National Nutrition Institute

World Food Programme
Egypt

Final Report

Assessment of the Nutritional Status of Bedouins in Non-Urban Areas in Sinai

June 2005

Preface

Sinai has great historical and religious significance for Egyptians, and in recent times has become internationally known as a popular tourist destination.

The Bedouins living in non-urban areas in Sinai face extremely difficult living conditions and are constantly moving from one place to another in search of food and water. In response, the Government of Egypt launched a developmental program called the "Bedouin Housing Project" as a part of the Sinai Longevity Project (SLP).

The Ministry of Health and Population (MOHP), under the Patronage of his **Excellency Prof. Dr. Mohamed Awad Tag El Deen,** gives continuous support to the nutritional research which aims to assess nutritional programs for all vulnerable groups, and assist in the design of programs to overcome nutritional problems.

The Country Director of the World Food Programme (WFP) in Egypt, Mr. Bishow Parajuli, together with Dr. Ayoub Al Jawaldeh Deputy Country Director, opened the channels of communication with the National Nutrition Institute (NNI) to collaborate with them to design this survey to assess the nutritional status of the Bedouins living in non-urban areas in Sinai.

With the great support of the **Secretary General of the Teaching Hospitals Institute, Prof. Dr. Abdel Hamid Abaza,** a research team from NNI traveled to more than 40 locations in Sinai to assess the nutritional status of the Bedouins living there.

This study is considered to be the first conducted in these non-urban areas. We thank every one who supported the NNI team during visits to Sinai, including the Directors of SLP, the Directors of the MOHP in South and North Sinai Governorates, and the Bedouins who gave us great support and cooperation to help make the survey a success.

We hope that results from this survey will help with the design of development programs to improve the health and nutritional status of Bedouins in Sinai.

Prof. Dr. Hoda Hassan

Director of National Nutrition Institute

Acknowledgements

We would first like to thank Dr. Ayoub Al Jawaldeh Deputy Country Director of WFP Egypt , the WFP Project Coordinator for his great support and cooperation during the design, implementation, and data analysis/reporting stages of this survey.

Special thanks are due to Dr. Khalid Chatila, Project Officer, WFP Egypt, for his special efforts and cooperation.

We thank contributors from the Sinai Longevity Project (SLP): Mr. Samir El Guindy, Director of SLP; Mr. Yousef Abdel Aziz, Deputy Director of SLP in North Sinai Governorate; Mr. Mahmoud Abdel Rahem, Deputy Director of SLP in South Sinai Governorate; and all SLP staff in both South and North Sinai Governorates.

We thank contributors from the Ministry of Health and Population: Dr. Mosleh El Mongey, Director of MOHP/South Sinai; Dr.Saad El Maghraby, Director of MOHP/North Sinai; Dr. Ibrahim Attya, Director of Preventive Medicine Directorate; Dr. M. Magdy Ihsaan, Director of Preventive Medicine Directorate; Dr. Hamed Mostafa; Dr. Hamdy El Azazy; Dr. Magdy Wasfy; and all the health providers in both South and North Sinai Governorates.

Special thanks to NNI colleagues who helped with questionnaire development, training of the NNI team, sampling design and also for advice given during the reporting process: Dr. Afaf Tawfik, Dr. Fardous Soliman, Dr. Dina Shehap, Dr. Abdel Hady Abass and Dr. Azza Omar Lottfy.

Special and great thanks are due to all the Bedouins for their kindness and hospitality. Thanks to all.

Dr. Ibrahim Ismail

Project Coordinator

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List of Acronyms

BHP	Bedouin Housing Project
BMI	body mass index
DM	diabetes mellitus
Hb	hemoglobin
HH	household
M&E	monitoring and evaluation
MUAC	Mid upper arm circumference
NCD	Non-communicable disease
NNI	National Nutrition Institute
NUA	non-urban areas
RBM	results-based management
RDA	recommended daily allowance
SD	standard deviation
SLP	Sinai Longevity Project
SLP	Sinai Longevity Project
WFP	World Food Programme
WHO	World Health Organisation

Executive Summary

The Bedouins living in non-urban areas (NUA) in Sinai suffer from poor living and environmental conditions, and live a nomadic lifestyle in search of food and water. Inadequate water supply, which leads to decreased food availability and income, is a major problem for the Bedouin. Their dietary habits differ from people in other areas of Egypt, and are mainly determined by socio-economic status and food availability. These habits affect both their nutritional and health status.

To improve the living conditions of Bedouins in Sinai, the Egyptian Government's Sinai Longevity Project (SLP) designed a project called the Bedouin Housing Project (BHP). The project aims to provide Bedouins with new cement block houses to replace those built from corrugated iron or animal skin; establish reliable water sources; and assist the Bedouin to re-cultivation their lands.

The World Food Programme (WFP), an arm of the United Nations mandated to fight hunger and malnutrition, cooperates with the Egyptian Government in the BHP by supplying the Bedouin with food aid while they construct their houses and irrigation dams or wells. This food aid continues for four years while the Bedouin re-cultivate their land and start planting fruit trees. This food aid program is known as "food/man/day" and supplies the beneficiaries mainly with wheat flour, oil and sugar. This is periodically supplemented with lentils, milk or rice.

This study, conducted by the National Nutrition Institute with technical support from WFP, and the directors of the SLP, is thought to be the first nutritional survey conducted to assess the nutritional status of the Bedouin in non-urban areas in Sinai.

Objective of the Study

The objective of the study was to assess the health and nutritional status of Bedouins living in non-urban areas of Sinai. As women and children 2-5 years of age are the most vulnerable groups, the study focuses on their health and nutritional status.

Methodology

Two types of research techniques were used in this study – quantitative and qualitative research.

Quantitative research consisted of questionnaires used to assess the social, anthropometric, nutritional and health status of the target population. The study sample consisted of 900 households (HH), 900 mothers and 517 children (2-5 years old) in about 40 non-urban areas in North and South Sinai Governorates. All households with children aged from 2-5 years, (461 households in total), were subjected to 24 hour food recall for the mothers and their children.

Qualitative research techniques, focus group discussion (FGD) and in-depth interviews were conducted to identify the perceptions, attitudes and beliefs of Bedouins and key stakeholders in Sinai about the BHP and its impact on their health and nutritional status.

The team conducting the survey faced some problems whilst in the field. Those most noteworthy were as follows:

- In some areas there were not enough families to survey, so to compensate sample numbers in other areas were adjusted accordingly.

- The Bedouin characteristic of living in small clusters required a great deal of effort from the coordinating staff and NNI to cover the entire sample population (900 HOUSEHOLDS).
- The study was conducted during the academic year so many houses were empty because beneficiaries moved nearer to the schools so their children could attend.

Results

The main findings of the quantitative survey were as follows:

Living conditions: Bedouins live in small clusters of 3-4 households near to each other, and separated from other clusters by about 1-2 km. The mean family size is 5.4. It was found that 71.2% of the surveyed households lived in new houses built from cement blocks, but only 10% had piped water. Although 60% had toilet facilities, most toilets inside the houses were not used. This may be due to shortage of water supply or social habits. The percentage of households with electricity is high (71.7%), but it was provided for only 6-8 hours/day.

Educational attendance: The percentage of children enrolled in schools is 23.8% of the total number of school-age children at. Most attend primary schools. There were very few girls or boys attending higher education, either secondary school or university. This may be due to the large distance between the Bedouins' houses and the schools, and/or the high cost of transportation and educational expenses.

Nutritional and health status of Bedouin children: The anthropometric data of the children aged 2-5 years old revealed that 23.8% had height-for-age z-scores below -2SD to >-3SD; compared to 2.28% estimated for the reference population. Nineteen percent were even below -3SD compared to 0.13% for the reference population. Based on weight-for-age z-score results, 20.6% were underweight (6.4% of those severely so). Wasting (weight-for-height z-score less than -2SD) was prevalent in 6.0% of the children, with 2.0% severely wasted. Forty-three percent of the wasted children were also stunted, reflecting the presence of current, as well as previous long standing malnutrition. In addition, 37.0% were falsely ranked among the normal weight-for-height group when they were actually stunted. The prevalence of anemia (Hb <11gm) was 42.1%. These results indicate that the Bedouin children are severely under-nourished. Vitamin A deficiency indicators (night blindness or Bitôt spots) were present in only 3.3% of the examined children, while 5.4% of them had thyroid enlargement (goiter).

Nutritional and health status of Bedouin mothers: The anthropometric data of mothers revealed that only 38.8% of the mothers had normal BMI, while 32.3% of them were overweight and 20.1% obese. Only around 6.4% were underweight (BMI <18). Nearly 37.0% of those classified as overweight, and 42.0% of those classified as obese, were stunted. This indicates a relative or misleading obesity. In addition, 55.5% of stunted mothers had a BMI >25 (pre-obese or obese). About 39.2% of the examined mothers showed signs of vitamin A deficiency (night blindness and/or Bitôt spots). Nearly 19% of the mothers had grade I goiter, 3.5% had grade II goiter, while 77.7% of mothers had no thyroid enlargement.

Food frequency: Food frequency analysis revealed that the main source of protein was pulses, while animal protein intake was very limited. Milk and milk product intake was very limited (30.8% had no access to milk or milk products, 29.8% consume milk products less than three times/week, while only 20.2% of the households consumed milk or milk products more than three times/week).

Food intake: The analysis of 24 hour food intake of the children and mothers revealed that:

- Only 16.5% of mothers and 15% of children received the recommended daily allowance (RDA) of energy (based on RDAs suggested by FAO/WHO). The study found that 12.3% of the children received less than 50% of the RDA of energy, while 33% received about 50%.
- About half of the Bedouin mothers (57.9%) and a third of their children (30.5%) received the RDA of protein, which was mainly plant, not animal protein.
- Although the caloric intake of the Bedouin mothers was low (the mean energy intake was 81.5% of energy RDA), anthropometric analysis revealed that around 40% had normal BMI, 32.3% were pre-obese and only around 5% were underweight. The cause for this discrepancy could be that the main food sources (bread and oil) of the Bedouins are high in calories, and when food is available the energy intake of the mothers is very high. When food is in short supply, such as at the time of survey, the mothers' energy intake is low.

Dietary analysis: Analysis of the micronutrient intake for mothers revealed that maternal intake of minerals and vitamins didn't meet RDAs, i.e.:

- The majority of mothers consumed less than 50% of the RDA of iron, calcium and iodine.
- Less than half of the mothers received adequate requirements of vitamin E, vitamin C, folic acid, vitamin B1 and potassium. While only 10-20% of mothers received adequate amounts of vitamin A, niacin, zinc, selenium, magnesium and copper.
- Only vitamin B2 intake meets recommended levels in the majority of mothers.

Analysis of micronutrient intake for children revealed marked deficiencies of all vitamins and minerals.

- Almost all the children received less than 50% of the RDA of iodine, zinc, calcium and potassium. Iron is markedly deficient in their diet and mainly of plant origin. Other minerals (magnesium, copper and selenium) were consumed in recommended levels by approximately only half of the children.
- The majority of children didn't receive the RDA of fat soluble vitamins (A and E), while about half received their requirements from water soluble vitamins (vitamin C, folic acid, vitamin B1, B2 and niacin).

The following results were identified through the qualitative research:

The dietary pattern of the Bedouins in Sinai is affected by environmental resources. As water is in short supply, they have a limited number of sheep and other animals, which affects their food intake of animal protein and milk. Their main food item is wheat flour used to make *faracheh* or *lipa* (special forms of Sinai Bedouin bread) which is eaten with tea. Their intake of vegetables and fruit is also very limited (once per week) due to the distance between their homes and food markets, and due to the high cost of fruit and vegetables.

The Bedouin Housing Project has positively affected the nutritional and health status of the Bedouin through the provision of food aid, and affected their social status by helping them change their living patterns from a nomadic existence in search of water and food, to a sedentary lifestyle in comfortable houses with access to water sources.

Bedouins usually live in small clusters formed of a few families, sharing water and food with each other. When the Bedouin Housing Project started, not all Bedouin participated. They worked together, however, to build the houses and dams, so they shared the food aid. This made it difficult to differentiate the nutritional status of beneficiaries and non-beneficiaries, as they lived, worked and shared food aid items with each other.

The food aid is not only given to Bedouin involved in construction, but is also given to men and women who attend training programs. The training programs for men teach construction methods, while those for women cover literacy skills, tailoring and cooking.

Many of the Bedouins who participated in the FGDs, either men or women, complained that the food items supplied by the project were very limited, and that they received only flour, oil and sugar. In past phases of the project WFP was supplying lentils, milk, rice and tea. The women asked that they continue to be supplied with milk as it is essential for the health of their children.

The Bedouins also complained that food aid was not provided regularly, and sometimes only after they had completed the construction work. Also, when rains were insufficient and crop production schedules were affected, the food aid ceased, which exacerbated food shortage problems.

Health services have improved due to the stability of the Bedouins in their new houses, but the number of health centers and health providers is inadequate. There are also shortages of medications and emergency services.

Bedouin women benefit from the project through the literacy, cooking and tailoring classes. They mentioned however, that the sewing machines were unsuitable due to a lack of maintenance services.

The major health problems that affect the Bedouin children are diarrheal diseases and malnutrition, while men and women mainly complain of rheumatic, eye and skin diseases. Iodine deficiency disorders (IDD) affect women and children due the use of non-iodized rock salt. Vitamin A deficiency mainly affects women of childbearing age and elderly women.

Conclusions and Recommendations

- The food analysis results revealed that the Bedouin mothers and their children face severe malnutrition. Urgent intervention is required to improve their nutritional and health status and to prevent malnutrition disorders.
- The Bedouin Housing Project, together with food assistance programs, has had a positive impact on the health and nutritional status of the Bedouin – both beneficiaries and non-beneficiaries.
- Interventions should target deficiencies in both the quantity and quality of food consumed by mothers and children.
- The food aid list should be modified to include food items such as powdered milk, iodized salt and packed fish to increase the consumption of essential elements such as calcium, iodine and zinc.
- Micronutrient supplementation, especially vitamin A and iodine, could help to overcome major nutritional problems affecting women and their children.
- A nutrition education strategy would help to increase the awareness of mothers about healthy diets, especially regarding young children. Education on the nutritional

importance of breastfeeding could help improve the health and nutritional status of infants and young children.

- WFP should review the design of the project to include additional activities, so that beneficiaries continue to receive food assistance throughout drought-affected periods when land cultivation is not possible.

1. Introduction

The Sinai Peninsula is located in the north-east area of Egypt. Its position at the junction of two continents, Africa and Asia, makes it strategically important. Because it has been the site of many hostilities in recent history, the socioeconomic and health status of its population has been greatly affected.

The total population living in both North and South Sinai governorates, an area of 56,000 km^2, does not exceed 500,000. The population density (per km^2) is 10.3 in North Sinai Governorate and 2.1 in South Sinai Governorate. The population density varies within the governorates according to the environmental and economic status.

The Sinai Peninsula has very specific environmental characteristics that affect the living conditions there. Food security is very poor because food production is low. The main cause for this low food production is the unavailability of water. More than 50% of the population of Sinai live in small settlements near water sources - either reliable springs or wells. Bedouins usually live in small clusters of 3-4 households near to each other, and separated from other clusters by about 1-2 km. Because of the severe environmental conditions, they usually migrate from one place to another in search of water and food.

Most of the Bedouins living in Sinai depend on traditional ways of living. They raise goats, sheep and camels, or cultivate date palm and olive trees. Some Bedouins, especially those living near international tourist areas such as Saint Catherines and Sharm El Sheikh, have a better economic income than others.

After the Sinai liberation in 1973, the Government of Egypt initiated the Sinai Longevity Project (SLP) to increase developmental activities there, especially in the field of health and education. The SLP then designed the Bedouin Housing Project, which aims to improve the living conditions of the Bedouins by providing them with new cement block houses, to replace those built from corrugated iron or animal skin, and help them to re-cultivate their lands. Water insufficiency is the main problem for the Bedouins, so the SLP helps them by digging deep wells or assists them to build irrigation dams to collect rain water for farming or to feed animals.

The World Food Programme (WFP) is an arm of the United Nations mandated to fight hunger and malnutrition. WFP partners with the Egyptian Government in the BHP by supplying the Bedouins with food aid while they construct their houses and irrigation dams. This food aid continues for four years while the Bedouins re-cultivate their land and start planting fruit trees. This food aid program is known as “food/man/day” and provides the beneficiaries with a daily food basket of 450gm of wheat flour, 20gm of sugar, 15gm of oil and 45gm of lentils (if available). This is periodically supplemented with milk or rice.

The food and dietary habits in Sinai differ from other areas in Egypt, and are affected mainly by socioeconomic status and food availability. These dietary habits affect both the nutritional and health status of the population. Many nutritional evaluations have been conducted in Upper and Lower Egypt governorates, but health and nutrition studies conducted in Sinai have been limited. In particular children under five years old have not been assessed in recent years. As health and nutrition affect the physical and mental growth of the population in general, and the children in specific, a health and nutrition assessment of children under five will give an indication about the future development and education of this area.

2. Objective of the Study

The objective of the study was to assess the health and nutritional status of Bedouins living in non-urban areas of Sinai. As women and children 2-5 years of age are the most vulnerable groups, the study focuses on their health and nutritional status.

3. Methodology

The study was carried out in four phases:

- Preparatory phase
- Data collection phase
- Data analysis
- Reporting

3.1 Preparatory Phase

During the preparatory phase, all pre-survey arrangements were carried out. Activities completed in the preparatory phase included:

- Communication with various partners and stakeholders; including communication with WFP staff, Sinai Longevity Project staff and MOHP Representatives in North and South Sinai Governorates. The objectives of these communications were to discuss survey goals and expected outcomes, facilitate survey activities including security regulations, enumerate SLP and MOHP personnel participating in the survey, and to discuss the implementation schedules.
- Design and review of the questionnaires
- Preparation of all survey tools, including measurement tools, blood test instruments, etc.
- Training of the field workers to ensure complete uniformity and standardization of technique employed in collecting and recording of data. The training programs were carried out at the NNI and at the Directorates of MOHP in El Arish city (North Sinai Governorate) and in Saint Catherines (South Sinai Governorate). This included:
    - Training of NNI social workers.
    - Training of NNI dietitians.
    - Training of NNI lab technicians.
    - Training of Sinai health staff in North and South Sinai.

Training of NNI staff

3.2 Data Collection Phase

Collection of quantitative and qualitative data.

3.2.1 Quantitative Research

Questionnaires for 900 households were completed. The questionnaires included social, nutritional, and medical information (see Annex). Four teams of researchers were formed, each consisting of two social workers (one from NNI and the other from the local health sector), two dieticians from NNI, one doctor and one nurse from the health sector, together with two coordinators from the health sector and the SLP. The four teams were directed to their field area under the supervision of the Field Coordinator and the two team leaders, with the help of the Deputy Director of SLP in South and North Sinai Governorates.

All households with children aged from 2-5 years, (461 households in total), were subjected to 24 hour food recall for the mothers and their children.

Data collection by NNI staff

Hemoglobin studies were conducted in the field on 200 children aged 2-5 years using BMS-hemoglobinometer (Model 10-101) apparatus.

Conducting Hb tests in the field

3.2.2 Qualitative Research

The qualitative research included in-depth interviews and focus group discussions (FGD). Ten in-depth interviews were conducted with key stakeholders – namely the directors of the Sinai Longevity Project, directors of the health sector in Sinai, and Bedouin community leaders. The duration of each interview ranged from 30-60 minutes.

Eight FGDs were conducted with female and male Bedouin (6-8 participants per group) in Saint Catherines, Rafah, El Hasana and Seder El Hetan areas; and with health providers from South and North Sinai governorates. FGDs lasted from 45-70 minutes.

The qualitative research was conducted by the field coordinator (qualitative research consultant) with the help of a note-taker and local coordinators from SLP.

3.3 Data Analysis and Reporting

Data analysis and reporting was conducted by NNI staff. Data analysis staff, with help from a statistical consultant, analyzed the questionnaires, studied the results, and prepared the final report under the supervision of the Principle Investigator.

Statistical analysis was carried out using SPSS - version 11, and Harvard Graphics package. Qualitative data were summarized as percentages, while quantitative data were summarized as means, standard deviations, and confidence intervals. Linear regression models using a stepwise approach were used to test the effect of different socio-environmental parameters on the health status of Bedouin mothers and children. Tables show the following parameters:

R2 coefficient is a measurement of fit of a particular model. Beta is the slope of the regression line when both (Y and X) are expressed as Z-scores (the standardized regression coefficient). T-statistics and 2-tailed observed significance levels are used to test the hypothesis that there is no relationship between X and Y. Constant value is the intercept value; the theoretical estimate of Y when X=zero.

F value relates the variability in the dependent variable due to regression to that not attributed to regression (residual). If the F value is small, the model fits the data well.

4. Sampling Methods

4.1 Sample Frame and Sample Units

This study targeted the Bedouin population in South and North Sinai Governorates. The sample frame was composed of households, and sample units were mothers and their children aged 2-5 years old.

Anthropometric as well as dietary assessments were conducted for mothers and their children using *Metro* scales and a stadiometer for weight and height measurements respectively. The 24 hour recall method was used for recording food intake on the day prior to the survey.

4.2 Study Setting

This study was implemented in non-urban areas surrounding five main cities in Sinai. In South Sinai Governorate the sample covered two main areas, namely Saint Catherines and Sedr El Hetan. In North Sinai Governorate the sample covered three main areas; Al-Hasana in the central area, Rafah in the north and Nekhel in the south.

4.3 Sample Size

As there was no accurate data about the exact number of households in these areas, and also due to the Bedouins' nomadic lifestyle, it was very difficult to calculate the exact sample that should be taken from each site. For a population of 10,000 people and above, the sample size can be calculated from the following equation:

$$n = Z^2 pq/d^2$$

where n is the described sample size, Z is 1.96, which corresponds to 95% confidence level,

P is the estimation prevalence of a health indicator disorder set at 50% (as there is no baseline data on Bedouins' health status), and q is 1-p.

The relative precision (d^2) is usually 10%.

The result is 384, which is usually rounded to 450 to give a safety margin. In case of cluster sampling, this figure is increased to 900 (doubled) to counteract the clustering effect. If separate estimates are needed, one should account for subgroups, and therefore each subgroup must be treated as a separate universe. In the case of this baseline survey, no further subgroups (religion, region etc.) were included.

4.4 Sample Procedure

This was a two-stage approach; the first stage involved the selection of cities, and the second stage involved selection of household clusters. For reasons mentioned above, when insufficient numbers were found, mothers and their two to five year old children, were examined in each cluster. A total of 900 mothers and 517 children were assessed. A total of 40 clusters were included.

The overall sample was 900 selected households: 321 in South Sinai and 579 in North Sinai (Table 1). The sample size details among the selected sites are illustrated in Tables 2 and 3. The total number of sites involved in the study was 47; 23 sites in South Sinai and 24 sites in North Sinai.

Table 1. Sample size of Bedouin households in North and South Sinai Governorates

Governorate	City	Sample Size	Total
South Sinai	Sedr El Hetan	53	321
	Saint Catherines	268	
North Sinai	Al Hasana	282	579
	Rafah	220	
	Nekel	77	
Grand Total			900

Table 2. Sample size of Bedouin households in South Sinai Governorate by community

City	Area	Sample Size
Sedr El Hetan	Ain Sedr	28
	Wadi Al Haj	25
Total		53
Saint Catherines	Malaka	23
	Shamya	8
	Abo Sila	17
	Wadi Al Raha	14
	Sheikh Awad	24
	Al Tarfa	34
	Al Esbaia	39
	Al Nabi-Saleh	11
	Al Frenga	12
	Wadi Al Shugirat	4
	Wadi Al Ashleaj	5
	Wadi Al Kharazin	9
	Al Marwa	23
	Sheikh Mohsein	4
	El Watia	2
	El Moada	4
	El Zaitona	7
	El Orogia	11
	Joja	7
	Om El Mogirat	7
	Olwayat	3
Total		268
Grand Total		321

Table 3. Sample size of Bedouin households in North Sinai Governorate by community

	Area	Sample size
Al Hasana	Al Gifjafa	25
	Tamada	4
	Al monshasah	2
	Wadi Abo-swera	1
	Al Brook	2
	Hasana	20
	Om shihan	31
	Al Hesan	18
	Al Qusayema	59
	Al Jayfa	29
	Al Monbateh	81
	Al Hessiat	13
Total		282
Rafah	Salah Al-Din village	53
	Al Bersh village	47
	Al Zohyrat	32
	Al Zaheer village	14
	Abo Al Erag village	21
	Al Barayet village	9
	Al Malafia village	14
	Abo Mosafes village	30
Total		220
Nekhel	Bir 7	18
	Nekhel	49
	Bir Graid	1
	Al Braid	9
Total		77
Grand Total		579

4.5 Geographic Area of the Survey

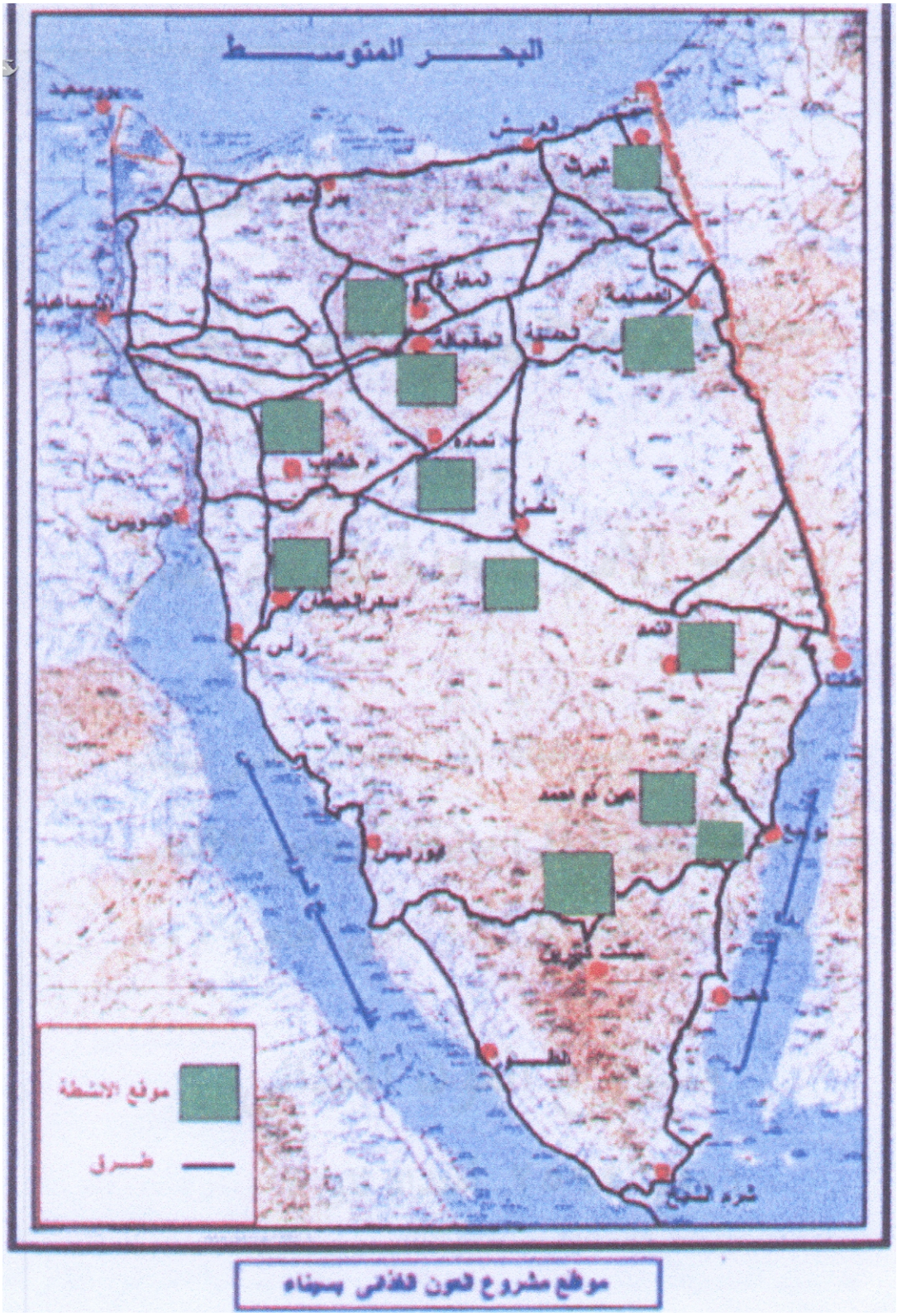


Figure 1. Geographic locations where the survey was conducted

5. Quantitative Results

5.1 General Characteristics of the Household Population

5.1.1 Population Distribution

Table 4 presents the percentage distribution of total household population by age and gender. The data indicates that:

- The mean family size is 5.4 persons
- More than half (58.2%) of the households had one or two children less than 5 years old.
- Less than half (46.2%) of the households had one or two children aged from 5 - <11 years.
- Eighty percent of the households had one adult male member and 84.4% had one female adult member.

Table 4. Distribution of the Bedouin household population age group and gender

Age group / No of Individuals	< 5 y		5 - < 11y		11 - <18y		Male adults >18 y		Female adults >18 y		Total	
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
0	304	33.8	404	44.9	563	62.6	51	5.7	6	0.7	-	-
1	273	30.3	238	26.4	137	15.2	720	80.0	760	84.4	-	-
2	251	27.9	178	19.8	107	11.9	63	7.0	73	8.1	-	-
3	63	7.0	56	6.2	60	6.7	40	4.4	31	3.4	-	-
4	8	0.9	20	2.2	16	1.8	17	1.9	20	2.2	-	-
5			1	0.1	13	1.4	8	0.9	6	0.7	-	-
6	1	0.1	1	0.1	4	0.4	1	0.1	2	0.2	-	-
7	-	-	2	0.2	-	-	-	-	1	0.1	-	
8	-	-	-	-	-	-	-	-	1	0.1	-	-
Total No. of persons	1002	20.6	867	17.8	684	14.0	1080	22.2	1232	25.4	4865	100
Mean family size											5.4	

5.1.2 Education of the Household Population

Tables 5 and 6 illustrate data on the educational level of household members. The overall number of males who attended different levels of education (584) was higher than that for females (338). The data also indicates that as the number of children per household increases, the likelihood of those children attaining higher education decreases.

Table 5. Educational level of surveyed Bedouin males

Educational Level / No. of children	Primary		Preparatory		Secondary		University		Total	
	No.	**%**	**No.**	**%**	**No.**	**%**	**No.**	**%**	**No.**	**%**
0	576	64.0	782	86.9	861	95.7	896	99.6	-	-
1	261	29.0	101	11.2	36	4.0	2	0.2	-	-
2	52	5.8	16	1.8	3	0.3	2	0.2	-	-
3	9	1.0	1	0.1	-	-	-	-	-	-
4	2	0.2	-	-	-	-	-	-	-	-
Total No. of males	400	68.5	136	23.3	42	7.2	6	1.0	584	100

Table 6. Educational level of surveyed Bedouin females

Educational Level / No. of children	Primary		Preparatory		Secondary		University		Total	
	No.	**%**	**No.**	**%**	**No.**	**%**	**No.**	**%**	**No.**	**%**
0	702	78.0	829	92.1	884	98.2	898	99.8	-	-
1	167	18.6	62	6.9	10	1.1	2	0.2	-	-
2	29	3.2	6	0.7	6	0.7	-	-	-	-
3	2	0.2	3	0.3	-	-	-	-	-	-
4	-	-	-	-	-	-	-	-	-	-
Total No. of females	231	68.3	83	24.6	22	6.5	2	0.6	338	100

The above tables indicate that the number of children attending schools was very limited (338 females + 584 males out of 3,863 school-age children). This equates to 23.8% of school-age children attending school. In addition, the percentage of children attending secondary or university education was extremely small. This could be due to the long distances between the Bedouins' homes and the schools, and/or the cost of education and transportation.

5.1.3 Housing Characteristics

Table 7. Housing characteristics of surveyed Bedouins

Characteristics		No.	%
Building material	block	641	71.2
	arbor	185	20.6
	other	74	8.2
	Total	900	100.0
Flooring	tile	169	18.8
	cement	232	25.8
	earth	499	55.4
	Total	900	100.0
Source of drinking water	tap	94	10.4
	water pump	98	10.9
	other	708	78.7
	Total	900	100.0
Electricity	yes	645	71.7
	no	255	28.3
	Total	900	100.0
Source of fuel	electricity	9	1.0
	gas	458	50.9
	cooking stove	182	20.2
	other	251	27.9
	Total	900	100.0
Toilet facility	yes	540	60
	no	360	40
	Total	900	100.0
Persons per sleeping room	< 2	420	46.7
	2 - 3	356	39.6
	≥ 4	124	13.8
	Total	900	100.0

Table 7 presents the number and percent of households by selected housing characteristics, such as building material, flooring, source of drinking water, electricity, source of fuel, toilet

facility and crowding index. These indicators are important to determine the socio-economic status of the household population.

Building material of the houses: The results revealed that there were 641 cement block houses, which represent 71.2% of the total sample. This high percentage is mainly due to the effectiveness of the Bedouin housing project, together with the support of WFP, to develop the Bedouin population.

Flooring: Around half (55.4%) of the houses have earth floors. Cement floors are present in 25.8% of houses, while only 18.8% of the houses have tiled floors.

Source of drinking water: Among the studied population around 80% of the households have cement or metal water containers and *haraba* (underground cement water tanks). However, only 10% of the households have access to piped water, while another 10% obtain drinking water from water pumps.

Electricity: The percentage of households with electricity is 71.7%. However, around 28% of the sample population has no access to electricity, which is due to the large distances between houses. Most Bedouin communities have electricity for a few hours every day (8 hours/day on average).

Source of fuel: Gas represents the most popular fuel used by around half of the households surveyed (50.9%). However, 20.2% of the households use cooking stoves with wood as the source of fuel.

Toilet facilities: The results indicated that 60% of households have toilet facilities inside the dwellings, although they differ in type between households. The study team observed, however, that a limited number of Bedouins use the toilet facilities inside the home – preferring to defecate outside, far from the house. The two main reasons for this are traditional habits and the lack of water to clean toilets after use.

Crowding index: Information about the number of persons per sleeping room was collected in order to provide a measure of crowding (crowding index). About half of the households have less than two persons per room, while only 13.8% of the households have four persons or more per room.

5.1.4 Household Possessions and Economic Levels

Table 8 provides information on household ownership of various possessions and property. The data on house ownership indicates that nine in ten households own their home, while only 6.9% are living in rented houses. About four out of ten households own farm land and seven in ten households own farm animals. Only 11.8% of the households own private cars.

Table 8. Household possessions

Possession		No.	%	Total
House	owned	797	88.6	900
	partially owned	41	4.6	
	rented	62	6.9	
Farm land	yes	361	40.1	900
	no	539	59.9	
Private car	yes	106	11.8	900
	no	794	88.2	
Farm animals	yes	647	71.9	900
	no	253	28.1	

5.2 Nutritional and Health Assessments

5.2.1 Nutritional Status of Bedouin Children (aged 2-5 yrs)

Anthropometric assessment of Bedouin children

As the difference is especially broad at the severe malnutrition cut-off between the WHO method (Z-scores) and percent of median methods (Gomez or Road-to-Health; RTH classification systems), it is important to use the same system to analyze and present data. The WHO method is the most widely used system. Accordingly, 23.8% of the children had height-for-age z-scores below -2 SD to >-3 SD; compared to 2.28% estimated for the reference population. Nineteen percent were below -3 SD compared to 0.13% for the reference population. Based on weight-for-age z-score results, 20.6% were underweight – 6.4% to a severe degree. The percentage of wasted children (weight-for-height z-score less than - 2 SD) was 6.0%, with 2.0% severely wasted.

Table 9. Distribution of Bedouin children according to height-for-age, weight-for-age, and weight-for-height z-scores*

Variable	Z-Score						TOTAL
	≤ - 4 SD **	>-4 SD to <-3 SD ***	>-3 SD to <-2 SD ***	± 2SD	> 2 SD to < 3 SD	≥3 SD	No. **** %
Height-for-age	19 3.7%	78 15.4%	120 23.8%	296 %٦.٥٨	4 0.8%	7 1.4%	505 100.0
Weight-for-age	4 0.8%	28 5.6%	72 14.2%	399 79.0%	6 1.2%	0 0.0%	505 100.0
Weight-for-height	0 0.0%	11 2.2%	19 3.8%	444 87.9%	27 5.0%	4 0.8%	505 100.0

* According to CDC/WHO (1990): Division of Nutrition, Center for Disease Control in Collaboration with the Nutrition Unit, WHO. Version 1.01 ** At less than 60% of the median, the closest corresponding Z-score is -4 SD or less (Gomez classification; which was widely used in the 1960s and 1970s and is a typically used weight-for-age measurement). *** In a normally distributed population (the reference population), by definition, 2.28% of the children would be below -2 SD to > -3 SD and 0.13% would be below -3 SD (a cut-off reflective of a severe condition) (WHO classification). **** Twelve cases were excluded because they were flagged by the program.

Table 10 shows that out of 30 wasted children, 43.0% were also stunted, reflecting the presence of current, as well as previous long standing malnutrition. In addition, 37.0% were falsely ranked among the normal weight-for-height group while they were stunted. Of the obese group, 61.0% were stunted. The weight-for-height indicator should therefore not be used alone to assess nutritional status, particularly among populations expected to suffer from malnutrition such as the Bedouin. When height-for-age indicators are in the normal range, it is more likely that distribution curves of other anthropometric indicators will follow the normal Gaussian distribution. Re-evaluation of Bedouin children with normal height-for-age z-scores shows that 90.0% of them also had normal weight-for-height z-scores, while 6.0% were wasted and 4.0% were overweight or obese.

Table 10. Categorization of Bedouin children according to both height-for-age and weight-for-height z-scores

Height-for-age categories	Weight-for-height Categories			Total
	Wasted Col%	Normal Col%	Overweight/obese Col%	
Stunted Total	١٣ 43.0	166 37.0	19 61.0	198 39.0%
>-3 SD to <-2 SD	7	١٠٢	٩	
>-4 SD to <-3 SD	3	٤٩	٧	
≤-4 SD	3	١٥	٣	
Normal	17 57.0%	٢٦٧ 60.0	12 39.0	296 59.0%
Tall Total	0	11 3.0	0 0.0	11 2.0%
>2 SD to <3 SD	0	٤	0	
3 SD to <4 SD	٠	٤	٠	
≥4 SD	٠	٣	٠	
Total row%	30 5.5%	444 87.9%	31 6.6%	505 100.0%

Table 11. Distribution of Bedouin children according to percentiles of mid upper arm circumference (MUAC)

MUAC Percentiles						Total	
Malnourished		Normal		Obese			
<5th		5th - < 95th		≥ 95Th			
No.	%	No.	%	No.	%	No.	%
166	32.1	349	67.5	2	0.4	517	100.0

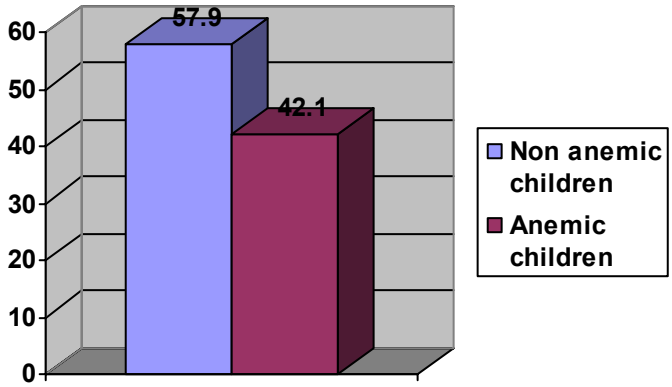
Anemia among Bedouin children

Hb testing was performed to a sub-sample of 190 children aged 2-5 years. The prevalence of anemia (Hemoglobin concentration <11gm%) was 42.1% (see Table 12 and Figure 2).

Table 12. Prevalence of anemia among Bedouin children

	Hb level	No.	%
Non-anemic	≥11gm%	110	57.9
Anemic	<11gm%	80	42.1
Total		190 children	

Figure 2. Prevalence of anemia among Bedouin children



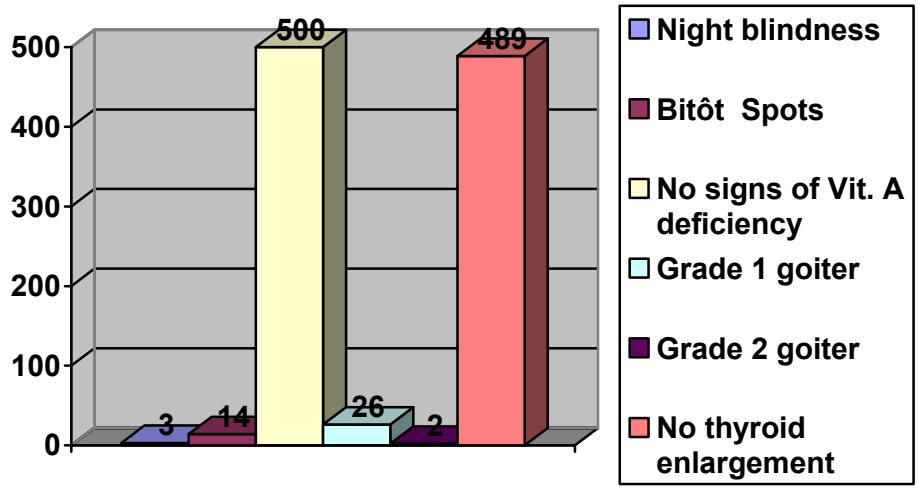
Vitamin A deficiency signs and goiter rates in Bedouin children

Table 13 indicates the signs of vitamin A deficiency. Night blindness was prevalent in 0.6% and Bitôt spots were prevalent in 2.7% of the surveyed children. Regarding the prevalence of goiter; only 5.4% of children were affected, with percentages of 5.0% and 0.4% for grades (1) and (2) respectively.

Table 13. Distribution of Bedouin children according to vitamin A deficiency signs and goiter rates

Variable		No.	%
Vitamin A deficiency signs	Night blindness	3	0.6%
	Bitôt Spots	14	2.7%
	No signs of Vit. A def	500	96.7%
Goiter	Grade 1 goiter	26	5.0%
	Grade 2 goiter	2	0.4%
	No thyroid enlargement	489	94.6%

Figure 3. Percentage distribution of Bedouin children according to vitamin A deficiency signs and goiter rates



Morbidity history of Bedouin children

The morbidity of Bedouin children in the month prior to the survey was assessed. The survey was conducted in November and December, i.e in the winter season.

Table 14 shows that diarrhea and vomiting were present in 21.1% of the children, with 4.6% of them having more than four episodes. About 40% of these children had vomiting and diarrheal attacks for more than four days. These figures indicate a high incidence of gastroenteritis attacks, even during winter, which affects the health and nutritional status of young children and predisposes them to severe malnutrition.

Upper respiratory diseases were present in 54.7% of children, with multiple episodes (4-10) in 4.6%. Prolonged duration of these diseases (4-8 days) occurred in 61.1% of cases. Lower respiratory diseases were present in 26.5% of children, with multiple episodes (4-8) in only 0.7%. Prolonged duration occurred in 65.0% of cases.

Fever attacks were present in 39.3% of children, with multiple episodes (4-8) in only 4.9%. Prolonged duration (4-8 days) occurred in 24.6% of cases.

Seven cases of measles were recorded, which represents 1.4% of the children.

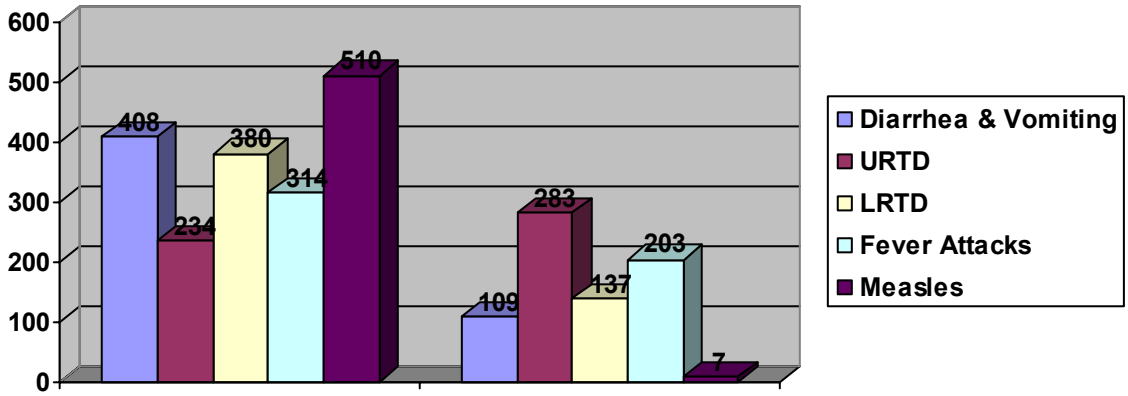
These data indicate that the prevalence of infectious diseases among Bedouin children is very high. Lower immunity due to severe malnutrition could be the cause for prolonged morbidity.

Table 14. Percent distribution of Bedouin children according to morbidity in month prior to the survey

Variable	Morbidity in month prior to survey		No. of episodes		Duration (days)		No morbidity in month prior		Total
	No.	%	1-<4	4-8	1-<4	4-8	No.	%	
Diarrhea and Vomiting	109	21.1%	104 78.9%	5 4.6%	66 60.6%	43 39.4%	408	78.9%	517
URTD*	283	54.7%	270 95.4%	13 4.6%	110 38.9%	173 61.1%	234	45.3%	517
LRTI**	137	26.5%	136 99.3%	1 0.7%	48 35.0%	89 65.0%	380	73.5%	517
Fever Attacks	203	39.3%	193 95.1%	10 4.9%	153 75.4%	50 24.6%	314	60.7%	517
Measles	7	1.4%	7 100%	0	1 14.3%	6 85.7%	510	98.6%	517

* URTI = Upper respiratory tract infections. ** LRTI = Lower respiratory tract infections.

Figure 4. Percentage distribution of Bedouin children according to recent morbidity



Vaccination and breastfeeding practices of Bedouin children

The results of this study revealed that only 88.4% of children were regularly vaccinated. The long distance between the Bedouins' houses and the health centers is one of the main causes for irregular vaccinations. Also, some of the mothers complained that sometimes the vaccines were not available. Oral polio vaccines were widely administered due to mobile polio campaigns where house visits are conducted to vaccinate children.

It was found that 20.1% of children had not received vitamin A supplementation (see Table 15), while 16.8% of the children received only one dose of vitamin A.

Table 15. Percentage distribution of children in relation to vaccination and breastfeeding practices

Variable		No.	%
Vaccination	Yes	457	88.4%
	No	22	4.3%
	Not regular	38	7.3%
Vitamin A dose	No Vitamin A supplementation	104	20.1%
	One dose	87	16.8%
	Two doses	326	63.1%
Duration of breastfeeding	< 6 mo	41	7.9%
	6-12	19	3.7%
	12-18	55	10.6%
	18-24	169	32.7%
	24-36	216	41.8%
	36+	17	3.3%
Complementary feeding	< 6 mo	185	35.8%
	6-12	301	58.2%
	12-18	24	4.6%
	18-24	3	0.6%
	24-36	3	0.6%
	36+	1	0.2%

The analysis of breastfeeding practices revealed that about half of the children (41.8%) breastfed for around 24 months, about a third of them (32.7%) breastfed for 18 months, while only 14.3% breastfed less than one year.

About one third of the children (35.8%) started complementary feeding before six months, which is not recommended by WHO/UNICEF, while the majority started complementary feeding after six months.

5.2.2 Nutritional Status of Bedouin Mothers

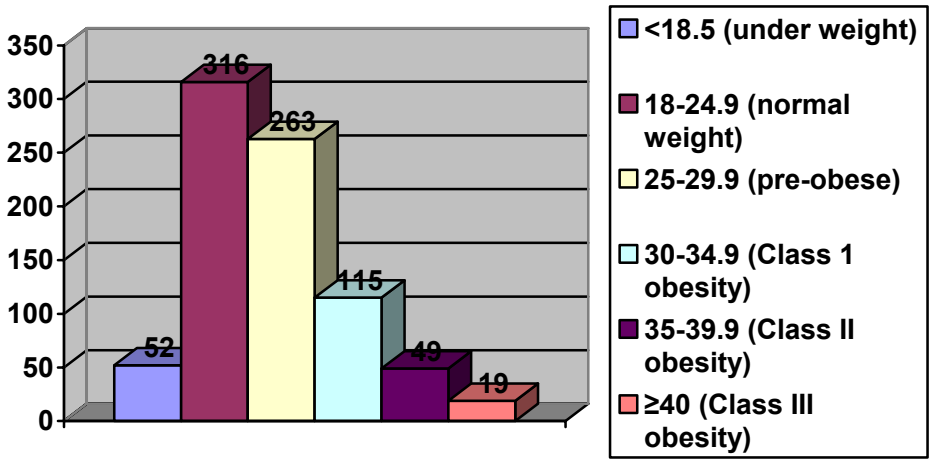
Anthropometric assessment of Bedouin mothers

Table 16 shows the body mass index (BMI) of mothers. Almost 40% were in the normal BMI range, while 32.2% were pre-obese (BMI: 25-29.9), and 22.4% were obese to varying degrees; 14.1% (BMI: 30-34.9), 6.0% (BMI: 35-39.9) and 2.3% (BMI: ≥ 40). Only 6.4% of mothers were classified as underweight.

Table 16. Percentage distribution of non-pregnant Bedouin mothers according to body mass index (BMI)

BMI classes	No.	%
<18.5 (under weight)	52	6.4%
18-24.9 (normal weight)	316	38.8%
25-29.9 (pre-obese)	263	32.3%
30-34.9 (Class I obesity)	115	14.1%
35-39.9 (Class II obesity)	49	6.0%
≥40 (Class III obesity)	19	2.3%
TOTAL	814	99.9%

Figure 5. Percentage distribution of non-pregnant Bedouin mothers according to body mass index (BMI)



Redistribution of non-pregnant Bedouin mothers was conducted using the standard curve for height-for-age of females at the age of 18 years to exclude those with relative overweight or obesity because of short stature or stunting. Table 17 shows this distribution.

Table 17.Percentage distribution of non-pregnant Bedouin mothers according to height-for-age and body mass index (BMI) parameters

Height-for-age	BMI Categories				Total
	Underweight row% col.%	Normal row% col.%	Overweight row% col.%	Obese row% col.%	row% col.%
< -2SD	6.1% 21 40.4%	38.4% 132 37.2%	31.4% 108 36.7%	24.1% 83 41.7%	100.0% 344 38.2%
+2SD	5.4% 30 57.7%	39.9% 220 62.0%	33.7% 186 63.3%	21.0% 116 58.3%	100.0% 552 61.3%
≥2SD	33.3% 1 1.9%	66.7% 3 0.8%			100.0% 4 0.5%
Total	5.8% 52 100.0%	39.4% 355 100.0%	32.7% 294 100.0%	14.0% 199 100.0%	100.0% 900 100.0%

Table 17 shows that nearly 37.0% of those classified as overweight and 42.0% of obese mothers were stunted, meaning that their obesity was relative or misleading. In addition, 55.5% of stunted mothers had BMI > 25 (pre-obese) or obese.

Vitamin A deficiency signs and goiter rates in Bedouin mothers

Table 18 illustrates signs of vitamin A deficiency among mothers. Night blindness exists in 13.6% of mothers while Bitôt spots exist in 25.6%. Regarding iodine deficiency disorders, goiter is present in 22.3% of mothers, with percentages of 18.8% and 3.5% for grades (1) and (2) respectively.

Table 18. Percentage distribution of mothers according to Vitamin A deficiency signs and goiter rates

Variable		No.	%
Vitamin A deficiency signs	Night blindness	122	13.6%
	Bitôt spots	230	25.6%
	No signs of Vitamin A deficiency	620	68.9%
Goiter	Grade 1 goiter	169	18.8%
	Grade 2 goiter	32	3.5%
	No thyroid enlargement	699	77.7%

Figure 6. Percentage distribution of Bedouin mothers according to prevalence of goiter

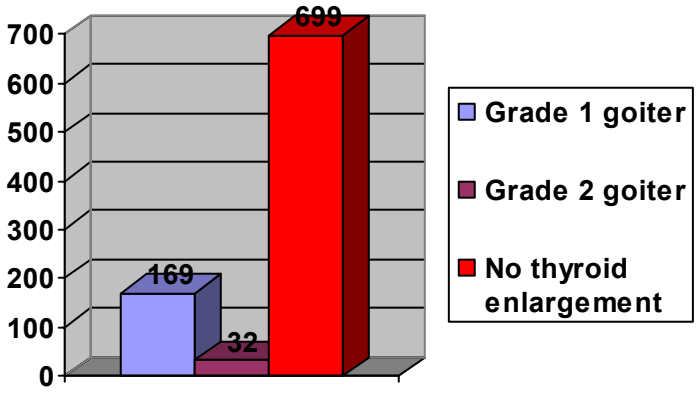
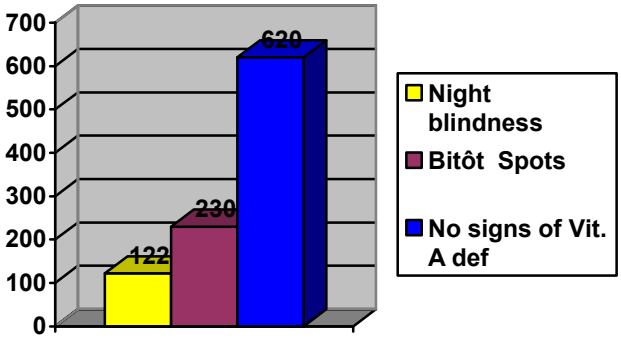


Figure 7. Percentage distribution of Bedouin mothers according to prevalence of vitamin A deficiency signs



5.3 Food Frequency

Table 19 shows the distribution of households by frequency intake of different food items.

Energy Providing Food: In terms of energy sources from food, 97.9% of the total sample consumed bread more than three times weekly, compared with 0.3% who consumed bread more than three times per month. Cereals and tubers were consumed more than three times weekly by 59.5% of households, while 28.3% consumed these items less than three times weekly. The majority of households (98.4%) consumed sugars more than three times weekly, with 0.4% consuming sugars less than three times weekly.

Fats and Oils: Almost no households consumed butter (99.0%) or ghee (94.0%). Of those that did, very few consumed these products more than three times weekly (0.9% and 2.0% respectively). Table 19a illustrates that 23.9% of households consumed hydrogenated oils more than three times per week, while 32.7% consumed it less than three times weekly. About 42% of households did not consume this food item at all. About 95% of households consumed vegetable oil more than three times weekly. The majority of households (72.3%) did not consume tahina. Around 10% ate it less than three times per week, while 19.1% ate it less than three times per month.

Tissue-building Food: As shown, 58.1% of households ate meat less than three times monthly, compared with 4.5% that consumed it more than three times monthly. Eighteen percent ate meat less than three times per week. The majority of households (88.9%) did not eat liver. About 9% of households consumed liver less than three times monthly. Chicken was consumed less than three times monthly by 58.9% of total households. About a fifth of the households (19.0%) did not consume chicken at all. Around half of the households (51.5%) ate fish less than three times monthly, about one third (31.8%) did not consume fish, and 12.4% ate fish less than three times per week. About 42.9% of households consumed eggs less than three times weekly. Almost 20% ate no eggs. Most households (78.2%) depended on pulses for food, eating them more than three times a week.

Milk Products: About one third of households (30.8%) had no milk products in their diet. Almost 30% had milk less than three times weekly, compared with 20.2% who had milk more than three times per week.

Food Rich in Vitamins and Minerals: Fresh vegetables were consumed less than three times per week by 64.7% of households, while 31.1% consumed them more than three times weekly. Fresh fruit is rich in vitamin A, however, 46.8% of households ate no fruit, 39.3% ate fruit less than three times per week, and 10.7% ate fruit more than three times weekly.

Beverages: Tea is widely consumed among the surveyed households, with 98.0% taking tea more than three times weekly. Almost 70% of households had no coffee, while 15.5% took it less than three times a week. As shown in the table, 88.9% of households did not consume karcade, 95.8% did not consume carbonated drinks, and 82.6% did not consume juices.

Table 19a. Frequency distribution of Bedouin households by consumption of different food and beverage items

Food Items		Weekly intake						Monthly intake						Rarely	
		< 3		≥ 3		Total		< 3		≥ 3		Total			
		No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
Energy Poviding Food	Breads	2	0.2	881	97.9	883	98.1	5	0.6	3	0.3	8	0.9	9	1.0
	Cereals	255	28.3	536	59.5	791	87.9	79	8.8	4	0.4	83	9.2	26	2.9
	Sugars	4	0.4	886	98.4	890	98.9	-	-	1	0.1	1	0.1	9	1.0
	Halawa Tehnia	137	15.2	22	2.4	159	17.7	174	19.3	13	1.4	187	20.8	554	61.5
	Molasses	91	10.1	27	3.0	118	13.1	183	20.3	20	2.2	203	22.6	579	64.3
Fats and Oils	Butter	1	0.11	8	0.88	9	1.0	-	-	-	-	-	-	891	99
	Ghee	16	1.8	18	2.0	34	3.8	19	2.1	1	0.1	20	2.2	846	94
	Hydrogenated Oils (Palm Oil)	294	32.7	215	23.9	509	56.6	10	1.1	1	0.1	11	1.2	380	42.2
	Vegetable Oil	19	2.1	856	95.1	875	97.2	3	0.3	1	0.1	4	0.4	21	2.3
	Tahina	87	9.7	9	1.0	96	10.7	142	19.1	11	1.2	153	17.0	651	72.3
Tissue-building Food	Meat	162	18.0	4	0.4	166	18.4	523	58.1	41	4.5	564	62.7	170	18.9
	Liver	9	1.0	-	-	9	1.0	83	9.2	8	0.9	91	10.1	800	88.9
	Chicken	158	17.6	2	0.2	160	17.8	530	58.9	39	4.3	569	63.2	171	19.0
	Fish	112	12.4	6	0.7	118	13.1	464	51.5	32	3.5	496	55.1	286	31.8
	Eggs	386	42.9	159	17.7	545	60.5	150	16.7	28	3.1	178	19.8	177	19.7
	Pulses	142	15.8	704	78.2	846	94.0	19	2.1	1	0.1	20	2.2	34	3.8
Milk products	Milk	268	29.8	182	20.2	450	50.0	140	15.5	33	3.7	173	19.2	277	30.8

Table 19b. Frequency distribution of Bedouin households by consumption of different food and beverage items (cont.)

Food Items		Weekly intake						Monthly intake						Rarely	
		< 3		≥ 3		Total		< 3		≥ 3		Total			
		No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
Food Rich in Viatmins and Minerals	Fresh vegetables	582	64.7	280	31.1	862	95.8	31	3.4	6	0.7	37	4.1	1	0.1
	Fresh fruit (rich in vitamin A)	354	39.3	96	10.7	450	50.0	19	2.1	10	1.1	29	3.2	421	46.8
	Fruits rich in calcium	524	58.2	71	7.9	595	66.1	163	18.1	22	2.4	185	20.6	120	13.3
Beverages	Tea	11	1.2	882	98.0	893	99.2	2	0.2	1	0.1	3	0.3	4	0.4
	Coffee	140	15.5	77	8.5	217	24.1	51	5.7	3	0.3	54	6.0	629	69.9
	Karcade	42	4.7	5	0.5	47	5.2	50	5.6	3	0.3	53	5.9	800	88.9
	Fenugreek (Helba)	77	8.6	10	1.1	87.0	9.7	69	7.7	4	0.4	73	8.1	740	82.2
	Carbonated drinks	19	2.1	4	0.4	23	2.5	14	1.6	1	0.1	15	1.7	862	95.8
	Juices	100	11.1	20	2.2	120	13.3	35	3.9	2	0.2	37	4.1	743	82.6

5.4 Food Intake of Bedouin Mothers

5.4.1 Macronutrient Intake of Bedouin Mothers

Table 20 below indicates the following:

Energy intake: The mean values of energy intake were found to be 1702 ± 527.3 Kcal/day for mothers, which represents 81.5% of the recommended daily allowance (RDA)[1] of energy. It has been documented that when energy intake is low, the intake of many other nutrients will also be low (Weaver et al, 1996).

Protein intake: The mean value of total protein intake by mothers was 55.4 ± 19.3 gm/day. From a nutritional point of view, this value can be considered satisfactory for mothers according to RDAs. The results showed that the majority of protein consumption was from plant sources at 48.8 ± 16.4 gm/day, compared with 6.6 ± 11.8 gm from animal origin. The main source of plant protein is from bread, which is consumed daily by almost 100% of the total sample according to the food frequency results. The data showed a low consumption of animal foods such as meat, poultry, fish, eggs, milk and dairy products.

Fat and carbohydrates: The mean total fat intake of the sample was 38.7 ± 23.8 gm/day. Mean animal fat intake of the total sample was 6.6 ± 11.5 gm/day compared with 32.04 ± 18.3 gm/day of plant fat. Mean carbohydrate intake of the sample was 272 ± 84.4 gm/day. The carbohydrate portion of the diet is totally derived from plant sources.

Table 20. Mean per caput energy and macronutrient daily intake of Bedouin mothers

Variables	Total (n=461)		% of RDA
	Mean	SD	
Energy (Kcal)	1702 ± 527.3		81.5%
Animal Protein (gm)	6.6 ± 11.8		
Plant Protein (gm)	48.8 ± 16.4		
Total Protein (gm)	55.4 ±19.3		115.4%
Animal Fat (gm)	6.6 ± 11.5		
Plant Fat (gm)	32.04 ± 18.3		
Total Fat (gm)	38.7 ± 23.8		66.4%
Carbohydrates (gm)	272 ± 84.4		86.4%

[1] Recommended daily allowances (RDA) mentioned throughout the report refer to those provided by FAO/WHO in 1989, 2000 and 2002.

Figure 8. Mean ± SD per caput macronutrient intake of Bedouin mothers

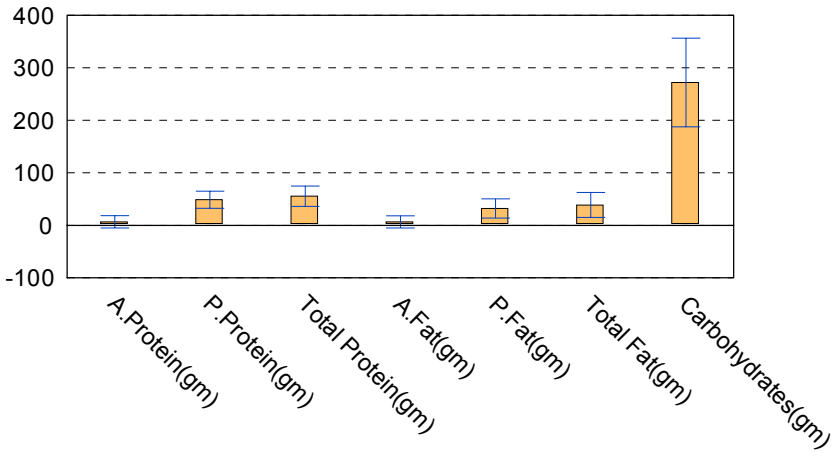


Table 21 shows that less than one fifth of mothers (16.5%) had their full energy requirements met (≥100% RDA). Almost 11% of mothers received <50% RDA of energy, while 72.7% received 50 - 75%. These results show that most of the mothers surveyed suffer from energy inadequacy, which is reflected in their nutritional status.

Table 21 also indicates the distribution of mothers by dietary adequacy of total protein. Nearly 58% of the sample consumed ≥100% RDA of protein, while 40.1% consumed 50 - 75%. Two percent of mothers got <50% RDA of total protein. Bread supplies most of the protein requirements for adults, which complies with the findings of the NNI Survey of Food Consumption Patterns in Egypt (1998).

Table 21. Distribution of Bedouin mothers by dietary adequacy of energy and total protein

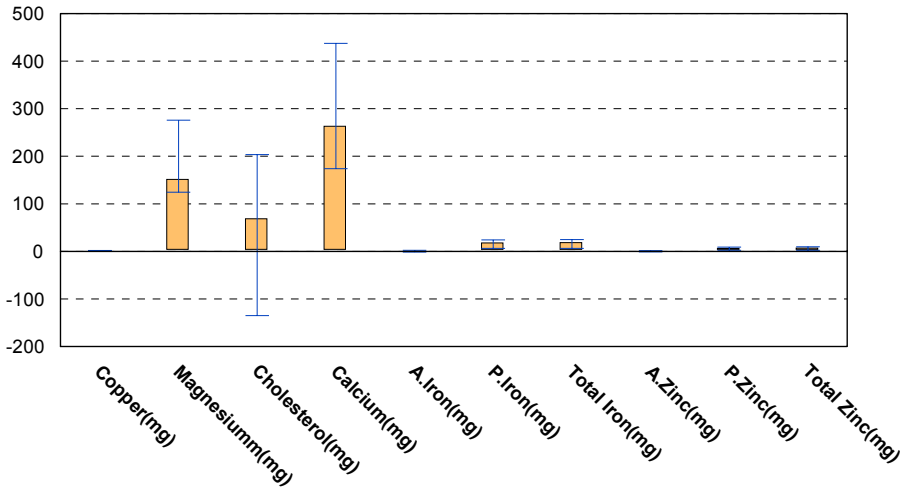
	<50% RDA		**50 - 75% RDA**		**75 - 100% RDA**		**≥ 100% RDA**		**Total**	
	No.	**%**	**No.**	**%**	**No.**	**%**	**No.**	**%**	**No.**	**%**
Energy Intake	50	10.9	190	41.2	145	31.5	76	16.5	461	100
Protein Intake	9	2.0	53	11.5	132	28.6	267	57.9	461	100

5.4.2 Micronutrient Intake of Bedouin Mothers

Table 22. Mean per caput daily micronutrient intake among Bedouin mothers

Micronutrient Intake	Total (n=461)		% of RDA
	Mean	SD	
Copper (mg)	1.6 ± 0.6		80.0%
Iodine (µg)	28.0 ± 19.4		25.5%
Selenium (µg)	19.2 ± 6.7		74.0%
Magnesium (mg)	151.5 ± 124.4		69.0%
Calcium (mg)	263.2 ± 174		24.0%
Animal Iron (mg)	0.81 ± 1.5		
Plant Iron (mg)	17.8 ± 6.2		
Total Iron (mg)	18.6 ± 6.3		45.4%
Animal. Zinc (mg)	0.5 ± 1.1		
Plant. Zinc (mg)	6.7 ± 2.3		
Total Zinc (mg)	7.2 ± 2.5		73.5%

Figure 9. Mean ± SD per caput daily micronutrient intake of Bedouin mothers



Copper: The mean intake of copper among mothers was 1.6 ± 0.6 mg/day.

Iodine: The mean iodine intake was 28.0 ± 19.4 µg/day.

Selenium: The mean selenium intake was 19.2 ± 6.7 µg/day.

Magnesium: The mean magnesium intake was 151.5 ± 124.4 mg/day.

Calcium: The mean calcium intake among mothers was 263.2 ± 174 mg/day, which is very low compared with the RDA. This is due to the low consumption of unaffordable dairy products, which are rich in calcium and protein.

Iron: The mean intake of total iron was 18.6 ± 6.3 mg/day. Animal iron intake represented only 0.81 ± 1.5 mg/day. This amount is very low and is due to low consumption of animal protein rich in iron. The main source of iron was from plant origin, representing 17.8 ± 6.2 mg/day. These amounts are lower than RDAs.

Zinc: The total mean intake of zinc among mothers was 7.2 ± 2.5 mg/day. This is very low, particularly for animal zinc which represented 0.5 ± 1.1 mg/day. This is due to low consumption of zinc-rich animal products. .

These daily micronutrient intake results do not meet RDAs, which are stated to be important for long-term health and disease prevention.

Table 23. Mean per caput daily vitamin intake of Bedouin mothers

	Vitamin Intake	Total (n=461)		% of RDA
		Mean	SD	
Fat soluble vitamins	Vitamin A (µg)	242.1 ± 281.6		48.4%
	Vitamin E (mg)	6.6 ± 3.4		88.0%
Water soluble vitamins	Vitamin C (mg)	54.4 ± 53.6		121.0%
	Vitamin B1 (mg)	1.11 ± 0.41		101.0%
	Vitamin B2 (mg)	1.81 ± 1.11		165.0%
	Niacin (mg)	11.4 ± 5.8		81.4%
	Folic acid (µg)	423.8 ± 389.3		106.0%

Table 23 shows the mean ± SD per caput daily vitamin intake among mothers regarding fat and water soluble vitamins.

Vitamin A: The mean vitamin A intake was 242.1 ± 281.6 µg/day, which represents 48.4% of the RDA.

Vitamin E: The mean intake of vitamin E was 6.6 ± 3.4 mg/day among mothers, which is slightly lower than recommended RDAs.

Vitamin C: The mean vitamin C intake was 54.4 ± 53.6 mg/day, matching recommended RDAs for a healthy diet. Most sources of vitamin C according to the studied dietary pattern are fresh vegetables (mostly tomatoes and leafy green vegetables).

Vitamin B1: The mean vitamin B1 intake is 1.11 ± 0.41 mg/day, which meets the RDA.

Vitamin B2: The mean intake of vitamin B2 (1.81 ± 1.11 mg/day) also meets the RDA.

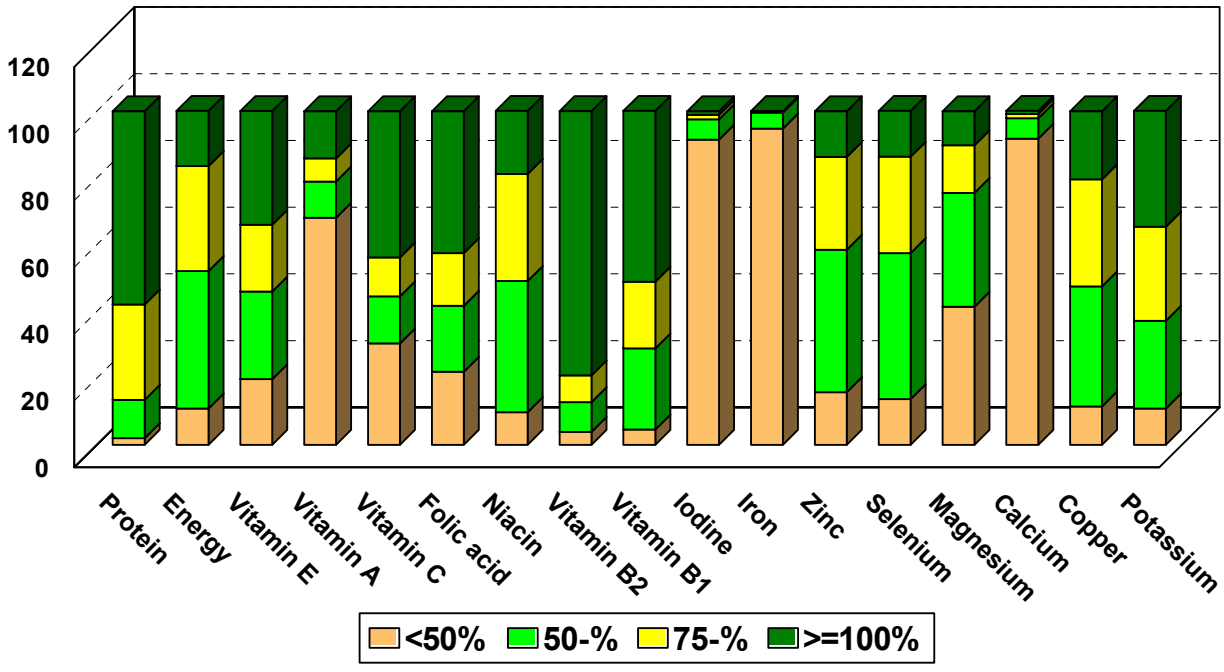
Niacin: The mean niacin intake of 11.4 ± 5.8 mg/day is lower than recommended.

Folic acid: Mean folate intakes of 423.8 ± 389.3 µg/day meet RDAs.

Table 24. Distribution of Bedouin mothers by percent RDA of different macro and micronutrients

	<50% RDA		50 -75% RDA		75 - 100% RDA		≥ 100% RDA		Total	
	No.	%	No.	%	No.	%	No.	%	No.	%
Protein	9	2.0	53	11.5	132	28.6	267	57.9	461	100
Energy	50	10.9	190	41.2	145	31.5	76	16.5	461	100
Vitamin E	91	19.7	121	26.25	92	20	157	34.1	461	100
Vitamin A	314	68.1	50	10.85	32	6.94	65	14.1	461	100
Vitamin C	140	30.4	65	14.1	54	11.7	202	43.8	461	100
Folic acid	101	21.9	91	19.8	73	15.8	196	42.5	461	100
Niacin	45	9.8	181	39.3	148	32.1	87	18.9	461	100
Vitamin B2	18	3.9	41	8.9	37	8.03	365	79.2	461	100
Vitamin B1	21	4.6	112	24.3	92	20.0	236	51.2	461	100
Iodine	422	91.5	28	6.1	6	1.3	5	1.1	461	100
Iron	437	94.8	22	4.8	2	0.4	-	-	461	100
Zinc	73	15.8	197	42.7	128	27.8	63	13.7	461	100
Selenium	63	13.7	202	43.8	133	28.9	63	13.7	461	100
Magnesium	191	41.4	157	34.1	66	14.3	47	10.2	461	100
Calcium	423	91.8	28	6.1	6	1.3	4	0.9	461	100
Copper	53	11.5	166	36.0	148	32.1	94	20.4	461	100
Potassium	50	10.9	121	26.3	130	28.2	160	34.7	461	100

Figure 10. Distribution of Bedouin mothers by percent RDA of different macro and micronutrients



As shown in Table 24 and Figure 10, those areas of greatest concern include intakes of vitamin A, iodine, iron and calcium.

The majority of mothers (68.1%) consumed <50% of the RDA of vitamin A, while only 14.1% had ≥100% of the RDA. This corresponds with earlier findings (Moussa et al, 1995; and Shaheen et al, 1997) of moderate sub-clinical health problems of vitamin A deficiency (VAD) in Egypt most probably due to insufficient intake by the Bedouins of dark green leafy vegetables, which are in short supply in Sinai.

Data on iodine intake shows that 91.5% of the sampled women receive <50% RDA, while only 1.1% receive their full requirement. Iodine intake shown here does not include the amount consumed from iodized salt. These results match the findings of the NNI Survey of Food Consumption Patterns in Egypt (2000). It is well documented that in geographic areas where the population are iodine deficient, food sources containing iodine are also deficient. One solution is the universal use of iodized salt. It is evident that iodine deficiency disorders (IDD) still constitute a public health problem in non-urban areas in Sinai.

Also of concern among Bedouin mothers is calcium intake. Almost 92% consumed <50% of the RDA, and less than 1% had their full calcium requirements. This is a serious concern, as dietary calcium inadequacy among mothers leads to the prevalence of osteoporosis among the elderly sector of the population.

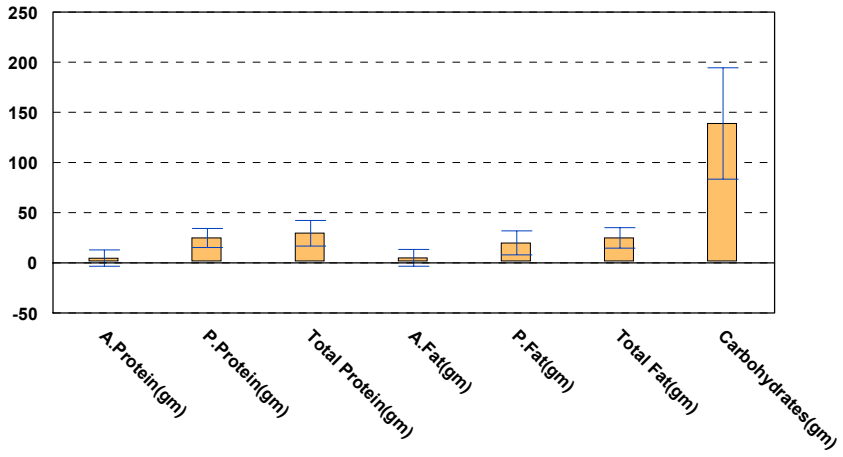
5.5 Food Intake of Bedouin Children (aged 2-5 yrs)

5.5.1 Macronutrient Intake of Bedouin Children

Table 25. Mean per caput energy and macronutrient daily intake of Bedouin children

Variables	Total (n=463)		% of RDA
	Mean	SD	
Energy (Kcal)	936 ± 380.3		58.7%
Animal Protein (gm)	4.7 ± 8.2		
Plant Protein (gm)	24.8 ± 9.5		
Total Protein (gm)	29.5 ± 12.81		83.1%
Animal Fat (gm)	4.92 ± 8.4		
Plant Fat (gm)	19.9 ± 12.0		
Total Fat (gm)	24.82 ± 10.2		56.0%
Carbohydrates (gm)	138.9 ± 55.5		58.0%

Figure 11. Mean ± SD per caput macronutrient daily intake of Bedouin children



Energy: The mean energy intake among children was 936 ± 380.3 Kcal/day, which is about half the RDA.

Protein: Mean total protein intake among children was 29.5 ± 12.81 gm/day. Mean animal protein intake was 4.7 ± 8.2 gm/day. The majority of protein intake was of plant origin 24.8 ± 9.5) gm/day. Plant protein intake matches RDAs but animal protein intake is low.

Fat: The mean animal fat intake was 4.92 ± 8.4 gm/day and the mean plant fat intake was 19 ± 12.0 gm/day. The total mean fat intake was 24.8 ± 10.2 gm/day.

Carbohydrates: The mean carbohydrate consumption among the children was 138.9 ± 55.5 gm/day.

Table 26. Distribution of children by dietary adequacy of total protein

	<50% RDA		50 - 75% RDA		75 - 100% RDA		≥ 100% RDA		Total	
	No.	%	No.	%	No.	%	No.	%	No.	%
Energy Intake	129	27.9	86	18.6	78	16.8	70	15.0	463	100
Protein Intake	57	12.3	153	33.0	112	24.2	141	30.5	463	100

Table 26 indicates that 33.0% of children consumed 50-75% of the RDA of protein. About one third of children (30.5%) had the full RDA of protein, while 12.3% consumed <50% of their RDA.

Table 26 also revealed that one fourth of the sampled children (27.9%) consumed <50% of the RDA of energy. Only 15% had their full requirement, and 35.4% had 50-75%.

5.5.2 Micronutrient Intake of Bedouin Children

Calcium: Table 27 indicates that the mean ± SD intake of calcium among the children was 170.9 ± 150.4 mg/day. These figures were very low compared to the RDA.

Zinc: The total mean intake of zinc was 3.7 ± 1.55 mg/day, which is less than RDAs. Zinc from animal sources represented 0.34 ± 0.73 mg/day, compared with 3.31 ± 1.3 mg/day from plant sources.

Iron: The total mean intake of iron was 9.6 ± 3.9 mg/day. Most of the iron intake was from plants, while iron of animal origin represented 0.6 ± 1.02 mg/day. These figures are less than RDAs.

Iodine: The mean intake of iodine among children was 16.7 ± 14.3 µg/day. This figure is very low when compared to the RDA.

Selenium: The mean intake of selenium among children is 9.6 ± 4.4 µg/day. This is also lower than RDAs.

Magnesium: Intake of magnesium was recorded at 83.0 ± 74.5 mg/day. This figure is very low when compared with RDAs.

Copper: The mean copper intake was 0.73 ± 0.36 mg/day. This result is again low according to the RDA.

Potassium: The mean potassium intake was 969.7 ± 480 mg/day.

Table 27. Mean per caput micronutrient daily intake of Bedouin children

Micronutrients intake	Total (n=463)		% of RDA
	Mean	SD	
Copper (µm)	0.73 ± 0.36		69.5%
Iodine (µg)	16.7 ± 14.33		18.1%
Selenium (µm)	9.6 ± 4.4		50.5%
Magnesium (mg)	83.0 ± 74.5		125.0%
Calcium (mg)	170.9 ± 150.4		31.7%
Animal Iron (mg)	0.6 ± 1.02		
Plant Iron (mg)	9.0 ± 3.7		
Total Iron (mg)	9.6 ± 3.9		74.0%
Animal Zinc (mg)	0.34 ± 0.73		
Plant Zinc (mg)	3.31 ± 1.3		
Total Zinc (mg)	3.7 ± 1.55		39.6%

Figure 12. Mean ± SD per caput of micronutrient daily intake of Bedouin children

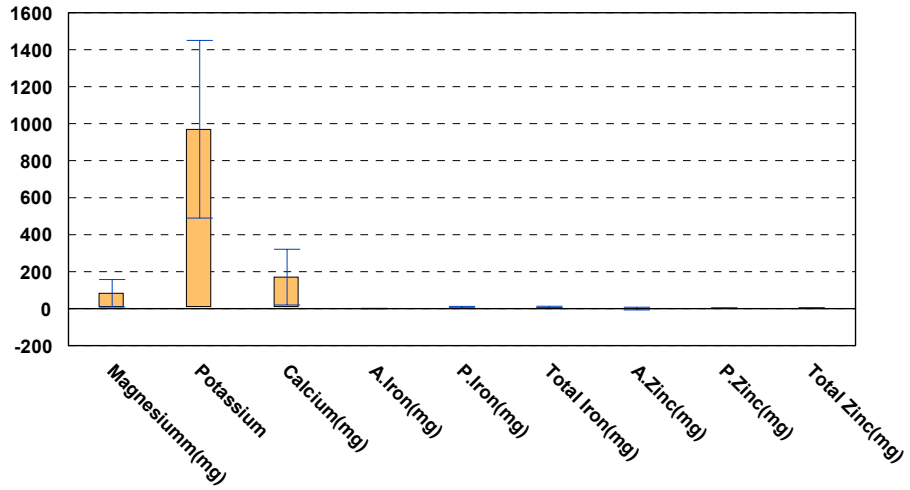


Table 28 shows the following data on vitamin intake of the sampled children:

Fat soluble vitamins

Vitamin A: The mean intake of vitamin A among children was 151.1 ± 189.6 µg/day. This is very low compared to RDAs.

Vitamin E: The mean intake of vitamin E among children was 3.6 ± 2.3 mg/day. This is also less than RDAs.

Water soluble vitamins

Vitamin C: The mean vitamin C intake was 33.2 ± 40.1 mg/day, meeting RDAs. This is due to the high consumption of vegetables which are rich in vitamin C.

Vitamin B1: The mean intake of vitamin B1 was 0.6 ± 0.3 mg/day – in accordance with RDAs.

Vitamin B2: The table showed that the mean intake of vitamin B2 among children was 1.0 ± 0.74 mg/day, which also matches RDAs.

Niacin: The mean intake of Niacin was 6.2 ± 4.1 mg/day, matching RDAs.

Folic acid: The mean intake of folate among children was 257.1 ± 261.7 µg/day, which is a satisfactory daily allowance.

Table 28. Mean per caput daily vitamin intake among children

Vitamin Intake		Total (n=463)		% of RDA
		Mean	SD	
Fat soluble vitamins	Vitamin A (µg)	151.1 ± 189.6		35.6%
	Vitamin E (mg)	3.6 ± 2.3		72.0%
Water soluble vitamins	Vitamin C (mg)	33.2 ± 40.1		110.7%
	Vitamin B1 (mg)	0.6 ± 0.3		100.0%
	Vitamin B2 (mg)	1.0 ± 0.74		181.8%
	Niacin (mg)	6.2 ± 4.1		88.6%
	Folic acid (µg)	257.1 ± 261.7		142.8%

As shown in Table 29 and Figure 13 below, the greatest areas of concern regarding macro and micronutrient intake of the sampled children relate to vitamins A and C, iodine, iron, zinc and calcium.

Almost 75% of children consumed <50% of the RDA of vitamin A. This figure indicates a nutritional problem of vitamin A deficiency among children, along with their mothers as mentioned earlier. These findings match data from the NNI Survey of Food Consumption Patterns in Egypt (1998). Vitamin C was lacking among children (36.7% received <50% of the RDA), a finding contrary to the 1998 survey.

Iodine intake among children was very low. Ninety-two percent had <50% of the RDA, while only 0.9% met the required level. These results indicate that iodine deficiency disorder (IDD) constitutes a public health problem in non-urban areas in Sinai.

The majority of children (62.2%) consumed 50-75% of the RDA of iron. Only 17.5% had the full RDA, while about 20% had <50% of the RDA. These inadequate intakes correlate with earlier findings (Moussa et al, 1995) which reported a moderate public health problem of iron deficiency anemia (IDA) in Egypt.

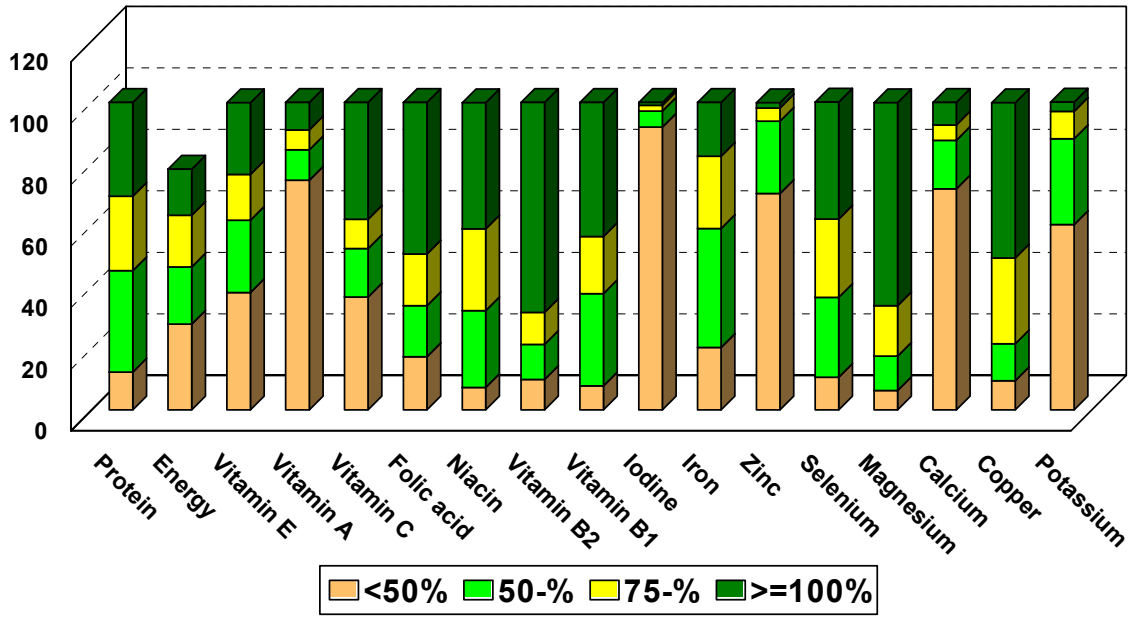
The majority of children (70.4%) consumed <50% of the RDA of zinc, with only 1.7% consuming the RDA.

A lack of calcium intake among children (71.9% consumed <50% of the RDA) is cause for concern as calcium is vital for bone formation in children aged 2-5 years. Findings matched those of the NNI Survey of Food Consumption Patterns in Egypt (1998).

Table 29. Distribution of Bedouin children by percent RDA of different macro and micronutrients

	<50% RDA		50 -75 % RDA		75 - 100% RDA		≥ 100% RDA		Total	
	No.	%	No.	%	No.	No.	%	No.	%	No.
Protein	57	12.3	153	33.0	112	24.2	141	30.5	463	100
Energy	129	27.9	86	18.6	78	16.8	70	15.0	463	100
Vitamin E	177	38.2	109	23.5	69	14.9	108	23.3	463	100
Vitamin A	346	74.7	46	9.9	30	6.5	41	8.9	463	100
Vitamin C	170	36.7	73	15.8	44	9.5	176	38.0	463	100
Folic acid	80	17.3	77	16.6	78	16.8	228	49.3	463	100
Niacin	34	7.3	116	25.0	123	26.6	190	41.0	463	100
Vitamin B2	46	9.9	53	11.4	48	10.4	316	68.3	463	100
Vitamin B1	36	7.8	139	30.0	86	18.6	202	43.6	463	100
Iodine	426	92.0	24	5.2	9	1.9	4	0.9	463	100
Iron	94	20.3	179	38.7	109	23.5	81	17.5	463	100
Zinc	326	70.4	109	23.5	20	4.3	8	1.7	463	100
Selenium	49	10.6	120	26.0	118	25.5	176	38.0	463	100
Magnesium	29	6.3	52	11.2	76	16.4	306	66.0	463	100
Calcium	333	71.9	73	15.8	23	5.0	34	7.3	463	100
Copper	44	9.5	56	12.0	129	27.9	234	50.5	463	100
Potassium	279	60.3	129	27.9	41	8.9	14	3.0	463	100

Figure 13. Distribution of Bedouin children by percent RDA of different macro and micronutrients



5.6 Socio-environmental Effects on the Bedouins' Nutritional Status

Assessing the nutritional status of a population is critical in developing nutrition intervention programs that enhance human health and well-being. The results of nutritional assessment efforts are necessary both to determine the presence and magnitude of particular problems and, when indicated by the results, to elicit public interest and courses of action. Assessment can also be used to monitor changes in nutritional conditions overtime, thereby permitting decisions on the effectiveness of intervention programs and need for their continuation.

Social and economic factors are important underlying determinants of childhood morbidity, mortality, and malnutrition, including micronutrient malnutrition. The following potentially useful socioeconomic indicators are used in this report:

Maternal education: Maternal education has been shown consistently to be critically important for child health, nutrition, and survival. Evidence from various countries indicates that childcare and feeding practices are key pathways. Thus, lower maternal education is likely to lead to inadequate child feeding, hygiene and health-seeking behaviors, which in turn are likely to be associated with increased risk of malnutrition among children. Maternal education is also known to be highly correlated with socioeconomic status and household food security. Maternal schooling is easier to measure and is less prone to recall bias than income or expenditure data, it may be a more useful overall proxy for poverty. A rate of 50% illiteracy among women 15-44 years of age has been suggested to define greater vulnerability to micronutrient deficiency (IZiNCG, 2004).

Income: The association between poverty and child nutrition has long been recognized. Because poor populations often rely heavily on monotonous plant-based diets low in animal products and high in phytate content, poverty is bound to be associated with poor mineral status. Economists have not yet agreed on a simple, reliable, proxy measure for income, but some commonly used alternatives are used in this report, such as:

- No. and value of some household assets
- Type and quality of dwelling (construction material of the wall, floor, or roof; and availability of water and sanitary services)
- Availability of electricity at community level
- Access to land (ownership)

Employment: Dependency on cash income, and if there is access to land.

Access to water and sanitation services: Poor access is more likely to be associated with increased risk of malnutrition because of repeated infections.

Table 60 shows the correlation matrix between previously selected parameters and the nutritional status of all children surveyed in Sinai.

Table 30. Correlation matrix between socioeconomic variables and nutritional status of Bedouin children

Socioeconomic Variables	Children's Nutritional Indicators				
	Height-for-age (z-score)	Weight-for-age (z-score)	Weight-for-height (z-score)	MAC (cm)	Hb gm/dl
Crowding index: Corr. Coeff. (r): Significance: No.	NS	0.126 0.005** 485	0.114 0.012* 485	NS	NS
HH Economic score: Corr. Coeff. (r): Significance: No.	NS	0.096 0.033* 495	0.114 0.011* 495	NS	-0.092 0.041* 495
Maternal education (secondary/university): Corr. Coeff. (r): Significance: No.	-0.092 0.042* 487	NS	NS	NS	NS
Paternal education (illiteracy): Corr. Coeff. (r): Significance: No.	NS	NS	NS	-0.096 0.034* 488	NS
Fever (+/-): Corr. Coeff. (r): Significance: No.	NS	NS	NS	NS	0.101 0.026* 486
Lower RTI (+/-): Corr. Coeff. (r): Significance: No.	NS	NS	NS	0.095 0.035* 490	0.173 0.000** 490
Lower RTI (No.): Corr. Coeff. (r): Significance: No.	NS	NS	NS	NS	0.144 0.001** 493
Lower RTI (duration): Corr. Coeff. (r): Significance: No.	NS	NS	NS	0.099 0.028* 493	0.117 0.009** 493
Skin rash (+/-): Corr. Coeff. (r): Significance: No.	-0.110 0.015* 483	NS	NS	NS	NS
Skin rash (No.): Corr. Coeff. (r): Significance: No.	-0.118 0.009** 493	NS	NS	NS	NS
Skin rash (duration): Corr. Coeff. (r): Significance: No.	-0.115 0.011* 493	NS	NS	NS	NS

Corr. Coeff. (r): = correlation coefficient, NS = not significant, * Significant ** Highly significant

Repeated and long episodes of skin rashes were more prevalent among short and stunted children. Again, this relationship was not present if children's height-for-age z-scores $\pm$3SD were excluded, indicating that skin problems were more prevalent among severely stunted children.

The household economic score and crowding index of families correlated significantly with weight-for-age and weight-for-height parameters. Higher scores were associated with heavier children. Low mid upper arm circumference is more prevalent among children from families headed by illiterate males, and unexpectedly these children reported a lower incidence of lower respiratory infections. Social levels and morbidity recall (chest infections) showed a reverse effect on anemia. This can be explained by the importance of proper maternal nutritional knowledge in childcare, particularly during times of sickness.

Based on the information gained from the correlation matrices between indicators of nutritional status and available social, economical, and morbidity data, multilinear regression models were used to detect the most influential of these parameters.

Table 31 below using height-for-age Z-score as the dependent variable shows that repeated skin infections are the most influential factor affecting height-for-age Z-scores. The greater the number of attacks, the shorter the child is in relation to his age. Dermatitis is a well known pathognomonic sign of severe malnutrition, and stunting is also commonly associated (WHO, 2000).

Results of this study showed that children of mothers who had graduated from secondary school or university were significantly shorter than those of mothers with lower educational levels (61% out of 18 child were stunted versus 34% out of 467 children respectively). The reverse was true concerning paternal education, where children in families headed by illiterate males were significantly shorter than others (44% of those children had values less than 2SD below the standard reference median for the height–for-age Z-score). This could be explained in part by the presence of poverty among families of illiterate parents, the lack of proper nutritional knowledge, even among educated mothers, and also by multi-determining factors for height gain including paternal genetic background, which is beyond the scope of this study. On repeating this approach after excluding height-for-age z-score values out with $\pm$3SD, maternal weight and education showed positive impacts on children's height (R^2 = 0.04 F= 6.25 significance = 0.002).

Table 31. Socio-economic and morbidity predictors for height-for-age parameter among surveyed children (dependent variable is height-for-age z-score)

Predictors	Beta Standardized Coefficient	Significance
(Constant = -1.54)		0.000
Skin rash (No.of episodes)	-0.134	0.003**
Maternal Education Level (secondary/university grade)	-0.134	0.005**
Paternal Education Level (illiteracy)	- 0.105	0.023*
(R^2 = 0.040 F = 6.5 significance = 0.000)		

* Significant ** Very significant

Pre-final models for weight-for-age z-scores showed that social factors were the most influential determinant of child weight. However, selecting the crowding index alone to represent the social class of families was better than using a score based on the summation of other social parameters. It was found that the fewer the persons per room, the higher the social class and the higher the weight-for-age z-score. The presence of URT infections was associated with the lowest values for weight-for-age z-score. Again, children of mothers with higher educational levels (secondary/university) had lower weight-for-age z-scores.

Table 32. Socio-economic and morbidity predictors for weight-for-age parameter among surveyed children (dependent variable is weight-for-age z-score)

Predictors	Beta Standardized Coefficient	Significance
(Constant = -1.92)		0.000
Crowding Index (No. of persons/No. rooms)	0.165	0.001**
URT infection (Presence/Absence)	-0.138	0.006**
Maternal Educational Level (secondary/university grade)	-0.111	0.029*
(R^2 = 0.055 F = 7.2 P = 0.000)		
Excluded Variables	t-value	P value
Proper Sewage disposal (Presence/absence)	-1.67	0.079
Cooking energy (gas/electric or baladi oven)	-1.66	0.099

* Significant ** Very significant

As in the model for weight-for-age z-scores, the crowding index correlated significantly with the weight-for-height z-score. Table 33 shows that the fewer the persons per room, the higher the weight-for-height z-score.

Table 33. Socio-economic and morbidity predictors for weight-for-height parameter among surveyed children (dependent variable is weight-for-height z-score)

Predictors	Beta Standardized Coefficient	Significance
Constant = -1.16		0.000
Crowding Index	0.128	0.013*
(R^2 = 0.014 F = 6.3 P = 0.013)		
Excluded Variables	t-value	P value
Proper Sewage disposal (Presence/absence)	- 0.58	0.56
Cooking energy (gas/electric or baladi oven)	- 1.46	0.14
Household ownership	0.97	0.33
Skin rash (duration of episodes)	1.67	0.096

* Significant ** Very significant

The model for mid upper arm circumference showed weight-for-age and duration of lower chest infection as the main determinants. A high weight-for-age z-score was associated with higher MUAC and higher prevalence of chest infection.

Table 34. Socio-economic and morbidity predictors for mid upper arm circumference (MUAC) parameter among surveyed children (dependent variable is MUAC in cm)

Predictors	Beta Standardized Coefficient	Significance
(Constant =15.4)		0.000
Weight-for-age z-score	0.146	0.001**
Lower RT infection (duration)	0.102	0.025*
(R^2 = 0.30 F =7.4 P =0.0001)		
Excluded Variables	t-value	P value
Paternal education (illiteracy)	-1.90	0.058
Weight-for-height (z-score)	1.397	0.163
Lower RT infection (present/absent)	0.63	0.53

* Significant ** Very significant

Table 35 indicates the social level of the family as the main influence on maternal nutritional status. Higher social class represented by low crowdedness, paved floor, and higher educational attainment for mothers, was associated with maternal overweight and obesity. Of concern is that maternal nutritional status, such as weight or BMI, correlated significantly with indicators for children's nutritional status.

Although the previous tables reflected influential parameters, they explain only small percentages of variation in anthropometric indicators (dependent variables), meaning that other parameters might be of more importance (e.g. food availability) in these families.

Table 35. Socio-economic and morbidity predictors for maternal BMI (dependent variable is maternal BMI)

Predictors	Beta Standardized Coefficient	Significance
(Constant =-26.2)		0.000
Maternal education (secondary/university)	0.075	0.039*
Crowding Index	-0.124	0.001**
Type of floor	0.103	0.007**
(R^2 = .055 F =7.2 P =0.000)		
Excluded Variables	t-value	P value
Paternal education (secondary)	0.369	0.71
Paternal education (high)	0.52	0.60

* Significant ** Very significant

Reference:

WHO (2000): Training course on management of severe malnutrition.

6. Qualitative Results

After reviewing the data of the FGD and the interviews with key stakeholders, the following points were considered as the most important according to FGD participants and the interviewers.

6.1 General Characteristics of Living and Dietary Habits of Bedouins in Sinai

Bedouins living in Sinai have certain living and dietary characteristics that are different from Bedouins living in other parts of Egypt. Sinai Bedouins usually live in small clusters of families and travel from one area to another searching for water and food resources. Families usually live with 5-6 other households in close proximity, sharing their water source and food. Their houses are built from animal skin or corrugated iron.

Their main food items are wheat flour, which is used to make their staple bread called *faracheh* or *lipa*. The women prepare the *faracheh* early in the morning, and the whole family eat it with tea. Both *faracheh* and *lipa* are made from wheat flour with water and salt. The difference between them is the method of cooking. *Faracheh* is made of thin layers and cooked over a solid plate of iron, while the *lipa* is thick and cooked deep in the hot earth.

Woman in South Sinai making *faracheh*

The main features of the Bedouins' dietary habits are as follows:

Wheat flour and tea are the staple food items for family members, which are often consumed three times per day among poor families. Some vegetables are usually eaten once or twice per week when there is a market near the home or when one of the families goes to a city for work. Vegetables and fruit are considered very expensive for the majority of Bedouin so they cannot afford them every day, and most families eat fish, chicken and eggs only once per month, when they are near a market.

Typical eating patterns for most Bedouin are to start the day with an early breakfast of *faracheh* and some tea, followed by an afternoon meal of freshly prepared *faracheh* or alternatively *lipa,* and served with cooked potato, tomato slices and green pepper. If rice and lentils are available they are cooked together with slices of tomato and pepper for lunch. In the evening, *faracheh* or *lipa* are eaten again with tea.

Bedouins living in Sinai eat very little animal protein. Meat consumption is restricted as a result of the unavailability of water and fodder to rear animals like sheep. Most Bedouins in Sinai eat meat only during the *Adha* Feast or on special occasions like wedding parties where whole families share the meat together. Limited space, lack of food and the risk of attracting foxes which endanger their children discourage the raising of chickens in desert areas.

Milk production is also constrained as a result of the paucity of animals; consequently milk is usually reserved for small children and not enjoyed b the whole family. Some poor families prefer to sell the milk, if available, to get money to buy wheat, tea and vegetables.

"Our living situation is very bad, we don't have money to buy vegetables and fruits, one kilo of tomatoes costs two pounds. We prefer to buy wheat flour to satisfy our children than to buy vegetables and fruits. The amount of milk is very limited, so we give it to small children." Women from North Sinai.

6.2 The Bedouin Housing Project as Perceived by FGD Participants and Key Stakeholders

The typical nomadic lifestyle of the Bedouins affects not only their living conditions but also the developmental plans of Sinai. The Bedouins don't plant crops as they are constantly moving, so any plants that are found will be eaten by their animals, with nothing planted to replace them. It is for reasons such as this that the Egyptian Government initiated the Sinai Longevity Program and the Bedouin Housing Project.

"The Bedouin Housing Project is an agreement between the Ministry of Housing, which is represented by the Sinai Longevity Project (SLP) and WFP. The aim of the Bedouin Housing Project is to provide Bedouins with good quality permanent housing and a reliable water source to cultivate their land so they don't have to move from one place to another to search for water and food." Deputy Director of the SLP.

WFP has supported the SLP since its trial stages in 1984-1985. Since the trial period, three phases of the project have been implemented. The first phase was from 1986-1990, the second from 1990-1996, and the current third phase began in 2000 and will continue until 2007.

A sample of the new cement block houses built for the Bedouin participating in WFP assisted projects in Sinai (right) compared to the corrugated iron shacks in other areas.

WFP provides subsidized food such as flour, oil, sugar and sometimes lentils and milk, to the Bedouins while they construct their houses. The Bedouins pay only 15% of its cost. Food is

distributed once the house and dam construction is complete and continues for the first four years, during which time the cultivated land starts to produce fruit and vegetables for household consumption.

"We have an agreement with WFP assisted projects to provide housing for the Bedouins in Sinai and encourage them to move away from raising animals and start cultivating fruit trees so that their lifestyle becomes more sedentary. The Egyptian government pays for the cost of the housing, while WFP gives food aid according to the number of day worked. The food aid consists of flour, sugar, oil and sometimes they could add milk or lentils." Director of the SLP.

The change in lifestyle of the Bedouins gives them a sense of warmth and security, especially for their children.

"I am the first one in this area who participated in the SLP. I heard about it from my relatives. What is important to me is to feel warm when our houses are finished, to find water for our tanks, and to send our children to school. I feel that education is essential. I am not educated but I want my children to go to school because it is important." Bedouin from Seder El Hetan.

FGD with Bedouin men

The Bedouin Housing Project affects the living conditions of the entire family. Bedouin women are responsible for carrying water from its source to the home and can travel up to 5 km/day to get water. They also must take care of the sheep and prepare food for the family. As a result of the Bedouin Housing Project, women now have time to attend literacy classes, be trained in tailoring, and learn how to make foods such as jam from the fruit available in their communities.

Teaching women to read and write is very important for their development, and also that of their children. The tailoring classes have faced many difficulties however. The sewing machines supplied for the classes are too few, while maintenance of them has proven difficult due to a lack of trained repair persons and spare parts. Training programs teaching women how to make traditional clothes and Bedouin handicrafts have been very successful and are more popular with the women.

6.3 The Impact of the Food Aid Program on the Nutritional Status of the Bedouin as Perceived by FGD Participants and Key Stakeholders

The food aid program to support the Bedouins during the rehabilitation phase was designed by WFP in collaboration with the Egyptian Government to prevent malnutrition disorders. The program provides food given to WFP from donors; therefore apart from flour, oil and sugar, the same food items are not available each year. The criteria for inclusion in the Bedouin Housing Project food aid program is as follows:

- The person must be Bedouin and have lived in Sinai all his life
- He is not employed by the Egyptian Government
- He is poor, with an income of less than 50 LE/month
- He has less than 5 sheep
- He has a piece of land in the project area suitable for cultivation and farming

Any Bedouin fulfilling these criteria has the chance to receive money and food aid to start building his house, re-cultivating his land, and developing a water source, either by digging a well or by building a dam or *haraba* to save rain water.

A *haraba* in South Sinai Governorate

"This agreement with WFP provides food aid to Bedouins from donors during the preparation phase. The Egyptian Government gives the Bedouins money - part as aid and part as a loan to be repaid over a 10 year period." Deputy Director of the SLP, North and Central Sinai region.

This food aid is not only given to Bedouins during house/dam construction, but also to men and women participating in the training programs. The training programs for men teach them how to construct houses and dams, while the women's training programs teach literacy, tailoring and cooking. The food aid is generally shared among the entire family.

Records of money and food aid distributed to beneficiaries in North and Central Sinai region

"Here we live as families - all these houses are my brothers and sisters. When we get food we share it with each other. They helped me while I was building my house and the water in the haraba is used by the whole family. We usually share food, water and even money." Bedouin from North Sinai area.

The impact of the food aid program on the nutritional status of the Bedouins was measured by the nutritional and anthropometric measurements shown in the quantitative section of this report. But the perceptions and attitudes of the Bedouins towards the program were measured through interviews and FGD. These perceptions are summarized in the following paragraphs.

The Bedouins appreciate the food aid program, which assists them while they build their houses and dams. As a result they feel safe and secure, especially in terms of their children's food requirements.

However, many of the Bedouins who participated in the FGD, both men and women, complained that the food items supplied at the time of the survey were limited to flour, oil and sugar, whereas in previous phases of the project WFP supplied lentils, milk, rice and tea. Women asked for milk to be added to the food basket for the benefit of their children's health.

"We know that milk is good for the children, but we can't afford it as we have so few sheep. Also, as there was not enough rain in past years, the sheep produced very little milk. They need to add milk powder to the food aid program for the small children." Woman from Rafah area.

FGD with Bedouin women in South Sinai Governorate

According to the regulations of the program, beneficiaries receive food aid during construction of their houses and for four years afterwards. At this point the food aid stops, even if there has been insufficient rain for the cultivated land to produce crops. This meant many of the Bedouin families had no food, for a reason they felt was beyond their control.

"Rain is a gift from ALLAH, and for four years now there hasn't been enough. We do all we can - we build the houses, build the haraba, cultivate the land and plant trees, but there is no rain. Why do they stop the food aid program?" Bedouin from Saint Catherines area, South Sinai.

FGD with Bedouin men in Sinai

The food aid is not given at regular intervals throughout the house and dam building process, only once the work has been completed, so many of the Bedouin go for long periods without receiving food aid. When the food is distributed, amounts can reach up to one ton of flour,

along with tins of oil, and sugar. These amounts are too much for one family so the food is shared with others, as typically the whole community participates in the work.

"The release of food aid is not regular, so it is impossible to measure its nutritional impact on beneficiaries compared with non-beneficiaries. Sometimes the food is plentiful so they share it among themselves, while at other times there is no food at all." Director of the SLP.

6.4 The Impact of the Bedouin Housing Project and Food Aid Program on the Health Status of Bedouins as Perceived by FGD Participants and Key Stakeholders

The Bedouin Housing Project aims to improve the welfare of Bedouins who for a long time have been isolated and without access to basic services. Their new homes protect them from the cold in winter and the heat in summer, while access to water and toilet facilities help prevent infectious disease. Of course, behavior change takes time and as mentioned earlier, many of the Bedouin did not use the toilets due to social habits and/or lack of water.

"The new houses are better for the health of our children, and as we don't travel a lot now they don't catch colds all the time. This also helps the children's education. In the past girls' education wasn't important." Bedouin from Seder El Heytan area, central Sinai.

One of the main problems in Sinai is the distance between Bedouin communities, which affects the availability and access to health services. To address this problem the government builds health centers in the communities once they become developed so that local health service providers can attend to the health needs of the local Bedouin.

Improvements to the health services in project areas include:

- An increased number of health centers in the large communities
- Better accessibility to preventive medicine services for the Bedouin
- Training to volunteers and social workers in first aid services such as snake bite management and wound dressing

"Before Sinai's liberation, there were a limited number of basic mobile health centers, but since the Sinai Longevity Project began, the number of health centers and hospitals has increased, while preventive medical care (such as national immunization campaigns) has become available to Bedouins in their new communities." Director of Preventive Medicine, South Sinai Governorate.

However, many Bedouin interviewed were not satisfied with the health services for the following reasons:

- The number of physicians is too few and they are not specialized
- There are not enough health providers, especially trained nurses
- The health centers are only available in large communities, which are far from many Bedouin communities
- Drug supplies in the health centers are scarce
- Emergency mobile services are inadequate

"I have to carry my baby up to 5km to reach the health center, and when I get there, either there is no physician or I don't get the medicine. The vaccination service is good – they come to our houses, but when the children get sick we have a difficult time reaching the health services." Bedouin Mother from South Sinai.

6.5 Health and Nutrition Problems Affecting Bedouins in Sinai as Perceived by FGD Participants and Key Stakeholders

The FGD participants and key stakeholders interviewed during the qualitative research identified the main health and nutrition problems affecting the Bedouin as:

- Under nutrition, especially young children, as they don't have enough food to eat
- Diarrheal disease, especially in infants and young children, and intestinal infestation in older children
- Rheumatic disease in elderly men and women
- Eye disease
- Skin disease

Despite the observation that many school-aged children and women of child-bearing age suffered from enlarged thyroid glands (goiter), none of the FGD participants or key stakeholders, including health staff, identified this as a nutritional problem. During the discussions it became clear that most Bedouins use non-iodized rock salt because it is inexpensive and locally available from the desert. Many of the beneficiaries and health providers alike are unaware of the health risks of IDD or its consequences.

"Everyone here uses rock salt. We search in the ground for it. Some people buy salt from the stores, but the majority use the rock salt because it is cheap and we can dig it up everywhere." Elderly woman from Rafah area.

School-aged children in Rafah area complaining of thyroid enlargement (goiter)

The other health and nutrition problem observed during the survey, but not identified by the FGD participants or during interviews, is vitamin A deficiency. A large number of females, particularly the elderly and those of child-bearing age, showed some sign of vitamin A deficiency, especially keratomalacia or Bitôt spots. None of the examined children showed signs of vitamin A deficiency, as most of them had received vitamin A supplementation.

There were also some signs of congenital diseases affecting Bedouin children as a result of marriage within the same family (consanguinity).

An elderly woman with Bitôt spots in Hasana area, Central Sinai Region

7. Conclusions

Analysis of the qualitative and quantitative data revealed the following:

- The Bedouins living in non-urban areas in Sinai suffer from poor living conditions which affects their health and nutritional status. Inadequate water supply, which leads to decreased food availability and income, is a major problem for the Bedouin.
- The Bedouin social habit of families living together in small clusters makes it more difficult for the Government to provide all communities with adequate educational and health services.
- The Bedouin Housing Project has been effective in helping the Bedouin to build new cement block houses, dams to hold water, and assisted them with the re-cultivation of their land. The project has had a positive impact in areas where water supplies have been adequate, but in areas with inadequate water, the cessation of food aid at the end of the four-year period has left many beneficiaries struggling with no crop production to feed their families.
- Anthropometric analysis revealed that most of the 2-5 year old children are stunted, underweight and wasted, which indicates chronic malnutrition. In addition, more than 40% of them are anemic. Vitamin A deficiency manifestation signs were limited in Bedouin children, which may be due to a vitamin A supplementation program conducted by the MOHP. The prevalence of thyroid enlargement (goiter) is not high among the 2-5 year old children targeted in this survey, but school-age children were severely affected.
- Although the caloric intake of the Bedouin mothers was low (the mean energy intake was 81.5% of energy RDA), anthropometric analysis revealed that around 40% had normal BMI, 32.3% were pre-obese, while 5% were underweight. Possible cause for this discrepancy include:
  - The main source of food for Bedouins is high caloric breads and oil.
  - When food is available, the mothers' energy intake is very high. But when food is scarce, such as at the time of the survey, the mothers' energy intake is low.
- In terms of micronutrient deficiency among Bedouin mothers, 13.6% complained of night blindness, and 25.6% had keratomalacia and/or Bitôt spots. These figures indicate severe vitamin A deficiency in these areas. Furthermore, the prevalence of goiter (22.3%) was very high.
- Food frequency analysis revealed that bread, sugar, vegetable oil, pulses and tea are the food items most likely to be consumed more than three times/week. Butter, meat, fish, milk, fruits rich in vitamin A and juices are the food items least likely to be consumed by Bedouins (more than 40% rarely consume these items).
- Analysis of 24 hour food recall indicates that:
  - The total energy intake of children and mothers was below the RDA.
  - Only half of mothers consumed the RDA of protein, which was mainly from plant sources. The situation is the same for children.
  - Milk and milk products were rarely consumed by Bedouins in NUA of Sinai, because they have so few sheep due to limited water supplies. Calcium intakes of mothers and children were thus very low.

- Iron intake was low and of plant, not animal origin. Zinc intake, which is important for the growth of young children, was also low and of plant origin.
- Nearly all children and their mothers experienced severe mineral (calcium, iron, zinc, potassium and iodine) deficiency. The RDA of magnesium, copper and selenium was consumed by only half of the children and 10-20% of mothers.
- The majority of Bedouin mothers and their children don't consume the RDA of fat soluble vitamins (vitamins A and E), and about half the RDA of water soluble vitamins.
- Around 50% of Bedouin mothers and their children rarely consume fruit and vegetables.

8. Recommendations

- The food analysis results revealed that Bedouin mothers and their children face severe malnutrition. Urgent intervention is required to improve their nutritional and health status and to prevent malnutrition disorders.
- Interventions should target deficiencies in both the quantity and quality of food consumed by mothers and children.
- The food basket should be modified to include food items such as powdered milk, iodized salt and packed fish to increase the consumption of essential elements such as calcium, iodine and zinc.
- Micronutrient supplementation, especially vitamin A and iodine, could help to overcome major nutritional problems affecting women and their children.
- A nutrition education strategy would help to increase the awareness of mothers about healthy diets, especially regarding young children. Education on the nutritional importance of breastfeeding could help improve the health and nutritional status of infants and young children.
- WFP should review the design of the project to include additional activities, so that beneficiaries continue to receive food assistance throughout drought-affected periods when land cultivation is not possible due to the lack of water.

Annexes

Nutrition Survey Questionnaire (Arabic)

بحث تقييم الحالة التغذوية للأسر في المناطق النائية في محافظة جنوب سيناء

استمارة الاجتماعي

رقم الفريق : ☐ رقم الباحث : ☐☐ رقم المراجع : ☐☐

مسلسل: ☐☐☐ تاريخ اليوم : ☐☐ ☐☐ ☐☐

المحافظة:.....المركز:..... قرية : .....

الموقع:..... اسم المركز الطبي التابع له :.....

اسم رب الأسرة :.....

العنوان: .....

- تعليم الأب: ☐ تعليم الأم : ☐

١- أميا ٢- يقرأ ويكتب ٣- شهادة ابتدائية ٤- إعدادية ٥- ثانوي- دبلوم ٦- جامعي

- عمل الأب :..... عمل ☐ الأم : ..... ☐

١- لا يعمل ٢- يعمل بشكل غير منتظم ٣- يعمل بشكل منتظم في مكان لا يملكه

٤- يعمل بشكل منتظم في مكان يملكه ٥- يعمل بالتعليم الثانوي أو الدبلوم ٦- يعمل بالتعليم الجامعي

- عدد أفراد الأسرة (شامل الأب والأم)

- تركيب الأسرة :

١- عدد الأطفال أقل من ٥ سنوات

2- عدد الأطفال من ٥ إلى اقل من ١١ سنه

٣- عدد الأبناء من ١١ إلى اقل من ١٨ سنه

٤- عدد البالغين أكبر من ١٨ ذكور

٥- عدد البالغين أكبر من ١٨ إناث

المراحل التعليمية لأبناء الأسرة؟

النوع الاجتماعى	إجمالى العدد	المرحلة الإبتدائية	المرحلة الإعدادية	المرحلة الثانوية	المرحلة الجامعية
الأولاد					
البنات					

- عدد الأولاد في سن التعليم(٦-١٨) ولكنهم لا يتعلمون ☐ يعمل منهم ☐ لا يعمل ☐

- عدد البنات في سن التعليم(٦-١٨) ولكنهم لا يتعلمون ☐ يعملن ☐ لا يعملن ☐

- عدد حجرات البيت (شامل الصالة) ☐

المنزل : ١- بناء بالطوب ٢- عريشة ٣- أخري (تذكر)..... ☐

المنزل : ١- ملك (تم سداد الثمن) ٢- ملك (باقي أقساط) ٣- ملك للغير (ايجار) ☐

كم يبلغ القسط شهربا ☐☐☐ كم يبلغ الإيجار ☐☐ شهريا

- الأرضية في المنزل: ١- مبلطة ٢- مصقولة بالأسمنت ٣- ترابية ☐

- مصدر المياه داخل المنزل : ١- بالصنابير ٢- بالطلمبة / نبع ☐
٣- غير (تذكر).....

ماهو مصدر المياه للقرية ؟ ١- صنابير ٢- نبع ٣- بئر عميق ☐

- هل توجد كهرباء: ١- نعم ٢- لا ☐

ما هي مصادر الطاقة للطهى داخل المنزل:؟

١- فرن كهربائى ٢- بتوجاز ٣- فرن بلدى (كانون) ٤- أخرى .....

- هل يوجد دورة مياه داخل المنزل: ١- نعم ٢- لا

هل الأسرة تمتلك

- أرض ١-نعم ٢-لا حدد

- عربة ١-نعم ٢-لا حدد

- مواشى ١-نعم ٢-لا حدد

استمارة تقييم الحالة التغذوية للأسرة

رقم الفريق رقم ☐ الباحث رقم ☐☐ المراجع ☐☐

مسلسل:- ☐☐ تاريخ البحث:- ☐☐ ☐☐ ☐☐

اسم رب الأسرة .....

١- عدد أفراد الأسرة ☐☐

- تقريبا نسبة المنصرف علي الغذاء من دخل الأسرة ؟ ☐

١- أقل من ٥٠% ٢- من 50% حتي 75% ٣- أكثر من ٧٥%

- إذا حدث دخل إضافي للأسرة ، علي ماذا يصرف بصفة أساسية؟ (اختيار واحد)

١- يشترى به ملابس ٢- يصرف على تعليم الولاد ☐
٣- تشترى به مواد غذائية ٤- يدخر

فى حال توفر موارد مالية إضافية - أى المواد الغذائية الاتية تشترى؟(اختيار واحد)

١- دقيق أو أرز ٢- لحوم وألبان ☐
٣- خضروات وفاكهة ٤- سمن أو زيت

- بعد حدوث ارتفاع للأسعار مؤخراً، هل تم التغيير في شراء أنواع أطعمة؟

	+	-	لا تغيير
دقيق أو أرز	☐	☐	☐

لحوم وألبان ☐ ☐ ☐

خضروات وفاكهة ☐ ☐ ☐

سمن أو زيت ☐ ☐ ☐

برنامج توزيع الحصص الغذائية لبرنامج الغذاء العالمى

هل الأسرة تصرف حصص غذائية من برنامج الغذاء العالمى ؟

نعم ☐ لا ☐

إذا كانت الإجابة لا فلماذا؟

.....

.....

(أكمل الأسئلة إذا كانت الإجابة نعم)

الأنواع	الكمية للأسرة (كجم)		مدة الصرف		انتظام الصرف
	أسبوعيا	شهرياً	١- أكثر من سنة	٢- اقل من سنه	١- نعم ٢- لا
دقيق					
بقول					
سكر					
زيت					

- هل تكفي الحصص الغذائية ؟

١- نعم ☐ ٢- لا

- ما هي الفئة المستفيدة من الحصص ؟

☐

١- كل الأسرة ٢- الأطفال الصغار ٣- البالغين

- إذا كانت الحصص غير كافية ماذا تفعل؟

١- أشترى المواد الغذائية من الأسواق ٢- أستعيرها من الأسر الأخرى ☐
٣- أقلل من استهلاكى لها

- إذا كانت الحصص الغذائية يزيد منها ماذا تفعل ؟

١- يتم تخزينها ٢- يعطي منها للأسر المجاورة ٣- يباع منها ☐

الهيئة العامة للمستشفيات والمعاهد التعليمية

المعهد القومي للتغذية

استمارة التاريخ الغذائي للأسرة مسلسل

المحافظة: المركز: ا القرية:.....

أسم رب الأسرة : .....

تاريخ البحث: رقم الباحث: رقم المراجع:

ما مدى دورية إستخدامك للمواد التالية؟

الصنف	الكود	أسبوعيا		شهرياً		ملاحظات
		اقل من ثلاث مرات	أكثر من ثلاث مرات	اقل من ثلاث مرات	أكثر من ثلاث مرات	
أطعمة الطاقة:						
النشويات	١١٣٠					
السكريات	٢١٠١					
الحلاوة الطحينية	٢١١١					
عسل اسود	٢١١٢					
الخبز بأنواعه	١١٢٠					
الدهون:						
سمن بلدي	١٣٠٧					
زبده	١٣٠٣					
زيت	١٣٣٠					
زيت نخيل	١٣٣٤					
طحينة	١٦٤١					
أطعمة البناء:						
اللحوم ومنجاتها	١٧٠١					
الكبده	١٧١٠					
الطيور	١٧٣١					
الأسماك	١٤٠٥					
البقوليات	١٦٠١					

البيض	١٢٠١					
الألبان ومنتجاتها	١٨٠١					
أطعمة الوقاية:						
خضروات	٢٣٠٧					
فاكهة	١٥٤٢					
خضروات و فواكه فيتامين أ						
المشروبات:						
شاي	١٠٠١					
قهوة	١٠٠٢					
كركديه	١٠٠٦					
حلبه	١٠٠٨					
مياه غازية	١٠١٢					
عصائر	١٥٣٤					

الهيئة العامة للمستشفيات والمعاهد التعليمية

المعهد القومي للتغذية

غذاء ٢٤ ساعة اليوم السابق للبحث للأم

مسلسل:-تاريخ ☐☐☐☐ البحث:- ☐☐☐☐☐☐

رقم الفريق ☐ رقم الباحث: رقم المراجع :

المحافظة: ..... ☐ المركز: ..... ☐ القرية:..... ☐

أسم الأم : / السن : عام ☐☐

الحالة الفسيولوجية: ١- حامل ٢- مرضع ٣- ليست حامل أو مرضع ☐

الوزن: كجم ☐☐ الطول: سم ☐☐☐

الوجبات الأساسية والغير أساسية	اسم الطعام أو الشراب		الرقم الكودي	الكمية بالمكاييل المنزلية	الكمية بالجرام
	اسم الصنف	المكونات			

الهيئة العامة للمستشفيات والمعاهد التعليمية

المعهد القومي للتغذية

غذاء ٢٤ ساعة اليوم السابق للبحث للطفل

مسلسل:- ☐☐☐ تاريخ البحث:- ☐☐☐☐☐☐

رقم الفريق ☐ رقم الباحث ☐☐ رقم المراجع ☐☐

أسم الطفل:-..... النوع:١- ذكر ٢- أنثى تاريخ ☐ الميلاد:- ☐☐ ☐☐ ☐☐

وزن الطفل كجم ☐☐ طول الطفل: سم محيط ☐☐☐ ذراع الطفل: ☐☐

تحليل الهيموجلوبين : كود ☐☐ ☐ فنى التحاليل ☐

- هل تم تطعيم الطفل التطعيمات الدورية ؟ نعم لا غير ☐ منتظم ☐ ☐

- هل تم إعطاء الطفل جرعة فيتامين أ: مرة واحدة ☐ مرتان ☐ لا ☐

- هل يرضع الطفل الآن رضاعة طبيعية؟ نعم ☐ لا ☐

- ما هي المدة التي تناول فيها الطفل الرضاعة الطبيعية ☐☐ شهر

- متي بدأت في إعطاء الطفل تغذية غير لبن الثدي ☐ شهر

الوجبات الأساسية والغير أساسية	اسم الطعام أو الشراب		الرقم الكودي	الكمية بالمكاييل المنزلية	الكمية بالجرام
	اسم الصنف	المكونات			

استمارة تقييم الحالة الصحية للأسرة

رقم الفريق رقم ☐ الباحث (الطبيب) ☐

مسلسل:- ☐☐☐ تاريخ البحث:- ☐☐ ☐☐ ☐☐ ☐☐

اسم رب الأسرة .....

Nutrition Survey Questionnaire (English)

Assessment of the Nutritional Status of Families in Non-Urban Areas

in the South Sinai Governorate

Social Sheet

Team code: ☐ Investigator code: ☐☐ Reviewer code: ☐☐

Serial No: ☐☐☐ Date: ☐☐ ☐☐ ☐☐

Governorate: …… District: …… Village: ……..

Site: …… Heath center: ……

Head of household (name): …….

Address: …….

---

*Father's education ☐ Mother's education ☐

1 - Illiterate 2 - Read and write 3 - Primary education
4 - Preparatory education 5 - Secondary education 6 - University education

*Father's work: …… ☐ Mother's work: …… ☐

1 - Doesn't work 2 - Irregular work 3 - Regular work (not in his own place)
4 - Regular work (in his own place) 5 - Works with secondary education degree
6 - Works with university degree

*Number of family members: ☐☐

Family structure:

1 - No. of children below 5 years ☐ 2 - No. of children 5 to 11 years ☐

3 - No. of children 11 to 18 years ☐ 4 - No. of adult males >18 years ☐

5 - No. of adult females >18 years ☐

Family members' educational levels:

Gender	Total	Primary	Preparatory	Secondary	University
Male					
Female					

*No. of school age sons (6-18 years) but not attending school: ☐

Working ☐ Not working ☐

*No. of school age daughters (6-18 years) but not attending school: ☐

Working ☐ Not working ☐

*Number of rooms in the house (including the hall) ☐

*House built of: 1 - Brick 2 Wood (Aricha) 3 - Other (mention) …… ☐

* House: 1 - Own 2 - Own but still have installments 3 - Rent ☐

*Cost of installment/month **or** *Cost of rent/month ☐☐☐

*Floors: 1 - Paved 2 - Concrete 3 - Non-paved (earth) ☐

*Source of water inside the house?

1 - Tap 2 - Spring 3 - Other (mention)……. ☐

*Source of water in the village?

1 - Tap 2 – Spring 3 - Deep well ☐

* Presence of electricity? 1 - Yes 2 - No ☐

*Source of cooking energy inside the house?

1 - Electric oven 2 - Gas-stove 3 - Cannon (wood oven) ☐
4 - Other …….……

*Presence of WC inside the house? 1 - Yes 2 – No ☐

* Family assets:

- Land 1 - Yes 2 - No ☐ specify: ……..
- Car 1 - Yes 2 - No ☐ specify: ……...……..
- Livestock 1 - Yes 2 - No ☐ specify: …….……..

Assessment of Nutritional Status of the Family

Team code: ☐ Investigator code: ☐☐ Reviewer code: ☐☐

Serial .No: ☐☐☐ Date: ☐☐ ☐☐ ☐☐

Head of household (name): ……..

Number of family members ☐☐

- The approximate percentage of family income used to buy food:

1 - <50% 2 - 50-75% 3 - >75% ☐

- If the family has extra income, how is it spent? (choose one only)

1 - Buying clothes 2 - Cost of sons' education ☐

3 - Buying food 4 - Saved

- When you have extra money, what are the main types of food you buy? (choose one only)

1 - Flour or rice 2 - Milk and meat ☐
3 - Fruits and vegetables 4 - Fat or oil

- After food prices increased, were there changes in buying food? (choose one only)
1 - Flour or rice 2 - Milk and meat ☐
3 - Fruits and vegetables 4 - Fat or oil

Food Aid Program (WFP)

Is the family receiving food items from the World Food Program?

1 - Yes 2 - No ☐

If the answer is No, why? ……

(If the answer is Yes, complete the questionnaire)

Kind	Amount for the family (in Kg)		Duration of supply		Is it supplied regularly?
	Weekly	Monthly	1 - >1 year	2 - <1 year	1- yes 2- no
Flour					
Peas and/or beans					
Sugar					
Oil					

- Is the food aid sufficient for you?
1 - Yes 2 - No ☐

- Who benefits from the food aid?
1 - The whole family 2 - Young children 3 - Adults ☐

- If there is a shortage in the food supply what you will do?
1 -Buy these foods from the market 2 - Borrow from other families
3 - Decrease consumption rate ☐

- If the food amount is more than your family needs what you will do?
1 - Store the extra 2 - Give it to neighboring families 3 - Sell some ☐

Assessment of Health Status of the Family

Team code: ☐ Investigator code ☐ Reviewer code ☐☐

Serial No: ☐☐☐ Date: ☐☐ ☐☐ ☐☐

Head of household (name): …….

Micronutrient deficiency signs for the mother:

Signs of vitamin A deficiency

*Night blindness ☐

*Bitot's spots ☐

*No signs of Vitamin A deficiency ☐

Goiter detection

*Grade of goiter size ☐

Clinical Examination for Children (under 5 years):

Name of the child …… Birth Date ☐☐ ☐☐ ☐☐

Signs of vitamin A deficiency

Night blindness ☐

Bitot's spots ☐

No signs of Vitamin A deficiency ☐

Goiter detection

Grade of goiter size ☐

Morbidity (during the last month)

***Diarrhea, vomiting or both** ☐

Number of episodes ☐ Duration of episode days ☐☐

***Upper respiratory disease** ☐

Number of episodes ☐ Duration of episode days ☐☐

***Lower respiratory disease** ☐

Number of episodes ☐ Duration of episode days ☐☐

***Fever attacks:** ☐

Number of episodes ☐ Duration of episode days ☐☐

***Skin rash (measles)** ☐

Number of episodes ☐ Duration of episode days ☐☐

Food Frequency

Investigator code: ☐☐ Supervisor code: ☐☐

Serial No.: ☐☐☐ Date: ☐☐ ☐☐ ☐☐

Governorate: .....…….. District: ....…… Village: .....……..

Head of household (name): …….

Food item	Code	Weekly		Monthly		Notice
		Less than 3 times	More than 3 time	Less than 3 times	More than 3 times	
Energy foods						
Carbohydrates	**1130**					
Sugar	**2101**					
Halawa tehina	**2111**					
Molasses	**2112**					
Bread	**1120**					
Fats						
Baladi margarine	**1307**					
Butter	**1303**					
Oil	**1330**					
Palm oil	**1334**					
Tehina	**1641**					
Building foods						
Meat	**1701**					
Liver	**1710**					
Poultry	**1731**					
Fish	**1405**					
Beans	**1601**					
Egg	**1201**					
Milk & products	**1801**					
Protective foods						
Vegetables	**2307**					
Fruits	**1542**					
Vitamin A rich vegetables & fruits						
Drinks						
Tea	**1001**					
Coffee	**1002**					
Karkade	**1006**					
Helba	**1008**					
Carbonated water	**1012**					
Juices	**1534**					

24 Hour Recall (Mother)

Serial No.: ☐☐☐ Date: ☐☐ ☐☐ ☐☐

Team code: ☐ Investigator code: ☐☐ Reviewer code: ☐☐

Governorate: ……. District: ……. Village: ……..……

Name of mother: ……/Age ☐☐ years

Physiological Status:

1 - Pregnant 2 - Lactating 3 – Non-pregnant non-lactating ☐

Weight ☐☐ kg Height ☐☐ cm

Eating events	Food or beverages		Code	Amount by household measurement	Amount in grams
	Food item	Composition			

24 Hour Recall (Child Under 5 Years)

Serial No.: ☐☐☐ ☐☐ ☐☐ ☐☐
Date:

Team code: ☐ Investigator code: ☐☐ Reviewer code: ☐☐

Governorate: ……..……. District: ……..……. Village: ……..……

Name of child ……/type: 1 - male 2 - female ☐

- Date of birth ☐☐ ☐☐ ☐☐

Weight ☐☐ kg height ☐☐☐ cm Arm circumference ☐☐

Hb test ☐☐ ☐ **Who did blood test (lab technician code)** ☐

- Did the child get the routine vaccination?

  Yes ☐ No ☐ Not regular ☐

- Did the child receive vitamin A supp. dose?

  Once ☐ Twice ☐ No ☐

- Is the child currently breastfed? Yes ☐ No ☐
- How long did the child breastfeed? Weeks ☐
- During the breastfeeding stage, when did you give the child food other than breast milk? ☐☐

Eating events	Food or beverages		Code	Amount by household measurement	Amount in grams
	Food item	Composition			

Contributors

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Thanks are due to all the field team from the National Nutrition Institute who worked very hard and traveled log distances to conduct this survey.

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