000 – 2015, four new DHS surveys reported LBW rate in 2000, 2005, 2008, and 2014 showing a prevalence between 9% - 15%. However, due to the data quality, UNICEF did not include any of the standard DHS survey data for the modeled LBW trend in Egypt (Figure 2.1). Therefore, the trend of LBW is remained unknown.

Figure 2.1. Low birthweight prevalence of children under 2 years of age in Egypt (2000 - 2015)

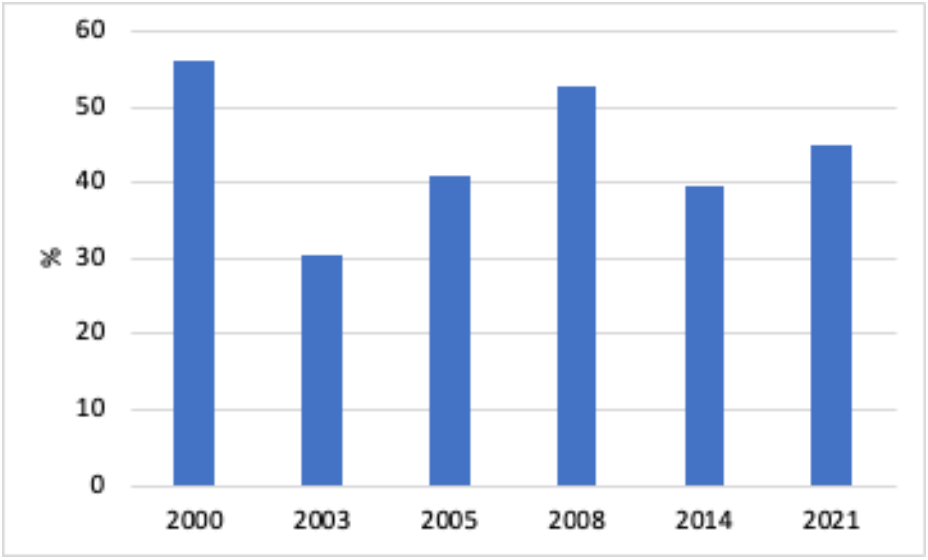


Infant LBW remains a public health challenge in Egypt due to many factors directly and indirectly related to poor maternal nutrition, widespread infectious diseases, and inadequate healthcare access during pregnancy. Maternal knowledge of healthy weight gain during pregnancy has been ascribed to inadequate nutrition counseling during ANC visits, many of which may be missed or made too late in pregnancy to yield behavior change for improved birth outcomes (3). Delayed ANC access, which often results from mistimed and unwanted pregnancies, and LBW were associated in a 2019 study conducted in Sohag district, for example (6). Upstream factors, including high food insecurity among financially vulnerable households, further underlies the ability of women to consume adequate diets during pregnancy in many parts of Egypt. Detailed risk factor analysis for low birth weight from Egypt are presented in the appendices (**Appendix 2 Figure 2.1**).

Exclusive breastfeeding

EBF estimates are highly variable across surveys conducted between 2000 – 2021 in Egypt. For example, the proportion of infants who were exclusively breastfed almost halved between from 56% in 2000 and to 30% in 2003. The proportion gradually increased between 2003 – 2008 to 53%. The current EBF proportion is estimated to be 45% in 45% according to the Egypt Family Health Survey 2021 (Figure 2.2).

Figure 2.2. Proportion of infants 0 – 6 months exclusively breastfed in Egypt



EBF is lower in urban areas of Egypt as well as among older mothers when they have their first baby, as declining fecundity may be motivating to have another pregnancy quickly, thus interrupting first-born feeding (7 – 8). Maternal employment, while offering other positive benefits that may be unrelated to nutrition, is a barrier for successful EBF, as a paucity of workplace facilities exist (e.g., offering on-site daycare; provision of lactation rooms) in Egypt. To be sure, just 14% of formally employed women in a Mansoura, Egypt study practiced EBF until six months, a large proportion of whom were still on their 3-months paid maternity leave which is protected under Egyptian law (9 – 10). According to a UNICEF Regional Officer, the more recent law provides 4 months of maternity leave. The increment in the length of maternal leave shows some promising underlying policy changes. Breastfeeding in public spaces does occur in Egypt but social norms require spousal permission to do so or contribute to feelings of maternal embarrassment, especially in the presence of men without privacy (11). Gender

norms may influence BF practices too: a societal bias toward boys helps explain higher EBF among male than female infants (7, 12). Cultural food rules practiced by family and friends also prescribe mothers to eat specific foods for increased breastmilk production, including milk, eggs, radishes, leafy greens (e.g., molokhaia), and animal-sources, as well as traditional Egyptian foods like halawa and fenugreek tea that are 'energy giving' (3). A combination of physical (e.g., birth complications, maternal tiredness or illness) and cultural (e.g., breastmilk is not sufficient for child growth, fear of losing physical attractiveness) factors underlie EBF rates in Egypt (13).

Healthcare professionals are less likely to facilitate BF practices in Egypt due to inadequate nutrition counseling training and distrust from mothers (3, 14). The lack of nutritional support from healthcare workers may help explain why many mothers report early BF cessation to improve the appetites of infants when they are considered 'old enough to eat' (3). The availability of BMS has hindered EBF progress in Egypt: one standard deviation increase in BMS availability was found to decrease BF duration by at least one month (7). Social support is important for EBF success given the challenges associated with single motherhood as well as those with more than three children, as the time needed for optimal care and feeding of all children is more limited (12). Egyptian mothers also turn to BMS when their infant is not gaining adequate weight or has illness, as well as when they perceive their own breastmilk supply to be insufficient (15). Children who are formula-fed are more likely to be obese than those that are EBF, underscoring the importance of this behavior for child growth and development in later life stages into adulthood (16). In 2014, the Ministry of Health and Population began implementing Egypt's National Breastfeeding Program and the Baby Friendly Hospital Initiative, inclusive of national IYCF counseling guidelines for healthcare workers (8).

Complementary feeding

In 2013, only 22.5% of children 6 – 23 months had minimally acceptable diets in Egypt. The typical diet of a child under 2 years of age in Egypt is characterized by early introduction of complementary foods at 4 months, an overall lack of dietary diversity, and high contribution of high-sugar, processed foods (15 – 20%) to daily energy needs (17 – 18). Food insecurity throughout Egypt helps to explain low children under 2 years of age diet quality. For example, vegetable availability is intermittent due to seasonality and rising costs of fruits and animal sources contribute to reduced food access (17 – 18).

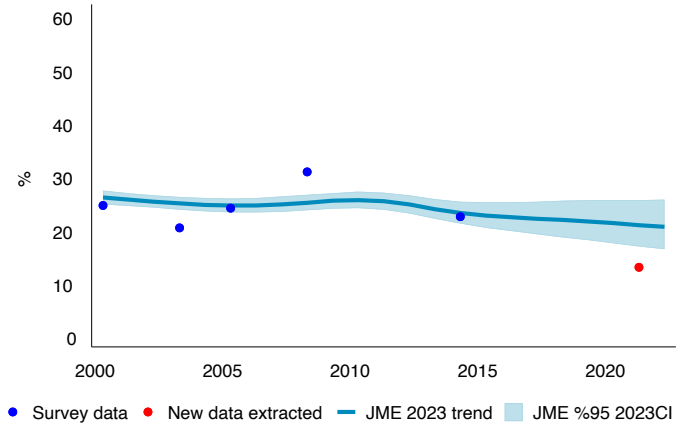
Twice the proportion of urban to rural children met MDD in a Suez Governorate-based study, suggesting geographic disparity (15). In rural areas, agricultural households purchase most of their food rather than consume what is produced, thus contributing to less nutritious diets overall and specifically for children under 2 years of age (8, 19). Culture also varies geographically with implications for diets: children under 2 years of age in Upper Egypt had lower complementary feeding indicators than those in the urban governorate, partially due to differential feeding practices that may be distinctly traditional and perpetuated by grandmothers and in-laws in rural areas (18).

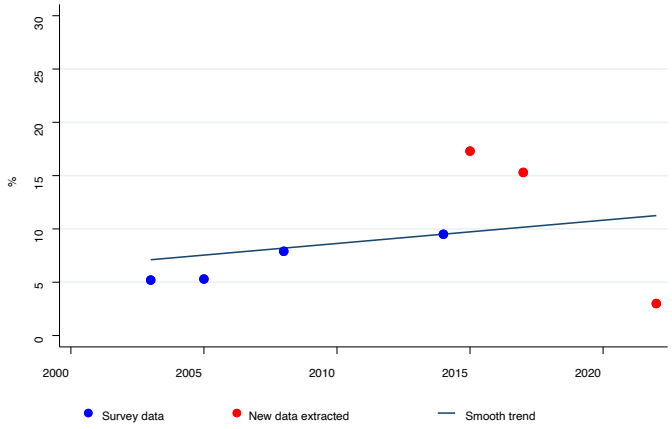
Children under 5 years of age

Stunting and wasting

While the children under 5 years of age stunting prevalence has been remained the same in the previous 20 years, the proportion of children under 5 years of age with acute malnutrition (wasting) has been steadily worsening during the same time period (Figures 2.3 – 2.4). The concurrence of child stunting and excess weight indicates an increasing double burden of malnutrition among children in Egypt as well (20).

Figures 2.3 – 2.4. Stunting (left) and wasting (right) prevalence of children under 5 years of age in Egypt





Child stunting and wasting in Egypt are influenced by a complex interplay of determinants, including individual risk factors such as larger family size, inadequate birth spacing, low maternal autonomy, history of child infection, low maternal BMI, low parental education, and health insurance access, among others (8, 10, 21 – 23). Inadequate dietary intake affects children under 5 years of age nutrition, especially in segments of the population like Upper Egypt where children are not typically eating animal sources but are consuming tea, juices, and energy-dense, nutrient-poor staple foods (8). Child diets that did meet the recommended intakes of meat and dairy food groups, however, has been shown to successfully reduce stunting risk among Egyptian children (23). However, Egypt is classified by W.H.O. as having intermediate to high endemicity for enteric viruses and thus food/water safety threatens children under 5 years of age diet quality (24 – 26).

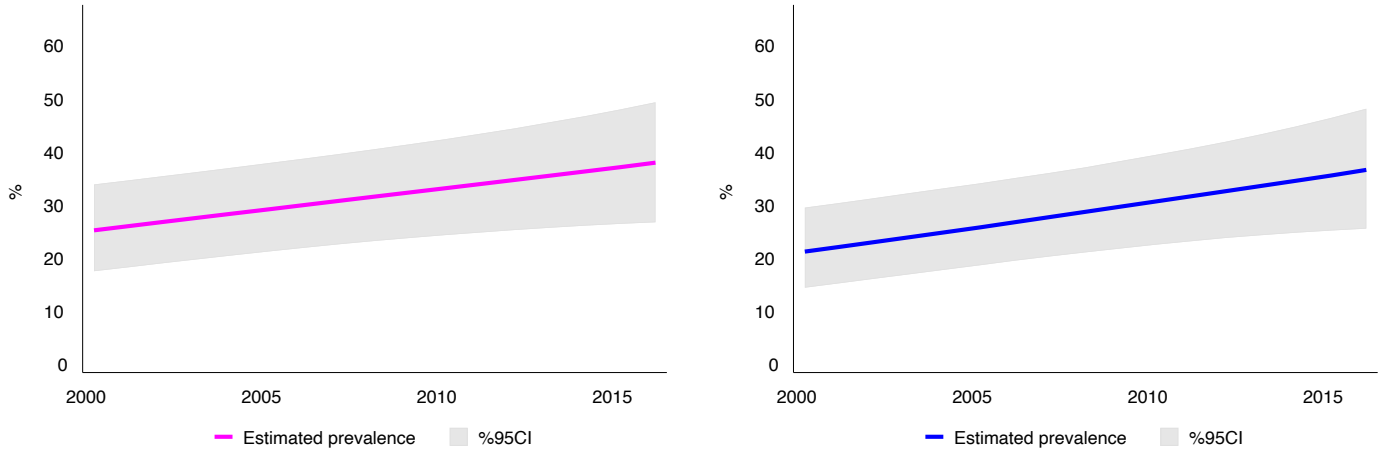
Young Egyptian children living in urban areas are more likely to have access to quality healthcare, a factor helping to explain why children living in rural areas have substantially higher odds of wasting (8, 22). Even so, while most healthcare providers are trained in management of child illnesses, studies have found nutritional training deficiencies among Egyptian providers, including just 16% of surveyed nurses with 'good' knowledge of stunting (27 – 28). Urban children are also more likely to have water/sanitation access, an important factor of child malnutrition in a country with poor sewage infrastructure, where just 36% of households have appropriate child stool disposal practices and parasitic infections affect most children with malnutrition (29 – 31). The 2006 avian flu epidemic, where large-scale poultry culling both reduced the amount of available animal source protein and reduced population trust in locally-available foods in favor of processed alternatives, has been associated with child stunting years later (8).

School-aged children and adolescents

Overweight and obesity

Although research suggests that national growth charts may be underestimating the actual prevalence of overweight and obesity, child and adolescent obesity has been continually increasing for both girls and boys between 2000 - 2016 in Egypt (32) Currently, Egypt's obesity prevalence is ranked 18th highest in the world (33). (Figures 2.5 – 2.6)

Figures 2.5 – 2.6. Overweight and obesity prevalence (95% CI) of girls (left) and boys (right) 5 – 19 yrs



Egyptian children who are born too large- or small-for-gestational-age and those born to overweight parents are more likely to be overweight during adolescence (8, 16). An abundance of evidence has documented the shift in Egypt towards more Western diets that are characterized by high consumption of sodium, sugar, fat, and excess calories while low in fruits and vegetables – a diet profile that is associated with child and adolescent obesity and early development of chronic diseases such as hypertension (8, 16, 34). Adolescence is a time of emerging autonomy when youth begin making their own health decisions that are not always beneficial for maintaining a healthy nutritional status, including skipping breakfast, consuming fast foods and sugary beverages, snacking while in front of a TV/computer, and eating calorie-rich meals before sleeping (35). Adolescents who have busy school commitments reported that their 'lack of time' primarily constrains their ability to prepare healthy foods and be physically active most days at school (36).

School feeding programs have been implemented in Egypt since the 1960s and have recently been expanded to include all public schools, inclusive of nutrition training for teachers (37). However, prolonged computer and mobile phone usage, both inside schools and out, is making physical activity even more difficult for Egyptian youth (8; 38 – 39). And culturally, large body size, which indicates health and strength among Egyptian boys, is at odds with healthy practices (16). Body weight concerns have also been reported as a factor influencing unhealthy eating patterns among adolescent females in Egypt (40). In an observational study, all Egyptian girl participants wore a hijab, which limited their sun exposure due to religious adherence.

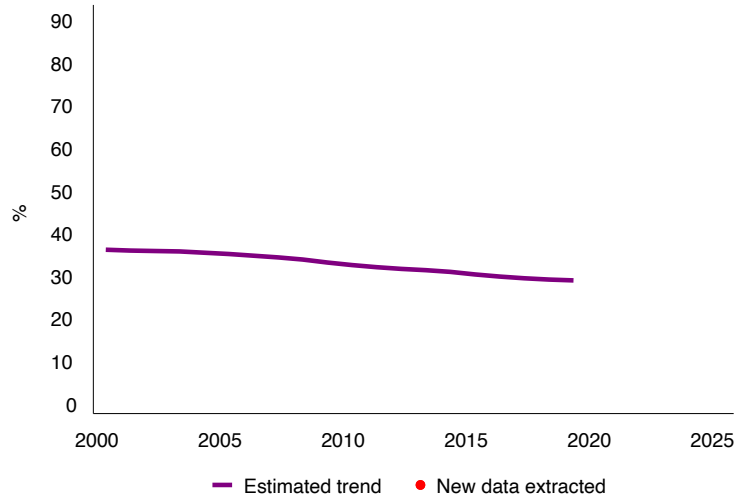
Further, girls with higher BMI had higher risk of vitamin D deficiency after adjusting for sex, multivitamin use, and physical activity (41). It was thought that underlying gender bias against girls may further contribute to disparate weight outcomes in MENA, however, a recent study conducted in Egypt, Jordan and Yemen did not observe nutritional bias against girls (42). National policy, such as government subsidies for sugar and flour-based food production has increased the affordability and thus access to more unhealthy foods throughout Egypt as well (8).

Maternal nutrition

Maternal anemia

Maternal anemia has affected an estimated one third of Egyptian women since 2000. (Figure 2.7).

Figure 2.7. Prevalence of anemia among woman aged 15 – 49 years in Egypt

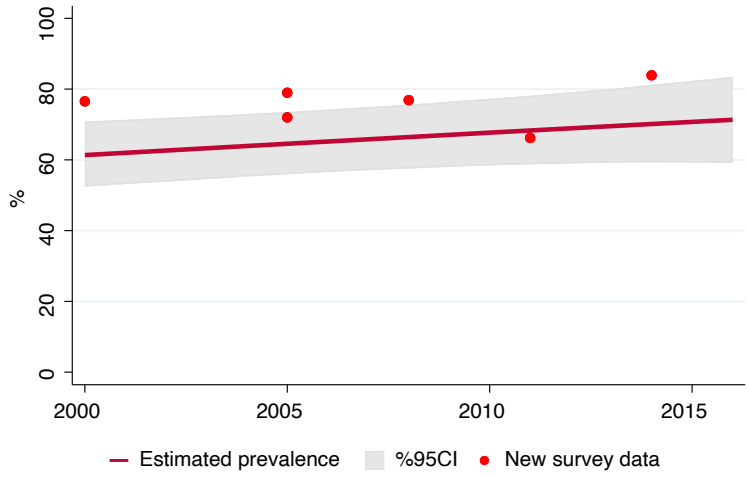


Insufficient levels of dietary iron intake, coupled with a variety of individual risk factors (e.g., non-nulliparous, menstruating), primarily contribute to persistent maternal anemia levels in Egypt (8; 43 – 44). Sub-optimal dietary patterns are primary contributors to persistent maternal anemia in Egypt, including practices that include skipping breakfast, as well as preferences for energy-dense, high-sugar foods in lieu of fruit and vegetable intake (45). In addition, Egyptian women have a high consumption of phytate-rich foods (e.g., black tea, bread) that limit the bioavailability of non-heme iron (44). Poor maternal knowledge of iron-deficiency anemia and its associated risks may help, in part, to explain these dietary patterns (Ahamed et al., 2018). Also, sub-optimal utilization and compliance with iron supplements has been documented in Egypt (46). In addition to diet, parasitic infections that are common to Egypt have been found to lower the hemoglobin levels of pregnant women and raise their risk of anemia (47). Before the discontinuation in 2013, large-scale fortification of wheat flour with iron and folic acid in 2008 reached an estimated 50 million Egyptians. In 2016 – 2017, national policy was put into place as a plan to resume wheat fortification, in addition to the provision of iron and folic-acid supplementation for pregnant women (48). Such policies that have been put in place during the past decade may help to address maternal anemia moving forward.

Overweight and obesity

The estimated prevalence of maternal overweight and obesity has been consistently worsening in Egypt and affecting more than 70% of adult women as of 2015 (Figure 2.8).

Figure 2.8. Prevalence (95%CI) of overweight and obesity among woman aged >18 years in Egypt



The rise in maternal obesity in Egypt in the past 20 years may be due to several factors reflective of a country moving rapidly moving through a nutrition transition and resulting in unhealthy lifestyle and dietary changes, increased sedentary behavior, and underlying factors such as urbanization (8, 43). As Egypt transitions to more Westernize diets, Egyptian women especially those who are wealthier and living in urban areas, increasingly consume diets that include higher-than-recommended energy, sugar, and sodium intakes (3, 43). Women living in Upper Egypt, one of the poorest regions in the country, have had higher rates of obesity due to environmental conditions considered to be obesogenic (8).

Nowadays, obesity is more prevalent among Egyptian females (50%) than males (30%) (49). Social and cultural factors may play a uniquely important role in this country setting where low levels of outdoor exercise stem in part due to safety concerns reported by women (43). In addition, gender norms that prescribe extra domestic chores for girls rather than boys further limits girls' ability to spend time on leisure activities that may be good for health and nutrition. Currently, the national, multi-sectoral action plan for prevention and control of NCDS has a guiding strategic goal of reducing overweight and obesity among all life stages including adult women (50).

Policies, strategies, and programs to improve nutrition in Egypt

Egypt has a number of recent and on-going **multi-sectoral** policies, strategies, and programs to address the country's health and nutrition challenges. For example, Egypt's National Multi-sectoral Action Plan for Prevention and Control of NCDs (2022) provided a guiding framework to reduce the NCD burden nationally (50). It has many objectives, including the establishment of a multisectoral executive sub-committee of all relevant stakeholders, as well as to reduce 30% of salt content from subsidized Baladi bread, to reduce sodium in industrial food production, to develop policy for school meals specifications, to provide counseling for healthy diets, and to raise taxes on soft drinks and sugar sweetened beverages, for example. Another example is the recently launched multi-sectoral food and nutrition strategy in 2023.

In addition, national iodization of salt in the 1990s and more recent fortification of wheat with iron and folic acid are examples of specific **health and food system** policies that have aimed to address population-level micronutrient deficiencies. Sometime after the fortification of wheat flour an oil fortification program was implemented for Egyptians benefiting from the government's food subsidy system, particularly children and women. More than 840,000 tons of subsidized vegetable oil was fortified with vitamins A and D, reaching close to 80% of Egypt's population (51). In 2016, Egypt mandated that all food products bearing a nutrition or health claim be substantiated, a policy to address obesity and NCDs (51).

Through the **social protection** system, Egypt has had a number of initiatives to improve health and nutrition, for example its Takaful and Karama cash assistance programs that were examples of nationally targeted social safety nets for those living in poverty (52). Egypt also enacted a labor code to increase social protections in the workplace, including maternity leave duration, maternity leave benefits, as well as supporting breastfeeding at work through paid breaks and available facilities. In the education sector, Egypt's Ministry of Education outlined its National Strategic Plan for Pre-University Education (2014 – 2030) to achieve full coverage of its national school feeding program with a focus on increasing the nutritional value of its meals (53). According to a UNICEF Regional Officer, currently, school meals provide fortified biscuits and snacks in primary schools 3 days a week. Relatedly, the National Strategy for Women's Empowerment 2030 aims to promote gender equity through improved educational attainment and economic participation among Egyptian women (54). And through the WASH sector, Egypt has prioritized improving sanitation in recent years as evidenced by its $14 billion National Rural Sanitation Program for poor households that may benefit from improved access to sanitation services and greater hygiene awareness (55).

While there are numerous types of documented programs targeting nutrition in Egypt, many are small-scale and not strategically linked together as part of a greater comprehensive plan. Thus, more collective and coordinated actions among all relevant stakeholders will be important for harmonizing efforts to scale-up successful multi-sectoral interventions throughout Egypt (56).

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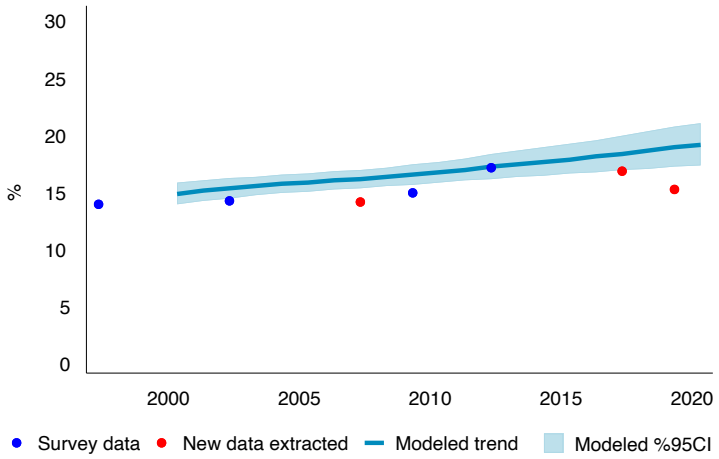
JORDAN

JORDAN NUTRITION SITUATION

Jordan is home to approximately 11 million people, including around 750,000 refugees from Syria and other nations (1). The country has a Human Development Index that ranks at 102/191 countries (2) and is categorized as an upper-middle-income country by the World Bank (3). Since the onset of Syrian refugee crisis in 2011, Jordan continued to face challenges in the national systems, including the education, health, and social safety net, to provide opportunities for the increasing population. Until 2008, Jordan's economic growth has reached to an average of 7.7 per cent, thanks to the large remittances from migrants working in the Arabian Gulf, the foreign investments in manufacture, information, technology and other sectors (4). However, the global crisis hit in 2008 and Jordan's economy has not been recovered the pre-global crisis level yet. Thanks to the increasing investment in general public health services since 2012, there were some remarkable improvements made in Jordan, including a reduction of mortality rate of children under five by over a third, achievement of universal access to primary education, and near universal access to improved water and sanitation facilities (4). However, the ongoing significant food price increases (5) and the recent Ukraine crises (6) continuously stress the wellbeing of mothers and children, especially girls due to the historical gender equality issues in the country (4). The current proportion of people who are food insecure or vulnerable to food insecure is estimated to by 57% in Jordan households in 2022 (1).

Infants and young children under 2 years of age

Figure 3.1. Low birthweight prevalence of children under 2 years of age in Jordan

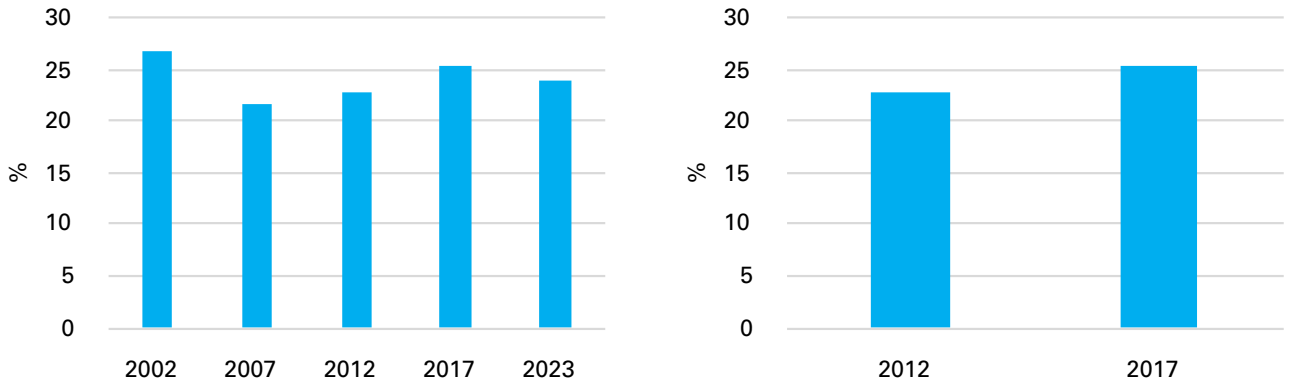


Low birthweight

Jordan has conducted consecutive assessments of LBW rate since 1997, primary through the DHS. Data show that there is a slight upward trend of LBW from 13% to 17% between 1997 – 2017. In 2019, LBW rate was 15%. The modeled trend shows a increased trend (Figure 3.1). According to our risk factor analysis and supported by the literature,

female babies (7), higher birth order (8), parity (7, 9), shorter birth interval (< 24 months) (8) are related to increased risk of LBW in Jordan (**Appendix 2 Figure 2.1**). In addition, suboptimal maternal nutrition (10), pregnancy comorbidities and complications (7, 9) and unplanned pregnancy (8) are associated with LBW. Supported by our analysis and literature, infants from the households with the lowest wealth quintile and less educated mothers have the higher risk of LBW (8). For cultural and contextual factors, consanguinity and place of residence, such as central and south regions of Jordan, also associated with higher risk of LBW (**Appendix 2 Figure 2.1**).

Figure 3.2 – 3.3. Proportion of EBF infants 0 – 6 months (left) and proportion of children 6 – 23 months meeting MAD (right) in Jordan



Exclusive breastfeeding and complementary feeding

EBF is still inadequate in Jordan, which was only achieved in about a quarter of children 0 – 6 months between 2002 and 2023 (11). The most recent EBF prevalence reported in PFHS 2023 was 23.9%. Similarly, minimum acceptable diet (MAD) was met by only 25% of children aged 6–23 months old in 2017, which did not improve much since 2012 (11). The PFHS 2023 did not report MAD, but only MDD, which was only achieved in 42.4% children 6 – 23 mo. However, the consumption of sweet beverage and unhealthy foods were high in 56.3% and 64.8% children 6 -23 mo, respectively. LBW is a barrier to EBF from 0 – 6 months (12).

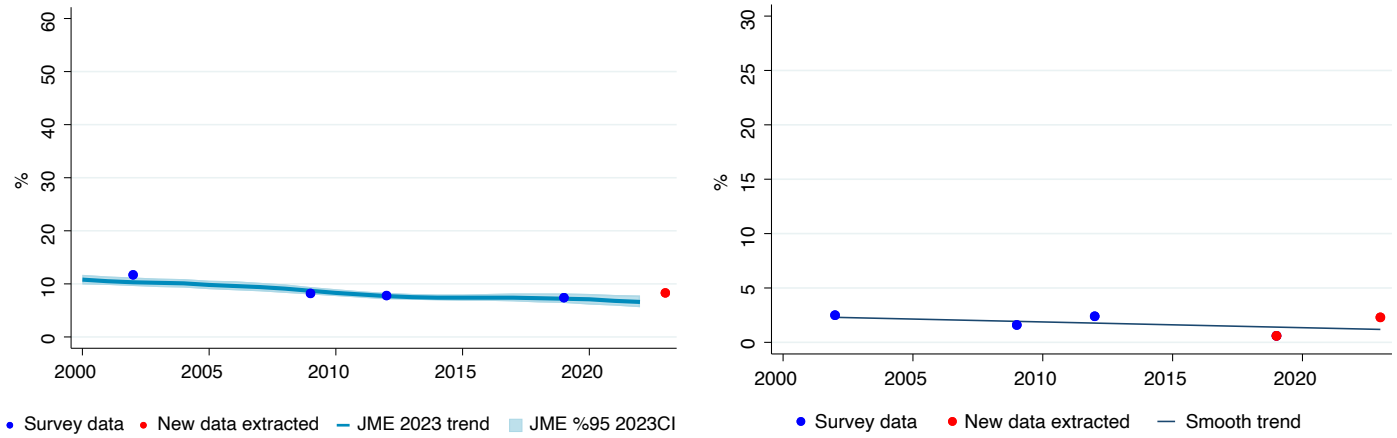
Maternal education level and knowledge about feeding practices in Jordan were shown to be significant determining factors of MAD (13). Grandmothers also influence breastfeeding practices by pressuring mothers to feed water and herbs to infants at early months (14). Low socio-economic status and food insecurity are limiting factors for appropriate IYCF (11). Barriers to EBF additionally include women's employment (12) and cultural beliefs, such as formula milk is "safer" than breast milk and early introduction of complementary feeding is appropriate (14).

Children under 5 years of age

Stunting and wasting

Jordan has shown a slight decreasing trend of stunting and wasting. The current prevalence of stunting and wasting were both below 10%, at 8.3% and 2.3% in PFHS 2023 (Figures 3.4 – 3.5).

Figures 3.4 – 3.5. Stunting (left) and wasting (right) prevalence of children under 5 years of age in Jordan.



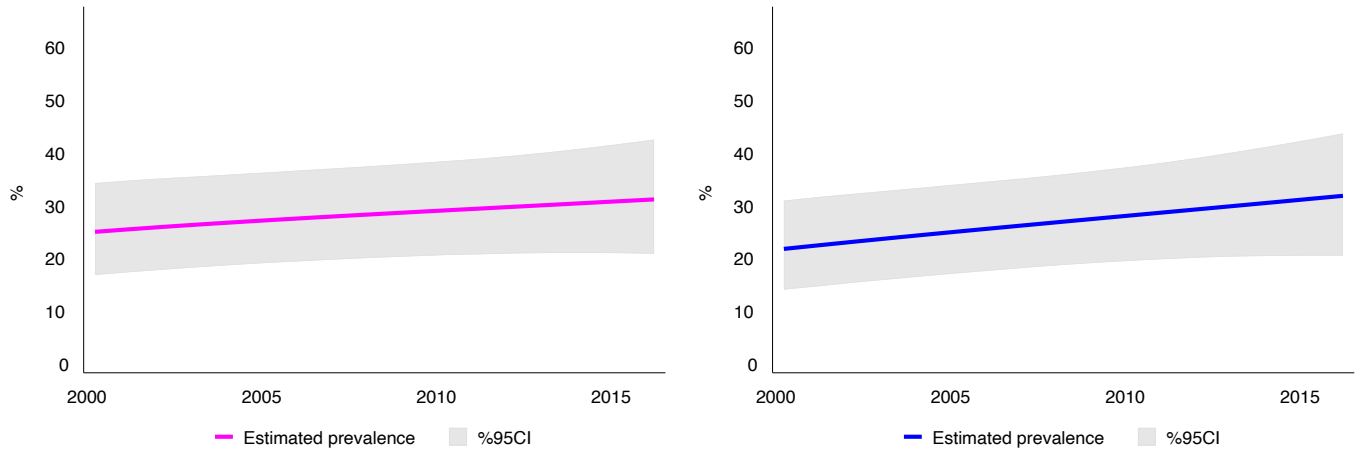
Jordan has shown a slight decreasing trend of stunting in CU5. Between 2015 -2020, the prevalence of wasting was ≤ 3%. In 2019, the prevalence of wasting was 0.6%, as shown from the newly extracted data from the MNM report. LBW predicted children under 5 years of age stunting in a study in Amman, Jordan (15). Appropriate feeding is key to optimal nutrition. From our analysis, lower odds of wasting were seen among children who met INTRO (**Appendix 2 Figure 2.3**). Mixed feeding (combined formula feeding and breastfeeding), as compared to EBF, is a significant risk factor of stunting (15). Given limited resources, children living in households with 2 to 6 other children under 5 years of age are more likely to suffer from stunting, according to our analysis. Greater odds of child wasting occurred in households with shared toilets (Appendix 2 Figure 2.3). Changes in several contextual factors are thought to play critical roles in the decreasing trend of stunting in Jordan, including the improvement of maternal education levels, gradual increase in the number of women's and children's health centers, increase in proportion of women receiving antenatal care, and improved vaccination coverage (5, 11, 16).

School-aged children and adolescents

Overweight and obesity

In Jordan, there is an increasing trend of overweight and obesity in girls and boys. The prevalence has reached to ~30% for both girls and boys, which is concerning.

Figures 3.6 – 3.7. Overweight and obesity prevalence (95% CI) of girls (left) and boys (right) 5 – 19 yrs



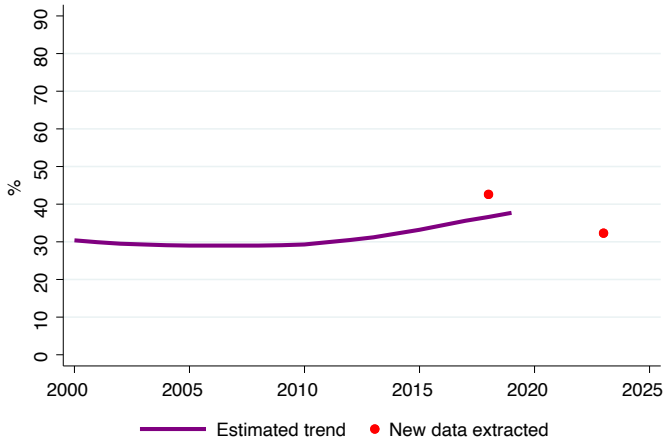
In Jordan, protein and fat intake exceed the recommended values among 14-18 years old (17). Dietary quality is poor and worsened among school-aged children with low nutrient density (18, 19), the decreasing trend of fruits and vegetable intake (11), and the increasing trend of sugar sweetened beverages and fast food over time (17, 20, 21). Beside dietary changes, the sedentary lifestyle with extended hours on smartphones, TV are also cited responsible for the overweight/ obesity trend in youth (22). Urban settings are more prone to childhood overweight and obesity (23) and nutrition transition associated with the fast urbanization could have explained the observed trend. There are other social barriers to live a more active life among Jordanian adolescents, including lack of easy access to physical activity facilities, scarce opportunities for physical activity, and lack of support from peers and friends (24).

Maternal nutrition

Maternal anemia

Jordan is the only country in MENA showing an increasing trend of maternal anemia between 2000 (30.4%) and 2019 (37.7%). The most recent 2023 PFHS data indicated a reduction of anemia rate to 32.3%. In 2012, risk factors of maternal anemia were maternal age (<25 years or >35 years) and living in rural areas. (Tables 6) (Figure 3.8).

Figure 3.8. Prevalence of anemia among women aged 15 – 49 years in Jordan

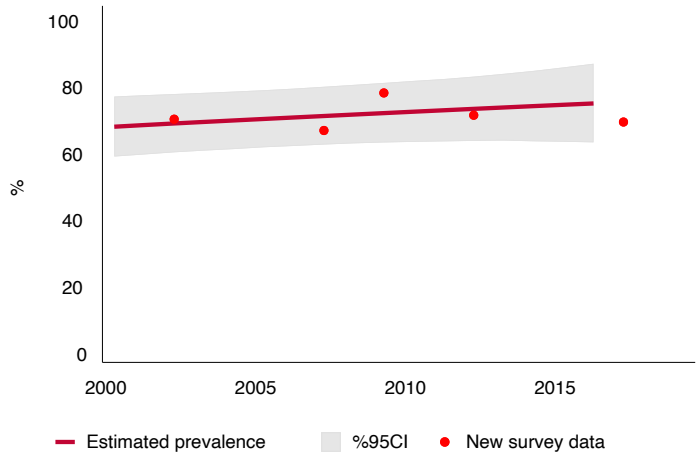


Nutritional deficiencies, including iron, vitamin B12, and folate, are cited to explain the high anemia rate in women (11), due intake of nutrient-poor diet, such as low-iron diet (11). Only 15% of non-pregnant women consumed iron supplements [24], which makes it hard to amend the iron requirement gap that could not be met by diet alone. Low maternal education (25) and early marriage (10-19 years) (26) are two other factors. Early marriage has both biological (e.g. adolescent mothers have higher risk of anemia risk) and social implications (e.g. low maternal empowerment) for maternal anemia risk. Supported by both our analysis and the literature, rural women, as compared to urban women, have higher risk of anemia (25) (**Appendix 3**). In addition, regional disparities of maternal iron deficiency is evident (Southern>Northern>Central) (6).

Overweight and obesity

Starting from a high prevalence of 67% in 2000, the trend of overweight and obesity is still increasing in Jordanian women, reaching an estimated rate of 74% in 2015 (Figure 3.9).

Figure 3.9. Prevalence (95%CI) of overweight and obesity among woman aged >18 years in Jordan



Nutrition transition towards a westernized diet and lifestyle changes in Jordan are evident and considered the direct drivers of the overweight/ obesity surge (11, 27). (**Appendix 3**). Women with no occupation, living in lower household wealth, living in lower access to community level access to health services had lower odds of being overweight (**Appendix 3)**, indicating overweight and obesity are more prevalent among the more SES better-off population. However, factors obesity of pregnant women include low education levels (28) and low socioeconomic level (29), suggesting women of lower SES who lived in the obesogenic environment may also have increased risk of overnutrition. The risk also differs by region with Ajloun being the highest (6). Women's traditional role for household chores and cultural constraints in lifestyle choices also increase the barriers to physical activity (27).

Policies, strategies, and programs to improve nutrition in Jordan

Through the **food system**, policies and strategies that aim to address food insecurity in Jordan include the country's strategic plan (2023–2027) and the National Food Security Strategy (2021-2030). The mandatory national wheat fortification (2006 – ongoing) has been implemented, which initially comprised iron and folic acid, followed by zinc, vitamins A, B1, B2, B3, B6, and B12, after which vitamin D was added in 2010. The Nutrition in Jordan Update and Plan of Action (2006 – ongoing) has broader goals to address both the burden of diet related disease, promote breastfeeding, address micronutrient deficiencies, and food insecurity. The recent Requirements-Salt standards in Bread (2019-Ongoing) is a more specific policy that entails the amount of salt limitation in Kamaj bread to reduce salt intake in the population. In line with the goals to address diet related chronic disease, through the **health/ nutrition system**, the National Strategy and Plan of Action Against Diabetes, Hypertension, Dyslipidemia and Obesity in Jordan (2015-Ongoing) and the Ministerial decree No. 5394 Banning the use of hydrogenated oils in dairy products (2017-Ongoing) are implemented.

In terms of on-going programs, the **multi-sectoral** UNICEF Jordan Country Program (2018 – 2022) focused on the most vulnerable children and young population and aim to provide equitable access to health care, nutrition services, education, WASH, and child protection services. The National Nutrition Strategy 2023 -2030 was recently launched as a new strategy and plan of action that aims to address multiple forms of malnutrition by 2023 in Jordan. Built upon the strong health sector in Jordan, many programs are implemented through the **health system**, including the USAID-supported "Community Health and Nutrition" (CHN) program (2022-Ongoing). Particularly, through the **education system**, Ajyal Salima Nutrition Education Program (2010-Ongoing), Standards or rules for foods and beverages available in schools - School age children, School feeding programmes, Nutrition education included in school curriculum, and the Monitoring children's growth in schools aim to strengthen the school feeding programs and nutrition education/ growth monitoring in school settings.

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LEBANON

LEBANON NUTRITION SITUATION

Lebanon is a low-middle-income country that has faced economic, political, and social challenges from both internal and external conflicts. Lebanon hosts the largest number of refugees per capita globally, with 1.5 million Syrian refugees since the 2011 Syrian war began (1). More recently in 2019, Lebanon started experiencing one of its worst economic crises in previous decades (2). Then in 2020, with COVID-19 emerging as a threat and the Beirut Port explosion that disrupted the entire import-dependent food system of Lebanon, the national fiscal crisis deepened to the point where the Lebanese pound lost more than 85% of its value and its GDP per capita dropped by 37% (3). As a result, poverty and extreme poverty increased from 28% and 8% in 2019, to reach 55% and 23%, respectively, in 2020 (4). The Integrated Food Security Phase Classification (IPC) 2023 showed that currently there were about 1.3 million Lebanese and 0.7 million displaced Syrians are facing high acute food insecurity in December 2022 (IPC phase 3 and above, which has been projected to increase to 1.45 million and 0.8 million in spring 2023 (5). These compounded crises have spared no sub-populations of the country, as worsening health and nutrition indicators have been reported among both citizens of Lebanon and refugees from Syria and Palestine (6 – 7). For example, although Lebanon had been cholera free since 1993, a 2022 outbreak occurred throughout northern parts of the country (8). The country now relies heavily on external international support for greater health and nutrition needs across most segments of the population (9).

"...we noticed that when the economic crisis in Lebanon started in 2019, things started to change...drastically...we used to target refugees, but now we are saying that the local communities are more in need of actual nutrition support."

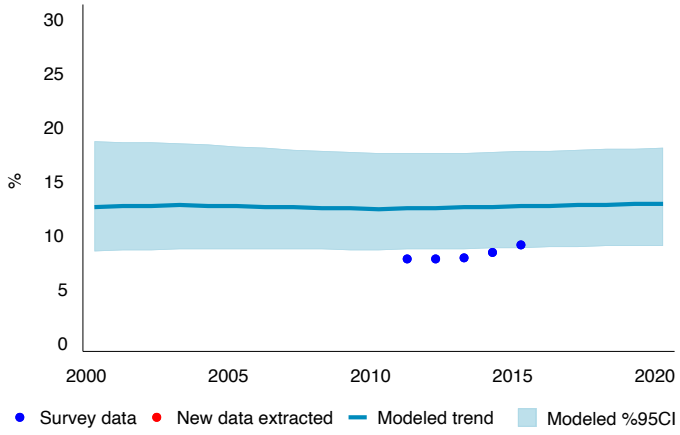
- Senior health program staff, NGO

Infants and young children under 2 years of age

Low birthweight

There has been a stagnant LBW trend in Lebanon based on data sources modeled between 2010 – 2015 (Figure 4.1). The available surveillance data were systematically lower than the UNICEF modeled trajectory, because model also 'borrowed' information from other similar countries.

Figure 4.1. Low birthweight prevalence of children under 2 years of age in Lebanon



Among pregnant mothers, maternal education level, health status (e.g., gestational diabetes or hypertension; exposure to airborne pollutants) and nutritional status (e.g., inadequate weight gain) are associated with sub-optimal birth outcomes including LBW in Lebanon (10 – 12). Newborns with older (>40 years) fathers and younger (20 – 29 years) mothers also have an increased risk of LBW (13). Household food insecurity has negative effects on maternal diets during pregnancy, with increased risk of delivering a LBW newborn (12, 14). Pregnant mothers who have inconsistent or disrupted access to ANC have increased LBW risk in Lebanon (12, 15). The psychological stressors pregnant women experience as a result of recent national turmoil have been shown to influence LBW as well (12).

Exclusive Breastfeeding and Complementary Feeding

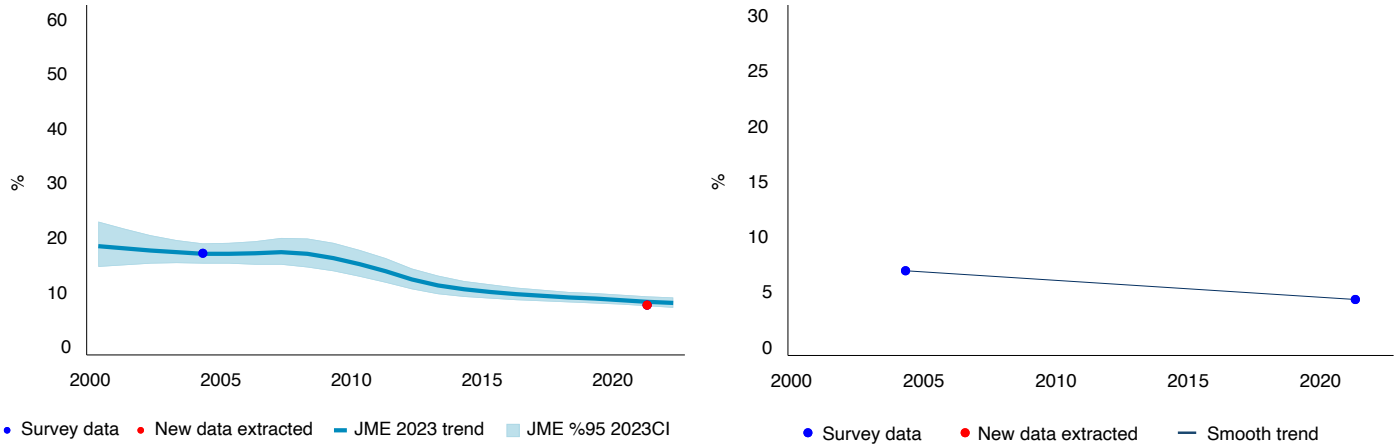
In 2021, only 32.4% of children 0 – 5 months were exclusively breastfed. The proportion of children meeting the MDD, MMF, and MAD criteria were 23%, 47%, and 6%. No prior feeding data were available in Lebanon.

Children under 5 years of age

Stunting and wasting

Stunting and wasting data sources are limited in Lebanon between 2000 - 2022, but prevalence estimates below reveal an improving trend in chronic malnutrition among hildren under 5 years of age years and the acute malnutrition rate was below 5% per the most recent survey data in 2021 (Figures 4.2 – 4.3). The promising decreasing trend should not overshadow the concerning high burden of child stunting in displaced Syrian refugees, whose prevalence increased from 17% in 2013 to 25% in 2021 (16).

Figures 4.2 – 4.3. Stunting (left) and wasting (right) prevalence of children under 5 years of age in Lebanon



During pregnancy, maternal nutrition is an established risk factor of children under 5 years of age nutrition, such as stunting, both globally and in Lebanon (17 – 18). At birth, LBW infants are at higher risk of stunting and from 6 – 23 months, sub-optimal dietary intake (i.e., not meeting MAD in the complementary feeding period 6 – 23 months) has been associated with children under 5 years of age stunting/wasting in Lebanon (17, 19). During qualitative interviews, most caregivers did not know what 'stunting' is when asked about it, highlighting a key challenge to behavior change. Due in part to Lebanon's economic crisis where the currency has been devalued and household food insecurity has increased, the diets of children under 5 years of age have also worsened (4, 6, 14, 18). Caregivers explained that food cost and food availability are the two primary factors that determine what they feed their children.

Further, healthcare in Lebanon is not equitable, given differential access across socio-economic strata with underlying effects on children under 5 years of age nutrition (18, 20). Other services do exist, though, such as nutrition education provided through nurseries (21). The economic downturn, which was exacerbated by the COVID-19 pandemic, contributed to greater poverty, fewer financial resources, and less health access for all population segments including children under 5 years of age (17 – 18).

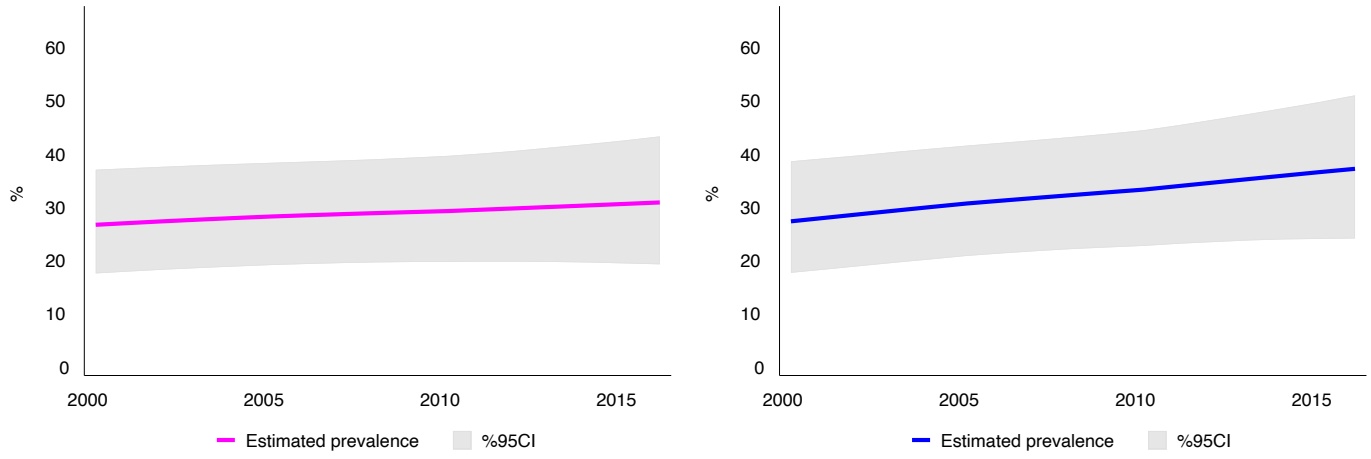
> *"...we do not get it [meat and chicken] frequently for sure...it is a question that should not be asked in our country...because there is no family that can go get even 1kg of meat unless they are good financially..."*
>
> **- Female caregiver, Beirut**

School-aged children and adolescents

Overweight and obesity

The overweight and obesity prevalence estimates among children and adolescents aged 5 – 19 years old in Lebanon reflect a worsening nutrition situation (Figures 4.4 – 4.5).

Figures 4.4 – 4.5. Overweight and obesity prevalence (95% CI) among girls (left) and boys (right) 5 – 19 yrs



Lebanese children who have mothers with high BMI are at higher risk of obesity, whereas those with more educated parents have healthier attitudes and practices related to nutrition (22 – 24). Actual diets are important for healthy child growth and development too. In Lebanon, the typical diets of youth are characterized by low micronutrient intake and high sugar and fat intake through consumption of a wide variety of sweets, sugar-sweetened beverages, and grains (22; 25 – 27). An eight-year-old explained that his daily priorities revolve around, *"Playing football and spending all of my money on buying snacks… usually I buy Mars chocolate, juice, and ice cream."* Adolescents explained that their diets are not only based on preference but also other challenges such as frequent power outages that make storing healthier, perishable options difficult.

Unhealthy dietary patterns have been observed among children and adolescents as a result of both 'Westernization' and related advertising targeting youth in Lebanon (22, 28, 29). School-aged children commonly skip breakfast before arriving at school where environments do not facilitate healthy diet or physical activity practices (21 – 22; 26, 30, 31). Youth explained that they usually get their food each day from multiple sources, including their home, relatives' houses, school, shops, and restaurants. Currently, though, nutrition education is delivered to school-aged children to address obesity, and some schools are actively developing a 'health promotion' culture that strengthens community involvement for better child health and nutrition (32 – 34). Obesity prevention programs targeting school-aged children and adolescents have become more commonplace (21). The government is said to be working to improve the obesogenic environment of Lebanon through legislation to increase physical activity as well as to prohibit unhealthy food and beverage sales in and nearby schools (21, 22, 35).

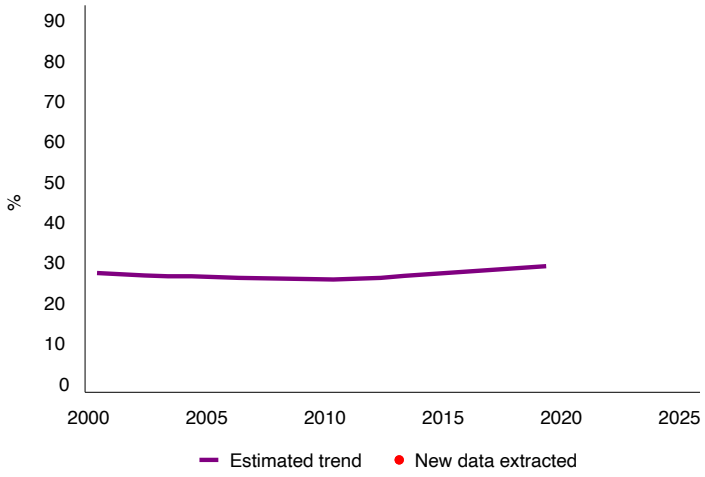
However, a social and cultural transition from traditional Lebanese diets to 'Westernized' diets and lifestyle habits remains, with downstream effects on nutrition of all life stages (31). Relatedly, social pressures and cultural emphasis on beauty and physical appearance have been associated with unhealthy dietary practices especially among Lebanese girls and adolescents (36 – 37).

Maternal nutrition

Maternal anemia

Anemia prevalence among adult women aged 15 – 49 years has remained largely unchanged for at least two decades in Lebanon (Figure 4.6).

Figure 4.6. Prevalence of anemia among woman aged 15 – 49 years in Lebanon



Lebanese women have lower-than-recommended intakes of iron and folate which is a risk factor of iron-deficiency anemia. In addition, pregnant women, and those with chronic diseases such as cancer, are also at higher risk of being anemic in Lebanon (38). Underlying diet inadequacy is household food insecurity, which is associated with risk of anemia among adult women in both the general Lebanese population and the Syrian refugee communities (6, 14, 18, 39).

Large-scale food fortification (e.g., wheat flour fortification) has faced coordination (e.g., an inactive national coordination committee as of 2019) and resourcing-related challenges that have, to date, hampered implementation (40). The Ministry of Public Health has national Reproductive Health Service Delivery guidelines that currently require physicians to request blood tests from pregnant women at primary healthcare centers for anemia screening and follow-up prescription of IFA supplements (free of charge), as needed (21, 38, 41). The free provision of IFA supplements is important in Lebanon, as low SES is an established risk factor of anemia in this setting (21, 39). While interventions and programs have aimed to improve anemia status of women in Lebanon, a lack of cultural tailoring has limited their success (21, 39).

"...meat...it's expensive and its quality is not so good due to electricity cuts...imagine that we buy meat and put it in the fridge for two or three days...then it will not be good anymore because of no electricity..."

- Adolescent girl, Beirut

"The government is working on school health but they still have Nestle [snack] machines. We do not have a law to prohibit this but it is not good practice. The same thing [legislation] that applies to breastmilk substitutes should be applied to chocolates, energy drinks, and soft drinks."

- Senior government health official, Beirut

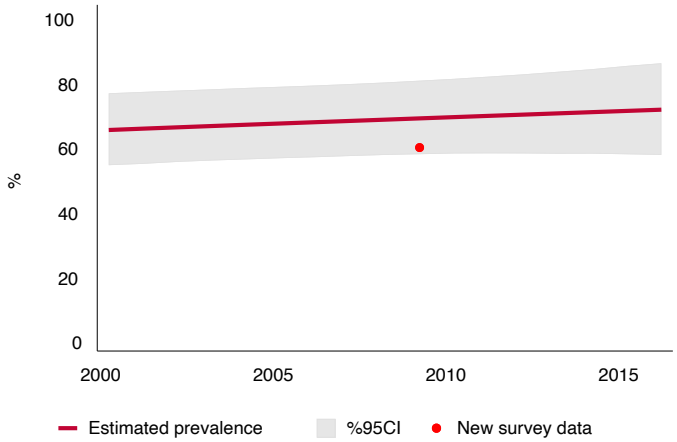
"...we know a woman who is breastfeeding should eat well: fruits and meat...but we eat mostly pasta, why? Because due to the current situation, it is the cheapest. Or canned foods...we cannot afford things that are really nourishing..."

- Male caregiver, Lebanon

Overweight and obesity

Maternal overweight/obesity prevalence has been on an increasing trend for the past 20 years in Lebanon, with an estimated worsening trend toward 75% prevalence (Figure 4.7).

Figure 4.7. Prevalence (95%CI) of overweight and obesity among woman aged >18 years in Lebanon



The factors influencing maternal overweight and obesity are similar to those determining similar child and adolescent outcomes. Maternal diets are characterized by an increased consumption of added fats and oils, poultry, cereals and cereal-based products, chips and salty crackers, sweetened milk, and hot beverages, while at the same time a decreased consumption of breads, fruits, fresh fruit juices, milk, and eggs (42). Gaps in maternal knowledge of actual obesity risk only partially explains this trend (43). Interviews with Lebanese women and national stakeholders highlighted the impacts of chronic stress on maternal mental health and diets. Stress-related, emotional eating was the number one factor that women ascribed to maternal obesity during

qualitative interviews, followed by hereditary factors, pregnancy, and a lack of exercise.

The current economic downturn in Lebanon may be exacerbating already precarious levels of household food security as nutritious food prices continue to rise while unemployment worsens (4, 6, 14, 18, 21, 44). National stakeholders explained that nutritious foods are now 10 – 15 times the price they used to be and many mothers are coping by reducing their own food intakes to ensure that their children are not hungry. One caregiver explained, "...I try [to eat healthy] but the priority is my children. I am the last to eat. I wait until my children have eaten...the leftovers that are left...I will eat them."

However, maternal overweight and obesity have been rising long before the recent recession, a steady increase reflective of a country moving through the nutrition transition with changing food consumption patterns and dietary habits (4, 42, 43). In addition, increased sedentary behaviors and decreased physical activity levels have been widely reported (26, 42, 43). Nutrition counseling services are offered at primary health care centers, but a lack of resources has resulted in attrition of many low-paid health workers who previously supported such activities, including dietetic consultations (21, 45). Interview participants explained that food assistance programs do exist but not provide nutritious foods either. As a result, women explained selling and bartering food provisions for more preferable items.

Lebanon has recently developed the Non-Communicable Diseases Prevention and Control plan to address chronic diseases, including overweight/obesity, but there are currently no mechanisms in place to facilitate successful collaboration across ministries at present (21).

"...I just cannot [eat healthy and exercise] ...it's not in my control. I do not know how to explain it but there is something inside of me that stops me from eating healthier... I just cannot...I am living a very hard life."

- 36-year-old mother of three, Lebanon

"...we get food assistance with a lot of lentils so I am exchanging with people for milk. You have to do what you think is best. I am not selling...do not get me wrong... but I am exchanging."

- 42-year-old mother of two, Lebanon

"...what I've noticed is that people in this situation need these free counseling services. And so, the IYCF service, the counseling services provided by specialists, is a highly needed service nowadays in Lebanon...and it's for free...they are going crazy for the service..."

- Maternal and child nutrition official, Beirut

"...I am optimistic because we have a lot of work done in IYCF and we also have a strategy that the WHO has created for the Ministry of Public Health. So now we have a lot of successful efforts that we can build upon. We also know what we want and we have a lot of factors that can help us succeed. The things that are out of our control, like the amount of money and the situation with the donors, may affect us but Lebanon has always been this way so maybe we cannot get to where we want exactly, but we can keep pushing forward..."

- Senior government health official, Beirut

Policies, strategies, and programs to improve nutrition in Lebanon

Given the extraordinary challenges that Lebanon has faced in recent years, stakeholders explained mixed levels of optimism toward seeing improvements to the nutrition situation. On one hand, national stakeholders acknowledged the seriousness of Lebanon's economic situation by reflecting on the real-life challenges that communities face. A UN policy officer explained, "…the main reason that I am not that optimistic, is that the situation, unfortunately…has nothing very optimistic about it…hearing stories from people around us and all the challenges that they are facing, like, feeding their family has even become a challenge nowadays." On the other hand, optimism was expressed by some stakeholders who pointed to current efforts to improve the national nutrition situation, the development of the 2022 – 2023 Crisis Response Plan, which was spearheaded by government and partners to address food insecurity, social protection, education, WASH, gender, and health through multi-sectoral modalities (6).

Multiple-system approach has been applied. Specific actions to improve nutrition through the **health sector** are primarily supported by the 2021 - 2026 National Nutrition Strategy and Action Plan and the 2018 Infant and Young Child Nutrition Policy (21, 46). The Ministry of Public Health has also developed maternal mental health guidelines (2022) and policies to reduce physical inactivity (2019) and in support of better nutrition across life stages in Lebanon (35, 47). National stakeholders explained previous successes implementing a variety of programs, including enactment of IYCF hotlines for improved access to counseling, tailored school nutrition programming based on needs assessments, and Baby Friendly Hospital Initiative participation, among others.

Salt iodization has been implemented as part of the national strategy since 1995. As noted by an UNICEF Regional Officer, there is a new law issued in 2011 and implemented in 2014 regarding the modification of iodine level from 10-200 mg to 60-80 mg per kg and the introduction of potassium fluoride at 250 mg per kg in salt. In 2016, Ministry of Health sums salt producers to abide by the law in terms of adding potassium iodate to table and cooking salt at a rate of 60-80 mg of KIO3 per kg of salt, and to prohibit the trading of non-iodized salt for packaging companies, in addition to other amendments regarding regulatory monitoring. However, currently Lebanon school-age children are still insufficient in iodine according to the national medium urinary iodine concentration (UIC) being less than 100 µg/L assessed 2007 -2021 (48).

A National Agricultural Strategy (2020 – 2025), in addition to salt iodization and prohibition of unhealthy food/drink sales in or close to schools since 2019, are examples of **food system** actions aimed to improve both under- and over-nutrition challenges (45, 47). Led by the Ministry of Public Health and partners, **WASH** strategies have been prioritized, including a 2022 Cholera Strategy, a 2020 WASH response to COVID-19, and an emergency WASH response for Syrian refugees since 2013 (50 – 52). Stakeholders in Lebanon support a variety of **social protection** initiatives, including an on-going National Poverty Targeting Program (2011), cash transfers and in-kind food assistance from WFP (2020) and the UNICEF-supported Haddi Program (2021) which offers monthly cash transfers linked to necessary services. Additional policy, strategy, and program detail is described in the appendices (Appendix 2.4).

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OMAN

OMAN NUTRITION SITUATION

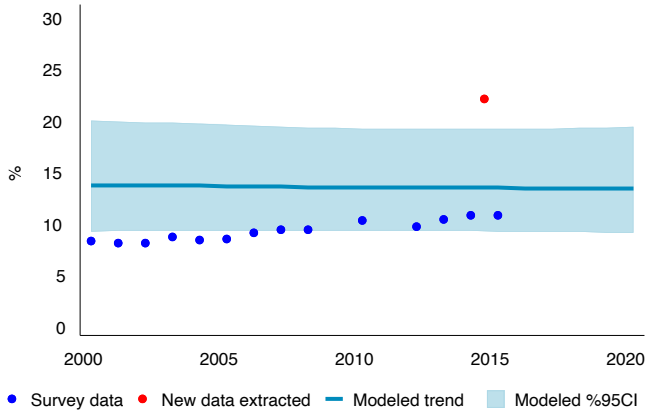
Benefited largely from the favorable oil price increase, Oman has undertaken significant economic growth and development since 1975, reaching to the GDP per capital over $19,000 in 2021 (1), and ranking as one of the high-income countries in the Western Asia (2). Accompanied with the striking economic growth, Oman has accomplished multiple achievements across sectors, including achieving the world's fastest reduction in under-five mortality rate, achieving universal antenatal care and institutional delivery services, achieving near-universal primary education, achieving near-universal access to improved water sources and sanitation facilities, and making significant progress in women's empowerment and gender equality (3). The underlying systematic changes help explain many of the promising changes we have observed in the trend of maternal and child nutritional status and situation. Oman is home to over one million international migrants, including domestic workers mainly from South and South-East Asia (4). However, the health disparities exist among immigrant workers, due to the lack of health insurance and their dependence on government funding for health care (5). There are also worrying trends of nutritional status being recognized, which we will discuss more in detail in the following sections by life stages.

Infants and young children under 2 years of age

Low birthweight

The 2023 LBW estimates, which were based on the available surveillance and survey LBW data, shows a flat trend of Oman's LBW rate between 2000 to 2020. Thin and/or short mothers are more likely to deliver babies with LBW (6, 7). Other factors found to be related to lower birth weight are low parity, late initiation of ANC visit, pregnancy complications (8). Regional and socioeconomic disparities of LBW was noted in one study, where infants born in Ad-Dhakhliyah region, in rural areas, and low economic status were at higher risk of LBW (8). In Oman, consanguinity is a unique cultural risk factor of LBW identified in one study (9).

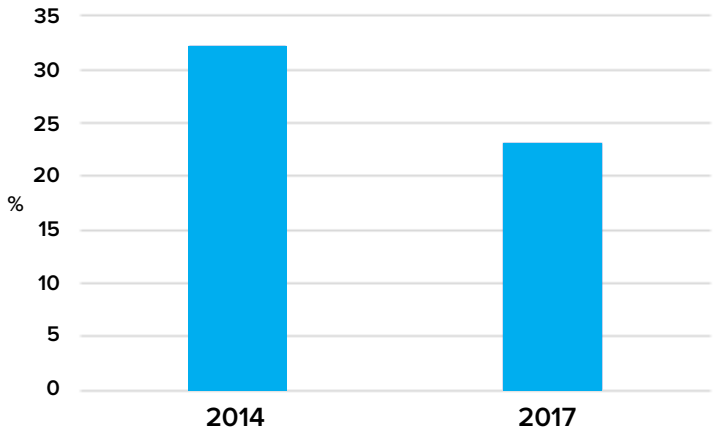
Figure 5.1. Low birthweight prevalence in Oman (2000 – 2015)



Breastfeeding and complementary feeding

In general, early BF initiation stayed at high levels achieved by ~80% of newborns in Oman. However, EBF was only achieved in 32.2% infants in 2014 and the rate decreased to 23.2% in 2017. The Oman National Nutrition Survey 2017 reported the MDD, MMF, and MAD was achieved in 80.7%, 64.5%, 47.0% of children 6 – 23 months of age. Because of the discrepancies of the definitions of IYCF indicators, the Oman 2017 data was not included in the global IYCF database. In the Second National Health Survey for Protein Energy Malnutrition in Children Below Five Years of Age (2009), the age-appropriate IYCF was only achieved in less than 10% of children under five (3). Because increasing child age is usually associated with increased dietary diversity, the overall achievement of MAD in children under two could be even lower than 10%.

Figure 5.2. Proportion of infants 0 – 6 months exclusively breastfed in Oman



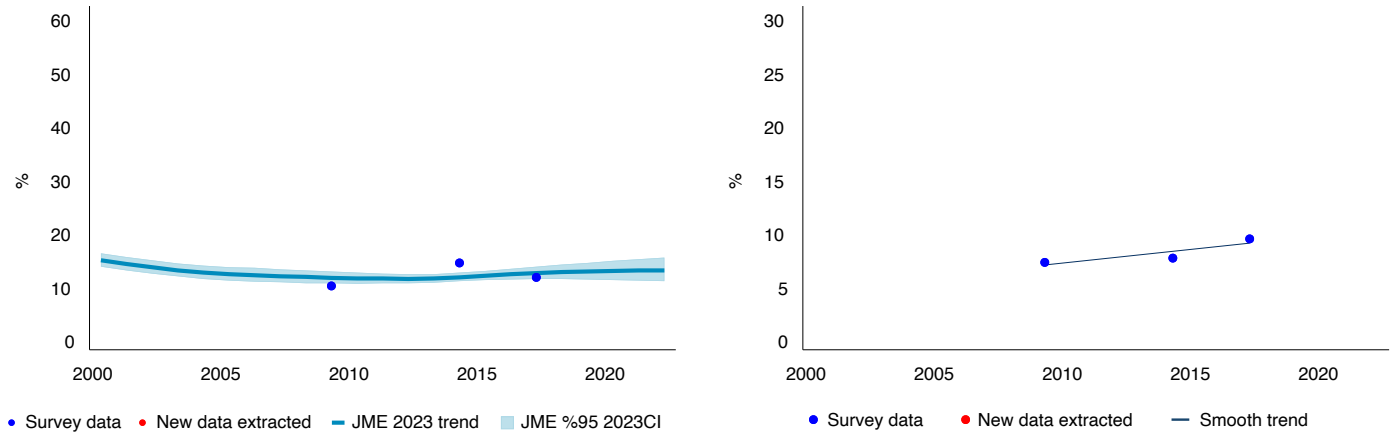
In the studies conducted in Oman, barriers of poor BF include lack of continuity of support for mothers, inadequate training of health care professionals, and the promotion of infant formula (10). An additional risk factor of poor BF is the lack of knowledge and self-efficacy of mothers (11, 12). Appropriate BF in Oman is associated with maternal secondary education and living in poorest households (13). Disparities of poor complementary feeding practices were also seen more frequently in some regions than others, such as Al Wusta and Dhofor (13). These findings reflect many unmeasured enabling factors at the household- and community-level, which warranted further investigation.

Children under 5 years of age

Stunting and wasting

There has been a flat trend of stunting among children under 5 years of age since 2000. The JME 2023 model estimated that the stunting rate remained stagnant around 11-12% since 2005. Wasting in Oman has been remained at 7 – 9% since between 2009 - 2017 (Figures 5.3 – 5.4).

Figures 5.3 – 5.4. Stunting (left) and wasting (right) prevalence of children under 5 years of age in Oman



Shorter maternal stature and poor complementary feeding practices increased stunting risk, while early decline in weight-for-height z-score could be due to poor breastfeeding practices, particularly a lack of exclusive breastfeeding (14).

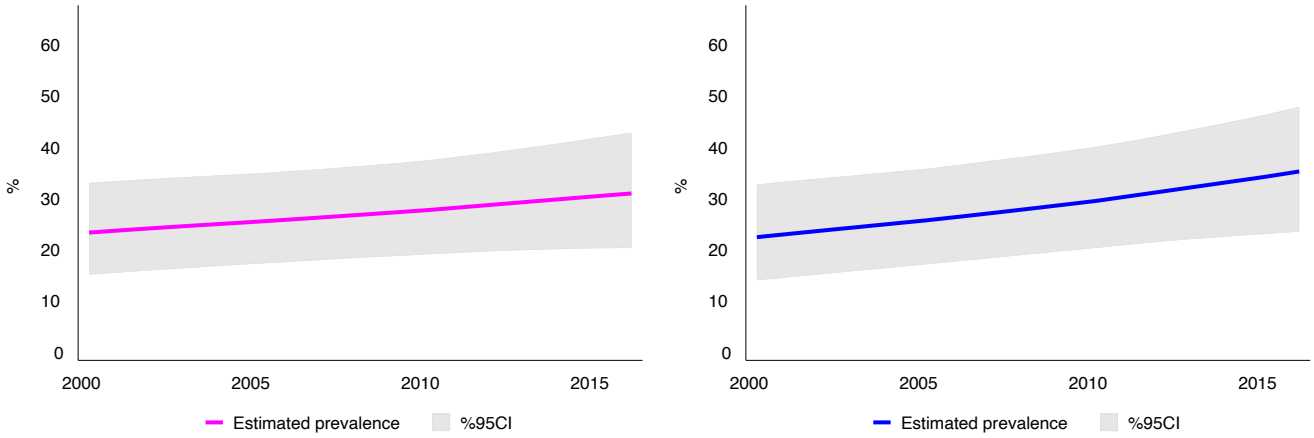
School-aged children and adolescents

Overweight and obesity

The rate of overweight and obesity has increased in both girls and boys in Oman (Figure 5.5 -5.6). The rate has seen to be increasing with child age: reaching 5% among first graders (6–7 years), 15% among seven graders (12–13 years) and 16% among 10th graders (15–16 years) (15, 16), indicating both early and continuous interventions to reverse the trend of childhood overweight and obesity are greatly needed. High caloric intake among Omani adolescents, especially consumption of the ready-made foods, such as sandwiches, sweets and cakes, red meat, and dairy products, were positively associated with overweight and obesity among Omani adolescents (17). Other lifestyle changes, including sedentary life style with low physical activity (especially among girls) (18), skipping breakfast (19), increased nighttime sleep hours (20) coexist in overweight and obese children.

Higher BMI in youth is associated with greater maternal BMI and higher maternal and paternal education level (20), which indicate that overweight and obesity in children may be attributable the parenting and home food environment of higher SES. Culturally, women in Arab countries perceive having greater barriers to engage in physical activity due to limited access to facilities and disapproval from family or the community (21-23). Geographic inequality of overweight and obesity was reported, where higher rate was found in the Dofar governorate than the Al Dakhilia governorate (19). Some governorates, such as Al Wusta and Musandam, are affected not only by overweight and obesity, but also stunting (3).These findings support the origin of overweight and obesity in later years could be due to undernutrition in early years. Actions that combating the double burdens of malnutrition in these regions in Oman are greatly needed.

Figures 5.5 – 5.6. Overweight and obesity prevalence (95% CI) of girls (left) and boys (right) 5 – 19 yrs

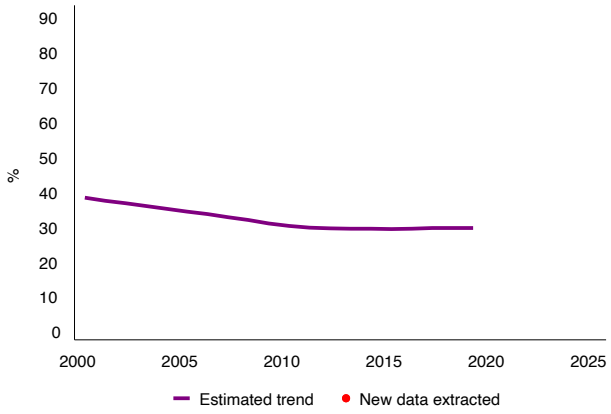


Maternal nutrition

Maternal anemia

In Oman, the proportion of anemic women of reproductive age was estimated to follow a decline trend from 38% in 2010 to 29% in 2019. (Figure 5.7).

Figure 5.7. Prevalence of anemia among woman aged 15 – 49 years in Oman

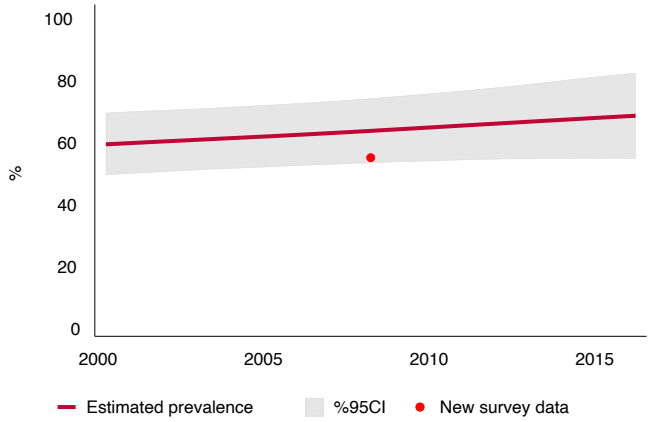


Causes of anemia could be multifactorial including micronutrient deficiencies, infections, and genetic trait. In Oman, prevalence of folate and vitamin B12 deficiencies were present in approximately one-tenth of non-pregnant women (11.6% and 8.9%, respectively) (14). 32.1% of women have at least one elevated inflammatory marker. 4.7% of women were affected by the sickle cell trait, while 2.8% were carriers of the β-thalassaemia trait (14). More than 80% of Omani women, consumed either tea or coffee or both on daily basis (14). Given a nutrient-poor diet, tea and coffee may further inhibit iron absorption that contributes to iron deficiency anemia. The decreasing trend of maternal anemia was thought to attributable to the successful fortification programs in Oman, where national-scale flour fortification with folic acid is achieved, and iron fortification of wheat flour is mandatory (3). However, low awareness utilization of fortified food in the target population could be a concern. For example, a study reported only about one-fifth of non-pregnant women 15-49 years of age reported having heard of fortified flour (24). Prevalence rates varied substantially among governorates, affecting only 15.1% of non-pregnant women living in Al-Wusta, but 38.8% of those in Al-Buraimi (14).

Overweight and obesity

Overweight and obesity rate in women 18 years and older has been on a rise. The estimated prevalence is 67.6% in 2016. (Figure 5.8).

Figure 5.8. Prevalence (95%CI) of overweight and obesity among woman aged >18 years in Oman



Most immediately, the transition in lifestyle contribute to the concerning trend of maternal overweight and obesity. Eating two or three big meals per day, and eating out, greater time spent for watching video or playing computer games, and reduced physical activity are identified risk factors (24, 25). Lack of time, and competing priorities with family responsibilities have been identified as the key barriers that limit women's physical activity in Oman (26). Individual behavior changes are rooted from the systematic shift in the living environment. The fast urbanization, mechanization and motorization, has resulted in significant cultural, social, and economic changes that result in lifestyle transitions (27). Cultural expectations also constrain what, when and how Omani women could perform physical activities, causing a common psychological barrier for women's mobility in Oman (26). Lastly, regional differences in risk of overweight and obesity rates are evident (24), which could be caused by the different regional risk of fetal origin of maternal obesity (e.g. LBW and stunting) as well as diverse level of nutrition transition and obesogenic environment by region.

Policies, strategies, and programs to improve nutrition in Oman

Multiple individual-system focused strategies are being implemented, with the majority focusing on the **food system** and the **health/nutrition system**. Under the food system, among the other strategies, there are the UNICEF Revision of the food fortification standards, legislation and regulation in Oman (2018-Ongoing), Ministerial decree No. 2010/49 By issuing the technical regulations for food fortification (2010-Ongoing), which aims to assess and promote **food fortification programs** in Oman; In response to the increasing trend in overweight and obesity and NCDs, there are strategies currently implemented with the aim to **limit salt and/or trans fats, unhealthy dietary intake with the goal to prevent obesity and diet-sensitive non-communicable diseases**. and Oman Ministerial decree No. 112/2019 On determining the value and types of selective goods and the category of tax levied on each (2019-Ongoing) are some strategies that aim to **limit salt and/or transfat, unhealthy dietary intake with the goal to prevent obesity and diet-sensitive non-communicable diseases**.

To promote appropriate child feeding and nutrition, a number of policies and strategies are implemented to promote breastfeeding and complementary feeding through the Omani Code for Marketing of Breast-milk Substitutes: Regulating the Marketing of Breast-milk Substitutes (2019-Ongoing) and the Marketing Regulation of Designated Products for Infants and Young Children, to improve malnutrition management through the Standard operative procedure for management of malnutrition in infants and young children at primary health care services (2017-Ongoing), to prevent malnutrition in school-age children through the MOH Regulations on School Canteens (2013-Ongoing).

A number of programs are identified through the **food system** with the aim to reinforce fortification programs and through **the social protection system** to enable the financing and private sector and investment. Two programs through the **health/nutrition programs** are focused on malnutrition management/ micronutrient deficiencies and anemia in infants and children and health care delivery through virtual clinics. The National Strategy for the Utilization of Treated Wastewater 2040 Program through the **WASH system** aims to improve water use efficiency and sustainability and has been actively monitored and has made good progress. Currently, UNICFF works closely with the National Center for Statistics and Information in Omen that supports further enhancement of administrative data to track children's wellbeing, such as violence against children, child disabilities, child development, and potential nutritional status (28). Additional policy, strategy, and program detail is described in the appendices (Appendix 2.5).

STRATEGIES THAT AIM TO LIMIT UNHEALTHY DIETS AND PREVENT NCDS

- The Combating the epidemic of Non-Communicable Diseases in Oman by changing the nutritional quality of the food chain 2014 (2014-Ongoing)
- Ministerial Resolution No. 83/2022 amending some provisions of the Food Safety Regulations (2019-Ongoing)
- Ministerial decision No. 2019/95 Omani standard for bread (2019-Ongoing)
- Ministerial decree No. 112/2019 On determining the value and types of selective goods and the category of tax levied on each (2019-Ongoing)
- National Policy for the Prevention and Control of Non-communicable Diseases: Working Towards a Healthy Life for All Omanis (2016-2025)

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SUDAN

SUDAN NUTRITION SITUATION

The Republic of the Sudan is a large country in northeastern Africa with an estimated population of more than 45 million residents (1). In 2019, and after months of civil protest, a transitional government was formed to prioritize peace and economic reform, as well as to make progress on meeting Sustainable Development Goal 2: Zero Hunger (2). However, Sudan persistently faces multiple emergencies, including a volatile economic situation, disease outbreaks, gender inequality, increased climate variability, and environmental degradation, tribal conflicts, and the risk of relapse back into potential conflict, all of which combined present substantial health and nutrition challenges.

Moreover, Sudan hosts more than 1 million refugees and asylum seekers who have fled neighboring countries along with a large internally displaced population due to localized violence and insecurity in parts of the country. National levels of unemployment and poverty have been on the rise since 2018 (3). Sudan imports almost 87% of its wheat from Ukraine and Russia combined, and as a result of both the economic downturn and Russia's war in Ukraine, an average food basket in Sudan now comprises more than 70% of household expenditure (4). Overall, Sudan is on course to meet targets for some, but not all, population-level nutrition indicators (5).

"A lot of reasons have affected nutrition. Political will is not there. Even the different types of emergencies, COVID-19…they have accumulated, the impact of a series of emergencies. Now we can call it a 'multi-emergency' or 'complex emergency'…the indicators are still bad and the sequence of emergencies and political instability in the last three or four years…they have affected the nutrition situation very much."

-National nutrition coordinator, NGO

Infants and young children under 2 years of age

Low birthweight

LBW in Sudan was 20% in 2014, which reflects the only available data for this indicator between 1990 – 2020. While the limited nature of LBW data in Sudan has been previously recognized, evidence points to the importance of maternal health and nutrition for infant birth outcomes, including maternal risk factors that increase risk of LBW such as having > 5 pregnancies, low BMI/MUAC, inadequate birth spacing, Dengue virus infection, and exposure to smoking (6 – 14). These factors contribute to inter-generational malnutrition, a phenomenon acknowledged by stakeholders during qualitative interviews.

ANC attendance is important for healthy birth outcomes in Sudan: pregnant women who had one ANC check-up or fewer were two times more likely to deliver a LBW infant (7 – 8). National stakeholders corroborated evidence of low ANC coverage during qualitative interviews.

LBW outcomes are also associated with maternal food insecurity, which contributes to sub-optimal diets during pregnancy (15). A 2019 case-control trial in a Khartoum hospital found that pregnant women living in rural communities, as well as those without formal education, were more likely to deliver LBW infants. Sudan's national nutrition strategy (2016 – 2024) aims to reduce LBW by 20%.

"…we have early marriage in our country. This is the cycle we continue to have…pregnant and lactating women who have anemia will give us low birth weight children and these children become children with malnutrition…and then adolescents with anemia…and again, they will give us low birth weight babies."

- Senior government health official, Khartoum

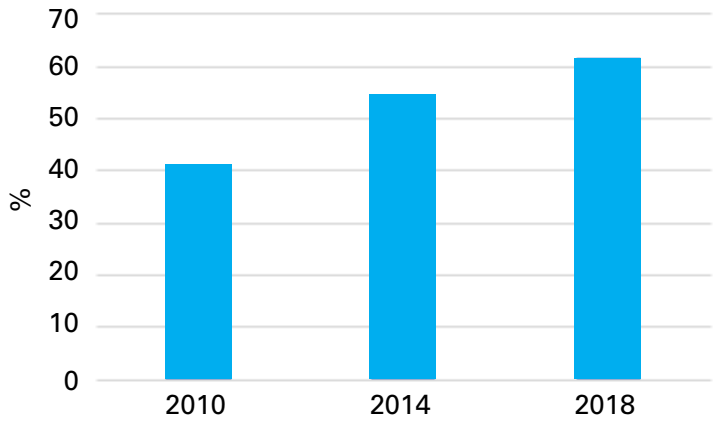
"We also have poor maternal [health] programs, specifically antenatal care…the [lack of] continuity of antenatal care…the coverage is not very high. Most of the women that they go for antenatal care go for 1 or 2 visits only…and also, they are starting the antenatal care very late… there is also a lack of awareness regarding the [optimal] food and nutrition during pregnancy."

- Government nutrition official, Khartoum

Exclusive breastfeeding

The proportion of exclusively breastfed infants 0 – 6 months improved from 41.0% in 2010, 54.6% in 2014 and 61.5% in 2018 (Figure 6.1).

Figure 6.1. Proportion of infants 0 – 6 months exclusively breastfed in Sudan (2010 – 2018)



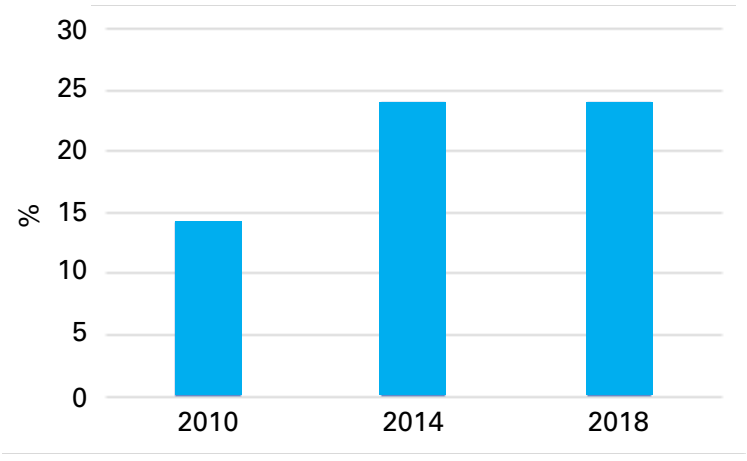
"...Children are not getting enough food diversity when exclusive breastfeeding ends. Mothers know that they should breastfeed...but after 6 months the households and mothers do not know a lot about complementary feeding. So we are now focusing on that [complementary feeding] because we have a gap there."

- Government nutrition staff, Khartoum

Complementary feeding

Between 2010 – 2018, the proportion of children aged 6 – 23 months meeting MAD increased from 14.3% – 24.1%. However, most of the improvement occurred between 2010 -2014 and thereafter remained at around 24% between 2014 – 2018.

Figure 6.2. Proportion of children 6 – 23 months with minimum acceptable diets in Sudan (2010 – 2018)



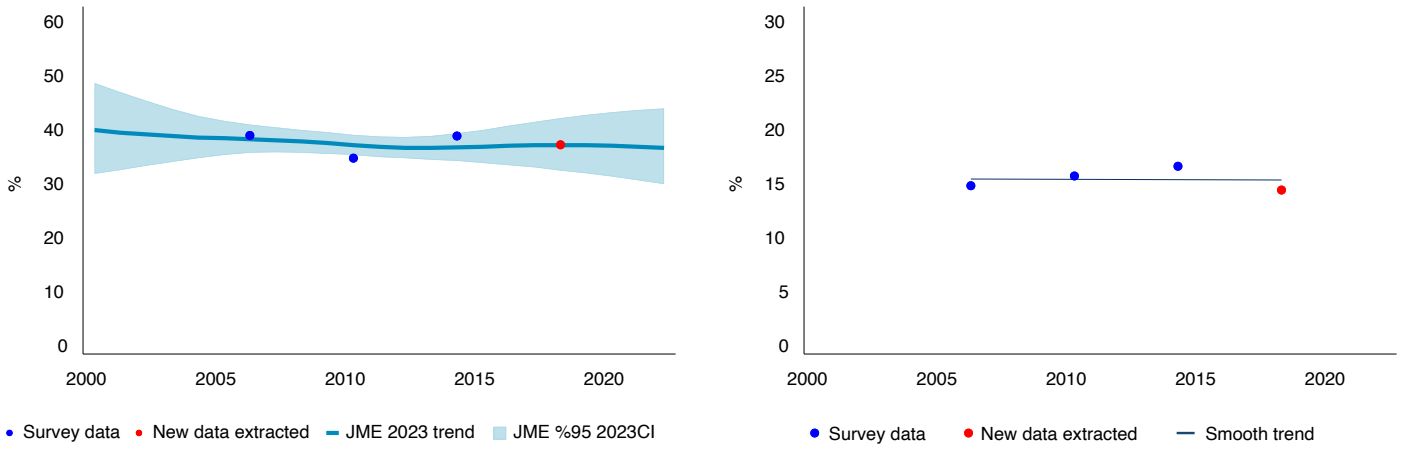
National stakeholders explained that the nutrient quality of young child diets, specifically greater dietary diversity, is a recognized complementary feeding challenge among organizations.

Children under 5 years of age

Stunting and wasting

Stunting among children under 5 years of age years is slightly decreasing per the JME 2023 estimates. Children under 5 years of age wasting, on the other hand, has been slightly increasing during that same time period based on the only three survey data available (Figures 6.3 – 6.4).

Figures 6.3 – 6.4. Stunting (left) and wasting (right) prevalence of children under 5 years of age in Sudan



In Sudan, like other settings globally, the health status of children under 5 years of age has a bidirectional relationship with nutrition outcomes. Infections from malaria and diarrhea are associated with children under 5 years of age wasting and stunting in Sudan, particularly among male children (16 – 22). In Sudan, typical IYC diets are not rich in animal-source proteins and may thus increase children under 5 years of age stunting and wasting by an estimated 11.3% and 28.0%, respectively (23). A recent study in White Nile state found maternal micronutrient deficiency to also influence children under 5 years of age nutrition outcomes (24). Household food insecurity and sub-optimal IYCF practices are interconnected contributors in this setting too (16 – 17; 20; 24 – 27). During qualitative interviews, most caregivers had never heard of stunting, while some had heard of it but had limited or inaccurate understanding.

Similarly, several caregivers indicated not knowing the causes of child malnutrition while others said it was likely due to financial constraints that families face to provide adequate food and care to children. National nutrition stakeholders pointed to specific cultural barriers, such as intra-household feeding patterns, that may be disadvantageous for young children.

WASH practices are important for child stunting/wasting outcomes in Sudan too. For example, children under 5 years of age in an internally-displaced persons camp in Darfur, Sudan were at higher risk of disease due to a shortage of potable water and vaccinations (26). Differential access to adequate healthcare, social protection programs, quality behavior change interventions, and improved sanitation facilities are service-oriented factors that further underlie children under 5 years of age nutrition outcomes in Sudan (16 – 17; 22, 26, 28). A national nutrition coordinator from an NGO explained, "...In the east [Sudan], there are a lot of culture-related issues, and hygiene issues...accessing safe drinking water and hygiene are problems." Inadequate social protection programs and weak behavior change interventions underlie many sub-optimal practices (28).

Rising food costs, due in part to inflation, the war in Ukraine, and loss of oil money within an unpredictable economy, contribute to the low

purchasing power of Sudanese households; typical food baskets cost 75% of household income (22). Rural, less financially-stable, and less educated households of Sudan have been found to be most vulnerable to U5 stunting (20 – 22; 29 – 30). For instance, while the burden of stunting was highest among such households in the eastern Darfur regions (21 – 22), those with higher maternal education levels had decreased U5 wasting irrespective of some culturally-bound practices that may limit child diet quality, including certain food taboos (31).

While Sudan has three national nutrition strategies relevant to U5 children, no legislation is in place to mitigate effects of climate change, to address rising food costs, to require large-scale food fortification, or to effectively legislate the marketing of breastmilk substitutes (28; 32 – 34).

"No, I have never heard of it [stunting]. My husband and I are tall so my children will turn out to be tall."

- Female caregiver, Sudan

"...we generally have this tradition that the main course is served to guests first, and then men are served food...so women and children are always at the bottom of the list. So they would obviously suffer from deficiencies even if food were available because they are offered food last so their meals may be insufficient."

- National nutrition coordinator, Khartoum

"...for mother and child feeding practices we face cultural issues. In some areas [of Sudan], they [caregivers] think that if you give eggs to a child who is less than 2 years [then] maybe he won't speak."

-Senior nutrition official, Khartoum

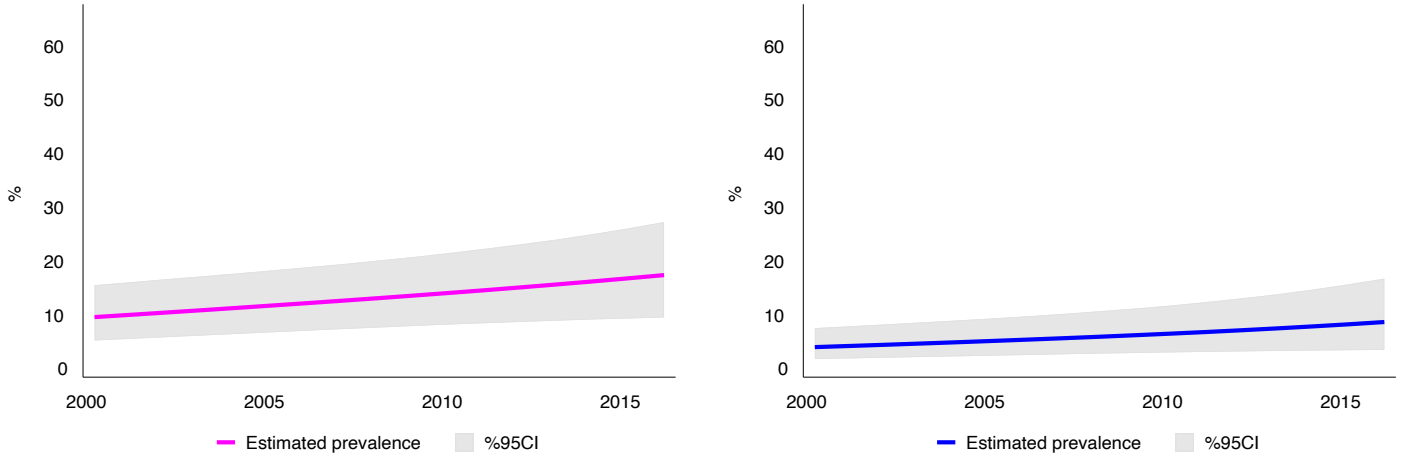
School-aged children and adolescents

Overweight and obesity

The overweight and obesity prevalence estimates among both girls and boys aged 5 – 19 years old in Sudan are depicted below for gender comparison.

If trends continue, then a greater proportion of Sudanese girls than boys will be affected, especially in urban areas (35).

Figures 6.5 – 6.6. Overweight and obesity prevalence (95% CI) among girls (left) and boys (right) 5 – 19 yrs



In Sudan, childhood overweight/obesity was found to be the main risk factor associated with the development of cardiometabolic syndrome among adolescents (36). Overweight and obesity not only affect more girls than boys in Sudan, but also a greater number of older adolescents compared to younger, and those living in urban compared to rural areas. (35 – 36). National stakeholders emphasized the importance of gender norms for explaining these nutrition outcome disparities in Sudan where girls do not have the same rights as boys to freely go where they wish, for example to school, thus limiting their opportunities for physical activity.

Unhealthy diets are also a primary determinant of overweight/obesity trends among children and adolescents in Sudan (37). Dietary patterns have been changing over time as the country develops economically and feels the influence of 'Western' diets, including greater consumption of fast-food and sugar-sweetened beverages among urban adolescents in particular (38 – 39). Most children who were interviewed reported drinking fruit juices (e.g., mango) frequently, but always with added sugar.

While vegetables are typically consumed frequently as part of traditional Sudanese dishes, energy-dense, nutrient-poor foods such as grains, bread, and rice increasingly comprise the greatest proportion of adolescent diets (40). To some extent, though, the diets of youth are shaped by normative views of body size and health or beauty. All but one children or adolescent who was interviewed said that they believed they, themselves, were in good health and indicated that being overweight is ideal given its association with health, beauty, and fertility.

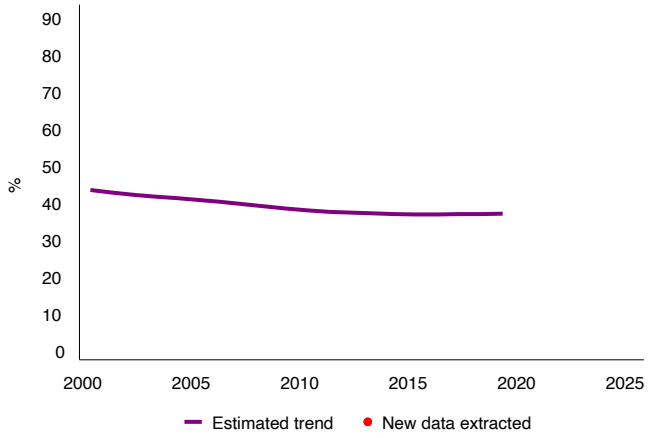
In rural Sudan, schools may offer nutrition education and related services (e.g., national school meals) but access is not guaranteed, with far distances and poor road quality limiting access, especially during rainy seasons and throughout COVID-19 when closures were more frequent (4, 41). An inverse relationship was found between maternal education level and child overweight/obesity status: the greatest burden of youth overweight/obesity exists in Sudanese households where mothers hold college degrees (42). A study in Dongola city found that students of families with history of overweight/obesity had doubled odds of overweight/obese themselves (35).

Maternal nutrition

Maternal anemia

The proportion of adult Sudanese women with anemia has plateaued since 2000 but still affects approximately 40% of women aged 15 – 49 years (Figure 6.7).

Figure 6.7 Prevalence of anemia among woman aged 15 – 49 years in Sudan



In Sudan, women who were older, underweight, had a cesarean section, or had multiple pregnancies, including those with bleeding or miscarriage events were at higher risk of anemia (43 – 45). Generally, maternal diets in Sudan lack adequate micronutrients but do vary by location, as the country has experienced multiple emergencies with differential impacts on food security geographically (46). For example, just 33% of women consume iron-rich foods in East Darfur while nearly 80% do so in While Nile state (46). Sudan is also a geographically large country that is home to various distinct religious and cultural groups whose longstanding dietary practices vary considerably at sub-national levels.

Maternal diets comprised of low meat or frequent tea consumption, particularly after meals, is associated with anemia in Sudan (43). Infectious diseases, including those from parasites, are also established contributors of maternal anemia, particularly during pregnancy (43, 47). Maternal diet and healthcare practices have been ascribed, in part, to a lack of knowledge and unfavorable attitudes toward anemia among women in Sudan (45). Those mothers with primary school education, or below, had greater odds of being anemic in eastern Sudan (48). Sudanese households with lower purchasing power report less frequent consumption of iron-rich foods while working mothers who generate income have 61% lower anemia risk (48). Interview participants also explained that meat, in particular, may be too costly for more vulnerable families and other less nutritious foods are consumed to prevent hunger. Food fortification programs exist throughout the country, but no national fortification policy exists to align efforts in Sudan (18 – 19).

"…You will see that girls at different levels do not exercise. They do not have a place to play, to feel free and do their activities. This [gender issue] is a big challenge in the country for girls…but for the boys, they can go to the gym, and they exercise more."

- Senior nutrition official, Khartoum

7-year old: *"I prefer to be overweight to avoid being sick."*

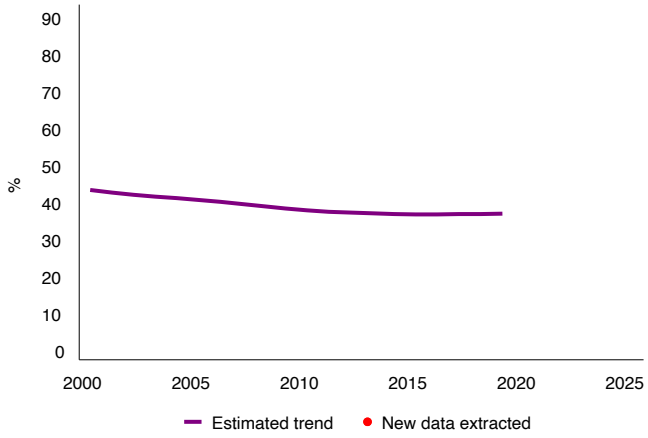
11-year old: *"I prefer to be overweight so I will not catch any disease. Women should be more overweight to appear more beautiful."*

- School-aged girls, Sudan

Overweight and obesity

Maternal overweight/obesity has been increasing in Sudan (Figure 6.8).

Figure 6.8. Prevalence (95%CI) of overweight and obesity among woman aged >18 years in Sudan



Maternal diets are comprised of energy-dense, nutrient poor foods that provide more than 60% of daily energy needs for Sudanese women (49). Oftentimes, limited financial access to more nutritious options prevents better maternal diets. A 54-year-old mother from Markaz al Manar explained, "...fruits and vegetables are not consumed daily because, you know, the financial situation...they are expensive." Moreover, low physical activity levels among adult Sudan women is normative, partially a result of rapid urbanization that has reduced safe spaces for exercise (50 – 51). However, traditional gender norms derived from longstanding religious and traditional values inherent to the Sudanese context also constrain the ability of women to freely exercise outside of the home, as well as deemphasize the importance placed on physical education for girls in schools (50, 52 – 58). Gender norms also permit more dietary freedoms among men than women.

Greater maternal body size is an important indicator of fertility, wealth, prosperity, and beauty among Sudanese women and thus a unique, enabling driver of maternal health behaviors (46). During qualitative interviews, women confirmed that, generally, being thin is associated with poor health and, conversely, being overweight is reflective of fertility and good health in Sudan.

This social norm is so influential for maternal diets that appetite-boosting nutritional supplements in the form of pills are not uncommon among women in Sudan.

"One of the biggest issues we need to address is that people from different areas have different cultures, even in their food [behaviors]. It is not just their language, but even in their foods and practices... drinking water, eating vegetables or fruits, and meeting dietary diversity is not the same [throughout Sudan] ... I cannot speak generally about Sudan when I talk about food diversity because different tribes in different areas eat differently."

"It [nutritious food] is costly and nowadays to even eat vegetables without meat or chicken is still costly so they [adult women] have sugar...they add carbohydrates and breads [to their diets] instead of foods with other nutrients."

- Senior government health official, Khartoum

"...Men generally eat in the restaurants, but their wives eat the food available at home because their financial status cannot allow them to buy those foods. I see how much money I have and buy anything to eat."

- 24-year-old mother of four, Jabarouna

Policies, strategies, and programs to improve nutrition in Sudan

In Sudan, multi-sectoral nutrition actions are guided by Sudan's National Nutrition Strategy (2015 – 2024) which focuses on four primary pillars (Box 1). *The National IYCF Strategy* (2015 – 2024) and the *25-year Strategic Plan for Health* (2003 – 2027) are examples of specific **health/ nutrition** strategies (33; 55 – 56).

Through the **food system**, the Government of Sudan and partners have engaged with the goal of increasing the national production of iodized salt (57), as well as are engaged in a Zero Hunger strategic review focused on meeting SDG2 by 2030 (58). Multi-sectoral coordination and implementation challenges were reported by nutrition stakeholders familiar with various fortification-related efforts.

Sudan's Water Sector Strategy (2021 – 2031) is led by the Ministry of Water Resources, Irrigation, and Electricity and provides a framework to support nutrition through WASH, including on-going supported by UNICEF (59) and the World Bank (60). State ministries, with support from partners, also address nutrition through social protection, including Sudan's Social Policy and Inclusion program led by Ministry of Social Development (39) and the Mother and Cash Transfer Plus Program, which is supported by State Ministries of Health and Social Development, in collaboration with UNICEF (61).

PILLARS OF SUDAN'S NATIONAL NUTRITION STRATEGY (2014 – 2025) (33)

- INCREASED EQUITABLE PROVISION AND UTILIZATION OF HIGH-QUALITY NUTRITION SERVICES
- INCREASED COUNTRY CAPACITY AND COMMITMENT TO NUTRITION
- INCREASED MULTI-SECTORAL PROGRAMMING AND COORDINATION FOR IMPROVED NUTRITION OUTCOMES
- INCREASED GLOBAL NUTRITION LEADERSHIP

"…we are a country that produces salt so it is very easy to iodize the salt given the iodine deficiencies in the country but the private sector faces problems because they need the government to better support them. There have been agreements made but our monitoring and evaluation is weak…"

"…the turnover of high-level decision makers impacts us…every time we train decision makers, we then find that there is turnover, and we are forced to repeat all our efforts. If we were able to work on food fortification and on food diversity, [then] we would solve a lot of the problems that we face of malnutrition…"

- Government nutrition coordinator, Khartoum

"…people have a bad misconception about their body image and think it is a sign of poverty if they are skinny…and it is a sign of wealth to be obese."

- 30-year-old mother, Jabarouna

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SYRIA

SYRIA NUTRITION SITUATION

Syria Arab Republic locates in the Western Asia. Since 2011, Syria has faced a multi-sided civil war and encountered long-term crisis, which has been exacerbated by the recent COVID-19 pandemic and fuel and food crisis. The year 2021 marked the year in which "fewer people had sufficient access to nutritious food in Syria than any other point during the last ten years of crisis", according to WFP (1). The outbreak of the Syrian Civil War has also caused significant mortality and a refugee crisis. According to UN, the number of Syrian refugees was estimated to be over 5.5 million and about 6 million others were internally displaced (2). The instability is a one of the direct drivers that threatened food security and maternal and child nutrition and health. The latest data in 2021 shows that about 12 million people or 55% of the population are food insecure (3).

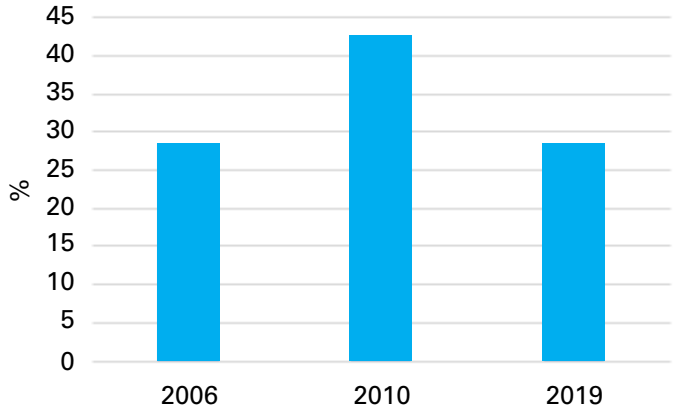
Infants and young children under 2 years of age

No LBW data were available in Syria. A few studies conducted in Syria explored factors related to LBW. Maternal health and complications, including having previous history of LBW childbirth, complications and gestational hospitalization, maternal morbidity (hypertension, anemia and hemorrhage), were associated with LBW (4). Other risk factors of LBW in Syria are female babies, first-born babies, and mothers with low pregnancy weight (5) (**Appendix 2 Figure 2.1**).

Breastfeeding and complementary feeding

Early BF initiation improved in Syria from 32.4% to 45.5% between 2006 and 2010, which has backslid to 36.4% in 2019. EBF follows a similar up-down pattern and the rate was 28.5% in 2006, 42.6% in 2010, and 28.5% in 2019. MDD, MMF and MAD were only assessed in 2019 with the corresponding proportion as 41.7%, 56.9%, and 26.5%.

Figure 7.1 – 7.2. Proportion of EBF infants 0 – 6 months in Syria



Maternal health plays an important role in breastfeeding practice. Lower EBF practices is associated with maternal anemia, maternal stress, lack of private spaces, and difficulty in accessing support for IYCF (6). In addition, maternal smoking (7), higher husband education (7), inadequate knowledge of breastfeeding and taboos (8) are also determinants of lower EBF.

Better maternal nutrition and support from healthcare providers and family members were associated for optimal breastfeeding (6, 8). Interestingly, among Syrian refugees in Lebanon, low dietary diversity

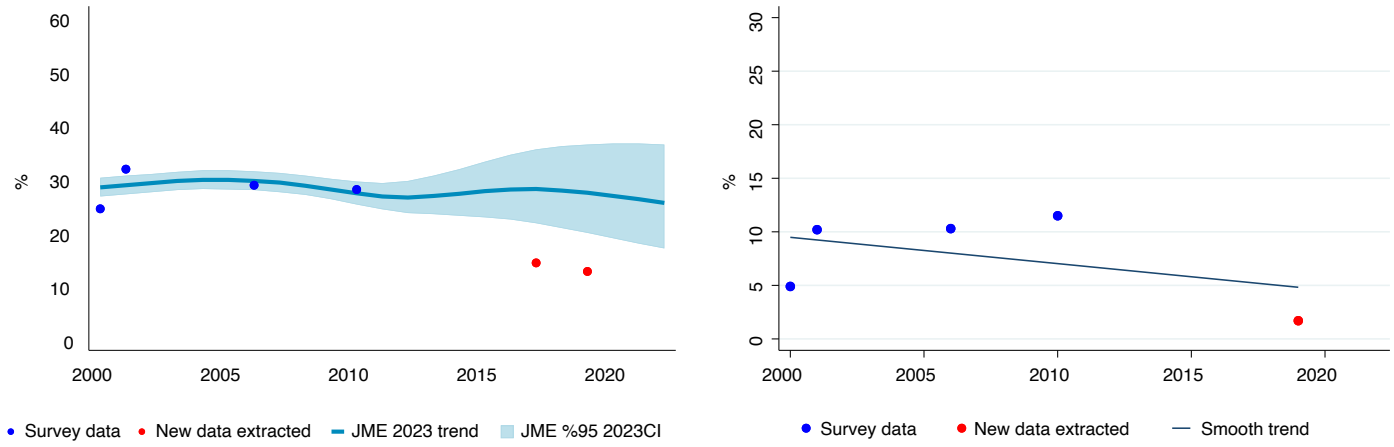
among mothers was associated with higher odds of early initiation of breastfeeding, possibly due to cost-effectiveness of breastfeeding) (8). Mother's poor knowledge (9), poverty, erosion of livelihoods (10), and poor access to clean water and a hygienic environment (11) were related to inadequate complementary feeding. Among Syrians, other enabling risk factors of poor CF are family separation (12), protracted crisis in Syria (13), and increased food prices due to the Ukraine war (14).

Children under 5 years of age

Stunting and wasting

Stunting among children under 5 years of age years was estimated to be stagnant around 30% between 2000 – 2020. Recent data from SMART 2017 and 2019 showed the rate has been down to 14.2% and 12.6%, respectively. Wasting data was available between 2000 and 2019 and with most of the prevalence reported between 5 – 11.5%. The most recent data in 2019 showed a prevalence of wasting of 1.7% in SMART 2019, which may be an outlier due to the substantial low value. (Figures 7.3 – 7.4).

Figures 7.3 – 7.4. Stunting (left) and wasting (right) prevalence of children under 5 years of age in Syria



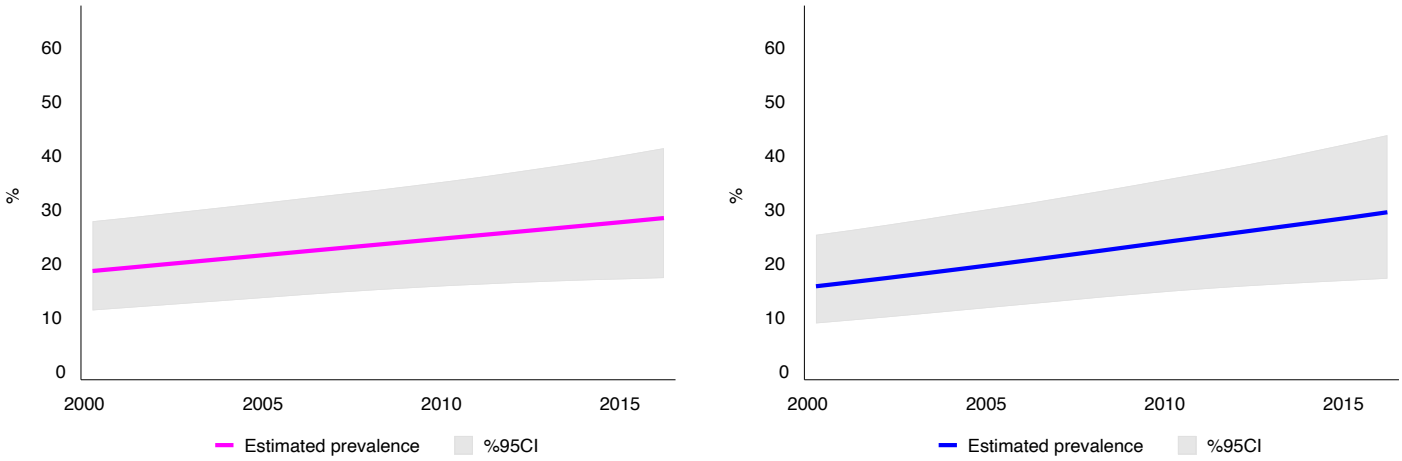
LBW and frequent infections from contaminated water/food were factors related to child stunting (15, 16). Poor breastfeeding (including low level of timely initiation of breastfeeding, low level of exclusively breastfeeding) and suboptimal complementary feeding practices are the two frequently cited practice factors associated with child stunting (14, 17, 18). Poverty and sub-optimal WASH environment affecting adversely malnutrition rates in Syria (14, 15). Poor male and female literacy rates are also linked to malnutrition in Syria (15). Bigger family size (19) and early marriage/child marriage (18) are among the other sociocultural factors that increased the risk of child undernutrition in the context.

School-aged children and adolescents

Overweight and obesity. The overweight and obesity prevalence in both girls and boys are estimated to increase, which is concerning. Data collected before the civil war shows that energy consumption from carbohydrate sources contributed significantly to the prevalence of obesity among adolescents in Syria, even after controlling for total energy consumption (20, 21). However, information about youth's dietary habits and lifestyle is rare in Syria after 2010 (22). The sedentary and urbanized lifestyle play a role in the increasing trend of overweight and obesity in Syrian youth. For example, eating while watching television is associated with obesity. Eating frequently outside home was reported by 67.4% of male adolescents aged

13–18 years and 54.5% female adolescents (23). The change in dietary intake was featured by higher total energy and total fat, but lower fruits and vegetables intake (23). Lastly, physical activity among youth in Syria is limited (24), which constrains the energy expenditure and encourages weight gain over time.

Figures 7.5 – 7.6. Overweight and obesity prevalence (95% CI) of girls (left) and boys (right) 5 – 19 yrs

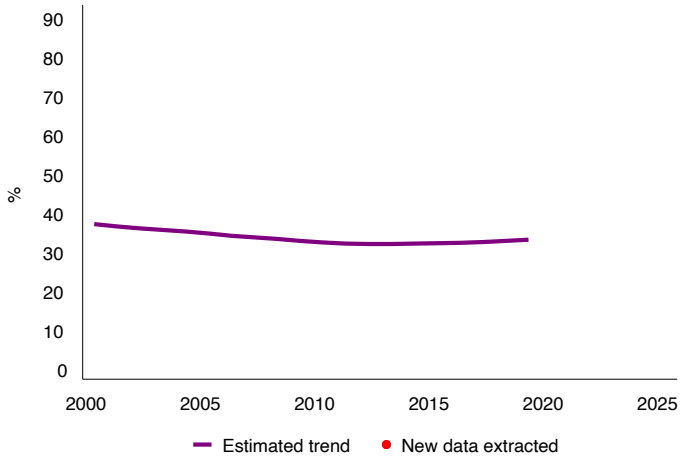


Maternal nutrition

Maternal anemia

The anemia rate in women of reproductive age was estimated to be ~32% in 2020, which is a continuation of a slight decreasing trend since 2000. Recent data collected in pregnant (30.6%) and nonpregnant women (29.4%) in 2019 SMART survey supports the trend estimation (Figure 7.7).

Figure 7.7. Prevalence of anemia among woman aged 15 – 49 years in Syria

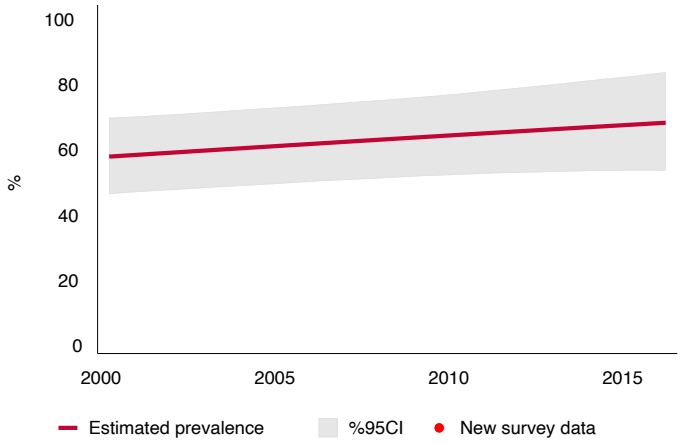


Limited studies were identified and are primarily among Syrian refugees. Evidence from Syrian refugees suggest overweight/obesity and central obesity (e.g., greater waist circumference) are risk factors for anemia (25), indicating hidden hunger of micronutrient deficiencies coexist among other forms of maternal malnutrition. Low dietary diversity predicts micronutrient deficiencies in women and food insecure refugees are more likely to suffer from poor quality diet (25), which are lack of key micronutrients, including iron, folic acid, and other vitamins and minerals relevant for anemia prevention. Limited proportion of pregnant women who were Syrian refugees receive iron-folic supplements (26).

Overweight and obesity

The estimated prevalence of maternal overweight/obesity has been increasing in Syria in the past two decades. (Figure 7.8).

Figure 7.8. Prevalence (95%CI) of overweight and obesity among woman aged >18 years in Syria



Few studies were conducted in Syria women in the past 5 years. Changes in dietary behaviors according to food insecurity situation was noted in Syria, including relying on less nutritious staple foods which are relatively energy dense and nutrient sparse (27). Other underlying factors related to increased risk of overweight and obesity include unemployment, no education, marriage, multiparity, low socio-economic status, low physical activity score, ex-smokers, non-users of alcohol, and participants treated for depression (28). Some of the individual level socioeconomic factors are reflective of the greater systematic environment, known as the enabling factors, for which no studies were identified.

Policies, strategies, and programs to improve nutrition in Syria

There are multiple strategies and plans currently being implemented in response to the ongoing crisis faced in Syria. The **multisectoral polices and strategies** include the Syria Crisis Response (2015), Humanitarian Syrian Response Plan (2022), Interim Country Strategic Plan (2021), the Syria Regional Response Plan (2013).

Through the **food system**, the IYCF program (2018) led by UNICEF, the Breastfeeding and Complementary Feeding Promotion and/or Counselling led by WHO and GINA were designed to scale up nutrition counselling and education, promote breastfeeding and complementary feeding practices among young Syrian children. In addition to IYCF promotion, WHO and GINA also initiated the Promotion of Healthy Diet and Prevention of Obesity and Diet-related NCDs with the goal to combat the increasing trend of overweight and obesity in the country. The Sector 5 Irrigation System led by WFP is another ongoing programming effort aims to improve agricultural productivity and food security in selected areas in Syria.

The School Meal Program and Emergency School Feeding program by WFP, The Cash Transfer for Basic Needs Support Program by UNICEF, and the Smart Card for Food Rations by WFP are example programs through **social protection** with the aim to promote nutrition, livelihood, and food security. A number of programs through the **health/nutrition system** are summarized. To highlight a few nutrition sensitive programs, there is the Electronic Food Voucher (People In Need) program, Infant Feeding in the Context of HIV, and the Vitamin and Mineral Supplementation programs. Through WASH, the WASH Services by UNICEF aims to pave the road for long-term investment to improve water and sanitation.

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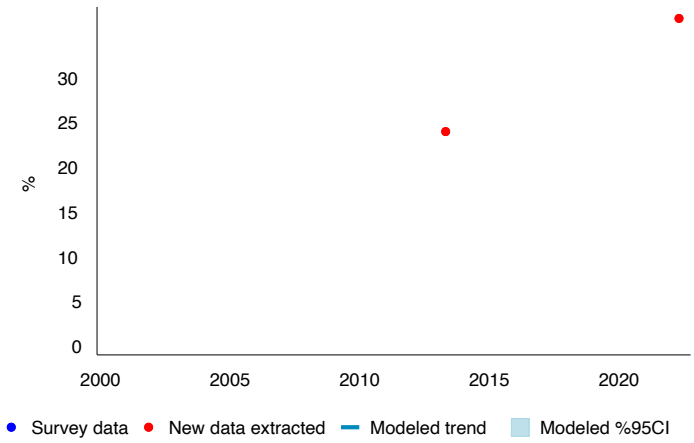
YEMEN

YEMEN NUTRITION SITUATION

Yemen has been in a civil war since 2011, which causes violence and mortalities of an estimated 377,000 people by the end of 2021, nearly 60% of which are indirect and caused by issues associated with conflict like the lack of access to food, water, and health care (1). The ongoing war and humanitarian crisis have continuously impacted the food and water system, causing a famine that affects >17 million people and a water safety crisis on top of the long-lasting water scarcity problem that further led to a cholera outbreak (2). In 2021 – 2022, Yemen ranked 183 out of 191 countries by the UNDP's Human Development Index (3). In 2022, Yemen ranked 121 out of 121 countries by Global Hunger Index (4), marking an alarming level of hunger. The tremendous challenges and worsened multi-sectoral systems continue to threaten maternal and child nutrition and wellbeing in Yemen. In the following sections, we reviewed the nutritional situation of Yemeni children and women by life stages.

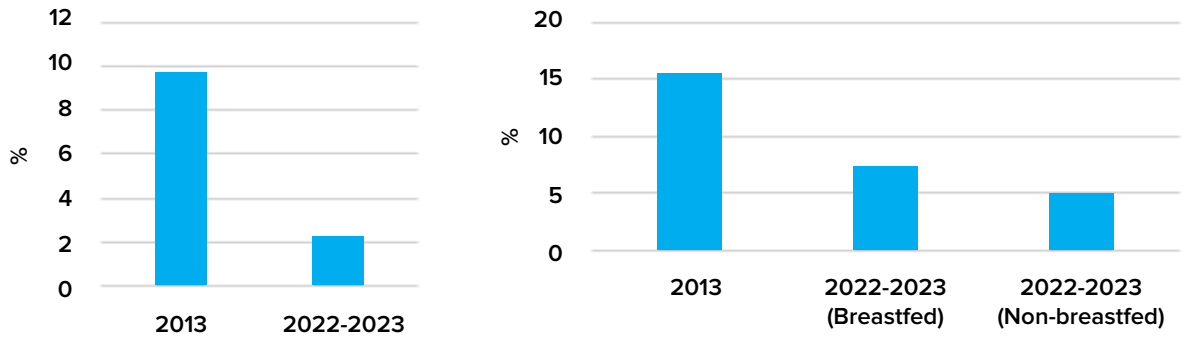
Infants and young children under 2 years of age

Figure 8.1. Low birthweight prevalence in Yemen (2013)



The prevalence of LBW in 2013 DHS was 23.7% among thoese with written record or the mothere's recall. The recent 2022- 2023 MICS reported the crude LBW raised to 36.3%. Because missing birth weight data is disproportionally high in poorer and in rural households, the actual prevalence could be higher than the reported. However, Yemen's LBW estimate is one of the highest in MENA. Poor maternal nutrition and health is the one commonly cited risk factor of LBW in Yemen. Immediate maternal dietary and nutritional factors include Inadequate maternal intake among pregnant and lactating women (5), maternal undernutrition (6-8), and maternal anemia (6, 7). Other health, reproductive care-related risk factors include maternal infections (6), history of pre-eclampsia (6, 9), birth interval of < 2 years (9, 10), and multiple pregnancies (6, 7). In addition, khat chewing and smoking is a lifestyle risk factor of LBW (9-11). Adequate antenatal care services (6, 12) and higher maternal education (9, 10) is associated with a lower risk of LBW among Yemeni women, suggesting the importance of access to reproductive health care and maternal education. In Yemen, famine and severe food insecurity threatening the lives of mothers lead to an increase of pre-mature and LBW babies (5, 13) (**Appendix 2 Figure 2.1**).

Figure 8.2. Proportion of EBF infants 0 – 6 months (left) and proportion of children 6 – 23 months meeting MAD (right) in Yemen



Breastfeeding and complementary feeding

Early initiation of BF was 52.7% and EBF was only 9.7% in 2013 and dropped to 2.2% in 2022-2023. Complementary feeding was also poor in Yemen with only 21.3% and 15.4% children 6 – 23 months achieving MDD and MAD in 2013, respectively. The proportions was lower in 2022 -2023 with MDD achieved in 9.6% children and MAD achieved in 7.3% breastfed children and 5.0% non-breastfed children.

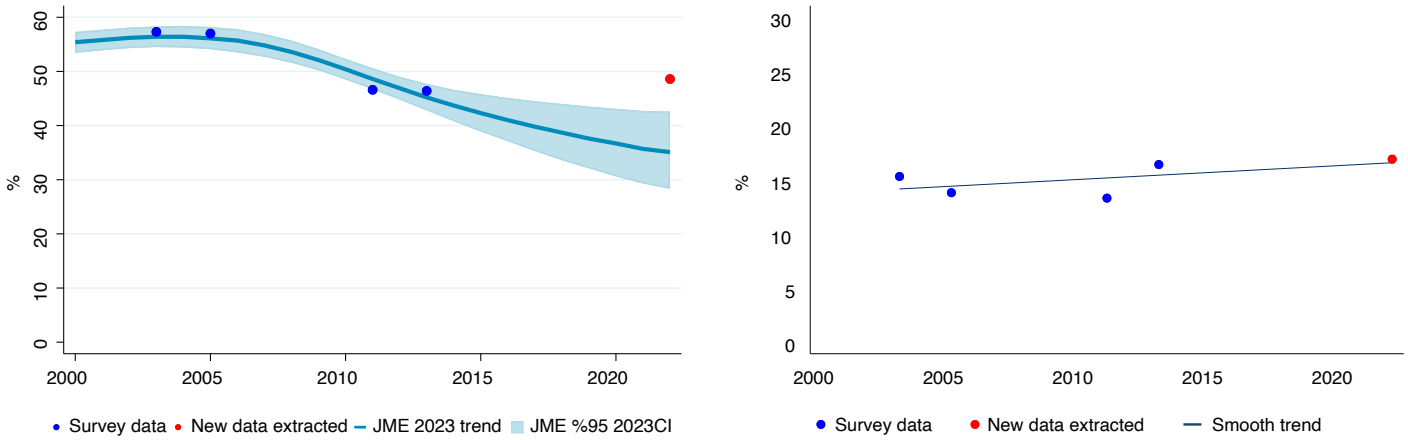
A lack of knowledge on age-appropriate behaviors and a lack of interaction with children during meals have also been highlighted as barriers to appropriate complementary feeding practices in Yemen (14). Lack of social support from partner discourages mothers to breastfeed (11). Based on literature review and the regional workshop, the cultural belief of "discolored" colostrum is bad and early addition of ward is good for infant health was an additional barrier of early initiation of BF in the first 3 days (15).

Children under 5 years of age

Stunting and wasting

Yemen has shown a decreasing trend of stunting, however the most current prevalence of 48.6% in 2022 -2023 is the highest in MENA in similar years. According to the most recent survey data, wasting rate was remained at a relatively high level of ~15% in Yemen between 2003 - 2023. The most recent wasting prevlance was 16.9% in 2022 -2023

Figures 8.3 – 8.4. Stunting (left) and wasting (right) prevalence of children under 5 years of age in Yemen



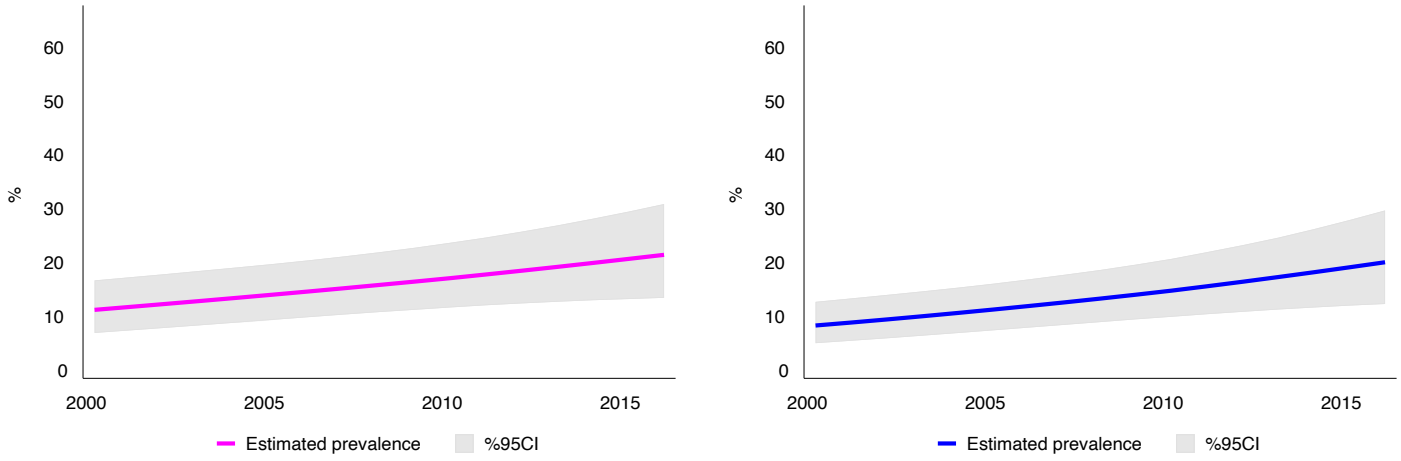
LBW (16), frequent infectious diseases (17, 18) and maternal overweight (19) are the immediate risk factors identified in relation to stunting/wasting, while access to adequate and frequent prenatal visits during pregnancy is a protective factor of stunting/wasting (17, 20, 21). Higher household food insecurity, poor access to health and nutrition services, and poor water and sanitation services are related to higher risk of child stunting and wasting (17, 18). Risk factors of wasting also include male children and infants perceived to be smaller than average at birth, and male children. By contrast, female infants, infants of higher birth order, and infants with larger perceived birthweight were more likely to experience stunting by age 5. These findings suggest differences in the immediate/underlying factors for stunting and wasting. Household with improved fuel, higher maternal education, and in general higher socioeconomic status, is associated with lower odds of stunting (20) (Appendix 2 Figure 2.2 – 2.3).

School-aged children and adolescents

Overweight and obesity

Despite the concerning trend of child undernutrition indicators consistently increasing trends of overweight and obesity in Yemeni girls and boys. However, despite the concerning trend, we were not able to find literatures explaining the trend or influencing factors published in the past 5 years. Future studies are expected to identify context-specific factors relating to overweight and obesity in Yemeni youths.

Figures 8.5 – 8.6. Overweight and obesity prevalence (95% CI) of girls (left) and boys (right) 5 – 19 yrs

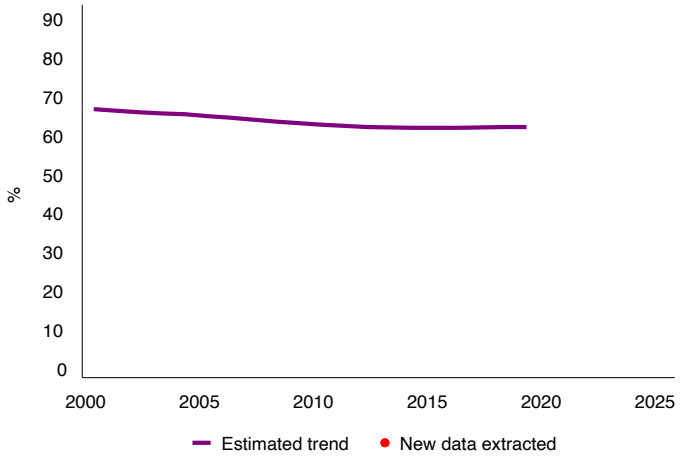


Maternal nutrition

Maternal anemia

Yemen's anemia rate in women of reproductive age remains to the highest in the MENA region. It was estimated that ~60% of women had anemia (Figure 8.7).

Figure 8.7. Prevalence of anemia among woman aged 15 – 49 years in Yemen

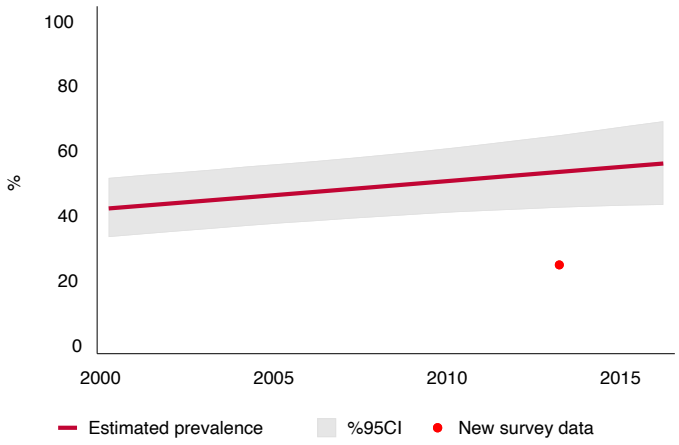


Never having consumed liver, tea drinking, khat chewing, infrequent consumption of vegetables, fruits, meats, fish, and chicken, and irregular breakfast pattern are some of the immediate dietary risk factors for maternal anemia (22- 23). For health related factors, having health problems (weakness, fatigue, dizziness, urinary tract infection, contractions, and constipation), having two or more cesarean surgeries, short pregnancy spacing are health and reproductive-health related risk factors (22,24). The current level of hunger and severe food insecurity is causing various hardships among Yemenis and hence, exacerbating all risk factors and vulnerabilities towards anemia and malnutrition (25).

Overweight and obesity

The estimated prevalence for overweight and obesity in women 18 years is 55% in 2016. The rate has been increased strikingly, despite the ongoing hunger and food insecurity situation in Yemen. (Figure 8.8).

Figure 8.8. Prevalence (95%CI) of overweight and obesity among woman aged >18 years in Yemen



Based on our own risk factor analysis, women who received no delivery assistance had lower odds of being overweight and obesity (Appendix 2 Figure 2.6). Most immediately, the transition in lifestyle contribute to the concerning trend of maternal overweight and obesity. Eating two or three big meals per day, and eating out, greater time spent for watching video or playing computer games, and reduced physical activity are identified risk factors (11, 24). Drinking water in own dwelling, improved water source, maternal employment (compared to no employment), and higher household wealth are associated with higher risk of overweight and obesity (Appendix 2 Figure 2.6), reflecting higher SES status may be related to greater degree of nutrition and lifestyle transition that promote weight gain.

Policies, strategies, and programs to improve nutrition in Yemen

In line with the Yemen Humanitarian Response Plan and Yemen accountability framework, the Yemen Nutrition Cluster Accountability to Affected Population operational guidance (2018-ongoing) was implemented. Multiple Cabinet decrees have been proposed to strengthen the policy commitment to incorporate malnutrition into the government plans and programs and to strengthen infant food regulation and standards. The Multisectoral Nutrition Action Plan (MSNAP) (2020-2023) is a multisectoral plan to improve IYCF, preventative and curative nutrition, maternal and child health and nutrition interventions.

Among the current programming and intervention efforts, the Yemen Food Fortification Initiative (2002 – ongoing) and the recent Emergency Agricultural Livelihood Assistance to Conflict & COVID-19 Affected Populations for Improving Food Security and Nutrition Project (2021-ongoing) through the **food system** have been implemented. Through **social protection**, there are the Cash Assistance Program (2017-Ongoing), Food Assistance Program (2017-ongoing), School Feeding Program (2017 – ongoing, and the recent Cash-for-Work Project for Youth in Yemen (2021 – ongoing). In response to the crisis, the Infant and Young Child Feeding in Emergencies (IYCF-E)(2017 – ongoing), through **nutrition system**, targets young children in humanitarian settings to support safe and IYCF. And the Yemen Emergency Health and Nutrition Project (EHNP) (2017-2022), through the **WASH system**, aims to strengthen basic essential health, nutrition, WASH services during the emergencies.

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APPENDICES

Appendix 1. Ancillary Methods Contents

Table 1.1. Key nutrition indicators included in regional and country trends analysis

Life stage	Malnutrition indicators	Practice indicators
Infants	Low birthweight (%)	Early Initiation of Breastfeeding (%) Exclusive breastfeeding 0 – 5 months (%) Intro 6 – 8 months, %)
Children	Stunting in CU5 (%) Wasting in CU5 (%) Overweight in CU5 (%) Anemia in CU5 (%)	MDD 6–23 months (%) MMF 6–23 months (%) MAD 6–23 months (%) Egg and/or flesh food consumption 6–23 months (%) Zero vegetable or fruit consumption 6–23 months (%) Sugar sweetened beverages consumption 6 – 23 months (%) Juice or juice drinks consumption 6 – 23 months* (%) Unhealthy food consumption 6 – 23 months (%) Iron supplementation in CU5 (%) Vitamin A supplementation in the past 6 months in CU5 (%) Multiple micronutrient powder use (%) Any vitamin or mineral supplements in CU5 (%)
School-aged children and Adolescents	Anemia (%) Thinness (%) Overweight (%)	Iron supplementation 5 – 19 y (%) →Iron supplementation during pregnancy 15 – 19 y (%)
Women	Anemia 15 – 49 y (%) → Anemia in non-pregnant women (%) → Anemia in pregnant women (%) Underweight (%) Overweight (%) Obesity (%)	Iron supplementation during pregnancy 15 – 49 y (%) Iron supplementation during pregnancy 20 – 49 y (%)

CU5, children under five; Intro, Introduction of complementary foods; MAD, minimum acceptable diet; MDD, minimum dietary diversity; MMF, minimum meal frequency; Proposed indicators without data to analyze; → additional indicators being analyzed as proxy indicators for those missing or as breakdown indicators; * Juice or juice drinks can be classified as healthy or junk food. We included this indicator as a proxy of unhealthy beverages, because of two reasons: 1) fruit drinks, not soft drinks, may be the highest contributor in the sugar-sweetened beverage consumption in MENA youth (Bawadi et al 2019); 2) evidence has shown that excessive intake of juice is associated with obesity and adverse child health outcomes (Kavle et al 2015).

Table 1.2. Existing and new data sources included in the regional nutrition situation analysis

	Indicators	Data source	# of countries	Year range
Malnutrition indicators				
Child nutritional status	Low birth weight (%)	UNICEF-WHO Low Birthweight Database (2023) Blencowe et al (2019) Lancet	14 11	2000 - 2015 2000 - 2020
	Stunting in CU5 (%) Wasting in CU5 (%) Overweight in CU5 (%)	The UNICEF, WHO, World Bank Joint Child Malnutrition Estimates 2023 (JME) Recalculated / newly extracted for stunting, wasting, and/or overweight	19 6-7	2000- 2022 2000 - 2022
School-aged children and adolescents' nutritional status	Underweight in girls 5 - 19 y	Recalculated based on Rodriguez-Martinez et al (2020)	20	2000 - 2019
	Overweight in boys 5 - 19 y	Recalculated based on Rodriguez-Martinez et al (2020)	20	2000 - 2019
Women's nutritional status	Underweight 18+ y (%)	NCD Risk Factor Collaboration (2016) Recalculated	20 10	2000 -2016 2000 -2019
	Overweight/obesity 18+y (%)	NCD Risk Factor Collaboration (2016) Recalculated	20 13	2000 -2016 2000-2019
Anemia	Anemia in CU5 (%) Anemia in non-pregnant women (%) Anemia in pregnant women (%) Anemia in women 15 - 49 y (%)	WHO Nutrition Landscape Information System (NLiS)	19 19 19 19	2000 - 2019 2000 - 2019 2000 - 2019 2000 - 2019

Practice indicators				
IYCF practices	Early Initiation of Breastfeeding (%) Exclusive breastfeeding (%) Intro 6 – 8 months, %) MMF 6–23 months (%) MDD 6–23 months (%) MAD 6–23 months (%) Egg and/or flesh food consumption 6–23 months (%) Zero vegetable or fruit consumption 6–23 months (%)	The global infant and young children complementary feeding (IYCF) database	17	2000- 2020
	Juice or juice drinks consumption 6 – 23 months (%)	Recalculated	10	2000 - 2020
Supplementation use	Iron supplementation in CU5 (%)	Recalculated	3	2012 - 2017
	Iron supplementation during pregnancy 15 – 19 y (%)	Recalculated	4	2000 - 2017
	Iron supplementation during pregnancy 20 – 49 y (%)	Recalculated	4	2000 - 2017
	Iron supplementation during pregnancy 15 – 49 y (%)	Recalculated	4	2000 - 2017
	Vitamin A supplementation in the past 6 months in CU5 (%)	Recalculated	6	2000 - 2017
	Any vitamin or mineral supplements in CU5 (%)	Recalculated	6	2000 - 2020

Table 1.3. The PICO (Participants, Intervention/Comparison, and Outcome) criteria, search strategy, and keywords and search terms for the regional-level scoping review

PICO criteria	
Participants	Publications and reports will be considered eligible if they include focus on infants, children, adolescents (10-19 years old), women of reproductive age, pregnant women, breastfeeding women, and mothers from the 20 countries of the MENA region.
Intervention **Exposure**	Publications will be included if they assess and evaluate health and nutrition related programs, interventions, frameworks, strategies, and policies within the selected population and geographical area. Interventions and programs may include nutrition-specific interventions (i.e. Interventions or programs that address the immediate determinants for optimal child and maternal nutrition (ex. breastfeeding and complementary feeding; micronutrient powder use; CMAM interventions - treatment of moderate and severe acute malnutrition; dietary diversification; nutrition interventions in emergencies) AND Interventions and programs may include nutrition-sensitive interventions (ie. interventions that address the underlying determinants for optimal child and maternal nutrition and development—food security; adequate caregiving resources at the maternal, household and community levels; and access to health services and a safe and hygienic environment (ex. cash transfer programs/social welfare, nutrition-sensitive agricultural programs, maternal mental health, women's empowerment, WASH interventions)
Comparison	Not applicable
Outcomes	The major outcome of this review is to present a situational analysis on the health and nutrition status of the target population. This will be achieved through assessing various anthropometric and nutrition outcomes related to population groups of interest (infants, children, adolescents, mothers). More specifically, primary outcomes of interest include: anthropometric and growth parameters (weight, height, weight for age, height for age, weight for height, body mass index (BMI), waist circumference, MUAC, head circumference), malnutrition indicators (stunting, acute malnutrition (wasting), overweight and obesity); dietary intake and diversity (dietary diversity score (MDD), MAD (minimal acceptable diet), nutrition-related knowledge and behavior; and nutrition biomarkers/micronutrient status.
Study designs	As a first step, all study designs for peer-reviewed publications were included in the search: Randomized Control Trials (RCT), quasi-experimental, cohort studies, cross-sectional studies, reviews (systematic, narrative, and meta-analysis). Designs to be included in our final search were finalized upon the number of hits/publications identified from all databases using the search strategy, assessing the rigor of the evidence (RCTs and quasi-experimental trials provide higher quality data) and ensuring that we are capturing all recently published reports relevant to the outcomes of interest
Search strategy	
Databases	The following databases were used in the literature searches: Medline Ovid databases, Scopus, Web of Science, Global Health, Google Scholar, and UNC Food policy. In addition to the above, the research team coordinated with the UNICEF regional office to acquire most up-to-date regional reports on optimal diets and nutrition outcomes for the target groups (women, adolescents, infants, and children).
Inclusion and exclusion criteria	Inclusion criteria: • Published between 2017-2022 to capture most recent scientific evidence of programs and interventions conducted in the MENA region. • Human studies only. • Published in English, Arabic or French Exclusion criterion: Studies with small sample sizes (<100 participants) were also excluded.
Keywords and search terms	
Countries	"MENA" OR "middle east" OR "North Africa" OR "Northen Africa" OR "Near East" OR "Lebanon" OR "Kuwait" OR "Bahrain" OR "Syria" OR "Djibouti" OR "Etypt" OR "Iran" OR "Jordan" OR "Libya" OR "Morocco" OR "Oman" OR "Qatar" OR "Saudi Arabia" OR "Iraq" OR "Gaza" OR "West Bank" OR "Palestine" OR "Tunisia" OR "Yemen" OR "The United Arab Emirates" OR "Algeria" OR "Sudan"
Health and Nutrition concepts	(nutrition* or health) AND (intervention* OR framework OR strategy* OR policy* OR recommend* OR guideline* AND
Population	women* OR female * OR girl* OR child* OR infant* OR adolescence* OR teenage* OR breastfeed* OR pregnant* or caregiver* or "school-aged children"
Outcomes	"weight" OR "height" OR "body mass index" or "BMI" or "BMI for age" or "height for age" or "weight for age" or "malnutrition" or "stunting" or "wasting" or "undernutrition" or "overweight" or obese* or diet* or "intake" or "dietary pattern" or dietary diversity" or "nutrition behavior" or "nutrition knowledge" or "biomarkers" or "micronutrient" or "nutrition status" or "MAD" or "minimal acceptable diet" or "minimum meal frequency" or "MMF" or "dietary diversity score" or "minimum dietary diversity" or "MDD" or "anemia" or "iron deficiency" or "vitamin deficiency" or "mineral deficiency"

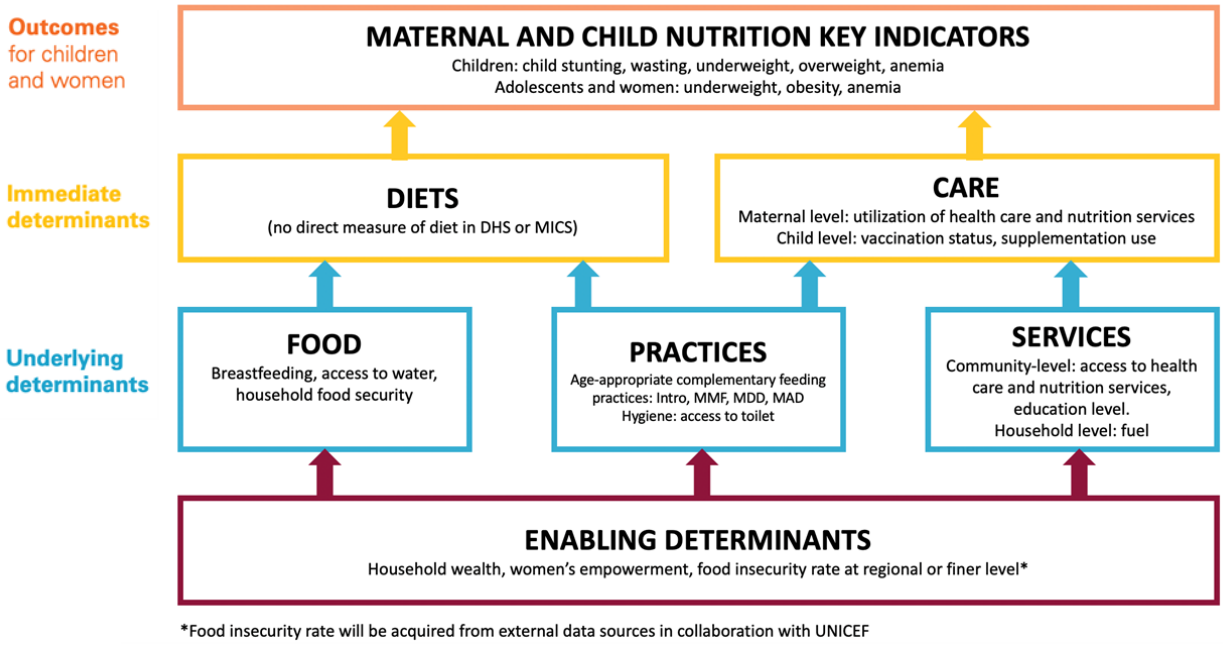
Table 1.4. Summary table of publications (peer-reviewed articles and grey literature) identified from the in-depth desk review in the eight focus countries:

Country (listed in alphabetical order)	Total	Peer-reviewed publications†	Grey literature‡
Djibouti	37	9	28
Egypt*	40	15	25
Jordan	90	45	45
Lebanon	79	45	34
Oman	62	34	28
Syria	82	37	45
Sudan	99	62	37
Yemen	68	24	44
Total	557	271	286

†Peer reviewed publications include scientific articles that explore the determinants of nutritional status of infants, children, and women as well as interventions that were identified in the context to address specific outcomes of interest in the review including LBW, stunting and wasting, infant and child feeding practices, anemia among children and WRA, among other health outcomes). ‡Grey literature included policies, programs, reports published from UN agencies and INGO reports

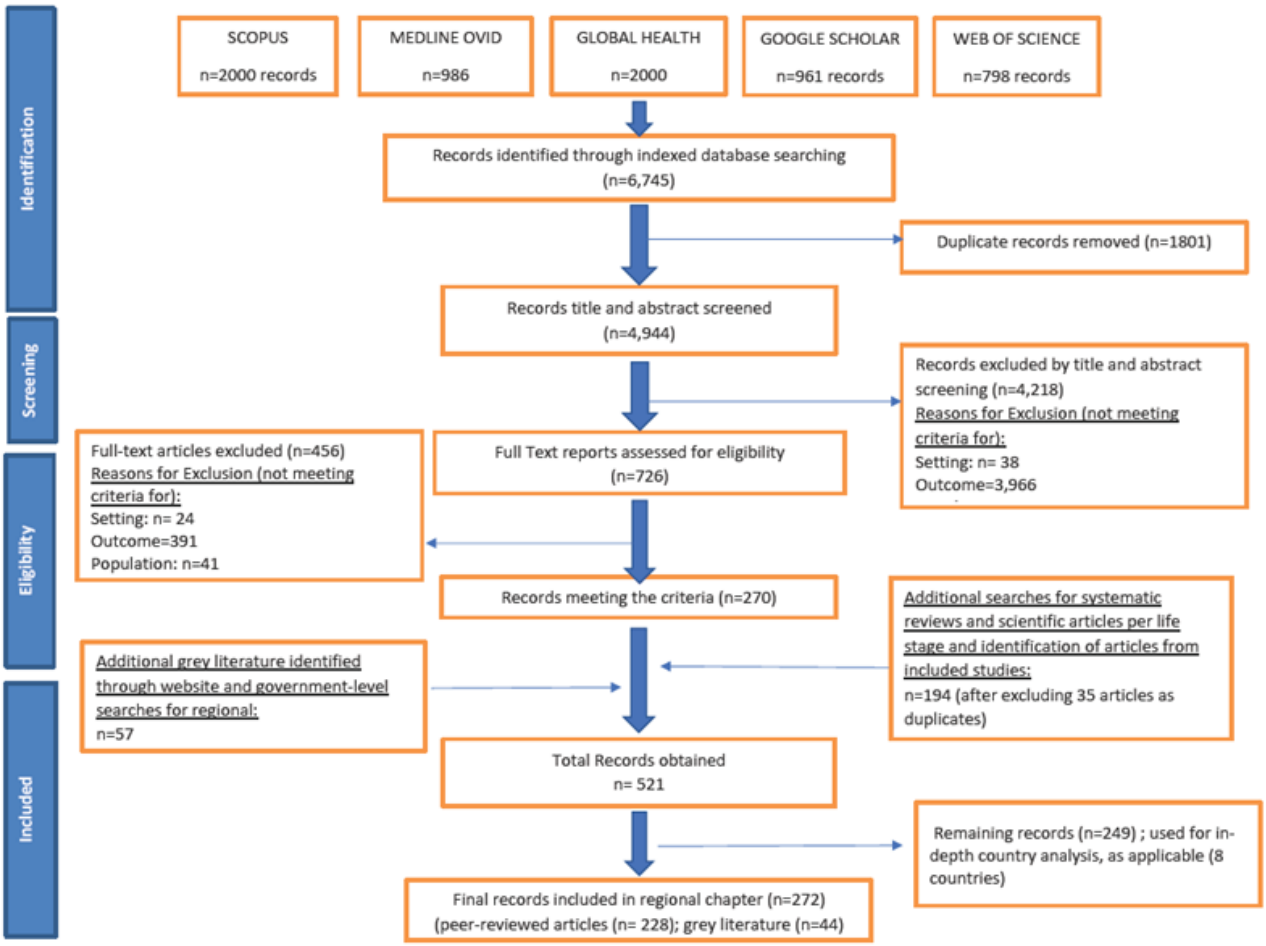
*Egypt list of references need to be updated based on the final count of articles and grey literature (by Steve).

Figure 1.1. Adapted UNICEF conceptual framework that guided risk factor analysis



The risk factor analysis utilized available DHS/MICS data and other external data sources.

Figure 1.2. Flow diagram for the country-level literature search and review



Appendix 2. Results for the Country-level Risk Factor Analysis

Figure 2.1. Significant risk factors of low birthweight derived from multivariable logistic regression models in Egypt, Jordan, Sudan, and Yemen

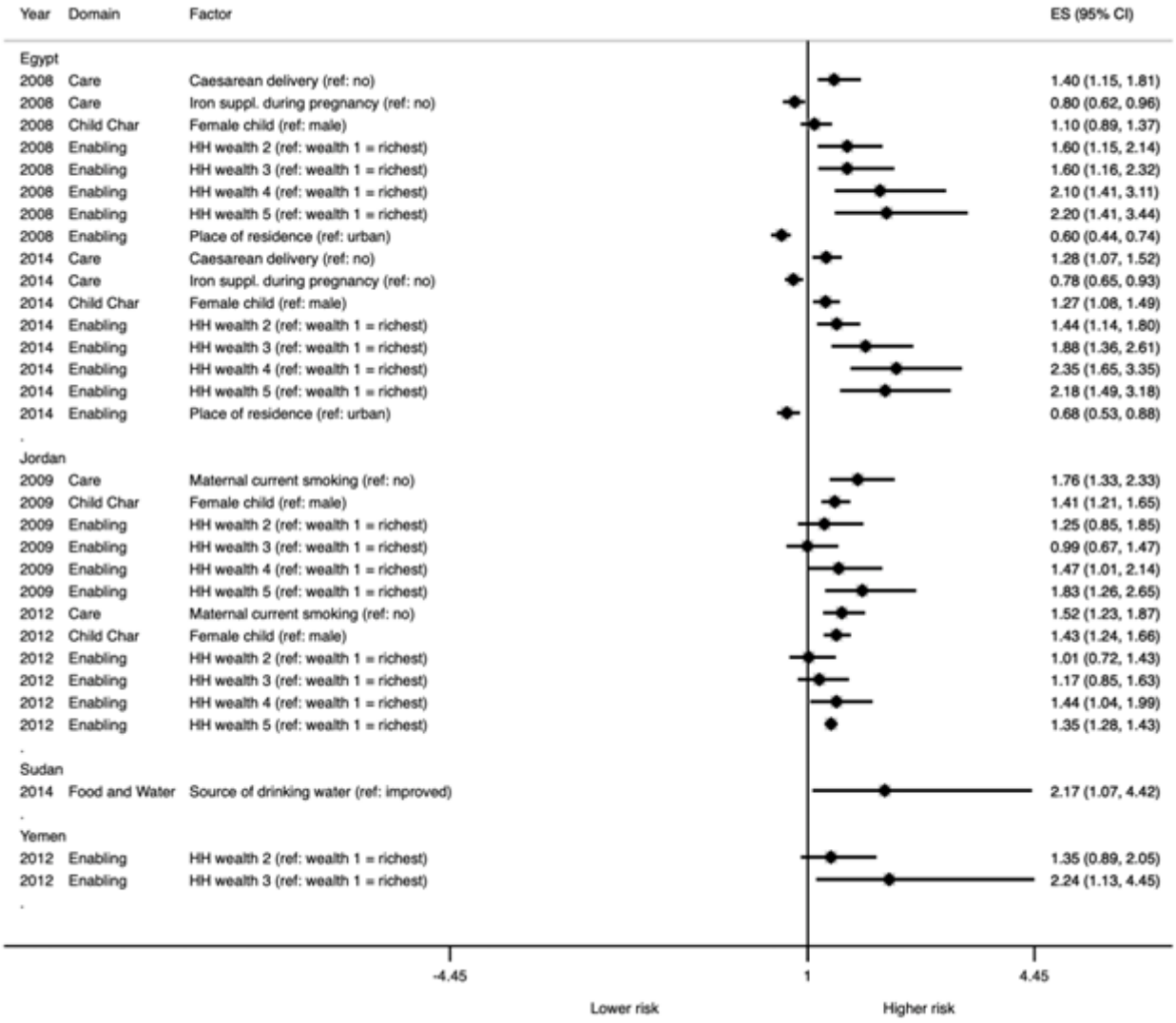


Figure 2.2. Significant risk factors of child stunting derived from multivariable logistic regression models in Egypt, Jordan, Sudan, and Yemen

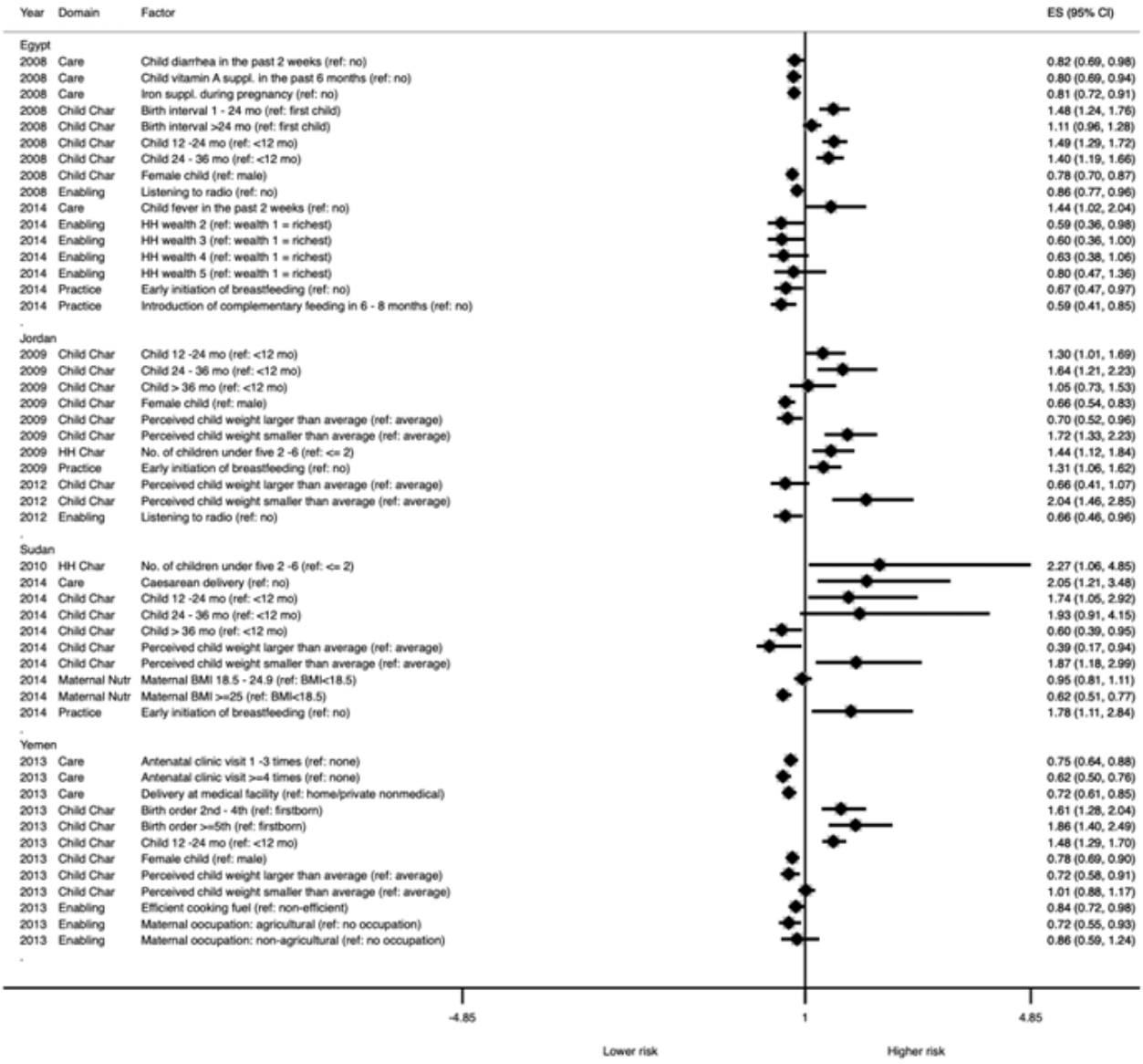


Figure 2.3. Significant risk factors of child wasting derived from multivariable logistic regression models in Egypt, Jordan, Sudan, and Yemen

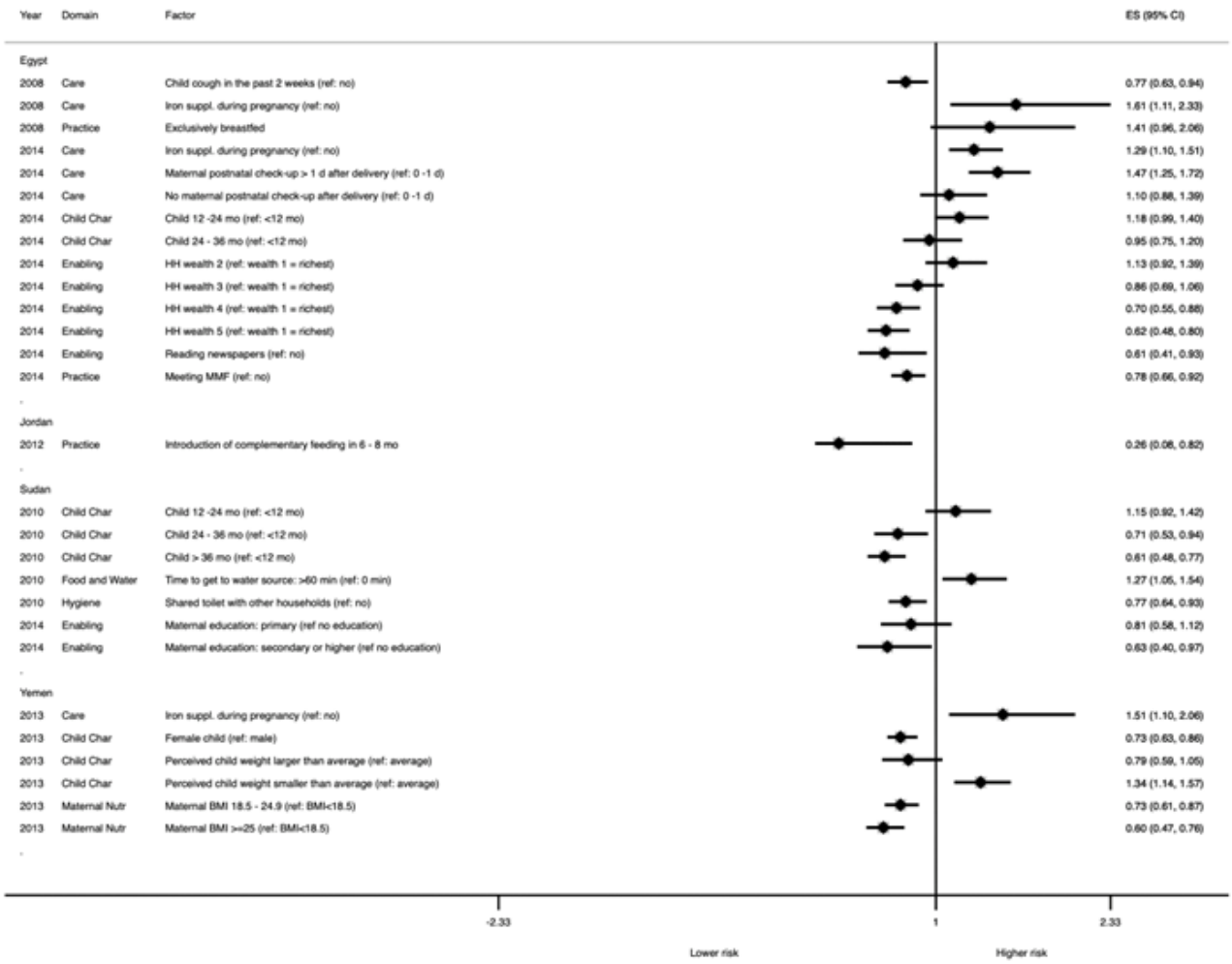


Figure 2.4. Significant risk factors of maternal underweight derived from multivariable logistic regression models in Egypt, Jordan, and Yemen

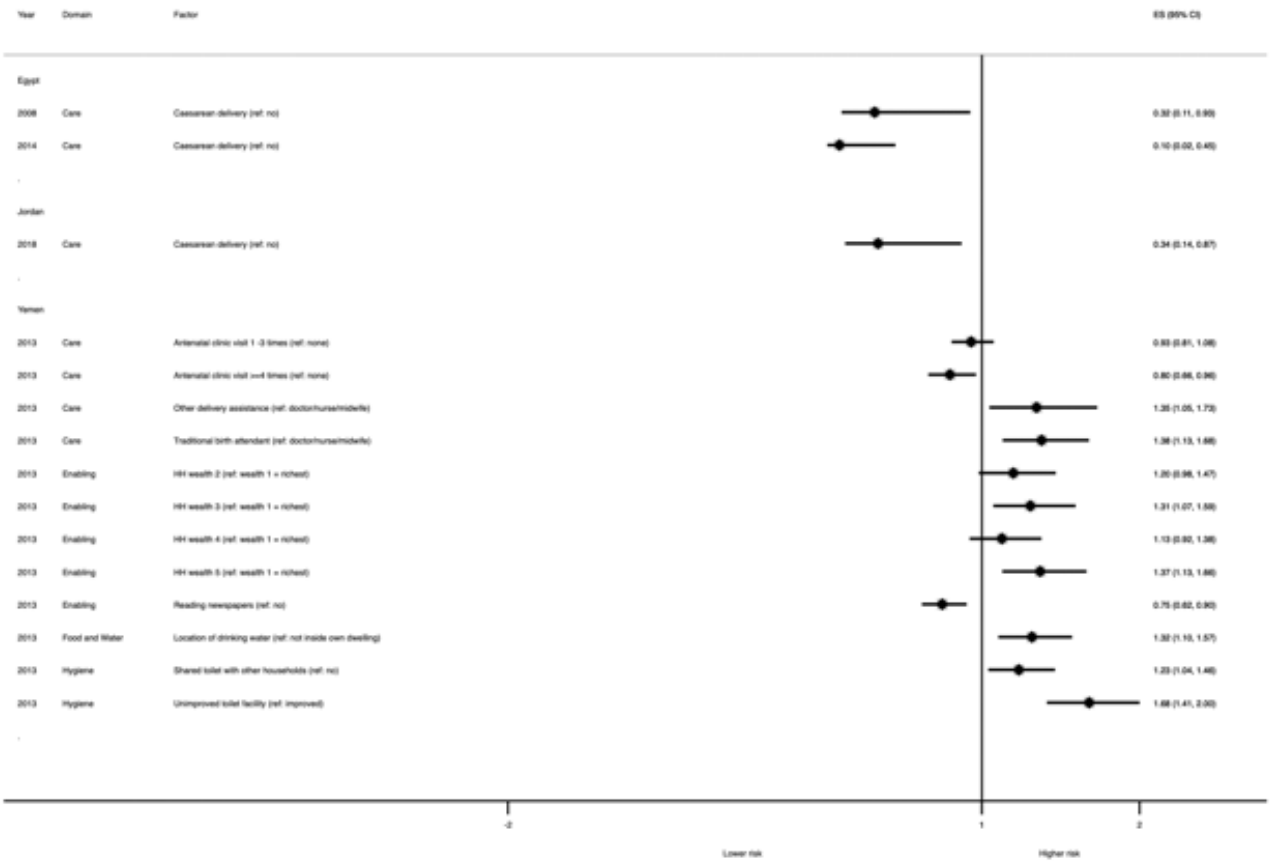


Figure 2.5. Significant risk factors of maternal anemia derived from multivariable logistic regression models in Egypt, Jordan, and Yemen

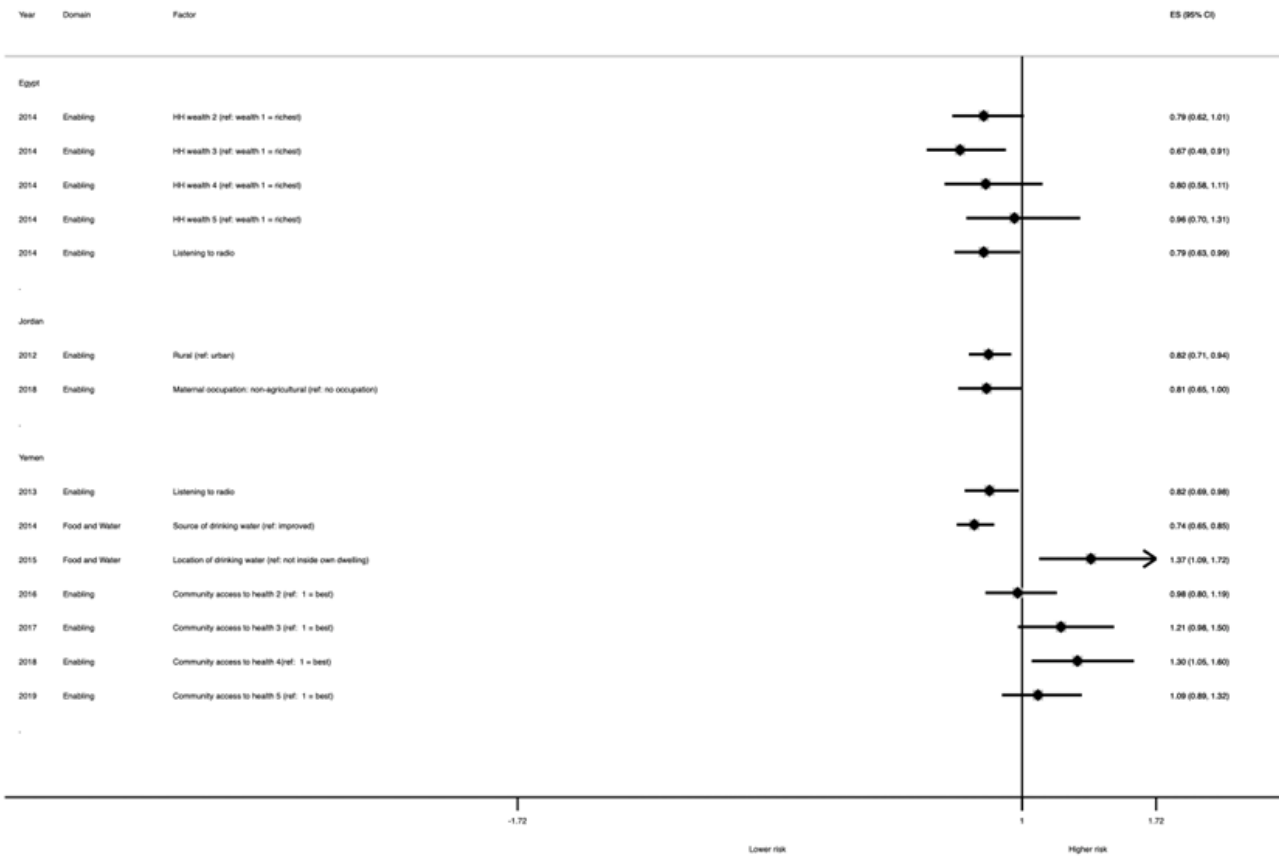
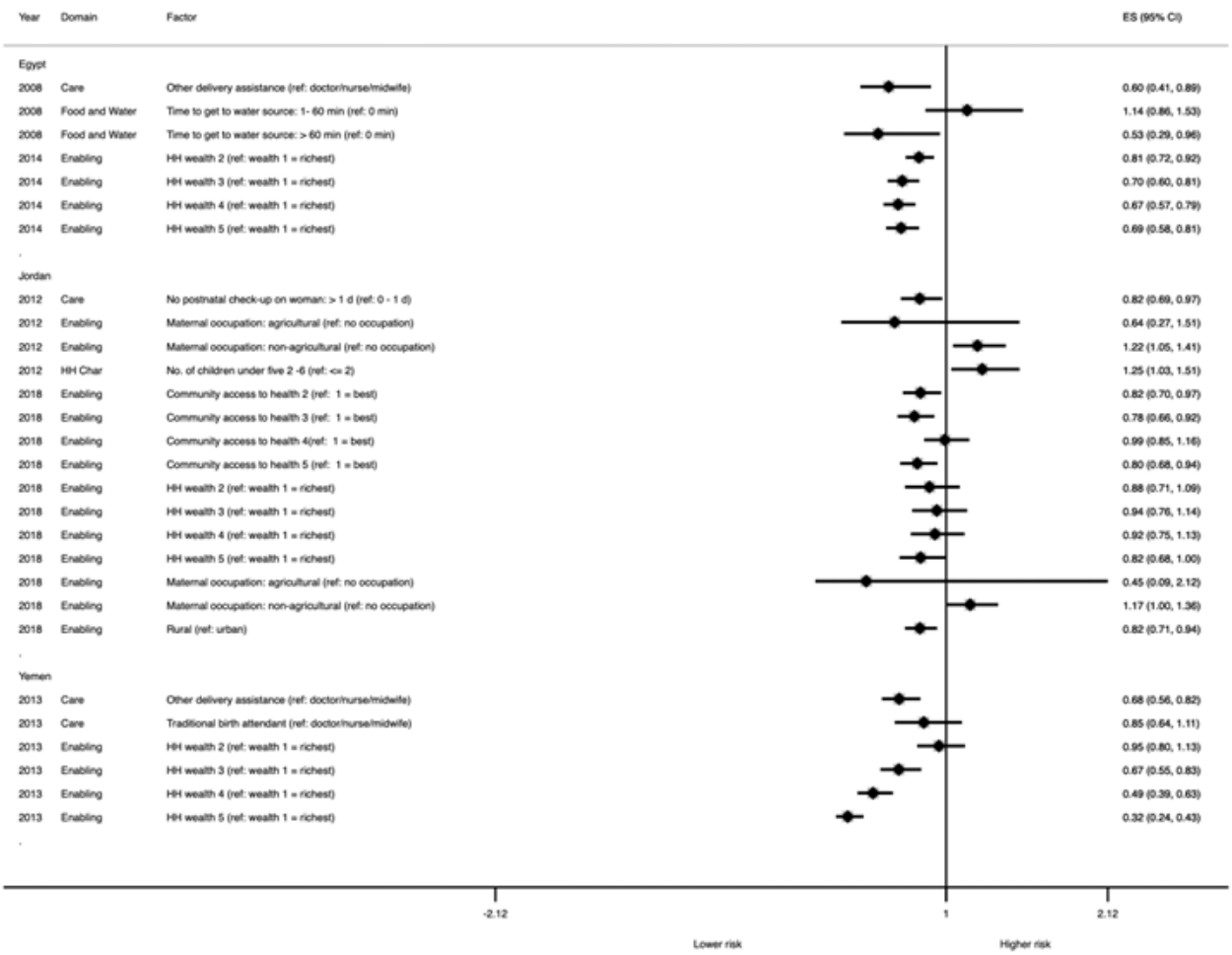


Figure 2.6. Significant risk factors of maternal overweight and obesity derived from multivariable logistic regression models in Egypt, Jordan, and Yemen



Appendix 3. Summary of change (in percentage points) of maternal and child nutritional status in MENA by country between 2000 - 2022

		UNDERNUTRITION INDICATORS					OVERNUTRITION INDICATORS			
Country	Income level	LBW (2000 - 2020)	CU5 stunting (2000 - 2022)	School-aged girl underweight (2000 - 2015)	School-aged boy underweight (2000 - 2015)	Women aged >=18y underweight (2000 - 2015)	CU5 overweight (2000 - 2022)	School-aged girls overweight and obesity (2000 - 2015)	School-aged boys overweight and obesity (2000 - 2015)	Women aged >=18y overweight and obesity (2000 - 2015)
Bahrain	High-income	2.3	-5.9	-0.3	-3.3	-0.6		4.8	9.3	5.7
Kuwait	High-income		2.9	0.4	-2.5	-0.2	4.0	3.3	8.6	4.4
Oman	High-income	-0.3	-1.9	-0.8	-4.5	-1.4	4.8	7.1	11.8	8.6
Qatar	High-income	0.1	-5.2	0.6	-2.6	-0.4	1.7	4.0	8.3	5.4
Saudi Arabia	High-income		1.0	-0.4	-4.3	-0.5	6.5	6.4	12.4	6.5
United Arab Emirates	High-income	1.0		-1.0	-4.1	-0.6		6.5	11.1	7.0
Iraq	Upper-middle income	0.6	-18.0	-1.8	-4.2	-0.7	-1.4	7.6	10.6	7.2
Jordan	Upper-middle income	4.3	-4.2	-0.7	-3.4	-0.4	5.0	5.8	9.4	6.6
Libya	Upper-middle income		33.8	-0.7	-3.8	-0.4	12.5	6.2	10.2	6.6
Algeria	Lower-middle income	0.4	-13.7	-2.3	-5.9	-1.6	-0.9	9.9	13.9	10.7
Djibouti	Lower-middle income		-15.0	-2.0	-4.0	-1.0	2.0	4.0	3.4	6.4
Egypt	Lower-middle income		-5.5	-3.7	-6.3	-0.6	6.7	11.9	14.3	9.4
Iran	Lower-middle income		-10.5	-0.5	-3.6	-1.1	-2.1	6.7	9.9	9.7
Lebanon	Lower-middle income	0.3	-10.4	-0.2	-3.2	-0.5	-0.1	3.9	9.2	5.9
Morocco	Lower-middle income	-3.5	-12.4	-2.2	-5.1	-1.4	-8.4	8.9	11.7	10.2
State of Palestine	Lower-middle income	1.4	-2.4	-0.9	-3.8	-0.4	2.2	6.3	10.3	7.2
Tunisia	Lower-middle income	0.4	-4.0	-1.6	-4.3	-1.1	15.0	7.6	10.4	8.7
Sudan	Low-income		-3.3	-4.1	-5.9	-2.2	-0.9	7.2	4.2	9.2
Syria	Low-income		-2.9	-2.4	-5.6	-1.1	-5.3	9.2	12.8	9.8
Yemen	Low-income		-20.3	-3.1	-5.5	-3.4	-3.0	9.5	10.8	13.0

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