Pakistan

National Nutrition Survey 2011

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Pakistan Medical Research Council (PMRC)

Nutrition Wing, Ministry of Health, Pakistan

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Acronyms

AJK	Azad Jammu and Kashmir
AKU	Aga Khan University
ANC	Antenatal care
ARI	Acute respiratory infection
BCG	Bacille Calmette-Guérin (vaccine against tuberculosis)
BMI	Body Mass Index
CHW	Community health worker
DHS	Demographic health survey
DMU	Data management unit
DPT	Diphtheria-tetanus-pertussis
EB	Enumeration block
EPI	Expanded program for immunization
ERC	Ethical Review Committee
FATA	Federally Administered Tribal Areas
FBS	Federal Bureau of Statistics
FGD	Focus group discussion
FHI	Family Health International
GB	Gilgit Baltistan
GAIN	Global Alliance for Improved Nutrition
Gm.	Gram
HH	Household
Hib	Haemophilus influenzae type B
IDA	Iron deficiency anaemia
IDI	In-depth Interview
IYCF	Infant and young child feeding
K. Cal	Kilocalories
KAP	Knowledge, attitude and practice
KP	Khyber Pakhtunkhwah
LBW	Low birth weight
LHV	Lady health visitor
LHW	Lady health worker
MDG	Millennium Development Goal
Mg	Milligram
Ml	Millilitre
MOH	Ministry of Health
MUAC	Mid-upper arm circumference
MWRA	Married women of reproductive age
NGO	Non-governmental organization
NID	National Immunization Day
NNS	National Nutrition Survey

OPV	Oral polio vaccine
ORS	Oral rehydration salt
PCO	Population Census Organization
PDHS	Pakistan Demographic Health Survey
PMRC	Pakistan Medical Research Council
PPS	Proportion to population size
PRSP	Punjab Rural Support Program
PSU	Primary sampling unit
RDA	Recommended dietary allowance
SAARC	South Asia Association of Regional Cooperation
SSU	Secondary sampling unit
TBA	Traditional birth attendant
UIE	Urinary iodine excretion
UNICEF	United Nations Children's Fund
USAID	United States Agency for International Development
VAD	Vitamin A deficiency
WHO	World Health Organization
WRA	Women of reproductive age

General Definitions

Body mass index (BMI): Statistical measure of weight scaled according to height, determined by dividing a person's weight by the square of their height in metric units. For adults, a BMI of less than 18.5 typically indicates under nutrition, while a BMI of more than 40 indicates morbid obesity.

Complementary feeding: This is the period starting when breast milk alone is no longer sufficient to meet the nutritional requirements of infants. Other foods and liquids are needed to complement breast milk at this stage. This transition from exclusive breastfeeding to family foods typically covers the period from 6 months to 18-24 months of age.

Exclusive breastfeeding: The practice of only feeding breast milk to an infant with no supplementation of any kind (e.g. no water, juice, food, or non-human milk). Exclusive breastfeeding has been shown to provide improved protection against many diseases. According to the World Health Organization, on a population basis, exclusive breastfeeding for six months is the optimal way of feeding infants. Thereafter infants should receive complementary foods with continued breastfeeding up to two years of age or beyond. (Note: The NNS 2011 does not include analysis of exclusive breastfeeding. It only measures rates of "predominant breastfeeding.")

Malnutrition: Various forms of poor nutrition leading to both underweight and overweight conditions caused by a complex array of issues, including dietary inadequacy, infections, and socio-cultural factors. Malnutrition can lead to wasting and stunting, micronutrient deficiencies, as well as diabetes and other diseases.

Micronutrients: Nutrients needed for life in miniscule amounts. These substances enable the body to produce enzymes, hormones and other substances essential for proper growth and development. Micronutrients are used to improve nutrition through processes such as bio fortification and supplementation.

Stunting: Failure to reach linear growth potential because of inadequate nutrition or poor health, also defined as a chronic restriction of growth in height indicated by low height-for-age. Stunting is usually a reliable indicator of long-term under nutrition among young children.

Supplementation: Process of supplying nutrients – in forms such as bars, capsules, and powders – those missing or not consumed in a person's diet. Typical supplements include vitamin A, iron, and zinc.

Undernutrition: According to the 2008 Lancet series on maternal and child under nutrition, under nutrition includes a wide array of effects including intrauterine growth restriction resulting in low birth weight, underweight, stunting, wasting and less visible micronutrient deficiencies. Under nutrition is caused by poor dietary intake that may not provide sufficient nutrients, and/or by common infectious diseases such as diarrhoea. These conditions are most significant during the first two years of life.

Underweight: This indicates a person has a low weight for their age and implies stunting or wasting. The rate of underweight children is the percentage of children who have low weight for their age.

Wasting: Acute weight loss indicated by a low weight for height ratio. Wasting is usually a result of acute starvation or severe disease. Often more chronic during the first two years of life, wasting is part of a pattern of under nutrition.

Reference ranges for biochemical assessments

Biochemical Test	Children under 5 years	Women of Reproductive Age Non-pregnant	Women of Reproductive Age Pregnant
Vitamin A	Severe (<0.35 µmol/L) Mild (0.35 - 0.70 µmol/L) Non-deficient (>0.70µmol/L)	Severe (<0.35 µmol/L) Mild (0.35 - 0.70 µmol/L) Non-deficient (>0.70µmol/L)	Severe (<0.35 µmol/L) Mild (0.35 - 0.70 µmol/L) Non-deficient (>0.70µmol/L)
Vitamin D	Severe deficiency (<8.0 ng/mL) Deficiency (8.0 - 20.0 ng/mL) Desirable (>20.0 - 30.0 ng/mL) Sufficient (>30.0 ng/mL)	Severe deficiency (<8.0 ng/mL) Deficiency (8.0 - 20.0 ng/mL) Desirable (>20.0 - 30.0 ng/mL) Sufficient (>30.0 ng/mL)	Severe deficiency (<8.0 ng/mL) Deficiency (8.0 - 20.0 ng/mL) Desirable (>20.0 - 30.0 ng/mL) Sufficient (>30.0 ng/mL)
Zinc	Deficient (<60 µg/dL) Non-deficient (>=60 µg/dL)	Deficient (<60 µg/dL) Non-deficient (60 - 150 µg/dL)	Deficient (<60 µg/dL) Non-deficient (60 - 150 µg/dL)
Calcium	Not conducted with children	Hypocalcaemia (<8.4 mg/dL) Normocalcaemia (8.4 - 10.2 mg/dL) Hypercalcaemia (>10.2 mg/dL)	Hypocalcaemia (<8.4 mg/dL) Normocalcaemia (8.4 - 10.2 mg/dL) Hypercalcaemia (>10.2 mg/dL)
Haemoglobin	Severe deficiency (<7 gm./dL) Moderate deficiency (7 - 10.99 gm./dL) Normal (>= 11 gm./dL)	Severe deficiency (<7 gm./dL) Moderate deficiency (7 - 11.99 gm./dL) Normal (>= 12 gm./dL)	Severe deficiency (<7 gm./dL) Moderate deficiency (7 - 10.99 gm./dL) Normal (>= 11 gm./dL)
Ferritin	Low Ferritin (<12 ng/dL) Normal (>=12 ng/dL)	Low Ferritin (<12 ng/dL) Normal (>=12 ng/dL)	Low Ferritin (<12 ng/dL) Normal (>=12 ng/dL)

Executive Summary

This section summarizes findings from Pakistan's National Nutrition Survey. Aga Khan University's Division of Women and Child Health, Pakistan's Ministry of Health and UNICEF conducted the survey in 2011 for the first time in ten years. The survey assessed the overall nutritional status of target groups based on anthropometric indices and micronutrient status. The findings provide relevant information for planning, implementation and monitoring appropriate population based interventions in Pakistan. Population groups surveyed included: pre-school children (6–59 months old), school aged children (6–11 years old), women of childbearing age (15–49 years old), and elderly persons (50 years and above).

This was the first time a National Nutrition Survey provided provincial specificity with representative population based samples. A two stage stratified sampling design was adopted and an overall sample size of 30,000 households was selected and calculated on the basis of major nutrition indicators used in the 2001 NNS. These included: 1. Stunting in children and 2. Anaemia in women of reproductive age (WRA) and in children. Households interviewed totalled 27,963; 24,421 blood samples were taken (women 12,282; children 12,139); and 2,917 urine samples were collected from women (1,460) and children 6-12 years (1,457) for urinary iodine assessments.

The NNS 2011 covered all provinces: Gilgit Baltistan (GB), Balochistan, Khyber Pakhtunkhwah (KP), Sindh, Punjab, Azad Jammu and Kashmir (AJK) and the Federally Administered Tribal Areas (FATA). This included 1,500 enumeration blocks (EBs)/villages and 30,000 households, with a 49% urban and 51% rural distribution. Renewed listing of all households in each enumeration block was conducted and twenty households were selected randomly using a computer automated selection process. Twenty-two survey teams conducted data collection across Pakistan.

Results from the 2011 National Nutrition Survey (NNS) indicated little change over the last decade in terms of core maternal and childhood nutrition indicators. With regard to micronutrient deficiencies, while iodine status had improved nationally, vitamin A status had deteriorated and there had been little or no improvement in other areas linked to micronutrient deficiencies.

The ratio of males to females was approximately 50.4% to 49.6% across Pakistan. A total of 45.7% of household heads were illiterate and 38.7% were workers or farmers. 15.5% of the population was unemployed – with higher rates in the urban population (17.5% urban unemployment, 13.7% rural unemployment).

The NNS 2011 also revealed 58% of households were food insecure nationally. Sindh was the most food-deprived province followed by Balochistan. 72% of families in Sindh and 63.5% in Balochistan faced food insecurity.

Overall, 18% of women were underweight in Pakistan – 14.4% from urban areas and 19.7% from rural areas. Only slightly over half (53.2%) of mothers had normal body mass indices (BMI).

Night blindness prevalence reported by women who were pregnant at the time of this survey was 12.7% while night blindness prevalence reported by women during their last pregnancy was 15.6%. Approximately 42.8% of the population reported awareness of the importance of iodine whereas 64.2% reported awareness about the benefits of iodized salt. Only 39.8% reported using iodized salt whereas kit-testing results confirmed use at 69%. This is a significant improvement over the 2001 NNS result of 17%. Overall knowledge of the importance of vitamin A in Pakistan was 24%. Knowledge about other micronutrient deficiencies was very low with significant rural and urban differences.

Widespread micronutrient deficiencies were found in women. For example, the survey discovered the following micronutrient deficiency levels in pregnant women: Anaemia 50.4%, iron deficiency anaemia 24.7%, vitamin A deficiency 42.5%, zinc deficiency 47.6%, hypocalcaemia 58.9% and vitamin D deficiency 68.9%. The prevalence of micronutrient deficiencies in non-pregnant women were as follows: Anaemia 51%, iron deficiency anaemia 19%, vitamin A deficiency 42.1%, zinc deficiency 41.3%, hypocalcaemia 52.1% and vitamin D deficiency 66.8%.Adequate iodine status was documented at national level and in most of the provinces. Balochistan, AJK and GB were the only provinces that documented inadequate levels (<100 µg/l median iodine excretion) of iodine status.

The proportion of women who were breastfeeding was estimated on the basis of feeding practices in the past 24 hours dietary recall. Data indicated 64.7% of mothers predominantly breastfed children from 0–6 months of age and 77.6% of mothers continued breastfeeding up to 12–15 months. Similar trends were found for continued breastfeeding – 72.3% of mothers breastfed their children at 12–15 months and 80.1% continued breastfeeding after this age. Nearly half (52.1%) of the women across Pakistan introduced semi-solid foods to their children between 6–8 months of age. Only 4.6% of women were practicing minimum dietary diversity for children from 6–23 months. All in all, only 8% of all children aged 6-23 months received a minimum acceptable diet nationwide.

Anthropometry status has not changed much over the past decade. Among children under 5, 43.7% were stunted in 2011 as compared to 41.6% in the 2001 National Nutrition Survey. 15.1% were wasted compared to 14.3% in 2001 and 31.5% were underweight, which has not changed since 2001 (NNS 2001). The anthropometric indices were relatively better in urban areas.

Micronutrient deficiencies were also widespread in children. Biochemical analyses revealed the prevalence of various micronutrient deficiencies in children under 5 years of age: Anaemia 61.9%, iron deficiency 43.8%, vitamin A deficiency 54%, zinc deficiency 39.2% and vitamin D deficiency 40%.

A total of 7,612 elderly persons were interviewed to determine their general health status. An estimated 29.2% reported moderate decrease in appetite, 10% reported a 1-3 kg weight loss in

the preceding three months, 3.6% had restricted mobility and stayed mainly in their beds or chairs due to ailments, and 49.6% suffered from arthritis.

The National Nutrition Survey 2011 indicates that stunting, wasting and micronutrient malnutrition is endemic in Pakistan. These are caused by a combination of dietary deficiencies; poor maternal and child health and nutrition; a high burden of morbidity; and low micronutrient content in the soil, especially iodine and zinc. Most of these micronutrients have profound effects on immunity, growth, and mental development. They may underlie the high burden of morbidity and mortality among women and children in Pakistan. Increasing rates of chronic and acute malnutrition in the country is primarily due to poverty, high illiteracy rates among mothers and food insecurity. Such rates can also be attributed to inherent problems in infant feeding practices and lack of access to the age-appropriate foods.

Chapter 1: Introduction

1.1. Introduction

Pakistan is a federal parliamentary republic consisting of four provinces – Balochistan, Khyber Pakhtunkhwah, Punjab and Sindh – and four federal territories – the capital Islamabad, the Federally Administered Tribal Areas (FATA), Azad-Jammu and Kashmir (AJK) and Gilgit Baltistan (GB). Bordering India, China, Iran and Afghanistan, the country can be divided into the Indus plain in the East, the mountainous area in the North and Northwest and the Balochistan plateau in the West. [1]

Pakistan is the sixth biggest country in the world, with an estimated population of more than 180 million people. It has the second largest Muslim population of any single country after Indonesia. Ranking 141 out of 182 countries in the Human Development Index (HDI), Pakistan is an impoverished and underdeveloped country. Life expectancy at birth stands at 65 years and the adult literacy rate is 49% (male 63%, female 36%).

Pakistan is a disaster-prone country and is exposed to a multitude of natural disasters including earthquakes, floods, storms and droughts. [2-6]. The country was under military dictatorship for 33 of its 64-year existence.

The security situation in Pakistan is complex. There are a number of overlapping threats, including the presence of non-state actors targeting government installations and security forces, especially in the areas bordering Afghanistan. [4, 6]

1.2 Context of malnutrition

Estimates suggest that more than 150 million malnourished children around the world are under 5 years of age. It is also well recognized that half of the 12 million deaths among children under 5, or almost 54% of young child mortality in developing countries, can be linked to malnutrition. [8] Studies suggest that malnutrition has a multiplicative effect on the risk of mortality from infectious diseases. [9]

Like other major health issues, malnutrition is a prevalent problem in the South Asian region. Half of the world's malnourished women and children are found in just three countries: Bangladesh, India and Pakistan. South Asia is the worst affected region and presents what has been termed an "Asian Enigma" due to high rates of low birth weight (LBW), unhygienic conditions, unsatisfactory breastfeeding and weaning practices and the poor status of women. [10]

Malnutrition is a recognized health problem in Pakistan and plays a substantial role in the country's elevated child morbidity and mortality rates. Due to its correlation with infections, malnutrition in Pakistan currently threatens maternal and child survival, especially in poor and underdeveloped areas. However, there are concrete solutions, which depend on political will, economic advancement and viable targeted research. [7]

The number of underweight children and women is very high in the South Asian region. About one third of babies are underweight and more than half of women of reproductive age weigh less than 45 kg. [11] It is believed that malnourished adult women have a much higher risk of giving birth to low birth weight infants. Infants born with a low birth weight are at a higher risk of morbidity and mortality in the neonatal period or later infancy, especially in developing countries. [12] The infants who survive are often poorly breastfed and weaned, resulting in stunted and malnourished children. These conditions result in children growing into adults who are less prepared to contribute to society and productivity, thus adding to poverty and unemployment in the country. Low birth weight women also develop into malnourished mothers who give birth to LBW babies and perpetuate this cycle.

Stunting is used as a reliable indicator of growth retardation in developing countries. The stunting rates in Pakistan fell from 47% in 1980 to about 33% in 2000. [13] It is estimated that the most important factors associated with lower prevalence of stunting are the availability of high-energy nutrients, female literacy and gross national product. [16] Challenges linked to these factors are still serious in Pakistan and particularly affect children, young girls and women. [16]

Like other developing countries in South Asia, with the exception of Sri Lanka, the situation in Pakistan linked to maternal and child under nutrition is serious. [18] Pakistan's prevalence of stunting declined from 67% in 1977 to an estimated 40-50% and remained at such levels until the end of the 1990s. However, these rates are still very high when compared to the global average. [19] According to the national survey (1990-94), among the urban middle to lower economic group, the prevalence of stunting was approximately 30-36% and as high as 35-45% in the same economic group in rural areas. [20] The national survey categorized economic status on the basis of material possessions and facilities owned by the household. However, it used different criteria for urban and rural households. Thus, Pakistan's urban-rural difference may be partially explained by the relatively higher level of education among the urban population as well as their access to basic health services. [21]

Malnourished children begin to fall behind on their regular growth at around six months of age. This is the time when an infant starts receiving complementary foods in addition to breast milk. [22] The divergence from normal growth is linked to a combination of poor nutrition and intra-uterine growth. [23] This problem is aggravated by the burden of morbidity. [24] Poor quality and quantity of complementary foods and inadequate caring practices are the key determinants for this early phase of childhood growth retardation, [25] which can lead to late onset of the childhood growth spurt and subsequent retardation. [26] Growth faltering is linked to a series of occurrences a child suffers, including repeated illnesses, inadequate appetite, insufficient food intake and poor standard care. Many of these children die before their first birthday and those who survive suffer long-term consequences such as weak stature and challenged mental capacity. [27]

Pakistan's economy is largely dependent on agricultural output. The country's farmers cultivate sufficient amounts of diverse crops to feed most of the population, which makes the degree of malnutrition even more distressing. However, the issue of malnutrition has been a constant

challenge in Pakistan for decades. The micronutrient survey in 1976-1977 revealed that 60% of children under 5 were malnourished. Widespread malnutrition in younger infants was further highlighted by a survey of children under 2 years of age. [28] The results of these surveys were confirmed by high rates of early childhood malnutrition from studies conducted in Lahore. [29,30] The National Nutrition Survey that was conducted in 1985-87 further revealed that 48% of children were malnourished and 10% were severely malnourished. The 2001-2002 National Nutrition Survey also showed a dire malnutrition situation in Pakistan. This was the first time a NNS highlighted the true extent and burden of macronutrient and micronutrient malnutrition in the country. [31]

Widespread macronutrient malnutrition coupled with subclinical micronutrient deficiencies prevail in South Asia and have been largely ignored in the region and in Pakistan. “Subclinical deficiency” is micronutrient malnutrition without visible signs of deficiency, also termed as the “hidden hunger”. It is estimated that more than seven million people suffer from clinical forms of these micronutrient deficiencies and another 2 billion from subclinical forms. [32]

Various studies and surveys from Pakistan indicate that subclinical micronutrient deficiencies such as iron-deficiency, zinc deficiency and vitamin A deficiency are widespread among pre-school children and women of reproductive age, particularly pregnant women. [31] A survey conducted with pre-school children in the North West Frontier Province (now Khyber Pakhtunkhwa) revealed that about 50% of the children showed evidence of significant anaemia and zinc deficiency. [33] Data on micronutrient malnutrition are scarce and limited. Only a few studies have been conducted on a local scale and these cannot be relied upon to measure larger scale issues. [34]

To implement successful strategies and sustainable interventions, the direct and indirect causes of Pakistan’s huge malnutrition burden must be identified. The analysis below identifies some of the determinants of malnutrition in Pakistan and the impact these factors have on the status of malnutrition in the country.

More than 30% of Pakistan’s population lives below the poverty line. [35] The Gini coefficient, used to measure economic inequality in a society (using the range of 0 to 1, “0” indicating complete equality and “1” indicating complete inequality), is 0.410 in Pakistan. This shows a very high rate of inequality. The poorest 20% of the population earn 6.2% of the country’s total income and most households in Pakistan spend almost half of their income on food. Poor food availability, poor quality of diet, and limited knowledge about nutritious foods all contribute to a vicious cycle of malnutrition. Political issues, security issues linked to non-state actors and unemployment in the country have amplified this problem. Another important risk factor contributing to malnutrition is a high and repeated burden of infections. Repeated acute respiratory infections (ARI), diarrhoea and other infections lead to a decrease in dietary intake and nutrient use due to loss of appetite and reduced absorption. [36]

Poor breastfeeding and weaning practices are also common in Pakistan. As a result, infants do not consume adequate calories, proteins and micronutrients. While almost 90% of women

breastfeed their children, very few start breastfeeding within one hour of birth and most of them discard colostrum considering it as waste or impure milk that is not suitable for their babies. The rate of exclusive breastfeeding in the first four months is only 16%. The current number of mothers introducing complementary foods at the right time is low and poor food choices commonly result in increased risk of diarrhoea and malnutrition. It is well known that lack of awareness about proper nutrition and feeding practices, coupled with poor food choices, trigger the widespread use of weaning diets with poor micronutrient content and bioavailability. [37]

The fertility rate in Pakistan is very high. On average, Pakistani women give birth 6.8 times in their lives. Approximately only 28% of women between 15 and 49 years of age use contraception. A high fertility rate and lack of birth spacing result in a continuous cycle of pregnancy and lactation. Such a cycle can deplete the body reserves of an already malnourished mother.

The adult literacy rate in 2011 in Pakistan was low, 67% for males and 42% for females. It is believed such low levels of education among women in Pakistan influence their reproductive behaviour. It also makes reproduction related decisions in families and in society at large principally dependent on men's knowledge and practices. In general, women in Pakistan have very little control over areas of life such as food distribution within household and family planning. [38, 39]

Antenatal care plays a vital role in the wellbeing of mothers and growing children. The care a mother receives during pregnancy and after delivery determines how well she will be able to feed and care for her child. This includes breastfeeding, food preparation, general care, hygiene and home health care. In Pakistan most pregnant mothers are unaware of the importance of antenatal care and have limited access to health facilities. The use of antenatal health care facilities is very low in the country and access has remained static over the years. To make matters worse, in 2011 trained health personnel attended only 39% of births. [40]

The rates of malnutrition in children under 5 determined by the 2011 National Nutrition Survey were as follows: wasting 13%, underweight 38% and stunting 37%. In the same survey about 13% of non-pregnant and 16% of pregnant women were reported to be malnourished (BMI<18.5). Similarly high estimates for micronutrient deficiencies shocked both the Pakistani population and the world. In terms of Iodine deficiency about 7% of school going children (6 -12 years) had either palpable or visible goitres on clinical examination. Vitamin A deficiency, as measured by serum retinol levels, quoted 6% of mothers and 12.5% of pre-school children to be deficient. Evaluation for iron deficiency showed 45% prevalence in mothers and 66.5% in children. Caring practices were also recognized as poor in the same survey. Many of these indicators are well above the World Health Organization (WHO) cut off points and warrant putting in place immediate public health measures and programs.

The direct and indirect factors that lead to malnutrition contribute to nearly 35% of all under 5 deaths in Pakistan and affect the future health, socioeconomic development and productive

potential of the society. Despite an increase in food availability over the past 20 years there has been little change in the prevalence of malnutrition in the population. This may be related to the cross-sectoral and complex nature of malnutrition, which includes issues related to poverty, intra-household food security and contemporary socio-cultural factors determining dietary patterns in pregnancy and early childhood.

1.3 Need for a National Nutrition Survey

National Nutrition Surveys provide an estimate of the severity and geographical scope of nutrition related challenges in a country. They also expose problems closely linked to nutrition issues and identify the most-at-risk groups. Nutrition surveys assess the likely evolution and impact of nutrition levels on the health and nutritional status of the population at large while taking into account secondary information such as food security and food distribution. They also help identify what types of nutrition interventions would be most effective to prevent or minimize the problem in the future. Governments use national surveys when deciding whether or not to establish or expand existing nutrition surveillance and to ensure effectiveness and monitor progress over time. To assess the magnitude of the problem, governments and partners also look at the population size, demographic characteristics of the population and distribution of malnutrition cases therein.

To understand the underlying causes of under nutrition and to plan and implement appropriate interventions and programs to improve the situation, the government and partners must identify the current nutritional status of both the population at large and vulnerable groups, recognize changes in nutritional status over time, and acknowledge the context in which challenges have surfaced. Sources of information that promote a deeper understanding of this context and help identify potential responses include formal nutrition surveys, food security surveys and records of malnutrition cases. Formal nutrition surveys are still the best way to accurately estimate prevalence of malnutrition because they reveal trends in the number of malnutrition cases and identify opportunities for action. Affected populations' ability to cope at a household level can also is assessed using food security surveys and records of malnutrition cases found during screening at health centres. These are important when seeking a deeper understanding of affected populations. However, these two tools cannot be considered sufficiently representative of the population at large like a formal national nutrition survey is.

The last National Nutrition Survey was conducted in 2001/2002, almost 15 years after the 1985/1987 National Nutrition Survey. Almost a decade later, the current survey was undertaken with the following goals:

- ⇨ Establish the current nutrition benchmark and related indicators for gauging progress toward the targets set for the Millennium Development Goals (MDGs);
- ⇨ Establish a benchmark for missing data/indicators, especially since the recent Demography and Health Survey (DHS) did not include anthropometric indicators.
- ⇨ Prioritize the programs and initiatives at the national and provincial level and refine the planning and implementation of initiatives on the basis of identified priorities.

1.4 Survey duration

Data collection began in January 2011 and was completed on 30 June 2011. The survey teams underwent five days of extensive training led by senior and experienced staff from The Aga Khan University who had experience conducting similar surveys in Pakistan and also abroad (Sri Lank and Maldives). Training sessions and refreshers were conducted in Karachi, Faisalabad, Lahore, Rawalpindi, Peshawar, Abbottabad, Quetta and Gawadar.

Chapter 2: Survey Design and Methods

2.1 Objectives

The specific objectives of the National Nutrition Survey 2011:

- Assess the population's nutritional status, especially women and children.
- Collect data on height, weight and age of children under 5 years of age, women of reproductive age and elderly persons.
- Collect blood specimens for micronutrient status assessments of children and women of reproductive age – mainly vitamin A, zinc, vitamin D, calcium and iron.
- Collect urine samples to assess the iodine status of women of reproductive age and children between 6–12 years of age.
- Assess infant and young child feeding and care practices, including breastfeeding, complementary feeding and morbidity of children.
- Collect data on food intake, food security, water and sanitation.
- Collect data on demographic and socioeconomic variables.

2.2 Indicators for National Nutrition Survey

2.2.1 Anthropometric indicators

- Stunting rates
- Wasting rates
- Underweight rates

2.2.2 Clinical indicators

- Clinical prevalence of anaemia (physical examination)
- Visible goitre (physical examination)
- Night blindness (history based)
- Worm infestation (history based)
- Comorbidities (diarrhoea and acute respiratory infections - history based)
- Immunization status (history and immunization card)

2.2.3 Biochemical indicators

- Anaemia among women of reproductive age (WRA) and children under 5 years.
- Serum vitamin A, D, zinc and calcium levels among WRA and children under 5 years of age.

- ⇨ Urinary iodine deficiency among WRA and children 6–12 years of age.
- ⇨ Alpha-1 glycoprotein levels (acute phase reactant) of WRA and children under 5 years.

2.3 Survey design

A cross-sectional survey design was chosen to collect data to make inferences about a given population at one point in time. Cross-sectional surveys provide a snapshot of the prevalence and attributes of problems or detect normalcy in specific target populations. A cross-sectional survey is a descriptive survey in which disease and exposure status is measured simultaneously to discover information about households, physical examinations, anthropometry and biochemical indicators.

2.3.1 Universe

The universe for this survey was comprised of all urban and rural areas of all four provinces of Pakistan, the Federally Administered Tribal Areas (FATA), Azad Jammu Kashmir (AJK) and Gilgit Baltistan (GB) defined as such by the 1998 Population Census, and the subsequent changes made by the provincial governments periodically. The population of the military restricted areas was excluded from the scope of this survey. Excluded areas constituted less than 1% of the total population.

2.3.2 Sampling frame

A. Urban areas

The Federal Bureau of Statistics (FBS) has its own sampling frame for all urban areas of the country. This frame is an area where each city and town is divided into a number of small compact areas called enumeration blocks (EBs). Each enumeration block consists of between 200 to 250 households with well-defined boundaries, which are recorded on forms and maps that also include physical features of the area and important landmarks.

Each enumeration block was classified into low, middle or high income groups – depending on what income group the majority of the households located in that particular enumeration block belonged to. This information was then used to formulate sub-stratification. This sampling frame covers all urban areas of Balochistan with the exception of military restricted areas. There is a continuous process of updating that occurs when newly built apartments, houses or extensions emerge within the municipal limits of urban localities, towns and cities. Due to rapid growth in these areas, the frame is regularly updated every 5 to 7 years. It was entirely updated in 2004. There are 26,753 enumeration blocks in all urban areas of the country.

B. Rural areas

The sampling frame for rural areas consists of list of mouzas, dehs and villages. The Population Census Organization (PCO) prepared it after a countrywide population census was conducted in 1998. A mouza, deh or village can be defined as the smallest “revenue estate” identified by its

name, and has the best number, cadastral map and name of Tehsil, District and Province in which it is located. The rural sampling frame is comprised of 50,572 mouzas/dehs/villages and has been used to draw the sample for this survey.

The information on the number of enumeration blocks in urban and rural areas of the country are given below:

Table 2.1: Enumeration blocks and villages by Province and Region

Province	Number of Enumeration Blocks	Number of Villages
Punjab*	14,900	26,007
Sindh	9,025	5,871
Khyber Pakhtunkhwa (KP)	1,936	7,334
Balochistan	618	6,555
Federally Administered Tribal Areas (FATA)	0	2,596
Azad Jammu Kashmir	210	1,643
Gilgit Baltistan	64	566
Total	**26,753**	**50,572**

*Including Islamabad

2.3.3 Listing activity

Fresh listing of households was undertaken in all sample areas after a comprehensive training of the quantitative survey team was conducted. In urban areas, enumeration blocks were considered as primary sampling units (PSUs). The sketch map of enumeration blocks drafted by the Federal Bureau of Statistics (FBS) in urban areas was used to perform listings. In rural areas, villages were taken as the PSUs, in line with the 1998 Population Census. Large sample villages that have a population of more than 2,000 (according to the 1998 Population Census) were split into hamlets/blocks of equal size. One of these blocks was selected randomly for data collection. Small villages were completely listed. The listing of households was used to select a specified number of households from urban and rural sample areas.

2.3.4 Stratification

A. Urban domain

i. <u>Large sized cities</u>

Karachi, Lahore, Gujranwala, Faisalabad, Rawalpindi, Multan, Sialkot, Sargodha, Bahawalpur, Hyderabad, Sukkur, Peshawar, Quetta and Islamabad were considered “large sized cities”. Each of these cities constitutes a separate stratum that was sub-stratified according to low, middle and high income groups. The sub-stratification was based on information collected about each enumeration block during demarcation when the urban area sampling frame was updated.

ii. <u>Remaining urban areas</u>

After excluding the population of large sized cities from the population of the respective administrative division, the remaining urban population of each administrative division of the

four provinces was grouped together to form a stratum called "other urban areas". Thus each administrative division in remaining urban areas in the four provinces constituted a stratum. In AJK, FATA and GB, all urban areas were grouped together within each region/state separately.

B. Rural domain

In the rural domain, each administrative district in the Punjab, Sindh and Khyber Pakhtunkhwa provinces was considered as an independent and explicit stratum, whereas in Balochistan province each administrative division constituted a stratum. In AJK, FATA and GB, all rural areas were grouped together to form stratum within each region separately.

2.3.5 Sample size and its allocation

After considering a variety of characteristics including population distribution and field resources available, a sample size of 30,000 households was selected as a sufficient number of households to provide reliable results. An exercise to compute the sample size based on the prevalence rate of three key variables – wasting in children under 5 years of age, stunting in children under 5 and maternal iron deficiency – was undertaken. The sample is estimated to have a 95% confidence interval and a 5% margin of error. A 5% non-response rate was also considered. The design effect of 1.6 was used to finalize and fix the overall sample size. The entire sample of 30,000 households (SSUs) was fixed comprising of 1,500 (PSUs) out of which 618 were urban and 882 were rural. As the urban population was more heterogeneous, a larger proportion of the sample size was allocated to urban domain. As KP and Balochistan are smaller provinces, a higher proportion of the sample size was allocated to these two provinces in order to get reliable estimates. After fixing the sample size at provincial level, further distribution of sample PSUs into different strata in rural and urban domains in each province was made proportionately. The distribution of PSUs and SSUs enumerated in the urban and rural domain of the provinces and regions is indicated below:

Table 2.2 Sample size and allocation plan

Province/Region	Number of sample PSUs			Number of sample SSUs		
	Total	Urban	Rural	Total	Urban	Rural
Punjab*	682	307	375	13,640	6,140	7,500
Sindh	323	157	166	6,460	3,140	3,320
KP	218	67	151	4,360	1,340	3,020
Balochistan	110	44	66	2,200	880	1,320
FATA	67	0	67	1,340	0	1,340
AJK	66	28	38	1,320	560	760
GB	34	15	19	680	300	380
Total	**1,500**	**618**	**882**	**30,000**	**12,360**	**17,640**

* Including Islamabad

2.3.6 Sample selection procedure

a) <u>Selection of primary sampling units (PSUs)</u>

Enumeration blocks in urban domain and mouzas/dehs/villages in rural domain were taken as PSUs. In the urban domain, sample PSUs from each ultimate stratum/sub-stratum were selected using the PPS method of the sampling scheme. In the rural domain, the number of households in the enumeration block from the 2004 Economic Census and the population from the 1998 census for each village/mouza/deh were considered as the measure of size.

b) Selection of secondary sampling units (SSUs)

Households within the sample PSUs were taken as SSUs. A specified number of households (i.e. 20 from each urban and rural sample PSU) were selected with equal probability using a systematic sampling technique with a random start.

2.3.7 Target population

The target population included women of reproductive age (15–49 years), children 6–59 months and elderly persons (>50 years).

2.3.8 Survey methods

A method mix of quantitative and qualitative methods was adopted.

2.3.9 Description of questionnaire (quantitative)

A structured questionnaire was used to obtain the data. The questionnaire was developed using standard components from previous and recent surveys undertaken nationally and internationally. All the data collection tools were thoroughly assessed by the technical committee established to oversee the NNS 2011. Three iterations of the survey instrument were reviewed and the final version was approved in December 2010.

In Section 1 of module "A", all members of each household were listed by their gender, age, education, occupation and marital status. Besides such information, anthropometry (height, weight and clinical examination for anaemia, jaundice, cyanosis, edema and goitre) was conducted for anyone who was present at the time of the survey. Data corresponding to the name of each member was recorded. Section 2 of module "A" was exclusively designed for obtaining socioeconomic data along with health and hygiene characteristics. Knowledge, attitudes and practices about micronutrients (iron, iodine, and vitamins A, B, C and D) were recorded in the module "B" while module "C" focused on reproductive history, intra-birth interval, antenatal care, night blindness, worm infestation, iron supplementation and morbidities. Additionally, module "C" assessed dietary intake and food practices using a 24-hour dietary recall to determine patterns of eating habits and variety of foods consumed over a longer period of time by WRA.

The infant and young child feeding (IYCF) Module "D" was used to capture several indicators including data on birth, newborn weight, resuscitation, breastfeeding initiation, complementary feeding, micronutrients, 24-hour dietary recall and food practices for the youngest child. A separate Module "E" was developed to determine the health status, immunization, physical

examination and lab investigation of children under 5 years of age. The appetite, movement, mobility and morbidities of elderly persons were also investigated in Module "F". The poverty assessment and food security Module "G" was also filled-in.

2.3.10 Description of qualitative research

The overall aim was to identify food consumption patterns, nutrition and food behaviour as well as to gain insight into the factors affecting decision-making. These factors include, the connection between diet, disease and health, beliefs about certain foods, dietary practices, food intake patterns, consumption of local versus imported foods, and other factors relating to food choices.

2.3.11 Qualitative research sample and target population

In qualitative research, purposive sampling is the dominant strategy and purposive sample size is often determined on the basis of theoretical saturation (FHI, 2005). A total of 40 focus group discussions and 16 in-depth interviews were conducted. Participants were identified and selected through the community recruiters at their living sites.

2.3.12 Transcription and translation of qualitative data

Data were transcribed and translated directly from the native language into English. The validity of the translations and transcripts was checked through back translation of the sample sections.

2.3.13 Biochemical analysis

Important and essential biochemical evaluation of the assessment of micronutrient deficiencies was performed on children under 5 years of age and women of reproductive age. Children between 6–12 years of age and WRA were also assessed for urinary iodine. Details of the biochemical test are shown in Table 2.3 below.

Table 2.3: Description of biochemical analysis/tests

Biochemical Test	Children 0 month to 5 years	Children 6 – 12 years	WRA
Alpha-1 Glycoprotein	Yes	-	Yes
Vitamin A	Yes	-	Yes
Vitamin D	Yes	-	Yes
Zinc	Yes	-	Yes
Calcium	-	-	Yes
Haemoglobin	Yes	-	Yes
Ferritin	Yes	-	Yes
Urinary Iodine	Yes	Yes	Yes

2.3.14 Project pre-implementation steps

Before launching the field activities the following steps were undertaken:

Table 2.4: Pre-implementation steps

Formation of Technical Committee	**Technical committees – with representatives from the relevant stakeholders to oversee technical aspects of the NNS 2011 – were notified.**
Liaison with the local partners	Liaison with partners: • Federal Bureau of Statistics (FBS) • Ministry of Health (MoH) and provincial health departments • Pakistan Medical and Research Council (PMRC) – data collection in KP and FATA
Development of survey manual	A detailed manual of operations for survey procedures was developed. This encompasses qualitative and quantitative data collection strategies, anthropometry guidelines, sample collection and transportation guidelines, and data management strategies.
Development of consent forms and survey Instruments	The relevant consent forms and instruments were developed. The instruments have different modules relevant to study participants.
Ethical Review Committee (ERC) application submission	Ethical review applications were submitted to National Bioethics and to AKU ethics committees for approval of the methodology and consent forms.
Acquisition of sample frame and design from FBS	Worked closely with the FBS to develop the research design and sampling frame. A sample size of 30,000 households and 1,500 enumeration blocks was proposed and agreed to.
Establishment of survey hubs: Punjab=8 (average 85 enumeration blocks per one Hub), Sindh=5 (65), KP and FATA=5 (57), Balochistan=5 (22), AJK=3 (22) and Gilgit Baltistan=2 (17)	Survey hubs were established for the operational movement of field teams in the following locations: Sindh: Karachi, Hyderabad, Mirpurkhas and Sukkur Punjab: RY Khan, Multan, DG Khan, Bahawalpur, Sahiwal, Faisalabad, Lahore and Rawalpindi KP and FATA: Abbottabad, Peshawar, Swat, D I Khan and Kohat AJK: Muzaffarabad, Bagh and Mirpur Gilgit Baltistan: Gilgit and Skardu Balochistan: Gawadar, Khuzdar, Bella, Quetta, Dalbandin and Jaffarabad

2.3.15 Identification and recruitment of field staff

Advertisements (in-house and in the national daily newspapers) were placed and candidates were shortlisted and interviewed in Karachi, Faisalabad, Rawalpindi, Peshawar and Quetta.

2.3.16 Survey teams

Initially 15 survey teams were established and more teams inducted as the survey progressed to keep the momentum and to meet the time target. At one point, 22 teams were simultaneously operating in different parts of the country. Each team consisted of 1 field supervisor, 1 team

leader, 4–5 data collectors, 3 registered nurses (with 1 phlebotomist), 2 logistic assistants and 2 community facilitators. Separate teams consisting of moderators and facilitators, observers, note-takers and community recruiters were also established.

A. Staff profile

The staff team included a national survey coordinator, a senior survey coordinator and survey coordinators. All the team supervisors were senior medical doctors and lead social scientists with over ten years of experience in nutrition related surveys nationally and internationally. The team included experienced female team leaders who were trained in social sciences. They helped gain access to households to ensure the quality and validity of data. All data collectors were at least university graduates supported by logistics assistants and local community facilitators.

B. Separate teams for mapping and listing

Each team consisted of a FBS representative and a logistic assistant and were supported by local community facilitators as they visited each EB/village prior to data collection for demarcation of the EB/village as per FBS maps. During this exercise, all structures and households were listed and allotted a unique ID (NNS 1, 2, 3 for structures and HH 1, 2, 3 for households). Additionally, basic data including that of children under 5 years of age, the household head, women of reproductive age and elderly persons above 50 years of age were obtained. From each of the listed HHs in the EB, 20 HHs were randomly selected through a computerized process using Microsoft Excel.

2.3.17 Training

Training sessions and refreshers were conducted in Karachi, Faisalabad, Lahore, Peshawar, Abbottabad, Quetta and Gawadar. These sessions took place over a period of five days and were carried out by staff from the department of paediatrics and child health of Aga Khan University who had prior experience in similar surveys. Some of the details of the training agenda are shown in Table 2.5.

Table 2.5: Details of the training agenda

Staff	Training Components
All Staff	Introduction to NNS Research design survey methodology
Team Leaders	Community rapport building, counselling techniques, research basics, interviewing techniques, dress code, consent procedures, interpersonal skills, ensuring high response, sampling methodology, question by question explanation, mock interviews, operational procedures, field procedures, daily documentation, log sheet completion, dealing with refusals, spot checking, random checking and desk editing

Data Collectors	Community rapport building, research basics, interviewing techniques, dress code, consent procedures, interpersonal skills, ensuring high response sampling methodology, question by question explanation, mock interviews, operational procedures, field procedures, daily documentation, log sheet completion
Nurses	Physical examination, anthropometry, field practice and urine sampling
Phlebotomists	Blood sampling, safe injection practices, labelling and storage, transportation of samples and field practice

Piloting/pre-testing

A pre-test was undertaken to pilot the questionnaire and to identify and solve unforeseen problems before actual data collection. The objectives of the pre-test were to improve the language of the questionnaire; establish the order of questions; check accuracy and adequacy of the questionnaire instructions such as "skip" and "go to"; clarify the instructions to the interviewers; eliminate unnecessary questions and add necessary ones; endeavour to lessen discomfort, harm, or embarrassment to the respondent; improve translation of technical terms; and estimate the time needed to conduct an interview.

Both the "participating" and "undeclared" pre-tests were undertaken. Participating pre-tests were done in the classroom among the interviewers themselves while undeclared pre-tests were done in the field without informing respondents that it was a pre-test.

About 100–150 respondents with reasonably similar characteristics from the survey population were interviewed in different parts of Karachi. The questionnaire was then revised and finalized on the basis of the pre-test results and direct observations by survey supervisors. The survey coordinators also closely monitored the pre-testing.

2.3.18 Coding scheme for assigning processing

A seven-digit coding scheme was developed in order to provide processing codes to primary sampling units [i.e. enumeration blocks/villages (PSUs)] and secondary sampling units [i.e. households (SSUs)].

2.3.19 Plan of operation, training and monitoring

In order to ensure timely completion of the survey, effective tools were developed for periodic field activity checks. A one step forward strategy was developed instead of the conventional approaches of monitoring. Additionally, internal monitoring survey stakeholders including Federal and Provincial Nutrition Wings, the Ministry of Health, the Government of Pakistan and UNICEF were proactively engaged in the training sessions as well as in monitoring and evaluating the progress of the survey activities. Besides this, independent and experienced monitors were also engag

2.3.20 Data management, transfer and analysis plan

The filled-in questionnaires were first desk-edited at the field sites for completeness and checked for major errors by the team leaders. Once this was complete, the questionnaires were sent through a courier service to Aga Khan University's Data Management Unit (DMU) in Karachi, where a full time desk was established to receive the survey questionnaires, maintain log registers and check for completeness. Where there was inconsistency or missing responses, the editors flagged the errors/omissions and consulted the team leaders for clarification. Before data entry, all questionnaires were coded for open-ended responses.

a. Software for data entry and analysis

Visual Fox Pro was used for designing the databases, data entry software and procedures for data quality assurance. Range and consistency checks as well as skip patterns were built in the data entry program to minimize entry of erroneous data. Special arrangements were made to enforce referential integrity of the database so that all data tables were related to each other. Analysis of data was undertaken using SPSS version 15.

b. Anthropometric data analysis

WHO Anthro (version 3.2.2, January 2011) was used for anthropometric analysis. However, ENA-SMART software was used to check the day-to-day consistency of anthropometric data, which helped to address measurement errors at the initial stages of data collection.

c. Data entry and quality checks

Two pass verification or double data entry was carried out for each filled-in questionnaire to minimize keypunch errors. An error check program was also incorporated into the data entry system to ensure quality of data. Data entry started after one week of data collection following clearance by the survey coordinator and requisite data quality assurance.

2.3.23 Ethical approval and confidentiality

The survey design, sampling strategy and analytical plan were reviewed and approved by the Aga Khan University's Ethics Review Committee as well as by the National Bioethics Committee (NBC) of the Government of Pakistan. Confidentiality of all collected data was assigned high priority during each stage of data handling. All the names and personal information regarding any individual were kept confidential and data sets were kept anonymous for analysis. Only senior staff had access to the data. All data files have been protected by passwords and serum and blood samples were duly secured, as per standard procedures of the institution.

Results of the

National Nutrition Survey 2011

Chapter 3: Background and Household Characteristics

3.1 Completion of data collection

The required sample size for data collection was 30,000 households. The survey teams were able to approach the required number of households, however, 6.8% of the sampled households refused to participate in the survey. A total of 27,963 households consented to participate in the survey and interviews were conducted successfully. The refusal rate varied widely between regions – the lowest being in AJK at 1.3% and the highest being FATA[1] at 32.8%. This was possibly related to the prevalent insurgency, security issues and accessibility in the FATA region. A verbal consent was obtained from participating households prior to the interview for permission to collect information and anthropometric measurements through a pre-printed questionnaire. For blood draws, urine samples collection and clinical examination a written consent was obtained.

The NNS 2011 coverage and population density maps for comparison of sample distribution and population conglomeration are featured below:

Fig 3.1 Population density

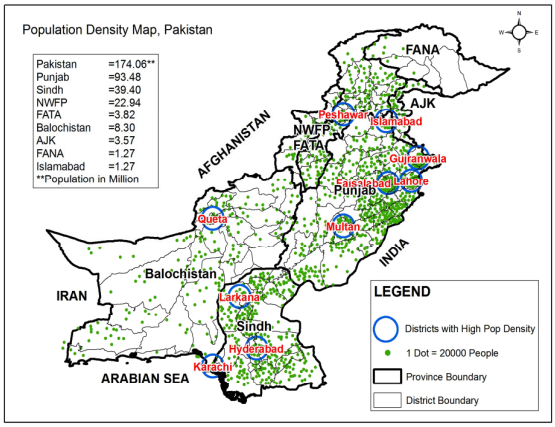
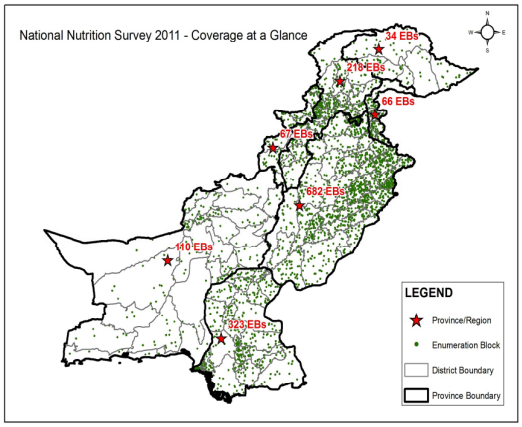


Fig 3.2 National Nutrition Survey coverage



Sample size coverage by provinces and regions is listed in the next table.

Table 3.1: Details of sample size coverage

[1] *Data from FATA are not representative due to high non-response rate. This is given only as part of national data.*

Number of PSUs and SSUs by Province / Region – Household Interviews Completed

Province / Region	PSUs		Household (HH) Interviews			
	Target	Completed	HH Visited	Consent Refused	HH Completed	Refusal Rate (%)
Balochistan	110	110	2,200	204	1,996	9.3
Khyber Pakhtunkhwa	218	218	4,360	734	3,626	16.2
FATA	67	67	1,340	440	900	32.8
Sindh	323	323	6,460	178	6,282	2.8
Punjab	682	682	13,640	452	13,188	3.3
AJK	66	66	1,320	17	1,303	1.3
Gilgit Baltistan	**34**	**34**	**680**	**12**	**668**	**1.8**
All Pakistan	**1,500**	**1,500**	**30,000**	**2,037**	**27,963**	**6.8**

3.1.1 Blood and urine specimen

Overall 24,421 blood samples (12,282 women and 12,139 children) were collected across Pakistan. The survey teams also collected 2,900 urine samples from women (1,460) and children 6-12 years (1,457) for biochemical assessments.

3.2 Background and household characteristics

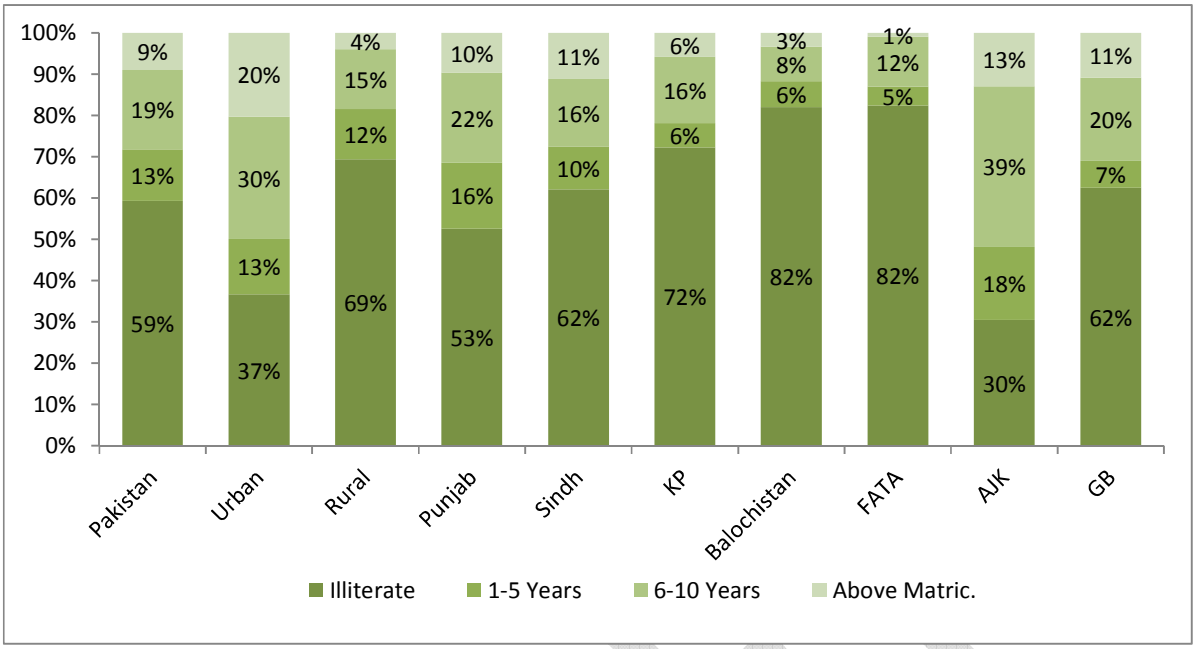
The total population counted in the surveyed households was 187,095. Males slightly outnumbered females (approximately 50.4% of the population were males and 49.6% females). The gender breakdown was 101.6 males to 100 females, which differed from the last census conducted in 1998 that found 108.5 males for every 100 females. This is, however, similar to the 2006 Pakistan Demographic and Health Survey statistics, which found 102 males for every 100 females. The data from FATA showed significant gender imbalance – 123.2 males for every 100 females. However, in AJK it was 95.7 males per 100 females. The average household size was 6.7, which is similar to what was found in the 1998 census.

3.3 Formal education – head of household and mothers

In the NNS 2001, 37.9% of the household heads were illiterate. The proportion of illiterate heads of household was lowest in AJK at 27.3%, whereas the proportion was highest in Balochistan at 58.2%. Female literacy in Pakistan has been a challenge for many decades. The results of the NNS 2011 showed that the proportion of illiterate mothers was 59.3% and the proportion was almost double in rural areas than it urban areas (36.6% urban and 69.4% rural). Only 10.5% of mothers completed their 10 years of schooling and 9.0% managed to complete their studies beyond grade 10. Data from the survey further revealed that about 10.9% of mothers from rural areas received education up to 10th grade while in urban areas 38.8% achieved the same.

The data also showed that females headed 6.2% of the households. The highest percentage of female headed households was FATA (11.9%) and the lowest in Gilgit Baltistan (4.9%).

Fig 3.3: Formal education of mothers



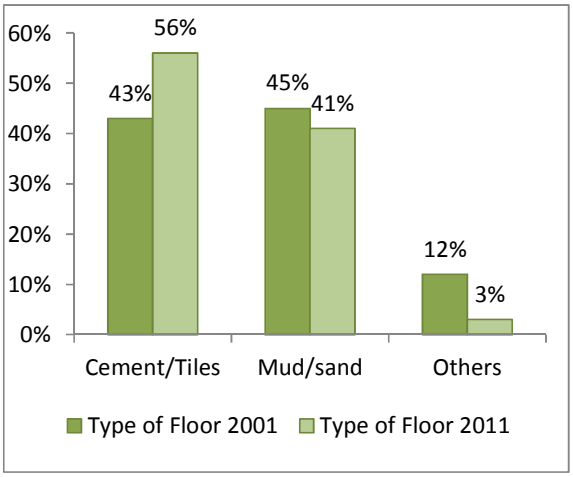
3.4 Occupation – head of household

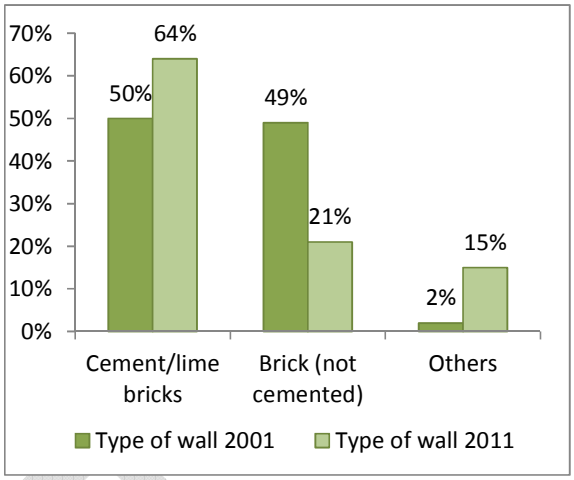
The NNS 2011 data showed that 53.6% of household heads were labourers, workers or farmers. Of these, 35.9% belonged to the urban population and 61.6% to the rural population. In comparison to the previous findings in the NNS 2001, 16.6% of household heads belonged to the labour/worker/farmer groups. Government and private service employees were the second largest group of those in employment (16.4%). The figures showed that the proportion of unemployed heads of households had doubled since 2001 (7.7% in 2001 compared to 15.5% in 2011).

3.5 Nature of dwelling by type of floor, roof and walls

The survey found that a large proportion of people living in urban and rural areas lacked basic civic necessities. The NNS 2011 data show that 64% of families were residing in houses that were constructed using bricks and concrete, which was an increase from the NNS 2001 findings (50%). The facilities available differed significantly between urban and rural areas, with less houses constructed with bricks and concrete in the rural areas (54%) than in the urban areas (87%). In 2011, across Pakistan 20.7% of household walls were made only with bricks and 56% houses had cement or tiled floors. 40.8% of houses had mud/sand floors – 10.2 % in urban areas and 54.9% in rural areas. Rural households were more likely than urban households to have sand or mud floors, while urban households were more likely than rural households to have floors made with cement.

Fig 3.4 Nature of dwelling – materials used





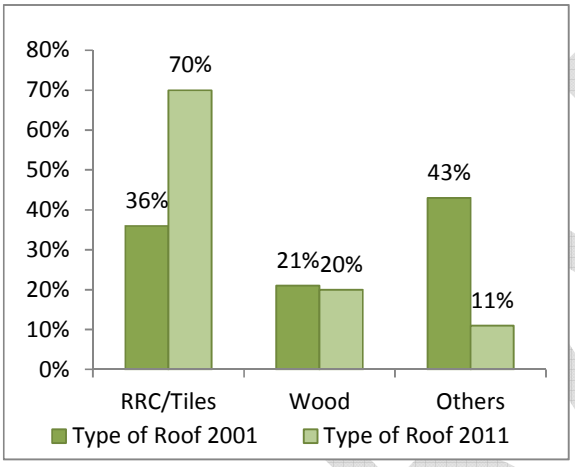
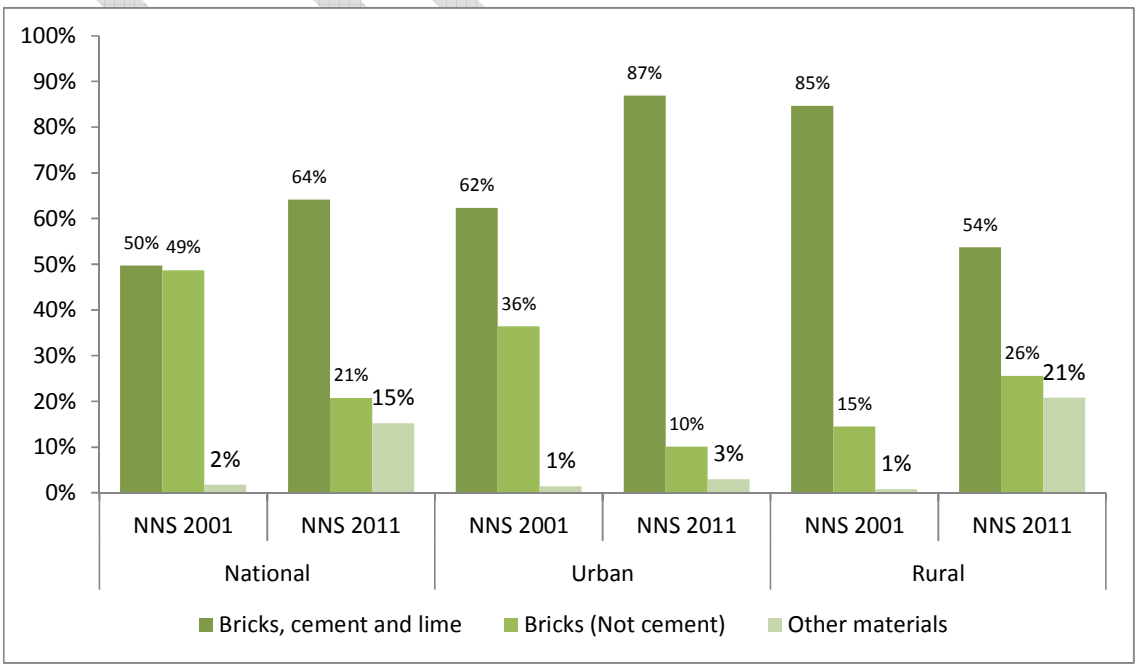


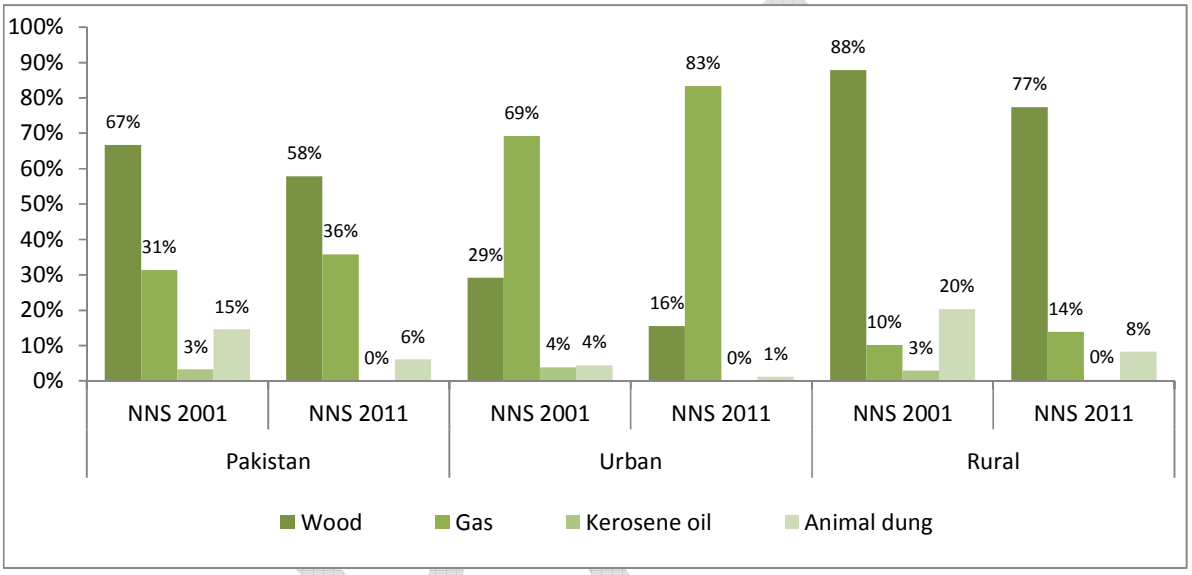
Fig 3.5 Nature of dwelling – urban/rural comparison of materials used for construction



3.6 Type of fuel used for cooking

Over the last decade the use of firewood has decreased. At the time the NNS 2011 was being carried out, around 57.7% of the households in Pakistan were still using firewood as the prime source of cooking fuel while the use of firewood was reported to be 66.7% in the NNS 2001. At 35.8%, natural gas was found to be the second main source of cooking fuel. This was available in 83.3% of households in urban areas. Use of animal dung as fuel was observed to have reduced significantly in all parts of Pakistan. Only 6.1% were using animal dung during the NNS 2011 as compared to 14.6% in the NNS 2001. The use of kerosene oil also reduced substantially from 4% to 0.2%.

Fig 3.6: Source of fuel for cooking

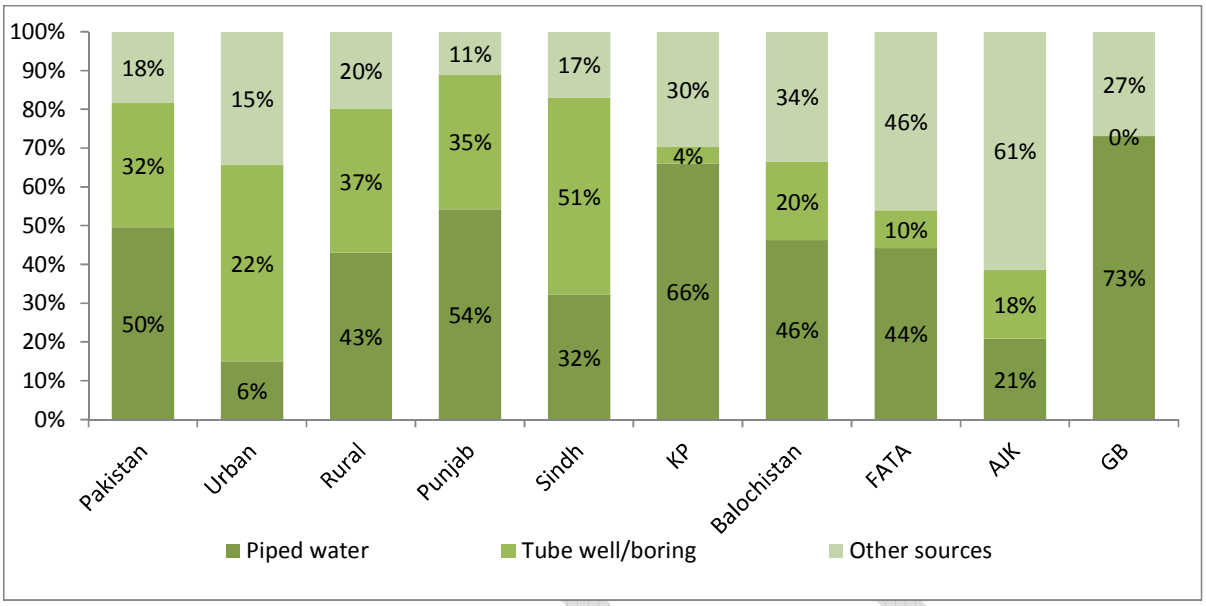


3.7 Water, sanitation and hygiene indicators

3.7.1 Source of drinking water

Piped drinking water was accessible to half of the households in Pakistan (49.6%), showing an improvement since the last NNS (41% of the households reported access to tap water in 2001). This facility was largely available to the urban population (63.8%). Tube-well/boring water was the second most common source of drinking water (32.2%). Its use was predictably higher in rural areas (37%) compared to in urban areas (22.3%).

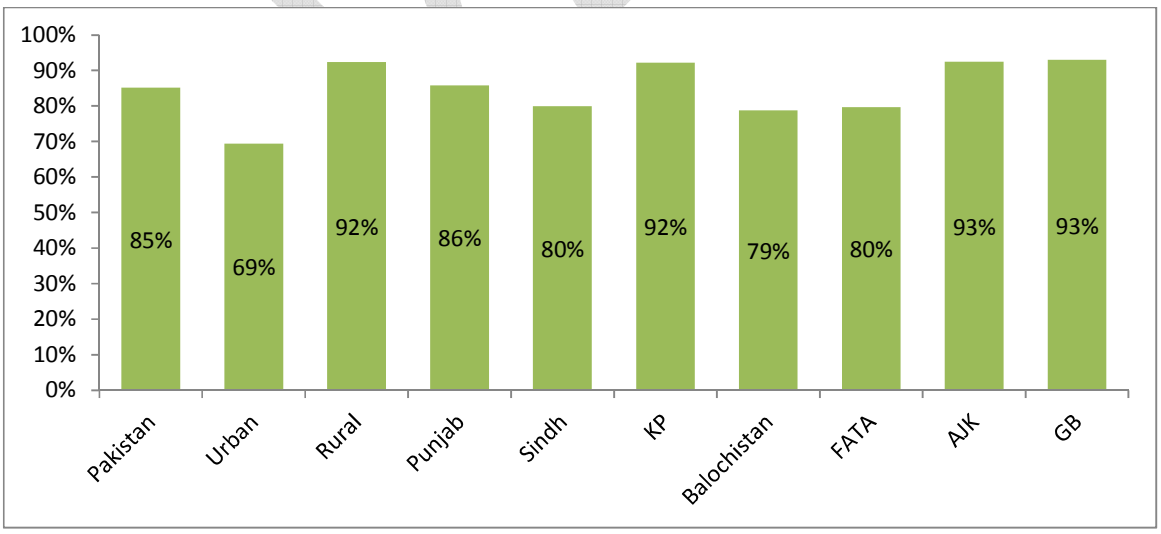
Fig 3.7: Source of drinking water



3.7.2 Water treatment

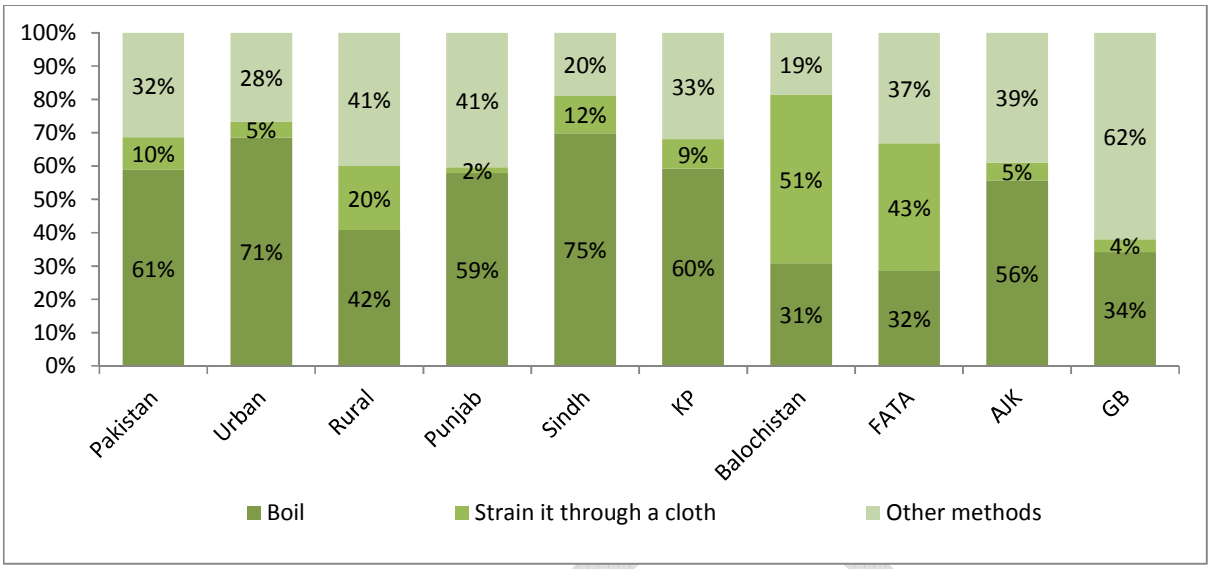
85% of the NNS 2011 survey respondents said they "never treat water in any way to make it safer for drinking". In rural areas, 92% responded that they never treat their water. Provincial and regional results are indicated in the next graph.

Fig 3.8: Households that do not treat water to make it safer for drinking (national/province)



When respondents did treat their water, they reported different methods used for water treatment to make it safer for drinking. About 60.9% boiled their water. As mentioned before, the proportion of household treating their water was lower in rural areas (41.6%). Details on treatment methods in the country and by province are given in the next figure.

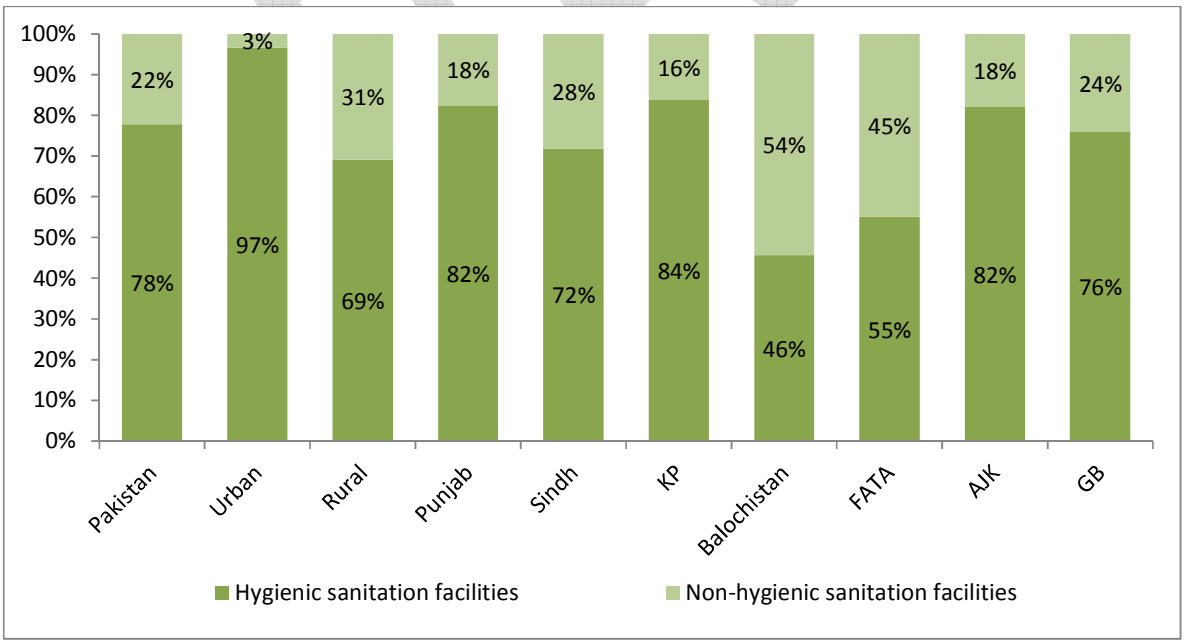
Fig 3.9: Water treatment methods



3.7.3 Hygiene and sanitation

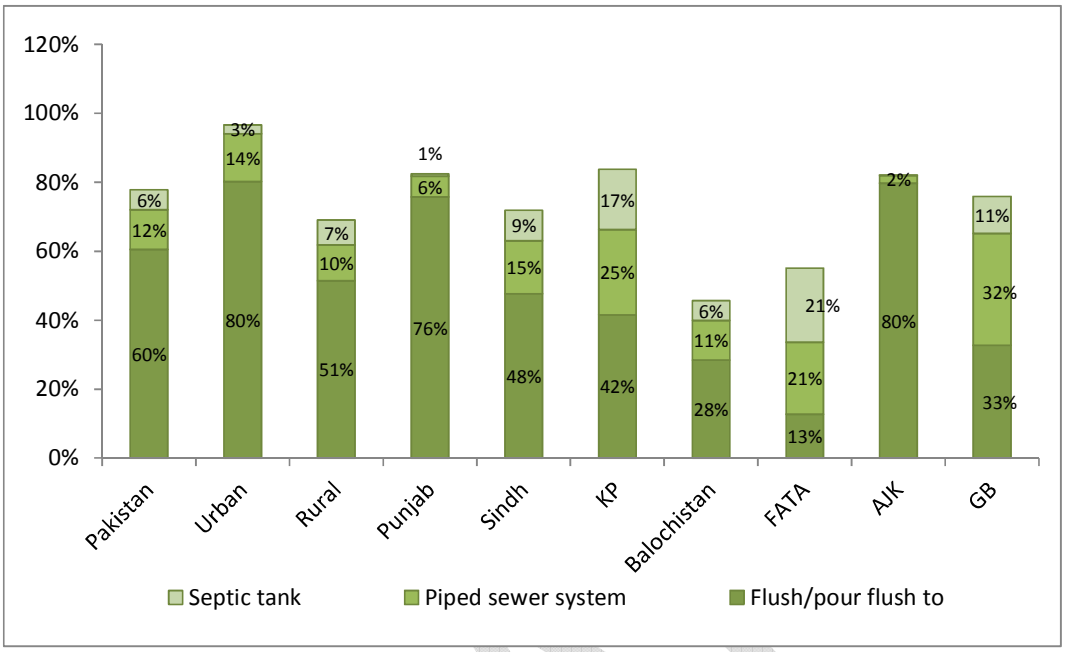
Data showed that 77.8% of households in Pakistan (96.6% urban and 69.1% rural) use hygienic sanitation facilities. In Balochistan more than half (54.3%) still lack sanitation facilities and more than 80% of households in KP, AJK and Punjab have facilities.

Fig 3.10: Households using sanitation facilities



Of those who used sanitation facilities, 60% had flush latrines and 12% had piped sewer systems.

Fig 3.11: Types of toilet facilities



Chapter 4: Food Insecurity in Pakistan

According to the FAO Publication, *The State of Food Insecurity 2001*, "Food security [is] a situation that exists when all people, at all times, have physical, social and economic access to sufficient, safe and nutritious food that meets their dietary needs and food preferences for an active and healthy life"[2] No single indicator can capture the full range of food insecurity and hunger. Instead, household levels of food insecurity or hunger must be determined by obtaining information on a variety of specific conditions, experiences and behaviours that serve as indicators of the varying degrees of severity. While developing the module and data collection, the following were considered:

- Anxiety that the household food budget or food supply may be insufficient to meet basic needs.
- The experience of running out of food, without money to obtain more.
- Perceptions by the respondent that the food eaten by household members was inadequate in quality or quantity.
- Adjustments to normal food use, substituting fewer and cheaper foods than usual.
- Instances of reduced food intake by adults in the household, or consequences of reduced intake such as the physical sensation of hunger or loss of weight.
- Instances of reduced food intake or consequences of reduced intake for children in the household.

The following steps were followed to analyse the food security data considering the guide to measuring household food security as a standard**:**

1. Converting the survey responses collected using the core-module questionnaire into the data set needed for applying the measurement model;
2. Applying the model to the data to determine the food security status level of each household;
3. Determining the severity level of the condition experienced in those households that show evidence of food-insecurity/hunger.

In the NNS 2011 the household food security has been determined on the basis of four categories: food secure, food insecure without hunger, food insecure with hunger (moderate) and food secure with hunger (insecure).

4.1. Food secure

[2] FAO. 2002. The State of Food Insecurity in the World 2001. Rome

Households show no or minimal evidence of food insecurity.

4.2. Food insecure without hunger

Food insecurity is evident in household members' concerns about adequacy of the household food supply and in adjustments to household food management, including reduced quality of food and increased unusual coping patterns. Little or no reduction in members' food intake is reported.

4.3. Food insecure with hunger (moderate)

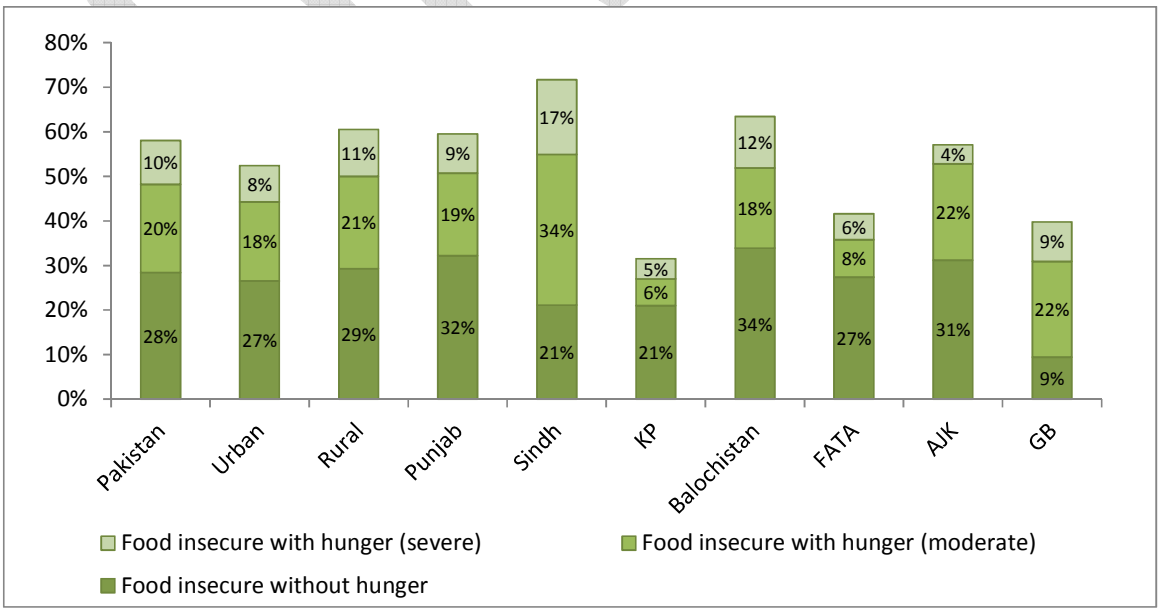
Food intake for adults in the household has been reduced to an extent that implies that adults have repeatedly experienced the physical sensation of hunger. In most (but not all) food-insecure households with children, such reductions are not observed at this stage for children.

4.4. Food insecure with hunger (severe)

At this level, all households with children have reduced the children's food intake to an extent indicating that the children have experienced hunger. For some other households with children, this already has occurred at an earlier stage of severity. Adults in households with and without children have repeatedly experienced more extensive reductions in food intake.

The results revealed that 42% of households were food secure at the national level. 28.4% were food insecure without hunger, 19.8% were food insecure with moderate hunger and 9.8% were food insecure with severe hunger. There was not much urban-rural difference found among the food insecure households. However, rural households were more food insecure as compared to urban households. Food insecurity was predominant in the province of Sindh (72%).

Fig 4.1: Food insecurity situation



Provincial and regional data revealed a clear variance for food security as indicated below:

Punjab: Punjab is the largest province of Pakistan. The data revealed that 40.5% of the households were food secure. 32.2% were food insecure without hunger, 18.5% were food insecure with moderate hunger and 8.8% were food insecure with severe hunger.

Sindh: Sindh appeared as the most food-deprived province of Pakistan. Only 28% of households were food secure. 21.1% were food insecure without hunger, 33.8% food insecure with moderate hunger and 16.8% were food insecure with severe hunger.

Khyber Pakhtunkhwa: KP appeared to be in a relatively better position where 68.5% of the population reported affordability and accessibility to all kinds of food in all seasons. Out of those that were food insecure, 21% were food insecure without hunger, 6% were food insecure with moderate hunger and 4.5% were food insecure with severe hunger.

Balochistan: After Sindh, the second most affected province was Balochistan, where only 36.5% of the population were food secure. 33.9% were food insecure without hunger, 18% were food insecure with moderate hunger and 11.5% were food insecure with severe hunger.

Federally Administered Tribal Areas: FATA data revealed that 41.6% were food secure. 27.4% were food insecure without hunger, 8.4% were food insecure with moderate hunger and 5.8% were food insecure with severe hunger.

Azad Jammu and Kashmir: In AJK 42.9% were food secure. 31.2% were food insecure without hunger, 21.6% were food insecure with moderate hunger and 4.3% were food insecure with severe hunger.

Gilgit Baltistan: Data from GB showed that 60.2% of the households were food secure. 9.2% households were food insecure without hunger, 21.5% were food insecure with moderate hunger and 8.9% were food insecure with severe hunger.

The food security situation showed no signs of improvement since the last food insecurity assessment conducted by the United Nations in Pakistan[3], which revealed that 51% of the population was food insecure. The situation has, in fact, deteriorated further. This will have serious implications on the nutrition, growth and health of the Pakistani population.

[3] WFP (2009). Food insecurity in Pakistan.

Chapter 5: Maternal Health and Nutrition

During the National Nutrition Survey 2011, detailed data were collected on basic nutritional indicators including dietary intake, reproductive history, anthropometry, clinical and biochemical micronutrient deficiencies and on knowledge and practices linked to micronutrients.

Section 1: Basic data – age and marital status of mothers

5.1.1 Age distribution

The survey revealed that about 63.7% of mothers were between 20–34 years of age, 28.2% were between 25–29 years and 23.9% were between 30–34 years. The data revealed no major differences between urban and rural age group distribution.

5.1.2 Marital status and current pregnancy status

Only 1.3% of mothers were either separated or widowed (2% urban; 1% rural), the rest of them were currently living with their husbands. Among all married women (24694), 2416 (9.8%) women were pregnant. Provincial results showed variations; number of currently pregnant women was the highest in Sindh (12%) followed by Punjab 11%, AJK 8.9%, KP 6.4%, Balochistan 5.4% and was the lowest in FATA 4.9%.

Section 2: Reproductive history and antenatal care

5.2.1 Reproductive history

29.7% of women surveyed had been pregnant 1 to 2 times, 46.6% had been pregnant 3 to 5 times and 23.7% had been pregnant 6 or more times. The data did not find any major difference in the number of pregnancies between urban and rural areas but provincial variation was observed. Further data regarding outcome of the last pregnancy showed that 93.4% of pregnancies resulted in live births, whereas 5.7% ended as miscarriages and 0.8% in stillbirths.

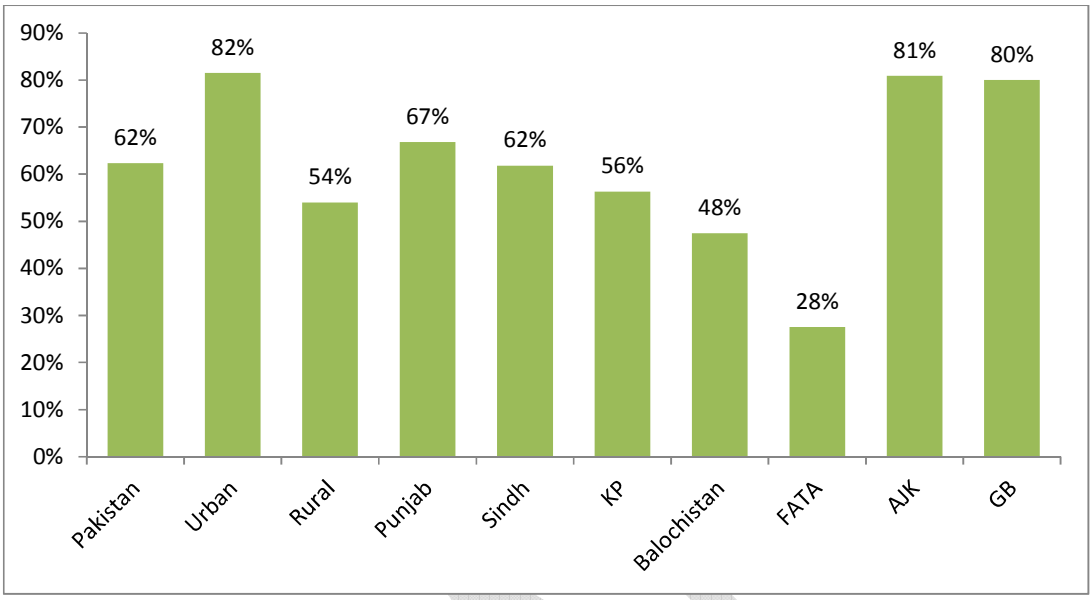
5.2.2 Antenatal care

1. Antenatal care during last pregnancy

Seeking antenatal care during pregnancy is of great importance as it identifies risk factors. Unfortunately, there has been no improvement in the percentage of women seeking ANC since 2006-07. The PDHS 2006-07 data showed that 65.3% of pregnant women sought care during their last pregnancy while the NNS 2011 results found 62.3% sought ANC. The data revealed a clear difference of ANC seeking behaviour patterns when comparing women living in urban

areas, where 81.9% sought ANC, and rural areas, where 54.2% sought ANC. Provincial data revealed that women who sought care during their last pregnancy in Punjab was 67.0%, Sindh 61.7%, KP 56.5%, Balochistan 47.9%, AJK 80.8%, GB 80.0% and FATA 27.5%.

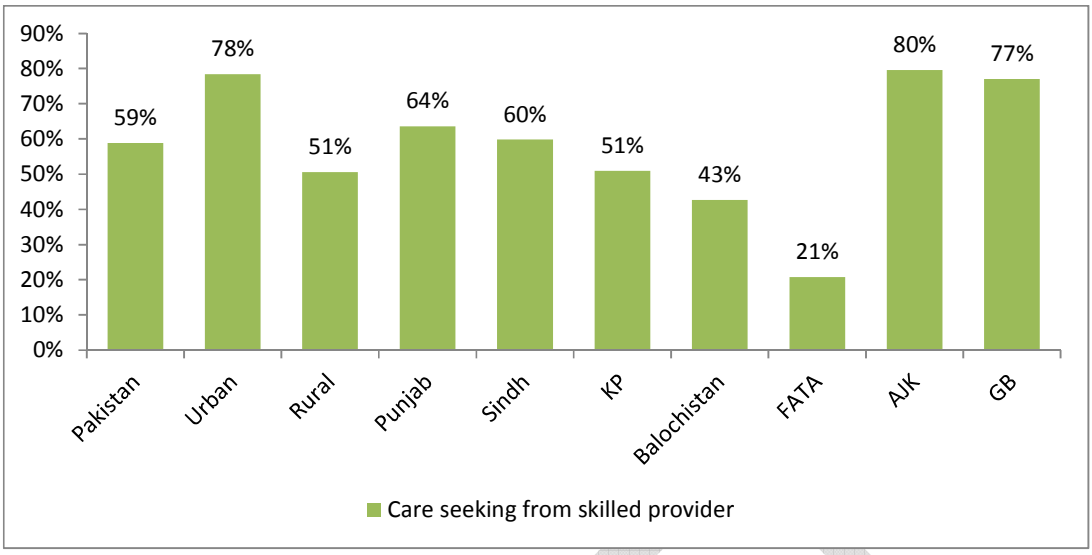
Fig 5.1: Antenatal care during last pregnancy



2. Choice of care provider

The selection of a qualified and skilled health care provider ensures quality care during pregnancy. In Pakistan, the percentage of women seeking care from skilled care providers has not significantly improved. The survey showed that in 2011 58.9% of mothers received ANC from a skilled provider. Of those who sought care from a skilled provider, 49.5% received care from a qualified doctor, 7.1% from a nurse and 2.3% from a Lady Health Worker. The percentage of women who sought care from skilled birth attendants varied by province: Punjab 63.6%, Sindh 59.8%, KP 50.9%, Balochistan 42.6%, AJK 79.6%, GB 77% and FATA 20.8%.

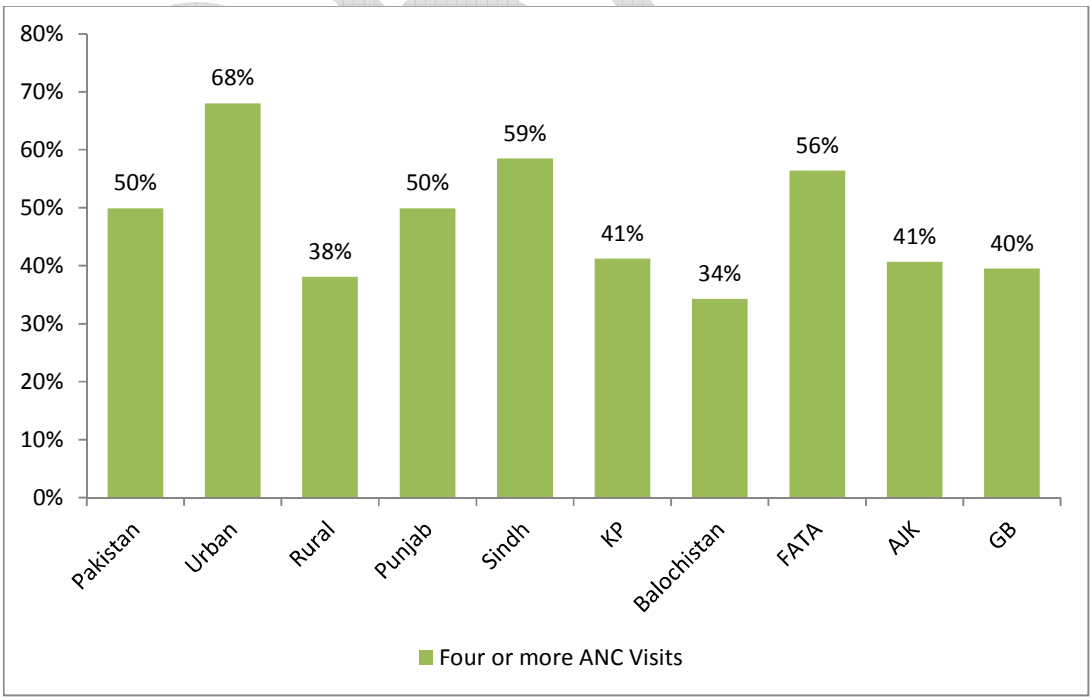
Fig 5.2: ANC from skilled care provider



3. ANC visits

The World Health Organization recommends at least four ANC visits during pregnancy to minimize the chances of complications at the onset of delivery and to ensure good health during the entire pregnancy. Data showed that a total of 49.9% of women had four or more ANC visits. In urban areas, 68% of women had four or more ANC visits as compared to 38.1% in rural areas. Provincial variation was as follows: Punjab 49.9%, Sindh 58.5%, KP 41.2%, Balochistan 34.3%, FATA 56.4%, AJK 40.7% and GB- 39.5%.

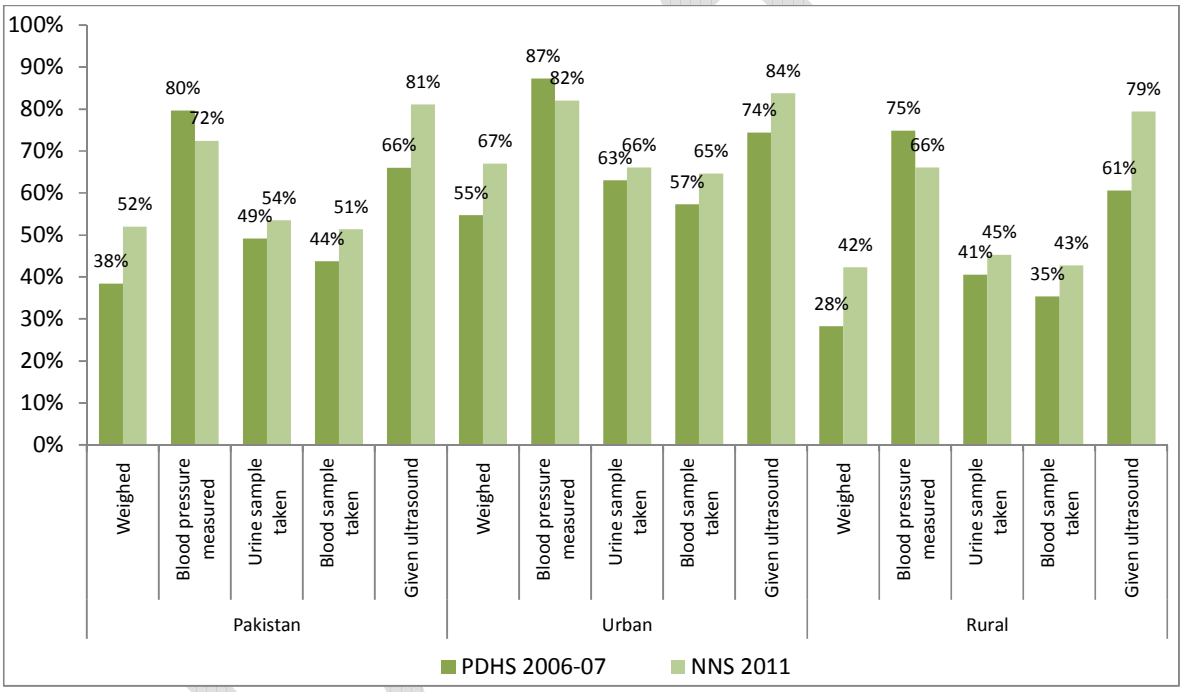
Fig 5.3: Antenatal care visits (four or more)



4. Components of care during ANC visits

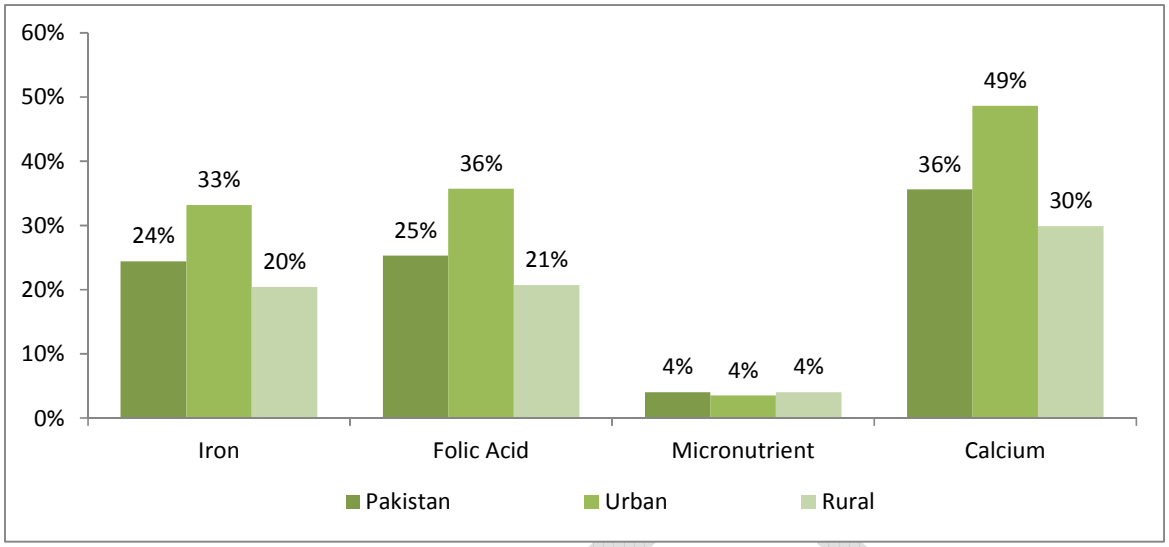
The NNS 2011 also assessed the components of care provided during an ANC visit. The provision of care varied greatly depending upon the interests of the care provider, facilities available and demand of the clients. Since 2006-07 (PDHS) some improvement has been made in the provision of care components. The major services offered during ANC visits were weight measurement, blood pressure measurement, urine tests, blood tests and ultrasounds. It was found that 52% of women were weighed, 72.4% had their blood pressure measured, 53.5% had their urine tested, 51.4% had a blood test and 81.1% had an ultrasound. The utilization of ultrasound examinations has markedly improved since the last PDHS, which showed 66% of women had ultrasounds during ANC visits.

Fig 5.4: Components of care during ANC visits



Data on women's micronutrient supplementation during their last pregnancy were also collected. 24.4% of pregnant women consumed iron (33.2% in urban areas and 20.4% in rural areas); 25.3% consumed folic acid (35.7% in urban areas and 20.7% in rural areas); 3.9% consumed micronutrients; and 35.6% consumed calcium. The details of the nutrition supplements consumed during last pregnancy are illustrated above in figure 5.5.

Fig 5.5: Micro-nutrient supplementation during last pregnancy



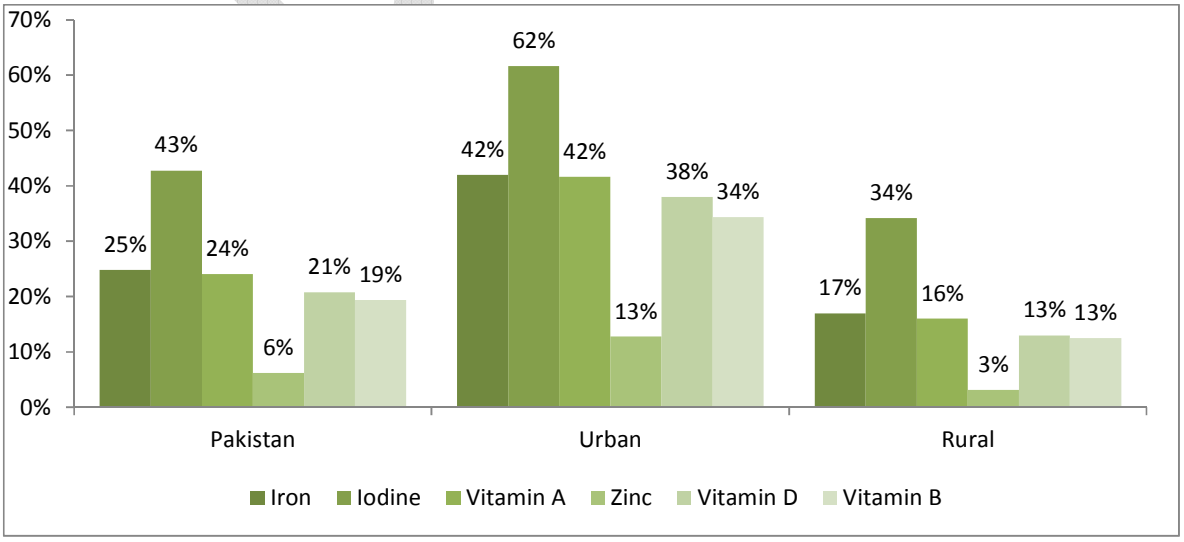
Section 3: Knowledge of micronutrients and micronutrient rich foods

Micronutrient deficiencies are an important public health problem in Pakistan. In the NNS 2011, questions were asked to determine respondents' level of knowledge about micronutrients, micronutrient rich foods and the impact of deficiencies (the education level of the respondents was taken into account).

5.3.1 Knowledge of micronutrients

To obtain information on micronutrient knowledge, survey respondents were asked simple questions such as, "Have you ever heard about (name of micronutrient)?" to determine if they knew what "foods contain (name of micronutrient)" and the "impact on health if deficient."

Fig 5.6: Knowledge about micronutrients



The survey found that knowledge about micronutrients was generally low and varied greatly between urban and rural areas. Only 25% of mothers had knowledge about iron across Pakistan – 42% in urban and 17% in rural areas. Only 6% of mothers had knowledge about zinc – 13% in urban areas and 3% in rural areas. 24% mothers had knowledge about vitamin A – 41.6% in urban areas and 16% in rural areas. 21% of mothers had knowledge about vitamin D – 38% urban areas and 13% in rural areas. 19% of mothers had knowledge about vitamin B complex – 34% in urban areas and 12.5% in rural areas. Finally, 42.8% of mothers in Pakistan had knowledge about iodine – 61.6% in urban areas and 34.2% in rural areas.

5.3.2 Knowledge of vitamin rich foods

Pregnant women are considered to be a nutritionally vulnerable segment of the population due to their greater need for nutritious foods during pregnancy. Marginal nutrient intake increases the risk of nutritional deficiencies during pregnancy. For this reason, it is concerning that across Pakistan only 25% of mothers had heard about iron and half of them did not know which foods contain iron. However, 36.5% mentioned that green leafy vegetables contained iron while 20% mentioned meat. Mothers also had poor knowledge about health problems caused by zinc deficiency. Overall, 73% of mothers did not know about foods that contain zinc. Only 7% mentioned meat and meat products while 2.3% mentioned watermelon seeds as a source of zinc. The majority of mothers (58%) in Pakistan did not know which foods contain vitamin A and just a small proportion had knowledge about vitamin A rich foods. The majority of mothers (64.4%) also did not know about Vitamin D rich foods in Pakistan. Only 4.8% mentioned eggs, 9.3% mentioned meat and liver, and 3.7% mentioned sunlight as a source. Approximately 70% of mothers were not aware about the vitamin B complex rich foods in Pakistan. 13% of women mentioned that they thought fruits contained it and 12% mentioned green leafy vegetables were vitamin B complex rich foods.

The national iodine deficiency disorder control program was launched in 1994 to promote use of iodized salt. Nevertheless, across Pakistan mothers had relatively poor knowledge about health problems caused by iodine deficiency. The NNS 2011 survey findings revealed 67% of the respondents mentioned iodized salt as the major source of iodine, while just 2.4% were aware of other iodine rich foods like fish and seafood.

5.3.3 Knowledge about iodized salt and its usage

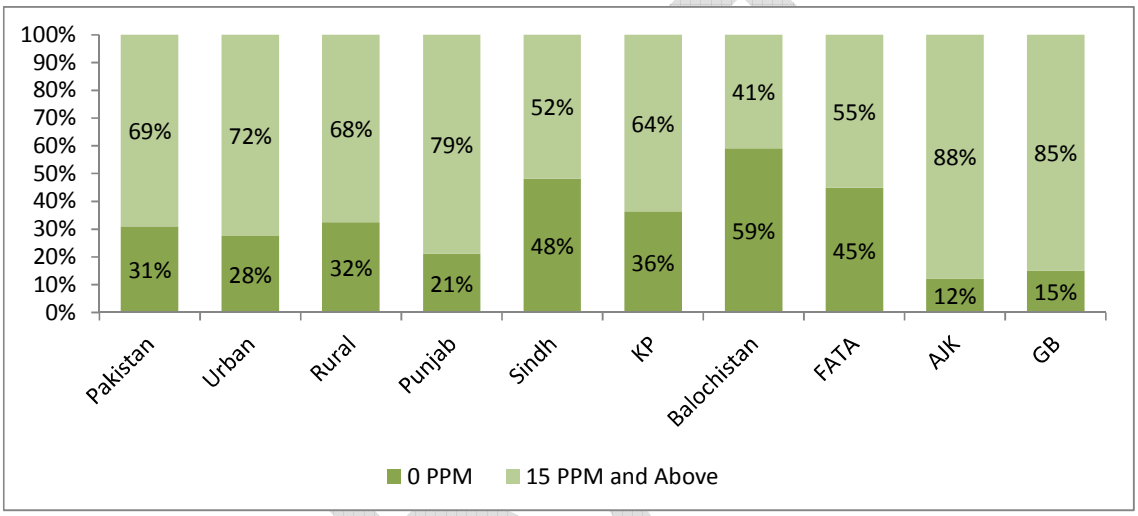
Overall, 64% of mothers said they were aware of iodized salt. Knowledge of iodized salt was higher (83%) in urban areas than in rural areas (55%). The respondents from AJK (82%), Gilgit Baltistan (79%) and Punjab (71.4%) had excellent awareness as compared to other provinces.

The reported use of iodized salt for cooking was 39.8% across Pakistan. A considerable provincial/regional variation was found between Gilgit Baltistan (95%), AJK (71.6%), FATA (14%)

and Punjab (36%). The reported use of iodized salt was higher (46.5%) in urban areas than in rural areas (35.2%).

Rapid iodized salt test kits were used in the survey to assess iodine content in salt used in households. The kit can test salt with drops of stabilized starch based solution, which causes a chemical reaction leading to colour change. The salt sample was taken on a teaspoon, and, after shaking the reagent (test solution) bottle well, a drop of the test solution was poured on the salt. The salt turned light blue to dark violet depending on the iodine content of the salt. To assess the iodine content, the colour of the salt is compared to that on a chart (0, 15, 25, 50 parts per million, ppm). The cut-off proportion of 15 PPM and above was considered as adequately iodized salt using the WHO/UNICEF reference indicators for the monitoring of iodized salt.

Fig 5.7: Level of Iodine content in salt



According to the test, the proportion of households using iodized salt in Pakistan was 69%. This was higher in urban areas (72%) than in rural areas (68%). The provinces with the greatest proportion of households using iodized salt were AJK (88%) and Gilgit Baltistan (85%). The provinces with the lowest rates of usage were Balochistan (41%) and Sindh (52%).

5.3.4 Consequences of micronutrient deficiencies

The respondents who had heard about micronutrients were further asked about the impact of micronutrient deficiencies on an individual's health. The majority of respondents were unaware about the health problems and illnesses caused in general to young children and pregnant women in particular. Around 60.7% of mothers expressed ignorance about the impact of iron deficiency on health. However, 26.4% were aware that it may cause anaemia, 7.4% mentioned lethargy/irritability and 4.4% mentioned weakness. As to zinc, approximately 78.9% of mothers were totally unaware of consequences of zinc deficiencies. The mothers mentioned growth retardation (7.5%) diarrhoea (5%) and skin ulcers (5.5%) as consequences of zinc deficiency.

Although knowledge of iodine by the mothers (mainly due to the iodized salt) was the highest among all micronutrients, 63.7% did not know its effects on health. Goitres were mentioned by

26% of mothers and 7.6% mentioned mental retardation. In Pakistan, 78.1% of mothers were not aware of the consequences of vitamin A deficiency and only 7.2% mentioned night blindness. No mother mentioned other major effects of vitamin A deficiency, which include pre-term delivery and pregnancy-induced hypertension. 13.3% of mothers mentioned rickets and slow bone development as results of vitamin D deficiency. Other major health concerns linked to a lack of vitamin D, like risk of preeclampsia and effects on the immune system, were not mentioned. Finally, only 9.2% mothers mentioned anaemia as an effect of vitamin B_{12} deficiency. 79.1% did not know the impact of vitamin B_{12} deficiency, which can potentially cause severe and irreversible damage, especially to the nervous system.

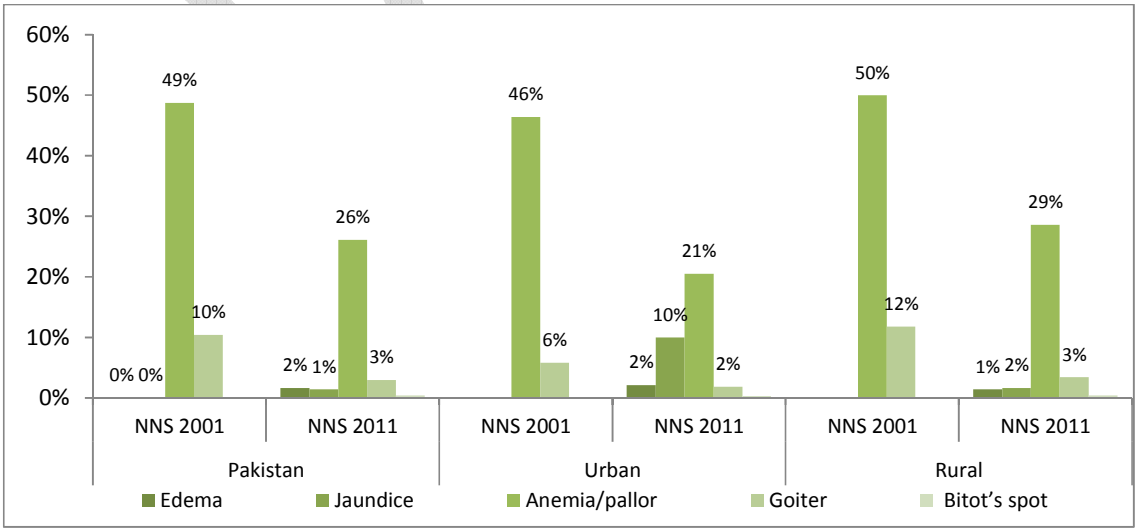
Section 4: Clinical examination

During the NNS 2011, clinical examination of mothers was also performed. Trained nurses conducted this examination. This was a direct assessment of micronutrient deficiencies on the basis of clinical signs and symptoms. The mothers were examined for anaemia, edema, jaundice, goitre and bitot's spots. Each of these conditions represents a micronutrient deficiency.

The survey revealed that overall, 26.1% mothers had pallor – 20.7% in urban areas and 28.3% in rural areas. The prevalence of clinical anaemia (pallor) amongst the provinces were as follows: 28.2% in Punjab, 34.2% in Sindh, 11% in KP, 19.1% in Balochistan, 10.3% in FATA, 36.1% in AJK and 16.3% in Gilgit Baltistan. The prevalence of edema was 1.3% with no significant variance among provinces except for Gilgit Baltistan where it was 4%. Bitot's spot was found in 0.4% of mothers, with no urban/rural variance. When assessed by province, Balochistan and FATA had the highest prevalence of Bitot's spot (2.4% and 4% respectively).

The prevalence of clinical anaemia found in the NNS 2001 was 48.7%. The NNS 2011 revealed a reduction to 26.2%. Similar trends were found for edema, jaundice, visible goitre and bitot's spot.

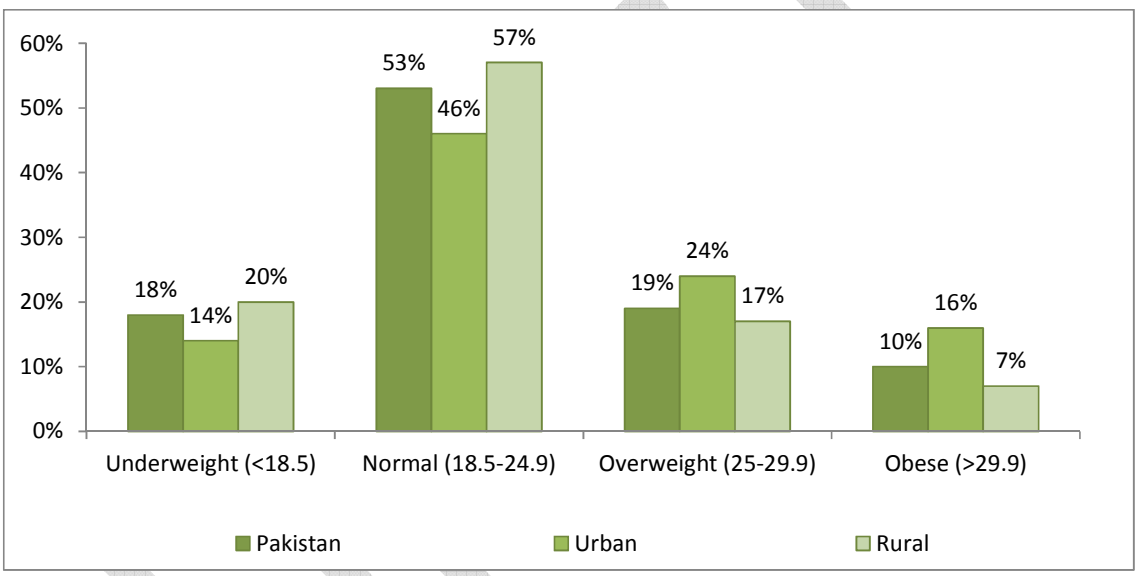
Fig 5.8: Clinical examination of mothers (comparison between NNS 2001-02 and NNS 2011)



Data were collected from non-pregnant women of reproductive age (15-49 years old), both married and unmarried, to calculate Body Mass Indices. The BMI were divided into four categories: underweight had a BMI of <18.5, normal had a BMI of 18.5–24.99, overweight had a BMI of 25–9.9 and obese had a BMI of >30.

The data showed that 18% of women had low BMI and were underweight (14.4% from urban areas and 19.7% from rural areas) and about 53.2% had normal BMI (46% from urban areas and 56.6% from rural areas). 19.3% of women of reproductive age were overweight and 9.5% of WRAs were obese (15.7% from urban areas compared to 6.5% from rural areas).

Figure 5.9: Body Mass Index

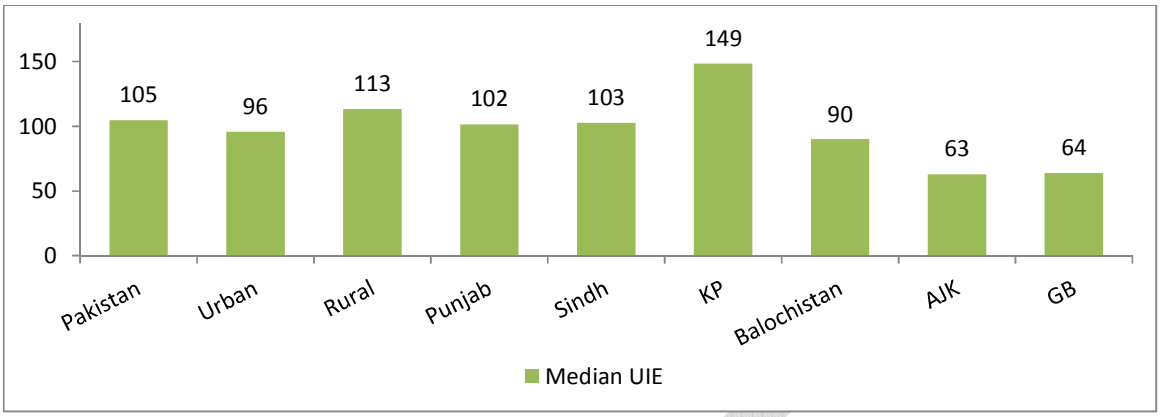


Section 6: Micronutrient deficiency

1. Urinary iodine excretion of mother

In the NNS 2011, urine samples from mothers were collected to assess their urinary iodine excretion. Urinary Iodine excretion is the most appropriate indicator of iodine deficiency in large populations. Adequate iodine nutrition is considered to pertain when the median urinary iodine concentration is 100–199 µg/l. The median urinary excretion of mothers indicates adequate levels of iodine status at national level, in both urban and rural area, and in most of the provinces (as indicated in the figure below). Balochistan, AJK and Gilgit Baltistan showed <100 µg/l urinary excretion, which indicates that the iodine intake in the population is insufficient.

Fig 5.10: Median urinary iodine excretion in mothers

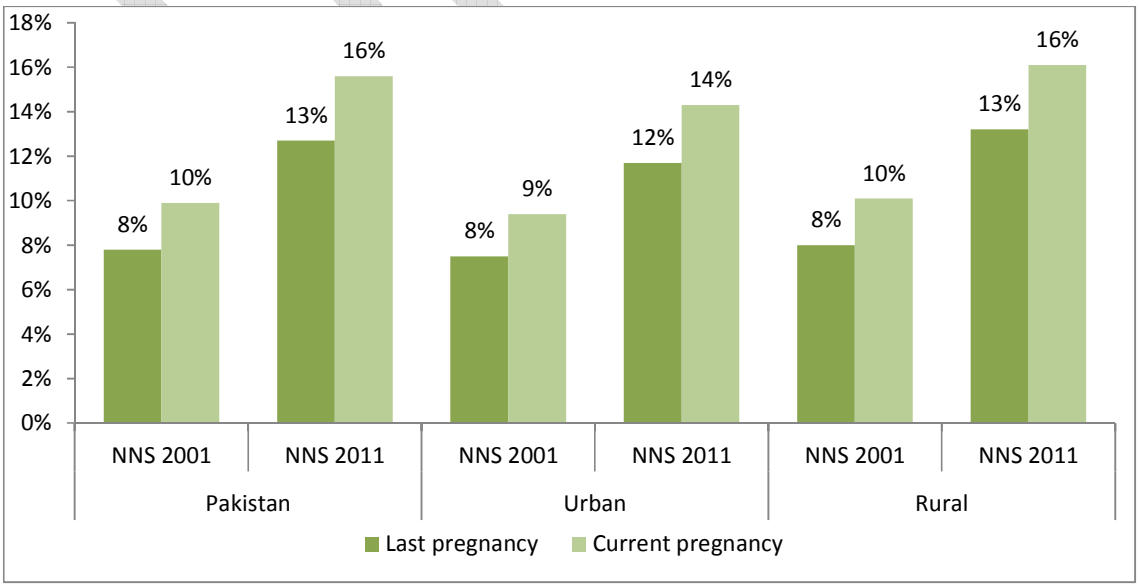


2. Night blindness among mothers

12.7% of women surveyed had experienced night blindness during their previous pregnancy and 15.6% had experienced night blindness during their current pregnancy. Among provinces of Pakistan, women in Sindh had the highest reported rates of night blindness during their last pregnancy (21.3%) followed by AJK, Balochistan, Punjab, FATA, KP and Gilgit Baltistan. Among those women who reported night blindness during their current pregnancy, women in FATA (35.4%) had the highest rates followed by Sindh, AJK, Balochistan, Punjab, KP and Gilgit Baltistan.

When comparing this survey with the NNS 2001, night blindness rates during previous pregnancies had gone up (12.7% in the NNS 2011 compared to 7.8% in the NNS 2001). Similar trends were seen in urban and rural areas. The night blindness rates during current pregnancies had also increased (in the NNS 2011 they were 15.6%, while in the NNS 2001 they were 9.9%).

Fig 5.11: Comparison of night blindness in women

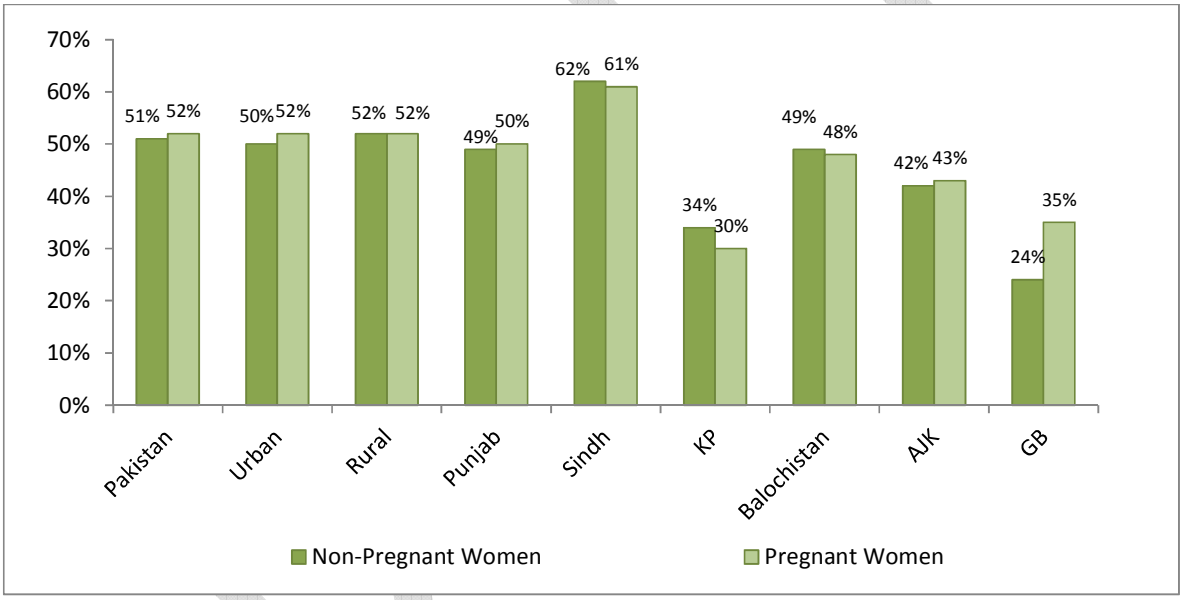


Blood specimens were collected to assess the biochemical status of micronutrients. These specimens were assessed for hemoglobin, ferritin, vitamin A, zinc, calcium and vitamin D levels. The results are as follows:

5.7.1 Anaemia (haemoglobin levels)

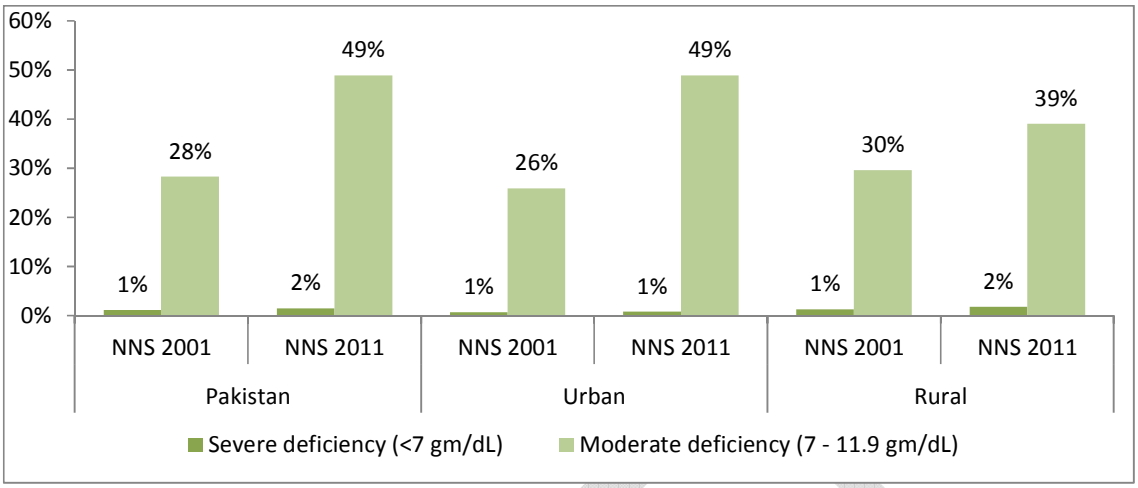
Haemoglobin levels of both pregnant and non-pregnant women were checked during the NNS 2011. 50.4% of non-pregnant women were found to be suffering from anaemia (49.3% in urban areas and 50.9% in rural areas). Provincial data revealed that 62% in Sindh were suffering from anaemia, followed by Balochistan (48.9%), Punjab (48.6%), AJK (41.0%), KP (35.6%) and Gilgit Baltistan (23.3%). Similar trends were observed for pregnant women.

Fig 5.12: Maternal anaemia



When the NNS 2011 data for anaemia in pregnant and non-pregnant mothers was compared with that of the NNS 2001, it was found that the prevalence of anaemia in non-pregnant women had worsened in 2011 (28% in NNS 2001 compared to 51% in the NNS 2011). Similar trends were observed for pregnant women.

Fig 5.13: Comparison of anaemia in mothers

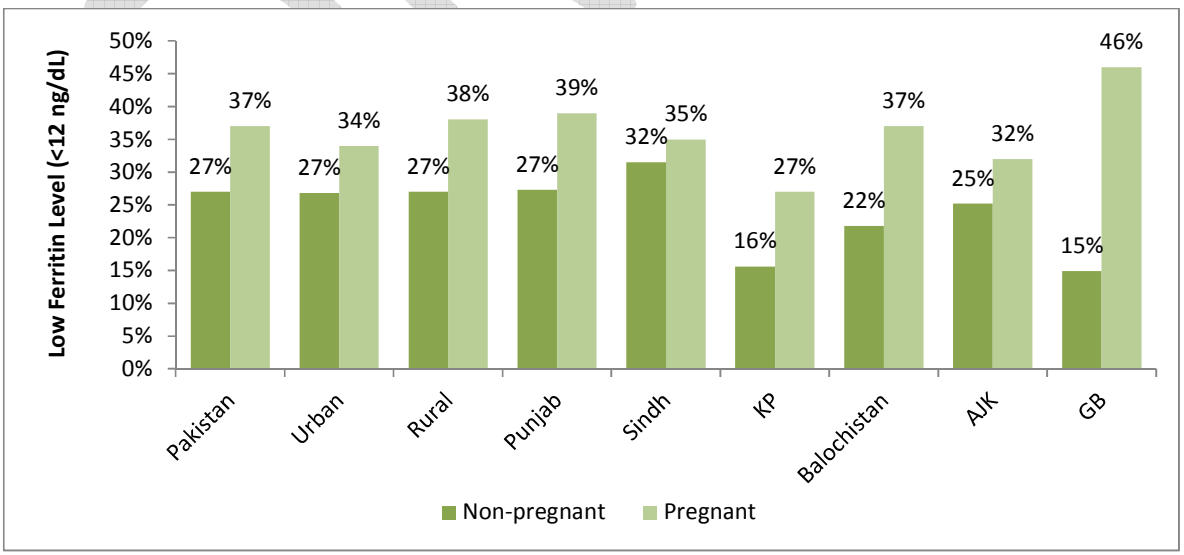


5.7.2 Iron deficiency (Ferritin levels)

26.8% of non-pregnant women had low ferritin levels (27.1% in urban areas and 26.6% in rural areas). When the data was disaggregated by province, Sindh had the highest proportion of women with low ferritin levels (31.3%), followed by Punjab, AJK, Balochistan, Gilgit Baltistan and KP.

Among pregnant women, 38.2% had low ferritin levels at national level whereas it was highest in GB (46%) followed by Punjab, Balochistan, Sindh, AJK and KP.

Fig 5.14: Ferritin levels



5.7.3 Vitamin A deficiency

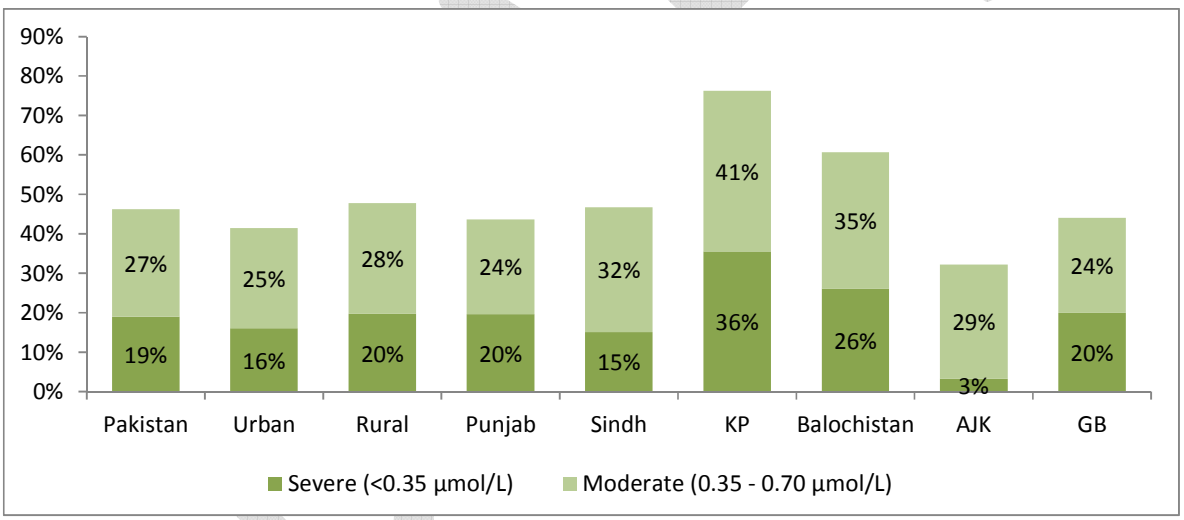
Retinol levels were tested in women (pregnant and non-pregnant) to determine vitamin A deficiency.

All married women: Vitamin A deficiency was prevalent at 42.5% (35.7% in urban areas and 45.4% in rural areas). Provincial variance showed vitamin A deficiency at the following levels in all married women: highest in KP 66.4% followed by Balochistan 54.9%, Punjab 41.8%, GB 39.1%, Sindh 37.1% Table 5.26).

Non-pregnant women: Among the non-pregnant women vitamin A deficiency was prevalent at 42.1% (34.9% in urban areas and 45.1 in rural areas). Provincial variance showed that VAD remained highest in KP 66.7% followed by 60.7 in Balochistan, 41.5% in Punjab, 38.7% in GB, 35.4% in Sindh and 13.7% in AJK (Table 5.27).

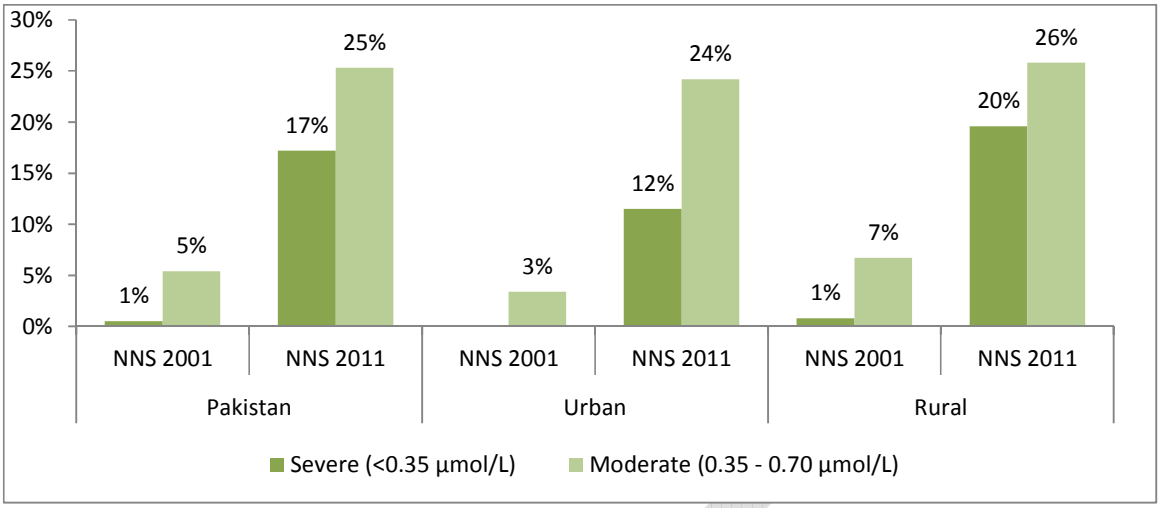
Pregnant women: Among the pregnant women vitamin A deficiency was prevalent at 46% (41.5% in urban areas and 47.6 in rural areas). Provincial variance showed that VAD remained highest in KP 76.2% followed by 60.7 in Balochistan, 46.7% in Sindh, 44.1% in GB, 43.7% in Punjab and 32.2% in AJK (Table 5.28).

Fig 5.15: Vitamin A deficiency (pregnant women)



Comparison of Vitamin A Deficiency among all women NNS 2011 vs. NNS 2001: Vitamin A deficiency levels found in the NNS 2011 had significantly increased over the NNS 2001 levels (5.9% in 2001 to 42.5% in 2011). Similar trends were seen in urban and rural areas.

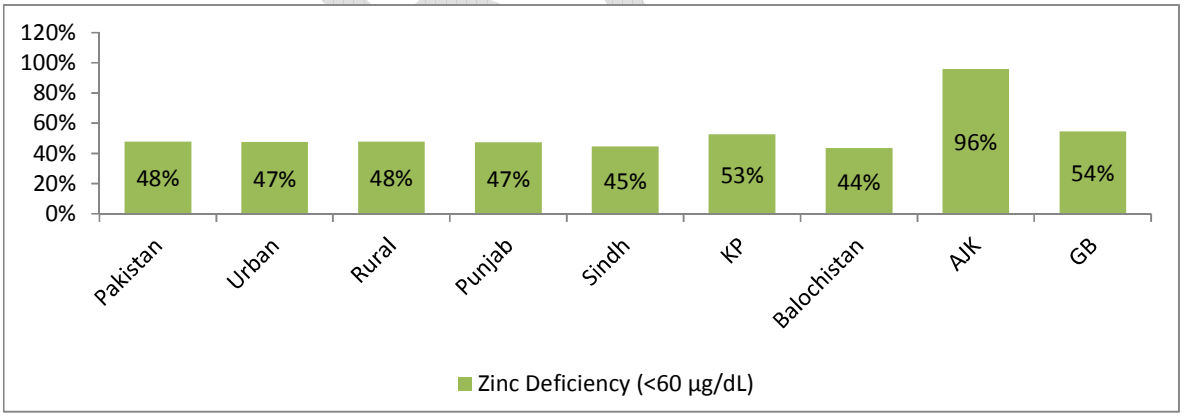
Fig 5.16: Comparison of vitamin A deficiencies among non-pregnant women (urban/rural)



5.7.4 Zinc deficiency

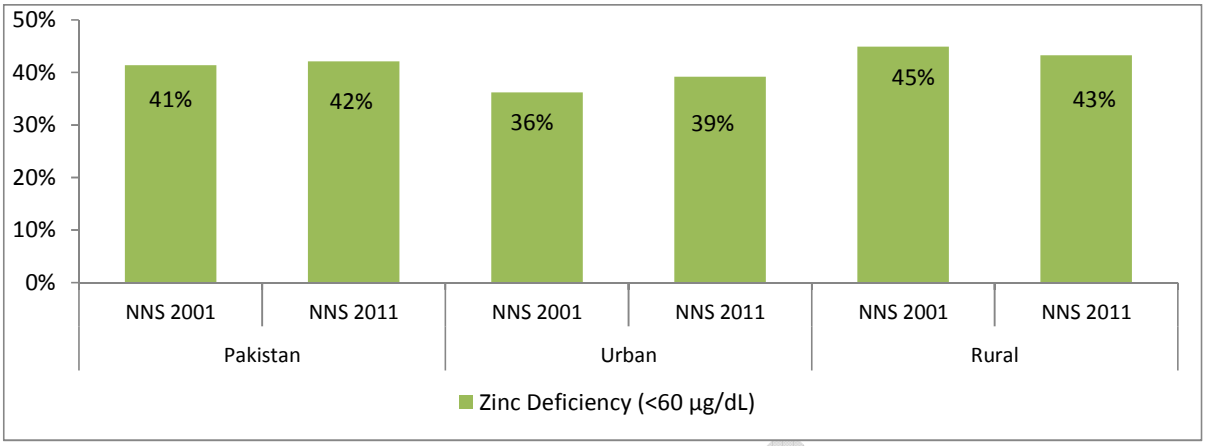
Serum zinc levels were determined in women. The serum analysis of non-pregnant women revealed that 41.3% of women were zinc deficient (38.2% in urban areas and 42.7% in rural areas). Women's serum zinc levels by province were as follows in 2011: Punjab 40.2%, Sindh 38.5%, KP 48.3%, Balochistan 43.7%, AJK 64.8% and Gilgit Baltistan 63.7%. The data also showed that 47.6% of pregnant women were zinc deficient across the country. The provincial variance for pregnant women was as follows: Punjab 47.3%, Sindh 44.5%, KP 52.6%, Balochistan 43.6%, AJK 95.8% and Gilgit Baltistan 54.4%.

Fig 5.17: Zinc deficiency (pregnant women)



It was also noted that there has not been any change in the prevalence of zinc deficiency in the last ten years. The prevalence was 41.9% in the NNS 2001 and 42.1% in the NNS 2011.

Fig 5.18: Zinc deficiency

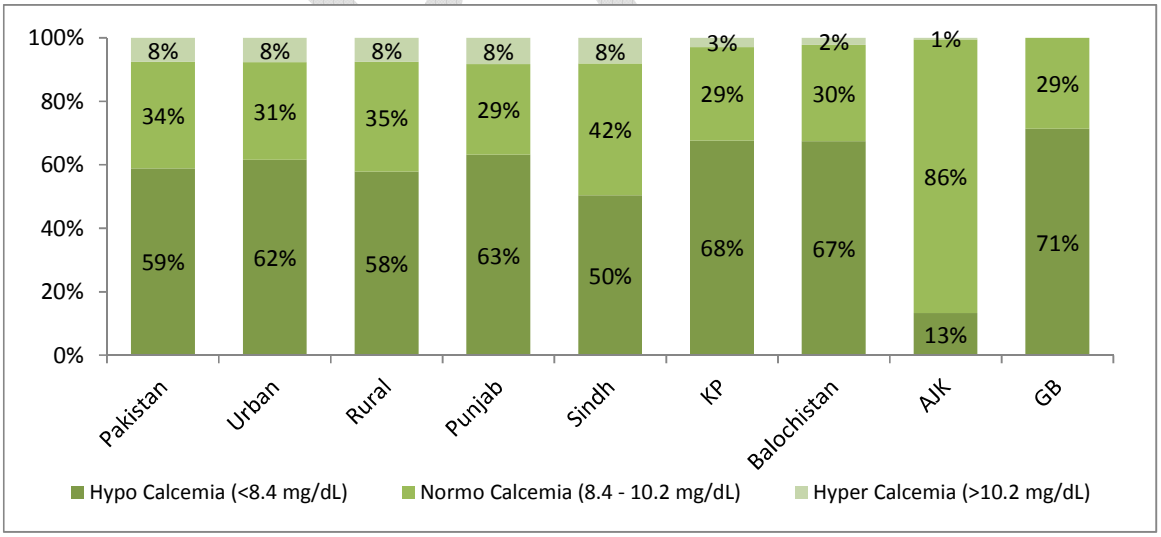


5.7.5 Calcium deficiency

The NNS 2011 calculated calcium levels for the first time on such a large population of women (non-pregnant and pregnant). The calculated calcium levels were not adjusted for albumin. The data revealed that 52.1% of non-pregnant women had hypocalcaemia. Provincial data also showed that 51.7% of non-pregnant women had hypocalcaemia in Punjab, 44.6% in Sindh, 74.0% in KP, 63.1% in Balochistan, 8.2% in AJK and 44.5% in GB.

Data on pregnant women showed that 58.9% had hypocalcaemia. The levels of calcium in pregnant women at the provincial level showed that 63.2% of pregnant women in Punjab, 50.3% in Sindh, 67.6% in KP, 67.4% in Balochistan, 13.3% in AJK and 71.3% in GB had hypocalcaemia.

Fig 5.19: Calcium deficiency (pregnant women)



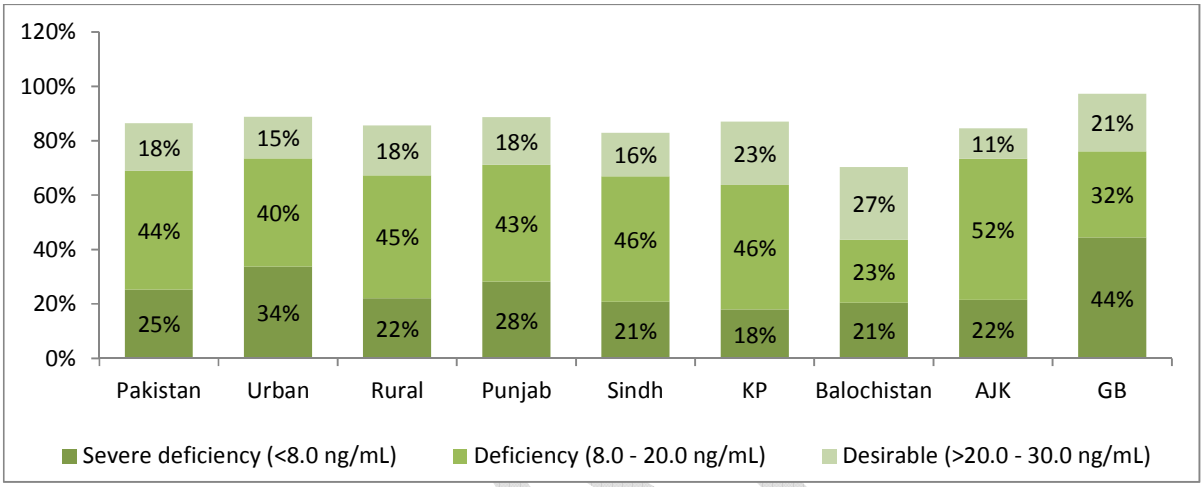
5.7.6 Vitamin D deficiency

The NNS 2011 was the first time a NNS analysed biochemical evidence for vitamin D deficiency on such a large scale. Widespread deficiency was found among non-pregnant women – 66.8% were vitamin D deficient (72.5% in urban areas and 64.3% in rural areas). On a provincial level,

the prevalence of vitamin D deficiency among non-pregnant women in Punjab was 66.4%, in Sindh 71.2%, in KP 61.0%, in Balochistan 54.6%, in AJK 73.3% and in Gilgit Baltistan 80.9%.

The prevalence of vitamin D deficiency was also tested in pregnant women. 68.9% were determined vitamin D deficient (73.9% in urban areas and 67.2%in rural areas). Provincial data revealed vitamin D deficiency among pregnant women in Punjab was 71.1%, in Sindh 66.9%, in KP 63.8%, in Balochistan 43.6%, in AJK 73.4% and in Gilgit Baltistan 76.1%.

Fig 5.20: Vitamin-D deficiency (pregnant women)



Section 8: Qualitative findings on perceptions about health and illness (mother and child)

Participants were asked about the common illnesses in children. The majority reported illnesses such as fevers, coughs, diarrhoea and intestinal worms. When asked about the perception of women's health and illnesses, the majority of mothers replied, "As long as we are able to perform household chores and care for our children we are considered healthy". Many participants of all focus group discussions (FGDs) agreed that, "If a woman is not looking pale and has energy for performing her routine responsibilities of household work she is healthy". Rheumatic pains, swelling, leucorrhea, backache, lower body pain, blood pressure and irregular menstruation were mentioned by a majority of the participants as major illnesses in women. However, participants from Upper Sindh and Southern Punjab mentioned that most of the women are suffering from health problems due to low or insufficient diets. Some of the responses included, "We do not have enough food to eat", "We are poor and cannot afford eating as desired" and "Even if we fall sick we cannot afford outside care and we use some home remedies for treatment".

When asked about the methods of treatment, the majority of FGD participants said, "If (the illness is) not so serious then some self-medication is used, such as left over drugs from previous illnesses that are already available at home." Some participants said, "We consult the nearby health care provider". Lady Health Workers also stated that, "Women called us to give them advice". The trained health professionals were asked the same question. According to them, the majority of patients do not follow doctors' advice and, when they do, it is only until they recover

from their illness. In some communities of Gilgit Baltistan and KP, women were only permitted to consult 'lady' doctors due to the cultural norms.

Alternative treatment and care seeking included traditional practices such as advice from elders, spiritual healers and unskilled birth attendants (*dais*) or home remedies. For instance, in Balochistan, upper Sindh, AJK and Gilgit Baltistan, the commonly used treatment for leucorrhea is a mixture of cardamom, ginger and lemon, which is consumed for a week.

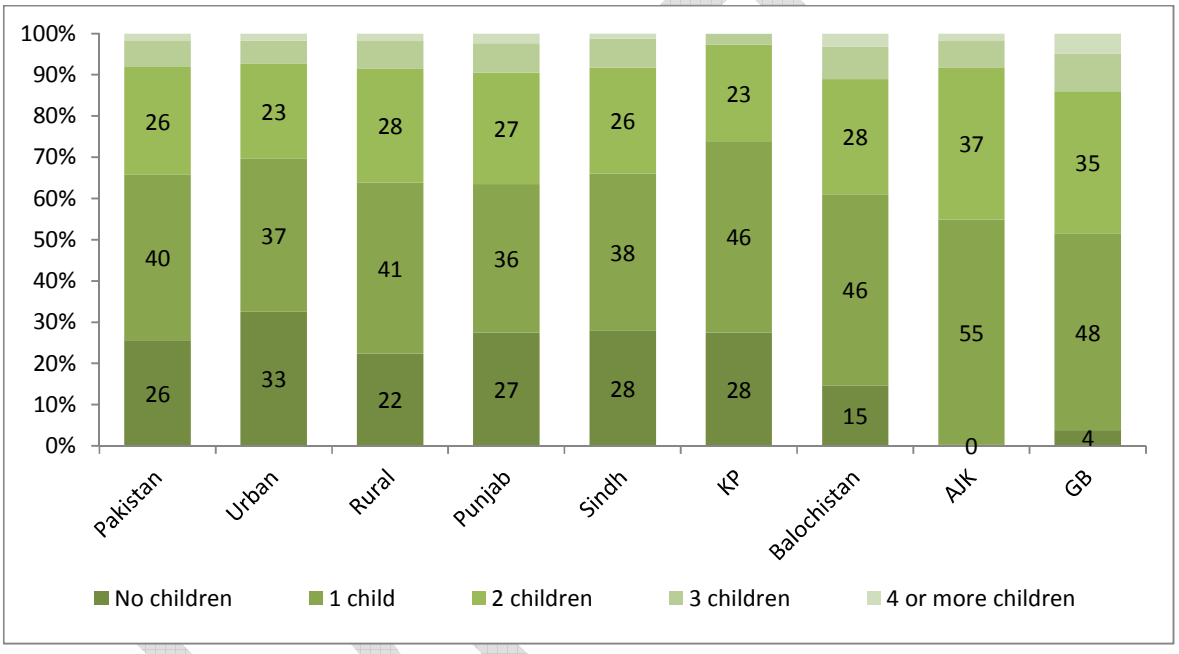
Chapter 6: Child Health and Nutrition

Section 1: Nutrition status of children

6.1.1 Children 0 – 59 months

The percentage of households with children aged 0–59 months was measured in the NNS 2011. 25.5% of households in Pakistan did not have a child in the home that was under 5 while 40.1% had only one child under 5 years of age. The average number of children living in each household is listed by province and region in the following figure.

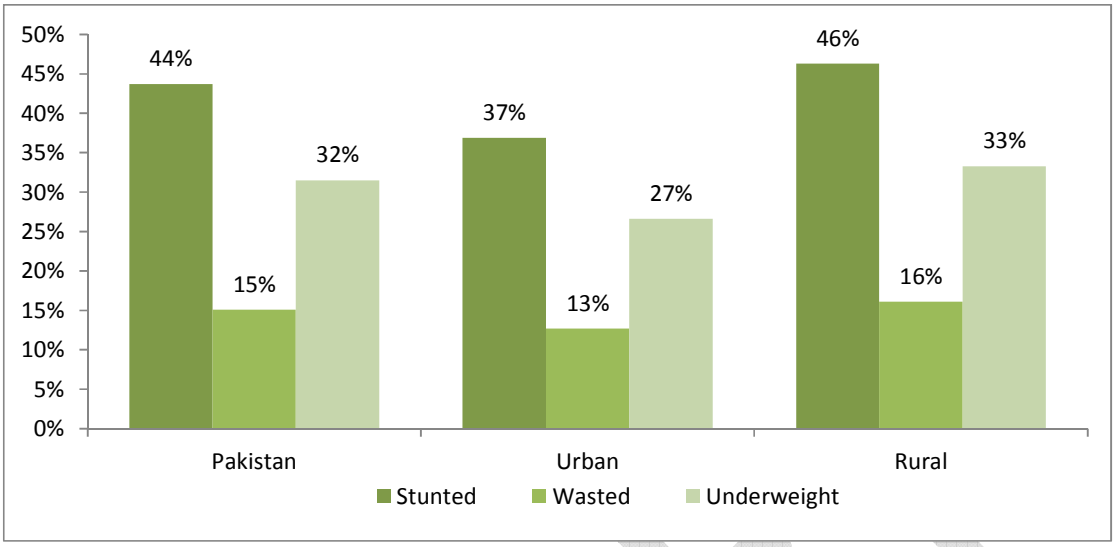
Fig 6.1: Households with children under 5 years of age



6.1.2 Anthropometry (children under 5 years of age)

An anthropometric measurement of all children below the age of five was conducted in every household. Results showed that in Pakistan 43.7% of children were stunted. In rural areas stunting in children was higher (46.3 %) than in urban areas (36.9%). The wasting rate was 15.1% and the proportion of wasted children was lower in urban areas (12.7%) than in rural areas (16.1%). About 31.5% of the children were underweight, with higher rates in rural areas (33.3%). The indicators of malnutrition appeared to be worse in rural areas than in urban areas across country.

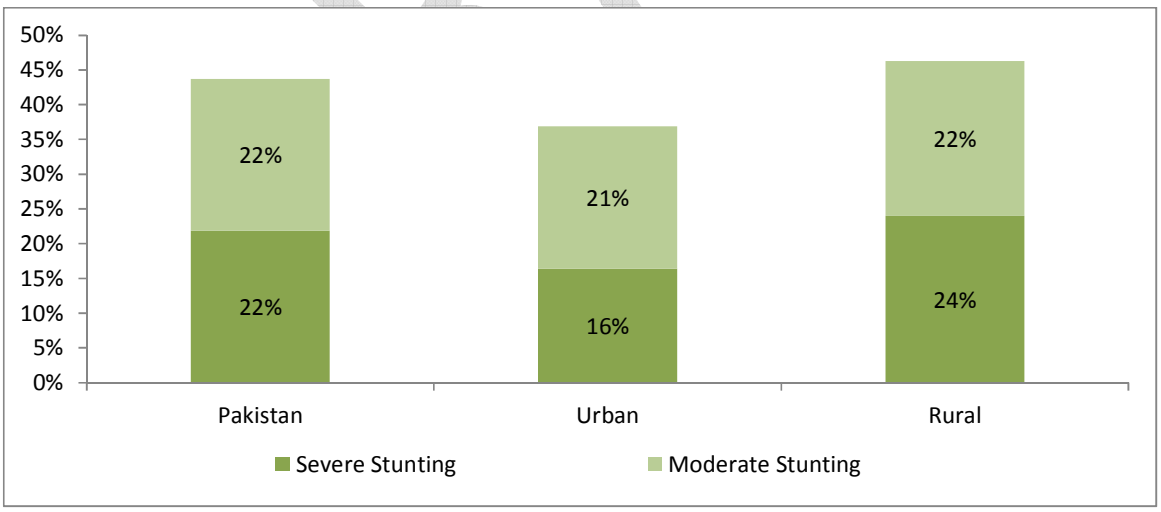
Fig 6.2: Prevalence of malnutrition in Pakistan (children under 5 years of age)



6.1.3 Stunting (children under 5 years of age)

Severe stunting in children showed an alarming situation (22%) across Pakistan. It was higher in rural areas (24 %) than in urban areas (16%).

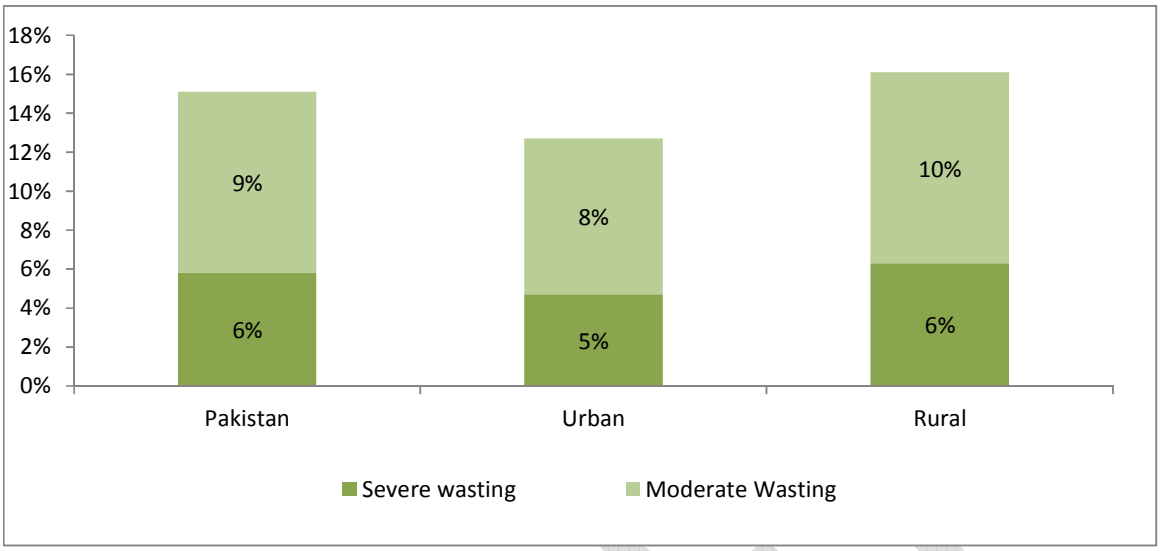
Fig 6.3: National stunting rates for children under 5 years of age



6.1.4 Wasting (children under 5 years of age)

Overall wasting rates were 7% for severe wasting and 10% for moderate wasting. The proportion of wasted children was higher in rural areas than in urban areas. In urban areas 6% of children under 5 years of age suffered from severe wasting while 8% were affected by moderate wasting. In rural areas severe wasting reached 7% and moderate wasting was 10%.

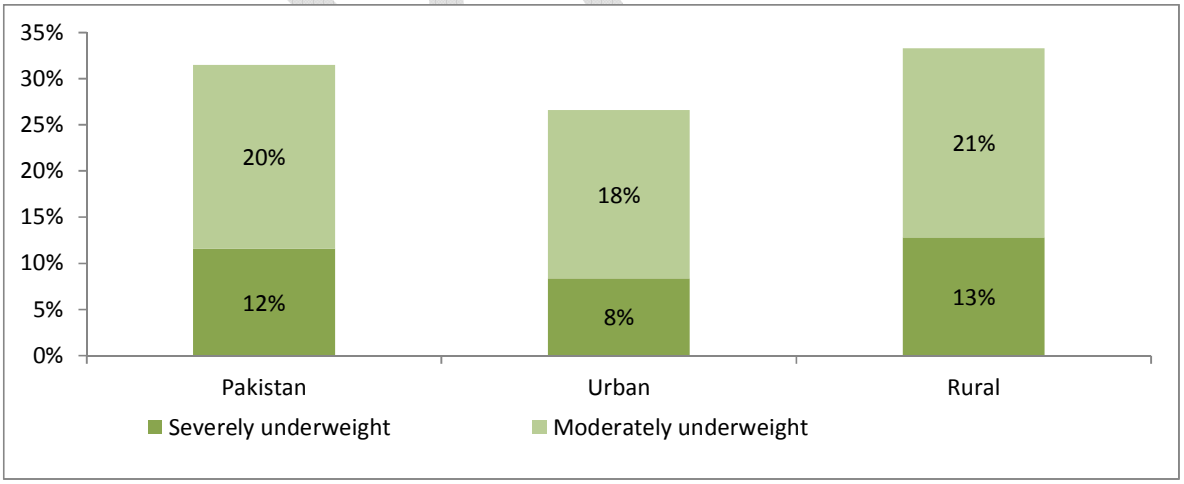
Fig 6.4: National wasting rates (children under 5 years of age)



6.1.5 Underweight (children under 5 years of age)

Across Pakistan, 11.6% of children were severely underweight while 19.9% were moderately underweight. No significant difference was found between rural and urban areas.

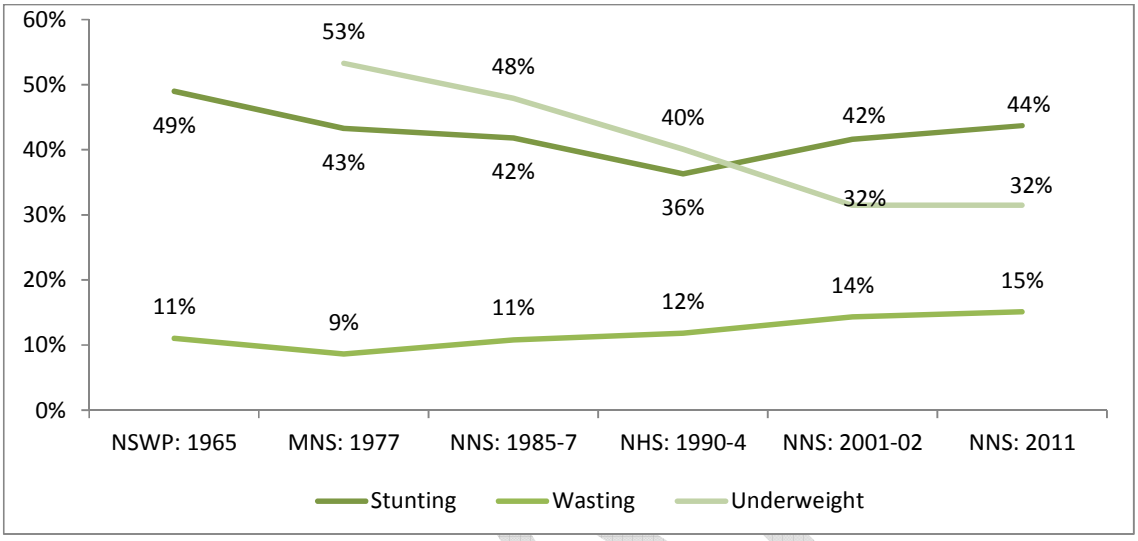
Fig 6.5: Underweight (children under 5 years of age) national



6.1.6 National trends in malnutrition

The malnutrition status of children under 5 years of age has shown no improvement in the last 46 years.

Fig 6.6: National malnutrition trends

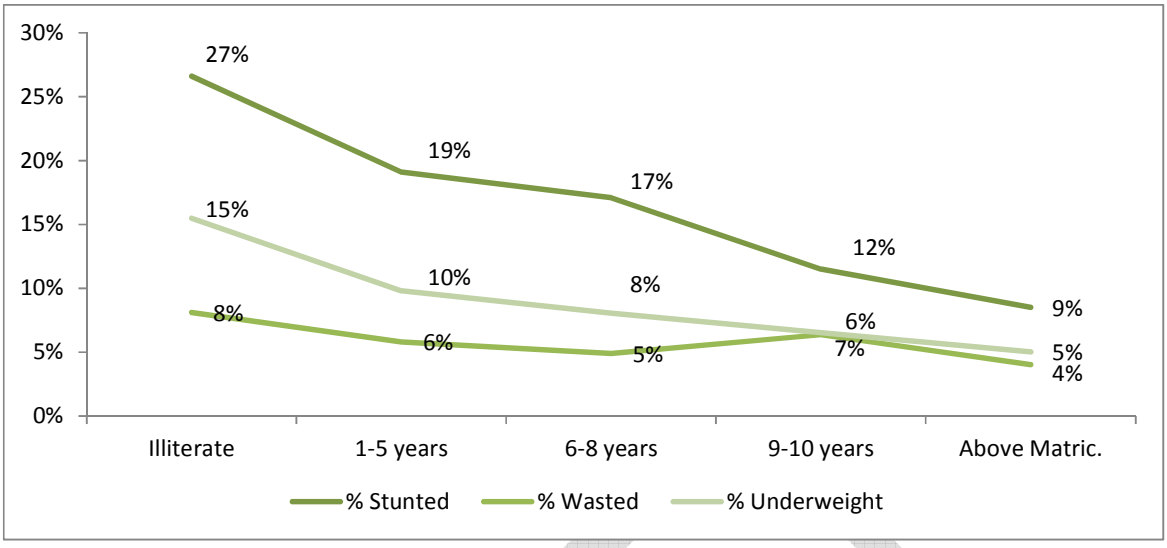


The NNS 2011 revealed that indicators of stunting and wasting have, in fact, worsened in the last 10 years. 43.7% of children were stunted, which is higher than NNS 2001 (41.6%). Similar trends were observed for wasting, 15.1% of children had signs of wasting in the NNS 2011 as compared to 14.3% in the NNS 2001. However, underweight rates remained constant during the last decade (31.5%).

6.1.7 Education of mothers and its effect on nutritional status of children

It is evident that the employment status and education level of a mother is directly associated with the nutritional status of her children. The findings of the NNS 2011 revealed that a mother's education level is closely associated with children's stunting, wasting and underweight status. Malnutrition in children was lower for those whose mothers had a higher education status.

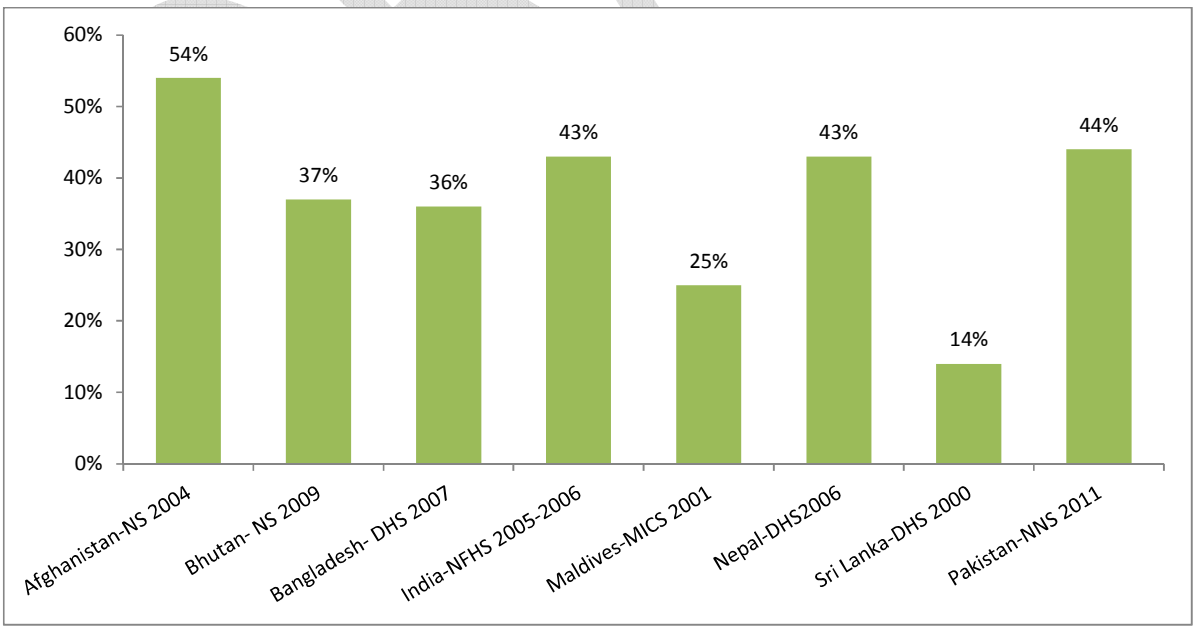
Fig 6.7: Education of mothers and its effect on nutritional status of children



6.1.9 Malnutrition situation in children under 5 years of age – comparison of SAARC countries

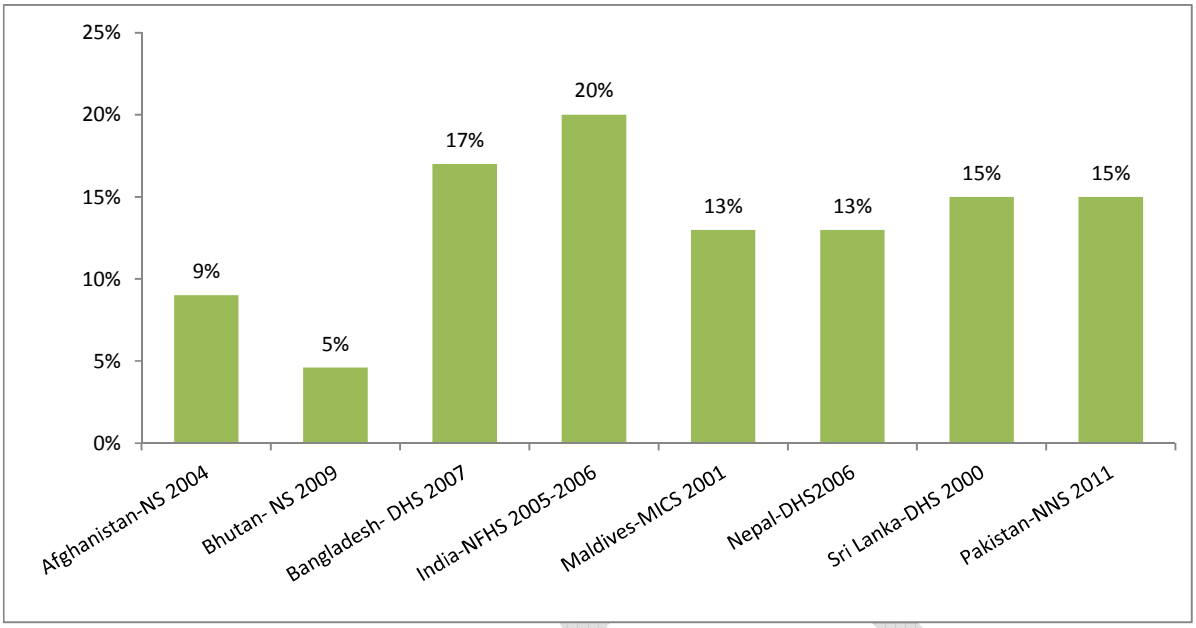
Of the South Asia Association of Regional Cooperation (SAARC) countries, Pakistan has the second highest stunting rate (43.7%). It follows Afghanistan, a country that faces extreme social, political and economic complexities. Nepal and India have similar stunting rates (43%). Bhutan has considerably better nutrition indicators than Pakistan.

Fig 6.8: SAARC countries national stunting status



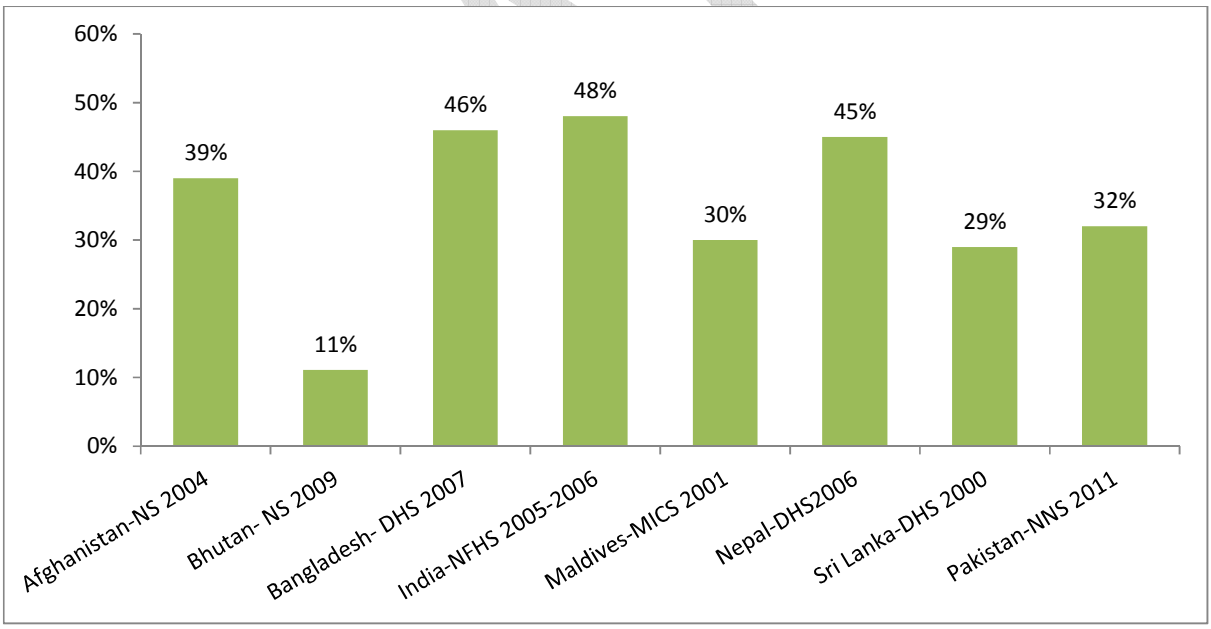
Pakistan and Sri Lanka have the third highest wasting rates in the region and Afghanistan has better rates than both.

Fig 6.9 SAARC countries national wasting status



Pakistan had lower rates of underweight children than half of the other SAARC countries

Fig 6.10: SAARC Countries national underweight status



Section 2: Biochemical assessment

Biochemical assessments are one of the established methods used to study the micronutrient status of a given population. Biochemical assessments are much more accurate and precise than most other forms of testing because many micronutrient deficiencies do not produce signs or symptoms until they are quite severe. For this reason, mild micronutrient deficiencies can only be diagnosed using biochemical indicators. Commonly used biochemical assessments include the

haemoglobin estimation for anaemia, serum retinol levels for vitamin A deficiency, serum zinc levels for zinc deficiency, and urinary iodine levels for urinary iodine excretion.

6.2.1: Anaemia

Overall, 61.9% of children were found to be anaemic (<10.99gm\dl) at the national level (severe deficiency 5.0% and moderate deficiency 56.9%). Regional differences in the prevalence of anaemia were substantial, ranging from 40.4% in Gilgit Baltistan to 67.7% in Sindh. The prevalence of severe anaemia was comparatively higher in rural areas (5.5%) than in urban areas (3.6%).

Fig 6.11 Anaemia in children under 5 years of age

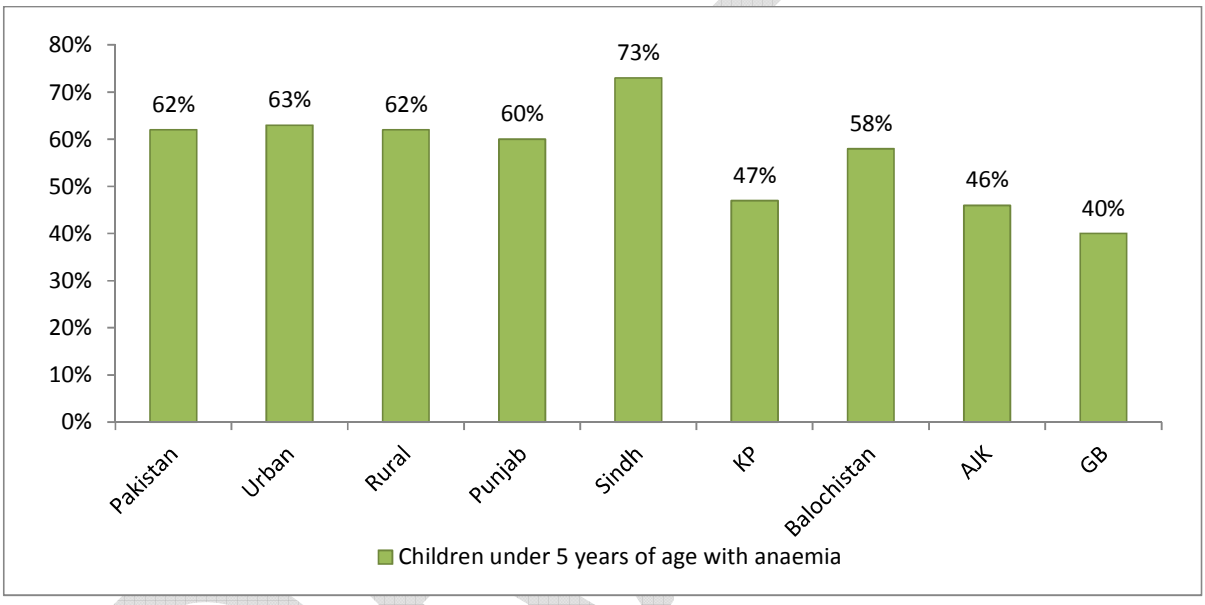
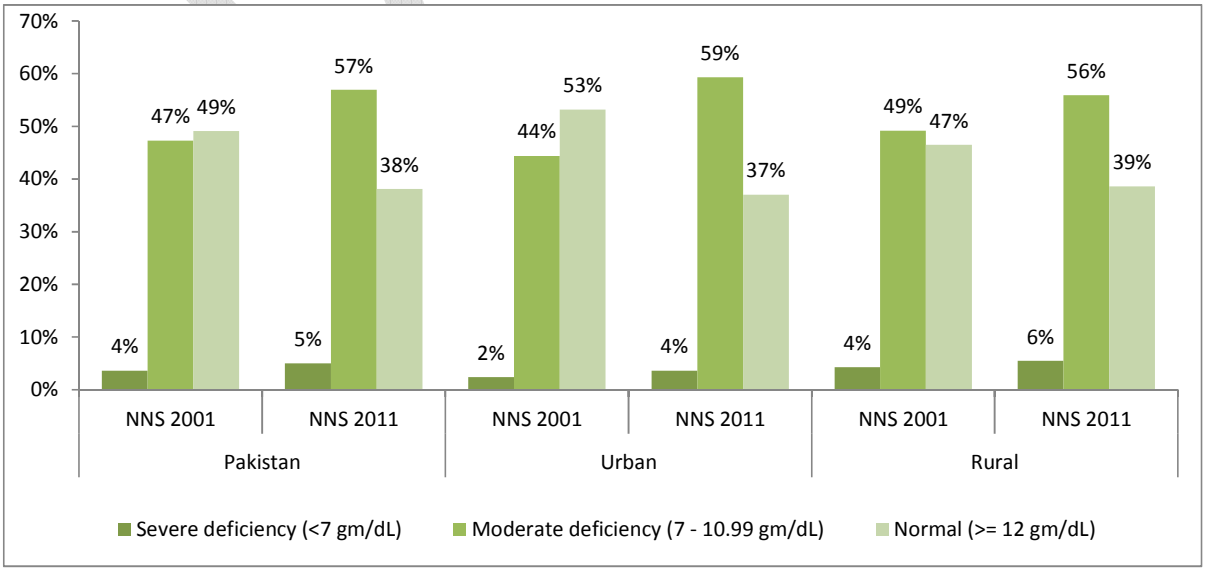


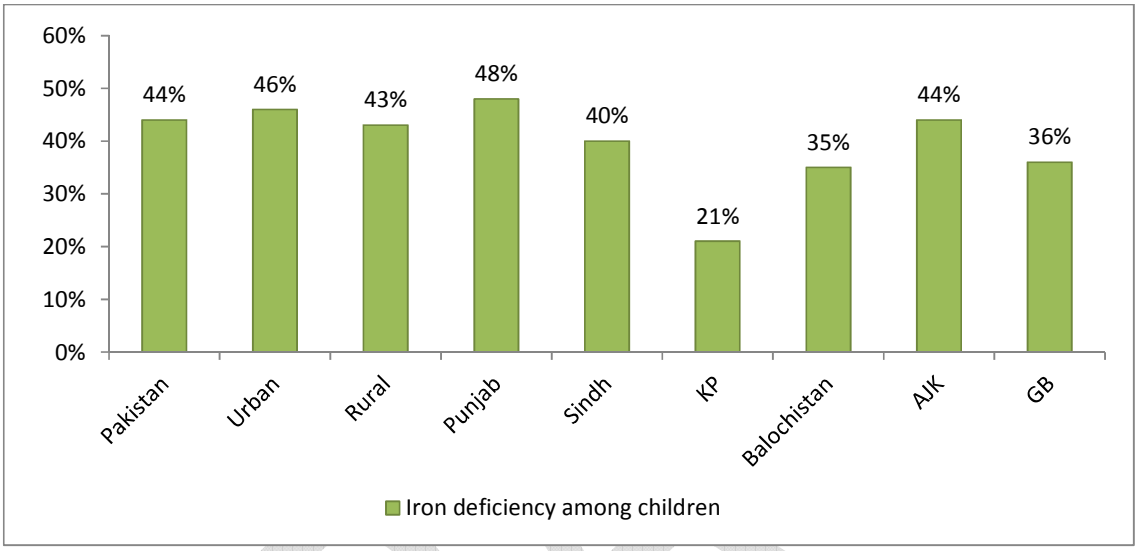
Fig 6.12: Comparison of prevalence of anaemia in children under 5 years of age



6.2.2: Iron deficiency (low ferritin levels)

High levels of iron deficiency (low ferritin levels) were observed in 43.8% of children across Pakistan. Provincial differences in prevalence of low ferritin levels varied ranging from 26.4% in KP to 48.6% in Punjab. Comparatively high prevalence was noted in urban areas (46.1%) as compared to rural areas (42.9%).

Figure 6.13: Iron deficiency among children



6.2.3: Vitamin A deficiency in children (under 5 years)

During the NNS 2011, vitamin A deficiency was assessed among children. The data showed that overall 54% of children in Pakistan were vitamin A deficient. 20.9% were severely deficient and 33.1% were moderately deficient.

Fig 6.14 Vitamin A deficiency

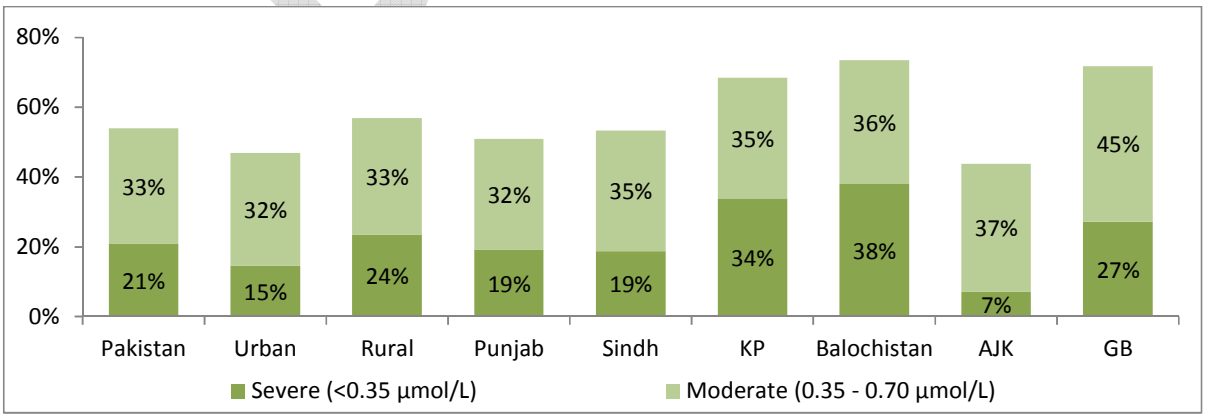
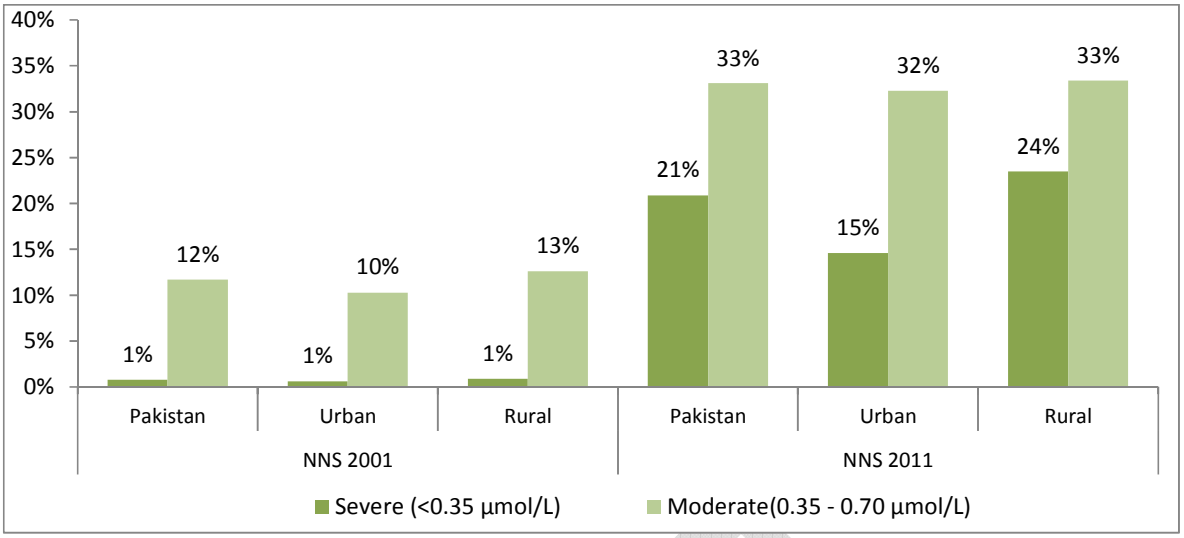


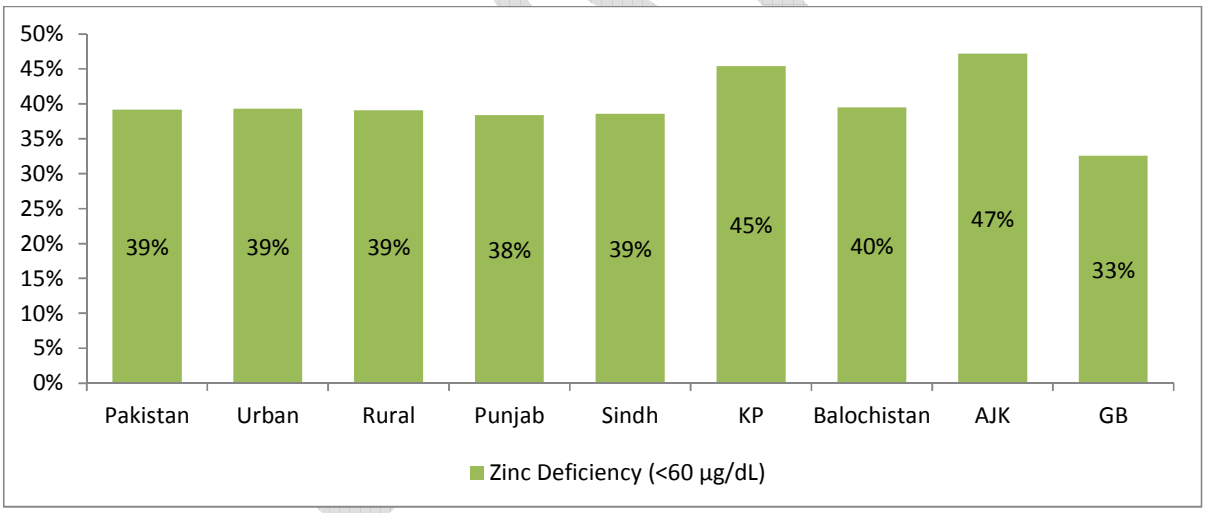
Fig 6.15: Comparison of vitamin A deficiency in children under 5 years



6.2.4: Zinc deficiency

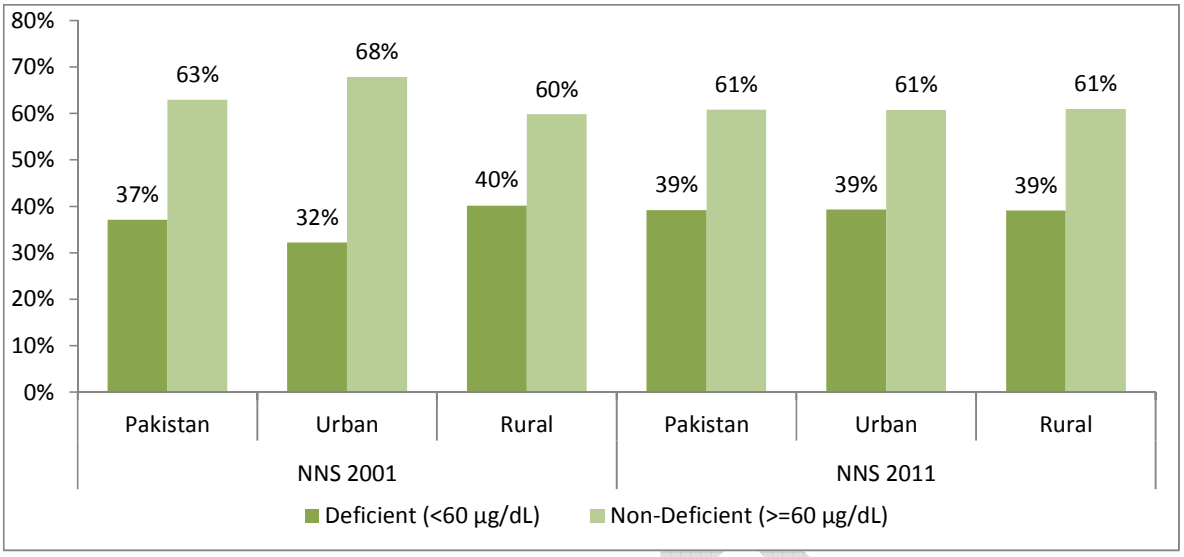
The survey revealed that overall prevalence of zinc deficiency among children in Pakistan was 39.2% (39.3% urban and 39.1% rural). Provincial data showed zinc deficiency at 38.4% in Punjab, 38.6% in Sindh, 45.4% in KP, 39.5% in Balochistan, 47.2% in AJK and 32.6% in Gilgit Baltistan.

Fig 6.16: Zinc deficiency in children (0–5 years)



When zinc deficiency data from the NNS 2011 was compared with that of NNS 2001, there was a slight change in the proportion of zinc deficient children as measured by serum zinc concentrations.

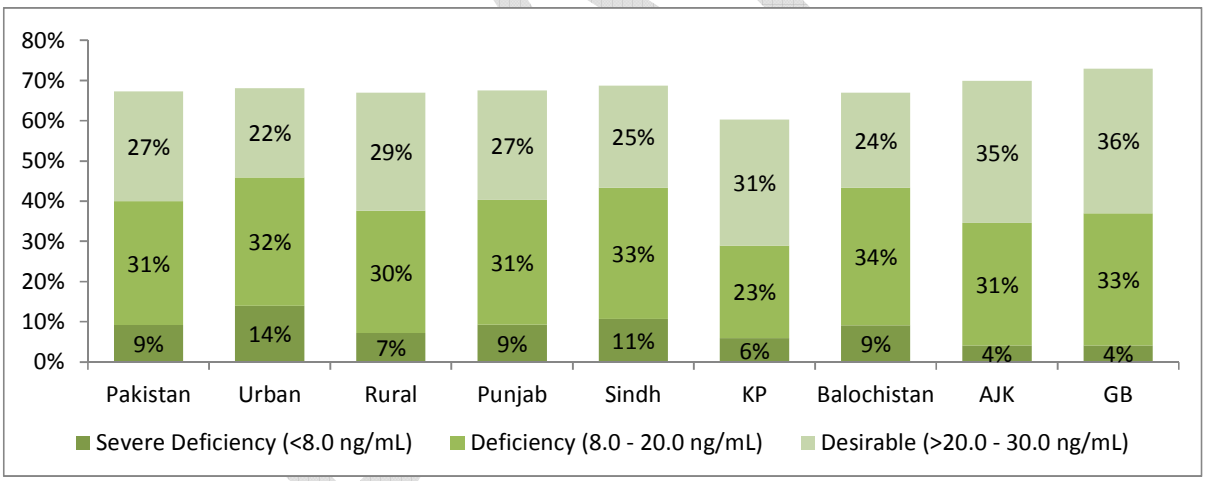
Fig 6.17: Comparison of zinc deficiency in children under 5 years of age



6.2.5: Vitamin D deficiency

The prevalence of vitamin D deficiency among children at national level was 40%. A high prevalence of vitamin D deficiency (45.9%) was noted in urban areas. Substantial variations were noted at the provincial level, ranging from 28.9% in KP to 43.4% in Balochistan.

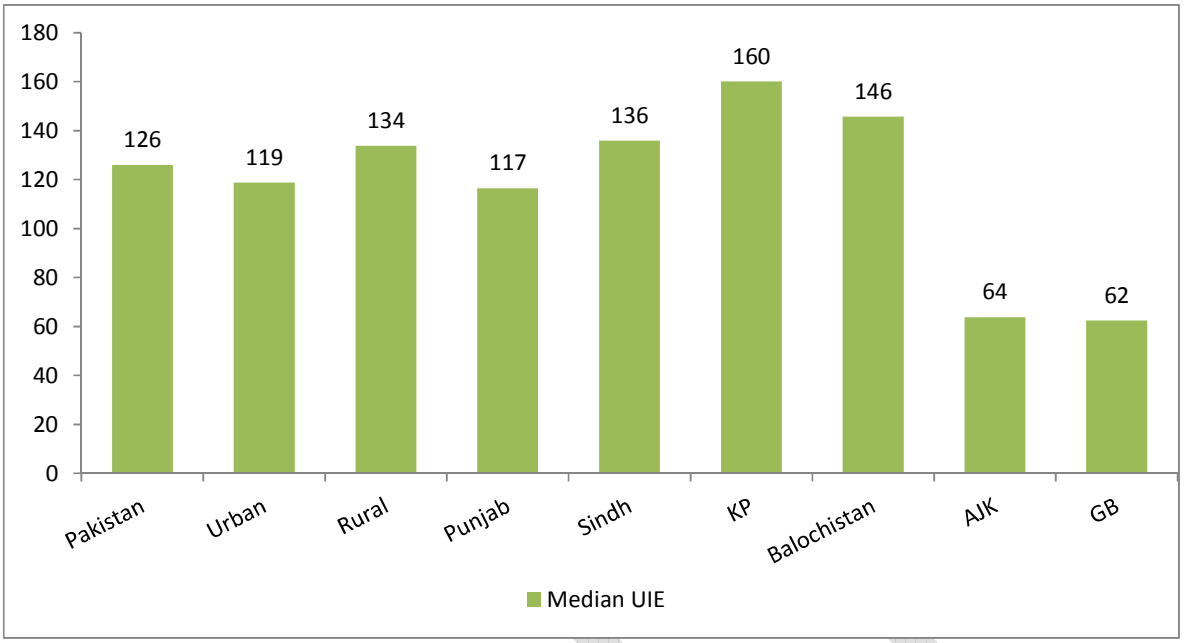
Fig 6.18 Vitamin D Deficiency



6.2.6: Urinary iodine excretion in children 6-12 years

The main indicator of iodine status in the population is measured by median urinary iodine concentration in a population of children aged 6–12 years. Adequate iodine nutrition is considered to pertain when the median urinary iodine concentration is 100–199 µg/l. Generally, the median urinary excretion of children aged between 6-12 years found in the 2011 survey indicated adequate levels of iodine status at national level, both urban and rural, and in all of the provinces except AJK and GB.

Fig 6.19 Median urinary iodine excretion in children 6-12 years …



6.2.7: Clinical examination of children under 5 years of age

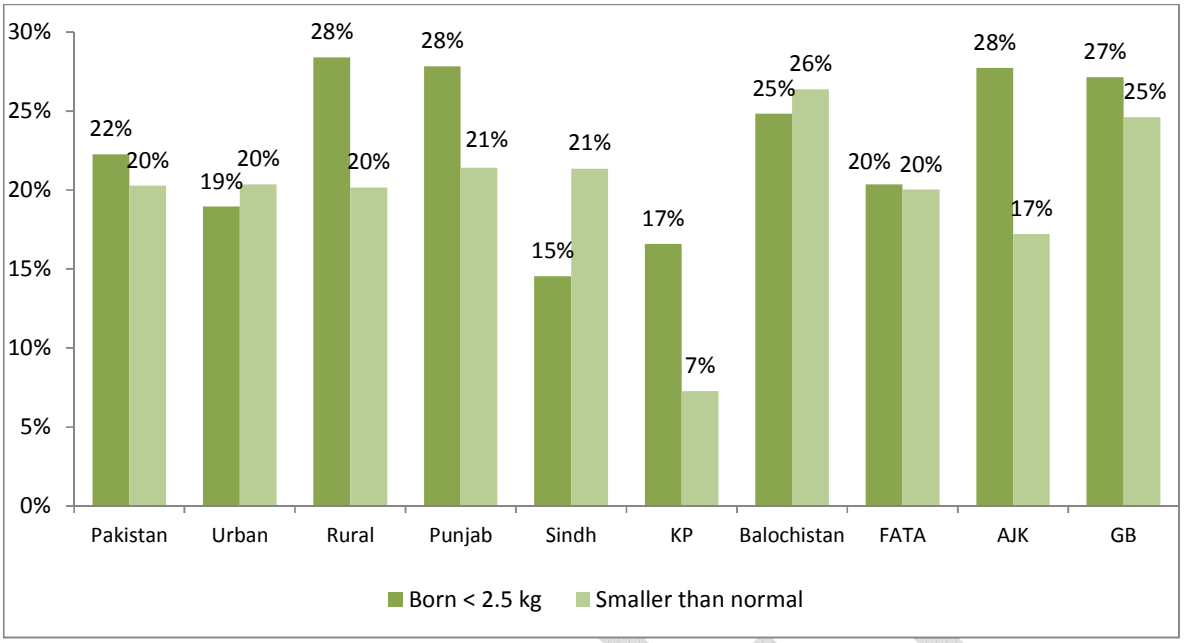
During the NNS 2011, trained nurses performed clinical examinations of children. The children were examined for anaemia, edema, jaundice, goitre and bitot's spot. The survey revealed that overall 22.8% of the children had pallor. Provincial variations were found in the prevalence of clinical anaemia ranging from 31.7% in AJK to 3.4% in KP. The prevalence of edema was 0.4% with no significant variance between provinces except for Gilgit Baltistan, where not a single case was found. Bitot's spot was present in 0.2% of the children.

6.2.8: Distribution of low birth weight

In the NNS 2011 the data on birth weight was also collected from mothers who were asked to recall the birth weight of their children. A total of 13.5% mothers could recall the birth weight of their last child and 22.3% of them said that the birth weight was less than 2.5 kg. About 19% of these mothers were in urban areas and 28.4% in rural areas. Surprisingly, Sindh (14.5%) and KP (16.6%) reported the lowest proportion of children born with a low birth weight.

The remaining 86.5% of mothers could not remember the birth weight of their children so a proxy question was used to ascertain the birth weight: "How did the child look like at the time of birth" (answer options were "normal", "bigger than normal" and "smaller than normal"). 20.2% of women reported that their child was smaller than normal. The response was similar in urban and rural areas. KP (7.3%) and AJK (17.2%) reported the smallest proportion of small babies according to the proxy indicator.

Fig 6.20: Distribution of low birth weight infants by mother recall (birth weight and size)



Section 3: Child immunization

Although health indicators are steadily improving in Pakistan, the nation is still far away from achieving its child health-related Millennium Development Goal (MDG). Vaccinations that have greatly reduced the burden of mortality and morbidity of vaccine preventable diseases in industrialized countries have not reached the optimal level in some developing countries like Pakistan. There are many reasons for "no-immunization" or "under immunization" in segments of the Pakistani population, which are linked to social, cultural, political, economic and behavioural barriers to vaccination.

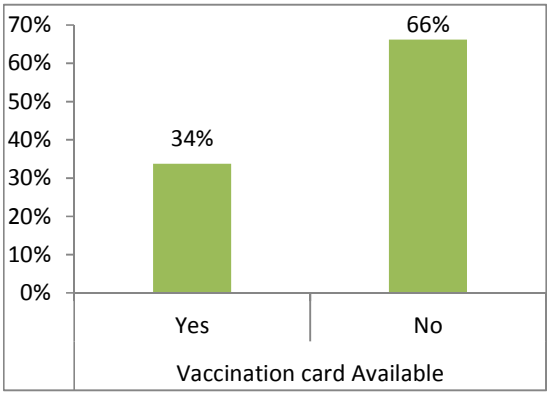
As part of its national immunization program, the government of Pakistan provides vaccines free of charge at basic health units, rural health centres, district hospitals (tehsil) and other state-run hospitals. During the first year of a child's life, the government program guidelines recommend that all children receive a BCG vaccination against tuberculosis; three doses of DPT vaccines for the prevention of diphtheria, pertussis (whooping cough), and tetanus; three doses of polio vaccine; three doses of the hepatitis B vaccine; and vaccination against measles. In addition to the program of routine immunizations, Pakistan has been conducting a number of special national immunization days (NID) since 1994 in an effort to eradicate polio.

According to the EPI program, approximately 5.1 million children are immunized every year. It is estimated that these vaccines prevent more than 100,000 deaths due to measles, 70,000 cases of neonatal tetanus and 20,000 paralytic cases of poliomyelitis each year in Pakistan.

In the NNS 2011, mothers were asked to show the vaccination cards of all children under the age of five. The interviewer then copied the date each vaccine was received. If a child never received a vaccine card, or if the mother was unable to show the card to the interviewer, the mother was

asked to recall whether the child had received BCG, polio, measles, and pentavalent as well as the number of doses for each vaccine.

Fig 6.21: Availability of vaccination cards



The data collected for 19,927 children showed that one-third of households reported having a vaccination card available for the children living there at the time of survey.

Vaccination coverage:

Information on vaccination coverage (listed by information source – vaccination card or mother's recall) is presented in the next table.

Table 6.1: Vaccinations by source of information

Source of information	BCG	Measles	OPV	Pentavalent
Vaccination card	31.5%	23.1%	27.2%	30%
Mother's recall	86.6%	64.6%	95.0%	76%

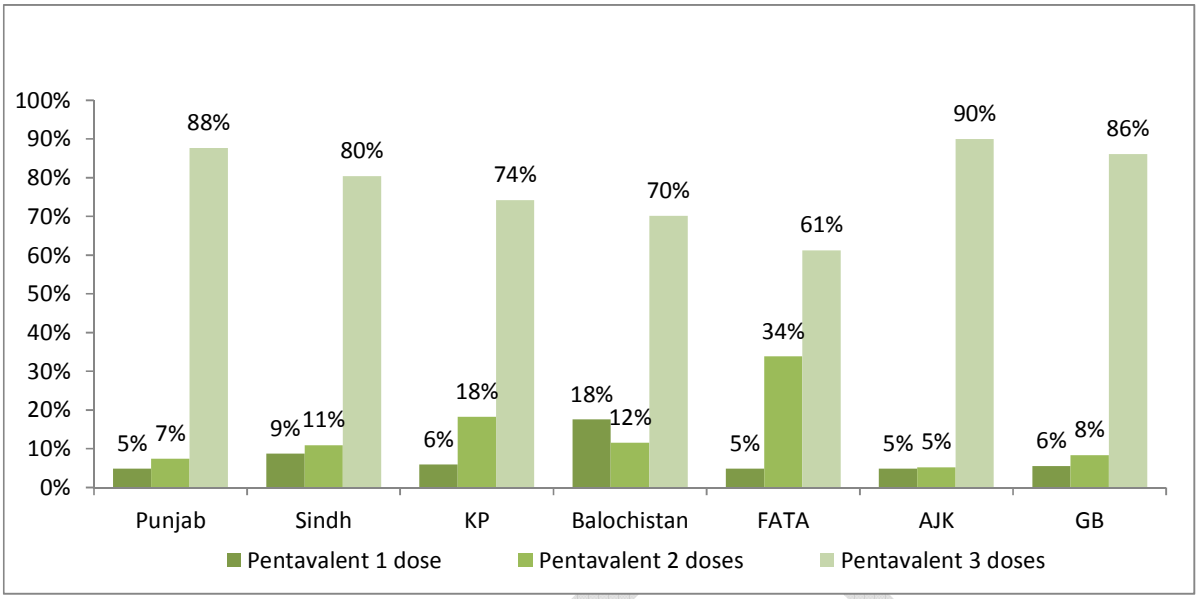
BCG vaccination based on mother's recall was 86.6% in Pakistan. However verification from vaccination cards showed that only 31.5% received BCG vaccination.

Measles trends show that only 64.4% of children were vaccinated however only 23.1% were verified from the vaccination card.

Oral polio drops (including routine vaccination and NIDs) were received by an overwhelming majority of children. However, while 95% of mothers reported their children received oral polio vaccination, records only showed 27.2% of children received it. 52.3% reported receiving more than 7 doses of polio drops, 26.1% received 7 doses and 19.3% received 3 doses. The rest of the mothers could not recall.

The pentavalent vaccine is a new combination of five vaccines that protect children against the bacterium Haemophilus influenzae type b (Hib) and four other common childhood diseases. It was introduced in Pakistan in November 2008. Pakistan is the first low-income country in South Asia to introduce the Hib vaccine. Almost 85% of children received all 3 doses of the pentavalent vaccine as per their mothers' recall but vaccination cards verified only 30% of this information.

Fig 6.22: Provincial reported pentavalent vaccine coverage



The availability of vaccination cards was highest in AJK (44.2%) and lowest in FATA (7.6%).

Fig 6.23: Provincial percentage for availability of vaccination cards

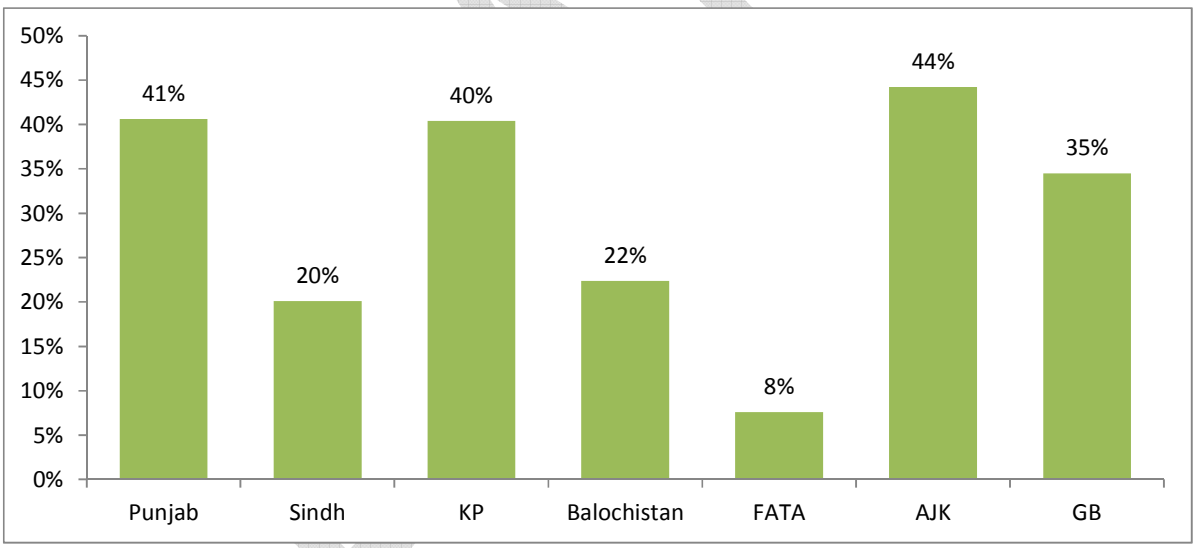
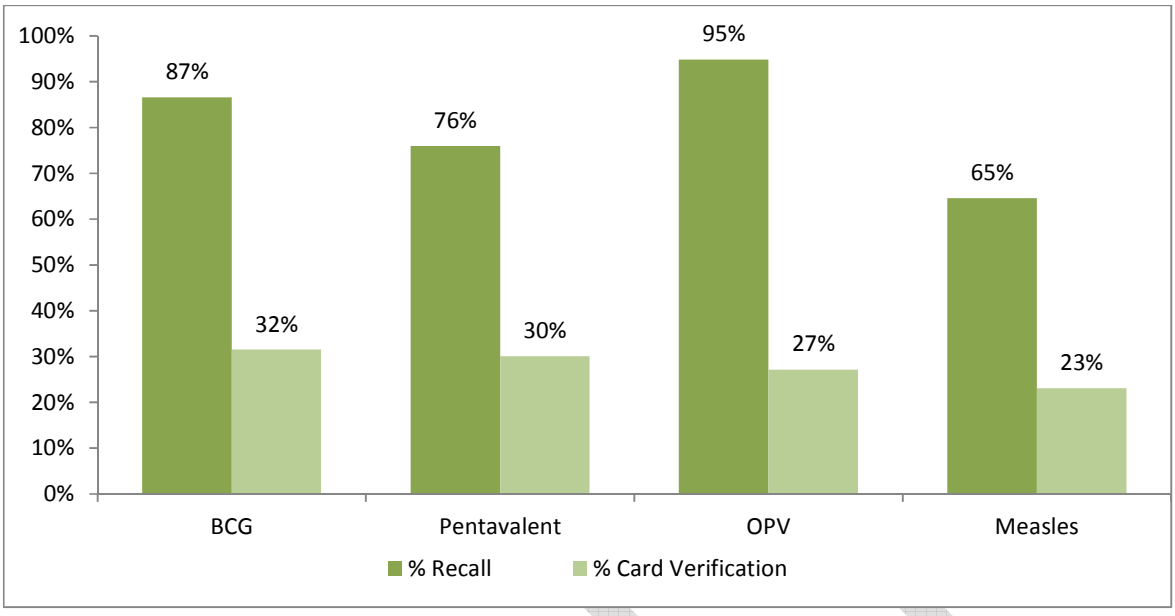


Fig 6.24 Immunization by source of information (mother's recall and vaccination card)

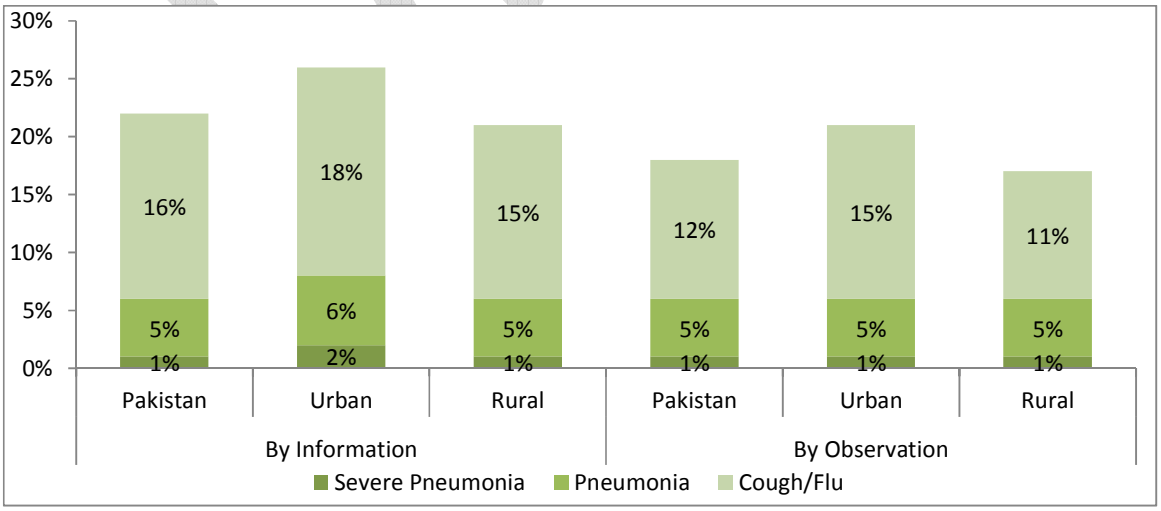


Provincial data showed mixed trends for each vaccine. Vaccination coverage was higher in urban areas than in rural areas.

Section 4: Child morbidity

Apart from neonatal disorders, diarrhoea and pneumonia are the other major causes of death in children under 5 years of age worldwide. In the NNS 2011, mothers of children under 5 were asked if the children had symptoms associated with acute respiratory illness (cough/flu, pneumonia, severe pneumonia and diarrhoea) on the day of the interview or two weeks preceding the survey.

Fig 6.25: Current ARI status



6.4.1: Prevalence of acute respiratory infections

ARI is a common cause of morbidity and death among children under 5 years of age. Pneumonia is characterized by difficult or rapid breathing. Severe pneumonia is defined as difficult or rapid breathing and chest in-drawing.

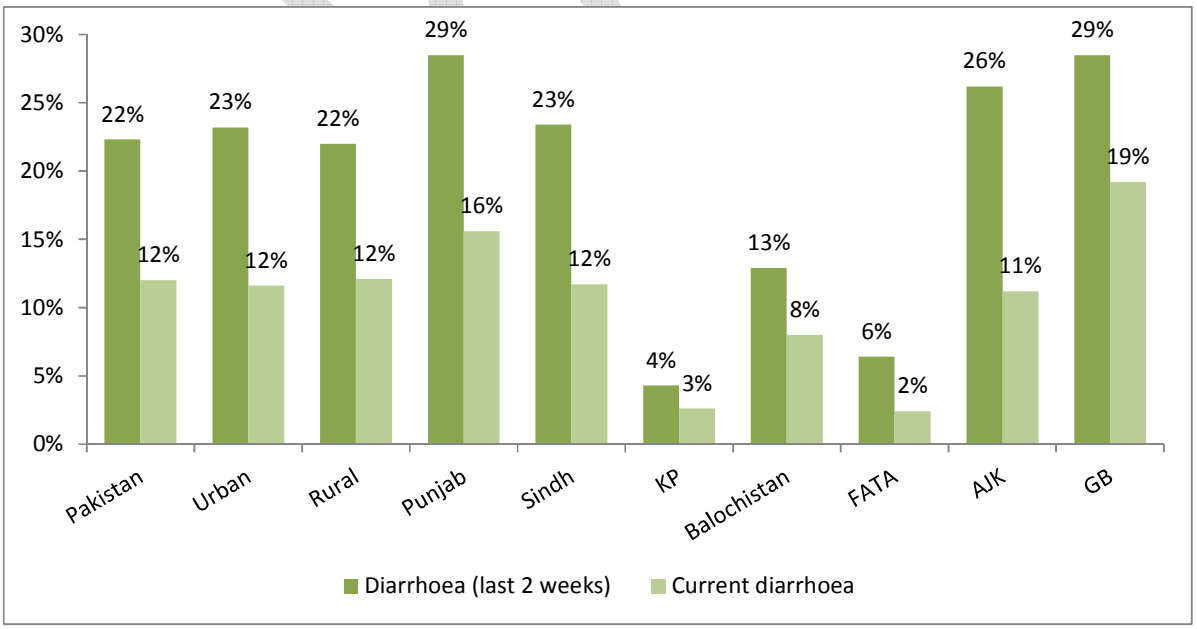
According to mothers of children, 4.9% of children had pneumonia on the day of the interview. However upon observation by the community nurse, 5.4% children had signs consistent with pneumonia. The survey findings revealed that either by observation or reported by mother, the ARI (cough/flu, pneumonia and severe pneumonia) were more prevalent in urban areas than in rural areas across Pakistan. Severe pneumonia symptoms were reported in 1.4% of children and the observed proportion was 1%.

6.4.2: Prevalence of diarrhoea

Diarrhoea is also a major cause of mortality among children. Childhood diarrhoea has been a serious health problem in Pakistan. Both its prevention, through improved water and sanitation, and management through oral rehydration salts (ORS) and zinc are on the top of the government's priority list.

The prevalence of diarrhoea was determined using the WHO definition. The mother was asked to report whether her child had diarrhoea on the day of the interview or two weeks preceding the survey.

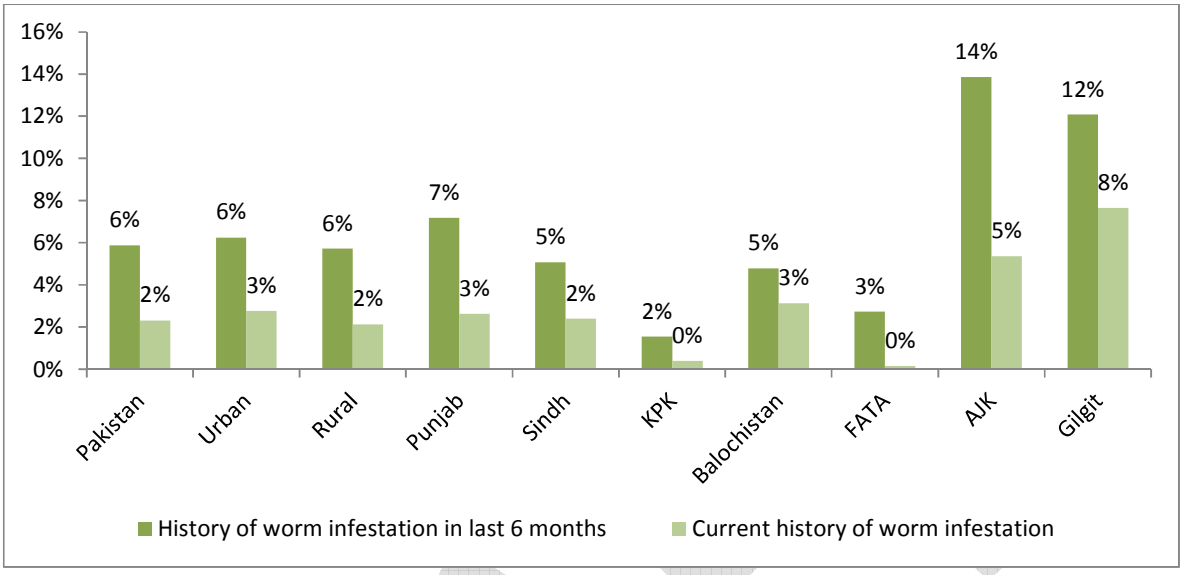
Fig 6.26: Prevalence of diarrhoea



Approximately 12% of children were reported to be suffering from diarrhoea at the time of the visit and 22.3% had diarrhoea during the previous. The prevalence of diarrhoea (current and over the previous two weeks) was similar between urban and rural areas.

Current diarrhoea prevalence was highest in Gilgit Baltistan (19%) and Punjab (16%). Similarly, prevalence of diarrhoea during previous weeks was highest in Punjab (29%), Gilgit Baltistan (29%), AJK (26%) and Sindh (23%).

Fig 6.27: Worm infestation among children



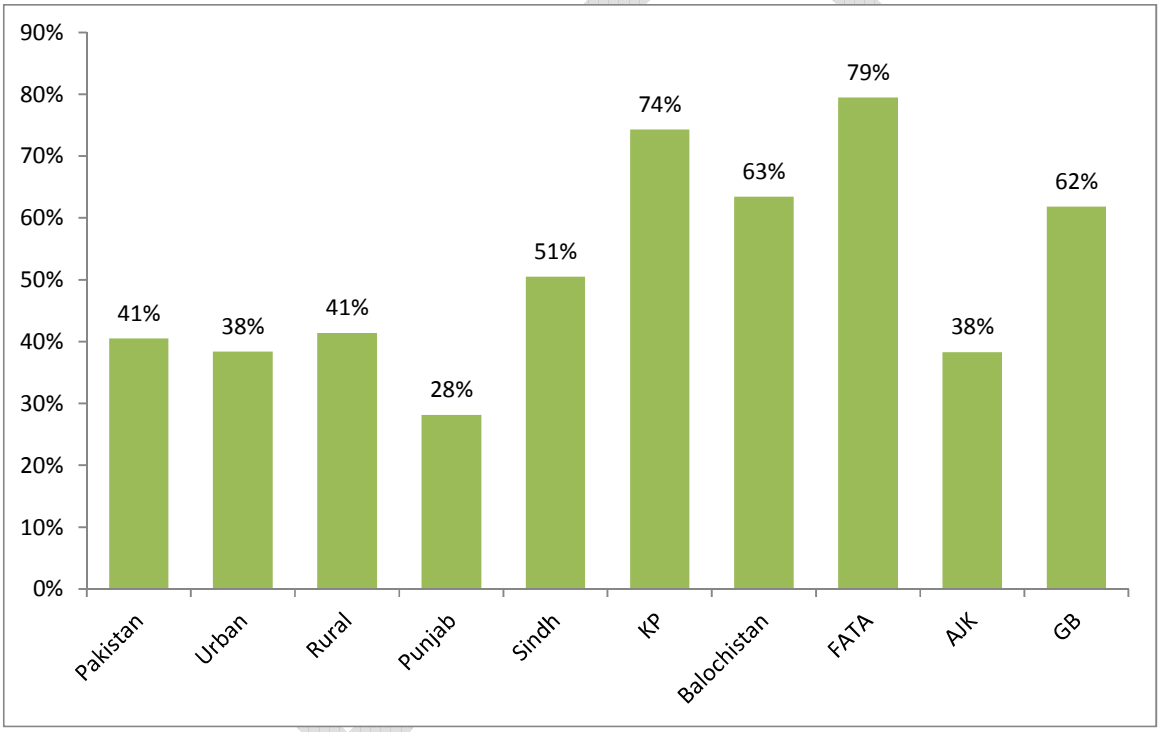
During the last six months, about 5.9% were reported to have worm infestation across Pakistan. High prevalence was reported in AJK (13.9 %) and Gilgit Baltistan (12.1%). The prevalence was also higher in urban areas (6.3%) than in rural areas (5.7%). Overall, only 2.3% of the children reported having worm infestation at the time of the household visit.

Chapter 7: Infant and Young Child Feeding Practices

Infant and young child feeding (IYCF) practices directly affect the nutritional status of children under two years of age and impact overall child survival. Improving infant and young child feeding practices in Pakistan for children 0–23 months of age is critical to guaranteeing them better nutrition, health and development.

The rate of exclusive breastfeeding (EBF) of children less than 6 months of age is a prime indicator of key nutrition practices. "UNICEF and WHO recommend *that children be exclusively breastfed—fed only breast milk with no other liquids (including water) or food—on demand for the first 6 months of life".*

Fig 7.1: Initiation of breastfeeding within one hour



NNS 2011 data revealed that 40.5% of mothers had initiated breastfeeding within one hour of birth. The percentage was greater in rural areas (41.4%) than in urban areas (38.4%). The early initiation of breastfeeding was highest in FATA 79.5%, followed by KP 74.3%, Balochistan 63.4% and Gilgit Baltistan 61.8%. Trends observed in Punjab (28.1%), Sindh (50.5 %) and AJK (38.3 %) differed.

In the qualitative research, the majority of participants also mentioned that breastfeeding behaviour is now changing and mothers have started understanding the benefits of early initiation of breastfeeding. Almost all participants across Pakistan unanimously said, “Breast milk is the first need of a child immediately after birth”. They also said, “If initiation of early breastfeeding is avoided then there were certain reasons – either no or insufficient milk or mother or baby was ill” and that, “Working mothers in urban areas do not breastfeed to maintain their physique and choose to introduce formula feed immediately following birth”.

Predominant breastfeeding practices

Predominant breastfeeding practices were assessed using the past 24 hour dietary recall. The survey data showed that 65% of mothers were predominantly breastfeeding their children who were under 6 months of age. Another 78% continued breastfeeding up to 12-15 months. Breastfeeding practices were higher in rural areas (67%) than in urban areas (59%). It was also found that 72% of mothers continued breastfeeding their children after 12-15 months in urban areas and 80% in rural areas did the same.

Fig 7.2: Breastfeeding practices

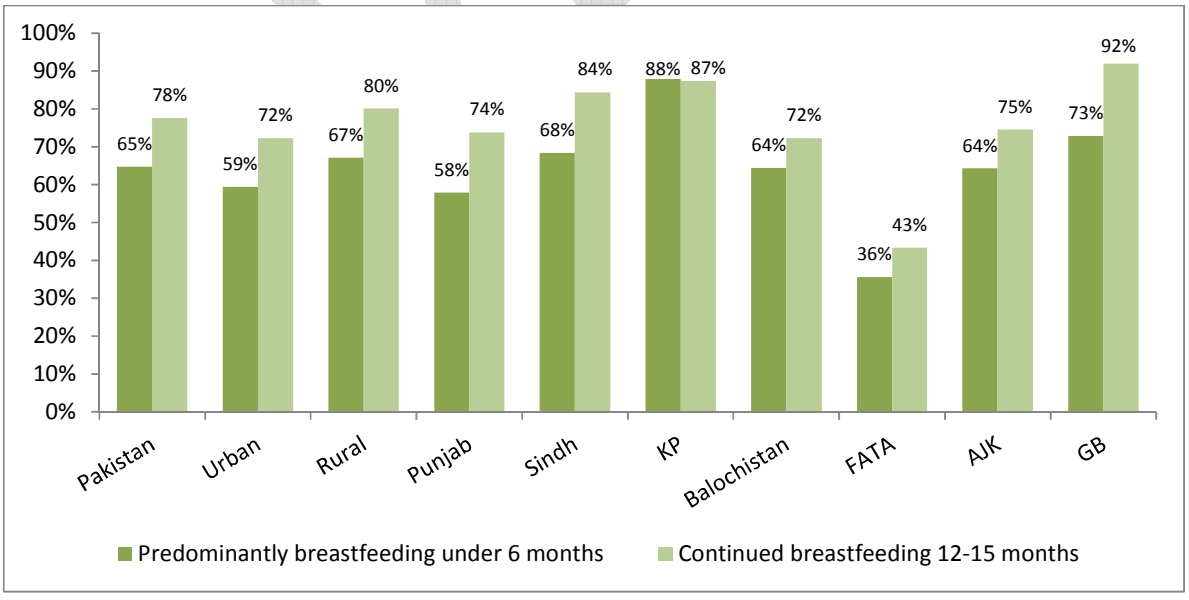
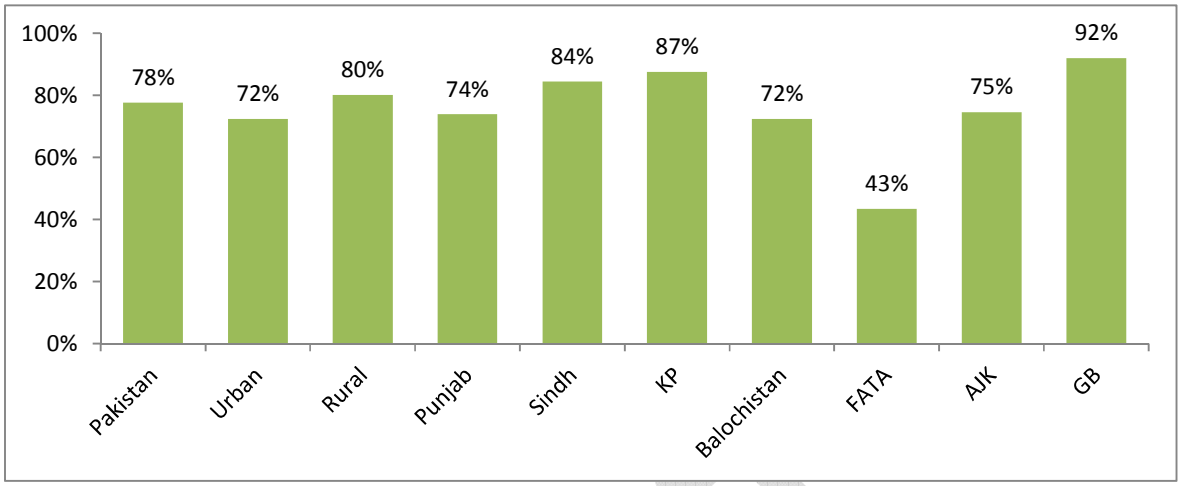


Fig 7.3: Continued breastfeeding 12-15 months



More than half (52%) of the mothers interviewed across Pakistan reported they had started giving semisolid foods to their children at 6–8 months. The proportion was higher (69%) in urban areas than in rural areas (45%). KP (36%) and AJK (36%) had lower trends than other provinces.

Similarly, qualitative research found that there was no variation found on the basis of cultural diversity across Pakistan linked to the introduction of complementary diets. However, the ingredients of complementary feeding varied on the basis of affordability. "We are poor and cannot afford special complementary diets for our children – we feed them what we cooked for ourselves" remarked the parents in the Southern Punjab and Upper Sindh. The age when a complementary diet was introduced varied from 4 to 6 months. The complementary foods used were porridge, eggs, bread, sago-dana, rice and milk dessert (kheer), buttermilk, bananas, tea, chapatti, potato curry, lentils, meat and broth, fish and vegetables.

Fig 7.4: Minimum dietary diversity (6-23 months)

Minimum dietary diversity is estimated as the proportion of children 6–23.9 months of age who received foods from 4 or more food groups. The NNS 2011 findings revealed that 3.6% of mothers provided dietary diversity for their children. Mothers in urban areas provided minimum

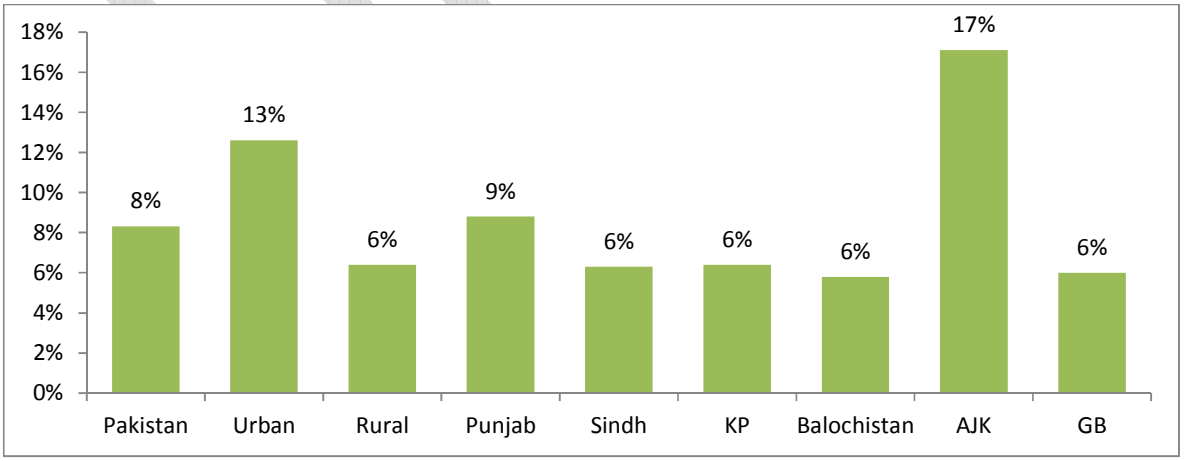
dietary diversity more often than mothers in rural areas (6.2% compared to 2.4%). FATA (15.4%) and AJK (8.9%) ranked highest in minimum dietary diversity amongst the provinces.

Fig 7.5: Minimum meal frequency (6-23 months)

Minimal meal frequency is estimated as the minimum number of times solid, semi-solid or soft foods (including milk for children who are not breastfed) are given to breastfed and non-breastfed children who are 6-23.9 months of age. "Minimum is defined as 2 times for breastfed infants 6-8.9 months, 3 times for breastfed children 9-23.9 months and 4 times for non-breastfed children 6-23.9 months.[4]"

Overall, 65.7% of mothers provided food to their children at an acceptable meal frequency. The minimum meal frequency practice was higher in urban areas (73.6%) than in rural areas (62.3%). About half of all mothers practiced minimal meal frequency in all provinces.

Fig 7.6: Minimum acceptable diet (6-23 months)

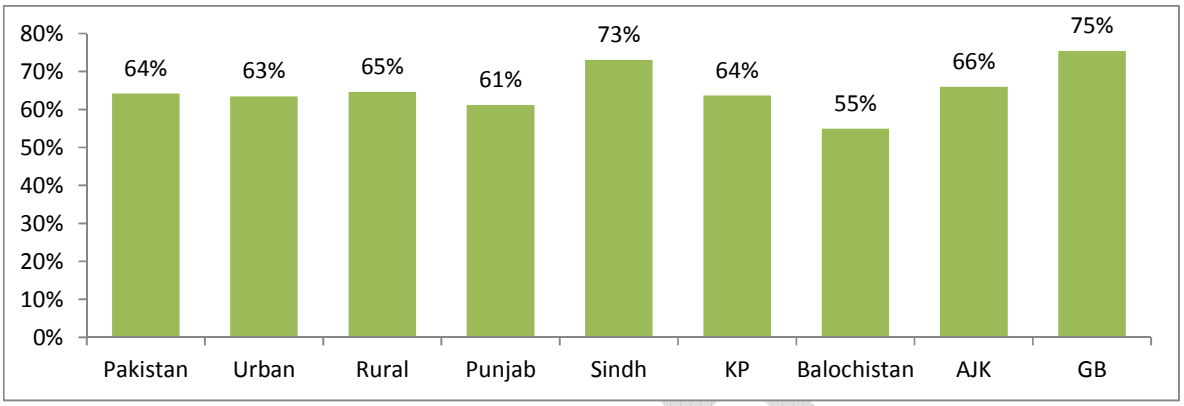


A minimum acceptable diet is a composite indicator of the adequacy of complementary feeding practices. It is the proportion of children 6–23 months of age who received a minimum

[4] Indicators for assessing infant and young child feeding practices: conclusions of a consensus meeting held 6–8 November 2007 in Washingtonm D.C., for acceptable diet of young child indicators

acceptable diet (apart from breast milk). Across Pakistan only 8% of children received minimum acceptable diets. Similar trends were observed in all provinces except AJK.

Fig 7.7: Age appropriate breastfeeding (0-23 months)



Age-appropriate breastfeeding was defined as the proportion of children 0–23 months of age who were appropriately breastfed. The proportion of age-appropriately breastfed children was 64.2% in Pakistan. Similar trends were recorded both in urban and rural areas. All provinces showed similar trends with the highest being in Gilgit Baltistan (75.4%).

Breastfeeding and complementary food duration (qualitative findings)

Duration of breastfeeding and complementary foods differed in diverse cultural settings. Most mothers continued to breastfeed for 1 to 2 years or until they conceived. Care providers confirmed that the duration for breastfeeding is less for girls and more for boys.

Chapter 8: Food Intake Practices

Information on dietary intake was obtained from two selected members of the interviewed households – a child 0–23 months of age and his/her mother. The dietary pattern and the nutrient intake of these two members was determined using food frequency for a given period of time in combination with a 24-hour recall of the previous day. The frequencies indicate a consumption pattern and use of selective food groups over a given period of time (number of days per week and number of times per day). The 24-hour recall provides an estimate of food intake during the previous 24 hours. The food composition table was used to estimate the quantity of nutrients consumed as per the information obtained from the 24-hour food consumption recall.

Section 1: Food consumption in children 0-23 months of age

The quantity of energy and nutrients consumed by children 0–23 months of age during the 24 hours are summarized in the next table.

Table 8.1: Breakdown of calories and nutrients consumed by children 0-23 months (24-hour food recall)

For last 24 hours	Pakistan	Residence		Province / Region							
		Urban	Rural	Punjab	Sindh	KP	Balochistan	FATA	AJK	GB	Recommended Dietary Allowance
Energy (K.cal)	560.3	700.2	491.6	522.5	560.7	656.7	807.9	601.7	727.8	422.6	1,200
Protein (gm)	18.0	21.1	16.4	18.1	15.6	21.2	22.6	19.4	21.6	12.2	13
Fats (gm)	25.2	30.7	22.5	26.0	22.0	24.2	32.2	22.3	31.2	15.8	30
Carbohydrate (gm)	55.5	68.6	49.1	48.2	60.1	67.2	86.1	74.1	82.1	54.8	100
Calcium (mg)	489.9	529.2	470.6	556.3	329.3	458.6	514.0	421.3	611.2	272.2	500
Phosphorus (mg)	376.8	419.5	355.8	394.1	276.3	513.2	426.7	461.0	487.5	246.0	460
Iron (mg)	3.6	4.4	3.2	3.1	3.7	6.0	5.3	5.3	4.0	3.2	11
Zn (mg)	1.5	1.8	1.4	1.5	1.5	1.7	2.1	1.6	1.6	1.1	3
Vit.C (mg)	19.7	34.3	12.5	10.3	34.6	16.8	54.4	6.7	37.1	23.8	15

8.1.1: Comparison of nutrient intake with the recommended dietary allowance (RDA)

Data revealed that children were only consuming around half of the recommended daily energy requirement. The consumption of protein was more than the RDA, while the consumption of carbohydrates and fats was much lower than the RDA. When micronutrients were compared with the RDA, consumption of all micronutrients was clearly less than the required allowance. Additionally, the consumption of zinc was lower than the RDA while that of Vitamin C was higher.

8.1.2: Consumption of food groups

The dietary data of children 0-23 months was further analysed for consumption of various food groups. The average amount of wheat consumed per day by children of this age group was 18.9 gm (19.0 gm in urban areas and 18.9 gm in rural areas). The use of wheat was found to be low in KP and Gilgit Baltistan. The average consumption of rice was 13.8 grams across Pakistan (15.4 grams in urban areas and 13.0 grams in rural areas). Punjab and Sindh had the lowest consumption of rice in this age group. Consumption of pulses was 23.9 grams (36.3 grams in urban areas and 17.8 grams in rural areas). Gilgit Baltistan had the lowest consumption of pulses.

Egg consumption was found to be 2.9 grams – 4.8 grams in urban areas and 2.0 grams in rural areas. The average consumption of meat in this age group was 3.1 grams per da – 3.8 grams in urban areas and 2.8 grams in rural areas. Surprisingly, FATA had the highest meat consumption levels (28.6 grams). The average intake of vegetables was 8.3 grams/day. Balochistan had the highest and AJK the lowest intake of vegetables. The average fruit consumption was 10.6 grams/day – 14.4 grams in urban areas and 8.7 grams in rural areas. FATA had the highest consumption level of fruits.

Levels of consumption of milk and tea were also analysed. It was determined that the population of Pakistan is consuming adequate amounts of milk. Average consumption of milk in 0–23 month old children was 244 ml/day, 249.2 ml in urban areas and 241.9 in rural areas. The maximum consumption of milk was in Punjab while the minimum was in Gilgit Baltistan.

Unfortunately, along with the consumption of adequate milk, children also had a significant intake of tea. Tea contains an anti-nutrient that binds to minerals, especially iron, and poses a risk of anaemia if ingested in large quantities. It also has its own implication especially in iron absorption. These children were consuming 31.4 ml of tea per day. Similar trends were observed in urban and rural areas.

Section 2: Food consumption in mothers

The amount of calories and other nutrients consumed by mothers has been summarized in the table below.

Table 8.2: Breakdown of calories and nutrients in mothers (24 hour food recall)

For last 24 hours	Pakistan	Residence		Province / Region							
		Urban	Rural	Punjab	Sindh	KP	Balochistan	FATA	AJK	GB	Recommended Dietary Allowance
Energy (K.Cal)	1,479.4	1,536.7	1,455	1,410.8	1,347.1	1,814.5	1,446.3	1,618.5	1,597.8	1,621.3	2,100
Protein (gm)	48.6	50.9	47.6	47.5	44.0	56.8	48.7	53.5	50.8	54.7	50
Fats (gm)	30.8	35.8	28.7	28.4	22.9	51.7	19.2	34.7	28.8	26.6	30
Carbohydrate (gm)	262.9	262.6	263.0	251.1	250.0	298.2	282.1	284.6	292.6	301.9	130
Calcium (mg)	455.8	457.8	455.0	494.3	403.5	433.9	434.9	470.4	437.2	519.3	1,000
Phosphorus (mg)	842.4	895.1	819.5	797.8	744.8	1,095.0	748.0	957.9	926.1	796.7	1,000
Iron (mg)	23.4	22.7	23.6	22.9	20.5	27.8	25.0	24.9	24.6	27.1	18
Zn (mg)	8.2	7.8	8.4	8.0	7.1	10.0	9.0	9.1	8.1	9.9	10
Vit.C (mg)	21.4	23.8	20.4	24.1	18.6	18.9	25.5	14.9	20.4	17.0	75

8.2.1: Comparison of nutrient intake with the RDA

The data revealed that mothers were consuming fewer calories than the RDA. Calcium intake was lower while iron intake was higher. Women were consuming less vitamin C and zinc compared to the recommendations.

8.2.2: Consumption of food groups - mothers

Mothers' dietary data was analysed for various food groups. The analysis revealed that their average wheat consumption per day was 298.2 gm – 279.6 gm in urban areas and 306 gm in rural areas. Consumption of wheat was found to be low in Sindh. The average consumption of rice was 259.9 grams. Pulses consumption was 138.3 grams – 146.3 grams in urban areas and 134.1 grams in rural areas. Gilgit Baltistan had the lowest consumption of pulses.

Egg consumption was found to be 45.7 grams and was similar in all provinces except Gilgit Baltistan. The average consumption of meat was 134.7 grams/day. Gilgit Baltistan had the lowest consumption of meat compared to other provinces.

The average consumption of tubers and roots was found to be 176.8 gm/day, 182.1 gm in urban areas and 175.2 gm in rural areas. KP had the maximum consumption of tubers and roots. The average consumption of vegetables was 198.3 grams/day. Fruit intake was at 227.6 grams/day.

The average consumption of milk by mothers was 262.3 ml/day – 214.7 ml in urban areas and 281.3 in rural areas. Tea intake per day was 164.9 ml/day – 171.3 in urban areas and 162.2 in rural areas.

Section 3: Qualitative findings on food intake, practices and buying behaviour

8.3.1: Common perception and physiological effects of 'hot' and 'cold' foods

The general perception across Pakistan regarding food is that it is either hot or cold. 'Hot' and 'Cold' refer, in the literal sense, to consuming food-containing properties that affect the body's digestive system. Hot food is generally perceived to cause gastric problems that can be passed onto the children directly or through pregnant and lactating women. Cold food is generally perceived to cause or aggravate a common cold during the winter season. Some common perceptions are that eggplant, bitter gourd and meat have a 'hot' effect.

'Cold food' includes vegetables, raw mango, rice and lentils in lower Sindh; zucchini, okra and pumpkin in Upper Sindh; spinach, carrot and cucumber in Balochistan; pumpkin, lentils and dairy products in Southern Punjab and apricot extract in Gilgit Baltistan.

'Hot food' includes seafood in lower and upper Sindh; meat in upper Sindh as well as northern and southern Punjab and Gilgit Baltistan; okra in Southern Punjab and AJK; clarified butter and eggs in Gilgit Baltistan; lentils in Gilgit Baltistan and AJK; and soup, spinach and spices in AJK.

8.3.2: Healthcare providers' viewpoints on food intake

The paediatricians and gynaecologists interviewed stated that the dietary intake of mother and child and poverty had a direct impact on mental and physical health. Other contributing factors were non-affordability of food, intra-family disputes and physical violence. A gynaecologist in AJK said that, "All issues pervading in Pakistani society are directly affecting women and children. The most severe are domestic violence, inter-spouse conflict, unemployed youths and food insecurity". Other care providers stated that the following other factors contributed to imbalanced diets and malnutrition: preference of male over female members within households starting from birth; husbands' drug and alcohol addictions; and fertility problems – leading to psychiatric illnesses.

8.3.3: Purchasing practices

Regardless of cultural and ethnic background, participants of focus group discussions and in-depth interviews across the country unanimously said eating out is either infrequent or an almost non-existent practice for them. Home cooked meals were preferred in community segments because (i) they cost less and (ii) they are fresh compared to pre-packaged or imported food. Responses from Karachi included comments such as, "We prefer to eat at home

and buy local foods". However a few participants from Karachi, AJK, Hub and Jhelum said, "Sometimes we purchase packed foreign foods".

Monthly grocery expenses by area were as follows: PKR 3,000 to 12,000 in Gilgit Baltistan; PKR 2,000 to 5,000 in Lower Sindh and AJK; PKR 1,800 to 5,000 in Balochistan; PKR 1,000 to 5,000 in Southern Punjab; and PKR 1,000 to 7,000 in Upper Sindh, Northern Punjab, KP and Central Punjab. The purchasing of foodstuffs varied greatly among the regions from daily, weekly, monthly or on a fortnightly basis especially for vegetables and even for food needed to be cooked daily.

The frequency of purchasing groceries depended firstly on the availability of a refrigerator. Secondly, it depended on the preference for fresh food rather than stored food. Most of the participants of the FGDs said, "Day by day it is becoming difficult to meet our daily basic needs – we cannot eat until we are full". Again in Upper Sindh and Southern Punjab some participants said, "Sometimes we have to prioritize children in getting food because of the shortage – so elders make the sacrifice". The female and male participants stated it is generally men who are mainly responsible for food purchase and expenditure.

8.3.4: Intra household food distribution

Results revealed contradictory statements between communities across the country and health care providers working in the regions, including Lady Health Workers and medical practitioners. Community statements were that there was equality in distribution of food in proportions and quantity. If someone took more food, this was on the basis of need rather than any discriminatory reason.

Women participants of focus group discussions (FGDs) gave a different scenario. They said traditional and cultural norms in society played a role in food distribution. Women insisted on serving men first because they (the men) worked outside, do more manual labour and spend long hours earning a living for their family. In AJK and Karachi some participants said that young girls are given priority in food distribution in families because they are regarded as future mothers who require extra nutrients. Participants stated "now the girls are more clever and do not allow their brothers to eat more than them". In cases of food shortage, they said children were prioritized.

The care providers were not in agreement with the opinions of focus group discussion participants. They unanimously said females are still neglected in their households and that males are given preference over them. This was the main reason why females frequently suffer from nutrient deficiencies and illnesses such as anaemia. All women who went for treatment complained of general physical weakness, for which they were commonly treated with iron, folic acid and vitamin supplements. The girls were either not given a proper diet or themselves did not eat well because they were busy tending to children, doing household chores or contributing in some way to meet the financial needs of the family.

8.3.5: Differences in dietary Intake between girls and adult women

According to the medical practitioners interviewed during the survey, younger women all over the country – including those living in rural areas – were consuming unhealthy fast food such as chips. The majority of the participants across the country said, “Eating by choice almost does not exist. There have been many weeks that we have not eaten meat. We just think that we should eat something to survive and it does not matter if it is some vegetables or lentils.” In AJK all LHWs and male decision makers were of the view that, “Some families even cannot afford vegetables and lentils and pass their days on potatoes only”. The same was found in Upper Sindh and Southern Punjab. Thus food insecurity among the families across Pakistan leaves no choice on the desired dietary intake.

8.3.6: Food safety – thawing and food storage

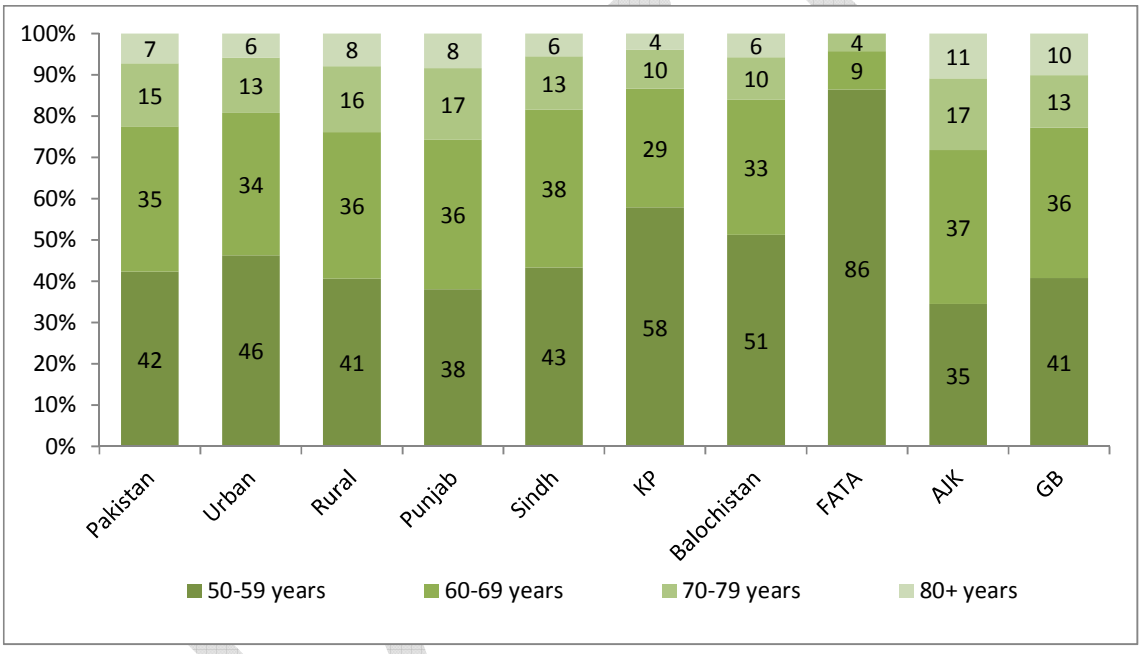
Cooked food is rarely stored in the low-income communities, because they have large families with several children and most of them do not have a refrigerator. Some working middle class women stated, “if we cook for more than one meal at time, which is more convenient, we immerse the utensils containing the food in water to keep it cool since we do not have refrigerators. For those who can afford enough food and have refrigerators, the majority store cooked food and leftovers in them. As to thawing meat, the majority of those in the low-income group immersed the meat in water. Participants also stated that, “The frequent and long electricity breakdown we are currently facing is affecting food storage”.

Chapter 9: Elderly Persons Health and Nutritional Status

Studies suggest that people's perceptions of their own health generally give a good indication of their mental and physical condition and are predictors of mortality for those who are 50 years of age and above. There are a number of factors that are known to have an impact on the general health of the population. These factors can contribute to an increased risk of diseases such as cardiovascular disease and cancer. Some of the contributing factors include cigarette smoking; excessive alcohol, excessive fat consumption; high blood pressure, high cholesterol levels, limited exercise and being overweight.

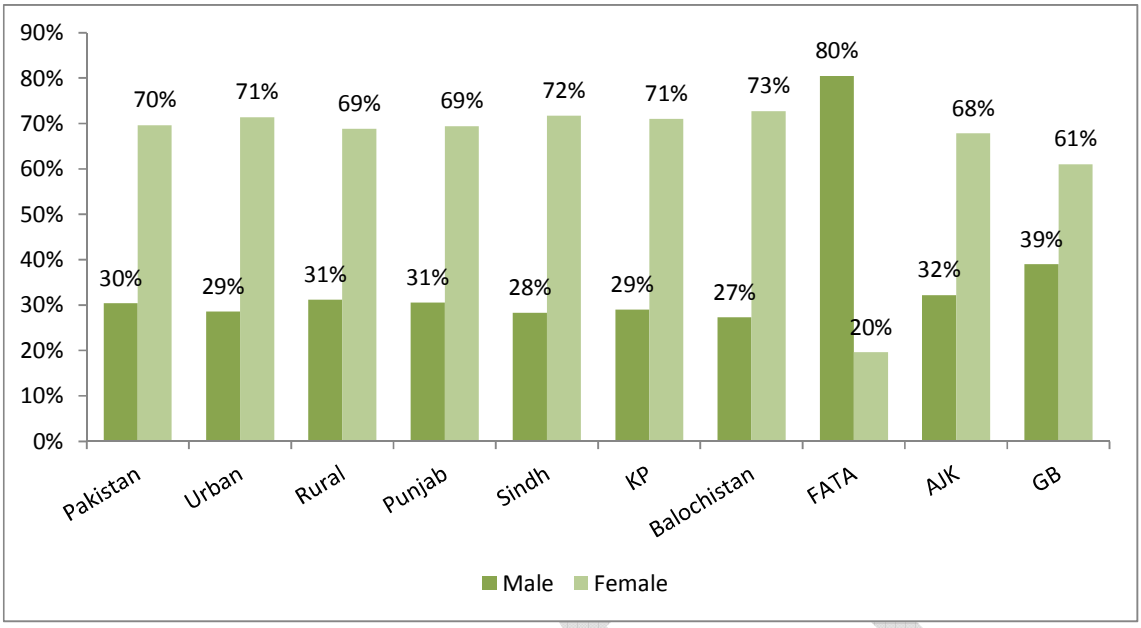
In the NNS 2011, elderly persons were interviewed to determine their health and nutritional status. In all, 7,612 elderly persons were interviewed at their residences.

Fig 9.1: Age distribution of elderly persons



There were 30.4% male and 69.7% female respondents in this sample because mostly women were at their homes during the day. Approximately 42.4% of the elderly population belonged to the age group between 50–59 years (46.3% urban and 40.6% rural). In FATA, 86.4% of elderly persons belonged to this age group.

Figure 9.2: Gender distribution of elderly persons interviewed

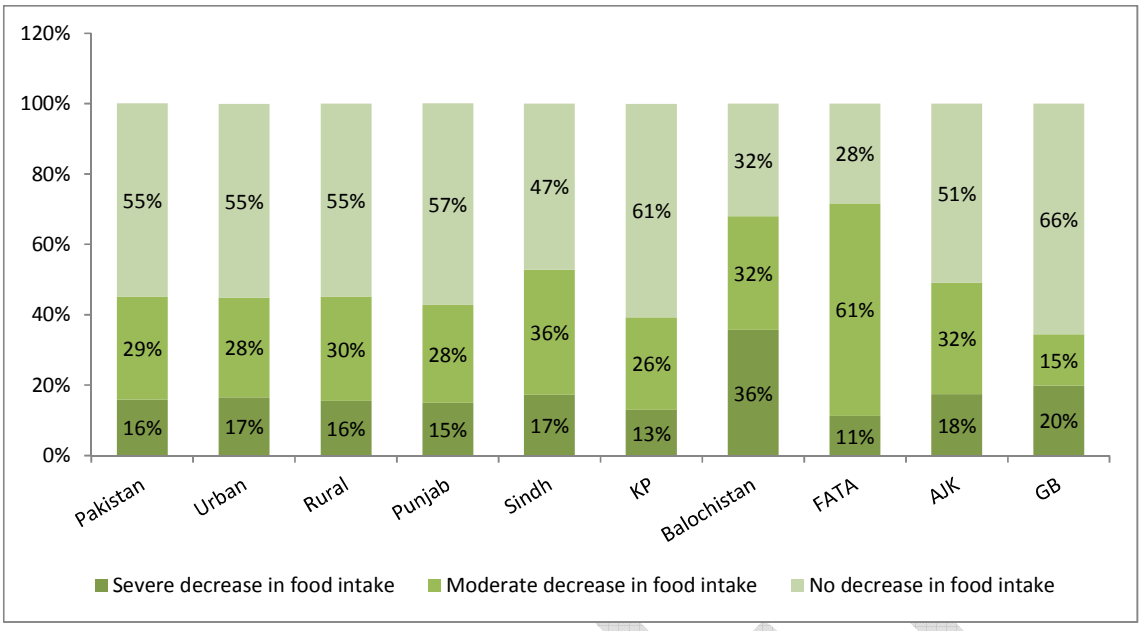


Elderly persons were found suffering from chronic illnesses. 50% of the elderly population was suffering from arthritis followed by hypertension (39.4%), heart disease (19.4%), diabetes (14%) and urinary complaints (10.2%). In AJK alone, 64.6% of the elderly population suffered from arthritis.

Body Mass Index: The results showed that 46.1% of elderly persons were maintaining normal weight while 15.8% underweight, 24.2% were overweight and 12.9% were obese. In FATA, 33.3% of the population of elderly persons was overweight.

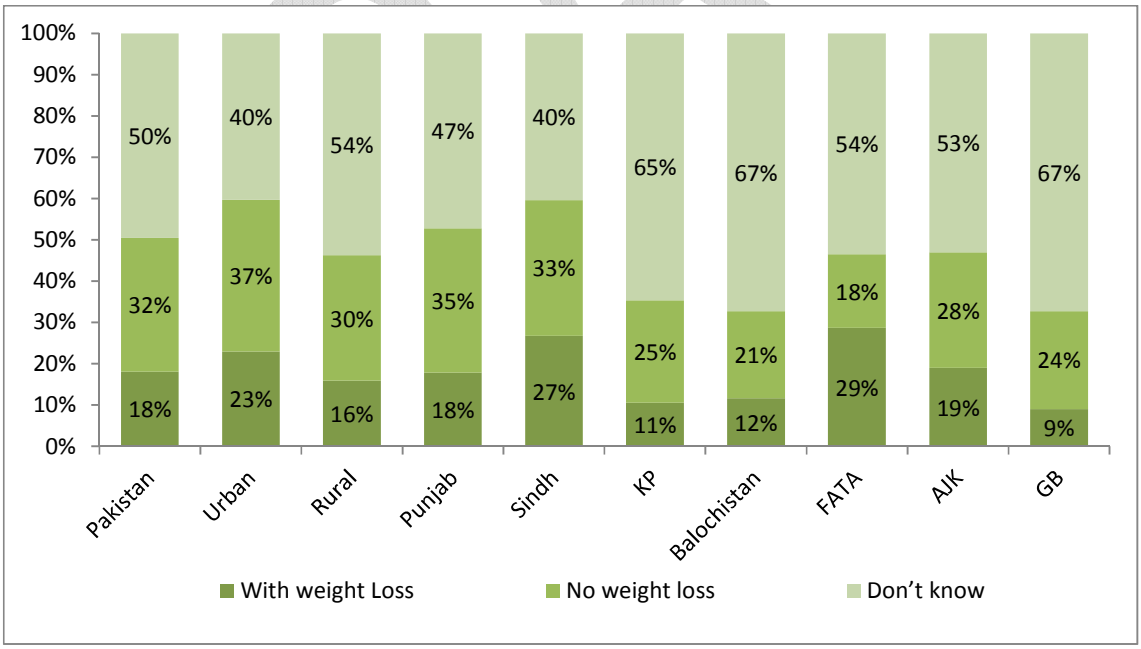
In the context of loss of appetite, there are primarily three levels: severe, moderate and normal. Overall, 29.2% of the elders reported moderate decrease of appetite and 15.9% reported severe decrease in appetite. Moderate loss of appetite was highest in Sindh (35.6%) while it was lowest in Gilgit Baltistan (14.5%). However, severe loss of appetite was highest in Gilgit Baltistan (19.9%).

Fig 9.3: Loss of appetite in elderly person



Nationwide, 49.5% of elderly persons were unaware of any weight loss in the past three months. A further 32.4% of elders confirmed that they did not lose weight. However, 10% mentioned a 1–3 kg weight loss during last three months.

Fig 9.4: Weight loss in elderly persons (by recall)



Mobility plays an integral role in maintaining good health status. In Pakistan 85.5% of elderly persons went out for minor work and 11% were only able to get out of bed or off their chairs but did not go out of their homes. Only 3.6% elders were bed ridden or had severe restriction of movement due to chronic illness.

Chapter 10: What Next

Implications for interventions and research

The key finding from the NNS 2011 is that very little has changed over the last decade in terms of core maternal and childhood nutrition indicators. The survey does point towards gains in iodine status nationally following the implementation of a universal salt iodization and promotion strategy. However, this is counterbalanced by substantial deterioration in vitamin A status and little to no gains in other areas of micronutrient deficiencies. These are reflective of an insufficient response to the nutrition situation in Pakistan and the lack of coordination in developing and implementing of a coherent nutrition strategy. A draft nutrition strategy was developed in 2003–2004 and was approved by the planning commission. However, its final approval and implementation never took place. Additionally the efforts of the bilateral agencies and the World Bank have not translated into a tangible response. Although the floods of 2010 and 2011 once again highlighted the seriousness of under nutrition in Pakistan, the response was largely reactive with little movement towards a national strategy for addressing under nutrition.

Despite the fact that these aspects of the poor nutritional status of women and children of Pakistan have been known for a long time, and have been the subject of multiple surveys, there is little public awareness at a national level of the importance and impact of nutrition in the social and economic development of society. Several successive governments have failed to recognize the level of importance nutrition has in the health and development of the population. Nutrition has thus remained unrecognized in current social safety nets and income support programs. Given the agrarian nature of the national economy, there has been consistent denial of household food insecurity. This is especially true in the case of girls and women in Pakistan and few effective interventions target them.

There is a widespread perception that malnutrition is closely related to poverty. While the relationship cannot be denied, it is complex and the poverty-nutrition interaction in Pakistan is strongly influenced by the degree and form of female subjugation, which affects the girl child and women alike.

It must also be recognized that nutrition is more than food and poverty is more than mere income or assets. The few nutrition related interventions in Pakistan that have been undertaken over the last fifty years have largely followed the pattern of vertical programs and are largely supported through external aid and grants. These include vitamin A supplementation, wheat flour fortification and promotion of iodized salt use. A huge amount of resources have been invested in therapeutic feeding of malnourished children in the wake of the floods but relatively less in preventive and promotion strategies. Although there have been breastfeeding promotion and support programs at both community and facility level, (through the LHW program and the Baby Friendly Hospital initiative), the comparable rolling out of complementary feeding promotion and education strategies or the provision of fortified nutritious weaning foods has

been lacking. Not surprisingly, the net impact of all such interventions has been negligible in terms of either nutrition awareness or improvement. In addition to planning nutritional interventions, the creation of a demand at a population level for adequate nutrition is pivotal for the success of any initiative. Neither widespread malnutrition nor poor dietary practices amongst Pakistani women and children have been subjects of national awareness or public education campaigns. In addition to well-designed interventions, Pakistan needs a mass campaign for public awareness on the importance and impact of malnutrition on the nation's health.

There is thus an overwhelming argument for making an investment in adequate nutrition for the families and children of Pakistan, as a means for economic revival and boosting national morale. Although Pakistan has had several national nutrition surveys in the past, none have resulted in a national intervention program aimed at addressing the root causes and effects of malnutrition. To illustrate this, although a food aid initiative has been in place for several years under the management of the World Food Program and Pakistan Bait-ul-Maal, its impact and effectiveness in reaching the most needy has been limited. For any nutrition intervention to succeed, it is imperative that it be part of a community-based intervention targeting some of the underlying determinants of malnutrition such as household food security, culturally acceptable food choices, as well as communal decision making for promotion of health and nutrition. These interventions must be firmly grounded in the principles of equity, community participation and ownership, while retaining scientific validity.

The alarming findings from the NNS 2011 – indicating vast inequities in indicators – suggest the urgent need for action and the implementation of a range of interventions for women and children. These include the review of existing programs for quality, such as the vitamin A supplementation program, micronutrient fortification strategies and interventions to address food insecurity. Some pilot projects are underway and additional strategies need to be identified that may help soil zinc repletion interventions with national staples.

As the NNS 2011 indicates, stunting, wasting and micronutrient malnutrition is endemic in Pakistan, and reflects a combination of dietary deficiency; poor maternal and child health and nutrition; a high burden of morbidity; and low micronutrient content of the soil, especially for iodine and zinc. Most of these micronutrients have profound effects on immunity, growth and mental development, and may underlie the high burden of morbidity and mortality among women and children in Pakistan.

So what can be done? Nutrition is an area that necessitates a multi-sectoral approach for interventions. Some of the activities that could help address the issues are within the domain of the health sector while others merit broad sustained support and collaboration of other sectors and partners. For coherence, the foundation of the nutrition strategic plan has been laid down under the overall framework of the Pakistan Poverty Reduction Strategy (PRSP). This document defines the roles and activities that the production and social sectors must assume in order to attain the overall objective of socio economic improvement, including a better quality of life.

The strategic territories where multi-sectoral support and coordination is imminently required are institutionalization of nutrition; food safety and regulatory mechanisms; food fortification; and social change communication. The interventions that fall within the umbrella of the health sector are in the areas of maternal, infant, child, adolescent, adult and elderly persons' nutrition. Collaboration between all partners is essentially required for improving the nutritional status of the target population with synergy. Given the devolution of health to the provinces, it will become even more imperative to develop a concerted and coherent national policy. The need for a central coordination and oversight mechanism to support provinces, especially those with limited capacity is imperative given the wide disparities highlighted by the NNS 2011. Among the various functions, this unit could also be required to form linkages that create social safety nets, address agricultural and food safety, and enforce food industry regulation.

Effective "social change communication" is a vital component of most successful programs and products created to reach and change behaviours in the society at large. Innovative and effective communication strategies can target misconceptions and educate the population about nutrition interventions and practices while still being sensitive to cultural ideas and practices. The integration of child nutrition with child survival becomes imperative. Similarly, given the high rates of maternal and child morbidity and mortality in Pakistan, nutrition interventions should be closely integrated with strategies for maternal, newborn and child health. The role of addressing some of the basic determinants of maternal and child under nutrition in Pakistan cannot be stressed enough. These include addressing issues of maternal education, empowerment and basic rights. It can be argued that some of the maximum gains for maternal education can be achieved by reducing high fertility rates, addressing inappropriate child spacing, and delaying the age of marriage (avoiding early marriages).

We would also like to underscore emerging areas of focus that have hitherto been ignored. One of these is the role of adolescent health and nutrition. As defined by WHO the age group ranging from 10-19 years is considered adolescent and is estimated at about 19% of the total population. Adolescent nutrition has so far been neglected in Pakistan and needs greater attention in the years to come. The NNS 2011 also provides illustrative data on the increasing need to address nutrition issues of the elderly. And, although not yet evident in the under 5 population, there are intriguing indicators in the NNS 2011 suggesting that Pakistan may be witnessing the double burden of under nutrition and obesity within rural and urban women of reproductive age.

Adult nutrition is marred by a complex interplay factors such as industrialization, urbanization, sedentary life styles, imbalanced diets and shifting socio-cultural norms. These give way to diseases such as hypertension, strokes, coronary heart disease, diabetes and cancers, among others. They tip the nutritional balance in many ways and require a multifaceted approach for interventions ranging from surveillance, research, and social change communication to simply healthy eating habits. The growing group of people over fifty years of age faces nutritional depletions and associated problems that are related to the changing and slowing metabolism of the body and inadequate replenishment of these nutrients. These changes bring along a spectrum of health problems including hypertension; strokes; coronary artery disease; sarcopenia (loss of muscle mass); glucose intolerance and other metabolic disorders;

osteoporosis and bone fractures; and cancers, among others. Efforts should be geared to assimilate and disseminate information on old age health issues and nutrition. Emphasis should also be placed on focusing on this emerging priority area for provision of rehabilitative and consultative services for needy elderly persons.

It is beyond the scope of this report to suggest remedies and discuss nutrition related interventions and strategies in depth. It is envisaged that this NNS 2011 report will provide the basis for further discussion at federal and provincial level for concerted action and strategy development. Pakistan urgently needs a nutrition policy and strategy for a coordinated, interlinked and multi-pronged approach for future endeavours to address malnutrition.

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Annex

Detailed NNS Tables