# Demographic & Health Survey 2006/07

## Prevalence of Anaemia Among Children and Women in Sri Lanka

**Department of Census & Statistics**

Health Sector Development Project

Ministry of Healthcare & Nutrition

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# Demographic and Health Survey 2006/7

Department of Census and Statistics
Sri Lanka

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# Preface

This report has been prepared as a supplement to the Demographic and Health Survey (DHS) 2006/7. The objective of this report is to provide current prevalence rates of anaemia among children and women in Sri Lanka based on haemoglobin levels of the respondents selected for the DHS 2006/7 survey, whereas the main DHS survey report consists of all other Demographic and Health indicators. All estimates are provided excluding the Northern Province of the country.

Department of Census and Statistics (DCS) has a long history of conducting large scale sample surveys to cater the needs of country's development planning. A series of DHS surveys have conducted by the DCS since 1987. Two similar surveys were conducted in 1993 and in 2000. DHS surveys are normally designed to collect data on fertility and determinants of fertility, family planning, fertility preferences, anthropometric measurements and HIV/AIDS related knowledge and attitudes of women in the reproductive age group. The latest DHS conducted in 2006/7 initiated collecting information on new topics such as malaria, use of mosquito nets by women and children, empowerment of women and information about some non-communicable diseases. In addition, this is the first time that Department of Census and Statistics attempted to evaluate anaemia status of children and women in Sri Lanka through a household survey.

In DHS surveys, information is collected from ever married women who are 15-49 years and their children who are below 5 years at the time of the survey. Haemoglobin measurements are provided for women in the same age group whereas for children, haemoglobin measurements are provided for the age group 6 – 59 months.

The assessment of blood for haemoglobin concentration is the result of concerted efforts of several individuals and institutions. Medical personnel were provided by the Medical Faculties of the Universities of Ruhuna, Peradeniya and Colombo and were trained by the staff of the Medical Research Institute of Sri Lanka. The Haemocue testing sets were provided by UNICEF, Sri Lanka. Financial support for this survey was provided by the World Bank under the Health Sector Development Project of the Ministry of Healthcare and Nutrition. Staff of DCS assisted in the field work. The dedication of the staff of the DHS Unit of DCS made this survey a success.

This report provides valuable information about the prevalence of anaemia among children and women in Sri Lanka and also indicates about differentials. I hope that policy makers and researchers in Sri Lanka would find this data of use.

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Department of Census and Statistics.

# ACKNOWLEDGEMENTS

## 1.1 Background:

Anaemia is a major public health problem throughout the world. Therefore assessment of haemoglobin should be periodically done to monitor the anaemia status. The Medical Research Institute, Sri Lanka has done a study in 2001 using a sub sample of 2000 population from the DHS and stated that "Similar to most developing countries across the globe, Sri Lanka too is heavily burden by the problem of anaemia, mostly due to nutritional deficiency of iron". There is no large anaemia survey has been done since 2001 and it is important to evaluate the present status.  (Assessment of Anaemia Status in Sri Lanka, 2001, Medical Research Institute, Ministry of Health, Nutrition and Welfare, Sri Lanka by Chandrani Piyasena and A.M.A.S.B. Mahamithawa).

Anaemia can be classified as mild, moderate or severe based on haemoglobin concentration in the blood, according to the classification developed by the World Health Organization (1968). Classification of haemoglobin levels is given in the Table 1 below.

Table 1: Haemoglobin levels defined by WHO (1968)

| Sub Group | Haemoglobin level for | | | |
|---|---|---|---|---|
| | Non anaemic | Mild anaemia | Moderate anaemia | Severe anaemia |
| Children age 6-59 months and pregnant women age 15-49 years | 11.0 g/dl and above | 10.0-10.9 g/dl | 7.0-9.9 g/dl | below 7.0 g/dl |
| | | | | |
| Non pregnant women age 15-49 years | 12.0 g/dl and above | 10.0-11.9 g/dl | 7.0-9.9 g/dl | below 7.0 g/dl |

Though classification for anaemia varies with the height of location from sea level, altitude correction is not necessary for Sri Lanka.

## 1.2 Authority

Ethical clearance was obtained from the Sri Lanka Medical Association to collect blood samples from the respondents before initiation of the survey (Annexure 1). Details regarding the anaemia survey were explained to selected respondents of the households and written consent was obtained from eligible women. Mother/guardian's consent was obtained prior to collection of blood samples for all children.

## 1.3 Field work

Haemoglobin estimation to assess status of anaemia were to be carried out from the respondents selected for the DHS survey as a part of the survey. Since this was the first time that such an effort has been taken by the DCS the DCS staff gathered challenging experience by doing this exercise. Medical officers were recruited outside from DCS specially to collect measurements of haemoglobin levels from the selected respondents. Initially it was planned to measure haemoglobin levels with the main DHS survey. However, there were lots of constraints to complete the field work as planned.

Special data collection form (Annexure 2) was used to record haemoglobin levels in Sinhala speaking households where as in Tamil speaking households haemoglobin levels were recoded in the space given in the survey schedule it self.



Picture 1 : Medical persons and field staff

## 1.4 Training

Officers of the Medical Research Institute of Sri Lanka trained medical officers in measuring haemoglobin with practice sessions.

## 1.5 Sample

The SLDHS 2006/7 used a stratified two-stage cluster sample design. The objectives of the sample design were to produce reasonably accurate estimates at three levels – national, sector (urban, rural, estate), and districts. The sample was spread geographically more or less proportionally to the population. The first stage involved selecting 2,500 enumeration areas (clusters) from the list of about 100,000 enumeration areas formed in the 2001 Population Census: 469 from urban, 1,831 from rural and 200 from estates.

The second stage of selection involved the systematic sampling of 10 households listed in each enumeration area resulting 25,000 housing units. The remaining 394 clusters were not

enumerated (340 clusters from Northern province due to unsettled conditions prevailing in the province at the time of the survey and 54 clusters from other areas were not covered for the main survey due to various other reasons).

Number of clusters and respondents by sector included in this analysis is given in  Table 2 . All results were weighted in order to achieve better representativeness.

Table 2 : Number of clusters and respondents used for the
survey on haemoglobin levels by sector

| | Sector | | | |
| --- | --- | --- | --- | --- |
| **Number of clusters used for the haemoglobin survey** | Urban | Rural | Estate | Total |
| For children | 246 | 1,051 | 156 | 1,453 |
| For non-pregnant women | 219 | 1,510 | 113 | 1,842 |
| For pregnant women | 61 | 463 | 49 | 573 |
| | | | | |
| **Number of respondents used for the study** | | | | |
| Children                               (Weighted) | 534 | 3,760 | 359 | 4,653 |
| Children                               (Unweighted) | 755 | 3,309 | 576 | 4,640 |
| | | | | |
| Women (non-pregnant)       (Weighted) | 1,217 | 8,672 | 660 | 10,549 |
| Women(non-pregnant)    (Unweighted) | 1,832 | 7,658 | 1,050 | 10,540 |
| | | | | |
| Women(Pregnant)            (Weighted) | 75 | 576 | 57 | 708 |
| Women(Pregnant)          (Unweighted) | 113 | 514 | 88 | 715 |

## 1.6 Data Entry and data analysis

Staff of the Data Processing Division of DCS was involved in data entry. Data was analyzed by the staff of the DHS unit of DCS using SPSS software package.

## 1.7 Limitations

a) Time gap - Due to unavailability of suitable medical officers at that time of conducting the field work in Sinhala – speaking housing units, the testing was done in a separate visit to the same households which were selected for the main survey. For Tamil-speaking housing units, medical officers were sent with the survey teams for measurement of haemoglobin of the respondents. Therefore the field work for this operation had to be arranged in two ways. For Sinhala speaking housing units the haemoglobin level measurement team consist of one field officer (to assist in identifying the selected household) from DCS and a one medical officer (to carry out haemoglobin tests) where as for Tamil speaking housing units, medical officer was sent with the main survey team consist of one female supervisor, four female interviewers, one filed editor, a measurer, (to get anthropometric measurements and to obtain GPS measurements) and a field assistant. Separate teams were sent to each district.

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b) Initially it was planned to collect blood for measurement of haemoglobin concentration simultaneously with the main DHS survey. However, due to constraints during the main DHS survey, blood collection of some respondents was done 0-9 months after the main survey. Due to the time gap between the main survey and collection of blood for measurement of haemoglobin, some respondents have been excluded from the analysis as they were over the age limit set at the designing of the DHS.

c) An attempt was made to collect information from all 2,106 clusters which were selected for the main DHS survey 2006/7. However, due to the gap between data collection and anaemia testing stages some respondents were unable to be captured for the testing.

d) Anaemia data should be analysed separately and cannot link with DHS data due to the time gap and different weighting factors used for estimations.

# CHAPTER 2

## ANAEMIA AND ITS MEASUREMENTS

### 2.1 Introduction

The demand for biomarker data is growing worldwide. In 1995, anaemia testing became a standard component of the DHS survey protocol after the Kazakhstan DHS showed that respondents were comfortable with providing blood specimens for testing. Since then, 15 more biomarkers have been added to DHS surveys in more than 30 countries. DHS surveys have tested for syphilis, the herpes simplex virus, HIV, serum retinol (Vitamin A), lead exposure, high blood pressure, and immunity from vaccine-preventable diseases, such as measles and tetanus. Most surveys now include testing for HIV infection in their survey design. (http://www.measuredhs.com/aboutsurveys/biomarkers/start.cfm, accessed on 15/09/09)

### 2.2 What is Anaemia?

Anaemia is a condition characterized by reduction in the volume of red blood cells and a decrease in the blood concentration of haemoglobin in the blood. A reduction in the volume of red blood cells in the blood decreases the amount of oxygen reaching the tissues and organs of the body, causing a range of adverse symptoms.

An anaemic person often appears pale and weak and may feel breathless or faint. He/she may aware of a pounding heart. An anaemic person may have insomnia, decreased appetite, or a general feeling of malaise.

For women, anaemia reduces their work productivity and places them at risk for poor pregnancy outcomes including increased risk of maternal mortality, perinatal mortality, premature births, spontaneous abortions and low birth weight. In developing countries, nearly half of all women and children are anaemic, with the highest overall rates being reported in Southern and Central Asia and certain regions of Africa. (http://www.measuredhs.com/topics/anaemia/start.cfm, accessed on 16/09/09)

Causes of anaemia include inadequate intake of iron, folate, vitamin $B_{12}$ or other nutrients. Anaemia can also be resulted from thalassemia, sickle cell disease, malaria and intestinal worm infestation such as hook worm.

Anaemia is also associated with increased morbidity from infectious diseases. Although some forms of anaemia require supervised medical care, those caused by improper nutrition can play typically be treated at home once the condition has been diagnosed.

### 2.3 Measuring Haemoglobin

Measurment of Haemoglobin concentration is the primary method for diagnosis of anaemia. Haemoglobin can be assessed by many methods, including the Haemocue Hb 201+ system. The system consists of a battery-operated photometer and a disposable microcuvette, coated with a dried reagent that serves as the blood collection device. The test is performed using a drop of blood taken from a person's fingertip. The result of the haemoglobin measurement was reported to the individual at the time of the testing by providing a sheet with recorded data for

each household (Annexure 3). Individuals with low levels of haemoglobin were instructed to seek medical advice.

Trained medical officers followed the instructions given in the manual accurately. Consent statement was read to the respondent before taking the blood sample (Annexure 4). For children, mother or the care taker's consent was taken.

Personnel responsible for collecting blood for haemoglobin measurement should take following precautions to prevent parenteral, skin, and mucous-membrane exposures to blood borne infections, such as hepatitis B, or human immunodeficiency virus (HIV). Under general precautions a set of rules should be followed to ensure protection from blood borne infections according to the U.S. Occupational Safety and Health Administration (OSHA) standards. The precautions to be taken to ensure safety and accurate results, such as making sure the haemocue microcuvettes are dried thoroughly after each use (otherwise results are very inaccurate). Wearing gloves, use new lancet for each prick, safe dispose of biohazards are the main precautions that should be taken in this process. (See Annexure 4 for more details.)

## 2.4 Materials and equipment

Materials and equipment necessary for haemoglobin testing using the Haemocue Hb 201+ system include the following. All the equipments were purchased according to the standard specifications.

1) Sterile, dry gauze pads

2) Alcohol preps (pads) latex gloves

3) HaemoCue Hb 201+ photometer for detecting haemoglobin levels

4) HaemoCue Hb 201+ microcuvettes

5) Adhesive bandages

6) Disposable lancets for adults

7) Disposable lancets for children

8) 4 type AA batteries



Picture 2 : Haemocue equipment

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# CHAPTER 3

## MAJOR FINDINGS

### 3.1 Introduction

Prevalence of anaemia for children and women in Sri Lanka was computed from 4,640 (unweighted) children age 6-59 months and 10,540 (unweighted) non pregnant women age 15-49 years. They were the respondents of the Demographic and Health Survey conducted in 2006/7. Haemoglobin (Hb) measurements were also collected from 715 pregnant women. However, due to the fewer number of pregnant women, haemoglobin levels were estimated only at national level. This information is given in the last section of this chapter. The weighted and unweighted number of non pregnant women and their children who's haemoglobin measurements were collected are shown in Table 3 by demographic and other background characteristics.

### 3.2 Prevalence of anaemia in children

Haemoglobin levels were collected from 4,640 children (Unweighted) and prevalence of anaemia has been estimated by selected background variables. Fig.1a shows a histogram of children who were below 11.0 g/dl (anaemic) while Fig. 1b shows the histogram of children who's haemoglobin level were greater than or equal to 11 g/dl (non anaemic). Mean haemoglobin concentration of children with anaemia was 10.0 with $\pm$ 0.8 (SD) g/dl. Mean value of the haemoglobin level of non anaemic children was 12.1 with $\pm$ 0.8 (SD) g/dl.

Fig 1a : Frequency distribution of anaemic Children  (weighted)
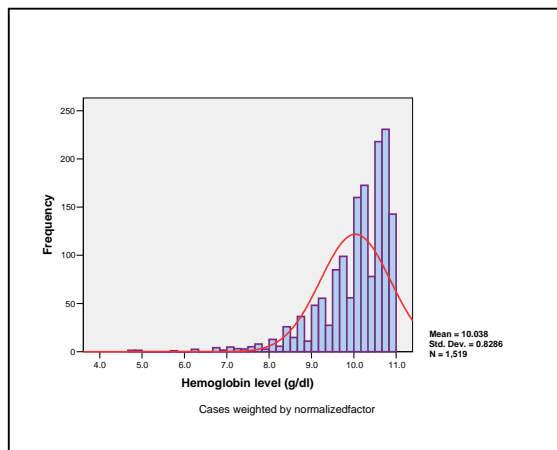
Fig 1b : Frequency distribution of non anaemic Children (weighted)
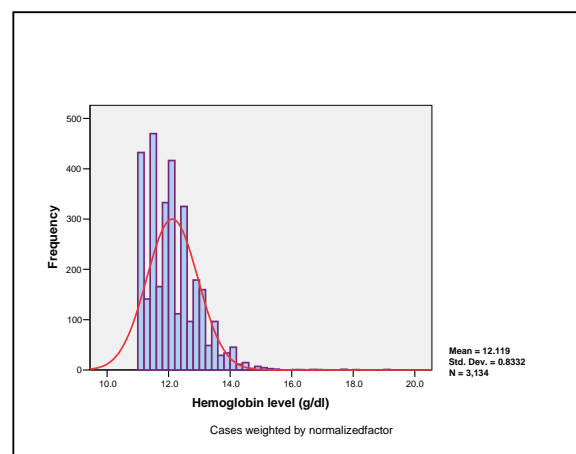
Table 3 : Weighted and unweighted number of children and non-pregnant women who's haemoglobin measurements were collected by background characteristics

| Background characteristic | Children | | Background characteristic | Non-pregnant women | |
|---|---|---|---|---|---|
| | Weighted | Unweighted | | Weighted | Unweighted |
| **Age in months** | | | **Age in years** | | |
| 6-8 | 142 | 143 | 15-19 | 145 | 148 |
| 9-11 | 188 | 202 | 20-29 | 2,373 | 2397 |
| 12-17 | 510 | 499 | 30-39 | 3,930 | 3875 |
| 18-23 | 569 | 561 | 40-49 | 4,100 | 4120 |
| 24-35 | 1,044 | 1,047 | **Number of children ever born*** | | |
| 36-47 | 1,080 | 1,070 | 0 | 736 | 740 |
| 48-59 | 1,121 | 1,118 | 1 | 2,324 | 2277 |
| **Sex** | | | 2-3 | 5,792 | 5821 |
| Male | 2,366 | 2,356 | 4-5 | 1,257 | 1289 |
| Female | 2,287 | 2,284 | 6+ | 216 | 218 |
| **Sector** | | | **Sector** | | |
| Urban | 534 | 755 | Urban | 1,217 | 1832 |
| Rural | 3,760 | 3,309 | Rural | 8,672 | 7658 |
| Estate | 359 | 576 | Estate | 660 | 1050 |
| **Province/Districts** | | | **Province/Districts** | | |
| *Western* | *1,105* | *1,091* | *Western* | *2,676* | *2677* |
| Colombo | 476 | 465 | Colombo | 1,102 | 1102 |
| Gampaha | 363 | 363 | Gampaha | 965 | 965 |
| Kalutara | 265 | 263 | Kalutara | 608 | 610 |
| *Central* | *684* | *683* | *Central* | *1,608* | *1601* |
| Kandy | 284 | 284 | Kandy | 703 | 700 |
| Matale | 107 | 106 | Matale | 351 | 350 |
| Nuwara Eliya | 293 | 293 | Nuwara Eliya | 553 | 551 |
| *Southern* | *660* | *661* | *Southern* | *1,399* | *1397* |
| Galle | 269 | 271 | Galle | 592 | 591 |
| Matara | 211 | 212 | Matara | 427 | 427 |
| Hambantota | 179 | 178 | Hambantota | 379 | 379 |
| *Eastern* | *621* | *623* | *Eastern* | *1,079* | *1079* |
| Batticaloa | 184 | 183 | Batticaloa | 322 | 321 |
| Ampara | 305 | 306 | Ampara | 544 | 540 |
| Trincomalee | 132 | 134 | Trincomalee | 214 | 218 |
| *North-Western* | *397* | *395* | *North-Western* | *949* | *947* |
| Kurunegala | 247 | 244 | Kurunegala | 591 | 591 |
| Puttalam | 149 | 151 | Puttalam | 357 | 356 |
| *North-Central* | *346* | *344* | *North-Central* | *815* | *817* |
| Anuradhapura | 227 | 226 | Anuradhapura | 478 | 479 |
| Polonnaruwa | 119 | 118 | Polonnaruwa | 337 | 338 |
| *Uva* | *506* | *509* | *Uva* | *1,124* | *1126* |
| Badulla | 305 | 306 | Badulla | 687 | 690 |
| Moneragala | 201 | 203 | Moneragala | 436 | 436 |
| *Sabaragamuwa* | *335* | *334* | *Sabaragamuwa* | *899* | *896* |
| Ratnapura | 185 | 184 | Ratnapura | 472 | 471 |
| Kegalle | 149 | 150 | Kegalle | 426 | 425 |
| **Mother's education*** | | | **Mother's education*** | | |
| No education | 126 | 142 | No education | 483 | 542 |
| Primary | 483 | 542 | Primary | 1,654 | 1,765 |
| Secondary | 2,413 | 2,391 | Secondary | 5,188 | 5,106 |
| Passed G.C.E (O/L) | 481 | 460 | Passed G.C.E (O/L) | 1,128 | 1,093 |
| Higher | 1,003 | 943 | Higher | 2,087 | 2,026 |
| **Wealth quintile** | | | **Wealth quintile** | | |
| Lowest | 1,143 | 1,219 | Lowest | 2,345 | 2,467 |
| Second | 1,037 | 1,018 | Second | 2,258 | 2,180 |
| Middle | 844 | 796 | Middle | 2,075 | 1,986 |
| Fourth | 870 | 831 | Fourth | 2,089 | 2,028 |
| Highest | 759 | 776 | Highest | 1,782 | 1,879 |
| **Total** | **4,653** | 4,640 | **Total** | **10,548** | **10540** |

* Totals are not tallied due to small number of missing values.

### 3.2.1 Prevalence of anaemia in children

- According to the findings of the survey, the overall prevalence of anaemia among children age 6-59 months is 33 percent.

- Prevalence of mild anaemia among children age 6-59 months is 22 percent, which is the major contributory factor to the total prevalence rate.

- Prevalence of moderate anaemia among children age 6-59 months is 11 percent.

- Prevalence of severe anaemia among children age 6-59 months is very low (0.3 percent).

Fig 2 : Prevalence of anaemia among children age 6-59 months
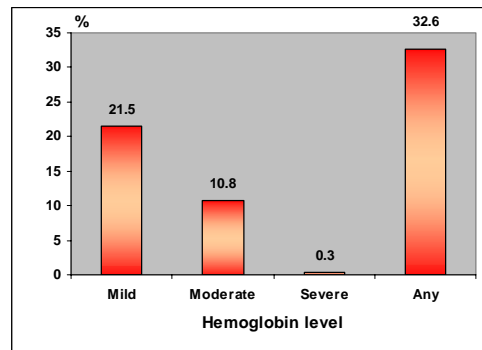


## 3.3 Differentials of anaemia status of children age 6-59 months by background characteristics.

As mentioned before, anaemia is defined as a condition with lowered oxygen carrying capacity in which haemoglobin content of the blood is below the established cutoff limits (WHO 1968), it is important to find out the prevalence of anaemia among children age 6-59 months by background characteristics. Table 4 shows the Percentage of children age 6-59 months by background characteristics with mild, moderate and severe anaemia using WHO cut offs.

### 3.3.1 Prevalence of anaemia among children by age of the child

- Prevalence of anaemia decreases gradually with increasing the age of the child.

- It is interesting to note that children age 9-11 months are more likely to be anaemic (61 percent) than other children.

Fig 3 : Prevalence of children with anaemia by age of the child



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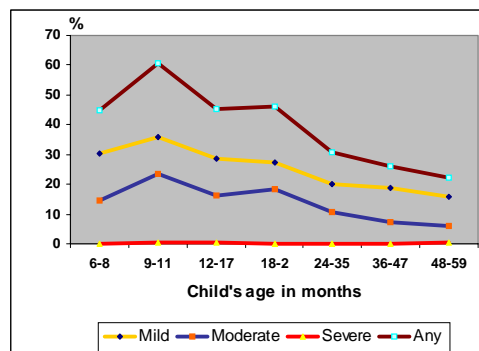
Table 4 : Prevalence of anaemia in children age 6-59 months by background characteristics

| Background characteristic | Anaemia status by haemoglobin level | | | Any anaemia (below 11.0 g/dl) | Number of children (weighted) |
|---|---|---|---|---|---|
| | Mild (10.0-10.9 g/dl) | Moderate (7.0-9.9 g/dl) | Severe (below 7.0 g/dl) | | |
| **Age in months** | | | | | |
| 6-8 | 30.1 | 14.5 | 0.0 | 44.7 | 142 |
| 9-11 | 36.6 | 23.4 | 0.5 | 60.5 | 188 |
| 12-17 | 28.8 | 16.2 | 0.4 | 45.4 | 510 |
| 18-23 | 27.5 | 18.2 | 0.2 | 45.9 | 569 |
| 24-35 | 20.0 | 10.5 | 0.1 | 30.6 | 1,044 |
| 36-47 | 18.7 | 7.1 | 0.2 | 26.0 | 1,080 |
| 48-59 | 15.8 | 6.0 | 0.5 | 22.3 | 1,121 |
| **Sex** | | | | | |
| Male | 21.4 | 11.6 | 0.3 | 33.4 | 2,366 |
| Female | 21.6 | 10.0 | 0.2 | 31.9 | 2,287 |
| **Sector** | | | | | |
| Urban | 20.7 | 10.7 | 0.6 | 32.0 | 534 |
| Rural | 22.1 | 10.8 | 0.2 | 33.2 | 3,760 |
| Estate | 16.4 | 11.6 | 0.2 | 28.1 | 359 |
| **Province /Districts** | | | | | |
| *Western* | *23.6* | *9.7* | *0.3* | *33.6* | *1,105* |
| Colombo | 24.4 | 6.6 | 0.4 | 31.4 | 476 |
| Gampaha | 26.0 | 16.5 | 0.4 | 42.8 | 363 |
| Kalutara | 18.8 | 6.0 | 0.0 | 24.8 | 265 |
| *Central* | *17.3* | *10.9* | *0.0* | *28.2* | *684* |
| Kandy | 18.3 | 9.1 | 0.0 | 27.4 | 284 |
| Matale | 24.4 | 10.9 | 0.0 | 35.3 | 107 |
| Nuwara Eliya | 13.7 | 12.7 | 0.0 | 26.5 | 293 |
| *Southern* | *23.4* | *11.1* | *0.1* | *34.7* | *660* |
| Galle | 26.0 | 8.5 | 0.0 | 34.5 | 269 |
| Matara | 20.6 | 11.8 | 0.0 | 32.4 | 211 |
| Hambantota | 22.8 | 14.2 | 0.5 | 37.5 | 179 |
| *Eastern* | *24.4* | *19.8* | *0.3* | *44.5* | *621* |
| Batticaloa | 27.1 | 17.6 | 0.9 | 45.6 | 184 |
| Ampara | 27.7 | 23.0 | 0.0 | 50.7 | 305 |
| Trincomalee | 13.3 | 15.2 | 0.0 | 28.5 | 132 |
| *North-Western* | *22.5* | *5.4* | *0.6* | *28.4* | *397* |
| Kurunegala | 22.8 | 5.4 | 0.9 | 29.1 | 247 |
| Puttalam | 22.0 | 5.4 | 0.0 | 27.4 | 149 |
| *North-Central* | *16.5* | *9.1* | *0.0* | *25.6* | *346* |
| Anuradhapura | 21.0 | 10.0 | 0.0 | 31.0 | 227 |
| Polonnaruwa | 7.8 | 7.4 | 0.0 | 15.2 | 119 |
| *Uva* | *22.0* | *8.7* | *0.2* | *30.8* | *506* |
| Badulla | 18.5 | 8.8 | 0.0 | 27.3 | 305 |
| Moneragala | 27.2 | 8.5 | 0.6 | 36.3 | 201 |
| *Sabaragamuwa* | *17.9* | *8.8* | *1.1* | *27.8* | *335* |
| Ratnapura | 20.3 | 12.4 | 2.0 | 34.7 | 185 |
| Kegalle | 14.8 | 4.4 | 0.0 | 19.2 | 149 |
| **Mother's education** | | | | | |
| No education | 27.8 | 12.8 | 1.1 | 41.8 | 126 |
| Primary | 22.7 | 15.7 | 0.6 | 39.0 | 483 |
| Secondary | 21.6 | 11.7 | 0.2 | 33.6 | 2,413 |
| Passed G.C.E (O/L) | 23.2 | 10.7 | 0.2 | 34.2 | 481 |
| Higher | 19.4 | 6.0 | 0.0 | 25.4 | 1,003 |
| **Wealth quintile** | | | | | |
| Lowest | 20.4 | 13.1 | 0.4 | 34.0 | 1,143 |
| Second | 20.5 | 13.2 | 0.1 | 33.8 | 1,037 |
| Middle | 22.6 | 9.5 | 0.2 | 32.2 | 844 |
| Fourth | 21.7 | 8.8 | 0.4 | 30.9 | 870 |
| Highest | 23.2 | 8.0 | 0.3 | 31.5 | 759 |
| **Total** | **21.5** | **10.8** | **0.3** | **32.6** | **4,653** |

Note : Totals are not tallied by background characteristic due to small percentages of missing values in some variables.

### 3.3.2 Prevalence of anaemia among children age 6-59 months by sex of the child

- On average, prevalence of anaemia among male children is marginally greater (33 percent) than that of female children (32 percent). The relationship is not statistically significant.

- Prevalence of moderate anaemia is also marginally greater among male children (12 percent) than that of female children (10 percent).

- The difference between the prevalence of mild anaemia is minimal among children by sex.

Fig 4 : Prevalence of children with anaemia by sex
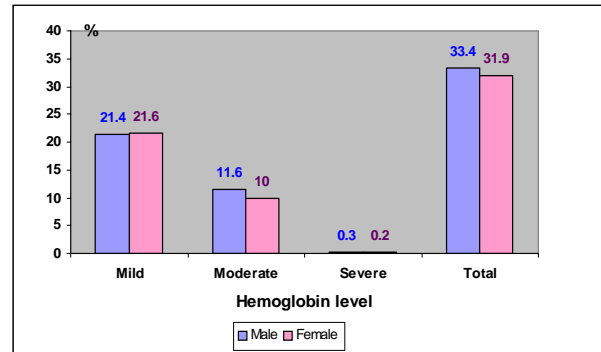


### 3.3.3 Prevalence of anaemia among children age 6-59 months by sector

- The differences between the prevalences of anaemia among children living in urban, rural and estate sector are not great. The relationship is not statistically significant too.

- However, prevalence of mild anaemia is higher among children in rural sector (22 Percent) than other two sectors.

- Prevalence of moderate anaemia is higher among children in estate sector (12 percent) than other two sectors.

- Prevalence of severe anaemia among children living in urban sector is 0.6 percent, which is marginally higher than that of other two sectors.

Fig 5 : Prevalence of children with anaemia by sector
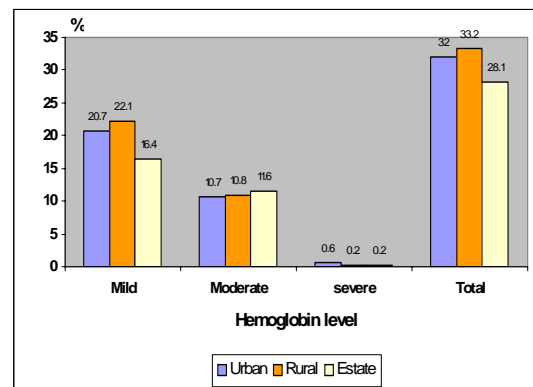
### 3.3.4 Prevalence of anaemia among children age 6-59 months by province

- Prevalence of anaemia among children is highest in Eastern Province (45 percent) and lowest in North-Central Province (26 percent).

- So the prevalence of anaemia among children in Eastern Province is nearly two times higher than that of children in North-Central Province.

- Southern (35 percent) and Western (34 percent) provinces also show high prevalence of anaemia among children.

Fig 6 : Prevalence of children with anaemia by province
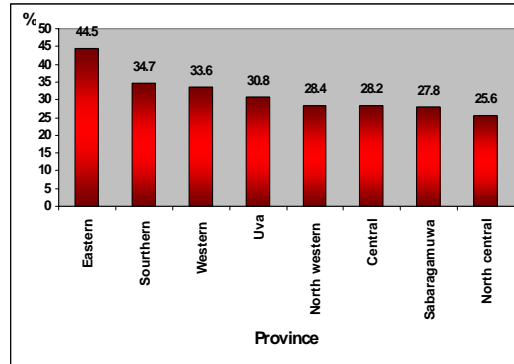


### 3.3.5 Prevalence of anaemia among children age 6-59 months by districts

- Prevalence of anaemia among children by district vary from 51 to 15 percent.

- Children residing in Ampara district (nearly 51 percent) shows the highest prevalence of anaemia followed by Batticaloa district (46 percent) and Gampaha district (43 percent).

- Children residing in Polonnaruwa district (15 percent) shows the lowest prevalence of anaemia followed by Kegalle district (19 percent).

- So the prevalence of anaemia among children in Ampara district is nearly three times higher than that of Polonnaruwa district.

Fig 7 : Prevalence of children with anaemia by districts
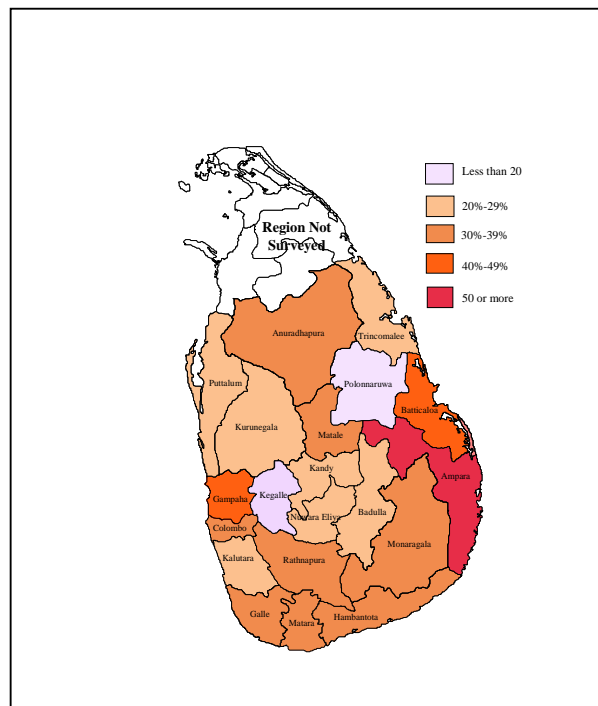
### 3.3.6 Prevalence of anaemia among children age 6-59 months by mother's level of education

- Mother's level of education has a strong effect on child's anaemia status.

- Prevalence of anaemia among children has decreased from 42 percent to 25 percent when mother's level of education increased from no education category to higher level of education.

- According to the survey results, prevalence of mild anaemia among children has decreased with increasing the mother's level of education except for mothers who have passed G.C.E. O/L.

Fig 8 :  Prevalence of children with anaemia
by mother's level of education
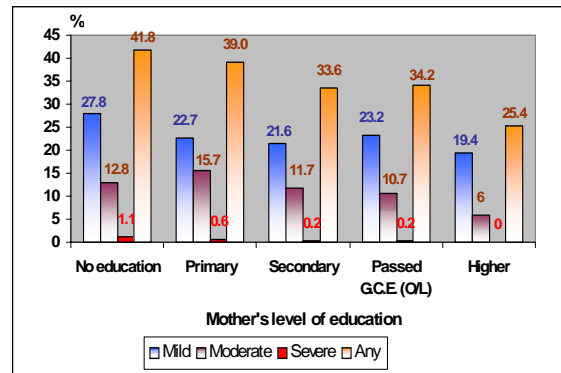


### 3.3.7 Prevalence of anaemia among children age 6-59 months by wealth quintiles

- Prevalence of anaemia steadily decreased with wealth quintile from the lowest (34 percent) to middle (32 percent) wealth quintile. This pattern violates at the highest wealth quintile which records marginally higher value (Refer Table 4).

### 3.4 Comparison of mild with moderate or severe levels of anaemia for anaemic children

This section compares the prevalence of anaemia among anaemic children.

Out of the total children (4,653) age 6-59 months, 33 percent (1,519) of children were identified as anaemic (Hb < 11.0 g/dl). Of the 33 percent anaemic children, further investigations were made among children reported mild haemoglobin level with children reported moderate or severe haemoglobin levels together for the purpose of comparisons. Table 5 presents details.

### 3.4.1 Prevalence of anaemia among anaemic children

- Prevalence of mild anaemia among anaemic children age 6-59 months is 66 percent.

- Prevalence of moderate or severe anaemia among the anaemic children age 6-59 months is 34 percent.

Fig 9 :  Prevalence of anaemia among
anaemic children age 6-59 months
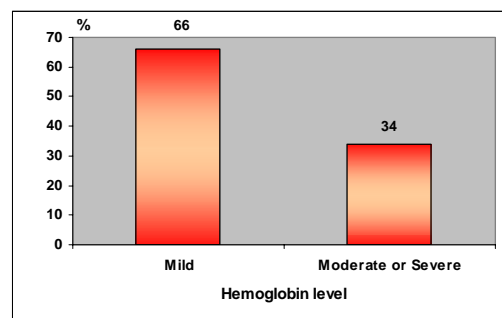


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## Table 5 : Comparision of prevalence of mild anaemia with moderate or severe levels of anaemia among anaemic children by background characteristics

| Background characteristic | Haemoglobin levels | | Number of children |
| | Mild (10.0-10.9 g/dl) | Moderate and severe (<or= 9.9 g/dl) | |
|---|---|---|---|
| **Age in months** | | | |
| 6-8 | 67.5 | 32.5 | 63 |
| 9-11 | 60.6 | 39.4 | 113 |
| 12-17 | 63.4 | 36.6 | 231 |
| 18-23 | 59.9 | 40.1 | 261 |
| 24-35 | 65.4 | 34.6 | 319 |
| 36-47 | 71.9 | 28.1 | 281 |
| 48-59 | 70.8 | 29.2 | 250 |
| **Sex** | | | |
| Male | 64.2 | 35.8 | 790 |
| Female | 67.8 | 32.2 | 729 |
| **Sector** | | | |
| Urban | 64.7 | 35.3 | 171 |
| Rural | 66.8 | 33.2 | 1,247 |
| Estate | 58.3 | 41.7 | 101 |
| **Province /Districts** | | | |
| *Western* | *70.2* | *29.8* | *371* |
| Colombo | 77.7 | 22.3 | 149 |
| Gampaha | 60.7 | 39.3 | 156 |
| Kalutara | 75.7 | 24.3 | 66 |
| *Central* | *61.3* | *38.7* | *193* |
| Kandy | 66.9 | 33.1 | 78 |
| Matale | 69.1 | 30.9 | 38 |
| Nuwara Eliya | 51.9 | 48.1 | 78 |
| *Southern* | *67.6* | *32.4* | *229* |
| Galle | 75.4 | 24.6 | 93 |
| Matara | 63.6 | 36.4 | 69 |
| Hambantota | 60.7 | 39.3 | 67 |
| *Eastern* | *54.9* | *45.1* | *276* |
| Batticaloa | 59.3 | 40.7 | 84 |
| Ampara | 54.6 | 45.4 | 155 |
| Trincomalee | 46.6 | 53.4 | 37 |
| *North- Western* | *79.1* | *20.9* | *113* |
| Kurunegala | 78.5 | 21.5 | 72 |
| Puttalam | 80.3 | 19.7 | 41 |
| *North-Central* | *64.4* | *35.6* | *89* |
| Anuradhapura | 67.7 | 32.3 | 71 |
| Polonnaruwa | * | * | 18 |
| *Uva* | *71.2* | *28.8* | *156* |
| Badulla | 67.9 | 32.1 | 83 |
| Moneragala | 75.0 | 25.0 | 73 |
| *Sabaragamuwa* | *64.3* | *35.7* | *93* |
| Ratnapura | 58.6 | 41.4 | 64 |
| Kegalle | 77.1 | 22.9 | 29 |
| **Mother's education** | | | |
| No education | 66.6 | 33.4 | 52 |
| Primary | 58.3 | 41.7 | 188 |
| Secondary | 64.3 | 35.7 | 811 |
| Passed G.C.E (O/L) | 67.9 | 32.1 | 164 |
| Higher | 76.2 | 23.8 | 255 |
| **Wealth quintile** | | | |
| Lowest | 60.1 | 39.9 | 389 |
| Second | 60.8 | 39.2 | 350 |
| Middle | 70.0 | 30.0 | 272 |
| Fourth | 70.4 | 29.6 | 269 |
| Highest | 73.6 | 26.4 | 239 |
| **Total** | 66.0 | 34.0 | 1,519 |

Note : 1.Totals are not  tallied by background characteristic due to small percentages of missing values in some variables.

2. An asterisk denotes a figure based on fewer than 25 unweighted cases and has been suppressed.

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### 3.5 Comparison of mild with moderate or severe levels of anaemia for anaemic children age 6-59 months by background characteristics.

This section compares prevalence of mild anaemia with moderate or severe anaemia among the anaemic children age 6-59 months by selected background variables.

### 3.5.1 Prevalence of anaemia among anaemic children by age of the child

Fig 10 :  Prevalence of mild and moderate or severe anaemia among anaemic children by child's age

- Prevalence of mild anaemia among anaemic children age 6-59 months is fluctuating in young ages and shows an increasing trend when child is getting older.

- Prevalence of moderate or severe anaemia among anaemic children age 6-59 months is fluctuating in young ages and decreasing trend could be observed when child is getting older.
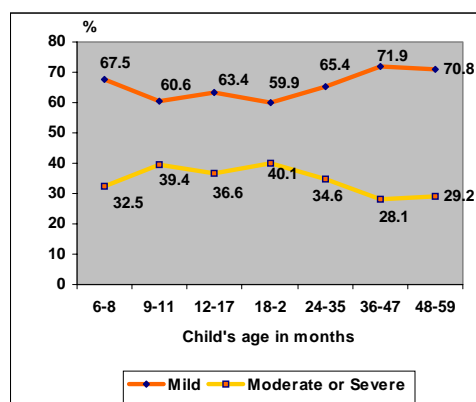


### 3.5.2 Prevalence of anaemia among anemic children age 6-59 months by sex of the child

Fig  11:  Prevalence of mild and moderate or severe anaemia among anaemic children by sex of the child

- On average, percentage of female children with mild anaemia is marginally higher (68 percent) than that of male children (64 percent).

- Percentage of male children with moderate or severe anaemia is marginally higher (36 percent) than that of female children (32 percent).



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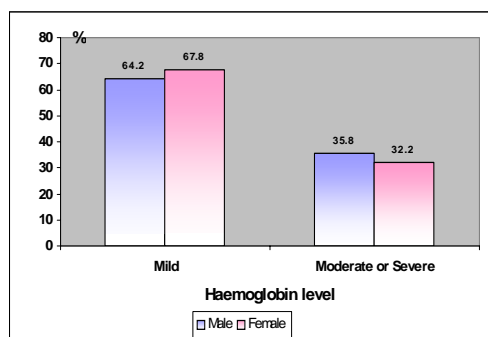
### 3.5.3 Prevalence of anaemia among anemic children age 6-59 months by sector

- Prevalence of mild anaemia among anaemic children in rural sector (67 Percent) marginally higher than that of children in urban (65 percent) and estate (58 percent) sectors.

- Prevalence of moderate or severe anaemia is highest among anaemic children in estate sector (42 percent) followed by anaemic children living in urban sector (35 percent) and rural sector (33 percent).

Fig 12 : Prevalence of mild and moderate or severe anaemia among anaemic children by sector
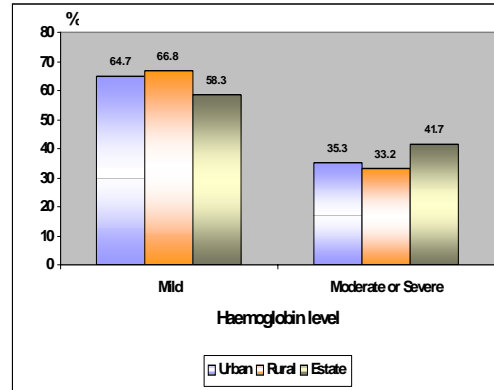


### 3.5.4 Prevalence of anaemia among anemic children age 6-59 months by province

- Prevalence of mild anaemia is highest among anaemic children living in North Western Province (79 percent) and lowest among anaemic children in Central Province (61 percent).

- In contrast, prevalence of moderate or severe anaemia is highest among children living in Central Province (39 percent) and lowest among children in North Western Province (21 percent).

Fig 13 : Prevalence of mild and moderate or severe anaemia among anemic children by province
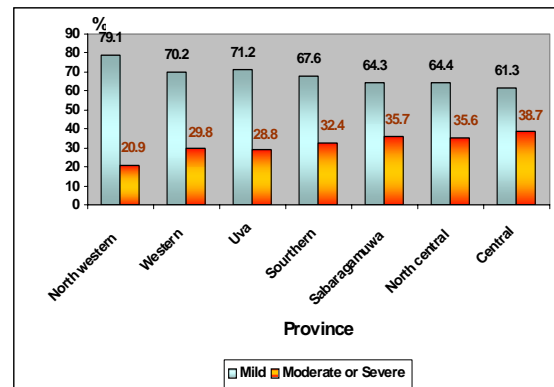


### 3.5.5 Prevalence of anaemia among anaemic children age 6-59 months by districts

- Children in Puttalam district (nearly 80 percent) shows the highest prevalence of mild anaemia followed by Kurunegala district (79 percent) and Colombo district (78 percent).

- Children in Trincomalee district (nearly 53 percent) shows the highest prevalence of moderate or severe anaemia followed by Nuwara Eliya district (48 percent) and Ampara district (45 percent).

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### 3.5.6 Prevalence of anaemia among anaemic children age 6-59 months by mother's level of education

- Prevalence of mild anaemia among anaemic children has decreased marginally from mothers with no education to mothers with primary level of education and steadily increases when mother's level of education increases.

- In contrast, the prevalence of moderate or severe anaemia among anaemic children has increased slightly from mothers with no education to mothers with primary level of education and steadily decreases when mother's level of education increases.

Fig 14 : Prevalence of mild and moderate or severe anaemia among anaemic children by mother's level of education
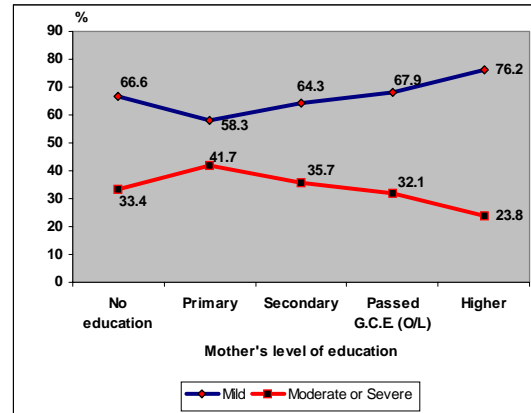


### 3.5.7 Prevalence of anaemia among anaemic children age 6-59 months by wealth quintiles

- Prevalence of mild and moderate or severe anaemia among anemic children shows a clear variation with wealth quintile.

- Prevalence of mild anaemia among anaemic children is steadily increased from the lowest (60 percent) to the highest wealth quintile (74 percent).

- In contrast, the prevalence of moderate or severe anaemia among anaemic children is steadily decreased from the lowest wealth quintile (40 percent) to the highest wealth quintile (26 percent).

Fig 15:  Prevalence of mild and moderate or severe anaemia among anaemic children by wealth quintiles



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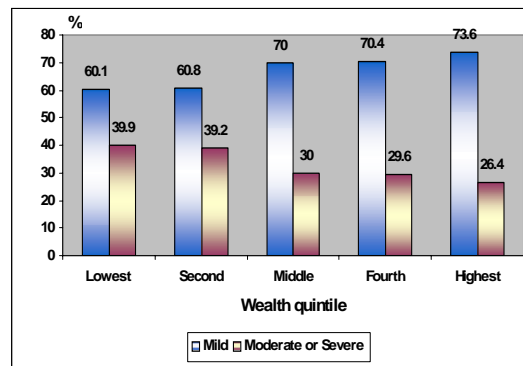
## 3.6 Prevalence of anaemia in non-pregnant women age 15-49 years

Haemoglobin (Hb) measurements were collected from 10,540 (unweighted) non pregnant women and the prevalence of anaemia has been estimated by selected background variables. Fig. 16a is the histogram of non pregnant women who were below 11.0 g/dl (anaemic) while Fig. 16b shows the histogram of non pregnant women who were greater than or equal to 11.0 g/dl (non anaemic). Mean haemoglobin level of non pregnant anaemic women was 10.9± 1.0 (SD) g/dl. Mean value of the haemoglobin level of non pregnant non anaemic women was 13.1± 0.9 (SD) g/dl.

Fig 16a : Frequency distribution of non pregnant anaemic women (weighted)
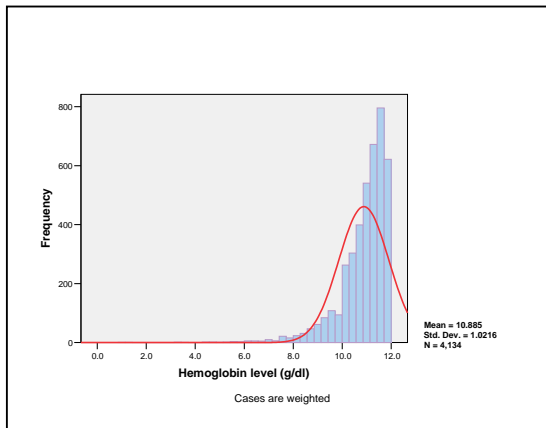
Fig 16b : Frequency distribution of non pregnant non anaemic women (weighted)
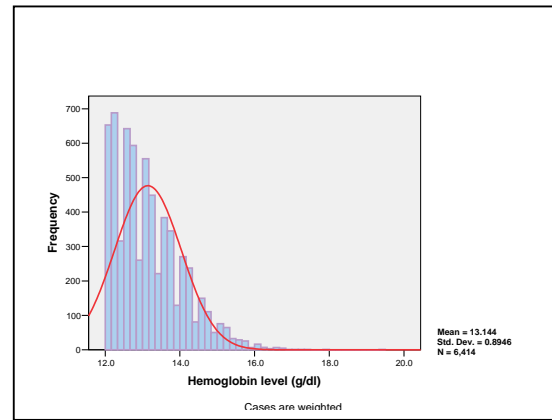




### 3.6.1 Prevalence of anaemia in non-pregnant women

- Prevalence of anaemia among non pregnant women aged 15-49 years is 39 percent.

- Prevalence of mild anaemia among non pregnant women aged 15-49 years is 34 percent.

- Prevalence of moderate anaemia among women aged 15-49 years is 5 percent.

- Prevalence of severe anaemia among the non pregnant women is very low (0.3 percent).

Fig 17: Prevalence of anaemia among non pregnant women age 15-49 years
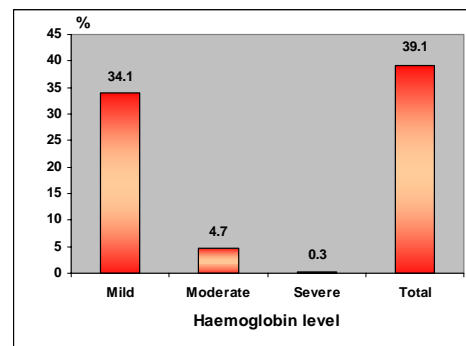


## 3.7 Differentials of anaemia status of non-pregnant women age 15-49 years by background characteristics.

Table 6 shows the percentage of women aged 15-49 years classified according to three statuses of anaemia mild, moderate or severe. The main findings are given below.

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Table 6 :  Prevalence of anaemia among non pregnant women age 15-49 years by
background characteristics

| Background characteristics | Anaemia status by haemoglobin level | | | Any anaemia (Below 11.0 g/dl) | Number of women |
| | Mild anaemia (10.0-10.9 g/dl) | Moderate anaemia (7.0-9.9 g/dl) | Severe anaemia (Below 7.0 g/dl) | | |
|---|---|---|---|---|---|
| **Age** | | | | | |
| 15-19 | 28.9 | 2.5 | 0.0 | 31.4 | 145 |
| 20-29 | 29.0 | 2.9 | 0.1 | 32.0 | 2,373 |
| 30-39 | 32.6 | 4.0 | 0.2 | 36.8 | 3,930 |
| 40-49 | 38.7 | 6.6 | 0.7 | 46.0 | 4,100 |
| **Number of children ever born** | | | | | |
| 0 | 31.2 | 3.4 | 0.5 | 35.1 | 736 |
| 1 | 32.8 | 3.4 | 0.1 | 36.3 | 2,324 |
| 2-3 | 34.2 | 4.9 | 0.3 | 39.4 | 5,792 |
| 4-5 | 36.8 | 6.9 | 0.9 | 44.6 | 1,257 |
| 6+ | 41.1 | 7.8 | 0.0 | 48.9 | 216 |
| **Sector** | | | | | |
| Urban | 37.1 | 06.5 | 0.3 | 43.9 | 1,217 |
| Rural | 34.1 | 04.1 | 0.2 | 38.4 | 8,672 |
| Estate | 28.9 | 10.4 | 2.3 | 41.6 | 660 |
| **Province/District** | | | | | |
| *Western* | *41.4* | *5.2* | *0.1* | *46.7* | *2,676* |
| Colombo | 42.5 | 5.6 | 0.1 | 48.2 | 1,102 |
| Gampaha | 39.7 | 4.7 | 0.0 | 44.4 | 965 |
| Kalutara | 42.2 | 5.0 | 0.0 | 47.2 | 608 |
| *Central* | *25.8* | *3.7* | *0.9* | *30.4* | *1,608* |
| Kandy | 22.2 | 3.5 | 0.0 | 25.7 | 703 |
| Matale | 37.5 | 2.0 | 0.3 | 39.8 | 351 |
| Nuwara Eliya | 23.0 | 4.9 | 2.5 | 30.4 | 553 |
| *Southern* | *36.0* | *5.4* | *0.3* | *41.7* | *1,399* |
| Galle | 45.3 | 6.7 | 0.2 | 52.2 | 592 |
| Matara | 26.3 | 4.2 | 0.8 | 31.3 | 427 |
| Hambantota | 32.2 | 4.6 | 0.0 | 36.8 | 379 |
| *Eastern* | *34.1* | *5.8* | *0.3* | *40.2* | *1,079* |
| Batticaloa | 30.7 | 6.1 | 0.3 | 37.1 | 322 |
| Ampara | 41.8 | 7.2 | 0.3 | 49.3 | 544 |
| Trincomalee | 19.4 | 1.7 | 0.0 | 21.1 | 214 |
| *North-Western* | *39.8* | *3.5* | *0.3* | *43.6* | *949* |
| Kurunegala | 41.5 | 3.6 | 0.5 | 45.6 | 591 |
| Puttalam | 36.9 | 3.4 | 0.0 | 40.3 | 357 |
| *North-Central* | *19.3* | *3.3* | *0.4* | *23.0* | *815* |
| Anuradhapura | 22.4 | 3.4 | 0.2 | 26.0 | 478 |
| Polonnaruwa | 14.8 | 3.1 | 0.6 | 18.5 | 337 |
| *Uva* | *30.8* | *5.6* | *0.3* | *36.7* | *1,124* |
| Badulla | 23.8 | 5.5 | 0.3 | 29.6 | 687 |
| Moneragala | 41.8 | 5.6 | 0.5 | 47.9 | 436 |
| *Sabaragamuwa* | *35.8* | *4.8* | *0.4* | *41.0* | *899* |
| Ratnapura | 42.5 | 7.4 | 0.6 | 50.5 | 472 |
| Kegalle | 28.3 | 1.9 | 0.1 | 30.3 | 426 |
| **Education** | | | | | |
| No education | 33.4 | 9.4 | 1.9 | 44.7 | 483 |
| Primary | 35.9 | 7.5 | 0.6 | 44.0 | 1,654 |
| Secondary | 33.3 | 4.3 | 0.3 | 37.9 | 5,188 |
| Passed G.C.E (O/L) | 34.3 | 3.8 | 0.2 | 38.3 | 1,128 |
| Higher | 34.6 | 3.1 | 0.0 | 37.7 | 2,087 |
| **Wealth quintile** | | | | | |
| Lowest | 32.3 | 5.8 | 1.0 | 39.1 | 2,345 |
| Second | 33.5 | 5.0 | 0.2 | 38.7 | 2,258 |
| Middle | 32.6 | 4.3 | 0.3 | 37.2 | 2,075 |
| Fourth | 35.8 | 4.2 | 0.0 | 40.0 | 2,089 |
| Highest | 36.9 | 4.3 | 0.1 | 41.3 | 1,782 |
| **Total** | **34.1** | **4.7** | **0.3** | **39.1** | **10,548** |

Note : Totals are not tallied by background characteristic due to small percentages of missing values in some variables.

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### 3.7.1 Prevalence of anaemia among non pregnant women by age of women

- On average, the prevalence of anaemia among women steadily increases with increasing the age of women.

- Prevalence of mild and moderate anaemia among women too has increased with increasing the age of women.

- Prevalence of severe anaemia does not change with the age of the women.

Fig 18 : Prevalence of anaemia among non pregnant women by age
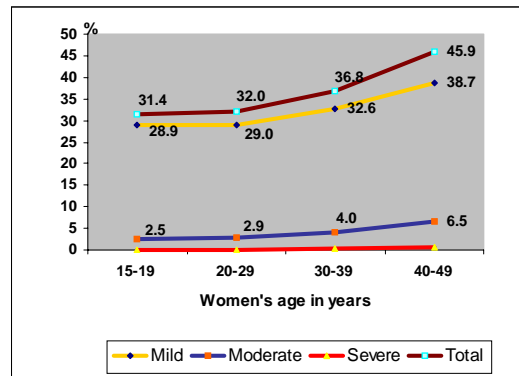


### 3.7.2 Prevalence of anaemia among non pregnant women age 15-49 years by number of children ever born

- On average, the prevalence of anaemia among non pregnant women increases with increasing the number of children ever born to them.

- Similarly, the prevalence of mild and moderate anaemia among non-pregnant women shows an increasing trend with increasing the number of children ever born.

Fig 19 : Prevalence of anaemia among non pregnant women by number of children ever born
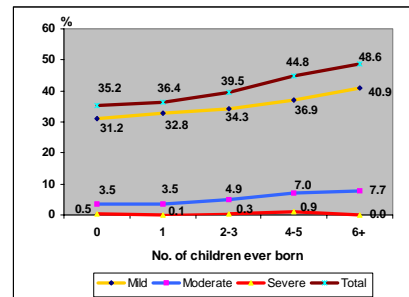


### 3.7.3 Prevalence of anaemia among non pregnant women age 15-49 years by sector

- On average, women in the urban sector reported the highest prevalence rate (44 percent) of anaemia. This may be due to unbalanced food practices in their busy life styles.
- The highest prevalence of mild anaemia (37 percent) is also reported for women in urban areas followed by rural (34 percent) and estate (29 percent) sector.
- However, women living in the estate sector reported the highest percentages of moderate and severe anaemia (10.4 and 2.3 percent respectively).

Fig 20 : Prevalence of anaemia among non pregnant women by sector



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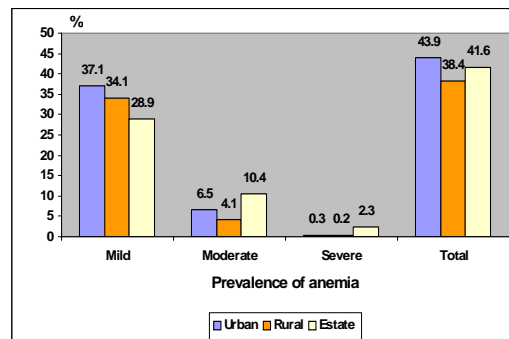
### 3.7.4 Prevalence of anaemia among non pregnant women age 15-49 years by province

- Prevalence of anaemia among non-pregnant women is highest in Western Province (47 percent) followed by North-Western Province (44 percent).

- Prevalence of anaemia is lowest among the women in the North Central Province (23 percent).

Fig 21 :  Prevalence of anaemia among non pregnant women by province
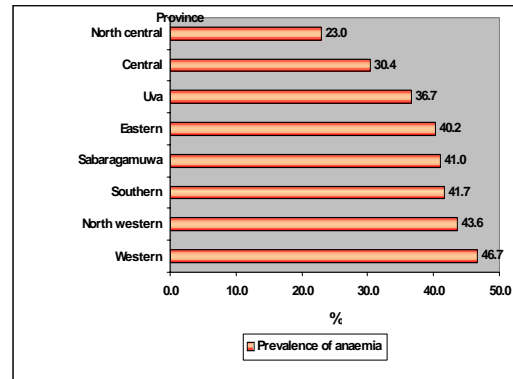


### 3.7.5 Prevalence of anaemia among non pregnant women age 15-49 years by districts

Fig 22 :  Prevalence of anaemia among non pregnant women by districts
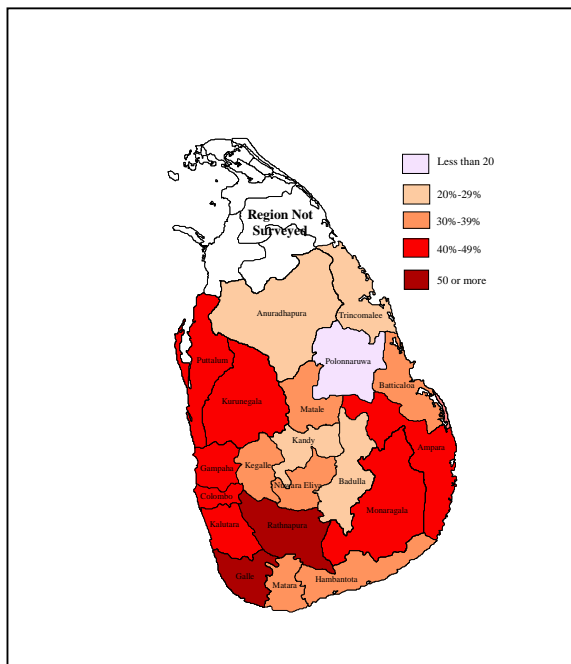


- Higher percentages of anaemic women (non-pregnant) were found in Galle (52 percent), Rathnapura (51 percent) and Ampara (49 percent) districts.

- Prevalence of anaemia among non pregnant women in Polonnaruwa (19 percent) and Trincomalee (21 percent) districts are low compared to women in other districts.

- Prevalence of anaemia in Galle district is nearly three times higher than that of women in Polonnaruwa district.

- Percentage of women with severe anaemia is highest in Nuwara Eliya district (2.5 percent).(See Table 6).

### 3.7.6 Prevalence of anaemia among non pregnant women age 15-49 years by level of education of women

- Women's education has some influence in determining the women's anaemic levels. Low educated women show high prevalence of anaemia compared to women with higher levels of education.
- Prevalence of mild anaemia among non pregnant women age 15-49 years fluctuates with the level of education of women.
- However the prevalence of moderate and severe anaemia among non pregnant women shows a clear decreasing trend with increasing the level of education of women.

Fig 23 : Prevalence of anaemia among non pregnant women by women's level of education
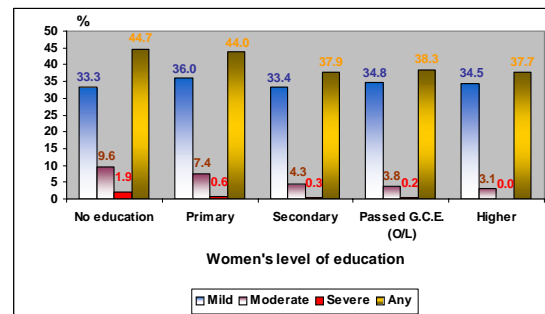


### 3.7.7 Prevalence of anaemia among non pregnant women age 15-49 years by wealth quintiles

Fig 24 : Prevalence of anaemia among non pregnant women by wealth quintiles

- Prevalence of mild anaemia is highest among women in the highest wealth quintile (37 percent) while the corresponding figure is lowest for women in the lowest wealth quintile (32 percent).

- In contrast, prevalence of moderate and severe anaemia is highest among women in the lowest wealth quintile.



### 3.8 Comparison of mild and moderate or severe anaemia levels of non pregnant anaemic women age 15-49 years

This section compares the prevalence of anaemia among anaemic women.

Out of the total women (10,540) age 15-49 years tested for haemoglobin levels, 39 percent (4,134) of women were identified as anaemic (Hb < 11.0 g/dl). Of the 39 percent anaemic non pregnant women, further investigations were made among non pregnant women who have reported mild haemoglobin level with moderate or severe haemoglobin levels together for the purpose of comparisons. Table 7 presents details.

## Table 7 : Comparision of prevalence of mild anaemia with moderate or severe levels of anaemia among anaemic women by background characteristics

| Background characteristic | Haemoglobin levels | | Number of women |
|---|---|---|---|
| | Mild (10.0-11.9 g/dl) | Moderate and severe (< or = 9.9 g/dl) | |
| **Age** | | | |
| 15-19 | 92.0 | 8.0 | 46 |
| 20-29 | 90.5 | 9.5 | 760 |
| 30-39 | 88.6 | 11.4 | 1,445 |
| 40-49 | 84.2 | 15.8 | 1,883 |
| **Number of children ever born** | | | |
| 0 | 88.8 | 11.2 | 258 |
| 1 | 90.3 | 9.7 | 843 |
| 2-3 | 86.8 | 13.2 | 2,284 |
| 4-5 | 82.5 | 17.5 | 560 |
| 6+ | 84.1 | 15.9 | 106 |
| **Residence** | | | |
| Urban | 84.5 | 15.5 | 535 |
| Rural | 88.8 | 11.2 | 3,325 |
| Estate | 69.5 | 30.5 | 274 |
| **Province/Districts** | | | |
| *Western* | *88.8* | *11.2* | *1,248* |
| Colombo | 88.1 | 11.9 | 531 |
| Gampaha | 89.4 | 10.6 | 429 |
| Kalutara | 89.4 | 10.6 | 287 |
| *Central* | *84.9* | *15.1* | *489* |
| Kandy | 86.3 | 13.7 | 181 |
| Matale | 94.4 | 5.6 | 140 |
| Nuwara Eliya | 75.5 | 24.5 | 168 |
| *Southern* | *86.3* | *13.7* | *582* |
| Galle | 86.8 | 13.2 | 309 |
| Matara | 84.1 | 15.9 | 134 |
| Hambantota | 87.4 | 12.6 | 139 |
| *Eastern* | *84.9* | *15.1* | *433* |
| Batticaloa | 82.6 | 17.4 | 120 |
| Ampara | 84.7 | 15.3 | 269 |
| Trincomalee | 92.1 | 7.9 | 45 |
| *North-Western* | *91.2* | *8.8* | *414* |
| Kurunegala | 91.0 | 9.0 | 270 |
| Puttalam | 91.6 | 8.4 | 144 |
| *North-Central* | *84.0* | *16.0* | *187* |
| Anuradhapura | 86.0 | 14.0 | 125 |
| Polonnaruwa | 80.0 | 20.0 | 62 |
| *Uva* | *83.9* | *16.1* | *413* |
| Badulla | 80.4 | 19.6 | 203 |
| Moneragala | 87.3 | 12.7 | 209 |
| *Sabaragamuwa* | *87.3* | *12.7* | *368* |
| Ratnapura | 84.1 | 15.9 | 239 |
| Kegalle | 93.2 | 6.8 | 130 |
| **Mother's education** | | | |
| No education | 74.7 | 25.3 | 216 |
| Primary | 81.7 | 18.3 | 728 |
| Secondary | 87.8 | 12.2 | 1,970 |
| Passed G.C.E (O/L) | 89.6 | 10.4 | 431 |
| Higher | 91.7 | 8.3 | 787 |
| **Wealth quintile** | | | |
| Lowest | 82.8 | 17.2 | 916 |
| Second | 86.6 | 13.4 | 873 |
| Middle | 87.5 | 12.5 | 772 |
| Fourth | 89.5 | 10.5 | 836 |
| Highest | 89.3 | 10.7 | 737 |
| **Total** | 87.0 | 13.0 | 4,134 |

Note : Totals are not tallied by background characteristic due to small percentages of missing values in some variables.

### 3.8.1 Prevalence of anaemia among anaemic non pregnant women

- Prevalence of mild anaemia among anaemic women age 15-49 years is 87 percent.

- Prevalence of moderate or severe anaemia among anaemic women age 15-49 years is 13 percent.

Fig 25: Prevalence of mild and moderate or severe anaemia among anaemic women age 15-49 years
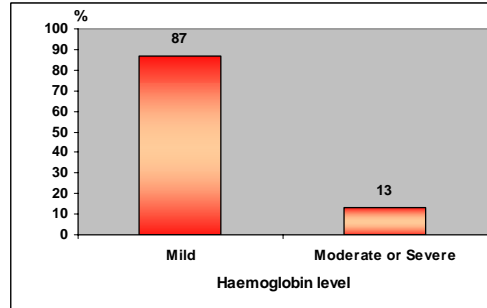


## 3.9 Comparison of mild and moderate or severe anaemia levels of non pregnant anaemic women age 15-49 by background characteristics

### 3.9.1 Prevalence of anaemia among anaemic non pregnant women by age of women

- Prevalence of mild anaemia among anaemic women age 15-49 years is decreasing with increasing the age of women.

- In contrast, prevalence of moderate or severe anaemia among anaemic women is increasing with increasing the age of women.

Fig 26: Prevalence of mild and moderate or severe anaemia among anaemic women by age
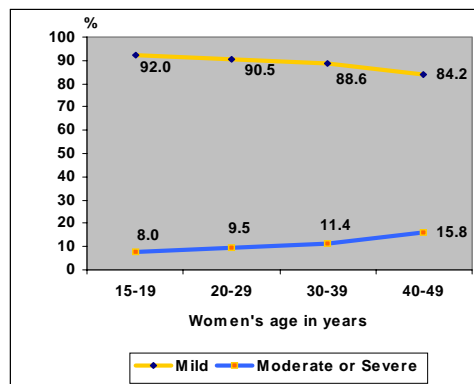


### 3.9.2 Prevalence of anaemia among anemic non pregnant women age 15-49 years by number of children ever born

- Prevalence of mild anaemia among anaemic women is highest among women who are having one child (90 percent).

- Prevalence of moderate or severe anaemia is highest among anaemic women who have had 4-5 children (18 percent).

Fig 27 : Prevalence of mild and moderate or severe anaemia among non pregnant women by number of children ever born to women



24
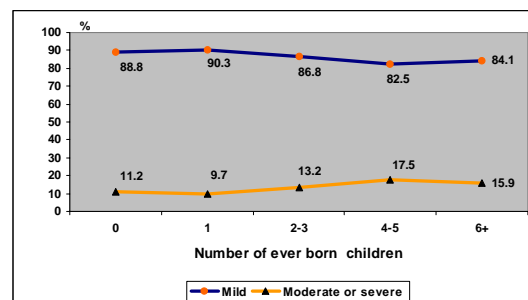
### 3.9.3 Prevalence of anaemia among anaemic non pregnant women age 15-49 years by sector

- Prevalence of mild anaemia among anaemic women is highest among the women reside in the rural sector (89 percent) followed by women reside in urban sector (85 percent) and estate sector (70 percent).

- In contrast, the prevalence of moderate or severe anaemia among anaemic women is highest among the women reside in estate sector (31 percent) followed by women reside in urban sector (16 percent) and rural sector (11 percent).

Fig 28 : Prevalence of mild and moderate or severe anaemia among non pregnant anaemic women by sector
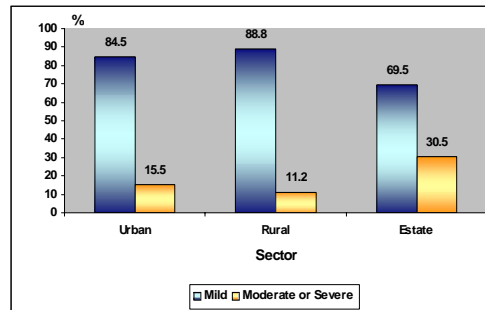


### 3.9.4 Prevalence of anaemia among anaemic non pregnant women age 15-49 years by province

- Prevalence of mild anaemia is highest among the anemic women in North-Western province (91 percent) while the prevalence is lowest among anaemic women in Uva and North–Central province (84 percent) each.

- In contrast, prevalence of moderate or severe anaemia is high among anaemic women in Uva and North – Central provinces (16 percent each).

Fig 29 : Prevalence of mild and moderate or severe anaemia among non pregnant anaemic women by province
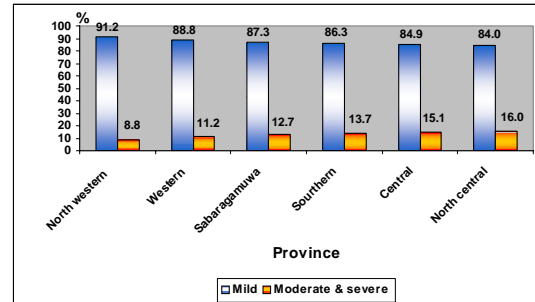


### 3.9.5 Prevalence of anaemia among anaemic non pregnant women age 15-49 years by districts

- Prevalence of mild anaemia among anaemic women is highest in the Matale district (94 percent) followed by anaemic women in the Kegalle district (93 percent) (Table 7).

- Prevalence of moderate or severe anaemia among anaemic women is highest in Nuwara Eliya district (25 percent) followed by anaemic women in Polonnaruwa district (20 percent) (Table 7).

### 3.9.6 Prevalence of anaemia among anaemic non pregnant women age 15-49 years by women's level of education

- Prevalence of mild anaemia among anaemic women show an increasing trend with increasing the level of education of the women.

- In contrast, prevalence of moderate or severe anaemia among anaemic women shows a decreasing trend with increasing the level of education of women.

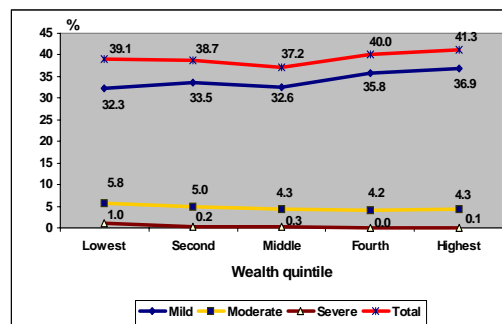Fig 30: Prevalence of mild and moderate or severe anaemia among non pregnant anaemic women by women's level of education
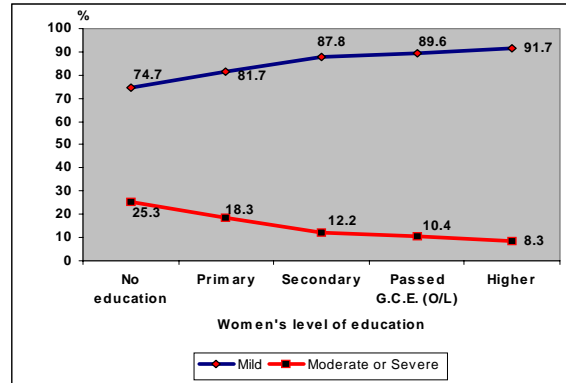


### 3.9.7 Prevalence of anaemia among anemic non pregnant women age 15-49 years by wealth quintiles

- Prevalence of mild anaemia is highest among women in the fourth wealth quintile (90 percent) while the corresponding figure is lowest among women in the lowest wealth quintile (83 percent).

- In contrast, prevalence of moderate or severe anaemia is highest among women in the lowest wealth quintile (17 percent).

Fig 31 : Prevalence of mild and moderate or severe anaemia among non pregnant anaemic women wealth quintiles



26
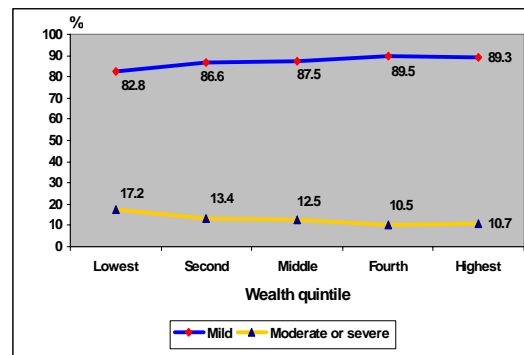
## 3.10 Prevalence of anaemia in pregnant women age 15-49 years

There were only 715 pregnant women (unweighted) in the sample at the time of haemoglobin levels were taken. Due to the lesser number of pregnant women, haemoglobin levels could not be estimated by any background variables. Therefore only the prevalence rates by two levels namely mild, moderate or severe are provided. Out of the total weighted pregnant women (707), 34 percent were found to be anaemic (Hb < 11.0 g/dl). Fig 32 shows the prevalence rates graphically.

**Table 8 : Prevalence of anaemia in pregnant women**

| Haemoglobin levels | | | Number of pregnant women (Weighted) |
|---|---|---|---|
| Mild (10.0-10.9 g/dl) | Moderate or severe (< or = 9.9 g/dl) | Any Anaemia (< 10.9 g/dl) | |
| 20.7 | 13.3 | 34.0 | 707 |

Fig 32 : Prevalence of mild and moderate or severe anaemia among pregnant women
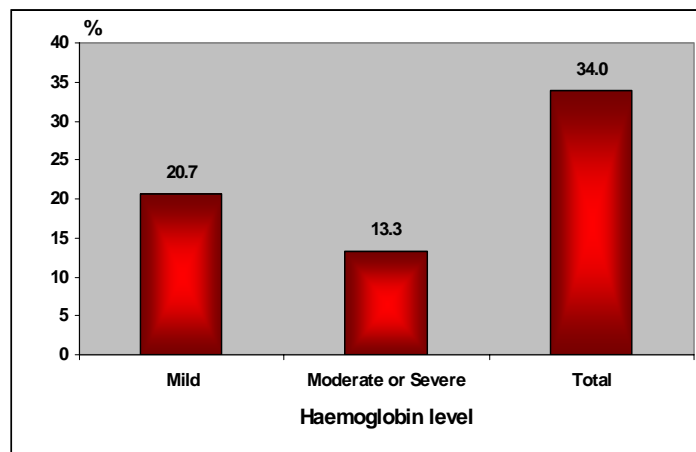
# Summary of Findings

Assessment of haemoglobin concentrations should be done time to time to monitor the prevalence rates of anaemia especially among children age 6-59 months and women in the reproductive age because it has found to be a major public health problem through out the world.

In the latest DHS survey, an effort has been taken by the DCS to give national, province and district level estimates of prevalence of anaemia among women and their children for the first time in DCS history. Prevalence rates are provided excluding the Northern Province of the country.

Anaemia status was evaluated haemoglobin as the biomaker. It was measured using the haemocue.

Due to constraints occurring during the main DHS survey, haemoglobin levels of some respondents had to be collected 0-9 months after the main survey. Therefore, anaemia status is provided in this supplementary report for the DHS survey with a limited number of background variables for women and their children. Due to the time gap between the main survey and collection of blood for Haemoglobin assessment, some respondents have been excluded from the analysis as they have exceeded the age limits considered in this survey.

Prevalence of anaemia was computed using haemoglobin measurements collected from 10,540 non pregnant women age 15-49 years, 715 pregnant women in the same age range and 4,640 children age 6-59 months. Results were adjusted by weighting factor to achieve better representativeness.

Anaemia can be classified as mild, moderate or severe based on haemoglobin concentration in the blood, according to the classification developed by the World Health Organization (1968). Mild, moderate and severe anaemia levels for children age 6-59 months and pregnant women age 15-49 is defined as 10.0-10.9 g/dl, 7.0-9.9 g/dl and below 7.0 g/dl respectively. The corresponding figure for mild anaemia level for non pregnant women is slightly changed from the pregnant women's level which is defined as 10.0-11.9 g/dl. Other levels are same for all women irrespective of their pregnancy status.

## Key findings

- The prevalence of anaemia among children aged 6-59 months was 32.6 percent.
- The prevalence of anaemia among non pregnant women age 15-49 years was 39.1.
- The prevalence of anaemia among non-pregnant women aged 15-49 years was 34 percent.

## Anaemia among children (6-59 months) – Important factors

- Prevalence of anaemia in children decreases with increasing the age of children and with the increasing level of education of mothers.
- Children in the Eastern province had a higher prevalence of anaemia especially in Ampara district (51 percent).
- There is no considerable difference of the prevalence of anaemia by sex and sector among children age 6-59 months. However, the prevalence of mild anaemia is higher

among rural children (22 percent) where as the prevalence of moderate anaemia is higher among estate children (12 percent). Children in the urban sector (0.6 percent) suffer more with severe level of anaemia compared to children in other two sectors.

- The prevalence of moderate anaemia is high (34 percent) among children in low wealth quintiles.

### Anaemia among anaemic children (6 -59 months)– Important factors

- On average, the prevalence of mild anaemia among anaemic children age 6-59 months is 66 percent compared to 34 percent of moderate or sever levels of anaemia for children in the same age group.
- Anaemic female children reported marginally higher percentage (68 percent) with mild anaemia than that of their male counterparts (64 percent). In contrast, male children reported marginally higher percentage (36 percent) of moderate or severe levels of anaemia compared to their female counterparts (32 percent).
- Prevalence of mild anaemia is highest among anaemic children living in North-Western province (79 percent) while the highest percentage of anaemic children with moderate or severe levels is reported from the Eastern Province (45 percent).
- Moderate or severe levels of anaemia among anaemic children are highest among the children in the lowest wealth quintile (40 percent).

### Anaemia among non pregnant women (15-49 years) – Important factors

- Prevalence of anaemia in non pregnant women has increased with the increasing age of women. In contrast, prevalence of anaemia decreased with the increasing women's level of education.
- Surprisingly, non pregnant women residing in Western Province reported the highest prevalence rate (47 percent) compared to other provinces.
- According to districts, the highest prevalence of anaemia among non pregnant women was reported from Galle district (52 percent).
- Prevalence of mild anaemia was high among women residing in urban sector 37 percent). However, moderate and severe anaemia is high among women residing in Estate sector (10.4 and 2.3 respectively).
- Prevalence of mild anaemia is high among women in the highest wealth quintile (37 percent) and women in the lowest wealth quintile reported the highest prevalence of moderate and severe anaemia levels (5 percent and 1 percent respectively).

### Anaemia among non pregnant women (15-49 years) – Important factors

- Prevalence of mild anaemia among anaemic women is decreasing with increasing the age of women. In contrast, prevalence of moderate or sever anaemia among anaemic women is increasing with increasing the age of women.
- Prevalence of mild anaemia among anaemic women is highest among rural sector women (89 percent) while the highest percentage of anaemic women with moderate or severe levels of anaemia is highest in estate sector (31 percent).
- Prevalence of mild anaemia among anaemic women is highest in Matale district (94 percent). However, the prevalence of moderate or sever anaemia among anaemic women is highest in Nuwara Eliya district (25 percent).

| Variable | Value (R) | standard error | Number of cases | | Design effect | Relative error | Confidence limits | |
|---|---|---|---|---|---|---|---|---|
| | | | Unweighted(N) | Weighted(WN) | | | R-2SE | R+2SE |
| **Age in months** | | | | | | | | |
| 6-8 | 63.48 | 8.60 | 143 | 142 | 1.179 | 13.554 | 46.60 | 80.36 |
| 9-11 | 113.40 | 11.26 | 202 | 188 | 1.143 | 9.929 | 91.33 | 135.50 |
| 12-17 | 231.30 | 17.48 | 499 | 510 | 1.386 | 7.557 | 197.00 | 265.50 |
| 18-23 | 260.90 | 18.16 | 561 | 569 | 1.335 | 6.961 | 225.20 | 296.50 |
| 24-35 | 319.40 | 19.49 | 1047 | 1044 | 1.273 | 6.102 | 281.20 | 357.70 |
| 36-47 | 280.80 | 17.97 | 1070 | 1080 | 1.220 | 6.400 | 245.60 | 316.11 |
| 48-59 | 249.70 | 17.10 | 1118 | 1121 | 1.234 | 6.848 | 216.20 | 283.20 |
| **Sex** | | | | | | | | |
| Male | 789.90 | 32.85 | 2356 | 2366 | 1.640 | 4.159 | 725.50 | 854.30 |
| Female | 729.10 | 30.04 | 2284 | 2287 | 1.463 | 4.120 | 670.10 | 788.00 |
| **Residence** | | | | | | | | |
| Urban | 170.90 | 15.89 | 755 | 534 | 1.528 | 9.298 | 139.70 | 202.00 |
| Rural | 1247.00 | 43.22 | 3309 | 3760 | 2.041 | 3.466 | 1162.00 | 1332.00 |
| Estate | 101.00 | 8.59 | 576 | 359 | 0.745 | 8.505 | 84.16 | 117.90 |
| **Province** | | | | | | | | |
| Western | 370.60 | 21.52 | 1091 | 1105 | 1.353 | 5.807 | 328.40 | 412.80 |
| Central | 193.20 | 18.15 | 683 | 684 | 1.774 | 9.394 | 157.60 | 228.80 |
| Southern | 228.60 | 16.88 | 661 | 660 | 1.306 | 7.384 | 195.50 | 261.70 |
| Eastern | 276.00 | 24.79 | 623 | 621 | 2.359 | 8.982 | 227.40 | 324.60 |
| North western | 112.80 | 10.82 | 395 | 397 | 1.061 | 9.592 | 91.59 | 134.10 |
| North-Central | 88.55 | 9.97 | 344 | 346 | 1.141 | 11.259 | 68.99 | 108.10 |
| Uva | 156.10 | 13.00 | 509 | 506 | 1.116 | 8.328 | 130.60 | 181.60 |
| Sabaragamuwa | 93.02 | 10.30 | 334 | 335 | 1.161 | 11.073 | 72.81 | 113.20 |
| **District** | | | | | | | | |
| Colombo | 149.30 | 14.15 | 465 | 476 | 1.382 | 9.478 | 121.50 | 177.10 |
| Gampaha | 155.60 | 13.12 | 363 | 363 | 1.142 | 8.432 | 129.80 | 181.30 |
| Kalutara | 65.74 | 9.51 | 263 | 265 | 1.392 | 14.468 | 47.08 | 84.40 |
| Kandy | 77.73 | 11.07 | 284 | 284 | 1.598 | 14.242 | 56.02 | 99.44 |
| Matale | 37.88 | 10.46 | 106 | 107 | 2.904 | 27.614 | 17.36 | 58.40 |
| Nuwara Eliya | 77.60 | 9.88 | 293 | 293 | 1.275 | 12.732 | 58.22 | 96.98 |
| Galle | 92.88 | 11.35 | 271 | 269 | 1.411 | 12.220 | 70.62 | 115.10 |
| Matara | 68.57 | 8.06 | 212 | 211 | 0.959 | 11.754 | 52.76 | 84.38 |
| Hambantota | 67.19 | 9.54 | 178 | 179 | 1.371 | 14.199 | 48.48 | 85.91 |
| Batticaloa | 83.90 | 12.81 | 183 | 184 | 1.987 | 15.268 | 58.76 | 109.00 |
| Ampara | 154.70 | 19.96 | 306 | 305 | 2.656 | 12.902 | 115.50 | 193.80 |
| Trincomalee | 37.44 | 7.20 | 134 | 132 | 1.393 | 19.231 | 23.31 | 51.56 |
| Kurunegala | 71.93 | 8.63 | 244 | 247 | 1.048 | 11.992 | 55.01 | 88.85 |
| Puttalam | 40.89 | 6.54 | 151 | 149 | 1.052 | 15.992 | 28.06 | 53.72 |
| Anuradhapura | 70.52 | 7.53 | 226 | 227 | 0.814 | 10.675 | 55.75 | 85.28 |
| Polonnaruwa | 18.03 | 6.54 | 118 | 119 | 2.372 | 36.256 | 5.21 | 30.85 |
| Badulla | 83.17 | 10.06 | 306 | 305 | 1.235 | 12.096 | 63.43 | 102.90 |
| Moneragala | 72.95 | 8.23 | 203 | 201 | 0.940 | 11.279 | 56.80 | 89.09 |
| Ratnapura | 64.32 | 8.65 | 184 | 185 | 1.175 | 13.442 | 47.36 | 81.28 |
| Kegalle | 28.70 | 5.60 | 150 | 149 | 1.097 | 19.516 | 17.72 | 39.69 |
| **Mother's education** | | | | | | | | |
| No education | 52.44 | 8.20 | 142 | 126 | 1.289 | 15.639 | 36.35 | 68.53 |
| Primary | 188.40 | 16.51 | 542 | 483 | 1.501 | 8.763 | 156.00 | 220.80 |
| Secondary | 810.70 | 33.82 | 2391 | 2413 | 1.709 | 4.172 | 744.30 | 877.00 |
| Passed G.C.E (O/L) | 164.40 | 15.74 | 460 | 481 | 1.553 | 9.574 | 133.60 | 195.30 |
| Higher | 255.00 | 19.55 | 943 | 1003 | 1.578 | 7.667 | 216.70 | 293.40 |
| **Wealth quintile** | | | | | | | | |
| Lowest | 388.70 | 25.74 | 1219 | 1143 | 1.855 | 6.622 | 338.20 | 439.20 |
| Second | 350.30 | 22.43 | 1018 | 1037 | 1.549 | 6.403 | 306.30 | 394.30 |

**Appendix A: Sampling errors for anemic children**

| | | | Number of cases | | | | Confidence limits | |
|---|---|---|---|---|---|---|---|---|
| | | | | | | | | |
| Middle | 271.80 | 19.24 | 796 | 844 | 1.442 | 7.079 | 234.10 | 309.60 |
| Fourth | 268.90 | 19.40 | 831 | 870 | 1.481 | 7.215 | 230.90 | 307.00 |
| Highest | 239.20 | 20.34 | 776 | 759 | 1.817 | 8.503 | 199.30 | 279.10 |
| **Total** | **1519.00** | **46.73** | **4640** | **4653** | **2.128** | 0.031 | **1427.00** | **1611.00** |

## Appendix B : Sampling errors for anemic women

| Variable | Value (R) | standard error | Number of cases | | Design effect | Relative error | Confidence limits | |
|---|---|---|---|---|---|---|---|---|
| | | | Unweighted(N) | Weighted(WN) | | | R-2SE | R+2SE |
| **Age** | | | | | | | | |
| 15-19 | 45.54 | 6.813 | 148 | 145 | 1.023 | 0.150 | 32.18 | 58.90 |
| 20-29 | 759.70 | 29.220 | 2397 | 2373 | 1.210 | 0.038 | 702.40 | 817.00 |
| 30-39 | 1445.00 | 42.050 | 3875 | 3930 | 1.416 | 0.029 | 1363.00 | 1528.00 |
| 40-49 | 1883.00 | 44.660 | 4120 | 4100 | 1.288 | 0.024 | 1796.00 | 1971.00 |
| **Number of children ever born** | | | | | | | | |
| 0 | 258.20 | 16.690 | 740 | 736 | 1.105 | 0.065 | 225.40 | 290.90 |
| 1 | 843.40 | 32.800 | 2277 | 2324 | 1.385 | 0.039 | 779.10 | 907.70 |
| 2-3 | 2284.00 | 50.230 | 5821 | 5792 | 1.408 | 0.022 | 2186.00 | 2383.00 |
| 4-5 | 560.10 | 25.400 | 1289 | 1257 | 1.215 | 0.045 | 510.20 | 609.91 |
| 6+ | 105.80 | 11.260 | 218 | 216 | 1.209 | 0.106 | 83.68 | 127.80 |
| **Residence** | | | | | | | | |
| Urban | 534.60 | 26.070 | 1832 | 1217 | 1.338 | 0.049 | 483.50 | 585.80 |
| Rural | 3325.00 | 63.680 | 7658 | 8672 | 1.779 | 0.019 | 3200.00 | 3450.00 |
| Estate | 274.30 | 13.620 | 1050 | 660 | 0.694 | 0.050 | 247.60 | 301.00 |
| **Province** | | | | | | | | |
| Western | 1248.00 | 35.800 | 2677 | 2676 | 1.164 | 0.029 | 1177.00 | 1318.00 |
| Central | 489.20 | 23.830 | 1601 | 1608 | 1.216 | 0.049 | 442.40 | 535.90 |
| Southern | 582.40 | 26.430 | 1397 | 1399 | 1.268 | 0.045 | 530.60 | 634.20 |
| Eastern | 433.10 | 29.870 | 1079 | 1079 | 2.146 | 0.069 | 374.50 | 491.70 |
| North western | 413.90 | 19.910 | 947 | 949 | 0.996 | 0.048 | 374.90 | 453.00 |
| North central | 187.00 | 14.400 | 817 | 815 | 1.127 | 0.077 | 158.80 | 215.20 |
| Uva | 412.60 | 20.650 | 1126 | 1124 | 1.075 | 0.050 | 372.10 | 453.10 |
| Sabaragamuwa | 368.10 | 20.350 | 896 | 899 | 1.165 | 0.055 | 328.20 | 408.00 |
| **District** | | | | | | | | |
| Colombo | 531.30 | 23.260 | 1102 | 1102 | 1.072 | 0.044 | 485.70 | 576.90 |
| Gampaha | 428.30 | 20.940 | 965 | 965 | 1.065 | 0.049 | 387.80 | 469.90 |
| Kalutara | 287.50 | 17.360 | 610 | 608 | 1.077 | 0.060 | 253.40 | 321.50 |
| Kandy | 181.00 | 14.350 | 700 | 703 | 1.157 | 0.079 | 152.90 | 209.20 |
| Matale | 139.70 | 12.400 | 350 | 351 | 1.115 | 0.089 | 115.30 | 164.00 |
| Nuwara Eliya | 168.50 | 14.420 | 551 | 553 | 1.253 | 0.086 | 140.20 | 196.80 |
| Galle | 309.10 | 20.560 | 591 | 592 | 1.407 | 0.067 | 268.80 | 349.40 |
| Matara | 133.90 | 10.970 | 427 | 427 | 0.909 | 0.082 | 112.40 | 155.40 |
| Hambantota | 139.40 | 12.480 | 379 | 379 | 1.131 | 0.090 | 114.90 | 163.90 |
| Batticaloa | 119.50 | 12.250 | 321 | 322 | 1.270 | 0.103 | 95.48 | 143.60 |
| Ampara | 268.70 | 26.060 | 540 | 544 | 2.591 | 0.097 | 217.50 | 319.80 |
| Trincomalee | 44.91 | 7.921 | 218 | 214 | 1.402 | 0.176 | 29.37 | 60.44 |
| Kurunegala | 270.10 | 15.040 | 591 | 591 | 0.859 | 0.056 | 240.60 | 299.60 |
| Puttalam | 143.90 | 13.050 | 356 | 357 | 1.199 | 0.091 | 118.30 | 169.50 |
| Anuradhapura | 124.60 | 11.600 | 479 | 478 | 1.092 | 0.093 | 101.80 | 147.30 |
| Polonnaruwa | 62.43 | 8.525 | 338 | 337 | 1.170 | 0.137 | 45.71 | 79.15 |
| Badulla | 203.40 | 15.170 | 690 | 687 | 1.153 | 0.075 | 173.60 | 233.10 |
| Moneragala | 209.20 | 14.010 | 436 | 436 | 0.956 | 0.067 | 181.70 | 236.70 |
| Ratnapura | 238.50 | 15.780 | 471 | 472 | 1.067 | 0.066 | 207.60 | 269.50 |
| Kegalle | 129.50 | 12.850 | 425 | 426 | 1.290 | 0.099 | 104.30 | 154.80 |
| **Education** | | | | | | | | |
| No education | 215.80 | 15.110 | 542 | 483 | 1.079 | 0.070 | 186.20 | 245.40 |

| Variable | Value (R) | standard error | Unweighted(N) | Weighted(WN) | Design effect | Relative error | R-2SE | R+2SE |
|---|---|---|---|---|---|---|---|---|
| Primary | 727.60 | 29.210 | 1765 | 1654 | 1.258 | 0.040 | 670.30 | 784.80 |
| Secondary | 1970.00 | 47.890 | 5106 | 5188 | 1.430 | 0.024 | 1876.00 | 2064.00 |
| Passed G.C.E (O/L) | 431.20 | 23.130 | 1093 | 1128 | 1.292 | 0.054 | 385.80 | 476.50 |
| Higher | 787.10 | 31.510 | 2026 | 2087 | 1.363 | 0.040 | 725.30 | 848.90 |
| **Wealth quintile** | | | | | | | | |
| Lowest | 915.90 | 34.630 | 2467 | 2345 | 1.433 | 0.038 | 848.00 | 983.80 |
| Second | 872.70 | 33.560 | 2180 | 2258 | 1.406 | 0.038 | 806.90 | 938.60 |
| Middle | 771.80 | 31.450 | 1986 | 2075 | 1.382 | 0.041 | 710.20 | 833.50 |
| Fourth | 836.40 | 33.600 | 2028 | 2089 | 1.465 | 0.040 | 770.50 | 902.30 |
| Highest | 737.00 | 31.460 | 1879 | 1782 | 1.442 | 0.043 | 675.30 | 798.70 |
| Total | **4134.00** | **69.890** | **10540** | **10548** | **1.941** | 0.017 | **3997.00** | 4271 |

## Appendix  C:  Sampling errors for  anemic women (pregnant)

| Variable | Value (R) | standard error | Number of cases | | Design effect | Relative error | Confidence limits | |
|---|---|---|---|---|---|---|---|---|
| | | | Unweighted(N) | Weighted(WN) | | | R-2SE | R+2SE |
| Total | **240.10** | **13.980** | **715** | **707** | **1.244** | 0.058 | **212.60** | **267.50** |

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**SLMA** SRI LANKA MEDICAL ASSOCIATION
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14th August 2006

Mrs D B P S Vidyaratne
Director general of Census and Statistics
Department of Census Statistics
15/12, Maitland Crescent
Colombo 7

Dear Mrs Vidyaratne

**ERC/06-007**
**Demographic and Health Survey 2006 (Haemoglobin tests to measure prevalence of anaemia)**

Thank you for your letter dated 4th August 2006 giving the information requested by the Ethical Review Committee.

Approval is hereby given by the Ethical Review Committee for you to conduct the above study.

Yours sincerely

Prof Anoja Fernando
Chairperson
Ethical Review Committee

DEMOGRAPHIC AND HEALTH SURVEY 2006/7

ANEMIA TEST FOR ELIGIBLE WOMEN & CHILDREN
================================================

CLUSTER_NO  PROVINCE    DS      GN          Code for (8) : preg-1 Not_Preg-2 Not_sure-3

...........  .........  ........  ..........   Code for (9) : agreed-1 refused-2

Head of the Household:..........................  Code for (11) : Measured-1 Not_Present-2
                                                                  Refused-3 Other-4

Address : ....................

| HHNO | SSU | QHNUMW/Line No | Name | Sex | Date of Birth | Pregnancy Status | | Consent Statement Code | Result of HB | Res Code Date (yy/mm/dd) |
|------|-----|---------------|------|-----|---------------|------------------|------|-----------|--------------|--------------------------|
| (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) Prg ☐ Wks ☐ | (9) | (10) | (11) |
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## Ministry of Healthcare and Nutrition And

## Department of Census and Statistics, Sri Lanka

Name _____ Date _____

Dear Respondent,

The Department of Census and Statistics is conducting a Demographic and Health Survey including testing of anemia this year. This survey is being done according to the request made by the Ministry of Healthcare and Nutrition. Technical advice will be provided by the Medical Research Institute.

*Hemoglobin* samples will be obtained by the ever married women aged 15 to 49 and their children below 5 years of age at the time of the survey. This information will help us to find out if there is a problem of *anemia*.

We appreciate that you allowed us to interview you and to test you and your child for *anemia*.

Thank you for your cooperation.

*Please look inside for the results of your anemia testing*

## What CAUSES Anemia?

Anemia is caused by:

$ loss of blood due to:
  $ parasites, especially hookworms;
  $ excessive menstrual losses;
  $ chronic diseases such as ulcers or tuberculosis.

$ a lack of iron in the diet.
$ inability of the body to absorb iron from food.

## How can Anemia be PREVENTED?

$ Pregnant mothers and infants should take iron tablets or syrup.
$ Eat a diet adequate in iron-rich foods such as dark green vegetables, liver, meat or fish, and fruits rich in vitamin C.
$ Avoid giving tea to infants and young children.
$ Avoid taking coffee or tea with meals.
$ Prevent and treat worms.
$ Prevent malaria by using bednets.
$ Limit the number of births through child spacing and delaying first pregnancies.

## What IS Anemia?

Anemia is a serious health condition in which there are not enough red blood cells or hemoglobin in the blood.

Hemoglobin is a substance in the blood that carries oxygen to the brain, muscles, disease-fighting organs and other parts of the body. Iron is important for making hemoglobin.

## What are the SYMPTOMS of Anemia?

Some of the symptoms of anemia are:

- $ tiredness
- $ headaches
- $ dizziness
- $ poor appetite
- $ heart palpitations
- $ shortness of breath

## Why is Anemia DANGEROUS?

Anemia is dangerous because:
- $ it reduces one's resistance to infections.
- $ severe anemia can lead to heart failure.
- $ during childbirth, anemic women are more likely to die from excessive bleeding.
- $ anemic children have low birth weight, poor learning capacity, and less resistance to infections than other children.

# TEST RESULTS

Date _____

### Hemoglobin level

| Woman | Child I | Child II |
|---|---|---|
| _____ g/dl | _____ g/dl | _____ g/dl |

### Diagnosis (circle one)

| Woman* | Child I | Child II |
|---|---|---|
| Severe anemia (less than 7.0 g/dl) | Severe anemia (less than 7.0 g/dl) | Severe anemia (less than 7.0 g/dl) |
| Moderate anemia (7.0-9.9 g/dl) | Moderate anemia (7.0-9.9 g/dl) | Moderate anemia (7.0-9.9 g/dl) |
| Mild anemia (10.0-11.9 g/dl) | Mild anemia (10.0-10.9 g/dl) | Mild anemia (10.0-10.9 g/dl) |
| Normal (more than 12.0 g/dl) | Normal (more than 11.0 g/dl) | Normal (more than 11.0 g/dl) |

*Cutoff values are for altitudes below 1000 metres. If a woman is pregnant, her hemoglobin level is normal if it is 11.0 or higher and mild if it is between 10.0 and 10.9 g/dl at altitudes below 1000 metres.

## What do the test results mean?

**Severe Anemia:** You have a seriously low level of hemoglobin in your blood. You need to see your doctor or health center immediately for treatment. Eat more foods rich in iron and treat malaria and worms immediately.

**Moderate Anemia:** Your anemia may be caused by iron deficiency, worms, excessive bleeding or malaria. You should visit your doctor or health center as soon as possible. Eat more foods rich in iron.
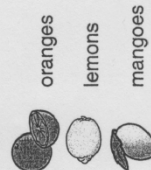
**Mild Anemia:** You need more daily iron. Treat malaria and worms immediately. Eat more foods rich in iron.

### Iron Rich Foods

dark green vegetables

meat, liver or fish

To increase the body's use of iron, eat more fruits rich in vitamin C:

oranges

lemons

mangoes

# Precautions to be taken when collecting blood samples for haemoglobin measurements

1) Wear Gloves : Gloves help to prevent skin and mucous-membrane exposure to blood. Gloves should be worn during blood collection and haemoglobin measurement until all specimens and materials are disposed of. Gloves must be disposed of as biohazardous wastes. Gloves must never be reused.

2) Avoid Penetrating Injuries : Although gloves can prevent blood contamination of intact and nonintact surfaces, they cannot prevent penetrating injuries caused by the instruments used for finger or heel pricks. Generally, self-retractable lancets are recommended to reduce the risk of penetrating injuries. Whatever the type of lancet, it should not be used for purposes other than a single finger or heel prick to collect blood for the anaemia testing. The lancets should not be broken or destroyed for curiosity or other purposes. Immediately after the testing is completed, the devices should to be placed in a puncture-resistant container for further disposal.

3) If an accident occurs, any skin surface or mucous membranes that become contaminated with blood should be immediately and thoroughly washed.

4) Since eating, drinking, applying cosmetics, and handling contact lenses may distract from the procedure, they are not permitted during blood collection and haemoglobin measurement.

5) Properly Dispose of all Biohazardous Materials : All materials coming in contact with blood must be placed in biohazardous waste containers after use and disposed of according to the survey organization's policy on infectious disposal.

6) The biohazardous waste containers should be labeled "biohazard". Take precaution when storing and transporting the waste containers during the field work, establish procedures to ensure proper disposal of all waste products.

**CONSENT STATEMENT FOR ANEMIA FOR CHILDREN**

Read consent statement to each respondent.

Anemia is a serious health problem that usually results from poor nutrition, infection, or chronic disease. The government need to develop programmes to prevent and treat Anemia and want to gather information needed for the purpose,.through this survey. This survey will assist the government for the purpose. Therefore we take a blood sample for testing Anemia as a part of this survey. This survey will assist the government to develop programs to prevent and treat anemia.

We request that all children born in 2001 or later participate in the anemia testing part of this survey and give a few drops of blood from a finger. The equipment used in taking the blood is clean and completely safe. It has never been used before and will be thrown away after each test.

The blood will be tested for anemia immediately, and the result told to you right away. The result will be kept confidential.

Do you have any questions?

You can say yes to the test, or you can say no. It is up to you to decide.
Will you allow (NAME(S) OF CHILD(REN) to participate in the anemia test?
Record the response in Q. No B70