

Guidelines for Investigating
Suspected Starvation Deaths
(Document prepared by the JSA Hunger Watch Group)

Contents

Section I: Introduction

Section II: Outline of Investigation Methodology

Section III: Assessment of Death Rates

Section IV: Anthropometry to assess nutritional status of the community

Section V: Assessing 'Food Security' related schemes and parameters

Section VI: Verbal Autopsy procedure

Section VII: How to prepare the final report and draw the 'Hunger Pyramid'

Section VIII: Entitlements for a population facing Food Insecurity

Annexures

1. Verbal Autopsy questionnaires
2. Expected Weight for Age (NCHS Standard)
3. IAP classification of Weight for Age
4. Details of food security schemes

Section I

Introduction

During the last few years, news items of drought, crop failure, suicides by farmers, and reports of starvation and hunger deaths have come in from various parts of the country. **The stark contrast between deaths in situations of severe food deficit on one hand, and government godowns overflowing with food grains on the other hand is mind-boggling.** Governments routinely shrug off reports of starvation deaths either by pointing out that people have been eating some inedible items (like mango kernels), or by blaming some illness immediately preceding the death. Often the only steps taken by the government are to hide the cause of mortality when there is uproar over starvation deaths. The reluctance of the Government to formulate and disseminate a coherent definition of starvation and starvation deaths is regrettable. It is surprising that even the academic community of nutritionists and public health professionals has not taken interest in clarifying this area of considerable social significance. This is a major hindrance for people's organisations who try to answer distress calls of the affected citizens.

In this context, during the NWG meeting of Jan Swasthya Abhiyan on 4 January 2003, it was decided to form a 'Hunger Watch' group as a response to high levels of undernutrition, growing instances of hunger deaths and government apathy towards them. The aim was to arrive at a scientific protocol to investigate and document hunger related mortality. This protocol could be employed across the country to assess undernutrition and document starvation deaths.

Subsequently, a group of activists from the Jan Swasthya Abhiyan, met on the 22nd and 23rd February 2003 in Mumbai to constitute the 'Hunger Watch' and to concretise the methodology to investigate hunger related deaths.*

One of the ideas behind constituting such a group has been that while the situation of silent hunger hardly seems to draw any action for relief, instances of suspected starvation deaths send the government machinery into overdrive to vehemently deny their occurrence. Therefore it was thought that efforts must be made to systematically investigate and document starvation deaths, at the same time keeping a focus on a community diagnosis of a starving population and to advocate for relief to the entire community. The occurrence of a starvation death could be used as an advocacy tool to highlight the omnipresent undernutrition, and could help establish the Right to Food for chronically starved populations especially in case of severe drought or crop failure.

We are acutely aware that the issue of starvation is ultimately not primarily a technical issue, but is rather related to deep-rooted socio-economic inequities, which require radical and systemic solutions. While the Hunger Watch group can perhaps only help point out the larger changes necessary, our dream would remain an India where no one goes to sleep hungry, no child remains undernourished, and no shame of a starvation death burdens our conscience.

* Those attending the Mumbai meeting included Veena Shatrughna (Deputy Director, National Institute of Nutrition, Hyderabad), Vandana Prasad (Paediatrician), Narendra Gupta (Prayas), Sunita Abraham (Christian Medical Association of India), Sarojini (SAMA and Convenor of MFC), C. S. Kapse (Professor, Department of Forensic Medicine, D. Y. Patil Medical College), Neeraj Hatekar (Professor, Department of Economics, University of Mumbai), Sanjay Rode (Ph. D. student, Department of Economics, University of Mumbai), Abhay Shukla (Co-ordinator, SATHI Cell, CEHAT), Neelangi Nanal, Amita Pitre and Qudsiya (all researchers at CEHAT).

Section II

Outline of Investigation Methodology

While approaching the issue of hunger related deaths, we should start with the basic fact that starvation and malnutrition related deaths are *public health problems requiring community diagnosis*. In this sense they differ from classical 'disease related mortality'. The diagnosis of a death due to tuberculosis may be approached as an individual diagnosis. But *the diagnosis of a 'malnutrition death' cannot be just an individual diagnosis*; we have to document the circumstances prevailing in the family and community along with the individual to reach such a conclusion.

When we look at the scale and depth of malnutrition in tribal and rural areas of our country, making individual diagnosis of a few 'malnutrition deaths' may seem almost peripheral to the main issue. These deaths, though tragic and extremely unfortunate especially since they could have been so easily prevented, are just the tip of the iceberg of a situation of near universal undernutrition in most tribal and backward rural areas. However, the paradox is that the Government can ignore or downplay the fact that millions of children and adults lead lives of severe, chronic undernutrition since it does not provoke any public outcry. But a few malnutrition deaths reported in the press make the entire Government machinery go into overdrive to 'deny' such an event and take some emergency measures. Even civil society and middle class opinion which starts wringing hands at the mention of starvation deaths, remains impervious to the implications of findings such as NIN data according to which around 90% of children in rural areas are undernourished! So what do we do - focus on the widespread community undernutrition / starvation or on the few starvation deaths? The first emerges as the main problem from a public health perspective while the second has certain urgency and carries the advocacy impact of moving public opinion and the Govt. system. *Our approach needs to adequately understand and document both.*

Another issue we need to keep in mind is that generally prevalent 'baseline' malnutrition, gradually worsening severe malnutrition and definite starvation merge with each other along a seamless continuum. In a community which is used to barely subsistence intake, three years of drought reduces this further and then some families start eating once a day, a few poorest families eat on alternate days ... where exactly is the dividing line between malnutrition and starvation? When exactly does the situation change from 'a chronic problem' to 'an alarming situation'?

Keeping these considerations in mind, we have tried to evolve a methodology to document starvation / malnutrition related deaths within a public health framework.

To establish adult starvation deaths in a particular community, we suggest the following criteria:

- ◆ Documentation of recent increased death rates (monthly, tri-monthly) in the community compared to state averages
- ◆ Anthropometric indicators below state averages
- ◆ No mass disasters or other accidents
- ◆ Reduced food off-take from PDS and other indicators of reduced food security like eating unusual foods, increased indebtedness, large-scale outmigration for work etc.
- ◆ Sample dietary histories to assess daily calorie intake, show starvation diets (<850 Kcal per day in adults)

- ◆ Verbal autopsies reveal at least a few deaths in which starvation is an underlying cause of death (irrespective of the immediate cause, which may often be infections etc.)

Verbal autopsies should be used only in conjunction with the first five criteria, to document specific starvation deaths. *Individual starvation deaths are only extreme examples of the severe nutritional deprivation being suffered by the entire community*, and should always be presented in the larger context of community starvation.

For children, the following criteria may tentatively be used to establish malnutrition deaths -

- ◆ Increased death rates among under-five children compared to state U5MR. An exercise must be done to calculate age specific death rates, and compare this with the state averages to define increased death rates.
- ◆ Siblings of children who have died of suspected malnutrition can be assessed. Their anthropometry may show very poor nutritional status and this would be supportive evidence.
- ◆ Access ICDS records/ records from other sources for weight of the deceased child shortly before death if possible
- ◆ High mortality from minor infections (e.g. diarrhea, measles) is itself an indicator that the underlying cause of death is malnutrition. We need to compare mortality rates due to the infection in the sample community with 'standard' mortality rates for that illness. If say the case fatality rate for measles in a community is 20% compared to the known case fatality rate of 2% then the '*measles deaths*' in the community are actually malnutrition deaths in which the terminal event is measles.

Keeping these broad criteria in mind, the following activities would need to be carried out for the investigation:

- (a) Initial contact with the community, coming to know about villages affected and anecdotal reports of starvation deaths
- (b) Selection of village (s) / hamlet(s) to be taken up for the study
- (c) Assessment of deaths rates in these communities during a specific recent period
- (d) Anthropometric measurements on a sample of adults and children
- (e) Dietary survey to assess adequacy of food intake in sample families (can be combined with anthropometric survey)
- (f) Assessment of any deterioration in food security in the community, based on data about off take from PDS etc.
- (g) Accessing ICDS weight-for-age records for recently deceased children if available
- (h) Verbal autopsy in case of selected suspected starvation deaths

Section III

Assessment of Death Rates

An important component of investigating suspected starvation deaths is the calculation of death rates, in a specific area and pertaining to a specified period during which suspected starvation deaths have been reported.

Identifying the area for investigation - Anecdotal reports may be received about unusually high number of deaths from certain villages. A cluster of such villages, from where there have been reports of suspected starvation deaths, may be taken up for investigation. All the deaths that have taken place in these villages during the period of serious food deficit (say a period of at least three months, may be six months or one year) would need to be documented.

Once the villages and the period have been finalised, all the deaths during the period should be recorded by means of small group enquiries throughout the area (covering all hamlets and house clusters)/ house to house survey in that area to document deaths in that particular period of time. The families of all the deceased would need to be visited, the date / month of death should be verified for all deaths being investigated. Deaths whose timing falls outside the study period should be excluded from the calculation.

To confirm the timing of all deaths, and in order not to miss any deaths, an attempt should be made to compare this data with the mortality records maintained by the ANM for the area. Our experience is that the ANM may be better at recording neonatal and infant deaths, since she does antenatal registration, but she may not record certain deaths esp. of adults in remote hamlets, which she visits infrequently.

Local calendar, local festivals, phases of the moon and local market days may be used to ascertain the date of death in case of all deaths in the specified period. The exact number of deaths in this period should be used for the calculation of death rates. The shorter the recall period, greater will be the accuracy in assessing the date of deaths.

A parallel important exercise is to assess the exact population of all the villages / hamlets in the cluster, which would form the denominator. The Gram Panchayat would usually have figures and voter lists, yet this may be cross-checked by actual estimation of number of households based on information from local people.

How to check whether the number of deaths in this particular area are significantly higher or not?

There are two major issues involved if we calculate the death rates for a comparatively shorter period (e.g. three months) and in a small sample, and then extrapolate it to the whole year and compare it with the state figures. Firstly, there is seasonal variation in deaths. For e.g. there may be more deaths in rainy season due to water born diseases like diarrhoea. If the death rate we have calculated in our study coincides with the period in which there are seasonally higher deaths in that region, and then we extrapolate to the whole year, then definitely the death rate that we have calculated will be an overestimate compared to the annual death rate. Thus it is essential to consider the seasonal variation in deaths while calculating death rates for a shorter period. One way of doing this is to compare death rate in a specific season *this year* with the death rate during *the same season last year*. A higher rate this year indicates a definite and significant increase.

A second important issue related to calculating death rates in this manner is that if the sample population we have covered is too small in size, and then if we compare it with the rates of the state, it will may give an inaccurate estimate of death rates for that sample

population being higher than the total state. For that we need to take certain minimum population while calculating death rates (*to be estimated*), and perform a statistical *comparison of proportions, which* will take into account the difference in sample size.

To see whether the number of deaths in the area we are investigating are significantly higher than the previous year in the same area or than that of the nearby villages in the same year, we will have to follow certain steps:

1. Document all the deaths in the area we are investigating in the specified period of time in which we are suspecting that the starvation deaths have occurred.
2. Find out the number of deaths in the same area in the same period in the previous year through Gram Panchayat data.
3. The data for deaths in that District in the same period can be collected from the NSS records.
4. Find out the number of deaths for the district in that period.

To overcome the problem of seasonal variation in deaths, here we are comparing the deaths in the same period during last year in the same population. To calculate whether the deaths in the area we are investigating are significantly higher, we can apply the comparison of proportions test or chi-square test. For comparison, age specific deaths should be compared.

For e.g. total number of deaths in the age group of 0 to 5 years in the village we are investigating are 17 in the year of investigation and the total number of children in this age group is 138.

In the previous year in the same village the total number of children in the same age group were 154 and the total deaths that took place were 13. Then to find out whether the number of deaths in this year is significantly higher or not, apply the proportion test.

$$P1=17$$

$$Q1=121$$

$$N1= 138$$

$$P2=13$$

$$Q1=141$$

$$N2=154$$

$$\begin{aligned} \text{Standard error of difference} &= \sqrt{P1Q1/N1 + P2Q2/N2} \\ &= \sqrt{17 \times 121 / 138 + 13 \times 141 / 154} \\ &= \sqrt{26.80839} \\ &= 5.1776 \\ &= 5 \end{aligned}$$

Actual difference – less than 10 that is less than 2 SD therefore not significant

Section IV

Anthropometry to assess nutritional status of the community

An effective nutritional survey involves an assessment of nutritional status of children and adults in the area based on anthropometric measurements, assessment of specific deficiencies, socio-economic status, along with current sources of income, availability of food and social security measures such as Fair price shop, Ration shop and Anganwadis etc. The following strategies could help in an accurate estimation of nutritional status based on anthropometric measurements. The other parameters could be tackled with the help of a short questionnaire answered by people in a village meeting.

At the outset explain what you are going to do to the activists who are helping you. Repeat this when you go to the actual villages. Explain the procedure patiently to each person involved in the study. Take their oral consent after informing them about the nature of the study, what is the objective behind it and where will the results be used. Assure them that the names of all participants will be strictly confidential in case they are alarmed about this. Lastly tell them that they can withdraw from the study at any stage.

Sampling- It is the method of choosing a part of the study population, rather than the entire population, for participation in the study. It should be representative of all the strata in the population. Sampling makes the study easier, economical and enables us to study a larger area.

Various methods can be employed for this according to our needs. In case of the present study we can study two or three hamlets in the area, which will give us a good idea of the nutritional status in the whole area.

In order to take a representation from all the groups in the population we can select hamlets such that:

- ◆ Hamlets close to the road and away from road are covered.
- ◆ Hamlets of different tribes, and or backward castes/ classes/ areas we are interested in working with are covered
- ◆ Hamlets with and without an Anganwadi facility are covered.

We can choose 2-3 hamlets, which cover these aspects. This would be a representative sample of the people we would like to work with. Within the hamlet we need not choose a further sub-sample if the hamlet is as small as of 30-40 households. In case it is as large as that of 100-200 households, we can take a 50% sample, i.e. we can choose every alternate house. This will give us a good representation of that hamlet. We can study the children in the age group of 1-5 yrs and adults above the age of 18 years in the chosen households. This sampling scheme will be repeated in each area we want to study.

Nutritional survey of children- The weight of a child is a sensitive indicator of its nutritional status. NCHS standards for ideal body weights for children, both male and female are available to us. (*Annexure I*) Classification systems based on these standards enable us to decide from the age of the child and its weight if the child has a normal nutritional status or is either undernourished or overweight. The IAP standards (Indian Academy of Paediatrics) are most commonly used as they are also the standards used by the ICDS (Integrated Child Development Scheme). In order to use this classification the weight of the child in Kilograms (Kg) and the age of the child in months should be available. It is also desirable to measure the height of the child to know the Height for age and whether there is 'stunting' which shows chronic/ long term undernutrition.

Tools required-

1. Weighing scale
2. Height measuring tape
3. Indian / local Calendar to ascertain the exact date of birth.

Weighing children above the age of 2 years is not a problem as they can stand on the weighing scale. To weigh children between the ages of 12 months to 24 months, ask any responsible adult to hold the child in her arms. Weigh them both together. Then weigh the adult alone and calculate the difference between the two weights.

Precautions to be taken while measuring weight:

- (a) The zero error of the weighing scale should be checked before taking the weight and corrected as and when required.
- (b) The individual should wear minimum clothing, and be without shoes.
- (c) The individual should not lean against or hold anything, while the weight is recorded.

For accurate measurement of height, ask the person to stand against a straight wall. The position should be as such that both the feet are together, heels to wall and chin parallel to ground looking straight ahead.

As record of vital statistics is very poor in rural India, many times there is no reliable record of the child's age. Hence make sure that you are acquainted with the local festivals or landmark events, and take an Indian Calendar while recording the date of birth of the child. Make as accurate an estimation in months of the child's age. This is important for the following calculation.

The weight of the child should be compared to the ideal weight for that age mentioned in the NCHS standards. Calculate what percentage of the NCHS standard is the child's weight, using the formula-

$$\text{Percentage of the NCHS standards} = \frac{\text{Weight of the child}}{\text{Expected weight for that age (NCHS std)}} \times 100$$

IAP classification of Nutritional Status

Grade of Nutrition	Weight as Percentage of NCHS weight stds
Normal	> 80%
Mild to moderate undernutrition I II	71-80% 61-71%
Severe undernutrition III IV	51-60% 50% <

Tabulate the number of children falling in each category of nutrition status.

Nutritional Status of Adults- This is assessed based on the Body Mass Index or the BMI. BMI is the ratio of the weight of the adult in Kgs to the square of her/his height in meters.

$$\text{BMI} = \frac{\text{Weight in Kgs}}{\text{Height in meters}^2}$$

This is a very good indicator of adult nutritional status as it is age independent. It measures the person's weight for her height. Values of BMI between 20 to 25 are normal.

Undernutrition is measured using the following parameters.

Nutritional Status using BMI

BMI analysis	Grade of undernutrition
1. BMI <16	III degree CED*
2. BMI 16-17	II degree CED
3. BMI 17-18.5	I degree CED
4. BMI 18.5 to 20	Low normal
5. BMI 20 to 25	Normal
6. BMI >25	Overweight

*CED - Chronic Energy Deficiency

Criteria to define starvation in Adults – An important issue is that malnutrition, starvation and starvation deaths seem to lie along a continuum. How is it possible to demarcate one from the other? A significant research finding is that in adults, below BMI of 19, mortality rates start rising. *Mortality rates among adults with BMI below 16 are nearly triple compared to rates for normal adults.*

Thus in adults a B.M.I of 16 and less should be used as a cut off point to demarcate starvation from undernutrition. Based on a requirement of 0.7 Kcal / kg / hour, a 50 Kg person needs about 850 Kcal per day to maintain oneself at Basal Metabolic Rate, without any physical activity. Thus *any food intake that is sustainedly lower than 850 Kcal per day would be incompatible with life in due course and is an indication of starvation.*

Section V

Assessing 'Food Security' related schemes and parameters

The issue of food security has gained importance in India in the decade of 90s when India clearly established self reliance in food production required to meet the food needs of its total population. In fact, in late 1990s the country accumulated huge stocks of food sufficient to feed the country even if there were no crops for three years. However the paradox is that inspite of overflowing graneries, a large number of persons and families still sleep hungry for certain periods in a year, leave aside getting food in balanced quantity. There are about 800 million children undernourished in the world, out of it 400 million children are in India. A majority of adults in the country have less than the optimum body mass index. Reasons for prevailing chronic under nutrition both among children and adults range from inability to purchase food due to poverty to non-availability of affordable food owing to improper functioning of the public distribution system.

What is Food Security :

The concept of food security implies that all people, at all times, have physical and economic access to sufficient, safe and nutritious food to meet their dietary needs and food preferences for an active and healthy life. But unfortunately, this is not happening in India today for the vast majority.

Food security in India, particularly for the vulnerable sections of the population, has always been closely linked with the Public Distribution System (PDS) where from basic food item the cereal was available at subsidised cost.

However, in recent years the prices have risen very rapidly. Also, in 1997, the Union government drastically reduced the off take from the PDS when it introduced the **Targeted PDS (TPDS)**, which divided consumers into those below poverty level (BPL), and those above poverty level (APL). APL consumers were to purchase grain from the PDS at a price equal to the market rates, while the BPL consumers were expected to pay half the APL price. This resulted in the total withdrawal of the APL consumers from the PDS, while the BPL consumers found the prices beyond their purchasing power. The off-take of rice and wheat taken together fell by about 10 million tonnes in 2000-01, adding further to the already burgeoning grains stockpiled with the Food Corporation of India (FCI).

And today we witness this paradox in our country- about 70 million tonnes of wheat and rice in Government go downs and over 200 million children, women and men chronically undernourished.

The process of globalisation has further sharpened the threat to food security of many people living in India and many developing countries. Chronic hunger is increasing in several parts of the country. Improving food security at the household level is an issue of great importance.

An estimated 400 million Indians do not have access to regular and adequate quantities of food. Hunger, malnutrition and under nourishment are widespread. Many parts of the country, particularly Orissa are stalked by death due to starvation. Recently there had been reports of hunger related deaths in tribal pockets of Rajasthan and M.P. Such unusual hunger amidst plenty can be attributed to a host of reasons, many of which are direct or indirect consequences of the structural adjustment as a part of globalisation. Some of the features of

globalisation are the government set out to reduce subsidies and fiscal deficit by cutting state expenditure on rural development, cutting food subsidies, reducing priority credit to agriculture and allowing Indian agricultural prices to move closer to world prices which led to increased food prices.

All of this however meant falling rural employment and real wages for the landless, and more insecure and volatile incomes from cultivation for small farmers. Simultaneously food prices in the Public Distribution System went up because of the reduction in food subsidies. Very few could purchase foodgrains at such high prices. The government was left with huge stocks, and it ran up enormous storage costs.

Repeated years of drought in states like Rajasthan and M.P. have led to extreme threat to the food security of poor people. Not only food but, water and fodder for animals have been an issue. In such situations, the government should not weaken the Public Distribution System (PDS), rather it needs to universalise PDS, make the PDS effective in the rural areas and create more employment opportunities for the rural people.

Inability and insensitive attitude of Government to ensure food security to its people in many states of the country particularly in states like Rajasthan which is experiencing drought for many years, the PUCL (People's Union for Civil Liberties), Rajasthan branch filed a writ petition in the Supreme Court in 2001. The court after hearing arguments passed on interim orders, which were applicable to the entire country. To ensure that court orders are followed, the Supreme Court also appointed two commissioners - Shri N.C. Saxena and and Shri S.R. Shankaran as the commissioners to undertake periodic review and submit reports about the status of implementation by different state Governments.

In a significant interim order dated 28 November 2001, the Supreme Court issued directions pertaining to 8 food-related schemes sponsored by the central government. Briefly, the order directs the Union and State governments to implement these schemes fully as per official guidelines. (See Annexure – 4 for outline of each scheme and a summary of the corresponding Supreme **Court directions**)

How do we assess the implementation of food security schemes in our areas :

The eligibility criteria for each scheme are clearly laid out. We should obtain the list of beneficiaries under various schemes from the local panchayat/block development or local revenue office. A separate department generally implements ICDS scheme.

From the point of view of Food security, collecting information about PDS (including Antyodaya Yojana), Annapurna Yojana, Mid-day meal scheme and ICDS should be a priority. The information collected ought to be verified in the villages where we are working with people. By verification we should try to ascertain whether selection of beneficiary families/individuals is appropriate, and if there are more eligible families, which are left out. We should also verify whether the selected families are receiving benefits in time and in full quantity. A people's monitoring team with advice of activists may develop monitoring framework to undertake fortnightly verification exercise. A suggestive monitoring schedule is attached.

Section VI

Verbal Autopsy procedure

Verbal Autopsy is a scientific method of proven validity used for establishing the cause of death of individuals in a community, where forensic autopsies have not been or cannot be conducted for any reason. This is particularly useful in situations where the proportion of deaths occurring under medical care are low and where no autopsies are routinely carried out. This method has been successfully employed in India, Bangladesh, Kenya, Nigeria, Philippines, Indonesia, Egypt, and several other countries to determine the cause of death of individuals in various circumstances, especially to identify causes of maternal and infant mortality. At the Bhopal Peoples' Health and Documentation Clinic run by the Sambhavna Trust, Verbal Autopsy (VA) was used as a method for monitoring mortality related to the December 1984 Union Carbide disaster in Bhopal.

Sampling- Ideally, all the recent deaths in the area should be considered for VA, so there is no sampling involved. All deaths during a specified period (from one to three months) should be taken. Recall of details becomes poorer with respect to deaths prior to 3 months before the time of VA, and should be avoided.

A less demanding method is to conduct VA only on *suspected starvation deaths* during a specified recent period. However, here a working definition of 'suspected starvation deaths' needs to be used, for example 'any death where family members report that the deceased had significantly reduced food intake due to non-availability of food, during the month prior to death'. This option would thus involve a two-stage survey process, first identification of suspected starvation deaths and then VA on the selected suspected starvation deaths.

Technique of Verbal Autopsy-This method is based on the assumption that most causes of death have distinct symptom complexes and these features can be recognized, remembered and reported by lay people. It involves trained workers administering a questionnaire to the carer / close family member of the deceased. Information thus collected on the symptoms suffered and signs observed is given individually and independently to a panel of experts for ascertaining the probable cause of death.

Steps in carrying out the Verbal autopsy

- ◆ **Training-** The questionnaire to conduct a VA is somewhat medicalised in nature and hence we recommend that a person with some experience of health work be given appropriate training in administering it, familiarity of the local language would be necessary. However given the circumstances in which it has been successfully used earlier, a well-trained fieldworker with good knowledge of the local language can also be suited for the job. The section wise details of the questionnaire will be provided later. All fieldworkers have to be given the background for conducting this VA, and be trained in interviewing skills, administration of the questionnaire and signs and symptoms of diseases.
- ◆ **Identification of households-** The fieldworkers would conduct a survey to identify and list households where deaths have taken place during the specified time period. Then for the VA, they would question carer of the deceased on the medical history and clinical symptoms suffered. It is best to identify a single carer who has been with the deceased

and nursed her/him through the illness, and get all the information through this person. In case of children, the mother is the best person, though this would depend entirely on the circumstances. Using culturally appropriate language, the fieldworkers, should apply stringent criteria in the collection and recording of information. Information would be recorded on a questionnaire designed to elicit details of the last illness, bodily appearance at the time of death, details of food availability in the house, medical examinations and their results, treatment including duration etc.

The VA questionnaire- At the outset, the interviewer must explain to the carer, the purpose of conducting the VA, and take an informed consent to proceed. This may be written or oral in case of non-literate carer, but this should be explicitly recorded. The verbal autopsy questionnaire (VAQ) begins with general, introductory questions to determine the lifecycle of the deceased. An instruction sheet is used by the field workers as a guideline for administration of the questionnaire. The instruction sheet should be translated into the local language where it is to be administered. The health workers would also confirm which medical records of the deceased are in the possession of the carer. General questioning familiarizes the carer with the type of information to be collected and enables the interviewer to create favorable conditions for the carer to speak openly, regarding personal and often traumatic details concerning the deceased.

The health worker then begins an open section in which the interviewee is invited to explain what happened in their own words, details of food security, subsequent illness/es, and responses to treatment received till the death of the deceased. The statement is recorded verbatim. With the use of filter questions, specific recordings of the symptoms related to different body systems are then made. While the interviewer should be cautioned against asking leading questions, the questionnaire consists of all important symptoms and signs relating to the major body systems, which should not be left out in case their importance is not realized by the carer. Thus the health worker identifies a body system, e.g. the respiratory system and encourages the carer to provide voluntary information on any particular symptoms, e.g. breathlessness, cough, expectoration tightness in chest etc. Care is taken to ensure that the interviewer does not provide any direct or indirect suggestions during questioning. Information on medical treatment received and documents related are also gathered.

A special section is devoted to collecting information concerning family food security. Another section elicits the dietary history relating to the deceased, during the week and during the month prior to death.

Assessment of Completed Verbal Autopsy Questionnaires- The filled VAQ is then sent to a panel of three independent physicians along with available medical records of the deceased. The physicians in the verbal autopsy assessment panel (who do not communicate with each other about their opinions) fill in a VA analysis table for their convenience, and then write their opinions on the probable immediate, underlying and contributory causes of death of the individual.

The final opinion is arrived at on the basis of the level of agreement among the three independent medical opinions. In case all the three doctors in the assessment panel opine that the underlying cause of death has been 'Starvation', then the final opinion states that the 'most probable' cause of death is attributable to 'Starvation'. The final opinion states 'probable' in case two of the three doctors agree on the nexus between starvation and subsequent death and 'possible' if only one of the doctors in the panel mentions starvation as a probable cause of death. In case all three doctors opine that the disease or condition of death

is not related to 'Starvation', the final opinion states that the cause of death is unrelated to 'Starvation'.

Validity of the method of Verbal Autopsy in ascertaining cause of death - Through numerous studies carried out in different parts of the world, the method of Verbal Autopsy has been found to have a positive predictive value in the range of 70% to 80% depending on the cause of death and age of the deceased. This range of validity has been confirmed through comparison of opinions on cause of death as ascertained through usual autopsies (post-mortem examinations) and that through Verbal Autopsy.

Appropriateness of VA in ascertaining starvation as a cause of death- The areas where Verbal Autopsy is going to be used to assess starvation as a cause of death are also the areas where availability of medical care is poor. This includes reasons related to extreme poverty and physical lack of access to any government or private medical facility. Also, an overwhelming majority of these deaths occur in people's homes resulting in autopsies rarely being conducted and often there being no competent doctor to certify the cause of death. Although some care may have been available, medical records of the deceased prior to death are often unavailable or where available, these are often incomplete. Given such a situation, VA appears to be the most appropriate method to assess the cause of death.

The VA has to be supplemented in these circumstances by a thorough recording of the conditions of 'Food Security' prevailing in the community in general, including natural disasters of drought, famines, rain and crop failure or conditions of gross/sudden unemployment, indebtedness etc, similar conditions in the individual household, any signs of desperation to find food such as borrowing, begging, stealing, consumption of unusual foods and incidents of suicide etc. Also an analysis of the 'Calorific value' of whatever food is available and eaten should be undertaken, to see whether the deceased was getting enough calories through food. To further strengthen the findings anthropometric measurements of the living siblings in case of children and the Body Mass Index of the living adults in the same household should be obtained.

Dietary Survey and Calorific Value of Locally Eaten Foods

Dietary survey is an essential part of the verbal autopsy process, which gives idea about whether starvation / insufficient food intake is a cause of death or not.

Whenever a dietary survey is carried out in any community to investigate starvation deaths, we first identify major local staple foods (basically cereals) eaten in that community. Then we give a fixed amount (say 1 kg.) of flour or grains of that cereal in any two houses of that community. We ask them to prepare their usual preparations out of the raw material given. We then calculate the amount of flour used to make one roti or amount of pulse used to prepare one Katori of dal. Then prepare a master chart indicating nutritive value of locally available foods. For eg. In Badwani district of Madhya Pradesh where verbal autopsies were conducted, one kilogram of maize flour was given to two families each and they were asked to prepare roti. Out of one kg. flour, six roties were made which means each roti contains approximately 170 gms. of flour. Since 100 gms of maize gives 342 calories, it was concluded that one roti in this area gives 580 Kcal approximately.

In case of calculating calorie intake of the deceased, information should be elicited regarding the food eaten by the deceased one week and one month prior to death. Note the number of meals eaten by him /her in a day. List the food items and their ingredients in details. In case of children, note the history of food intake up to three months prior to death. With the help of the master chart of calorific value of locally available foods, then calculate the total calorie intake of the deceased per day prior to death.

Based on a requirement of 0.7 Kcal / kg / hour, a 50 Kg person needs about 850 Kcal per day to maintain oneself at Basal Metabolic Rate, without any physical activity. Thus **any food**

intake that is sustainedly lower than 850 Kcal per day would be incompatible with life in due course and is an indication of starvation

It may be noted here that the intake during the week prior to death may be reduced due to the illness itself, and is less significant to identify starvation compared to the intake one month prior to death. The data on intake has to be combined with data on Food availability for the family to come to a conclusion *about lack of food intake due to non-availability of food, in other words, starvation.*

History of consumption of unusual or 'famine' foods like toxic roots, leaves, tubers etc. or consumption of substances eaten to suppress hunger should also be noted. It indicates the non availability of other edible food items like pulses, grains etc.

Confirming the date of death

To determine the exact date of death, local events calendar should be used. A local events calendar shows all the dates on which important events took place during a past one year period. It shows the different seasons, months, phases of moon, local festivals and events in the agricultural cycle.

It is important to accurately determine the date of each death also in the context of calculation of death rates (section III).

Mode and Causes of Death

Even medical professionals are often not very clear about the difference between mode of death and cause of death, and types of causes of death. Hence the need for us to be clear about these terms when we talk of starvation as a cause of death.

The Death Certificate issued by a doctor should contain the following-

Cause of death: A disease or injury that results in the death of the individual. If there is a time delay between the onset of the disease or injury and the time of death, then the cause can be divided into the following categories:

- (a) **Immediate cause of death:** This is the disease or injury that developed just before the death and resulted in the death. E.g. Pneumonia, Diarrhoea, Ischaemic Heart Disease, Burns, Accident.
- (b) **Underlying cause of death:** When there is a delay between the onset of the disease or injury and the ultimate death, this is the process that started the chain of events that eventually resulted in the death. E.g. Measles could be the underlying cause of Pneumonia which resulted in death of the individual, Atheromatous or narrowed blood vessels could be the underlying cause of Ischaemic Heart Disease. In the same way, severe malnutrition or starvation could be the underlying cause of death in a case where the immediate cause is diarrhea.
- (c) **Contributory cause of death** is inherently one not related to the principal cause, but it must be shown that it contributed substantially or materially; that it aided or lent assistance to the production of death. It must be shown that there was a causal connection. E.g. Undernutrition in death due Pneumonia, High blood pressure in Ischaemic Heart Disease.

To illustrate the difference, take the case of a woman who is severely anemic during pregnancy. Her severe anemia remains untreated, and immediately after delivery she has moderate amount of bleeding and dies. (A healthy, non-anemic woman with similar amount of bleeding may have survived.) In this case, immediate cause of death is post-delivery bleeding, while underlying cause is severe anemia.

Mode of death: A pathophysiologic derangement that is incompatible with life. It is a common final pathway to death for a number of disease processes. Modes of dying include organ failure (e.g. 'heart failure', 'renal failure', multi-organ failure'), cardiac or respiratory arrest, coma, cachexia, debility, uraemia and shock.

Therefore it is important to recognize that 'Cardio-respiratory arrest', which is often erroneously mentioned as the immediate cause of death *is in fact the mode of death in a person*. To state 'cardio-respiratory arrest' as a *cause* of death is not only factually erroneous, it may also be a deliberate subterfuge by a medical official, to avoid commenting on the actual cause of death, such as starvation.

As a general rule, a number of pathways can be responsible for a mechanism or mode of death, but causes of death are specific. For example, shock has a number of causes and therefore is a mode of death. However the post-partum sepsis that resulted in shock is the cause of death.

Another way of looking at it is, if all dead people have the entity that you would like to list as a cause of death, then it is likely to be a mode of death. All dead people suffer from low blood pressure (shock), cardiac arrest and pulmonary arrest.

Starvation and Undernutrition as a cause of death- It is obvious that Starvation and Undernutrition would generally occur as the underlying or contributory cause of death in an individual. The final clinical event before death may be a minor infection such as diarrhea or measles, which may become the immediate cause of death.

As we are going to deal with actual human beings in real life situations, the individuals would suffer from gradual reduction in the calorie intake while having to keep up desperate efforts to find work and food for the family. The children would have to cope with demands for their growth. Rather than an absolute deprivation of food leading directly to death, we would have a chain of events where starvation (<850 Kcal daily intake) is the underlying cause, and an infection becomes the immediate cause of death.

Ethical issues related to conducting VA

There are certain serious ethical issues, which come up during the process of conducting a verbal autopsy in such a social situation. Some of the issues encountered and how they may be addressed are outlined below-

(a) Distress to relatives caused by the verbal autopsy procedure

The verbal autopsy process involves a detailed questioning of the relatives about the illness, food intake, treatment and various other aspects of the deceased prior to death. This is a process, which is liable to cause distress among the relatives of the deceased when they are questioned.

To deal with this issue, an attempt should be made to carefully explain the purpose of the study to the relatives. Also, the option of not participating in the study should be kept open for the respondents. In some situations, where the respondents are not in a mental frame to answer the questions, a second visit may be made to conduct the questioning at a later stage, or the asking of information may be spread over two visits. Of course, the interviewer must properly introduce himself / herself, state the purpose of his / her visit, and thank the respondents for their co-operation etc.

(b) Possible raising of false expectations among respondents

Measuring of nutritional status of children and adults and detailed questioning of relatives of the deceased might lead to generation of expectation of some immediate benefit

to be given by the interviewers to the respondents. This is especially likely if the interviewer is a person from outside the area, of apparently better socio-economic background etc.

This problem may be partly avoided if the basis of contact is by means of a local organisation or person who is already known to the people. If possible, the verbal autopsy should be done by a person who is known to the community or linked with a local organisation. People may be already aware of the method of working of the local organisation and would not expect any personal preferential 'dole' from a person who is linked to the organisation. Rather it should be made clear that the findings of the survey would be used to generate pressure for better implementation of relief measures in the area, which would benefit everyone, provided that such an attempt is planned.

(c) Need to share the results of the study with the people in their language

Such a study should preferably be conducted on the demand of a local organisation, and should help to strengthen their demand for relief facilities. In the same spirit, the results of the survey should be communicated to the people in their own language, in village meetings and also by means of a simply written note in the local language.

Section VII

Method of preparing the final report and drawing the ‘Hunger Pyramid’

The methodology of investigation as described in previous chapters has been devised to ensure a thorough, factual and relatively objective investigation of a death as well as its context.

However, the report is not a mere collation of the facts thus collected. The report is a statement of our opinion on the basis of the facts collected along with corroborative arguments and evidence. It is, therefore, an analytical document carefully arguing a case once our investigation is complete and has led us to an opinion.

If the investigation convinces us that the death concerned is not a starvation death we must make our report accordingly if asked to do so by any agency. However, henceforth, this chapter assumes that we are making the report of what we consider to be starvation death(s), either of children or adults, in the setting of a starving community.

The objectives of the report are twofold:

1. To verify and certify **starvation death(s)**
2. To clearly detail the prevailing **community conditions** of malnutrition and starvation leading to morbidity (sickness) and further mortality (death) if action is not immediately taken.

Such a report can be used for demanding immediate action such as compensation and appropriate state action to ensure food security for the entire community, as well as build evidence and pressure for long term policy changes.

The report should have the following sections, at least –

1. Introduction
2. Under five mortality rates of the given community and comparison with state under-five mortality rates
3. Death rates within the community and comparison with state crude death rates
4. Estimation of malnourished children based on weight for age
5. Estimation of severely malnourished adults based on BMI
6. Details of starvation / malnutrition deaths among children
7. Details of starvation deaths among adults
8. Community situation of food security
9. Hunger pyramid for the community and overall assessment
10. Recommendations

1. Introduction

This section should outline the initial information (press reports, personal communication), which originally led the team to investigate starvation deaths in this particular community. It should also contain some information about the area (district, taluka, villages), organisations and individuals involved in the investigation, and overall setting of food insecurity in the state / region (drought, failure of food security schemes etc.)

2. Under five mortality rates of the given community and comparison with state under-five mortality rates

3. Death rates within the community and comparison with state crude death rates

These death rates should be calculated and compared with the relevant state mortality rates. Then the number of excess deaths (actual deaths minus deaths expected according to state mortality rates) can be calculated. *All excess deaths taking place in a situation of serious food insecurity may be regarded as malnutrition deaths unless proved otherwise.* Here the absence of any major disasters or accidents may be quoted to rule out other causes of excess deaths.

4. Estimation of malnourished children based on weight for age

All children with weight for height less than $-3SD$ should be enumerated and listed individually also. The number should be expressed as a percentage of all children and compared with the state/block average as per ICDS records / NFHS II records, whichever available. ICDS records are preferable. Increase should be shown as percentage increase and it has to be argued that **according to the WHO any child with $-3SD$ or less weight for age is considered in need of emergency treatment.**

It has been documented that **mortality rates among children increase several fold and drastically when the weight for age is below 60% of the expected weight.** Hence these children are at very high risk of mortality. Any increase in numbers of such children indicates that the entire community of children is at risk. Therefore, emergency measures must apply to all children in that particular community.

According to the WHO criteria, if more than 30% of children in a community have low weight-for-age, it is a very high prevalence level. Although practically all poor rural communities in India have higher than this level of malnutrition, this too may be cited as evidence of very high level of malnutrition.

Prevalence group	% of children with low weight-for-age (below -2 SD scores)
Low	<10
Medium	10-19
High	20-29
Very High	≥ 30

(Criteria laid down in the WHO expert committee report on Anthropometry - WHO TRS 854, 1995)

For effective advocacy, the weights of the children in the affected area should be compared with those of middle class children in the same age group. This would bring out the differences more sharply than do figures of percentages in the various categories of undernutrition.

5. Estimation of severely malnourished adults based on BMI

The number and percentage of adults with BMI less than 18.5 and BMI less than 16 should be computed and presented. Adults with BMI less than 16 are at high risk of mortality from starvation. If over 40% of adults in the community have a BMI of < 18.5 , the community may be termed at 'critical risk for mortality from starvation' or a starving community.

Low prevalence	5-9% population with BMI < 18.5
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Medium prevalence	10-19% population with BMI< 18.5
High prevalence (serious situation)	20-39% population with BMI< 18.5
Very high prevalence (critical situation)	>= 40% population with BMI< 18.5

(Criteria laid down in the WHO expert committee report on Anthropometry - WHO TRS 854, 1995)

6. Details of starvation / malnutrition deaths among children

This part of the report is based upon

1. Verbal autopsy
2. Anthropometry of siblings and family members
3. Community Situation of Food Security
4. Community Child Death Rates

These are used to argue the following points -

1. Evidence that the dead child was already malnourished (description of physical appearance, hair, skin, nails, previous anthropometric /medical records, siblings and other family members being malnourished – by anthropometry)
2. Evidence that there was acute shortage of food to the individual. This is done by relating dietary history for the last few days to caloric intake. Since this is relatively difficult for a child, specially a breast feeding child, this part of the report should be commented upon by the technical support team (nutritionist / pediatrician)
3. Evidence that there was an acute shortage of food in the household (dietary history of other household members, examination of household food supplies, loan taken recently, recent migration of able bodied family members, eating of unusual food, recent beggary / crime for food, failure to receive food from PDS, ICDS or any other schemes due to non availability, illness or debility)
4. Evidence that there is an abnormally raised child death rate in the community (section 2 of the report). Even if the terminal event in most of the deaths are infections (diarrhea, pneumonia, measles) if the death rate is significantly higher than the under five death rate for rural areas in the state, this is evidence of hunger related deaths provided there is a community setting of food insecurity.

Infection as the terminal event

When the terminal event is an infectious disease, which is the commonest scenario, such as pneumonia or diarrhoea, the ‘diagnosis’ of starvation death need not change.

This logical progression to disease, which forms the terminal event, is well documented in cases of starvation. The last two points suffice to call a death a starvation death.

If there has been an outbreak of a disease (e.g. measles) and all the deaths have been attributed to the outbreak, the logical argument in the context of starvation would be that normally speaking the mortality of a disease does not exceed x percent of cases. The fact that mortality has been so much higher proves that death was due to starvation, not disease.

7. Details of starvation deaths among adults

This part of the report depends upon -

1. Verbal autopsy and dietary history
2. Anthropometry of family members

Verbal autopsy

This is to establish that death did not take place due to accident or other physical trauma, and to document the clinical events preceding death, as also dietary history and body appearance.

The dietary history component should be analysed in terms of caloric value by referring to the charts of caloric values of local food for assistance or taking the assistance of the technical support group. Caloric intake of less than 850kcal per day for an adult establishes the diagnosis of starvation.

Food security of the family – substantiating findings of food stores within the family, recent loans, migration of able-bodied members, eating of unusual foods, beggary should be documented.

Anthropometry of surviving family members

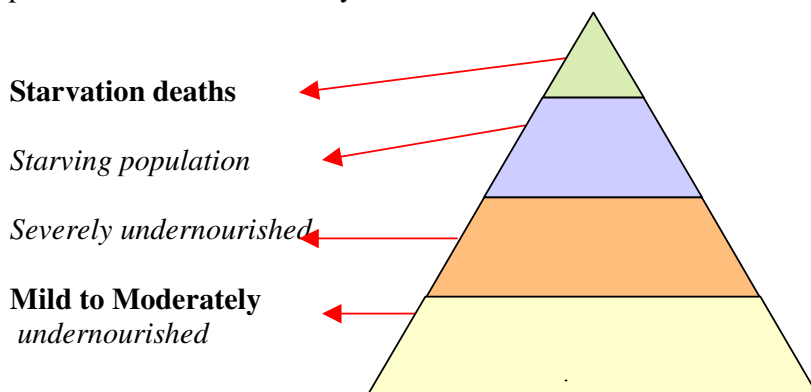
BMI of less than 18.5 amongst adults of the family, and weight for age less than 3SD in the children is supportive evidence that the whole family is in a situation of starvation.

8. Community situation of food security

The provision of supplies, access and uptake from PDS, Food for Work Programmes if any, ICDS, Mid Day Meal, maternity benefit and other schemes should be described.

9. Hunger pyramid for the community

The above mentioned two objectives are fulfilled by drawing the entire ‘hunger pyramid’ that prevails within a community, of which the starvation death/s are only the tip.



Appropriate figures or percentages should be given for each of these categories, to give a complete idea of the situation, e.g. in a particular village –

Starvation deaths – 6 persons (4 adults, 2 children)

Starving population – 7% families

Severely undernourished – 15% adults, 18% children

Mild to Moderately undernourished – 43% adults, 62% children

Starvation deaths are those deaths which have been identified as being due to starvation / malnutrition on the basis of the Verbal autopsy process.

Starving population is the proportion of families where adults have a daily caloric intake of less than 850 Kcal.

Severely undernourished population is the proportion of adults with BMI < 16 and in case of children, those with weight for age less than 60% of expected. (deduct the proportion of starving population from this to avoid overlap)

Mild to moderately undernourished population is proportion of adults with BMI < 18.5, proportion of children with weight for age less than 80% of expected (deduct the previous two proportions from this to avoid overlap)

The investigating team along with the Hunger Watch group should express an overall opinion. This should categorically express an opinion regarding the deaths that have taken place – starvation deaths or not starvation deaths. It should also make a community diagnosis – community at risk for further starvation deaths (starving community) or not.

10. Recommendations

Finally, the report should make recommendations for immediate action at the local level. Recommendations should include compensation for the deceased, measures to feed and supply food, hospitalization where necessary, arrangements for nutrition rehabilitation, healthcare including immunization, long term food security measures.

Section VIII

Entitlements for a population facing Food Insecurity

1] Mid Day Meal Scheme (MDMS)

The National Programme for Nutritional Support to Primary Education [MDMS] was started in 1995. Cooked mid-day meals were to be introduced in all government primary schools within two years. In the meantime, state governments were allowed to distribute monthly dry-rations to the children instead of cooked mid-day meals.

The centre allocates to each district, through the medium of the FCI, a quantity of grain @ 100 gms of grains per child per day. The allocation is made based on the off take of the previous term. Cooked meals with the content of 300 calories and 18-20 gms of protein is to be provided on every working day of the school and for at least 200 days a year to students having a minimum of 80 % attendance in the previous month. Where dry rations are given, 3 Kgs of wheat or rice per month is to be provided to every child with 80% attendance for 10 months in a year.

The Supreme Court order regarding this scheme is that cooked mid-day meal is to be provided in all the government and government aided primary schools in all the states. In states, where the scheme is not operational, it is to be started in half the districts of the state (by order of poverty) by Feb 28th, 2002. By May 28, 2002, it is to be started in the rest of the districts too.

2] Targeted Public Distribution System (TPDS)

The scheme was introduced in 1997 to replace the earlier universal public distribution system (PDS). The families are categorized as below poverty line (BPL) and above poverty line (APL). The two groups have different entitlements with BPL families getting more grain at a cheaper price than APL families. The total number of BPL families in each State is chosen by the Planning Commission. BPL families are to be identified on the basis of household surveys. The BPL families are given a card of a different colour to distinguish from the APL families.

3] Antyodaya Anna Yojana (AAY)

This scheme was supposed to provide food security to the poorest of the poor. Provision has been made to identify one crore such families. The selected families are to be given a special Antyodaya Card, with which they can claim the grain from the local ration shop. 25 Kgs of grains to be provided each month to the selected families at the price of Rs. 2 / Kg for wheat and Rs. 3/ kg for rice. The identification of families is supposed to be done by Gram Sabhas.

4] Integrated Child Development Scheme (ICDS)

The scheme is supposed to cover several activities, ranging from nutrition of the pregnant women to nutrition, healthcare and educational needs of the child till he or she completes the age of 6. Children up to 6 years are to be provided 300 calories and 8 to 10 gms of protein. Adolescent girls are to be provided 500 calories and 20-25 Gms of protein per day. Pregnant and nursing mothers are to be provided 500 calories 20-25 gms of protein per

day. Malnourished children are entitled to double the daily supplement provided to the other children [600 calories and/or special nutrients on medical recommendation.

The services to be provided under the scheme include supplementary nutrition, immunization, health check-up, referral services, and non formal preschool education.

Annexure I

Verbal Autopsy Questionnaire - Adults (Above 15 years of age)

Preliminary Information

Name of the deceased:

Date of interview:

Age in years at time of death:

Sex: Male/Female

d. if Female- Pregnant / Lactating/ Neither

Age of eldest living child

Marital status

* Married * Unmarried *Divorced * Widowed *Others

Address:

Name of the informant(s)

Informant's relation to the deceased -

Who, among the informants, was present at the time of the fatal illness?

Occupation (give details of type of work)

i) Working person, active till death

ii) Working person, stopped working for some period before death (specify period)

iii) Not working person

Family structure - Nuclear / Joint

Total No. of Members

Male adults

Female adults

Children

Income and food supply: (Relates to the family)

Agriculture:

Total Land owned _____

Irrigated land owned _____

Crop from last harvest was sufficient to adequately feed the family till which month

-

Wages: (In the last six months)

Work as agricultural labour –

No. of days in last 6 months _____ Daily Wage-

Work on Govt. relief works –

No. of days in last 6 months _____ Daily Wage-

Work outside the village (State the type of work)

No. of days in last 6 months _____ Daily Wage-

Any other source of income: _____

Has the total income during last six months been sufficient to adequately feed all family members?

Yes No

If not then what was the approximate proportionate decrease (proportion of usual)? -

– Which items in the diet specifically were decreased -

– Foodgrains (Maize, Wheat, Jowar, Rice etc.)

Pulses

Vegetables

Oil, milk etc.

In the last six months relating to the deceased and family -

Were any unusual or 'famine' foods being eaten (roots, tubers, leaves etc.)

– Were other members of the family eating such unusual things ?

Any substances being eaten to suppress hunger?

– Was the family purchasing PDS rations ?

Did the family avail of drought relief ?

Yes / No

If so in what form?

– Deaths of cattle or other animals

– Distress sale of cattle, vessels, implements and other belongings to obtain food

– Borrowing or begging food from neighbours, relatives or others

– Personal habits

i. Smoking

Yes

No

If yes

Duration

Bidi / cigarette per day

ii. Alcohol Yes No
If yes
Duration
Quantity per day

Date of death
Day Month Year

Weather at the time of Death:
Extreme cold / Extreme heat / Neither

Place of Death
i. Home
Staying alone / With family

b. Families in immediate neighborhood: Yes / No
Health centre / Hospital

iii On the way to Health Centre/Hospital

iv. Any other
Whether Death Certificate Available
Yes/No
If not why

_____ If yes
Mention Cause of Death as certified

2. Medical history related to death

2.1 Was the deceased seeing a health care provider before death: 1.yes 2.no

2.2 If yes, specify (name, profession, address.):

2.3 For how long: _____
years

2.4 For what complaint (specify):

2.5 Was the deceased taking any medication: 1.yes 2.no

2.6 If yes, specify (ask for remaining containers / unused medicines):

2.7 Was the deceased hospitalized before death: 1.yes 2.no

2.8 If yes, specify where (name, address):

2.9 For how long: _____ days

2.10 Did the deceased leave hospital (before death): 1.yes 2.no

If yes, how many days before death?

_____ days

2.11 Did the deceased undergo any surgical operation during this hospitalization: 1.yes
2.no

2.12 If yes, when (before death): _____ days

2.13 Do you know what was the operation: 1.yes 2.no

2.14 If yes, specify _

2.15 Was the deceased or any member of the family ever told the nature (the diagnosis)
of the illness:

1.yes 2.no

2.16 If yes, what was it (specify as clearly as possible):

Was there any accident / poisoning / bite / burn or other unnatural event shortly before
death-

1.yes 2.no

2.17.1 If yes, what was the accident:

2.17.2 If yes, specify hours / days before death:

2.18 Where did the accident occur:

1. at work
2. road (vehicular accident)
3. at home
4. other (specify):

2.19 Organs/part of body injured during
accident_____

2.20 Other unnatural events-

Drowning

Poisoning

Hanging

Bite by snake or other venomous animal

Burns
Violence
Any other (specify)

How long before the death did this event take place?
(Hours /days)_____

Details of the event (in case of poisoning, what agent was used; in case of violence, what type of violence etc.)

3. Specific disease related information

3.0 Open ended question about the illness –

According to what you know what did the deceased die of and how? Please narrate.

(All questions in the sections below pertain to the illness immediately preceding death unless specified otherwise)

3.1 Cardiovascular system

Did the deceased ever complain of unusual breathlessness? : 1.yes 2.no

If yes, was it on:

Exertion: 1.yes 2.no

If yes, how much exertion:

1. Walking on level surface
2. Walking up an incline
3. Climbing stairs

Breathlessness while lying down flat: 1.yes 2.no

At night, relieved by sitting up in bed:1.yes 2.no

3.1.2 Did the deceased ever complain of chest pain: 1.yes 2.no

If yes:

3.1.2.1 Was it persistent for several hours: 1.yes 2.no

Was it accompanied by excessive sweating: 1. Yes 2. No

3.1.2.2 Was it relieved by rest: 1.yes 2.no

3.1.2.3. Did the deceased ever complain of cyanosis on the lips, fingers or nails: 1.yes
2.no

3.1.2.4 Did the deceased ever complain of swelling on the body (the lower limbs, foot and leg, eyelids, abdomen, back):
especially if lying down:1.yes 2.no

3.1.2.5 Did the deceased ever complain of an episode of palpitations (sudden rapid heart beats for one hour or more):
1.yes 2.no

3.1.2.6 Did the deceased ever complain of recurrent sore throat, joint pain and inflammation (migrating, fleeting and affecting several joints):

1.yes 2.no

Respiratory system

3.2.1 Did the deceased have cough: 1.yes 2.no

3.2.2 Dry cough / Productive cough

If productive, was the sputum:

3.2.2.1 Clear and sticky: 1.yes 2.no

3.2.2.2 Yellowish or greenish: 1.yes 2.no

3.2.2.3 Stained with blood: 1.yes 2.no

3.2.2.4 Whether large quantity of sputum and offensive smell: 1.yes 2.no

Duration of the cough _____

Was the cough related to season ? If so, in which season was it worse?

3.2.5 Chest pain: 1.yes 2.no

If yes

3.2.5.1 Was it increased with cough and / or deep breath : 1.yes
2.no

3.2.5.2 Was it localized and tender: 1.yes 2.no

3.2.6 Wheezing: 1.yes 2.no

Digestive system

Did the deceased ever complain of:

3.3.1 Abdominal pain 1.yes 2.no

If yes, since when?

Was the pain

3.3.1.1 Persistent: 1.yes 2.no

3.3.1.2 Localized over one area: 1.yes 2.no

If yes:

3.3.1.2.1 Central abdomen: 1.yes 2.no

3.3.1.2.2 Left upper abdomen 1.yes 2.no

3.3.1.2.3.Right upper abdomen 1.yes 2.no

3.3.1.2.4 Lower abdomen 1.yes 2.no

If yes then – left side

right side

entire lower abdomen

3.3.1.2.5 Loin radiating to the groin (inguinal region) 1.yes 2.no

3.3.1.2.6 Relieved by meals (food): 1.yes 2.no

3.3.1.2.7 Aggravated by meals (food): 1.yes 2.no

3.3.2 Persistent heartburn: 1.yes 2.no

3.3.2.1 Was it sometimes accompanied by water brash (belching of sour fluid in the mouth):

1.yes 2.no

3.3.3 Diarrhoea: 1.yes 2.no

If yes, was it:

3.3.3.1 Acute (less than 15 days) _____

3.3.3.2 Chronic (more than 15 days) _____

3.3.3.3 Accompanied by blood 1.yes 2.no

Alternating with constipation: 1.yes 2.no

3.3.4 Vomiting blood: 1.yes 2.no

If yes:

3.3.4.1 Was the blood: 1.bright red 2.dark brown

3.3.4.2 Did this vomiting of blood last until death: 1.yes 2.no

3.3.4.3 For how long before death: _____
month(s)

3.3.4.4 Was the deceased or any member of the family informed of the nature or the cause of this

vomiting blood: 1.yes 2.no

If yes:

3.3.4.5 What was it _____

3.3.5 Normal stools with blood in the stools: 1.yes 2.no

If yes:

3.3.5.1 Was the blood: 1.red 2.dark brown

3.3.5.2 Did the symptoms last until death: 1.yes 2.no

If yes:

3.3.5.2.1 For how long before death: _____ months

3.3.5.3 Was the deceased or any member of the family informed of the nature or cause:

1.yes 2.no

If yes:

3.3.5.3.1 What was it: _____

3.3.6 Jaundice: 1.yes 2.no

If yes:

3.3.6.1 For how long before death: _____
days

3.3.6.2 Did jaundice last until death: 1.yes 2.no

3.3.6.3 Was the deceased or any member of the family told of its nature or cause:

1.yes 2.no

If yes:

3.3.6.3.1 What was it:

3.3.7 Persistent vomiting: 1.yes 2.no

If yes:

3.3.7.1 Did it last until death: 1.yes 2.no
_____ days

3.3.7.1.1 What was the duration: (before death):

_____ days

Urinary system

3.4.1 Did the deceased ever complain of one of the following symptoms:

3.4.2 Blood in urine: 1.yes 2.no

If yes:

3.4.2.1 Did blood in urine last until death: 1.yes 2.no

If yes:

3.4.2.1.1 For how long (before death): _____ month(s)

3.4.2.1.2 Was Blood in urine ever associated with pain:

1.yes 2.no

3.4.2.2 Was blood in urine: 1.persistent 2.intermittent

3.4.3 Problems in urination: 1.yes 2.no

If yes:

3.4.3.1 Decreased volume of urine: 1.yes 2.no

3.4.3.2 Complete retention of urine lasting for more than a few hours:

1.yes 2.no

If yes:

3.4.3.2.1 Was this retention:

1.recurrent 2.transient

3.4.3.2.2 Did this retention last until death: 1. yes 2. no

3.5 Infectious diseases

3.5.1 Did the deceased ever complain of fever in the month prior to death:

1. continuous 2. intermittent 3. never complained

If continuous or intermittent:

3.5.1.1 Did fever last until death: 1. yes 2. no

If yes:

Was the fever on alternate days or every day at a fixed time?

Were there chills / rigors accompanying the fever?

Was there continuous fever for more than one week?

3.5.1.2 Was the deceased or any member of the family ever informed of the nature of the diagnosis

of this fever:

1.yes 2.no

If yes:

3.5.1.2.1 What was it: _____

Reproductive mortality

If the deceased is a female aged 12-50 years:

3.6.1 If married and living with her husband OR separated, divorced, or widowed for less than 3 months,

did she complain before she died of:

3.6.2.1 Continuous fever: 1. yes 2. no

3.6.2.2 Vaginal bleeding: 1. yes 2. no

3.6.2.3 Abortion (up to 42 days (6 weeks) before death): 1. yes 2. no

3.6.3 Was she pregnant and delivered before her death (up to 6 weeks before death) regardless of gestation

age:

1. yes 2. no

If yes:

3.6.3.1 Where did the delivery take place: 1. hospital 2. home 3. other

(specify)

Any significant symptoms or events related to the pregnancy or delivery

Unusually large amount of vaginal bleeding before / during / after delivery

Inability to deliver within 24 hours of onset of labour

Severe continuous pain in the abdomen during labour

Pain in lower abdomen with fever / foul discharge after delivery

Malignancies

Did the deceased ever complain of:

3.7.1 The presence of any mass or tumour in any part of the body: 1.yes

2.no

If yes:

3.7.1.1 Where: (specify, if a woman emphasize mass in breast) _____

3.7.1.2 Did this tumour persist until death: 1.yes

2.no

3.7.2 Continuous loss of weight with no apparent reason 1.yes 2.no

3.7.3 Abnormal vaginal bleeding aside from the menstrual cycle especially after
menopause

3.7.4 Lump in the cheek / tongue

3.7.5 Was the deceased or any member of the family ever informed of the possible
existence of a malignant tumour or growth:

1.yes 2.no

If yes:

3.7.4.1 Where in the body (specify as clearly as possible): _____

3.7.4.2 What was the outlook for the patient:

1.not mentioned

2.good

3.reserved

4.bad (fatal)

Did the person have obvious loss of weight in the three months prior to death?

3.8 Other

Did the person have paralysis / extreme weakness on one side or a particular part of the
body? _____

Did s/he have severe continuous unremitting headache ? _____

If yes, was there accompanying fever and inability to bend the head forwards?

Did s/he have convulsions? If yes, did these last until death?

Was the body stiff/ arched back for some hours or days before death?

Was the person unconscious before death? if so, for what duration?

Specific information related to malnutrition / starvation

Food intake (semi-quantitative) – here the interviewer has to estimate the caloric intake if
possible based on detailed dietary history.

Daily intake during the week prior to death

How many meals did the deceased have in a day ?

Morning

Noon

Afternoon / evening

Night

Other meals / snacks

(Quantify exact amounts of roti, rice, ghat / rabdi (porridge), dal etc. as far as possible)

Was this food enough to satisfy his hunger? _____

Daily intake during the month prior to death
How many meals did the deceased have in a day ?

Morning

Noon

Afternoon / evening

Night

Other meals / snacks

Was this food enough to satisfy his hunger?

4.2 a. Water intake – Normal / reduced / increased / do not know

b. Source of Water -

Did s/he complain of
Constant complaint of hunger
Loss of feeling of Hunger
Dizziness on standing up
Extreme weakness and inability to walk
Inability to see at night

What were the observations of the family members regarding the deceased person:

Eyes: Sunken/ Normal/ Do not know

Skin: Creases, wrinkles over forehead and face as usual
Increased
Do not know

Normal / Scaling or peeling / Do not know

Hair: Normal / Dry or discoloured / Do not know

Cheeks : As usual/ very sunken /Do not know

Ribs: As usual / very prominent/ Do not know

Limb bones : As usual / prominent/ Do not know

Abdomen: As usual/ very sunken /Do not know

Hipbones : As usual/ prominent and projecting /Do not know

Tongue: Dry / coated or fissured / Do not know

Normal pink colour / very pale or whitish / Do not know

Lips: Normal / Dry or cracked / Do not know

Gums : normal / loose teeth, bleeding / do not know

Swelling over Ankle : Y/N

If yes - unilateral / bilateral

Face : Y/N

Upper limbs: Y/N

Palms and nails: Normal pink colour / very pale or whitish / do not know

Body temp : Normal / Cold / Do not know

Bed sores : None

If yes, site : Shoulder blade/ Lower back / Hip/Calf /Other part

Behavioral changes: None /Muttering or irrelevant talk / Unconscious

5. Presumed cause of death

5.1 From death certificate if available:

5.2 From verbal autopsy form:

5.21 Immediate cause of death:

5.22 Underlying cause(s) of death

5.23 Contributory cause(s) of death:

Questionnaire modified from - Mortality and causes of death in Jordan 1995-
96:assessment by verbal autopsy
S.A. Khoury, D. Massad, T. Fardous,
Bulletin of the World Health Organization, 1999, 77 (8)

3.5.2 Total number giving information at interview ___

3.5.3 If mother is not present at the interview, is the mother still alive? Yes No

Section 4: Information about the child

4.1 Date of birth of child: ___/___/___ (dd mm yy)

4.2 What was the date of death? ___/___/___ (dd mm yy)

4.3 Where did the child die? (*tick relevant box*)

- 1. Hospital
- 2. Other health facility
- 3. On route to hospital or health facility
- 4. Home
- 5. Other (specify _____)

4.3.3 For deaths at hospital or health facility, record facility name and address:

Section 5: Open history question

5.1 Could you tell me about the child’s illness that led to death?

Prompt: Was there anything else?

Instructions to interviewer - Allow the respondent to tell you about the illness in his or her own words. Do not prompt except for asking whether there was anything else after the respondent finishes. Keep prompting until the respondent says there was nothing else. While recording, underline any unfamiliar terms.

—

—

Take a moment to tick all items mentioned spontaneously in the open history questionnaire.

5.3 Was care sought outside the home while he/she had this illness?

- 1. Yes 2. No 3. Don’t know

(If “No” or “Don’t know”, go to section 6)

5.3.1 (*If yes ask:*) Where or from whom did you seek care? (*Record all responses*)

- 1. Traditional healer
- 2. Governmental health centre or clinic
- 3. Government hospital
- 4. Community-based practitioner associated with health system including trained birth attendants..
- 5. Private physician

- 6. Pharmacy, drug seller, store, market
- 7. Other provider
- 8. Relative, friend (outside household)

*After respondent finishes prompt: Did you seek care anywhere else?
Keep using this prompt until respondent replies that they did not seek care from anyone else.*

Note: Above categories should be country-specific.

Section 6: Accident

6.1 Did the child die from an accident, injury, poisoning, bite, burn or drowning?

- 1. Yes
- 2. No.
- 3. Don't know

(If "No" or "Don't know", go to section 7)

6.1.1 *(If yes ask): What kind of injury or accident? Allow respondent to answer spontaneously. If respondent has difficulty identifying the injury or accident, read the list slowly.*

- 1. Motor vehicle accident
- 2. Fall
- 3. Drowning
- 4. Poisoning
- 5. Bite or sting by venomous animals
- 6. Burn
- 7. Other injury (specify) _____

6.1.2 How long did the child survive after the injury, poisoning, bite, burn or drowning?

- 1. Died within 24 hours
- 2. Died 1 day later or more

Section 7: Age determination and reconfirmation

7.1 Record the child's date of birth from question 4 _ / _ / _
dd mm yy

Record child's date of death from question 4.2 _ / _ / _ dd mm
yy

7.2 Take a moment and calculate the age of the child at the time of death. Read out:

I have calculated that the child was ____ days (or months or years old as appropriate) at the time of death. Is this correct?

If the respondent indicates this is not correct, reconcile the inconsistency by re-checking the child's date of birth and date of death. Make the necessary corrections here and in section 4.

- If child died within 24 hours from injury or accident, go to section 10 – treatment and records.
- If child was less than 28 days old do not record any details as that is beyond the purview of this study.
- If child was 28 days old or more at the time of death, go to section 8 – post-neonatal deaths

Section 8: Post-neonatal deaths

8.1 During the illness that led to death, did he/she have a fever?

- 1. Yes
- 2. No
- 3. Don't know

(If "No" or "Don't know", go to question 8.2)

8.1.1 *(If fever ask): How many days did the fever last?* ____ days

8.2 During the illness that led to death, did _____ have frequent loose or liquid stools?

1. Yes 2. No 3. Don't know

8.2 During the illness that led to death, did he/she have (local terms for diarrhoea)?

Note: When preparing the country-specific questionnaire, include local terms for diarrhoea.

1. Yes 2. No 3. Don't know

(If "No" or "Don't know", for both questions 8.2 and 8.3, go to question 8.4)

8.3.1 *(If frequent or loose stools or local terms for diarrhoea ask):*

For how many days did he/she have loose or liquid stools? ____ days

8.3.2 Was there visible blood in the loose or liquid stools?

1. Yes 2. No 3. Don't know

8.3.3 During the time with the loose or liquid stools, did the child drink 'Rabdi' or 'Salt and Sugar solution' or ORS?

1. Yes 2. No 3. Don't know

8.3.4 During the illness that led to death, did the child have a cough?

1. Yes 2. No 3. Don't know

(If "No" or "Don't know", go to question 8.5)

8.5 During the illness that led to death, did the child have difficult breathing?

1. Yes 2. No 3. Don't know

(If "No" or Don't know", go to question 8.6)

8.6 During the illness that led to death, did the child have fast breathing?

1. Yes 2. No 3. Don't know

(If "No" or Don't know", go to question 8.7)

(If yes ask): For how many days did the difficult breathing last? ____ days

8.6.1 *(If yes ask):* For how many days did the fast breathing last? ____ days

8.7 During the illness that led to death, did he/she have indrawing of the chest?

1. Yes 2. No 3. Don't know

8.8 During the illness that led to death, did he/she have noisy breathing?
(Demonstrate each sound)

- | | | | |
|--------------------------|--------|-------|---------------|
| 8.8.1 Stridor | 1. Yes | 2. No | 3. Don't know |
| 8.8.2 Grunting | 1. Yes | 2. No | 3. Don't know |
| 8.8.3 Wheezing | 1. Yes | 2. No | 3. Don't know |

8.9 During the illness that led to death, did his/her nostrils flare with breathing?

1. Yes 2. No 3. Don't know

8.10 During the illness that led to death, did the child have pneumonia?

1. Yes 2. No 3. Don't know

Note: When preparing country-specific questionnaires include local terms for pneumonia here.

8.11 Did the child experience any generalized convulsions/fits during the illness that led to death?

- 8.12 1. Yes 2. No 3. Don't know

8.13 Was the child unconscious during the illness that led to death?

1. Yes 2. No 3. Don't know

8.14 At any time during the illness that led to death, did the child stop being able to grasp?

1. Yes 2. No 3. Don't know

(If "No" or Don't know", go to question 8.14)

8.15 At any time during the illness that led to death, did the child stop being able to respond to a voice?

1. Yes 2. No 3. Don't know

(If "No" or Don't know", go to question 8.15)

8.16 At any time during the illness that led to death, did the child stop being able to follow movements with their eyes?

1. Yes 2. No 3. Don't know

(If "No" or Don't know", go to question 8.16)

8.15.1 *(If yes, ask):* How long before he/she died did the child stop being able to follow movements with their eyes?

1. Less than 12 hours
2. 12 hours or more

8.17 Did the child have a stiff neck during the illness that led to death?
(Demonstrate) 1. Yes 2. No 3. Don't know

8.18 Did the child have a bulging fontanelle during the illness that led to death?
1. Yes 2. No 3. Don't know

8.19 During the month before he/she died, did the child have a skin rash?
1. Yes 2. No 3. Don't know

(If "No" or Don't know", go to question 8.18)

8.18.1 (If yes, ask) Was the rash all over the child's body?

1. Yes 2. No 3. Don't know

8.18.2 Was the rash also on the child's face?

1. Yes 2. No 3. Don't know

8.18.3 How many days did the rash last? . . . __ __. __ __ days

8.18.4 Did the rash have blisters containing clear fluid?

1. Yes 2. No 3. Don't know

8.18.5 Did the skin crack/split or peel after the rash started?

1. Yes 2. No 3. Don't know

8.18.6 Was this illness "measles"?

1. Yes 2. No 3. Don't know

Note: When preparing country-specific questionnaire include local term for measles.

8.18 During the illness that led to death, did the child become very thin?

1. Yes 2. No 3. Don't know

8.20 During the illness that led to death, did the child have swollen legs or feet?
8.21

1. Yes 2. No 3. Don't know

(If "No" or Don't know", go to question 8.21)

8.20.1 (If yes, ask): How long did the swelling last? Number of weeks __ __

8.22 During the illness that led to death, did the child's skin flake off in patches?

1. Yes 2. No 3. Don't know

8.23 Did the child's hair change in colour to a reddish (or yellowish) colour?

Morning _____
Afternoon _____
Evening _____
Night _____
Other _____

(Try to quantify approximately how much each of Roti, Ghat, Raabdi. Etc)

9.1.3 Was this food enough to satisfy the child's hunger?

9.2 What and how much was the child eating about one month before death?

9.2.1 How many meals did the child have in a day? _____

9.2.2. Approximately what and how much was the child eating in the

Morning _____
Afternoon _____
Evening _____
Night _____
Other _____

(Try to quantify approximately how much each of Roti, Ghat, Raabdi. Etc)

9.2.3 Was this food enough to satisfy the child's hunger?

9.3 What and how much was the child eating about three months before death?

9.3.1 How many meals did the child have in a day?

9.3.2 Approximately what and how much was the child eating in the

Morning _____
Afternoon _____
Evening _____
Night _____
Other _____

(Try to quantify approximately how much each of Roti, Ghat, Raabdi. Etc)

9.3.3 Was this food enough to satisfy the child's hunger?

9.8 Were the corners of the child's mouth cracked, or did he/she have ulcers in the mouth/ tongue?

1. Yes 2. No 3. Do not know

9.9 Did the child have problems such as bleeding gums or loose teeth?

1. Yes 2. No 3. Do not know

9.10 Did the child have 'bow legs' ?

1. Yes 2. No 3. Do not know

Section 10: Treatment and records

I would now like to ask a few questions about any drugs the child may have received during the illness that led to death.

10.2 Do you have any prescriptions, case papers or other health records that belonged to the child ?

1. Yes 2. No 3. Don't know

(If "No" or Don't know",go to question 10.5)

10.2.1 *(If yes ask)*: Can I see the health records?

1. Yes 2. No 3. Don't know

(If "No" or Don't know ",go to question 10.5)

If respondent allows you to see the health records, transcribe all the entries within the 12 months before the child died.

10.3 Weights (most recent two)

10.3.1 Record the dates of the most recent weight, two weights

1. __ /__ /__ (dd/mm/yy)

2. __ /__ /__ (dd/mm/yy)

10.3.2 Record the most recent two weights .

1 _____

2_____

10.4 Medical notes

10.4.1 Record the date of the last note. . . _ /_ /__ (dd/mm/yy)

10.4.2 Transcribe the note _____

10.5 Was a death certificate issued?

1. Yes 2. No 3. Don't know

(If "No" or Don't know",go to question 10.7)

INSTRUCTIONS TO INTERVIEWER - Ask to see the death certificate and record whether you have been able to see it.

10.5.1 Able to see death certificate?

1. Yes 2. No

(If "No", go to question 10.7)

10.6 Record the immediate cause of death from the certificate

Record the first underlying cause of death from the certificate _____

Record the contributing cause(s) of death from the certificate

Now I would like to ask a few questions about the child's mother.

10.7 Has the child's mother ever been tested for "HIV"?

1. Yes 2. No 3. Don't know

(If "No" or "Don't know", go to question 10.8)

10.7.1 (If yes ask): Was the "HIV" test ever positive?

1. Yes 2. No 3. Don't know

10.8 Has the child's (biological) mother ever been told she had "AIDS" by a health worker?

1. Yes 2. No 3. Don't know

11. From verbal autopsy form: _____

11.1 Immediate cause of death: _____

11.2 Underlying cause(s) of death: _____

11.3 Contributory cause(s) of death: _____

END OF INTERVIEW
THANK RESPONDENT(S) FOR THEIR COOPERATION

(Modified from - WHO/CDS/CSR/ISR/99.4; A STANDARD VERBAL AUTOPSY METHOD FOR INVESTIGATING CAUSES OF DEATH IN INFANTS AND CHILDREN)

Annexure II

Expected Weight for Age (NCHS Standard)

Age in months	Weights in Kg.	
	Male	Female
12	10.2	9.5
15	10.8	10.1
18	11.5	10.8
21	12.5	11.3
24	12.6	11.9
27	13.1	12.4
30	13.7	12.9
33	14.2	13.4
36	14.7	13.9
39	15.2	14.5
42	15.7	15.1
45	16.2	15.5
48	16.7	16
51	17.2	16.4
54	17.7	16.8
57	18.2	17.2
60	18.7	17.7
63	19.2	18.1
66	19.7	18.6
69	20.2	19.5
72	20.7	19.5
75	21.2	20

*Reference- Weight in Kg are 50th percentiles of Boys and Girls;
NCHS growth curves for children, Birth-18 yrs. National Centre for Health Statistics,
Publ No. DHS 878-1650, 1977. Hyattsville MD, USA*

Annexure III
IAP classification for weight for age

Weight for Age			
Years	A ge	B oys	G irls
1	1 2	1 0.2	9 .5
1.3 m	1 5	1 0.8	1 0.1
1 1/2	1 8	1 1.5	1 0.8
1.9 m	2 1	1 2.5	1 1.3
2	2 4	1 2.6	1 1.9
2.3 m	2 7	1 3.1	1 2.4
2 1/2	3 0	1 3.7	1 2.9
2.9 m	3 3	1 4.2	1 3.4
3	3 6	1 4.7	1 3.9
3.3 m	3 9	1 5.2	1 4.5
3 1/2	4 2	1 5.7	1 5.1
3.9 m	4 5	1 6.2	1 5.5
4	4 8	1 6.7	1 6
4.3 m	5 1	1 7.2	1 6.4
4 1/2	5 4	1 7.7	1 6.8
4.9 m	5 7	1 8.2	1 7.2
5	6 0	1 8.7	1 7.7
5.3 m	6 3	1 9.2	1 8.1
5 1/2	6 6	1 9.7	1 8.6
5.9 m	6 9	2 0.2	1 9.5
6	7 2	2 0.7	1 9.5

6.3 m	7 5	2 1.2	2 0

Annexure IV

Suggested reading material

1. Physical Status: The Use And Interpretation Of Anthropometry
Report Of A WHO Expert Committee
WHO technical report series 854
- 2.