Measuring hunger in the Russian Federation using the Radimer/Cornell hunger scale

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Compared in the study are the results obtained using the Radimer/Cornell hunger scale to measure the prevalence of hunger in random samples of mothers and their households in the Russian Federation and in the USA in 1993. The 12 items in the scale measured hunger at three levels: household, women, and children. If the mother answered positively to one of the four items at a particular level, hunger was established for that level. The prevalence of hunger in the Russian Federation was very high: approximately 77% of the women surveyed, 70% of the households, and 32% of the children were classified as hungry. The corresponding estimated prevalences of hunger in New York State in 1993 were 46.8%, 25.9% and 18.3%. In both surveys, children were the least likely to be classified as hungry and, if they were, their mothers and households were almost always hungry. In both surveys, the hunger scale proved to have criterion-related validity. Basic indicators of household socioeconomic and demographic well-being were highly related to the three levels of hunger. The higher level of hunger in the Russian survey can be explained by the very low incomes. Further study of the nutritional status of the Russian population is recommended.

Introduction

From February 1992 to May 1994, the U.S. humanitarian relief organization CARE responded to the health and food security crisis in the former Soviet Union. With financial support from the U.S. Agency for International Development (USAID), CARE established a survey unit whose task was to identify nutritionally vulnerable groups and to assess their needs. One round of surveys assessed food security and nutrition among children under 2 years of age. For this purpose, CARE conducted nutritional surveys in the cities of Moscow, St Petersburg and Ekaterinburg and their surrounding *oblasts*, which are more rural. The surveys were carried out by personnel hired and supervised by CARE technical staff.

The results of the study showed that children under 2 years of age were at risk of food insecurity, although there was no evidence of frank protein–energy malnutrition. A high proportion, approximately 25%, had anaemia. The majority of households reported spending over 50% of their monthly income on food. The risk was exacerbated by low levels of childhood immunization.

Details of the under-2-year-old survey itself have been published (*1*). This article analyses hunger in the Russian Federation and compares the results with those on hunger in a U.S. population. Both the U.S. and Russian studies used the Radimer/Cornell hunger scale to measure the prevalence of hunger in the respective populations. This scale was first used in New York State in 1988 and 1993 to identify households experiencing hunger, defined as "the inability to acquire or consume an adequate quality or sufficient quantity of food in socially acceptable ways, or the uncertainty that one will be able to do so" (*2*). The entire Radimer/Cornell questionnaire from the New York surveys, except for one item used only in the 1993 survey, was translated into Russian and used in the present study, together with a range of socioeconomic, demographic and nutritional data.

The present article compares the findings of hunger assessment among the Russian population with those of the 1993 New York study, since both their designs were similar. Both included random samples of women, not just low-income women. In addition, an evaluation is presented of the criterion-related validity of the Radimer/Cornell hunger scale.

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Methods

The Russian study design was based on a cross-sectional representative sample of 4860 children under 2 years of age. Six areas — Moscow, St Petersburg, Ekaterinburg and their surrounding *oblasts* were sampled. Two-stage cluster sampling was used in the cities, and three-stage sampling in the *oblasts*. Approximately 800 mothers were questioned in each of the six study sites. The survey in the cities was conducted from July to September 1993 and the *oblast* survey from October to December 1993. Details of the sampling methodology have been published previously (*1*).

In the 1993 New York survey, the study design consisted of a stratified random sample of women and their children living in a rural county in New York State. Radimer et al. sampled a much smaller number of women than were sampled in the Russian study (*3*).

The Russian questionnaire included questions on the socioeconomic status of the household (household food and non-food expenditures), dietary assessment, anthropometry, and the Radimer/Cornell hunger scale. The questionnaire for under-2-year-olds used the same 12 Radimer/Cornell hunger items as in the 1988 New York survey, which did not include an additional household qualitative item used in the 1993 survey. These items measured hunger at three levels: household, women, and children. Radimer and a team from Cornell University developed the questionnaire by first conducting in-depth interviews with mothers who had experienced hunger. The Cornell team then carried out a second phase, using survey methodology and factor analysis to determine the 12 items that were most valid and reliable (*3*).

The response categories for the items were also the same in both the New York and Russian surveys: "never", "sometimes" and "often"; answers were considered positive if the response was either "sometimes" or "often". If the mother answered positively to one of the four items at a particular level, hunger was established for that level.

Results

Sample characteristics

Demographic details of the sample populations in the Russian Federation and 1993 New York studies are shown in Table 1. Women in the Russian Federation sample were relatively well educated: <8% reported not completing high school. Approximately 90% of the mothers were ethnic Russians. The average household comprised 4.1 persons. More than half of the households consisted of a nuclear family; the remainder (37.5% in the cities and 29.1% in the *oblasts*) were extended families, with a grand-

Table 1: **Demographic characteristics of the Russian and New York samples**

	Russian Federation		
	Cities	*Oblasts*	New York
Mean age of children (months)	13.1	12.4	NA[a]
Mean age of mothers (years)	26.6	25.4	33.6
Mean parity of mothers	1	1.7	NA
Mothers without high school education	4.9%	7.0%	16.0%
Households designated as rural	NA	37.3%	100%
Household composition			
Mean household size	4.1	4.1	4.3
Nuclear families	55%	65%	80%
Extended families	37.5%	29.1%	1%
Single mothers	7.5%	5.9%	19%
Employment status			
Mothers unemployed	29%	25%	36%
Fathers unemployed	14%	11%	28%
Households receiving state allowances	89.1%	88.3%	21%[b]
Mean monthly household income (per adult household member)	US$ 39	US$ 46	NA
Mean monthly food expenditure (per adult household member)	US$ 26	US$ 31	US$ 73
Sample size	2402	2458	193

[a] NA = not applicable
[b] Percentage of New York families receiving food stamps

parent typically living with the family. Fewer than 8% of the mothers were single.

In the Russian Federation twice as many women as men (ca. 12%) were unemployed. Over 85% of the families were receiving some type of state allowance. Approximately 70% of the mothers received the allowance for a child aged ≤1.5 years. Also, 43% of mothers received an allowance for mothers of children ≤6 years of age, 20% the subsidized milk for young children, 7% the single mother's benefit, and 4% the benefit for mothers of many children. The average allowance received by the mothers was low, approximately 4000 roubles (US$ 4) per month. The data in Table 1 indicate that the economic conditions among the Russian sample were difficult: the average per capita income was <50000 roubles (<US$ 50) per month and about 70% of this was spent on food.

Women in the 1993 New York sample were less educated than those in the Russian sample: 16% of the mothers had not completed high school. The average household, however, was similar at 4.3 persons. A larger proportion (80%) of New York households were nuclear families, and approximately 20% of the mothers were single. The unemployment rates for both men and women were also higher at 28% and 36%, respectively. Annual income was <US$ 10000 for 25% of the sample, US$ 10000–15000 for 18%, US$ 15000–20000 for 13%, US$ 20000–25000 for 14%, and >US$ 25000 for >30% of the sample. Over 20% of the households were receiving food stamps, and the mean monthly cost of food per person was US$ 73. The sample size for the New York study (n = 193) was much smaller than that for the Russian study (n = 4860) and the New York sample was entirely rural (*3*).

Prevalence of hunger

Table 2 shows that maternal hunger was the commonest type: approximately three out of four mothers responded positively to at least one of the items on women's hunger. Household hunger was also high: 71.9% of households in the cities and 67.1% of

Table 2: **Distribution of positive responses to the Radimer/Cornell hunger scale**

	% in Russian Federation		
	Cities	*Oblasts*	% in New York
Prevalence of household hunger	71.9	67.1	46.8
Household hunger items			
1. I worry whether my food will run out before I get money to buy more (qualitative)	56.3	58.6	39.0
2. The food I bought just didn't last and I didn't have money to get more (quantitative)	42.6	44.6	22.3
3. I ran out of the foods that I needed to put together a meal and didn't have money to get more food (quantitative)	42.5	41.9	29.6
4. I worry about where the next day's food is going to come from (qualitative)	54.0	50.2	13.2
Prevalence of women's hunger	79.1	75.0	25.9
Women's hunger items			
1. I can't afford to eat the way I should (qualitative)	70.8	66.3	22.6
2. I can't afford to eat properly (qualitative)	58.9	60.5	23.2
3. I am often hungry, but I don't eat because I can't afford enough food (quantitative)	11.9	11.4	9.8
4. I eat less than I think I should because I don't have enough money for food (quantitative)	28.2	24.9	14.8
Prevalence of children's hunger	33.3	29.8	18.3
Children's hunger items			
1. I can't afford to feed my child(ren) a balanced meal because I can't afford that (qualitative)	25.0	26.1	15.1
2. I can't afford to feed my child(ren) the way I think I should (qualitative)	29.7	28.0	26.9
3. My child(ren) is/are not eating enough because I just can't afford enough food (quantitative)	15.2	12.0	7.1
4. I know my child(ren) is/are hungry sometimes, but I just can't afford more food (quantitative)	2.8	2.6	8.5

those in the *oblasts* were classified as hungry. Children's hunger was the least common, with 33.3% of households in the cities and 29.8% of those in the *oblasts* considered "child hungry".

Table 2 also shows that in the New York survey, household hunger (46.8%) was the commonest type, followed by women's hunger (25.9%) and children's hunger (18.3%) (*3*).

In general, in both surveys, the qualitative items of the hunger scale had a higher proportion of positive responses than the more concrete or specific items, which Radimer has termed "quantitative". Overall, the children's quantitative items in both surveys received the lowest number of positive responses. Children in both surveys were the least likely to be classified as hungry and, if they were, their mothers and their households were very likely to be considered hungry (*3*).

Correlates of hunger

The Radimer/Cornell scale proved to have criterion-related validity in that socioeconomic and demographic characteristics associated with hunger were highly significantly related to hunger status at all three levels. These socioeconomic "criteria" or characteristics included the following: single mothers, poverty (i.e. receiving the highest amount in government allowances), ≥3 children, rural household, non-Russian mother, primary breadwinner unemployed, and low education level of the mother. The hunger scale did not include any items that were significantly associated with the nutritional indicator measured in the survey, i.e. low weight-for-age of the children (<–2 SD).

The results of the 1993 New York survey also showed that many of the same demographic characteristics, such as household economic status, employment status, educational level, and participation in a food programme, varied significantly by hunger status. The New York survey, like the one carried out in the Russian Federation, did not show a significant relationship between hunger and body mass index of the household members (*3*).

Discussion

The estimated prevalence of hunger in the Russian Federation survey was very high: approximately 77% of the women, 70% of the households, and 32% of the children were classified as hungry. As with the New York findings, a household designated as "child hungry" was most probably experiencing the most extreme form of hunger (*2*). Even though child hunger was less prevalent than maternal and household hunger, an alarming number (>30%) of children in the Russian Federation were classified as hungry. Since hunger in children can have detrimental effects on their cognitive development and later productivity as adults, it is strongly recommended that the nutritional status of Russian children be further studied (*4*). The high level of hunger in the Russian Federation could be explained by low incomes, inadequate social security and the declining economy over the past 6 years (*1*, *5*, *6*).

The distribution of hunger within families differed in the Russian and New York surveys. Maternal hunger was the most prevalent form in the Russian Federation (77%) whereas in the 1993 New York survey it was household hunger (47%). The higher prevalence of maternal than of household hunger in the Russian Federation may be explained by a recent World Bank report (*7*), which states that the psychological climate in the Russian Federation poses formidable barriers to the most efficient use of female labour. Women have traditionally been overrepresented among the poor and vulnerable groups in the country and this trend has intensified with rapid inflation. Women, who make up 53% of the population, account for 60% of the unemployed, and their average salary is a third less than that of men. Women in the Russian Federation may be suffering more from hunger in order to provide first for their children and then for other household members.

According to the World Bank report (*7*), in the Russian Federation there is also near exclusive dependence on women's domestic labour for maintaining the material well-being and comfort of households. As a result much of the social protection of the young, the old, and the disabled is borne by women in the context of the family. Women, and particularly mothers, may therefore comprise a vulnerable group that should receive increased attention.

In general, the Radimer/Cornell scale behaved very similarly in both surveys. This can be understood in the context of the types of populations surveyed and the study design methods used. In both populations, frank malnutrition in children is rare, since historically these populations have met at least the calorific needs for growth and body maintenance (*1*, *8*). Food consumption behaviour in general tends to satisfy energy needs first, while the diversity and dietary quality may worsen. The results of the survey of under-2-year-olds and other findings suggest that this may be the case in the Russian Federation. Low weight-for-age (<–2 SD), which would most probably indicate that energy needs were not being satisfied, had a very low prevalence (<3%) among the Russian children. Anaemia, however, which could

reflect that food quality was deteriorating, was high: 25% of the children in the survey had a haemoglobin level ≤11 g/dl. In the under-2-year-old survey mothers also reported marked reductions in the consumption of meat and fruit, though not of starch, which may explain these findings. The Radimer/Cornell hunger scale may be useful in providing early warning that dietary quality and diversity in a population are worsening before frank malnutrition, as measured anthropometrically, becomes prevalent.

Finally, the present study suggests that a simple index may be used to assess hunger in populations. One study has reported that the Radimer/Cornell hunger scale is conceptually clear, with the items thoroughly tested and validated, and contains items appropriate for a baseline measure of hunger within the U.S. population (*4*). The scale also seems appropriate in measuring hunger in the Russian Federation. In addition, this direct measure of hunger is more sensitive and specific than indirect indicators. Radimer writes:

"Virtually all coping tactics and all physical consequences of hunger have been shown to be insensitive, meaning that assessing hunger with emergency food demand, missing meals, going a day without food, or weight loss misses many of the hungry. Several coping tactics have also been shown to be nonspecific: getting family help with food and limiting food intake have included people or households that were not hungry" (*3*).

Most importantly, the information derived from the hunger scale can be used to make decisions that affect policies and programmes. Classifying individuals on the basis of household and individual hunger is a simple and straightforward way of identifying those households that would benefit from different kinds of intervention (*8*). The Radimer/Cornell scale should be studied further as a rapid assessment or early warning tool. Other similar measures may have limitations of accuracy, be too costly or reflect only advanced stages of hunger (measured by anthropometry), and therefore a new, simple assessment tool is highly desirable. The results we have reported here for the Russian Federation suggest that the Radimer/Cornell hunger scale may be a viable alternative.

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Résumé

Fédération de Russie: évaluation de l'état nutritionnel à l'aide de l'échelle de Radimer/Cornell

En 1993 on a appliqué l'échelle nutritionnelle de Radimer/Cornell lors d'enquêtes effectuées en Fédération de Russie et aux Etats-Unis d'Amérique afin de mesurer la prévalence de la sous-alimentation chez les mères et dans leurs ménages, échantillonnés de façon aléatoire. Les 12 points de l'échelle permettent de mesurer les carences alimentaires à trois échelons: le ménage, les femmes et les enfants. Si la mère a répondu positivement à l'un des quatre points d'un échelon donné, on considère que cet échelon présente des carences alimentaires. La prévalence des carences alimentaires en Fédération de Russie s'est avérée très élevée: environ 77% des femmes, 70% des ménages et 32% des enfants sur lesquels les enquêtes portaient se sont avérés souffrir de sous-alimentation selon cette échelle. Les prévalences estimées correspondantes pour l'Etat de New York en 1993 sont de 46,8%, 25,9% et 18,3% respectivement. Dans les deux cas, les enfants sont ceux qui sont les moins touchés par la sous-alimentation et s'ils le sont, leurs mères et leurs foyers en souffrent également presque toujours. En Fédération de Russie comme aux Etats-Unis d'Amérique, l'échelle de Radimer/Cornell a montré sa validité par rapport à certains critères. Les indicateurs de base du bien-être socio-économique et démographique d'un ménage sont étroitement liés aux trois échelons de sous-alimentation. On peut expliquer les chiffres plus élevés de l'enquête russe par les très faibles revenus rencontrés dans ce pays. Il est recommandé de procéder à des études plus approfondies de l'état nutritionnel de la population russe. Cette échelle nutritionnelle a opéré de la même façon dans les deux pays, montrant ainsi qu'on peut utiliser un indicateur simple pour évaluer l'état nutritionnel des populations.

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