Nutrition Survey

of

The Democratic People's Republic of Korea

Report by the EU, UNICEF and WFP
of a study undertaken in collaboration with the Government to DPRK

November 1998

Report on the

Nutrition Survey

of

The Democratic People's Republic of Korea

Contents

Introduction

The Nutrition Survey aimed to provide the Government and its international partners with an assessment of the current nutritional situation of young children in the DPRK. The assessment was designed to serve as a reference for future evaluations of the combined impact of the range of programmes implemented by the Government and its partners.

The specific objective of the Nutrition Survey was to assess the nutritional status of a representative sample of children from six months to seven years of age.

Survey Methods

Study population

The Democratic People's Republic of Korea (DPRK) consists of 9 provinces and 3 major municipalities. There are 212 counties in these areas. The counties consist of smaller administrative entities; these are the Ris (in rural areas), or the Dongs (in urban areas). The total population of the country is over 22 Million.

The Central Bureau of Statistics of the DPRK is the body responsible for providing information related to the population census and the population size of different counties in the country. This information was made available at the planning stage for the purpose of sample selection.

The universe of the sampling excluded 82 counties to which access is currently not granted to international assistance personnel or to which access could not be guaranteed prior to the survey. Thus the sample selection was based on 130 counties to which access could be guaranteed, representing 71 percent of the country's population and 61 percent of all counties, with a range from 22 percent to 91 percent for various provinces.

Sample Design

The required sample size was estimated for different indicators, using the following basic assumptions: the number of persons per household = 4.5; and the proportion of population under 5 years = 11%; design effect = 2 to 10. A standard margin of error of 5 percentage points was used, and the prevalence of malnutrition was estimated as a rough guess of what the true values might be. It was agreed that a sample size of 3600 households would be drawn for the study.

Multi-stage sampling was used to identify clusters at the level of the Ris/Dongs. At the first stage 30 counties were selected with probability proportional to size (PPS). Within each of the selected counties, 4 Ris/Dongs were then selected using PPS, based on the information that all Ris consist of about 1000 households, and all Dongs have about 1500 households.

In the third stage, 30 households were selected from each of the 120 sampled Ris/Dongs. The selection was made by systematically sampling at the Ri/Dong level prior to data collection.

Annex 1 lists the provinces, counties and clusters included in the study. They are listed in order of regions: .i.e., East Coast (North Hamgyong, South Hamgyong, Kangwon); West Coast (North Pyongan, South Pyongan, Nampo city, North Hwanghae, South Hwanghae) and the Central Region (Ryanggang, Chagang, Pyongyang city, Kaesong city). Annex 2 contains a map of the counties in DPRK.

The household selection took place at the head office of the RI/Dong, where a complete and up-to-date list of all households was made available to the teams. Systematic sampling was used to select the 30 households from each cluster (Ri/Dong). At the request of the government, a copy of the list of selected households was given to the Ri/Dong chairman on the day before the start of the field work: families were informed of the intended visit and thus a call-back visit was rarely needed. The Ri/Dong officials guided the team to the selected households where the target group was surveyed, i.e. children aged 6 months to 84 months.

Data Collection

The field work was carried out by fourteen teams, each consisting of one international and four nationals - two health officers, one interpreter and one driver. Each team had two coordinators, one from the Government and the other representing one of the international partners in the survey - EU, UNICEF or WFP. The counties to be surveyed were divided into three groups, each being assigned a different coordinating international partner. EU contributed personnel to three teams, UNICEF contributed to eight teams and WFP contributed to three teams. Following the provision of the agreed protocol for the survey, field work started on the 23rd September, 1998 and ended on the 16th October, 1998. Appendix 5 lists the names of the members of the field teams as well as the international coordinators and technical advisers.

The coordinator in each team next recorded the age, sex, height and weight of the children, and examined them for signs of oedema.

Weights and heights were measured using the standard methods recommended by the WHO. UNICEF electronic scales (Seca, USA) were used for weight measurement, and Shorr infant/child height measuring boards (Shorr, Maryland) were used for height measurement.

All field team members, international and national, were intensively trained. This was done at the Institute of Child Nutrition (ICN) in Pyongyang. The training covered the methods of sampling, anthropometric measurement and identification of oedema.

The international members of the field teams received an extra training session (reinforcement training) in the UNICEF office on the 21st of September, two days before the start of the field work proper. It aimed to strengthen their knowledge of the survey methods. A full review of the sampling methods at the Ri/Dong level was done and a learning-by-doing exercise was employed to ensure subsequent accuracy in the measurement of heights and weights. Volunteer children were used for this session. International co-supervisors were instructed to help maintain high standards of data collection, especially by checking each questionnaire for completeness, accuracy and legibility. In addition, stress was laid on checking the accuracy of the equipment during every field visit.

A number of documents were distributed to the teams, in both Korean and English languages, to facilitate training and the subsequent reliability of data collection. These included guidelines for use of the scales, a summary procedure for nutritional status measurement, a field manual, and a list of the responsibilities of the team leaders. The field manual is included in Appendix 3.

Data processing and analysis

Raw data from the completed English language questionnaires were compiled by designated individuals from each of the international partners involved in the survey. A Data entry file was created using EPI-INFO (version 6). All data entered by the three agencies were then merged to create a complete data file. Double data entry was made in the UNICEF office to help reduce transcription errors. All data entry operators were trained by the UNICEF consultants. They were also introduced to the process of data editing, to data entry programmes , and to file handling methods. Consistency checks and editing were done to produce a clean set of data for analysis.

The raw data on weights and heights were converted into indices using EpiInfo EPINUT, based on the growth reference curves developed by the National Center for Health Statistics (NCHS). This procedure is recommended by the World Health Organization. Information on age, sex, weight and height were used to calculate the values of various anthropometric indices - height-for-age (HA), weight-for-age (WA), and weight-for-height (WH). These indices were expressed in terms of Z-scores, relative to the international growth reference values, as recommended by WHO.

The cutoff points recommended by WHO, CDC, and other authorities, to classify low anthropometric levels were used in the analysis. Children whose anthropometric indices fell below a Z-score of –2 were considered moderately or severely malnourished. Those falling below –3Z were considered severely malnoutrished.

Preliminary data analysis was done at the UNICEF office using EPI INFO and the Statistical Package for Social Sciences (SPSS). A second round of analysis was subsequently done under the coordination of representatives of the three international partners cooperating in the survey. SAS was used for this analysis in which adjustment was made for the sample design. Since the sample selection was based on assumptions about the numbers of households in the Ri/Dong, an adjustment was made in keeping with the actual numbers of households found in the Ri/Dong. Also, all cases with values less than –6Z score were excluded from the height for age computation. These cases were considered to contain errors in the recorded ages.

Main findings

Table 1 shows the age and sex distribution of the children studied. Females and males were roughly equally represented in the sample.

Overall malnutrition prevalence is shown in Table 2, for each of the three indices computed. Moderate and severe wasting, or acute malnutrition, affected approximately 16 percent of the

children, including about three percent with oedema. Moderate and severe stunting, or chronic malnutrition, affected about 62 percent of all children surveyed, while the prevalence of moderate and severe underweight, or low weight for age, was approximately 61 percent.

If children under five years of age are considered, the data indicate that underweight was more prevalent in this surveyed population (about 60 percent) than in the most severely affected countries of East Asia (40 percent in Cambodia and Laos). The prevalence of underweight in this surveyed population is even higher than levels found in Bangladesh (56 percent) and India (53 percent).[1]

The age and sex distribution of malnutrition is presented in Table 3, from which it can be seen that the prevalence of wasting peaks in the age range 12 to 35 months, before and after which it is less. On the other hand, stunting and underweight continue to rise through the fourth year and tend not to decline thereafter. The data also show that the prevalence of malnutrition, measured by all three indicators, tended to be higher among boys than girls. While the distributions of weight for age and height for age were normally shaped, their mean Z scores were very negative, indicting that the whole population of children seems to have been affected by the crisis.

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[1] The data from the current survey excludes children under six months of age and therefore are not directly comparable with data normally reported in the literature. However, a rough comparison is possible by making a reasonable assumption that, in the current DPRK situation, prevalence of underweight among the 0-5 month age group is similar to the prevalence among the 6-< 12 month age group.

Table 1. Age and sex structure of the sample

Age group	Males N	%	Females N	%	Total N	%
6 - <12 months	61	6.9	83	9.5	144	8.2
12 - <24 months	146	16.5	151	17.3	297	16.9
24 - <36 months	159	17.9	133	15.2	292	16.5
36 - <48 months	139	15.7	125	14.3	264	15.0
48 - <60 months	141	15.9	125	14.3	266	15.1
60 - 84 months	241	27.2	258	29.5	499	28.3
Total	887	100	875	100	1762	100

Table 2. Overall prevalence of malnutrition

	Percent Malnourished	Z-score	
	< -2Z	Mean	95% Confidence intervals
Wasted (Wt/Ht)	15.6	0.95	-1.03 to –0.87
Stunted (Ht/Age)	62.3	-2.57	-2.73 to –2.45
Underweight (Wt/Age)	60.6	-2.29	-2.44 to –2.20

Table 3 . Prevalence of moderate and severe malnutrition by age and sex

	Males	Females	Total
Wasting (Wt/Ht < -2Z)	Percent	Percent	Percent
Age groups			
6 - <12 months	19.1	16.5	17.6
12 - <24 months	36.5	25.8	30.9
24 - <36 months	25.3	14.2	20.5
36 - <48 months	16.3	9.2	13.4
48 - <60 months	14.6	3.0	8.9
60 - 84 months	11.7	4.2	7.8
Stunting (Ht/Age < -2Z)			
Age groups			
6 - <12 months	23.0	8.2	14.5
12 - <24 months	45.6	51.1	48.5
24 - <36 months	63.7	60.2	62.2
36 - <48 months	74.6	75.6	75.1
48 - <60 months	80.0	75.0	77.5
60 - 84 months	76.4	73.4	74.8
Underweight (Wt/Age < -2Z)			
Age groups			
6 - <12 months	46.7	21.6	32.2
12 - <24 months	63.1	49.4	56.1
24 - <36 months	72.1	61.5	67.3
36 - <48 months	69.1	70.3	69.7
48 - <60 months	66.6	56.6	61.9
60 - 84 months	70.1	59.7	64.7

Annex 1 Selected provinces, counties and clusters

Province	County	Ri/Dong	Cluster No.
North Hamgyong	Giju	Ryong Dam Worker District	241
		Gum Song Ri	242
		Yong Buk Workers District	243
		Ju Nam Workers Distrct	244
	Chongnam	So Ri	251
		In Gok 1 Dong	252
		Mun Hwa 2 Dong	253
		Ryen Jin Dong	254
South Hamgyong	Tanchon	Hae An 1 Dong	231
		Ga Wan Ri	232
		Gum Gol 2 Dong	233
		Ryong San Ri	234
	Hwyngdok	Hung Buk Dong	271
		Un Dok Dong	272
		Hung Do 3 Dong	273
		Hung So Dong	274
	Jongpyong	Go Yang Ri	281
		Tae Yang Ri	282
		Da Ho Ri	283
		Se Gang Ri	284
	Rakwon	Rak Won Count	291
		Sa Dong Ri	292
		Hung Sang Ri	293
		Se Po Ri	294
Kangwon	Wonsan	Chun San Ri	211
		Rul Dong	212
		Wa U Dong	213
		Hae Bang 2 Dong	214
	Tongchon	Myong Go Ri	221
		Bo Ho Ri	222
		Song Jon Ri	223
		Bong Ho Ri	224
North Pyongan	Jongju	Sam Ma Dong	081
		Yok Jon Dong	082
		Sin Bong Ri	083
		Bo San Ri	084
	Taechon	Song Tae Ri	091
		Un Ryong Ri	092
		Bal Jon workers District	093
		Dok Hung Ri	094
	Cholsan	Ga Bong Work District	101
		Li Ha Ri	102
		Myong Am Ri	103
		Gom Am Ri	104

Province	County	Ri/Dong	Cluster No.
South Pyongan	Anju	Ryong Hwa Ri	111
		Chil Song Dong	112
		Nam Hung Dong	113
		Song Do Ri	114
	Bukchang	Song Nam Worker District	121
		Hye An Ri	122
		Sin Bok Ri	123
		Sin Pyong Ri	124
	Pyongsan	Ha Cha Dong	131
		Bak Sng Ri	132
		Du Mun Dong	133
		Bo Dok	134
	Songchon	Ryong Hung Ri	141
		Jam Rim Workers District	142
		Hye Jon Ri	143
		Un Jong Ri	144
	Pyongwon	Suk Am Ri	151
		Ryonggo Ri	152
		Won Am Ri	153
		Song Eim Ri	154
Nampo City	Hungyu	Jung Dae Du Dong	061
		Gom Sa Ri	062
		Ha Bi Suk Dong	063
		Do Gi Ri	064
	Chollima	Bong Hwa Dong	071
		Jung Dong	072
		Dal Ma Dong	073
		Hwa Suk Dong	074
North Hwanghae	Sariwon	Gu Chon 4 Dong	181
		Dong 1 Dong	182
		Buk 2 Dong	183
		Jong Bong Ri	184
	Bongsan	To Song Ri	191
		Song San Ri	192
		Chon Dok Ri	193
		Ma San Ri	194
	Sinjye	Tae Ul Ri	201
		Jong Bong Ri	202
		Gum Song Ri	203
		Baek Gok Ri	204
South Hwanghae	Samchon	Gung Hung Ri	161
		Wal Bong Ri	162
		Sin Myong Ri	163
		Pak Nam Ri	164
	Chaeryong	Samgi Gang Ri	171
		Ryong Go Ri	172
		Jae Ryong Cou Ri	173
		Bu Dok Ri	174
Ryanggang	Hyesan	Hye Hung Dong	261
		Ye Yon Dong	262
		Gang Gu Dong	263
		Jang An Ri	264

Province	County	Ri/Dong	Cluster No.
Chagang	Tongsin	Yang Hung Ri	301
		Won Hung Ri	302
		Ryong Pyong Ri	303
		Baek San Ri	304
Pyongyang City	Ryongsong	Oun Dong	011
		Chong Ge Dong	012
		Ryong Gung 1 Dong	013
		Ryong Song 1 Dong	014
	Samsok	Song Mun 2 Dong	021
		Kung Dok Ri	022
		Sam Song Ri	023
		Do Dok Ri	024
	Songyo	Nam Sin 1 Dong	031
		Zank Chung 2 Dong	032
		Lulkok 2 Dong	033
		Dae Hung Dong	034
	Taedonggang	Buksu Dong	041
		Dae D Gang Dong	042
		Sakok 2 Dong	043
		Mun Hung 1 Dong	044
	Junghwa	Gun Bong Ri	051
		Sam Song Ri	052
		Choe Song Ri	053
		Ma Jang Ri	054

Annex 2 DPRK provinces and counties

DPRK
Provinces

DPR Korea Nutrition Survey

The field manual

Things to remember:

- the key for the success of the survey is good interviewing skills
- that the interview is an interaction between the interviewer and the respondents
- that the appearance and behavior of the interviewer affects the answers elicited for the Interview
- The interviewer tasks are largely based on a) finding the sample members; b) obtaining an interview; c) asking the questions, d) doing the measurements, if needed

A. Finding the sample members:

Before discussing the methods of finding the sample members we have to define the **respondents**.   After introducing yourself identify the head of the household. Children living in the selected household are targeted in the survey. If no adult or the mother is not at the house you may consider call-back. Discuss it with the team leader.

As for selecting household notice the following:

30 household in each Ri or dong will be selected on site <u>systematically</u> from a complete list of all houses in the Ri or dong.

The usual technique requires a list not necessarily numbered, of all the sampling units(i.e. households). Having decided on the size of the required sample (in here 30 houses) the field worker calculates the sampling interval, expressed as the total number of households divided by the size of requested sample (30). The outcome figure k will then be used to select the sample. Thus, the field worker selects every Kth item in the list, starting with a household selected at random (using random numbers).

Example: In a cluster the total number of households in the selected Ri is 600. Thus the sampling interval is 20 (600/30). The field worker has to select every 20th after starting with a random number between 1 and 20; say 9, so he will selects 9th, 29th, 49th and so on.

Note to team leaders: Remember to fill in the list of selected household from the sample area. Fill in the form and sign it. The selection will be carried out in the county headquarter after meeting with the chairmen of the four Ris, that are selected for the survey.

B. Obtaining the interview:

The aim is to increase the respondent's motivation to cooperate. Thus introduce yourself and your organization, state why the survey is being done, inform them of the possible time of the interview, and ensure confidentiality.

C. Asking the questions:

Start with identifying the respondents and ask the questions in systematic order, trying to be consistent with your style. Please try to assess the adequacy of the responses and when necessary you may probe for further details. In the case of inadequate responses you may pause a while expecting further information. Remember that encouraging but not suggesting is good way of increasing the responses.

Recording the answers, although very simple, is an important task.   It is expected to do the recording with accuracy and without errors. Always check the code you used. At the end check that your questionnaire is complete.   Of course your handwriting must be clear and neat.

The detailed instructions of the questionnaire are included below.

D. Doing the examination and measurements:

Anthropometric Measurements:

Weight Measurement.

This is to be done using the UNICEF Electronic Scale. This scale is simple and accurate, when used properly.

How to do the measurement

- Prepare the scale. The scale has two windows. The display window and the solar window. The display also has a 'baby in arms' symbol.
- Put the scale on the floor in a well-lit place. Look at the display window, and if it is not blank , please wait for two or three minutes until the scale switches itself off.
- Turn the scale on by covering the solar window for less than one second by moving the bottom of your foot or palm quickly across the switch window. The scale will switch on and you will see a number. In about 5 seconds, the scale will adjust itself to zero and you see the display of 0.0. This indicates that the scale is ready to weigh a person.
- The person then stands still on the scale. The person should have very light clothing. You will see for few seconds that the number 1 is moving back and forth from side to side to show you that the scale is working.
- Then you should see the weight of the person in the display.
- Write it down, and weigh the next person following the above steps.
- If you are going to weigh a young child who has to be held by the mother, repeat the above mentioned steps. Weigh the mother, and while the mother still on the scale, pass your foot across the switch window. You will see the display with the sign of 'baby in arms'.   Hand the baby to his mother while she sta ying on the scale. Wait for few seconds, and then read the child's weight.
- If you faced any problem, please consult the manual.

Height Measurement

This is to be done using the Height Measuring Board.

- Prepare the Measuring board. Make sure that you know how to handle it. Fix the pieces.
- Pick a hard flat surface against the wall. Make sure the board is stable.
- Ask the child to stand on the board.   The standing position should be straight.   Make sure that the feet and shoulders are onto the board. The vision line should be straight.
- When the child's position is correct, place the headpiece a few centimeters above the child's head and slowly lower it onto the head.
- Children less than two years must have their length, not height, measured. Thus 1) place the measuring board on a hard flat surface; 2) lay the child on the board supporting him at the trunk of the body, and making sure that the head against the base of the board; 3) place the foot-piece firmly against the child's heels; 4) m read the measurement to the nearest 0.1 cm. Make sure the recording is correct.

Remember: It is extremely important to take the measurement in a proper way, and to re -check your reading and recording.

Instructions on the questionnaires

Starting with the Basic information on the Ri/Dong , enter the cluster number first.

Q1.1 Enter the total population in the Ri/Dong

Q1.2 Enter the total number of households

Q1.3 Enter the number of the health facilities available

Q1.4 Enter the number of nurseries in the Ri/Dong

Q1.5 Enter the number registered in the nurseries

Q1.6 Enter the number of children attending the nurseries in July

Q1.7 Enter the number of kindergartens in the Ri/dong

Q1.8 Enter the number of children registered in the Kindergartens

Q1.9 Enter the number of children attending the kindergartens in July

Q2.0 Fill in the size of the Ri (land) estimated in squared kilometers

Move now to describe the Ri/Dong.
- Enter the cluster number as instructed
- Enter the household number as instructed
- Fill in the name of the province
- Fill in the name of the district
- Fill in the Ri/Dong name
- State whether it is urban or rural. '1' is urban and '2' is rural
- Fill in the name of he household head
- Fill in the address as described
- Enter the name of the clinic/hospital utilized by the family
- Enter the date of interview
- Enter your code and name
- Write down the name of the national co-supervisor
- Write down the name of the international co-supervisor
- The data entry clerk will write down his name and code and will state down the date for data entry.

Move now to fill in the household list

Q1. -Fill in the number of persons usually residing in the dwelling then list all children under 17 years old and married women between 15 to 49 years old. Start with the oldest woman then her children recording the youngest child first.

Q2. Fill in the number of the persons in the sequence as above

Q3. Write down the name of the person in order

Q4. Enter the code specified for the sex of the person .1' is male and '2' is female

Q5. Fill in the date of birth for the person listed starting with days, months then year

Q6. Convert the date of birth into age Years/months

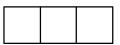Q7. Enter the appropriate code indicating whether the child is attending a facility, as specified.

Then move to do the measurements

Annex 4   **Nutrition Survey Questionnaire**

DPRK – Nutrition survey 1998

LIST OF SELECTED HOUSEHOLDS FROM THE SAMPLE AREA

Province (City).. ....

County (District)..

Ri/Dong name ....

Cluster | | | | Number of households in the Ri | | | | |

Person providing the Ri list:

Name ....

Position ....

Contact details: Tel. no. ....

Any relevant comments about the quality of the list:

....

....

....

Sampling interval used: ....…   Starting point: ....

    Names of national interviewers:-   Signature :-

 1. ....

 2. ....

    Name of international observer:-   Signature :-

    ....….......   ....

Household	Name	Address	Workteam
01			
02			
03			
04			
05			
06			
07			
08			
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30			

ANTHROPOMETRY MODULE

Household

INTERVIEWER: *After questionnaires for all children are complete, the measurer weighs each child under 7 years old. Record weight and height below, taking care to record the measurement on the correct questionnaire for that child (Interviewers with WFP and EU should not fill the child number).*

Child no	Rewrite name	Sex 1=Male, 2=female	Date of birth dd/mm/yy	Weight (kg)	Clothes 1=full, 2=light	Height/ length (cm)	Oedema 1=yes, 2=no

Thank the parents for their cooperation.

Annex 5 Survey Personnel

International Technical Advisers and Coordinators

Mohamed Ali	(UNICEF consultant)	Catherine Mears	(EU)
Hayam Bashour	(UNICEF consultant)	Ali Mokdad	(UNICEF consultant)
Peter Digby	(UNICEF consultant)	Omawale Omawale	(UNICEF)
Judit Katona-Apte	(WFP)	Runar Soerensen	(UNICEF)
Michel Masson	(EU)		

Field Workers

National

Health Officers

Choe Dong Chol
Choe Yong Hui
Han Man Gap
Hong Yong Ae
Jang Do Kyong
Jang Kyong Suk
Jo Chang Su
Jong Bong Ju
Jong Chol Jin
Kang Kyong Yon
Kim Chol
Kim Gwang Song
Kim Ho Yong
Kim Kyong Sun
Kim Myong Sun
Kim Song Un
Kim Su Hwan
Kim Yang Guk
Kim Yong Suk
Pak Hak Chun
Pak Yong
Ri Bae Kil
Ri Hun Je
Ri Ran Ok
Ryu Kwang Song
Sim Byong Chol
Sim Hung Sop
Sok Yong Guk

Interpreters

Gu Hyon Myong
Han Hye Yong
Jon Chol Nam
Jon Ok Sun
Jong Kwang Chol
Kim Mun
Kim Mun Chol
Kim Mun Nam
Kim Son Il
O Hye Ran
Paek Chan Myong
Paek Kyong Hui
Pak Yong Su
So Yong Sun

Drivers

Jo Sung Jin
Kim Gyong Gi
Kim Il Nam
Kim Jong Bok
Kim Jong Sok
Kim Kil Nam
Kim Kwang Bok
Kim Myong Hyan
Kim Pil Hyon
Pak Ri Sik
Rim Chang Man
So Man Ho

International

EU

Rita Cauli
Piere Gerard
Jean-Francois Letang
Heather McDonnel

UNICEF

Fathia Abdallah
Afaf Jamil
Ahmed Madar
Malcolm Nachia
Nalinee Nippita
Herbert Raaijmakers
Bardan Rana
Suchitra Rani Singha
Ahmed Tayeh
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Rita Bhatia
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Marilyn Weingartner