Background

MABAT is the Hebrew acronym for the First National Health and Nutrition Survey, which was planned and carried out by staff of the Food and Nutrition Services of the Public Health Services and the Israel Center for Disease Control. This survey was the first stage of an ongoing process of monitoring the health and nutrition status of the population. The study was approved by the Institutional Review Board of the Sheba Medical Center and the Ministry of Health.

National health and nutrition surveys are essential and efficient means to describe the general health, lifestyles and nutritional status of the population. The findings of these surveys provide scientific data which serve decision and policy makers in the formulation of policy and planning of interventions, both for the population at large and for specific population groups. The information generated from the surveys serves as a basis for the evaluation of health indicators in the population, the monitoring of changes over time, and the identification of sub-population groups at increased risk of morbidity.

National health and nutrition surveys are undertaken periodically in many countries, in accordance with the recommendations of the WHO (World Health Organization) and the FAO (Food and Agriculture Organization). In Israel, the lack of information has hindered the development of health promotion programs and delayed the formulation of guidelines for the Israeli population as a whole and for specific subgroups of the population.

Specific contribution of this survey – Mabat First

The findings of this survey form a basis for formulation of dietary guidelines for the population at large, and for specific population groups. The findings enable identification of at-risk groups, and form a baseline for development of intervention programs to improve nutrition status in these groups. The survey provides baseline information, to be used in monitoring eating patterns.

Significance

The MABAT First survey - the national health and nutrition survey- is an important means for decision making concerning nutrition policy in Israel. The Department of Nutrition in cooperation with the Israel Center for Disease Control conducted the first national nutrition survey. This survey is the first stage of an ongoing process of monitoring the health and nutrition status of the population. Very repetitive- is this what was also written in Hebrew
Methods
Survey design
Descriptive. Cross-sectional survey.

Study population:
The study population was based on a random sample from the population registry and a sample of neighbors of the people in the random sample. Eligibility required that the participant had been in Israel at least for one year prior to the interview and not in long-term care or living in institutions. Due to logistic problems, the Bedouin population was excluded. The target sample size was a minimum of 3,000 men and women aged 25-64.

Population definition
Random samples were drawn from the national population registry (Jews and others) within the relevant age group, age 25-64, that have lived in the country for at least one year and are listed as “active” status, ( alive, holding Israeli citizenship and listed as residents of Israel, living in the country).

Sampling method: random sample.
The sample – clarification

Table 1: Distribution of the population, age 25-64, according to Jew/Other, and two ages groups (in 1000’s)
(Statistical Abstract of Israel 1997 No.48 table 2.10)

<table>
<thead>
<tr>
<th>Strata</th>
<th>Age distribution by % in population</th>
<th>Age 25-44 in 1000’s</th>
<th>Age 45-64 in 1000’s</th>
<th>%</th>
<th>In 1000’s</th>
</tr>
</thead>
<tbody>
<tr>
<td>Jews</td>
<td>60% 60% 40% 40%</td>
<td>1246.1</td>
<td>826.5</td>
<td>84</td>
<td>2072.6</td>
</tr>
<tr>
<td>Others</td>
<td>75% 75% 25% 25%</td>
<td>289.8</td>
<td>110.2</td>
<td>16</td>
<td>400.0</td>
</tr>
<tr>
<td>Total</td>
<td>62% 62% 38% 38%</td>
<td>1535.9</td>
<td>936.7</td>
<td>100</td>
<td>2472.6</td>
</tr>
</tbody>
</table>

The desired sample size for each stratum was decided according to its representation within the population from the total 3000. Following this, each sample was divided according to expected compliance within each age group and the coverage (Table no. 2). The expected compliance within the older age group was 60%, within the younger age group-50%. The expected compliance within the “others” group was expected to be 50% mainly because of difficulties of locating the people. As the sample provided was not sorted according to population groups, (“Jews” and "others") it was decided to allocate the total sample according to the expected compliance by age only.
Table 2: Sample size for each age strata, according to chances of “finding” person, dropout because of interviewing difficulty, refusals, and living overseas

<table>
<thead>
<tr>
<th>Strata</th>
<th>% representation within population</th>
<th>Total samples from the 3000</th>
<th>Young age group</th>
<th>Older age group</th>
<th>Number of samples according to 50% expected compliance – young group</th>
<th>Number of samples according to 60% expected compliance – older group</th>
<th>Desired sample size</th>
</tr>
</thead>
<tbody>
<tr>
<td>Jews</td>
<td>84</td>
<td>2,520</td>
<td>1,512 (60%)</td>
<td>1,008 (40%)</td>
<td>3,024</td>
<td>1,680</td>
<td>4,704</td>
</tr>
<tr>
<td>Arabs</td>
<td>16</td>
<td>480</td>
<td>360 (75%)</td>
<td>120 (25%)</td>
<td>720</td>
<td>200</td>
<td>920</td>
</tr>
<tr>
<td>Total</td>
<td>100</td>
<td>3,000</td>
<td>1800</td>
<td>1200</td>
<td>3,774</td>
<td>1,880</td>
<td>5,624</td>
</tr>
</tbody>
</table>

A second sample, of 3000 persons, was ordered, during the field interview stage- as compliance numbers were low. Criteria for the second sample were identical to those for the first sample:

Age: The distribution of older and younger is 40% / 60% for Arab and Jewish population.
Sex: 50% women and 50% men
Nationality: 16% Arabs

For each sample the following identifying details were provided: identity number, surname, first name, previous last name (important especially for young women), the known address as appeared in the civil registry at the time of sampling (December 1998), sex and date of birth.

The sample was sorted by age but unsorted by nationality or religion (Jew, other) and then transferred. Thus, two samples were obtained according to age, with the younger group (ages 25-44) constituting 62% of the sample. Others (non-Jewish minorities) constituted 16% (see Table 1).

After receiving the sample the following actions were carried out:

1. Addition of nationality according to last name and settlement.
2. Addition of a district number in order to examine the dispersing of settlements.
3. Calculation of the age of the sampled people in order to facilitate the reviewers' initial conversation.
4. A random division of the samples to the sampling days.

Telephone numbers were located using the "Dvash-Telepathy" computer program, used for matching telephone numbers to names. Where a telephone number could not be found or where the number was incorrect, a telephone number search based on the family name was carried out using the program, which lists all persons with a particular family name at a specific address. If the sample person could not be located, he/she was classified as “non-located”. If the person consented to the interview, a letter explaining the survey and its importance was sent to his/her home. If the sample person was located but did not consent to be interviewed, the status of “refused” was assigned.

In order to reduce the costs of the survey, it was decided to include neighbors of the sample persons in the study population. Lists of persons living in the same building as the person located in the random sample were created using the “Telepathy” program. In the case of sample persons living in private homes (not multi-dwelling buildings) lists were produced of...
neighbors living in the same street, with priority for those living in closer proximity. Up to two neighbors could be interviewed for each person in the original sample. If the individual in the population registry sample agreed to be interviewed, one of the individuals in the neighbors' sample was selected for interviewing. Otherwise, two neighbors were selected, until the desired sample size was reached. A total of 3,246 persons were interviewed, 1,969 of whom were neighbors. Overall there was an over-sampling of Arabs of 11.1%.

Response rates
1,992 people aged 25-64 from the Israeli National Population Registry sample could be identified correctly according to name, identity number and address. They were approached by telephone and 1,287 (64.6%) agreed to be interviewed in their homes. 1,277 completed the interview (64.1%).

Of the total of 3,246 interviewees who completed the interview (random sample and neighbors' sample), 3,242 agreed to report a first 24-hour food recall and 4 refused (2 individuals in the random population sample and 2 in the neighbors' sample). According to the survey design, a second 24-hour food recall was to be carried out for 50% of the random population sample. In actual fact the second 24-hour food recall was carried out for 1,472 (45.3%) of the random population sample.

Analysis of differences
In an attempt to assess the extent of possible non-response bias, differences between groups were examined on a number of levels:
In the random population sample – when those contacted were compared with those not contacted due to technical difficulties, it was found, after adjusting for sex and population group, that those who were contacted were, on the average, 1.1 years older (p<0.001). When comparing those who were interviewed to those who refused to be interviewed, no significant age difference was found, following adjustment for sex and population group.

When the random sample was compared with the neighbors' sample, it was found that among those interviewed; the average age was 2.6 years higher in the neighbors' sample than in the registry sample. There was no difference in average number of years of schooling between the two samples. After adjusting for sex, age and population group, no significant differences in weight, height or BMI were found between the interviewees in the two samples.

The questionnaire.
The questionnaire included demographic details on the sample person and family, questions on health status, alcohol intake, exercise, smoking habits, eating and dieting habits, food allergy and sensitivity, food supplementation use, knowledge and attitudes regarding nutrition and sources of nutrition knowledge. Data collection was carried out over two years. The purpose was to reflect the variations in the nutritional habits of the Israeli population in the different seasons of the year, on all days of the week, including religious holidays.
In addition to the general questionnaire, a 24-hour food recall was conducted, in which the interviewee was asked to report his or her food consumption in the 24 hours prior to the interview. As part of the Mabat survey interviewers used cards, a Food and Food Quantities Guide, and measuring aids such as a measuring cup, a tablespoon and a teaspoon (used to facilitate quantification of foods consumed). Furthermore, those who agreed filled out a survey on their "bowel habits". A total of 1159 samples answered the questionnaire.
The Hebrew questionnaire was translated into three languages: Arabic, Russian and English. A total of 2,356 (72.6%) of the interviews were in Hebrew, 830 (25.6%) in Arabic, 56 (1.7%) in Russian and 4 (0.1%) in English. The Hebrew and English versions were coded and include categories that were added during preparation of the data file. The Arabic and Russian versions are the original questionnaires used in the field during the data collection stage.

The interview
A face-to-face interview was carried out with the sample person in the person's home. As described above, this interview included a 24-hour food consumption recall. In order to assess intra-personal variation, a second 24-hour food consumption recall was carried out in the interviewee's home, within 10 days of the first interview. The second interview was conducted for 41.9% of the sample.

The Food Recall
The 24-hour recall method was used to obtain information on dietary intake in which the interviewee was asked to report his or her food consumption in the 24 hours prior to the interview. The food recall was conducted in two stages. During the first stage the interviewee was asked to give a quick list of the foods and drinks he/she ate and drank and to report at what hour of the day they were consumed. During the second stage the interviewee was asked to answer further, more detailed questions, such as times of meals, where the meals were consumed, and to what meal each specific food belonged. In addition, at this stage he/she was asked to give a more specific inventory of the food items and beverages that he/she remembered eating and drinking, and to quantify them. In order to assist the interviewee in identifying food types and quantities during the food recall, a "Food and Food Quantities Guide" was prepared, based partly on the Food Information Booklet of the United States Department of Agriculture. The Guide includes detailed questions about food, and many photographs of Israeli foods. The first version of the Guide was published by the Israel Center for Disease Control in November 1998. Another version of the guide was prepared in Arabic, adapting it to the eating habits of the Arab population of Israel and including also photographs of foods common in Arab cuisine.

The data in this publication are based on the first 24-hour food recalls (first interview). Data from the second food recalls are available at the Israel Center for Disease Control upon request.

The Israeli Nutrient Database - BINAT
For the statistical analysis, a food and nutrient database was needed, which could be used to translate the data collected on food intake into data on the nutrient components of each food item.

The existing Israeli Nutrient Data Base ("BINAT"), was expanded and updated from various sources (see below), concurrently with the collection of data, by means of the "MANA" program. The database is continuously being updated on the basis of changes in the information provided by the various data sources, which are also continually being revised. This may in the future lead to changes in some of the data presented.

The Israeli Nutrient Database is based on the following data sources:

1. The USDA (United States Department of Agriculture) database. This database is the basis for the structure, the classification and identification of the foods. All the other sources are integrated into this structure.
2. Databases of other countries, such as: England, Italy and Lebanon.
3. The Israeli food industry.
4. Laboratory tests performed by the Ministry of Health to determine the nutrient components of certain local (Israeli) foods.
5. Imputation - a method for calculating nutrient values of a local product on the basis of the nutrient values of an existing similar product, for which all the nutrient values exist.
6. Optimization - A method that enables the calculation of all nutrient values of a certain food item, after defining the components and constructing a "recipe" (a recipe is a food item consisting of a number of foods, such as: salads, soups or cakes). If some or all of the components undergo a cooking process, changes that may affect the nutrient values during this process are taken into consideration.

**Anthropometric measurements**

Anthropometric measurements were performed in order to obtain standardized, objective information, in addition to self-reporting. All the measurements were carried out twice, and an average was calculated. The following measurements were carried out: height, weight, waist circumference, hip circumference. All measurements were carried out in light clothing. Height and weight were measured without shoes. If the interviewee refused to remove his shoes, a note was made. Weight was measured using portable analog scales, with a maximum measurement of 130 kg, and level of accuracy of 0.5 kg. The scales were placed on the (non-carpeted) floor, calibrated to zero before commencement of weighing. If the two measurements differed by more than 1 kg, the interviewee was weighed a third time. Height was measured using a coil-spring tape measure, a fixed angle (right angle) made of wood, plastic or aluminum was used to determine intersection of top of the head with the wall. Stickers were used to mark the height measurement. If the two measurements differed by more than 0.4 cm, a third measurement was done. Waist circumference was measured using a flexible nylon tailor's measuring tape, with a maximum measurement of 1.5 meter. The tape was placed at waist level at the narrowest part of the body, at the place of the “fold” formed when bending over. If the two measurements differed by more than 0.5 cm, a third measurement was done. Hip circumference was also carried out using a flexible nylon tailor's measuring tape, with a maximum measurement of 1.5 meter. The tape was placed horizontally on the interviewee, at hip level, at the widest part of the body, where the buttocks are most prominent. If the two measurements differed by more than 0.5 cm, a third measurement was done.

**Quality Control**

Various quality control checks were maintained. The management staff directly observed a sample of the interviews for each interviewer. All questionnaires were checked at the ICDC by specially trained staff.

**Data Entry**

Data entry was performed using two programs. General data were entered using SAS screens, specially developed for the questionnaire. Data on the food recalls were entered using a special MAGIC-based program "MANA", especially adapted to meet the needs of the Mabat survey. Quality control was carried out both on the general data entry and on the food data entry. Checking of the SAS data entry was done by comparing keyed in data from the questionnaire with the answers from the original questionnaire being read out by one of the
staff; by checking the data output against the original questionnaire; and by checking the frequency distributions for outliers and errors. In all instances where data entry errors were found, these were corrected and after completion of data entry and corrections the data were analyzed using the SAS program.

After completion of entry of the 24-hour food recall data, reports summarizing the food intake were produced in an Excel format. These reports were checked for outliers, inappropriate quantities, and hours that did not match meals, missing quantities, and incorrect use of codes. In all instances where data entry errors were found, these were corrected, and after completion of food data entry and corrections, final Excel reports were prepared. The SAS data entries were merged with the Excel files, and final analyses were carried out using the SAS program.

**Merging files**

In order to merge the main data file and the (EAT) file containing the details of food items eaten by each sample, use the int + intkod variables.

**Main variables**

**Demographic:** (Appears on questionnaire cover)

- **Sex**
- **Age- in years, by year of birth**
- **Personal status** – (questions 70-94)
  - Nationality - by categories
  - Religious definition - by categories
  - Country of birth - self defined
  - Year of immigration to Israel (for non-Israeli born)
  - Country of father’s birth - self defined
  - Country of mother’s birth - self defined
  - Country of maternal grandmother’s birth - self defined
  - Country of paternal grandfather’s birth - self defined
- **Crowding of dwelling:** Number of rooms in house

  - Number of people living in household

- **Income - personal - by categories**
- **Income - household - by categories**
- **Supplementary income (Pensions) - by categories**
- **Number of schooling years (all schools) - years**
- **Scholastic achievement - by categories (type of diploma, certificate etc.)**
- **Employment status – yes, no**
- **Profession/training - self defined**
- **Job description - self defined**
- **Staff management – by number of staff managed by interviewee**
- **Work routine - by categories**

**Eating patterns** - (questions 1 -16)

- **Vegetarianism/ veganism - self defined**
- **Foods avoided - self defined**
- **Food allergy/sensitivity – self defined**
- **Foods avoided - by categories.**
Use of food supplements by: which supplements used – by name
Recommendations for use - by categories
Frequency - by categories
Daily food intake - based on analysis of food recalls:
  By nutrients- energy, protein, fat (including type of fat), carbohydrate, fiber, vitamins, minerals;
  By foods and drink (type, quantity)
Meals: intake, number of meals and times - self defined, by categories
Food combinations- types, number - by categories
Place of eating
Food source (home, restaurant) – for each food - self defined, by categories
Food consumed on recall day – same as usual or not. If not, reasons,
Kashrut- self defined
Use of kosher meat, koshering of meat at home - self defined

**Alcohol Intake** - (questions 17-23)
Any alcohol drunk in past year (including for religious purposes) – yes, no
Kiddush, Havdala (ritual alcohol intake):
Times (Friday eve, Saturday morning, Havdala) – yes, no
Types of alcohol consumed - by categories
Amounts of alcohol consumed - by categories
Frequency of alcohol consumed - by categories
Other alcohol intake- according to:
Types of alcohol consumed (beer/ red wine/white wine/ spirits/liqueur/ other) - by categories
Amounts of alcohol consumed - by categories
Frequency of alcohol consumed - by categories

**Dieting patterns** - (questions 24-31)
Following any type of diet - yes, no
Weight reduction – yes, no
  Source of recommendation for weight reduction - by categories
  Dietary instruction- by categories
Other diets (not for weight reduction or maintenance) - yes, no
  Type of diet - by categories
  Source of recommendation for diet - by categories
  Dietary instruction for diet- by categories

**Attitudes to nutrition, sources of information, food labeling** –
(questions 32-39)
Degree of interest in relationship between nutrition and health -scale
Degree of influence of nutrition publications on eating patterns -scale
Sources of nutrition information -categories
Food purchasing- degree of interest in price/cleanliness of sales point/use by date/ nutrition label -scale
Food labeling- frequency of checking, degree of understanding, degree of belief in: ingredient listing, presence of food colors, and presence of preservatives, nutrition claims, health claims, and nutrition label -scale
Nutrition facts table: frequency of checking of nutrients listed, 14 items (energy, protein, carbohydrate, fat, saturated fat, cholesterol, sodium, dietary fiber, vitamins, iron, calcium, sugar, minerals and other) - scale

Health status (questions 40-44)
Self assessment of health status - scale
Lifetime diagnosis (by doctor) and if currently treated: anemia, osteoporosis, hypertriglyceridemia, hypercholesterolemia, diabetes (IDDM, NIDDM) hypertension, stroke, cancer – yes/no
Lifetime incidence Heart disease and cardiac surgery - heart attack, coronary bypass surgery, angiogram (diagnostic, with stent) -scale
Regular medication use - type and reason - self assessment

Hormone use and lactation practices (questions 41-49)
Current status of women – (pregnant, breastfeeding, not pregnant, not breastfeeding) - by categories
Hormone use – women- use of contraceptives, hormone replacement therapy – yes/no
Fertility – women only -number of children - self assessment
Lactation - yes/no.
History of lactation- ages of children, duration of breastfeeding, age (months) of introduction of solids/liquids

Reported weight, height (questions 50 – 56)
Date last weighed - categories
Weight at age 18
Weight change over past 2 years - categories
Pattern of weight change
Association between weight change over past 2 years and a weight loss diet – categories
Association between repeated weight change over past 2 years and a weight loss diet – yes/no

Physical activity (questions 57- 64)
Level of activity at work - categories
Aerobic activity- general – yes/no
frequency - categories
Non-aerobic activity - yes/no
Routine physical activity for 10 activity items - yes/no
Frequency, duration (minutes), time period- for 10 activity items; walking, running, cycling, swimming, aerobic exercise, ball games, dancing, body shaping, light exercise, other exercise – categories

Smoking (questions 65- 68)
Current status (3 categories) - present smoker, past smoker, never smoked
Smokers (including past smokers) – commencement age, what is/was smoked, number of cigarettes per day (now/past)
Past smokers - period of time (months, years) since cessation

Anthropometry (questions 95 - 98)
Measured height, weight – average of 2 measurements
Measured waist circumference, hip circumference – average of 2 measurements
BMI – calculated from average height and weight measurements
Hip/waist ratio - calculated from average hip and waist measurements

**Bowel habits** – (questions 1 - 16)
Bowel habits questionnaire, self administered.
Frequency- usual, desired - categories
Times of bowel movements, as related to meals
Use of medications, treatments- to aid bowel function – yes/no
Types, frequency of use, purpose, recommendations - categories
Impact of smoking on bowel function - categories
Definition of bowel habits - categories
Presence/absence of burping, flatulence
Effects of food on bowel habits- types of foods and effects
   Use of food to affect bowel habits
Reasons for fluid consumption - categories
Daily fluid consumption- types and amounts (8 items)
Sleep- number of hours per day

**Note:** When using the survey data in publications, please mention the data source as specified -
First published: February 2012.