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Pakistan National Nutrition Survey, 2011

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National Nutrition Survey

Pakistan

2011

Aga Khan University, Pakistan

Pakistan Medical Research Council (PMRC)

Nutrition Wing, Cabinet Division, Government of Pakistan

Supported by UNICEF Pakistan

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Chapter 1: INTRODUCTION

1.1 PAKISTAN – An Introduction

The nation of Pakistan is 63 years old and the population has surged from a 34 million in 1947 in the western wing to an estimated population exceeding 180 in 2011 **(1)**. Maternal and Child health and survival remain major challenges. Pakistan is a signatory to the Millennium declaration and a declared intent to reduce maternal and child mortality.

In addition to smoldering decades old conflict in neighboring Afghanistan, a debilitating insurgency in the North and growing militancy in Southern Punjab and Balochistan, Pakistan has faced a spate of recent disasters. The earthquake in 2005 left over 75,000 dead with massive infrastructure damage **(2)** and the recent unprecedented floods in 2010 also affected close to 20 million people, displacing almost 8 million in its wake **(3)**. The unprecedented torrential rains in Sindh broke the last 60 years record and left 3 million people homeless and 2 million with food starvation affected the country thus faces the triple challenge of political fragility, complex security issues and natural disasters. The security situation in large parts of the country is fragile affecting the policy environment and distribution of key primary care programs. The relatively recent economic downturn has also affected overall purchasing power and household level food security. Other than the limited population based surveys undertaken following the recent floods in 2010, little systematic information is available on trends of maternal and childhood nutrition status over the last decade. Given the critically important contribution of social determinants especially nutrition, to health and development outcomes, this is a key policy relevant information gap.

1.2 Malnutrition among Women and Children in Pakistan – Background

Directly or indirectly the concurrent vicious life cycle of malnutrition contributes to almost 35% of all under-5 deaths in the country consequently affecting the future health and socio-economic development and productive potential of the society. Over the past 20 years there has been little change in the prevalence of malnutrition in the population despite more food availability and an overall increase in caloric intake per capita. This may be related to the cross sectorial and complex nature of malnutrition which also include issues related to poverty and those that impact intra-household food security and contemporary socio-cultural factors determining dietary patterns in pregnancy and early childhood.

Although the problem of malnutrition has been never good throughout the history but the current situation is alarming because we did not make any significant progress in reducing malnutrition since many years. In Sindh alone, while the emergency standard is 15 percent the southern part of Sindh has reached 21 – 23 percent – the worst condition of malnutri-

tion in the world over the years. The purchasing power of people is decreasing day by day. In Pakistan, large family size forced to expense 46 percent of the family income on food while food expenditures in India are 35 percent and the US 7 percent (Times Magazine March 2011, What We Spend in a Month by Stephen Gandel).

1.3 Review of Literature – Background and Magnitude of the Problem

Under-nutrition is one of the modifiable threats to global health and child survival especially in poor and under developed settings due to its interaction with infections. There are certain solutions available but they require political will, economic advancement and research to attain the results (6). Under-nutrition is a recognized health problem in Pakistan and plays a substantial role in the country's elevated child morbidity and mortality.

Global estimates suggest that there are more than 150 million malnourished children under the age of 5 years. It is also well recognized that close to 35 percent of the estimated 9.2 million deaths among children under-five is associated with under nutrition (7). Studies suggest that malnutrition exerts a multiplicative effect on the risk of mortality from infectious diseases (8). Like other major health issues malnutrition is widely prevalent in South Asian Region where half of the world's malnourished children are to be found in just 3 countries Bangladesh, India and Pakistan. South Asia is the worst affected region and presents 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 (9).

The prevalence of underweight is very high in South Asian Region and between a quarter to a third of all newborns are born low birth weight and over half of women of reproductive age weigh less than 45 kg (10). It is recognized that malnourished women have a significant higher risk of giving birth to low birth weight infants. Moreover low birth weight infants are at a higher risk of morbidity and mortality in the neonatal period or later infancy (11). Furthermore LBW infants who survive are often poorly breast-fed and weaned, resulting in stunted, malnourished children and when grown up are less productive in society, thus adding to poverty and unemployment in the country. Not only this, LBW female infants develop into malnourished mothers who in turn produce LBW babies in a vicious cycle.

Stunting is used as a reliable indicator of growth retardation in developing countries. The stunting rates in Pakistan have fallen from 47 percent in 1980 to 33percent in 2000 (12). Despite a reduction in overall prevalence, child malnutrition remains a major public health problem in developing countries, where a third of all children under five are stunted; 70 percent of them live in South Asia (13, 14). Factors associated with reduction in childhood stunting include availability of high-energy nutrients, female literacy and rise in gross national product (15). It can be stated that these very factors or lack of interventions are the reason of widespread malnutrition affecting children as well as young girls and women (16).

In comparison with other neighboring countries of South Asia (except Sri Lanka), the maternal and child health and nutrition situation Pakistan is a cause of much concern (17). Although the prevalence of stunting in Pakistan declined from 67 percent in 1977 to an estimated 40-50 percent by then end of the 1990s (18), subsequent progress has been very slow. According to the national health survey (1990-94), the prevalence of stunting among the urban middle to lower economic groups was approximately 30-36 percent and as high as 35-45 percent in the same economic group in the rural areas (19). The national survey categorized economic status on the basis of material possessions and facilities owned by the household but with different criteria for urban and rural households. Pakistan's urban-rural difference may partially be explained by the relatively higher level of education among the urban population as well as their facilitated access to basic health services (20).

Available evidence for under nutrition signifies that growth faltering in majority of such children begins at around four to six months of age, this is the time when an infant starts receiving complementary foods in addition to breast milk (21). This divergence from normal growth is actually a combination of poor nutrition and intra-uterine growth restriction (22), further aggravated by the burden of morbidity especially diarrheal diseases (23). Poor quality and quantity of complementary foods, as well as inadequate caring practices are the key determinants for this early phase of childhood growth retardation (24), which has long-term consequences in determining the late onset of the childhood growth spurt and subsequent retardation (25). The process of growth faltering is essentially a series of events throughout childhood. The child suffers from repeated illnesses, inadequate appetite, deficient food and poor standard care. Many such children face premature mortality before their first birthday and those who do survive carry long-term consequences such as weak stature and challenged mental capacity (26).

1.4 Need for Nutrition Survey

Nutrition surveys are useful tools that provide estimate of the severity and geographical extent of the problem and possibly the groups most affected or at risk. The surveys also assess the likely evolution and impact of the problem on health and nutritional status, taking into account secondary information, including food security and food distributions. They also identify the need for nutrition interventions and the most effective measures to prevent or minimize the problem. Through such surveys the governments can determine the need to establish or expand existing surveillance, so that the effectiveness of measures taken can be monitored overtime. To assess the magnitude of the problem we also need to understand the population size and, if possible, the demographic characteristics of the population and distribution of cases therein.

To understand the reasons for the problem of under nutrition and to plan and implement appropriate interventions and programs, the usual situation for that population, the evolu-

tion of the changes, and the context in which the situation has arisen each needs to be considered. There are many sources of information that are relevant in understanding the context and potential responses that may be appropriate and effective. The effects of these factors on livelihoods and the ability of the affected population to cope at a household level are frequently assessed using food security surveys. Additionally formal nutrition surveys remain the best way to estimate accurately prevalence of malnutrition. Records of cases of malnutrition at health centers or during screening cannot be considered sufficiently representative of the population. They do, however, provide an indication of trends in the number of cases of malnutrition and opportunities for action.

The last National Nutrition Survey was conducted in 2001-02, almost 15 years after the 1985-1987 National Nutrition Survey. After another lapse of almost a decade, the current survey was undertaken with specific aims of:

- ⇒ Establishing the current benchmark of nutrition and related indicators for gauging progress along the targets set for the Millennium Development Goals (MDG);
- ⇒ Establishing a benchmark for missing data/indicators, especially as the recent DHS survey (2007) did not include anthropometric indicators.
- ⇒ To prioritize the programs/initiatives at the national and provincial level and refining planning and implementation of initiatives on the basis of identified priorities.

Chapter 2: SURVEY DESIGN AND METHODS

2.1 Objectives

The specific objectives of the NNS 2011 included the following targets

- ⇒ To assess the population nutritional status; especially of women and children
- ⇒ To collect data on height, weight and age of children, 6 – 59 months, mothers of these children, adolescent girls, adults and elderly.
- ⇒ To collect blood samples for the assessment of micronutrient status of children mainly iron Vitamin A, Zinc, Vitamin D, calcium, and iron status of mothers
- ⇒ To collect urine samples for the assessment of iodine status of women of reproductive ages and children
- ⇒ To assess infant and young child feeding and care practices, including exclusive breastfeeding and complementary feeding rate
- ⇒ To collect data on food intake and food security
- ⇒ To collect data on demographic, socio economic and cultural variables (Income, education, etc.)

2.2 Indicators for National Nutrition Survey

2.2.1 Anthropometric Indicators

- ⇒ Stunting rates
- ⇒ Wasting Rates

2.2.2 Clinical Indicators

- ⇒ Clinical prevalence of Anemia (Physical examination)
- ⇒ Prevalence of Visible Goiter (Physical examination)
- ⇒ Prevalence of worm infestation (History based)
- ⇒ Co morbidities (Diarrhea, ARI and Pneumonia)
- ⇒ Immunization status (history + Immunization cards)
- ⇒ Micronutrient supplementation status

2.2.3 Core Biochemical Indicators

- ⇒ IDA among MWRA and WRA and children under five years
- ⇒ Serum Vitamin A, D, Zinc and Calcium concentrations among mothers and children under five years of age
- ⇒ Urinary Iodine deficiency among MWRA, WRA and children 6 to 12 years
- ⇒ Alpha-1 Glycoprotein levels (acute phase reactant)

2.3 Survey Design

A Cross-Sectional Survey Design was chosen to collect data to make inferences of a given population at one point in time. Cross-sectional surveys provide a snapshot of the prevalence and attributes of problems or normalcy in specific target population. A cross-sectional survey is a descriptive survey in which disease and exposure status is measured simultaneously along with to elucidate the information regarding households, physical examination, and anthropometry and biochemical indicators (27).

2.3.1 Universe

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

2.3.2 Sampling Frame

A. Urban Areas

Federal Bureau of Statistics has developed its own sampling frame for all urban areas of the country. This frame is an area frame wherein each city/town has been divided into a number of small compact areas called Enumeration Blocks (EBs). Each enumeration block consists of about 200 to 250 households with well-defined boundaries recorded on the prescribed forms and maps thereof with physical features.

There are important land marks indicated on the sketch map of the boundary of each block. Each enumeration block has also been classified into low, middle and high income groups keeping in view the majority of the households located in the enumeration block belonging to a particular income class. This information is useful to formulate sub-stratification. This sampling frame now comprises all urban areas of the Baluchistan except military restricted areas. There is a continuous process of updating in case of emerging newly built in apartments /houses or extension in the municipal limits of urban localities/towns/cities. The frame is regularly up-dated completely after every 5 to 7 years due to rapid growth in cities/towns/urban areas. It was entirely updated during 2004. There are 26,753 enumeration blocks in all urban areas of the country

B. Rural Areas

The sampling frame for rural domain consists of list of mouzas/dehs/villages prepared by the Population Census Organization (PCO) as a result of Population Census conducted in 1998 in the country. A mouza/deh/village is the smallest revenue estate identified by its name, had-best number, cadastral map and name of Tehsil, District and Province in which it is located. The rural sampling frame, comprising 50,572 mouzas/dehs/villages, has been used for drawing the sample for this survey.

The detail of number of enumeration blocks in urban and numbers of mouzas/dehs/villages in rural areas of the country are given as under:

Table 2.1: No of enumeration blocks and villages

Province	Number of Enumeration Blocks	Number of Villages
Islamabad	351	132
Punjab	14,549	25,875
Sindh	9,025	5,871
Khyber Pakhtoon Khawa(KPK)	1,936	7,334
Balochistan	618	6,555
Federally Admn. Tribal Areas(FATA)	0	2596
Azad Jammu Kashmir	210	1643
Gilgit-Baltistan	64	566
Total	26753	50572

2.3.3 Listing Activity

Fresh listing of households has been undertaken in all sample areas. For this purpose, a comprehensive training to the listers has been imparted. In urban areas, enumeration blocks have been considered as Primary sampling units (PSUs). The sketch map of enumeration blocks demarcated by Federal Bureau of Statistics (FBS) in urban area of Baluchistan province has been used to perform listing work. In rural areas, villages as per Population Census 1998 have been treated as Primary sampling units (PSUs). Large sample villages having population more than 2000 as per Population Census 1998 have been split up into hamlets/blocks of equal size. One block has been selected randomly for data collection. Small villages have completely been listed. The listing of households has been used to select a specified number of households from urban and rural sample areas.

2.3.4 Stratification

A. URBAN DOMAIN

i. Large Sized Cities

Karachi, Lahore, Gujranwala, Faisalabad, Rawalpindi, Multan, Sialkot, Sargodha, Bahawalpur, Hyderabad, Sukkur, Peshawar, Quetta and Islamabad have been considered as large sized cities. Each of these cities constitutes a separate stratum which has been further sub-stratified according to low, middle, high income groups based on the information collected in respect of each enumeration block at the time of demarcation/up-dating of urban area sampling frame.

ii. Remaining Urban Areas

After excluding the population of large sized cities from the population of respective administrative division, the remaining urban population of each administrative division of four provinces has been grouped together to form a stratum called other urban areas. Thus each adm. division in remaining urban areas in the four provinces constitutes a stratum. In Azad Jammu & Kashmir, FATA and Gilgit-Baltistan, all urban areas have been grouped together within each region/state separately.

B. Rural Domain

In rural domain, each administrative district in the Punjab, Sindh and KPK Provinces has been considered, as independent and explicit stratum, whereas in Balochistan province each administrative division constitutes a stratum. In Azad Jammu & Kashmir, FATA and Gilgit-Baltistan, all rural areas have been grouped together to form stratum within each region/state separately.

2.3.5 Sample Size and its Allocation

Considering the variability of characteristics for which estimates are prepared, population distribution, and field resources available, a sample size of 30,000 sample households has been considered appropriate to provide reliable estimates of key characteristics at the desired level. An exercise to compute sample size based on the prevalence rate of three key variables namely wasting and stunting in children less than five years, mother iron deficiency and mother iron deficiency anemia was undertaken keeping in view 95% level of 5% margin of error. Further, 5% non-response rate was also considered. The design effect of 1.6 was used to finalize and fix overall sample size. The entire sample of 30,000 households (SSUs) has been fixed comprising 1500 Primary Sampling Units (PSUs) out of which 618 were urban and 882 were rural. As urban population was more heterogeneous therefore, a higher proportion of sample size was allocated to urban domain. Similarly NWFP and Balochistan being the smaller province and to get reliable estimates, a higher proportion of sample was assigned to these provinces. After fixing the sample size at provincial level, further distribution of sample PSUs to different strata in rural and urban domains in each province has been made proportionately.

The distribution of PSUs and SSUs enumerated in the urban and rural domain of the provinces, states/regions are as under:

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	13640	6140	7500
Sindh	323	157	166	6460	3140	3320
KPK	218	67	151	4360	1340	3020
Blochistan	110	44	66	2200	880	1320
FATA	67	0	67	1340	0	1340
AJK	66	28	38	1320	560	760
GB.	34	15	19	680	300	380
Total	1500	618	882	30,000	12,360	17640

* Including Islamabad

2.3.6 Sample selection procedure

a) Selection of Primary Sampling Units (PSUs)

Enumeration blocks in urban domain and mouzas/dehs/villages in rural domain have been taken as primary sampling units (PSUs). In the urban domain, sample PSUs from each ultimate stratum/sub-stratum have been selected with probability proportional to size (PPS)

method of sampling scheme. In urban domain, the number of households in enumeration block Economic Census 2004 and population of 1998 Census for each village/mouza/deh have been considered as measure of size.

b) Selection of Secondary Sampling Units (SSUs)

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

2.3.7 Target Population

Women of reproductive ages (15-49 years), Children 6-59 months and Elderly (> 50 years)

2.3.8 Survey Methods

A method mix of quantitative and qualitative methods was adopted. A comparison of both methods is given in the following Table 2.1.

Table 2.3: A comparison of quantitative and qualitative methods (28)

Components	Qualitative Research	Quantitative Research
Focus of research	Quality (nature, essence)	Quantity (how much, how many)
Philosophical roots	Phenomenology, symbolic interaction	Positivism, logical empiricism
Associated phrases	Fieldwork, ethnographic, naturalistic, grounded, subjective	Experimental, empirical, statistical
Goal of investigation	Understanding, description, discovery, hypothesis generating	Prediction, control, description, confirmation, hypothesis testing
Design characteristics	Flexible, evolving, emergent	Predetermined, structured
Setting	Natural, familiar	Unfamiliar, artificial
Sample	Small, non-random, theoretical	Large, random, representative
Data collection	Researcher as primary instrument, interviews, observations	Inanimate instruments (scales, tests, surveys, questionnaires, computers)
Mode of analysis	Inductive (by researcher)	Deductive (by statistical methods)
Findings	Comprehensive, holistic, expansive	Precise, narrow, reductionist

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 done nationally and internationally. All data collection tools were assessed in-depth by the technical committee established to oversee the NNS 2011. Three iterations of the survey instrument were reviewed and the final version approved in December 2010.

In the Section 1 of Module “A”, all members of household were listed by their gender, age, education, occupation and marital status. Besides such information, anthropometry (Height,

weight, mid-upper arm circumference – MUAC and physical examination for anemia, jaundice, cyanosis, edema and goiter was conducted for whom were present at the time of survey. Data were recorded against the name of each member. Section 2 of Module “A” was exclusively designed for obtaining socio-economic 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” was focused on reproductive history, intra-birth interval, antenatal care, night blindness, worm infestation, iron supplementation and morbidities. In same Module “C” 24-hour dietary recall to assess dietary intake and food practices to determine patterns of eating habits and variety of foods consumed over a longer period of time of MWRA/WRA were also assessed.

Standard infant and young child feeding (IYCF) Module “D” was used to capture data on birth, newborn weight; resuscitation, breastfeeding initiation and exclusively breastfeeding, complementary feeding, micronutrients, 24-hour dietary recall and food practices for the youngest child were obtained. A separate Module “E” was developed to determine the health status, immunization, physical examination and lab investigation of the index child. Elderly persons’ appetite, movement and mobility and morbidities were also asked through the Module “F”. 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 behavior and 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.

The main objectives were:

- To gain insight into the knowledge, attitudes, beliefs and practices relating to nutrition, food behaviors and consumption among the population
- To aid the understanding of cultural factors which may be the determinants regarding the types of foods eaten, preparation methods used and when, where and how such foods are served in the family
- To explore the contextual determinants of Maternal and Child under nutrition in different ethnic groups

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 40 focus group discussions and 16 in-depth interviews were conducted.



Participants were identified and selected through the community recruiters at their living-sites. A detail distribution of in-depth interviews and focus group discussions by target population is given below:

Table 2.4: A detail distribution of in-depth interviews and focus group discussions

Targeted Study areas	Focus Group Discussions					In-depth Interviews		
	Participants					Respondents		
	Mothers [Child < 5]	Decision makers in the family		LHWs	Total	Gynecologist	Child Specialist	Total
Male		Female						
Lasbella	1	1	1	1	04	1	1	02
Peshawar	1	1	1	1	04	1	1	02
Haripur	1	-	-	1	02	-	-	-
Muzaffarabad	1	1	1	1	04	1	1	02
Sukkur	1	1	1	1	04	-	-	-
Larkana	1	1	1	1	04	1	1	02
Bahawalpur	1	1	1	1	04	1	1	02
Lahore	1	1	1	1	04	1	1	02
Jhelum	1	-	-	1	02	-	-	-
Gilgit	1	1	1	1	04	1	1	02
Karachi	1	1	1	1	04	1	1	02
Total	11	09	09	11	40	08	08	16

2.3.12 Tools for qualitative data collection

The semi-structured in-depth interviews and focus group discussions guidelines were developed and translated into local languages for the FGDs and IDIs. The guidelines were based on pre-defined themes that included motherhood (establish emotional pulls), necessities of

children, child feeding decision, initiation and duration of breastfeeding, pre-lacteal feeding, pre-natal and post-natal care for women (diet), complementary feeding, psychological care of children, perceptions related to health and illness, perception about nutrition and food intake, local/imported food, buying behavior, behavior change, eating patterns and food preparations, dietary practice, food poverty (choice and preferences), food safety, intra-household food distribution, and violence against women.

2.3.13 Transcription and translation of qualitative data

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

2.3.14 Biochemical Analysis

For the important and essential biochemical evaluation assessment of micronutrient deficiencies in children 6 months to 5 years of age and the mother of index child and in 6 -12 years children were also assessed for urinary iodine. Details of the biochemical test are shown in Table 2.2 whereas technical details of the methods involved provided in [Annex XV](#).

Table 2.5: Description of Biochemical Analysis/Tests

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

2.3.15 PROJECT PRE-IMPLEMENTATION STEPS

Before the start of the NNS the following steps were assured:

Table 2.6: Pre-implementation Steps

Formation of Technical Committee	Technical Committee has been notified with representatives from the relevant stake holders to oversee technical aspects of the NNS 2011.
Liaison with the Local Partners	Liaison with partners such as <ul style="list-style-type: none"> •Federal Bureau of Statistics (FBS) •Ministry of Health (MoH) & Provincial Health Departments •Pakistan Medical and Research Council (PMRC) – Data Collection in KPK & 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.
ERC application submission	Ethical review application was submitted to both National Bioethics and AKU ethics committees for approval of survey methodology and consent forms.
Acquisition of Sample Frame and Design from FBS	Close working with the FBS for the development of research design and sampling

Establishment of Survey Hubs
Punjab = 8 (Average 85 EBs per one Hub), Sindh=5 (65), KPK&FATA=5 (57), Balochistan=5 (22) ,
AJK=3 (22) and Gilgit Baltistan=2 (17)

frame. A sample size of 30,000 HH and 1500 Enumeration Blocks was proposed and agreed.

Survey hubs were established for the operational movement of field teams. These hubs were established at Karachi, Hyderabad, Mirpurkhas, Sukkur, for Sindh Province, RY Khan, Multan, DG Khan, Bhawalpur, Sahiwal, Faisalabad, Lahore and Rawalpindi for Punjab, Abbottabad, Peshawar, Swat, D I Khan, Kohat for KPK & FATA, Muzaffarabad, Bagh and Mirpur for AJK, Gilgit and Skardu for Gilgit-Baltistan, Gawadar, Khuzdar, Bella, Quetta, Dalbandin and Jaffarabad for Balochistan.

2.3.16 Identification and Recruitment of Field Staff

Advertisements (In-house and in the National Dailies) were placed and candidates were shortlisted and interviewed at Karachi, Faisalabad, Rawalpindi, Peshawar and Quetta.

2.3.17 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 in time 22 Teams were operating in the different parts of the country. Each team consists of 1 Field Supervisor, 1 Team Leader, 4-5 Data Collectors, 3 Registered Nurses with 1 phlebotomist where needed, 2 Logistic Assistants and 2 Community Facilitators. Separate teams consist of Moderators/Facilitators; Observers, Note-Takers and Community Recruiters were also established.

A. Staff Profile

National Survey Coordinator, Senior Survey Coordinator and Survey Coordinators were senior medical doctor and lead social scientists with years of experience in nutrition related surveys nationally and internationally. Team Supervisors were highly experienced not less than a decade and mix blend of medical and social science background. Similarly, experienced Team Leaders, all females having Masters in Social Sciences with suitable experience were deployed with the view to easy access into the households to ensure the quality and validity of data. All Data Collectors were at least Graduates supported by Logistics Assistants and Local Community Facilitators.

B. Separate Teams for Mapping and Listing

Separate teams consist of FBS representative and Logistic Assistant supported by local community facilitators visited each EB / village prior to data collection for demarcation of EB/village as per FBS maps, listing of all structures and households, allotted a unique ID (NNS 1, 2, 3 for structures and HH1, 2, 3 for households), basic data on children <5, household head, women of reproductive age, elder person above 50 years, etc. were obtained. From the listed HHs of each EB, 20 HHs were randomly selected through a computerized program in Excel.

2.3.18 Training

Training sessions and refreshers were conducted in Karachi, Faisalabad, Lahore, Peshawar, Abbottabad, Quetta and Gawadar. Four days extensive classroom training was imparted to the teams by the senior and experienced staff of the Department of Paediatrics and Child Health; Aga Khan University who have prior experience of similar surveys. Some of the details of training agenda are shown in Table 2.6.

Table 2.7: Details of Training Agenda

For All	Team Leaders	Data Collectors	Nurses	Phlebotomists
Introduction to NNS Research design Survey methodology	Community rapport building	Community rapport building	Physical examination	Blood sampling
	Counselling techniques	Research basics	Anthropometry	Safe injection practices
	Research basics	Interviewing techniques	Field practice	Safe injection practices
	Interviewing techniques	Dress code	Urine sampling	Labeling and storage
	Dress code	Consent procedures		Transportation of samples
	Consent procedures	Interpersonal skills		Field practice
	Interpersonal skills	Ensuring high response		
	Ensuring high response	Sampling methodology		
	Sampling methodology	Question by question explanation		
	Question by question explanation	Mock interviews		
	Mock interviews	Operational procedures		
	Operational procedures	Field procedures		
	Field procedures	Daily documentation		
	Daily documentation	Log sheet completion		
	Log sheet completion	Dealing with refusals		
	Dealing with refusals	Spot checking		
	Spot checking	Random checking		
	Random checking	Desk editing		
Desk editing				

2.3.19 Coding Scheme for Assigning Processing Codes

A 9- digit coding scheme for providing processing codes to primary sampling units i.e. enumeration blocks/villages (PSUs) and secondary sampling units' i.e. households (SSUs) selected in was developed.

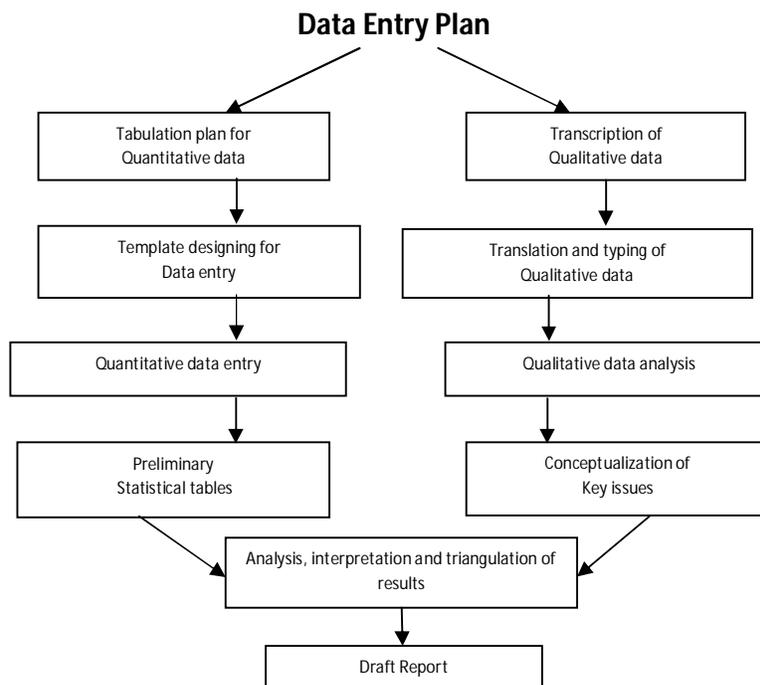
2.3.20 Plan of Operation, Training and Monitoring

Project planning was critical to the development of detailed field work plans, assessment of the timelines and progress, resources and performance schedules during the execution of the project. Effective tools were developed for periodic checking of works progress against the targets laid down in order to ensure timely completion of the NNS project. We were one step forward from the conventional approaches of monitoring; therefore besides internal monitoring we also engaged project stakeholders, especially Nutrition

Wing, Ministry of Health Government of Pakistan, proactively in assessing the progress of the project activities and achievement of their anticipated targets. Details about Plan of Operation and how it was implemented is placed at Annex.

2.3.21 Data Management, Transfer and Analysis Plan

Data management team (Data Analyst, Data Supervisor and Data Entry Operators) worked under the supervision of Data Manager. The filled-in questionnaires first desk-edited in the field sites for completeness and major errors if any by the Team Leaders. After desk editing all such questionnaires were sent through courier to the Data Management Unit (DMU) Aga Khan University Karachi where a desk was exclusively established to receive the NNS filled-in questionnaires and make an inventory register. Before the data entry, all filled-in questionnaires were coded for open-ended responses. In case of inconsistency or missing responses, the editor flagged the errors/omissions and consulted the Research Supervisor interviewers for clarification.



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. Data entry screens were employed range and consistency checks and skipped to minimize entry of erroneous data. Special arrangements were made to enforce referential integrity of the database so that all data tables are related to each other without problem. Analysis of data was done through SPSS version 16.

b. Software for Anthropometric Analysis

There are many software are available for anthropometric analysis like *Software for Calculating Pediatric Anthropometry* v 1.02, 1999, WHO Anthro (version 3.2.2, January 2011), ENA for SMART - Software for Emergency Nutrition Assessment, People Size 2008, RAPIL – ANTHROPOMETRIC SOFTWARE, NutriStat: Nutritional Anthropometry Program. For the NNS 2011, WHO Anthro (version 3.2.2, January 2011) was used for anthropometric analysis. However for day to day monitoring and anthropometric data consistency check the ENA-SMART software was used which helped a lot to address the errors in measurement at the initial stages of the data collection.

c. Data Entry and Quality Checks

Two pass verification or double data entry was carried out for each filled-in questionnaire to ensure data entry quality due to any systematic error or operator misread entries from the questionnaire. Data entry was started after one week of data collection following clearance by the Research Supervisors and requisite data quality assurance. The error checks were performed simultaneously with the data entry.

2.3.23 Ethical approval and Confidentiality

The project design, sampling strategy and analytical plan were reviewed by the Ethics Review Committee of the Aga Khan University as well as the National Research Ethics Committee of the Government of Pakistan and duly approved. Confidentiality of all data collected was of highest priority during all stages of data handling. All the names and personal information regarding any individual were kept confidential and data sets anonymous for analysis. Only senior staff has had access to the data. Participant privacy and confidentiality in electronic and printed data, publications, and reports will be ensured. All the data files have been protected by passwords and serum and blood samples duly secured as per standard procedures.

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 30000 households, of which a total of, 27963 household were visited and interviews conducted successfully by the field teams. A verbal consent was obtained from participating households prior to the interview for collecting information through a pre formed for questionnaire, and for anthropometric measurements. However for blood draws, urine samples collection and clinical examination a written consent was sought by survey teams. 6.8 percent of the targeted population refused to participate in the survey. The refusal rate varied widely between regions; being lowest in AJK 1.3 percent and highest in FATA 32.8 percent possibly related to the prevalent insurgency, security issues and accessibility constraints.

NNS 2011 coverage and population density map for comparison of sample distribution and population conglomeration is given below:

Fig: 3.1 Population density

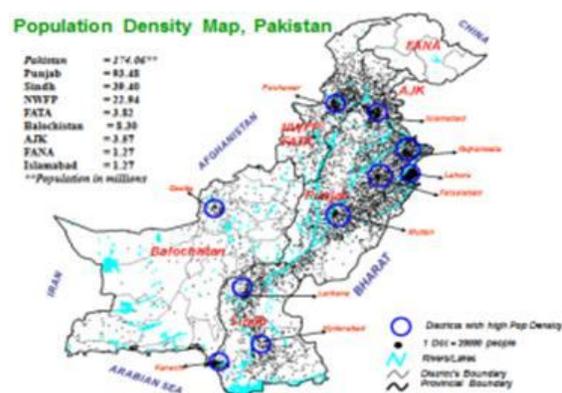
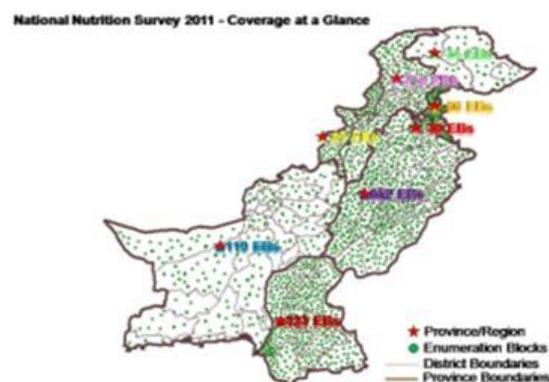


Fig: 3.2 National nutrition Survey coverage



Sample size and achievement by provinces and regions are given below:

Table 3.1: Details of Sample Size and Achievement

Province / Region	Number of PSUs and SSUs by Province / Region – Household Interviews Completed					
	PSUs		Household (HH) Interviews			
	Target	Completed	HH Visited	Consent Refused	HH Completed	Refusal Rate (%)
Balochistan	110	110	2200	204	1996	9.3
Khyber Pakhtunkhaw	218	218	4360	734	3626	16.2
FATA	67	67	1340	440	900	32.8
Sindh	323	323	6460	178	6282	2.8
Punjab	682	682	13640	452	13188	3.3
AJK	66	66	1320	17	1303	1.3
Gilgit/Baltistan	34	34	680	12	668	1.8
All Pakistan	1500	1500	30000	2037	27963	6.8

3.1.1 Blood and Urine Specimen

The Survey teams collected 2000 blood specimen for biochemical assessments from mother and their children.

Table 3.2: Description of Blood and Urine Specimen Collected

Specimen		Punjab	Sindh	KPK	Balochistan	FATA	AJK	Gilgit	Total
Blood	Mother	6110	2892	1061	980	38	798	403	12282
	Child	6099	2892	1046	867	34	798	403	12139
	Total	12209	5784	2107	1847	72	1596	806	24421
Urine	Mother	742	330	213	53	23	65	34	1460
	Child	749	326	207	53	23	65	34	1457
	Total	1491	656	420	106	46	130	68	2917

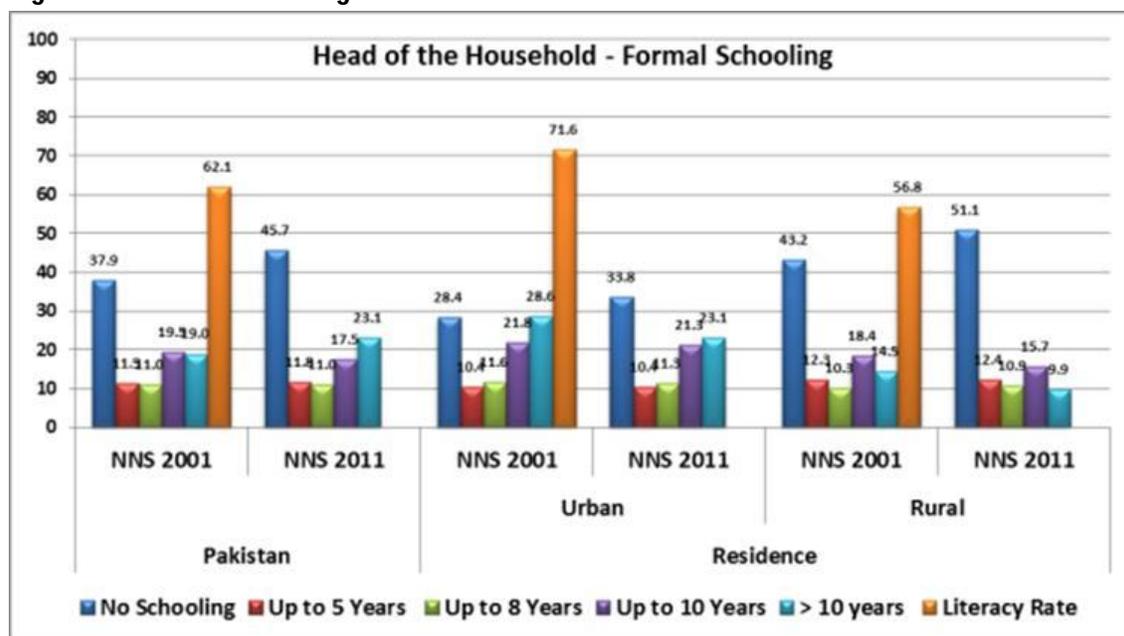
3.2 Background and Household Characteristics

The percentage distribution of male: female was almost similar i.e. 50.4%: 49.6 % respectively across urban and rural population of Pakistan .The gender break-up differed from the last census conducted in 1998 that documented a sex ratio of 108.5 and the current survey revealed 101.6. The data from FATA showed significant gender imbalance, 123.2 males for every 100 female. But in AJK, it was 95.7 male per 100 female. The average household size was 6.7 ± 3 similar to the 1998 census.

3.3 Formal Education – Head of Household

In the NNS 2001, 37.9 percent of the households' heads were illiterate across Pakistan, but NNS 2011 revealed an increase in illiteracy rate with 45.7 % household heads being illiterate

Figure 3.3 Formal schooling of head of household



3.4 Occupation – Head of Household

The NNS 2011 Pakistan showed 53.6 percent of the household heads were laborers/workers/farmers of which 35.9% belonged to urban and 61.6% to rural population respectively. In comparison to the previous findings of NNS 2001-02, 16.6 percent household heads belonged to labor/worker/farmer groups.

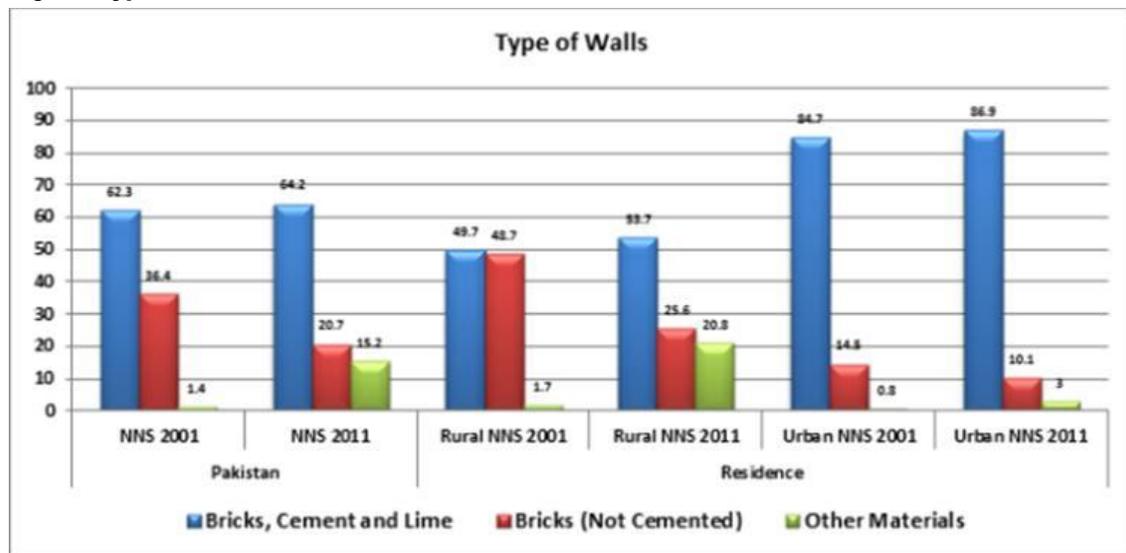
Government and private service employees were the next major group of employment, 16.4 percent were engaged with either public or private sector. The proportion of unemployed heads of households showed figures that had apparently doubled since last than 2001, In NNS 2001 where the percentage was merely 6%.

3.5 Nature of Dwelling by Type of Floor, Roof and Walls

A large proportion of people living in urban and rural areas were found to be deprived of basic civic necessities. The facilities available also differed significantly between urban and rural areas. In NNS 2011, we documented 64.2 percent families were residing in houses that were constructed with bricks and concreted with cement and; this did not differ from NNS 2001-02 findings where 62.3 %t had cemented walls.

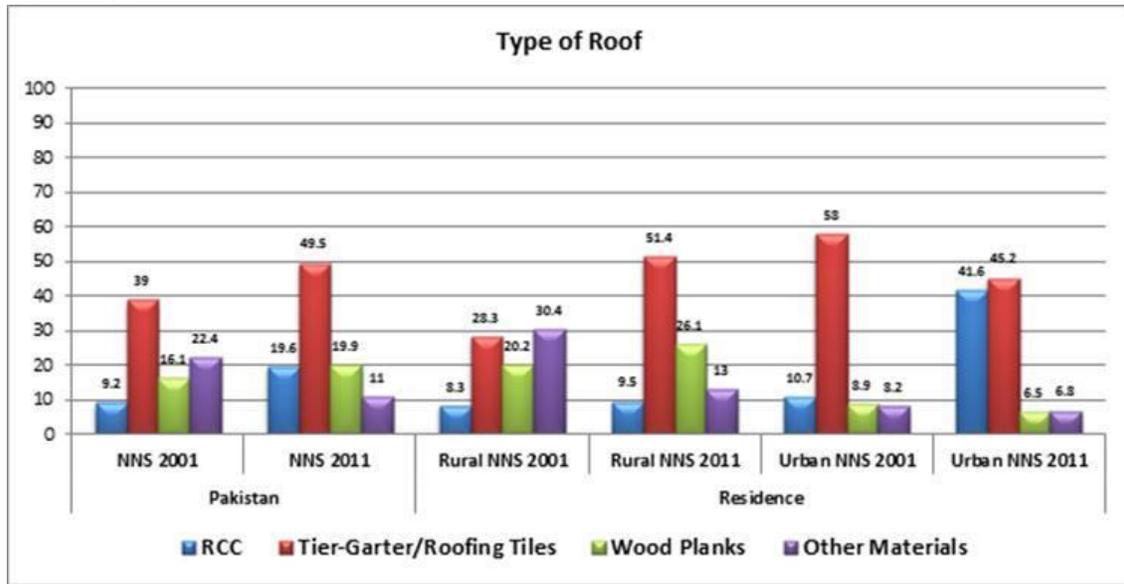
20.7 % families possessed houses structure where walls were made with bricks only. In urban area 86.9 %t houses were made of bricks, almost similar as was in the NNS 2001 (84.7 percent). The ratio of houses with brick walls in rural area was 48.7 percent (NNS 2001) and 25.6 (NNS 2011) that showed an improvement in rural housing.

Fig 3.4 Type of walls



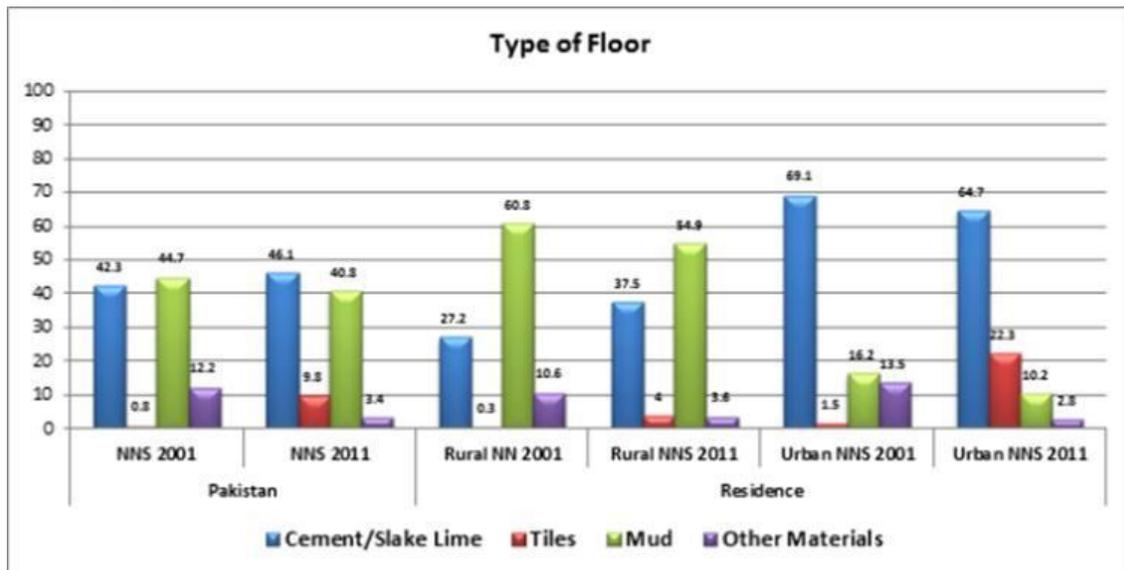
The results showed that 19.6 percent of the houses comprised of RCC roofs followed by the 19.9 percent of houses have roof made of wood planks across Pakistan.

Fig 3.5 Type of Roof



In the NNS 2001 the use of tiles for flooring was negligible whereas in the NNS 2011 the use of tiles was 9.8 percent and use of other material was on decline from 12.2 percent (NNS 2001) to 3.4 percent (NNS 2011). In urban areas majority of houses 64.7% had cemented flooring. This was almost double to those of rural areas where only 37.5 percent houses had cemented flooring. The comparison with NNS 2001 is given in the following figure:

Fig 3.6 Type of Floor

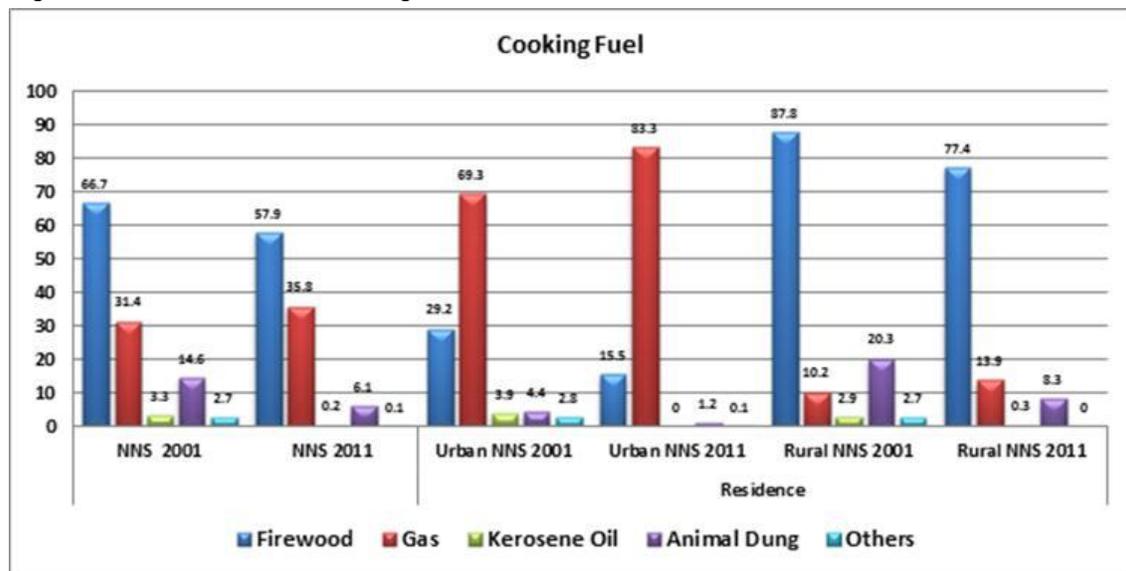


3.6 Type of Cooking Fuel Used

Over the last decade consumption of fire wood has decreased. At the time of NNS 2011, around 58 percent 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. The usage of firewood was more than three times greater in rural area as compared to urban areas (77.4 & 15.5%) respectively.

Natural gas was found to be the second main source of cooking fuel as 39.7% household were using natural gas for cooking food.. This facility was found to be more conveniently available in the urban areas where 83.3% were utilizing gas. Furthermore the use of animal dung as fuel was observed to be reduced significantly in all parts of Pakistan; only 5.2 percent were using animal dung in NNS 2011 while in NNS 2001 it was reported to be 14.6 percent. The use of kerosene oil was also reduced substantially; 4 % to 0.2 %.

Fig 3.7 source of fuel for cooking



3.7 Source of Drinking Water

The basic necessity of piped drinking water was accessible to half of the households (50.4%), depicting an improvement since last NNS in 2001 where 41% of the households reported access to tap water. This facility was largely available to the urban population (62.8 %).. Tube-well /boring water was the second most common source of the drinking water (31%). Its utilization was predictably more in rural areas (37.1%) vs. urban (22.3%).

Fig 3.8 source of drinking water at national level

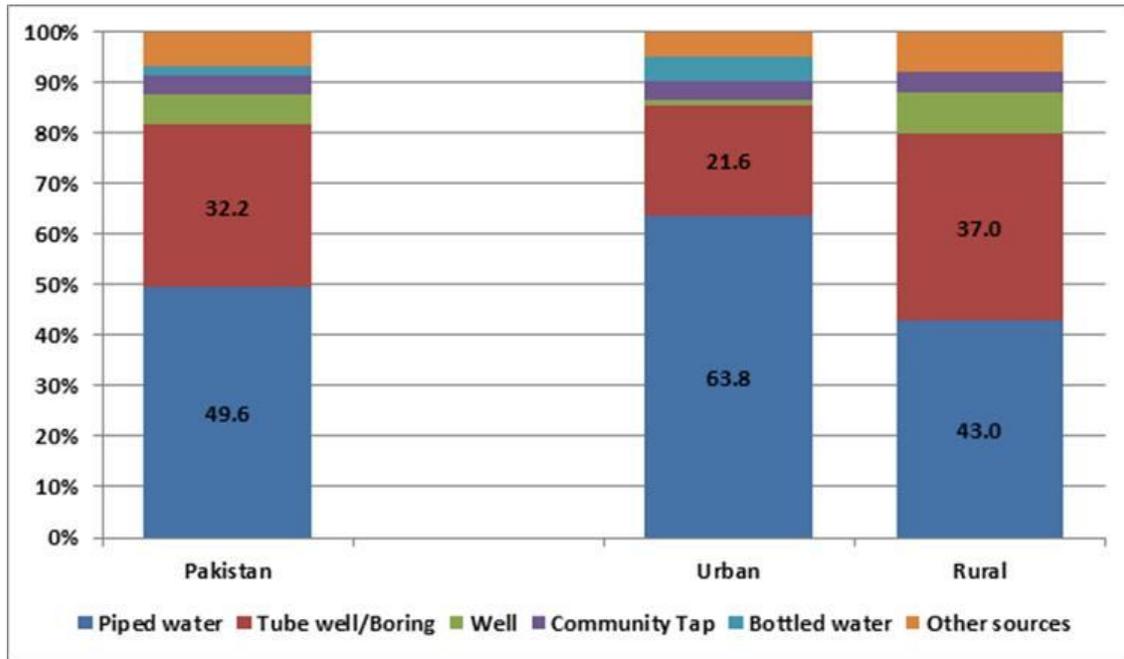
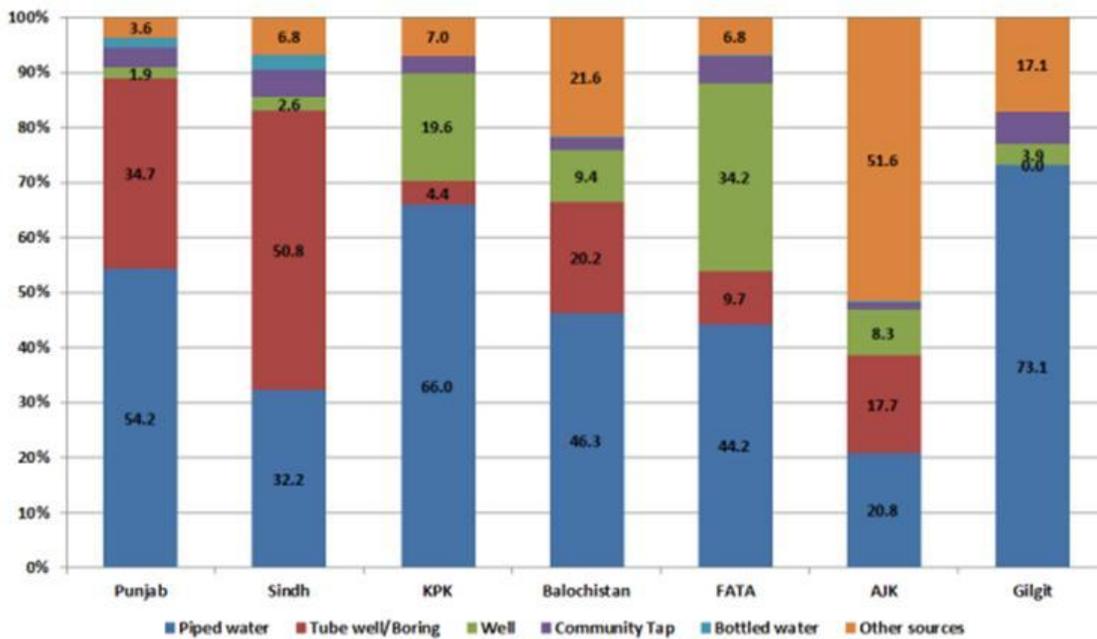


Fig 3.9 Source of drinking water at provincial level



Chapter 4: FOOD INSECURITY IN PAKISTAN

It has been estimated that over 900 million people experience the hardship that hunger imposes, a figure which continues to rise even amidst the riches of the 21st century. As world food prices scale new peaks, food insecurity and famine once again dominate humanitarian headlines, barely few years since the last crisis. Engulfed within a vortex of population growth, economic instability and climate change, food security presents a formidable challenge for national and global governance.

Food insecurity has become one of the major national problems in Pakistan. The report produced by United Nations in 2008 revealed that high food prices have significantly worsened food security in Pakistan. In 2008, 72 million people (51 percent of the population) were food insecure and consumed less than 2,100 kcal per day. Since 2005-06 the food insecure population has increased by 12 million. The number of severely food insecure (consuming less than 1,700 kcal per day) has risen by 9.6 million to 45.3 million people (28 percent of the population). Two thirds of these new severely food insecure people live in rural areas (29). The poorest of the poor have been disproportionately affected by the crisis. Simulation analysis has shown that the poorest quintile spend 13 percent higher on food than two years ago, whereas the richest quintile's food expenditure increased by only 5 percent (29).

The floods of 2010 in Pakistan have caused widespread destruction, ruined livelihoods, displaced millions, and sparked a food crisis. Food prices have skyrocketed across the country as miles of farmland succumb to the deluge. Food insecurity is now rife across the country yet even before the floods; millions of Pakistanis struggled to access food. Back in 2008, the UN estimated that 77 million Pakistanis were hungry and 45 million malnourished. And while many developing nations have begun to recover from the global food crisis of 2007-08, Pakistan's food fortunes have remained miserable. Throughout 2010, Pakistan's two chief food staples, rice and wheat, have cost 30 to 50 percent times more than they did before the global food crisis. Drought, rampant water shortages, and conflict have intensified food insecurity in Pakistan in recent months.

There is no straightforward, universally accepted definition of food security. Most versions stipulate secure access to sufficient and affordable nutritious food. . "Food security exists when all people, at all times, have physical, social and economic access to sufficient, safe and nutritious food to meet their dietary needs and food preferences for an active and healthy life (31, 32)"

It is recognized that the full range of food insecurity and hunger cannot be captured by any single indicator. Instead, a household's level of food insecurity or hunger must be determined by obtaining information on a variety of specific conditions, experiences, and behaviors that serve as indicators of the varying degrees of severity of the condition. While developing the module and data collection 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; and
- Instances of reduced food intake or consequences of reduced intake, for children in the household.

Following steps were followed to analyze the food security data considering the Guide to Measuring Household food security as standard **(30)**.

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, for those households that show evidence of food-insecurity/hunger, the severity level of the condition experienced

In NNS 2011 the household food security has been determined on the basis of four categories that are defined below

1. Food secure:

Households show no or minimal evidence of food insecurity.

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

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. 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 at National level about 42% of the households are food secure while the remaining 58% are food insecure, the food insecurity data was further disaggre-

gated and it was found that out of 58% that were food insecure 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 is a division between the urban and rural areas, in urban areas about 48% are food secure while 52% are food insecure compared with rural areas where 39.4% of Households are food secure and 60.6% are food insecure. In urban areas of those households that were food insecure 26.5% of them were food insecure without hunger, 17.7% were food insecure with moderate hunger and 8.2% were food insecure with severe hunger. In rural areas out of those households that were food insecure 28.3% were food insecure without hunger, 20.7% were food insecure with moderate hunger and 10.5% were food insecure with severe hunger. The data suggested that the households in rural areas are more food insecure when compared with the urban areas.

We further investigated the data on provincial basis and it was revealed that there is a clear variance among the provinces for the food security data. Following is the disaggregated data on the provincial basis

Punjab:

Punjab is the biggest province of Pakistan; the survey revealed that about 40.5% of the households are food secure while 59.5% are food insecure of those that were food insecure 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 poorest and food deprived province as only 28% households were food secure and the rest 72% households were found to be food insecure of these 72%, 21.1% are were food insecure without hunger, 33.8% were food insecure with moderate hunger and 16.8% were food insecure with severe hunger.

Khyber Pakhtunkhwa (KPK):

KPK appeared relatively better off with 68.5 % populations reporting affordability and accessibility of all kinds of food in all seasons and only 28.2 % were food insecure and out of those that were food 21 % were food insecure without hunger, 6 % were food insecure with moderate hunger and 4.5 % were food insecure with severe hunger.

Baluchistan:

After Sindh, Baluchistan was found to be affected more by food insecurity and it was revealed that about 36.5% were food secure and 63.5% were food insecure. Of those that were food insecure about 33.9% were food insecure without hunger, 18% were food insecure with moderate hunger and 11.5% were food insecure with severe hunger.

FATA:

Food security data from FATA revealed that about 41.6 % are food secure and 58.4 % are food insecure. In FATA of those households that were food insecure about 27.4% were food insecure without hunger, 8.4% are food insecure with moderate hunger and 5.8% were food insecure with severe hunger.

Azad Jammu and Kashmir (AJK):

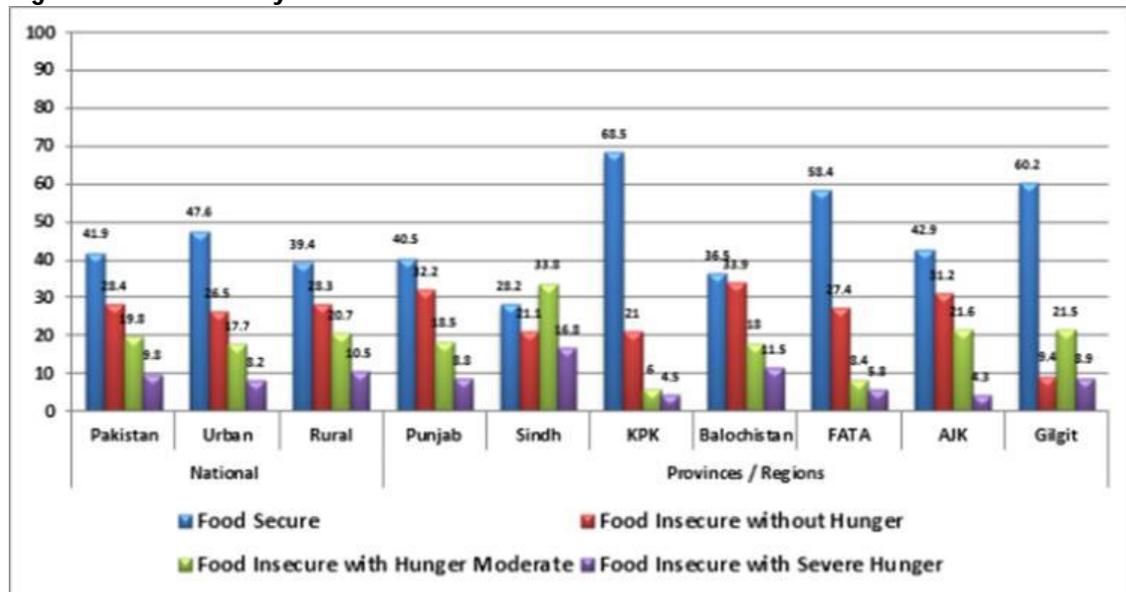
In AJK about 42.9% were food secure and 57.1 % are food insecure, among those households that were food insecure it was revealed that 31.2% were food insecure without hunger, 21.6% were food insecure with moderate hunger and 4.3% were food insecure without severe hunger.

Gilgit Baltistan (GB):

Food security data from GB showed that about 60.2% of the households were food secure and 39.8% were food insecure, the data revealed that about 9.2% of 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 data of the presented survey has shown no signs of improvement since the last food insecurity assessment done by the United Nations in Pakistan which revealed about 51% of the sampled population was food insecure. The NNS 2011 brought up the figure of 58% of the households being food insecure; this figure does not portray any good sign on the nutrition status of the Pakistani population and have consequent implications on the nutrition, growth and health of the population.

Fig 4.1 Food insecurity status



Chapter 5: MATERNAL HEALTH AND NUTRITION

During the National Nutrition Survey 2011 detailed data was collected on basic characteristics, dietary intake, reproductive history, anthropometry, clinical and Biochemical micronutrient deficiencies and KAP regarding micronutrients from the mothers of the Index child. Index child in the survey has been defined as the “selected youngest child of less than five years of age”

Section 1: Basic Data: Age, Education and Marital status (Mother of Index Child)

5.1.1 Age Distribution of Index Mothers

The survey revealed that about 71.7% of index mothers were between 20-34 years of age, among all index mothers that were interviewed about 32.3 % were of 25-29 years of age and ; 26.2 % were of 30-34 years of age. The data revealed no major urban and rural difference as 34 % of the index mothers of 25-29 were residing in urban areas and 31.6 percent in rural area similarly in age group of 30-34 years, 27.3 percent were residing in urban areas and 25.7 percent in rural area. (Table 5.1).

5.1.2 Formal Education

Female literacy in Pakistan has been a challenge since decades; results of the NNS 2011 showed that 59.5 % of index mothers were illiterate. The percentage of illiterate mothers was almost twice in rural area than urban (36.3 % in urban and 68.7 % in rural). From the total only 10.4 % mothers completed their 10 years of schooling and 8.7 percent managed to complete their studies beyond grade 10. Data from the survey further revealed that about 11.2 percent mothers from the rural area received education up to 10th grade whereas this level of education in urban areas was more than three times i.e. 38.9 percent (Table 5.2).

5.1.3 Marital Status and Current Pregnancy Status (Mother of index child)

Only 0.8 percent mothers of index child were either separated or widowed (Urban 1.3 percent - rural 0.6 percent), rest of them were currently living with their husbands. Current pregnancy status of the index mothers was also ascertained and it was revealed that 10.6 % index mothers were pregnant, with no major urban and rural difference.

Section 2: Reproductive History and Antenatal Care

5.2.1 Reproductive History (Mother of Index Child)

Reproductive history of pregnancies that were conceived during the last five years was also ascertained. The number of pregnancies was grouped as 1-2, 3-5 and 6 and plus pregnancies in last five years duration. It was found that about 30% had 1-2 pregnancies, 47.4% had 3-5 pregnancies and 22.3 % had 6 and plus pregnancies. The data did not find any major differ-

ence in the number of pregnancies between urban and rural areas but provincial variations were observed. Trends among other provinces and regions are given in the Table 5.1. Further the data regarding the outcome of the last pregnancy was also collected and the survey revealed that 95 % of pregnancies resulted in live births, where as 4.4% and 0.4% ended as Miscarriage and still birth respectively.

5.2.2 Antenatal Care

1. ANC- during Last Pregnancy

Seeking Antenatal care during pregnancy is of great importance as it identifies risk factors which reduce the chances of later maternal complications and also minimize the chances of miscarriages and stillbirths. Unfortunately there has been no improvement in seeking ANC since 2006-07. The PDHS 2006-07 data showed that 65.3 % pregnant women sought care during pregnancy while NNS 2011 results showed that 63.5 % of pregnant women sought ANC during their last pregnancy. The data revealed a clear difference of ANC seeking pattern between urban and rural areas as this proportion is much higher among urban women 83.8% compared to rural women 55.5% respectively. The data for the Antenatal care seeking was also collected on provincial basis; it was revealed that from the women who sought care during ANC about 69.2% were from Punjab, 62.8% were from Sindh, 55.1% were from KPK, 48 % were from Baluchistan, 27.7% were from FATA, 80.8% were from AJK and 80.1% were from Gilgit. The scenario in FATA was depressing where only 28 % pregnant women seek ANC because of one or the other reason. Mothers of index children in AJK and Gilgit were much aware about the importance of ANC.

2. Choice of Care Provider

The selection of qualified and skilled health care provider ensures better care during pregnancy. In Pakistan, little improvement has been made in seeking care from the skilled care provider. In 2006-07 (PDHS) 60.9 percent pregnant women received care from a qualified and skilled care provider whereas the Nutrition survey showed that among mothers of index child about 67.8 % received ANC from a skilled provider; of those who sought care from skilled provider about 62.3% received care from a doctor, 11.9 % from a Nurse, and 3.6 percent from LHV. The gap for seeking ANC has also narrowed down; in 2006-07 (PDHS) urban-rural gap was 24.6 percent (Urban 78.1 percent and rural 53.5 percent) while currently it is only 7 percent (Urban 82.2 % and rural 75.2 %). In provincial comparison (Table 5.5) 81.2% from Punjab, 71.3% from Sindh, 77% from KPK, 66.7% from Baluchistan, 76.3% from FATA, 78.6% from AJK and 86.8% from Gilgit sought care from skilled birth attendants.

3. ANC Visits

Early pregnancy care which should be continued till delivery minimizes the chances of complications at the onset of delivery and also ensures the good health of pregnant women throughout pregnancy duration that's why WHO recommended at least 4 ANC visits under the normal situation. Data from NNS 2011 showed that a total of 49.6% women had 4 or

more ANC visits. 67.8% were from urban areas and 38.6% were from rural areas. When provincial variance was assessed it was found that in Punjab 49.9%, Sindh 56.9%, KPK 42%, Baluchistan 34.1%, FATA 56.7%, AJK 40.7% and Gilgit 39.8% women had 4 or more ANC visits.

Table 5.1: Did you seek any one for antenatal care during your last pregnancy

	Total	Residence		Province / Region						
		Urban	Rural	Punjab	Sindh	KPK	Balochistan	FATA	AJK	Gilgit
ANC										
Yes	63.5	83.8	55.5	69.2	62.8	55.1	48.0	27.7	80.8	80.1
No	36.2	16.1	44.2	30.7	37.2	44.3	51.7	69.9	19.2	19.9
Don't know	0.2	0.1	0.3	0.1		0.6	0.3	2.4		
N	20188	7788	12400	8981	4373	2434	1636	868	1263	633
Care provider										
Gynecologist	62.3	74.4	55.0	62.1	67.9	56.2	58.5	47.6	62.0	66.6
Nurse	11.9	5.6	15.7	17.8	2.9	1.6	5.3	12.8	15.5	14.2
CHW	0.6	0.6	0.6	0.4	0.4	1.8	0.4	3.3	0.2	0.5
LHW	1.9	1.2	2.3	1.4	0.7	4.9	3.8	11.1	0.9	3.0
LHV	3.6	2.2	4.5	1.3	0.5	19.2	2.9	15.9	1.1	6.0
TBA	2.2	1.8	2.5	2.1	1.9	2.1	6.0	8.5	0.3	
Others	0.2	0.1	0.2	0.3	0.1	0.1			0.2	
N	13112	6290	6822	6408	2722	1391	784	227	1053	527
#of ANC Visits										
1	14.3	7.4	18.4	16.5	10.0	10.0	22.2	4.8	15.4	20.3
2	18.4	11.1	22.8	17.5	17.6	21.4	26.1	18.6	20.0	14.6
3	17.5	13.4	20.0	15.9	15.3	26.4	17.4	17.9	23.5	25.0
>3	49.6	67.8	38.6	49.9	56.9	42.0	34.1	56.7	40.7	39.8
Don't know	0.2	0.3	0.2	0.3	0.1	0.2	0.1	1.9	0.3	0.3
N	13115	6294	6821	6428	2717	1388	788	213	1053	528

4. Components of Care during ANC Visits

The NNS 2011 also assessed the components of care provided during the ANC visit.

The provision of care during ANC varied greatly depending upon the interest of care provider and facilities at her health facility and also on condition and demand of the clients. Since 2006-07 (PDHS) some improvement has been made in the provision of care components. The major components that were carried out during the ANC were weight measurements, Blood pressure measurements, urine test, blood test and ultrasound. It was found that about 51% of women were weighed, 72.2% women had their Blood pressure measured, 53.4% had their urine tested, 51.2% had their blood tested and 82% had their ultrasound done. The utilization of Ultrasound examination has markedly improved since the last PDHS which showed 65.9% of women had their ultrasounds done during their ANC of which 74.4% were from urban areas and 60.6% were from rural areas. The NNS 2011 revealed that 82.1%

of women had their ultrasound done during their ANC of which 85.2% from urban areas and 80.3% were from rural areas. The following Figure shows the other results:

Fig 5.1 components of care during ANC visits

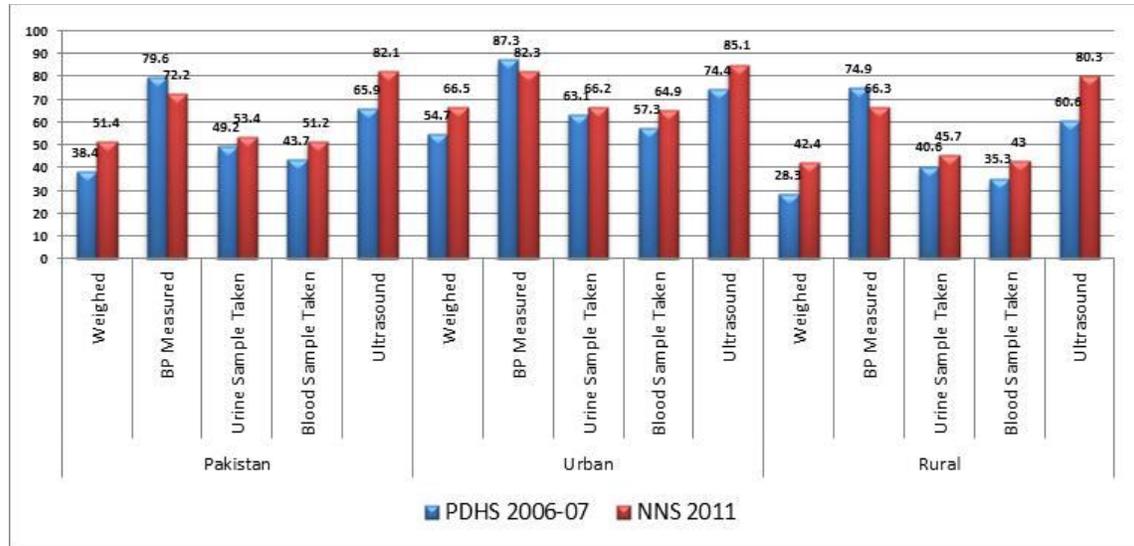
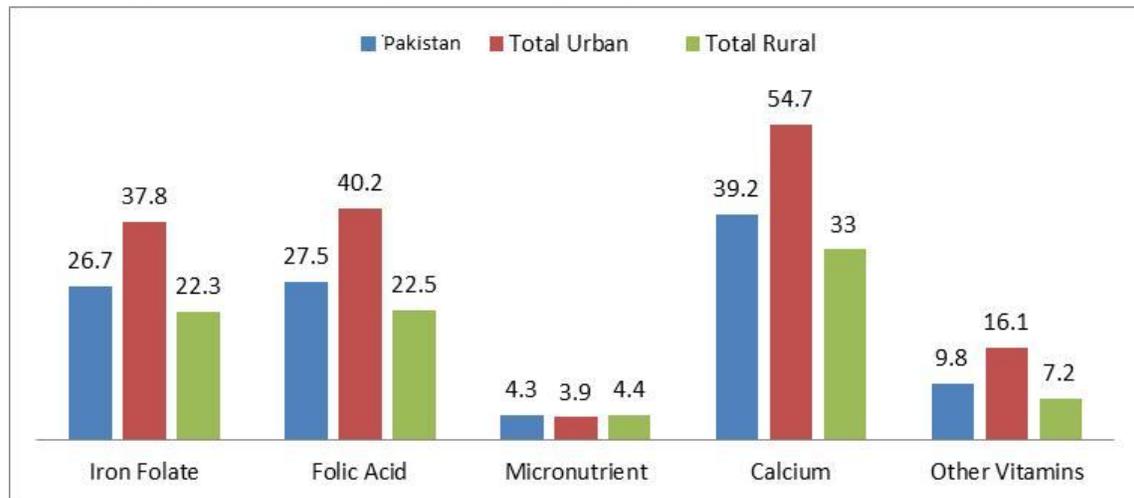


Fig 5.2 Supplementation during the Last Pregnancy



Data on the micronutrient supplementation during the last pregnancy was also collected during the survey. It was revealed that about 26.7% of pregnant women were consuming Iron, folate, 37.8% from urban areas and 22.3% from rural areas, a total of 27.5 % were consuming folic acid, 40.2% from urban areas and 22.5% from rural areas, 4.3 % women were consuming micronutrients out of which 3.9 were form urban areas and 4.4% were from rural areas, a total of 39.2% were consuming calcium, 54.7 % from urban areas and 33% from rural areas and about 9.8% women were using other vitamins, 16.1% from urban areas and 7.2% from rural areas. The details of the nutrition supplements consumed during pregnancy are illustrated in above figure 5.2.

Section 3: Knowledge of micronutrients and vitamin rich foods

5.3.1 Knowledge of Micronutrient

Micronutrient deficiencies still remain important public health problems in Pakistan. During survey, to obtain information of micronutrient knowledge, respondents were asked simple and straight questions "Have you ever heard (Micronutrient)?" "Their impact on health if deficient" and "Which foods contain micronutrients?".

Table 5.2 Knowledge about Micronutrients

Regions	Iron	Zinc	Vitamin A	Vitamin D	Vitamin B	Iodine
Pakistan	24.8	6.1	24.0	20.8	19.3	42.8
Urban	42.0	12.8	41.6	38.0	34.4	61.6
Rural	17.0	3.1	16.0	13.0	12.5	34.2
Punjab	29.8	6.6	28.6	24.3	23.2	47.8
Sindh	23.6	7.5	23.5	22.5	19.2	38.4
KPK	13.9	4.2	12.5	9.9	9.7	41.3
Balochistan	8.6	2.8	10.6	6.4	5.8	17.3
FATA	9.5	0.9	7.5	3.8	3.6	17.3
AJK	40.8	9.7	44.5	41.6	40.1	59.1
Gilgit	22.7	4.5	28.8	16.7	15.6	37.1

1-Knowledge about Iron:

The findings of present survey found that mothers had very low knowledge about Iron in Pakistan. Overall, only 25 percent of the mothers had knowledge about iron. The percentage of awareness about iron was higher (42%) in urban areas than in rural areas (17%). Balochistan (8.6%), FATA (9.5%) and KPK (14%) had poor knowledge of iron in comparison to other provinces.

2-Knowledge about Zinc:

Overall, only 6 percent of the mothers had knowledge about Zinc, while this knowledge was higher in urban areas (13%) than in rural areas (3%). The pattern of poor knowledge about Zinc was almost similar across all provinces but FATA (0.9%) had least knowledge of zinc.

3-Knowledge about vitamin A:

Only 24 percent mothers were aware about Vitamin A in Pakistan, while this awareness was higher (41.6%) in urban areas than in rural area (16%). FATA (7.5%), Balochistan (10.6%) and KPK (12.5%) had lesser knowledge of vitamin A.

4-Knowledge about vitamin D:

Around 21 percent of the mothers were aware about vitamin D, while this knowledge was higher (38%) in urban areas than in rural areas (13%). FATA (3.8%), Balochistan (6.4%) and KPK (10%) had poor knowledge of vitamin D in comparison to other provinces.

5-Knowledge about vitamin B Complex:

Only 19 percent of the mothers were aware about vitamin B complex, while knowledge was higher (34%) in urban areas than in rural areas (12.5%). Again FATA (3.6%), Balochistan (5.8%) and KPK (9.7%) had poor knowledge of vitamin B complex in comparison to other provinces. Punjab had highest (23.2%) knowledge of vitamin B complex within all provinces of Pakistan.

6-Knowledge about iodine:

Overall, 42.8 percent mothers in Pakistan had knowledge about iodine, while level of awareness was higher (61.6%) in urban areas than in rural areas (34.2%). FATA and AJK (17%) each had less knowledge about iodine in comparison to other provinces.

3.3.2-Knowledge of Vitamin Rich Foods

Vitamins are essential nutrients that contribute to a healthy life. Although many people get all the vitamins they need from the foods they eat yet hundreds of people still do not correlate them with specific vitamin.

The pregnant women are considered to be a nutritionally vulnerable segment of the population due to enhanced need of nutrition during pregnancy for fetus growth. The marginal nutrient intake increases the risk of nutritional deficiencies in pregnancy. Recent research confirmed the higher prevalence of anemia and iron deficiency along with some other micronutrient deficiencies among the pregnant women.

In the NNS 2011 the efforts were aimed at investigating dietary pattern, nutrient intake and nutritional status of MWRA with a particular focus on the knowledge of micronutrients and vitamins and appropriate knowledge about vitamin rich foods and micronutrient deficiency's impact on health.

1-Iron Rich Foods:

Across Pakistan 24.8 percent mothers who have heard about iron, around half of them did not know which foods contain iron. However 36.5 percent said green leafy vegetables, 20 percent mentioned meat and rest told about miscellaneous food preparations which may or may not iron rich. Highest knowledge about iron rich foods were noted in province Sindh (69%) and urban Pakistan (65%); and lowest in FATA (25%) and AJK (35%). Around 80 percent mothers were not aware about health problems may occur due to iron deficiency in FATA and 76 percent in AJK.

2-Zinc Rich Foods:

Unfortunately 73 percent mothers did not know about foods which contain Zinc across Pakistan. Only 7 percent mentioned meat and meat products while 2.3 percent mentioned about water melon seeds. Knowledge about Zinc rich foods was greater in KPK and FATA

(64% & 52%) respectively; and lower in AJK (10%) & Punjab (22%). 90 percent mothers were not aware about the health problems due to Zinc deficiency in AJK and 84 percent in Punjab.

3-Iodine Rich Foods:

Iodine Deficiency Disorders (IDDs) is affecting almost half of Pakistan population. The national IDD Control Program launched in 1994. One major goal of the program was iodization of salt and its promotion. NNS 2011 survey finding revealed that 67 percent respondents mentioned that iodized salt is the major source of iodine however very limited (2.4%) awareness about other iodine rich food like fish/sea food. Around 76 percent mothers were not aware about the problems due to iodine deficiency in FATA, 70 percent in Sindh, 68 percent in rural Pakistan and 65 percent in AJK.

4-Vitamin A Rich Food:

58 percent mothers in Pakistan did not know which vitamin A rich foods, similarly (78%) in FATA, (72%) in AJK, and (63%) in Punjab were also not aware. While 20.5 percent mentioned fruits and 17 percent mentioned green leafy vegetables across Pakistan.

5-Vitamin D Rich Foods:

Majority of mothers 64.4 percent did not know about Vitamin D rich foods in Pakistan, while this percentage was higher (70%) in rural areas than in urban areas (60%). Only 4.8 percent mentioned egg, 9.3 percent meat and liver, 3.7 percent also said sun light as source. AJK (74%), Punjab (70.8%), and FATA (64.6%) did not know about vitamin D rich foods.

6-Vitamin B complex Rich Foods:

70 percent of the mothers were not aware about the vitamin B complex rich foods in Pakistan with 73.4% in rural areas and 66.5% in urban areas. Around 13 percent and 12 percent mentioned fruits and green leafy vegetables respectively. Across provinces, AJK (80%), Punjab (75%), and Sindh (65.8%) did not know about vitamin B complex rich foods.

5.3.3 Knowledge about iodized salt and its usage:

Overall, 64 percent mothers were aware of iodized salt, whereas knowledge of iodized salt was higher (83%) in urban areas than in rural areas (55%). The respondents from AJK (82%), Gilgit (79%) and Punjab (71.4%) had excellent awareness but respondents in FATA (29.8%) & Balochistan (29.3%) were comparatively least aware about iodized salt.

The reported use of iodized salt for cooking was (39.8%) across Pakistan. A considerable provincial/regional variation was found as Gilgit (95%), AJK (71.6%); and FATA (14 %) and Punjab (36%). The reported use of iodized salt was higher (46.5%) in urban areas that in rural areas (35.2%).

Fig 5.3 Knowledge and reported use of iodized salt

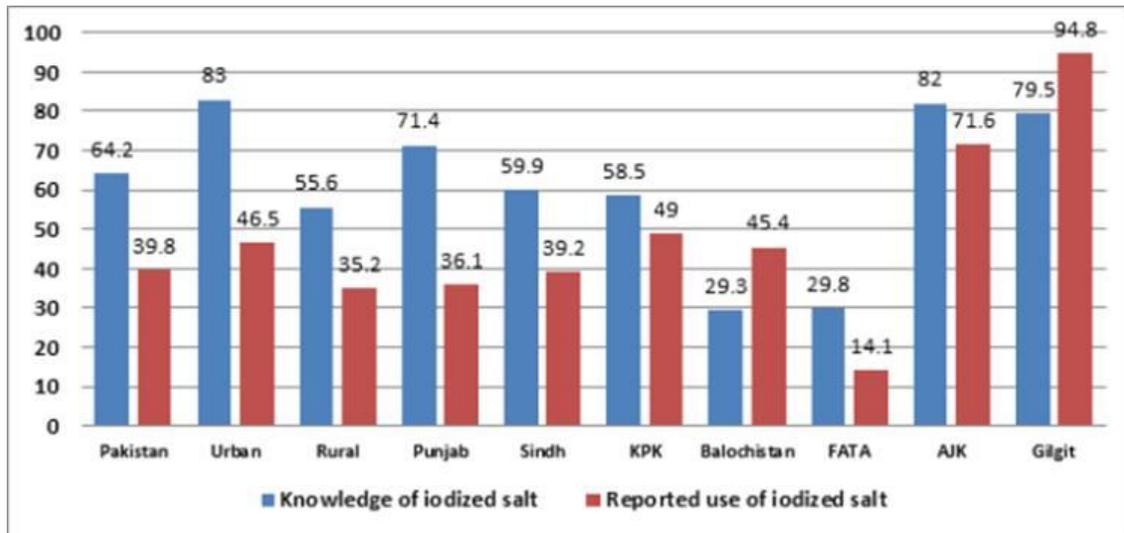


Table 5.3 Salt Test Results

Areas	0 PPM	15 PPM	25 PPM	50 PPM
Pakistan	30.9	13.4	17.6	38.2
Urban	27.6	12.3	16.3	43.9
Rural	32.4	13.9	18.1	35.5
Punjab	21.2	11.6	19.0	48.2
Sindh	48.2	14.0	11.8	26.0
KPK	36.4	19.0	24.4	20.2
Balochistan	59.2	15.2	9.2	16.5
FATA	44.9	29.2	15.6	10.4
AJK	12.1	14.9	22.6	50.4
Gilgit	15.1	14.8	16.5	53.5

Rapid iodized salt test kits were used in survey to assess the iodine content in the salt used in the household. The kit tests salt with drops of stabilized starch based solution, which causes chemical reaction manifested by color change. The salt sample was taken in a tea-spoon, and after shaking the reagent (test solution) bottle well, a drop of the test solution was poured on the salt. The salt will turn light blue to dark violet depending on the iodine content of the salt. To assess the iodine content, the color of the salt is compared with 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 monitoring of iodized salt.

According to the test, the proportion of households using actual iodized salt in Pakistan was (69%), while the actual use of iodized salt was higher (72%) in urban areas than in rural areas (68%). Highest actual use of iodized salt was observed in AJK (88%), Gilgit (85%); and lowest in Balochistan (41%) and Sindh (52%) in comparison to other provinces.

5.3.4 Consequences of Micronutrient deficiencies

Majority of respondents was unaware about the potential causes of illness and effects on health in general and on young children and pregnant women in particular might come-up due to the micronutrient deficiency.

1-Iron Deficiency: 60.7 percent mothers told that they know nothing what iron deficiency can cause. Those who known said that iron deficiency cause anemia (26.4 percent), lethargy/irritability (7.4 percent) and weakness (4.4 percent).

2-Zinc Deficiency: 78.9 percent mothers were totally unaware. Growth retardation mentioned by 7.5 percent mothers, diarrhea 5 percent and skin ulcer 5.5 percent. Zinc deficiency may lead to impaired cognitive function, behavioral problems, impaired memory, learning disability were not known to any mother.

3-Iodine Deficiency: Although knowledge of mothers about iodine (Mainly due to the iodized salt) was the highest among all micronutrients still 63.7 percent did not know its effects on health in case of deficient. Goiter was mentioned by 26 percent mothers and endemic mental retardation by 7.6 percent.

4-Vitamin A Deficiency: Vitamin A deficiency is a public health problem in Pakistan hitting hardest young children and pregnant women. In Pakistan, 78.1 percent mothers were not aware of consequences of vitamin A deficiency. Only 7.2 percent mentioned night blindness. No other major effects like pre-term delivery and pregnancy-induced hypertension was not mentioned by any mother.

5-Vitamin D Deficiency: Rickets and slow bone development was mentioned by 13.3 percent women. Other major health concerns like risk of pre-eclampsia and affect immune function were not mentioned.

6-Vitamin B₁₂ Deficiency: Vitamin B₁₂ deficiency can potentially cause severe and irreversible damage, especially to the brain and nervous system. At levels only slightly lower than normal, a range of symptoms such as fatigue, depression and poor memory may be experienced however only 9.2 mothers mentioned anemia while 79.1 percent did not it's deficiency effects.

Section 4: Clinical Examination (Mothers of Index Child)

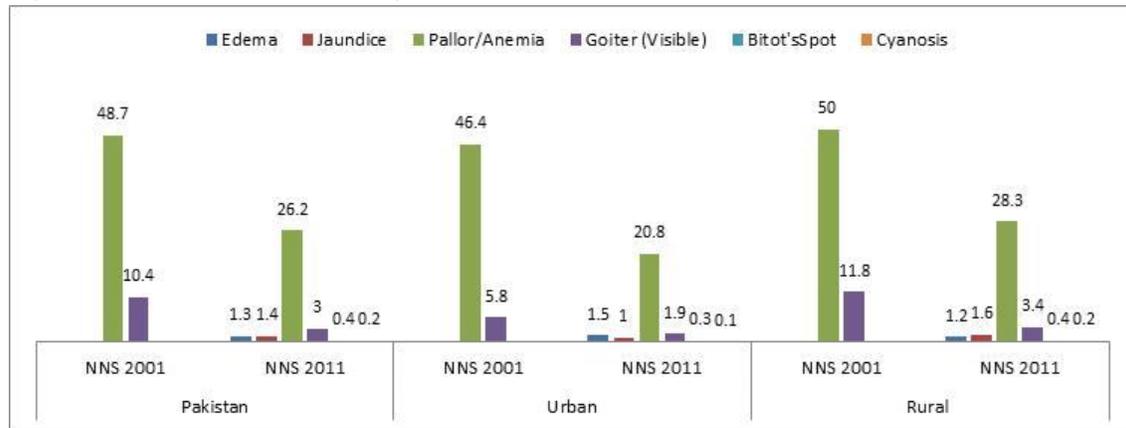
During the NNS 2011 clinical examination of the mothers of Index children was also performed. This examination was done by trained nurses. This is the direct assessment of micronutrient malnutrition and depends upon the clinical signs and symptom. The mothers were examined for Anemia, Edema, Jaundice, Goiter and Bitot's spot, each of these sign and symptom represents a micronutrient deficiency.

The survey revealed that overall 26.1% of the mothers were anemic of which 20.7% were from urban and 28.3% were from rural. The prevalence of clinical anemia among the provinces was found to be 28.2% in Punjab, 34.2% in Sindh, 11% in KPK, 19.1% in Baluchistan, 10.3% in FATA, 36.1% in AJK and 16.3% in Gilgit. The prevalence for edema was 1.3% (1.5% urban and 1.2% rural) with no significant variance among provinces except for Gilgit where it was 4%. Bitot's spot was found in 0.4% of the mothers with no urban and rural variance. When it was assessed on provincial basis it was found that Baluchistan and FATA had the highest percentages that were 2.4% and 4% respectively. (Table 5.4)

	Pakis-tan	Residence		Province / Region						
		Ur-ban	Ru-ral	Punjab	Sindh	KPK	Balo-chistan	FATA	AJK	Gilgit
Anemia / Pallor	26.1	20.7	28.3	28.2	34.2	11	19.1	10.3	36.1	16.3
Edema	1.3	1.5	1.2	1.7	0.6	0.8	1.7	1.6	1.6	4
Jaundice	1.4	1	1.6	1.6	1.5	0.7	1.2	0.4	1.8	0.1
Goiter	2.9	1.9	3.3	4.1	1.3	1.2	1.0	0.7	9.8	1.3
Bitot's spot	0.4	0.3	0.4	0.1	0.2	0.3	2.4	4	0	0.3

The prevalence of clinical anemia in NNS 2001 was 48.7 percent (46.4 percent in urban and 50 percent in rural) that has been reduced to 26.2 percent (20.8 percent in urban and 28.3 percent in rural). Similar trends were found for edema, jaundice, goiter visible, cyanosis and bitot's spot.

Fig 5.4 Clinical Examination among Mothers



Section 5: Anthropometry

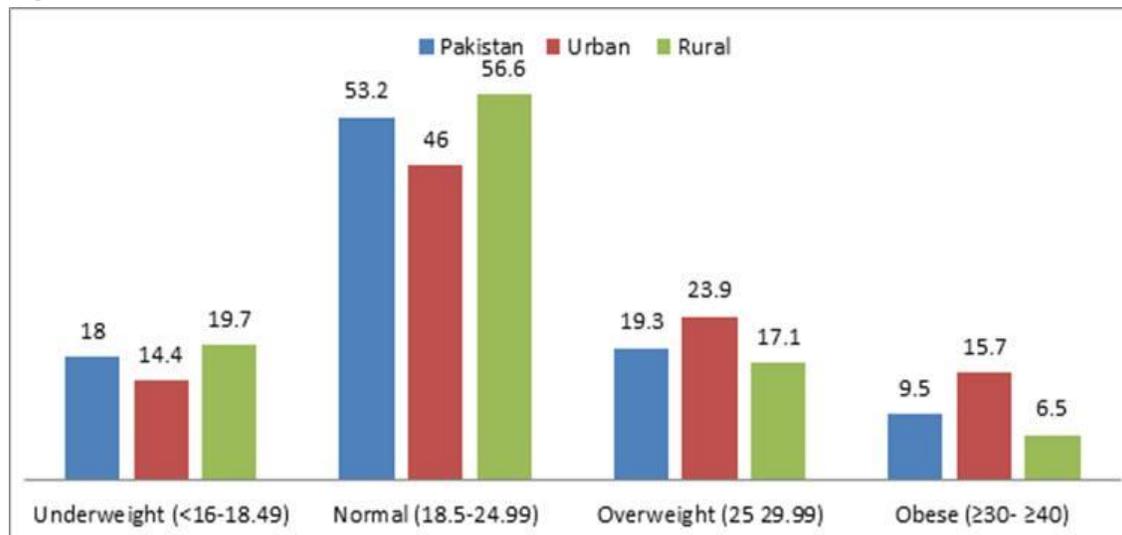
Anthropometry is the hallmark technique of biological anthropology, and has become increasingly important in health assessments across this century. "There are two possible ways to assess the adequacy of food and nutrition and to detect the presence of inadequacy in food intake among individuals or population groups: the first measures nutritional intake and the second assess nutritional status. The second option assesses the nutritional status

of the individual or a representative sample of individuals within a population by measuring anthropometric, biochemical or physiological (functional) characteristics to determine whether the individual is well-nourished or undernourished (UNICEF, 1998 *The state of the world's children 1998*. Oxford, Oxford University Press)".

During the NNS 2011 Anthropometry was also done by the trained nurses for all available women of reproductive age group. Measurements for weight, height and MUAC were taken and consequently Body Mass Indices were also calculated. The BMI was divided into four categories namely underweight having BMI of <16 to 18.49, Normal having BMI of 18.5 to 24.99, over weight having BMI of 25 to 29.99 and obese having BMI of >30.

The data revealed that a total of 18% of WRA had low BMI and were under weight of which 14.4 % were from urban areas and 19.7 % from rural areas. About 53.2% had Normal BMI of which 46% were from urban areas and 56.6% from rural areas. It was also found that 19.3% of total WRA were overweight of which 23.9% were from Urban and 17.1% from rural respectively. The data also revealed information about the obese person and it was found that 9.5% of the WRA were obese out of which 15.7 belonged to urban areas and 6.5% belonged to rural areas.

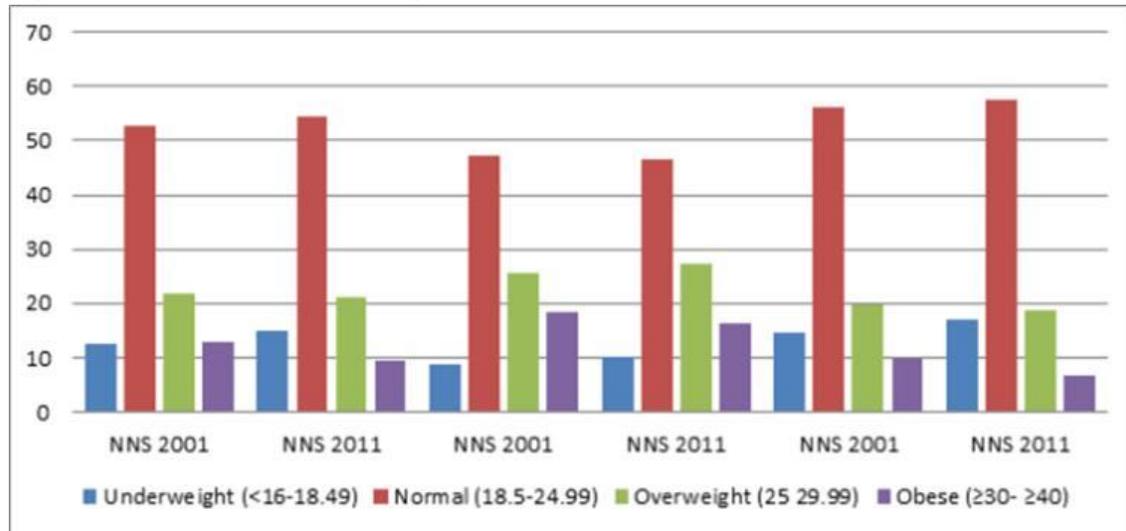
Fig 5.5 BMI for all WRA



1- Body Mass Index – Non Pregnant Mothers

In the NNS 2011 we also analyzed the BMI data on the Non pregnant mothers and compared this with the previous NNS 2001. The data revealed that the 54.4% of non-pregnant mothers in 2011 had Normal BMI compared to 52.9% in 2001. About 15.1% were underweight in 2011 compared to 12.5% in 2001 and 21.1% were overweight in 2011 compared to 21.8% in 2001. A total of 9.5% are found to be obese in 2011 compared to 12.8% in 2001.

Fig 5.6 BMI of Mothers (Non Pregnant)



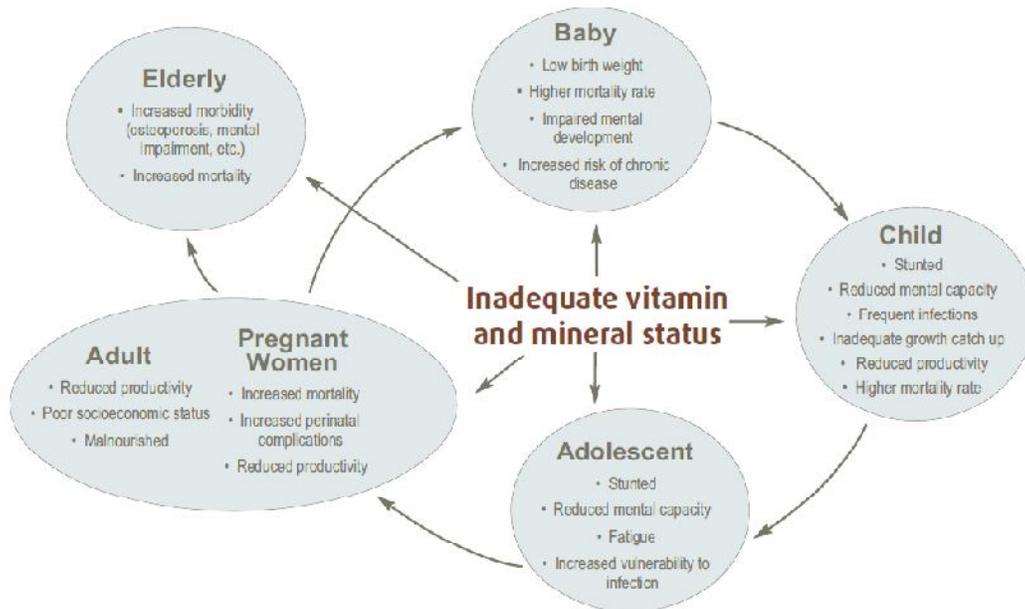
Section 6: Micronutrient Deficiency

Micronutrient deficiency is a major global health problem. More than 2 billion people in the world today are estimated to be deficient in key vitamins and minerals, particularly vitamin A, iodine, iron and zinc. Most of these people live in low income countries and are typically deficient in more than one micronutrient. Deficiencies occur when people do not have access to micronutrient-rich foods such as fruit, vegetables, animal products and fortified foods, usually because they are too expensive to buy or are locally unavailable. Micronutrient deficiencies increase the general risk of infectious illness and of dying from diarrhea, measles, malaria and pneumonia. These conditions are among the 10 leading causes of disease in the world today (The World Health Report 2001: Reducing risks, promoting healthy life. Geneva, World Health Organization, 2001).

Although the micronutrient deficiency affects throughout lifecycle since the pre-birth however the groups most vulnerable to micronutrient deficiencies are pregnant women, lactating women and young children, mainly because they have a relatively greater need for vitamins and minerals and are more susceptible to the harmful consequences of deficiencies. For a pregnant woman these include a greater risk of dying during childbirth, or of giving birth to an underweight or mentally-impaired baby. For a lactating mother, her micronutrient status determines the health and development of her breast-fed infant, especially during the first 6 months of life. For a young child, micronutrient deficiencies increase the risk of dying due to infectious disease and contribute to impaired physical and mental development (Preventing and controlling micronutrient deficiencies in populations affected by an emergency, Joint statement by the World Health Organization, the World Food Program and the United Nations Children’s Fund, WHO 2007).

Fig 5.7 consequences of vitamin a and mineral deficiencies

Figure 1. Consequences of vitamin and mineral deficiencies during the life cycle



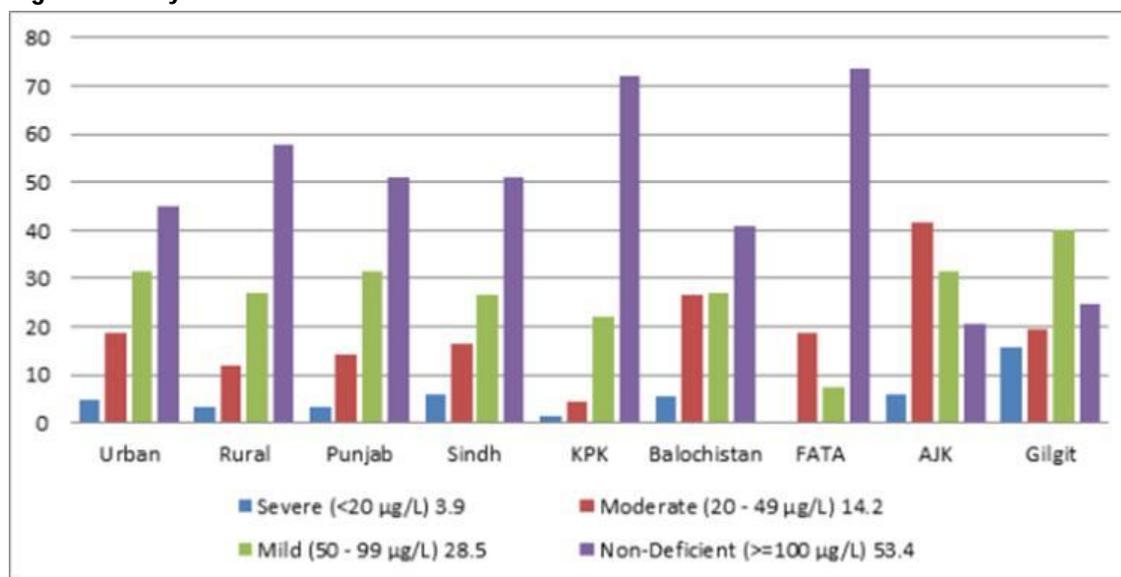
Adapted from the United Nations Administrative Committee on Coordination Sub-Committee on Nutrition (ACC/SCN), Fourth Report on the World Nutrition Situation, 2000, Geneva: ACC/SCN In collaboration with IFPRI.

1-Urinary Iodine Excretion of Mother of Index Child

Urinary Iodine Excretion Is the Most Appropriate Outcome Indicator for Iodine Deficiency at Field Conditions. In NNS 2011 urine samples from the mothers of index children were collected to assess the urinary iodine excretion. The data revealed that about 52.3% women (Urban 43.7% and rural 56.9%) had normal urinary iodine excretions. Whereas 29.2% women (Urban 32.7% and rural 27.4%) had mild deficiency of iodine excretion in urine, 14.6% women, (urban 19.4% and rural 12.0%) had moderate deficiency of iodine excretion in urine. However 3.9% women (Urban 4.2% and rural 3.8) had severe deficiency of iodine in urine. While comparing the women who had normal iodine excretion in urine on provincial basis it was found that KPK province had the highest percentage 76.1% followed by Sindh 51.5%, Punjab 49.8%, Baluchistan 31.8%, AJK 18.3%, and Gilgit 24.4%. Further, with regard to overall percentage of women having severe deficiency of iodine excretion in urine, Gilgit had the highest percentage 15%, followed by Sindh 6.3%, AJK is at third with 5.9%, and Baluchistan and KPK have 4.6% and 1.5% respectively.

When the data of NNS 2011 was compared with that of 2001 it was found that iodine deficiency rate had reduced during the last decade, it was found that in NNS 2011 about 52% were non deficient compared to NNS 2001 which revealed that only 23.7% were non deficient. Similar trends were found for the urban and rural areas.

Fig 5.8 Urinary Iodine Excretion in mothers



Median Urinary Iodine Excretion in mothers

The median of urinary iodine excretion was also determined in mothers at it was revealed that the Median iodine excretion in mothers was 104.5ug/l, 94.6 ug/l in urban areas and 112.7 ug/l in rural areas. The provincial distribution of Median Urinary iodine excretion was 100 ug/l in Punjab, 101 ug/l in Sindh, 148.6 ug/l in KP, 85.3 ug/l in Balochistan, 204.6 ug/l in FATA, 64.9 ug/l in AJK and 63.8 ug/l in Gilgit

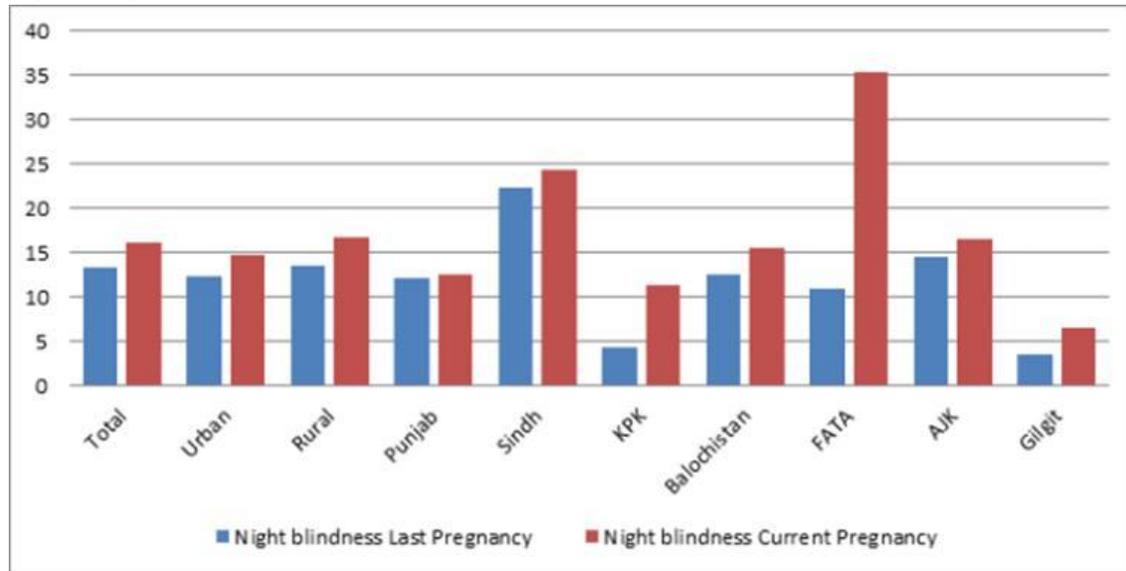
Table: 5.5 Comparison of urinary iodine excretion in mothers

	Pakistan		Urban		Rural	
	NNS 2001	NNS 2011	NNS 2001	NNS 2011	NNS 2001	NNS 2011
Severe	36.7	3.9	27.3	4.2	41.5	3.8
Moderate	21.2	14.6	27.8	19.4	17.8	12
Mild	18.4	29.2	21.2	32.7	17	27.4
Non-deficient	23.7	52.3	23.7	43.7	23.7	56.9

2-Night Blindness of the Mother of Index Child (Last and Current Pregnancy)

Reported prevalence of night blindness in the current and last pregnancy revealed that 13.3% women (Urban 12.4% and rural 13.6%) reported night blindness during their last pregnancy while 16.2% women (Urban 14.7% and rural 16.7%) reported night blindness during their current pregnancy. Among provinces of Pakistan, Sindh (22%) has the highest reported rates of night blindness during the last pregnancy followed by AJK, Baluchistan, Punjab, FATA, KP and Gilgit. Among those women who reported night blindness during their current pregnancy FATA (35.4%) had the highest rates followed by Sindh, AJK, Baluchistan, Punjab, KP and Gilgit.

Fig 5.9 Night Blindness in Women



The data of night blindness in NNS 2011 and NNS 2001 was also compared, it was found that night blindness rates have gone up as in NNS 2011 the rates during the last pregnancy were 13.3% compared to 7.8% in NNS 2001, similar trends were seen in urban and rural division. The night blindness rates during current pregnancy in 2011 were found to be 16.2% compared to 9.9% in NNS 2001 an increasing trend was observed in both urban and rural areas.

Table: 5.6 Comparison of night blindness

	Pakistan		Urban		Rural	
	NNS 2001	NNS 2011	NNS 2001	NNS 2011	NNS 2001	NNS2011
Night Blindness % (Last Pregnancy)	7.8	13.3	7.5	12.4	8	13.6
Night Blindness % (Current Pregnancy)	9.9	16.2	9.4	14.7	10.1	16.7

Section 7: Biochemical Analysis:

During the NNS 2011 blood samples were collected to assess the biochemical status of micronutrients among mothers of the index child, the blood samples were analyzed for Hemoglobin, Ferritin, Vitamin A, Zinc, calcium and vitamin D levels. Following are the results revealed from the analysis.

1-Hemoglobin Levels:

Hemoglobin levels of both pregnant and non-pregnant women were checked and it was revealed that 50.5% of women that were non pregnant were hemoglobin deficient out of which 49.5% were from urban areas and 51% were from rural areas. When the data was compared for provinces it was found that 62.1% from Sindh province had hemoglobin deficient followed by Punjab 48.8%, Baluchistan 48.7%, FATA 45.5%, AJK 41.3%, KP 36.3% and

Gilgit 23.4%. Out of 50.5% of women that were not pregnant 48.9% had moderate hemoglobin deficiency and 1.6% had severe hemoglobin deficiency.

Table: 5.7 Hemoglobin Levels Non Pregnant mother

	Pakistan	Residence		Province / Region						
		Urban	Rural	Punjab	Sindh	KPK	Baluchistan	FATA	AJK	Gilgit
Severe deficiency (<7 gm/dL)	1.6	1.0	1.9	1.2	3.0	0.9	2.0	0.0	0.2	0.6
Moderate deficiency (7 - 11.99 gm/dL)	48.9	48.6	49.1	47.6	59.1	35.5	46.6	45.5	41.1	22.8
Normal (>= 12 gm/dL)	49.5	50.5	49.0	51.2	37.9	63.7	51.3	54.5	58.7	76.6
N	10793	4418	6375	5433	2469	793	891	151	719	337

The data for the pregnant women revealed that 51 % of women that were pregnant were hemoglobin deficient out of which 50.7 % were from urban areas and 51.4 % were from rural areas. When the data was compared for provinces it was found that 60.2 % from Sindh province were hemoglobin deficient followed by Punjab 49.7 %, Baluchistan 48.1%, AJK 43 %, Gilgit 35% and KP 28.3 %. Out of 51 % of women that were pregnant 48.7% had moderate hemoglobin deficiency and 2.5 % had severe hemoglobin deficiency.

Table: 5.8 Hemoglobin Level Pregnant mothers:

	Pakistan	Residence		Province / Region						
		Urban	Rural	Punjab	Sindh	KPK	Baluchistan	FATA	AJK	Gilgit
Severe deficiency (<7 gm/dL)	2.5	1.6	2.8	1.2	5.3	2	3	0	0	0
Moderate deficiency (7 - 11.99 gm/dL)	48.7	49.1	48.6	48.4	54.8	26.3	45.1	0	43	35
Normal (>= 12 gm/dL)	48.8	49.3	48.6	50.3	39.8	71.7	51.9	100	57	65
N	1363	496	867	730	397	66	65	3	77	25

We also compared the NNS 2011 data of hemoglobin deficiency with the data of NNS 2001 both for pregnant and non-pregnant mothers. It was found that situation of hemoglobin deficiency in non-pregnant women has become worse as in NNS 2001 about 72% women had normal hemoglobin levels which has now decreased to 49%. Similarly when the data was compared for the pregnant women about 60.9% had normal hemoglobin levels in 2001 which has now reached to 47.9%.

Fig 5.10 Maternal Anemia (Mothers - Non Pregnant)

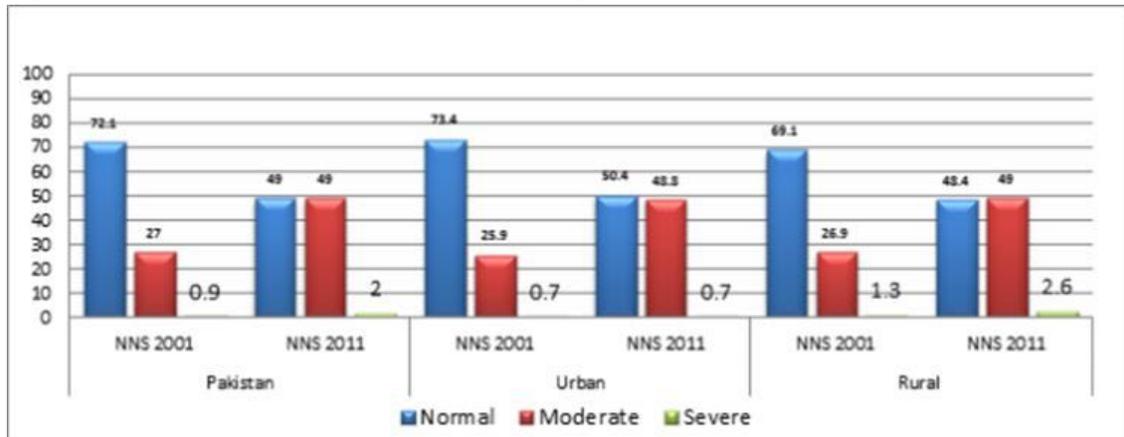
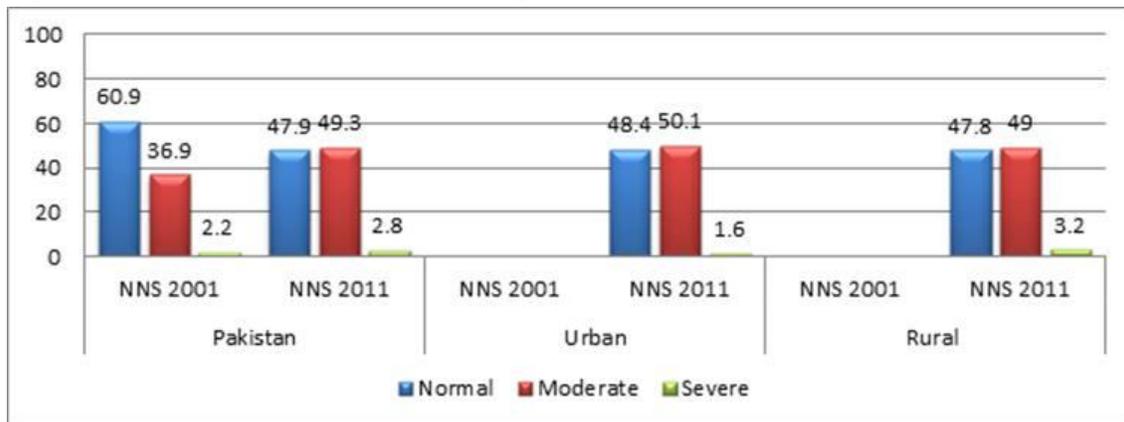


Fig 5.11 Maternal Anemia (Mothers - Pregnant)



2-Ferritin Levels:

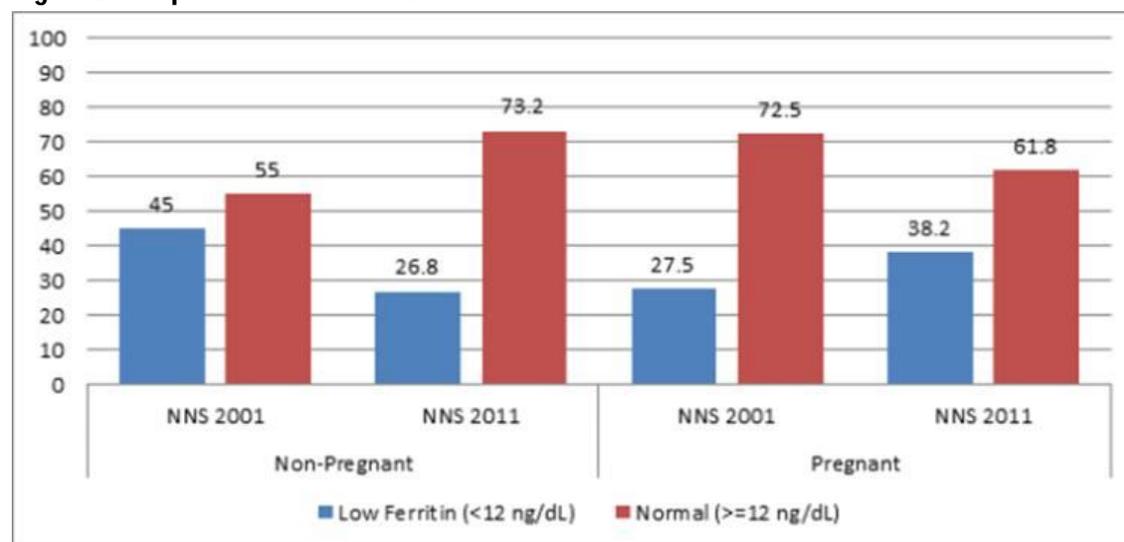
Table: 5.9 Ferritin Levels of mothers of index child

Ferritin Level - Non- Pregnant Mothers										
	Pakistan	Residence		Province / Region						
		Urban	Rural	Punjab	Sindh	KPK	Baluchistan	FATA	AJK	Gilgit
Low Ferritin (<12 ng/dL)	26.8	27.1	26.6	27.3	31.3	12.4	22.8	20.2	25.8	14.9
Normal (>=12 ng/dL)	73.2	72.9	73.4	72.7	68.7	87.6	77.2	79.8	74.2	85.1
N	7415	2868	4547	3716	1918	535	459	57	403	327
Ferritin Level - Pregnant Mothers										
Low Ferritin (<12 ng/dL)	38.2	36.7	38.7	40.5	34.8	26.4	41.2	0	38.2	45.7
Normal (>=12 ng/dL)	61.8	63.3	61.3	59.5	65.2	73.6	58.8	0	61.8	54.3
N	982	342	640	524	319	35	39		39	26

The survey also analyzed the blood samples for Ferritin levels. It was revealed that among women that were non-pregnant 26.8% had ferritin deficiency of these 27.1% were from urban areas and 26.6% were from rural areas. Further when the data was disaggregated on provincial basis women of Sindh 31.3% had the highest ferritin deficiency, followed by Punjab, AJK, Baluchistan, FATA, Gilgit and KP. When the ferritin levels were observed for the pregnant women it was revealed that about 38.2% had ferritin deficiency of which 36.7% were from urban areas and 38.7% were from rural areas. When the deficiency was assessed on provincial basis it was found that Gilgit 45.7% had the highest prevalence of ferritin deficiency followed by Baluchistan, Punjab, AJK, Sindh and KP.

We also compared the data of ferritin levels over the time and it was revealed that 45% of non-pregnant women had ferritin deficiency in 2001 compared to 26.8% in 2011; similarly in 2001 27.5% of pregnant women had ferritin deficiency in 2001 which has now reached to 38.2%.

Fig 5.12 Comparison of Ferritin Levels



3-Iron Deficiency Anemia

The data was also evaluated to ascertain the iron deficiency anemia among the mothers of index child both non pregnant and pregnant. It was revealed that 19.9% of the total non-pregnant women had iron deficiency anemia of which 18.5% were from urban areas and 20.5 were from rural areas. When data was looked for provincial variance it was found that women who had IDA, 20% of them were from Punjab, 23% were from Sindh, 5.4% were from KPK, 16.1% were from Baluchistan, 15.9% were from FATA, 18.7% were from AJK and 10% were from Gilgit.

Similarly the data was evaluated for pregnant women and it was observed that 25.9% of the total pregnant women had iron deficiency anemia of which 25.6 % were from urban areas

and 26.1% were from rural areas. When data was looked for provincial variance it was found that pregnant women who had IDA, 27% of them were from Punjab, 24.6 % were from Sindh, 15.3 % were from KPK, 31.1% were from Baluchistan, 28.4% were from AJK and 30.4 % were from Gilgit.

Table: 5.10 Iron Deficiency Anemia

Iron Deficiency Anemia - Non-Pregnant Mothers										
	Total	Residence		Province / Region						
		Urban	Rural	Punjab	Sindh	KPK	Baluchistan	FATA	AJK	Gilgit
Severe IDA	0.8	0.6	0.9	0.6	1.3	0.1	1.5	0	0.3	0.3
Moderate IDA	19.1	18	19.6	19.4	21.8	5.2	14.6	15.9	18.4	9.7
Non Anemic	80.1	81.5	79.5	80	77	94.6	83.9	84.1	81.3	90
N	6873	2728	4145	3519	1887	292	440	37	401	297
Iron Deficiency Anemia - Pregnant Mothers										
Severe IDA	1	1	1	0.6	2.1	0	0	0	0	0
Moderate IDA	24.9	24.6	25	26.4	22.5	15.3	31.1	0	28.4	30.4
Non Anemic	74.1	74.4	73.9	73	75.4	84.7	68.9	0	71.6	69.6
N	949	334	615	502	315	32	37	0	39	24

4-Vitamin A Deficiency (Mother of Index Child)

The retinol levels were also checked on the blood samples taken from mothers of index child (both pregnant and non-pregnant) to determine the Vitamin A deficiency. Among those that were non-pregnant the data revealed that about 43.1% had Vitamin A deficiency of these 34.3 were from urban areas and 46.9% were from rural areas. We also evaluated the data for the provincial variance and found that in non-pregnant mothers of index child 43.4% had VAD from Punjab, 36.2% had VAD from Sindh, 71.7% had VAD from KPK, 50.2% had VAD from Baluchistan, 83.3% had VAD from FATA, 12.5% had VAD from AJK and 39% had VAD from Gilgit.

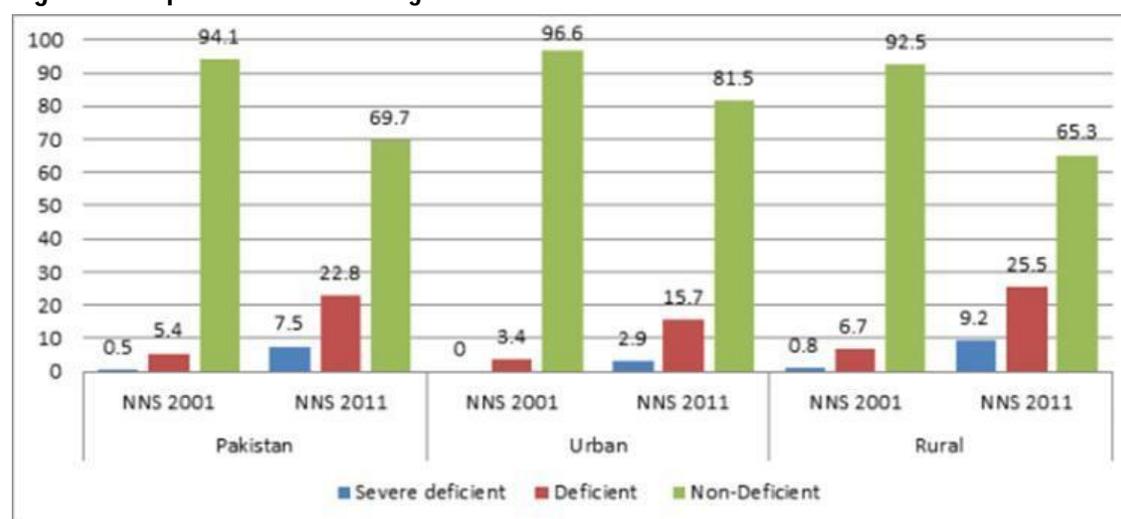
Data was also explored for those that were pregnant and it was revealed that about 48.8 % had Vitamin A deficiency of these 41.4% were from urban areas and 51.6 % were from rural areas. We also evaluated the data for the provincial variance for pregnant women as well and found that in pregnant mothers of index child 46.7 % had VAD from Punjab, 49.5% had VAD from Sindh, 85.2% had VAD from KPK, 62.5 % had VAD from Baluchistan, 30.6 % had VAD from AJK and 44.5 % had VAD from Gilgit.

Table 5.11: Vitamin A Deficiency – pregnant and Non Pregnant Mothers

Vitamin A Deficiency - Non Pregnant Mothers										
	Total	Residence		Province / Region						
		Urban	Rural	Punjab	Sindh	KPK	Baluchistan	FATA	AJK	Gilgit
Severe (<0.35 µmol/L)	17.8	10.1	21	19.2	10.3	38	20.3	48.2	0.5	8.5
Mild (0.35 - 0.70 µmol/L)	25.4	24.2	25.9	24.3	25.9	33.7	29.9	35	12	30.5
Non deficient (>0.70 µmol/L)	56.9	65.7	53.1	56.6	63.8	28.3	49.8	16.8	87.5	61
N	6925	2686	4239	3502	1819	434	435	57	394	284
Vitamin A Deficiency - Pregnant Mothers										
Severe (<0.35 µmol/L)	19.9	15.6	21.5	20.5	16.5	47.7	26.7	0	0	20.9
Mild (0.35 - 0.70 µmol/L)	28.8	25.8	30	26	33	37.5	35.8	0	30.6	23.6
Non deficient (>0.70 µmol/L)	51.2	58.6	48.4	53.5	50.5	14.8	37.5	0	69.4	55.5
N	912	329	583	497	285	30	36		42	22

We also made the comparison of Vitamin A deficiency between the data of 2011 and 2001 and it was revealed that in 2001 about 5.9 % of the women were VAD compared to 30.3% in NNS 2011. Similar trends were seen in both urban and rural areas.

Fig 5.13 Comparison of VAD among mothers



5-Zinc Deficiency In mothers of Index Child:

Serum zinc levels were also determined on the blood samples taken from the mother of the index child. The serum analysis of mothers that were not pregnant revealed that 41.6% women were zinc deficient of these 38.2% belonged to urban areas and 43.2% belonged to

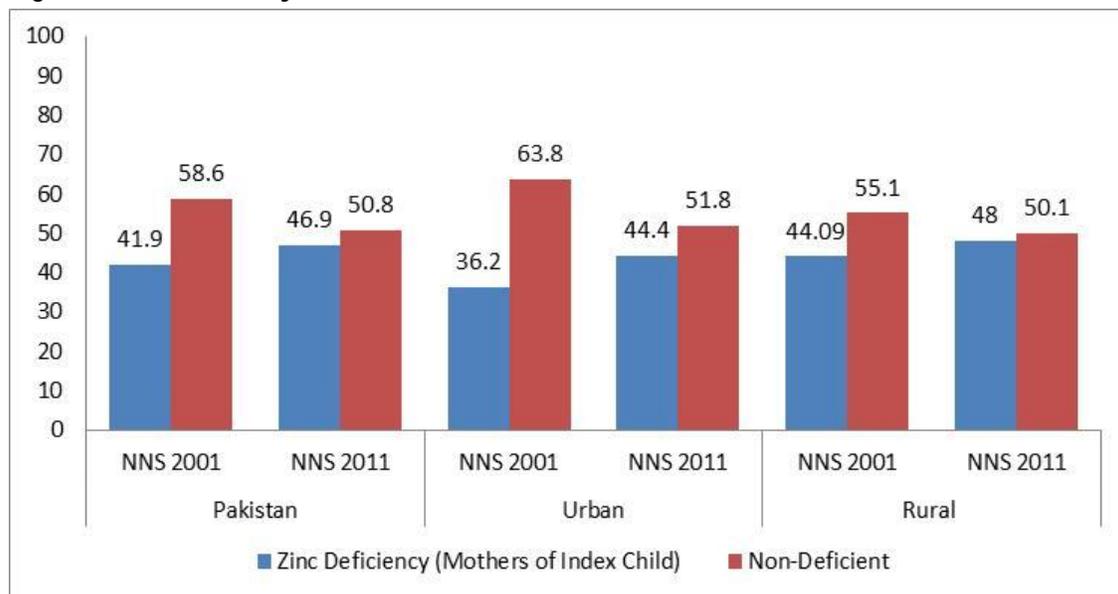
rural areas. The data was also analyzed for the provincial variance and it was revealed that the 40.8% women from Punjab, 38.9% from Sindh, 47.9% from KPK, 40.9% from Baluchistan, 41.8% from FATA, 66.9% from AJK and 36.3% from Gilgit were Zinc deficient.

When it comes to the pregnant mothers of the index child it was found that 48.3% women were zinc deficient of these 47.2% belonged to urban areas and 48.7% belonged to rural areas. The data was also analyzed for the provincial variance and it was revealed that the 48.6% pregnant women from Punjab, 44.6% from Sindh, 47.7% from KPK, 44.7% from Baluchistan, 1.2% from AJK and 45.6% from Gilgit were Zinc deficient.

Table 5.12 Zinc Deficiency In mothers of Index Child:

Zinc Deficiency - Non Pregnant Mothers										
	Total	Residence		Province / Region						
		Urban	Rural	Punjab	Sindh	KPK	Baluchistan	FATA	AJK	Gilgit
Deficient (<60 µg/dL)	41.6	38.2	43.2	40.8	38.9	47.9	40.9	41.8	66.9	63.7
Non-Deficient (>=60 µg/dL)	58.4	61.8	56.8	59.2	61.1	52.1	59.1	58.2	33.1	36.3
N	5953	2395	3558	2792	1684	293	448	46	363	327
Zinc Deficiency - Pregnant Mothers										
Deficient (<60 µg/dL)	48.3	47.2	48.7	48.6	44.6	47.7	44.7	0	98.8	54.4
Non-Deficient (>=60 µg/dL)	51.7	52.8	51.3	51.4	55.4	52.3	55.3	0	1.2	45.6
N	791	285	506	393	276	20	38	0	38	26

Fig 5.14 Zinc deficiency



We also had done the comparison of zinc deficient between the NNS 2011 and 2001. The data showed that in NNS 2001 the prevalence of zinc deficiency was 41.9% which has now become 46.9%. When the comparisons were done between urban and rural areas it was found that in 2001 the prevalence of zinc deficiency in urban areas was 36.2% which is now 44.4% similarly in 2001 the prevalence was 44.09% which has now increased to 48%.

6-Calcium Status:

In NNS 2001 Calcium levels were ascertained for the first time on such a large scale, the calcium levels in the serum were determined for the mothers of index child both non-pregnant and pregnant. The data revealed that about 51.1% of the women that were non-pregnant had Hypocalcaemia out of which 51.9% were from urban areas and 50.8% were from rural areas. We also evaluated the levels of calcium on provincial level and the data showed that about 52.3% women from Punjab, 44.2% from Sindh, 70.9% from KPK, 59.8% from Baluchistan, 81.4% from FATA, 5.9% from AJK and 44.5% from Gilgit had Hypocalcaemia.

When it comes to Pregnant women it was found that about 58.3% of the women that were pregnant had Hypocalcaemia out of which 61.6 % were from urban areas and 57.1 % were from rural areas. We also evaluated the levels of calcium in pregnant women on provincial level and the data showed that about 63.4 % pregnant women from Punjab, 50.4 % from Sindh, 61.4 % from KPK, 62.9 % from Baluchistan, 4.4 % from AJK and 71.3 % from Gilgit had Hypocalcaemia

Table: 5.13 Calcium Status

Calcium Deficiency - Non Pregnant Mothers										
	Total	Residence		Province / Region						
		Urban	Rural	Punjab	Sindh	KPK	Baluchistan	FATA	AJK	Gilgit
Hypo Calcimia (<8.4 mg/dL)	51.1	51.9	50.8	52.3	44.2	70.9	59.8	81.4	5.9	44.5
Normal (8.4-10.2 mg/dL)	39.7	39.4	39.8	36.1	49.6	22.4	39.4	18.6	85.5	54.4
Hyper Calcimia (>10.2 mg/dL)	9.2	8.8	9.4	11.6	6.2	6.7	0.8	0	8.5	1.1
N	7818	3137	4681	4022	1903	656	459	44	410	324
Calcium Deficiency - Pregnant Mothers										
Hypo Calcimia (<8.4 mg/dL)	58.3	61.6	57.1	63.4	50.4	61.4	62.9	0	4.4	71.3
Normal (8.4 - 10.2 mg/dL)	33.8	30.5	35.1	28	41.6	34	37.1	0	95	28.7
Hyper Calcimia (>10.2 mg/dL)	7.8	7.9	7.8	8.6	8	4.5	0	0	0.6	0
N	1048	387	661	578	323	42	36	0	43	26

7- Vitamin D Deficiency:

The NNS 2011 also determined the Biochemical levels of Vitamin D deficiency on such a larger scale for the first time. Vitamin D levels were tested on the samples taken from the mothers of index child both regnant and non-pregnant. It was found that there is a widespread deficiency of Vitamin D in Pakistan and among non-pregnant mothers of index child 85.1% were vitamin D deficient out of these 87.9 were from urban areas and 84.2 were from rural areas. When the vitamin D deficiency was assessed on provincial level it was found the prevalence of vitamin D deficiency among non-pregnant women in Punjab was 83.5%, in Sindh it was 90.5%, in KP it was 79.5%, in Baluchistan it was 82.6%, in FATA it was 85%, in AJK it was 95% and in Gilgit it was 96.2%.

The prevalence of vitamin D deficiency was also determined for the pregnant women. The data revealed that among pregnant mothers of index child 86.1% were vitamin D deficient out of these 86.3% were from urban areas and 86.1% were from rural areas. When the vitamin D deficiency was assessed on provincial level it was found the prevalence of vitamin D deficiency among pregnant women in Punjab was 87.7 %, in Sindh it was 84.6 %, in KP it was 77.5 %, in Baluchistan it was 77.6 %, in FATA it in AJK it was 85.5 % and in Gilgit it was 95.7 %.

Table 5.14: Vitamin D Deficiency – Pregnant and Non Pregnant Mothers

Vitamin D Deficiency - Non Pregnant Mothers										
	Total	Residence		Province / Region						
		Urban	Rural	Punjab	Sindh	KPK	Baluchistan	FATA	AJK	Gilgit
Severe Deficiency (<8.0 ng/mL)	25.3	46.3	18.4	25.1	30.7	12.7	21.1	7.6	25.4	21
Deficiency (8.0 - 20.0 ng/mL)	40.9	30.5	44.4	40.9	42.4	32.1	36	46.9	48.2	66.1
Desirable (>20.0 - 30.0 ng/mL)	18.8	11.2	21.4	17.5	17	34.7	25.5	30.6	21.5	9.1
Sufficient (>30.0 ng/mL)	14.9	12.1	15.8	16.5	10	20.5	17.4	15	4.9	3.8
N	5402	1965	3437	3023	1154	290	363	32	334	206
Vitamin D Deficiency - Pregnant Mothers										
Severe Deficiency (<8.0 ng/mL)	26.5	50.7	20.2	29.3	22.8	12.7	22.5	0	15	68.9
Deficiency (8.0 - 20.0 ng/mL)	42	27.7	45.7	41.9	44.7	26.5	26.8	0	60.2	22.5
Desirable (>20.0 - 30.0 ng/mL)	17.6	7.9	20.1	16.4	17.1	38.3	28.3	0	10.3	4.3
Sufficient (>30.0 ng/mL)	13.9	13.7	13.9	12.3	15.4	22.5	22.4	0	14.5	4.3
N	699	222	477	400	189	20	41	0	39	10

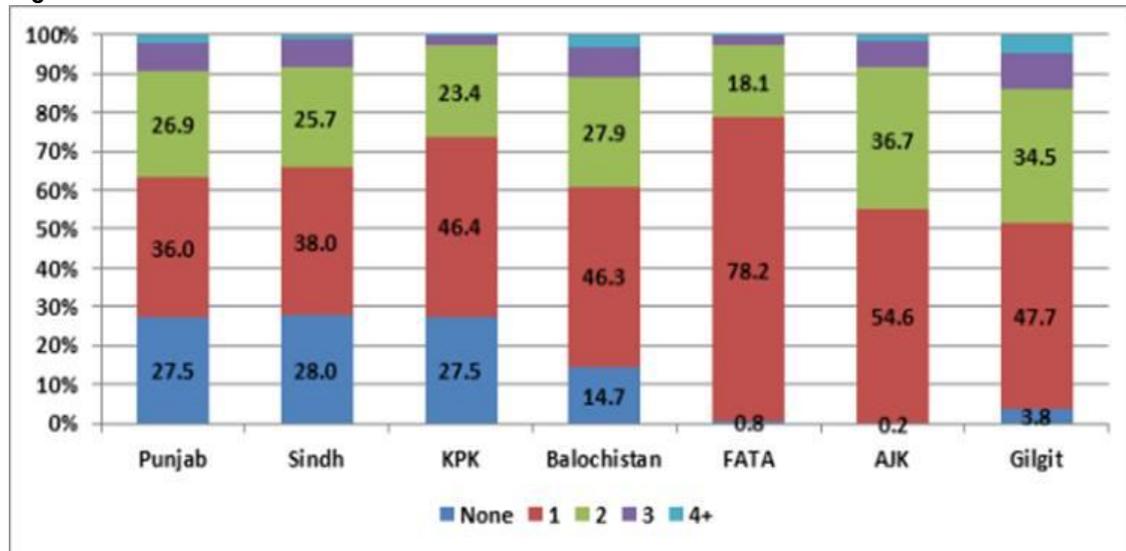
Chapter 6: Child Health and Nutrition

Section 1: Nutrition Status of the Index Children

6.1.1 Children 0 – 59 months

The details of distribution of children 0 – 59 months of age by provinces and regions are given in the following figure:

Fig 6.1 Household with Children Under 5 Years



At national level 25.5% households were without any child of <5 years while 40.1% had only one child under-5 years. FATA and AJK data shows that almost all households had a child under-5. Punjab, Sindh and KKP showed similar trends.

6.1.2 Sex and Age Distribution of Index Children

The mean age of index children was 24.9 months and 52.3% of them were males. The proportion of male children was relatively higher in rural than urban areas (Table 6.2).

Majority of index children (21.8%) belonged to the age group of 12-23 months. About 12% were less than 6 months, 15% between 6-11 months, 20.35% between 24-35 months, 15.4% between 36-47 months and 15.5% between 48-59 months.

Provincial and regional details are given in the following figure.

Fig 6.2 Age Distribution of Index Children - National

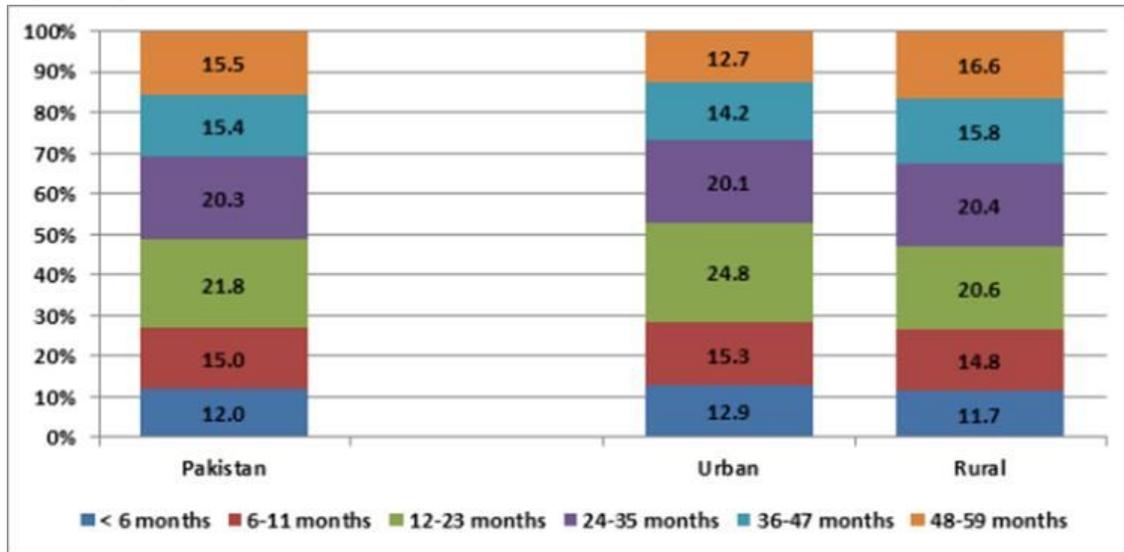
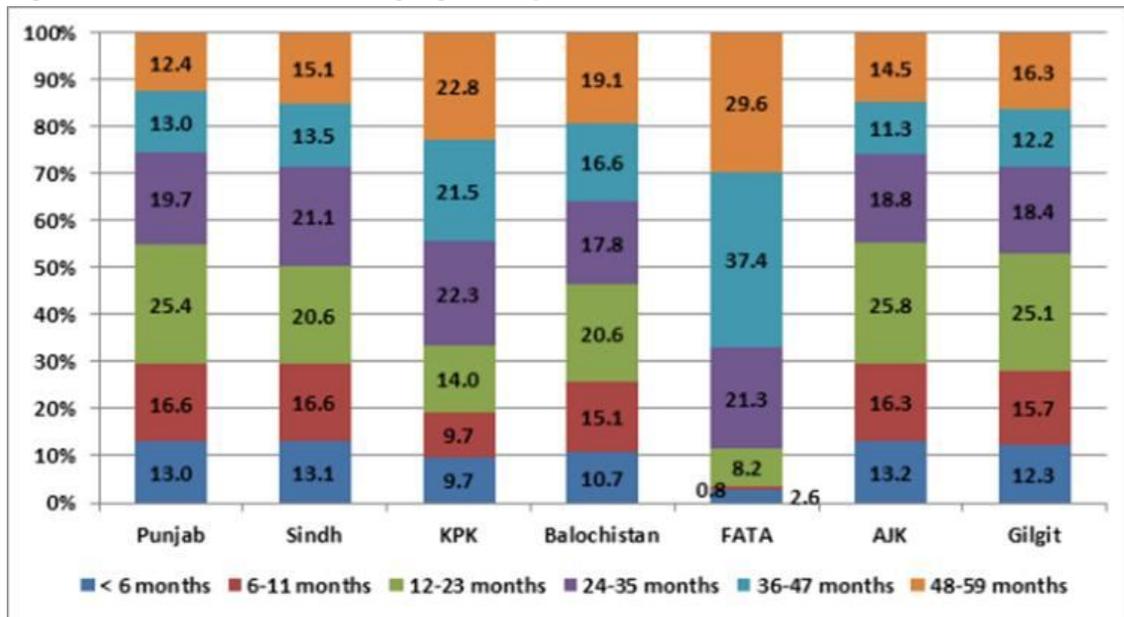


Fig 6.3 Provincial Distribution by Age Group (Index Children)

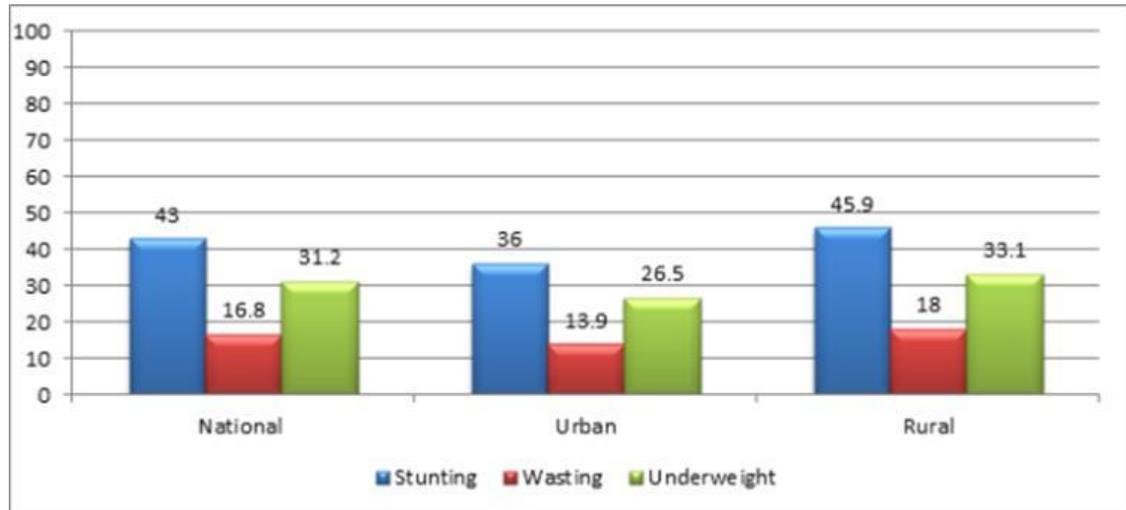


Provincial and regional data also showed similar trends in distribution of children in different age groups. Detail is given in the figure 6.3

6.1.3 Anthropometry (Index Children)

The unique aspect of the NNS 2011 was that the index children were part of “Mother-child” pair. Therefore the anthropometry and bio-chemical samples of blood were taken from the pair of biological mother and child. Wasting, stunting and underweight are widely used indices for describing the prevalence of malnutrition in childhood across the world

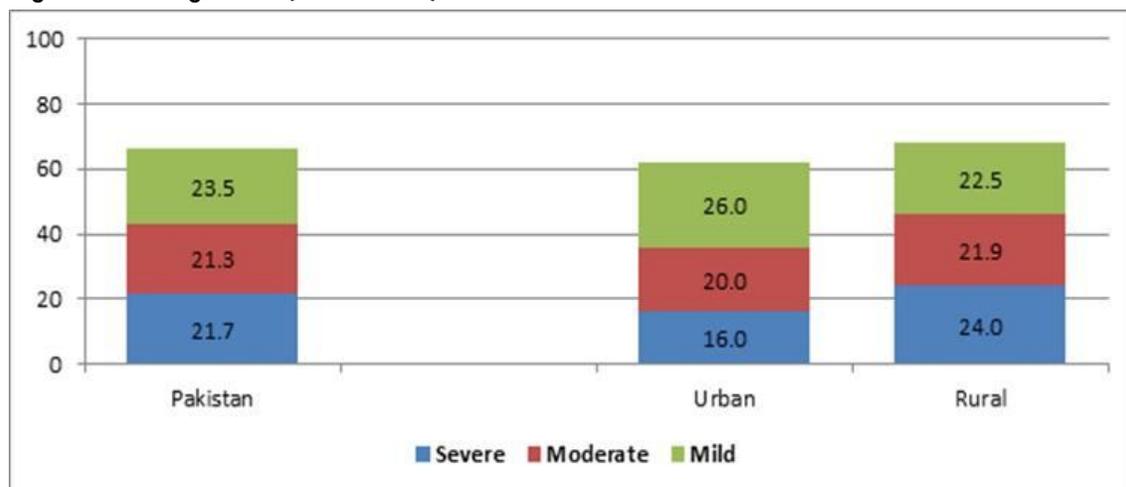
Fig 6.4 Prevalence of Malnutrition (Index Children)



6.1.4 Stunting (Index Children)

Severe stunting was observed to be alarmingly high (23.5%) among children at national level. It was high in urban area (26%) and low in rural (22.5%). Results showed that prevalence of stunting from severe to mild had similar trends at national level.

Fig 6.5 Stunting Rates (Index Child) - National



Regional/provincial variations were noted in the prevalence of stunting. Severe stunting among children were found comparatively high in FATA (35.5%) and lowest in AJK (11.9%)

Fig 6.5a Stunting Rates (Index Child) – Provinces

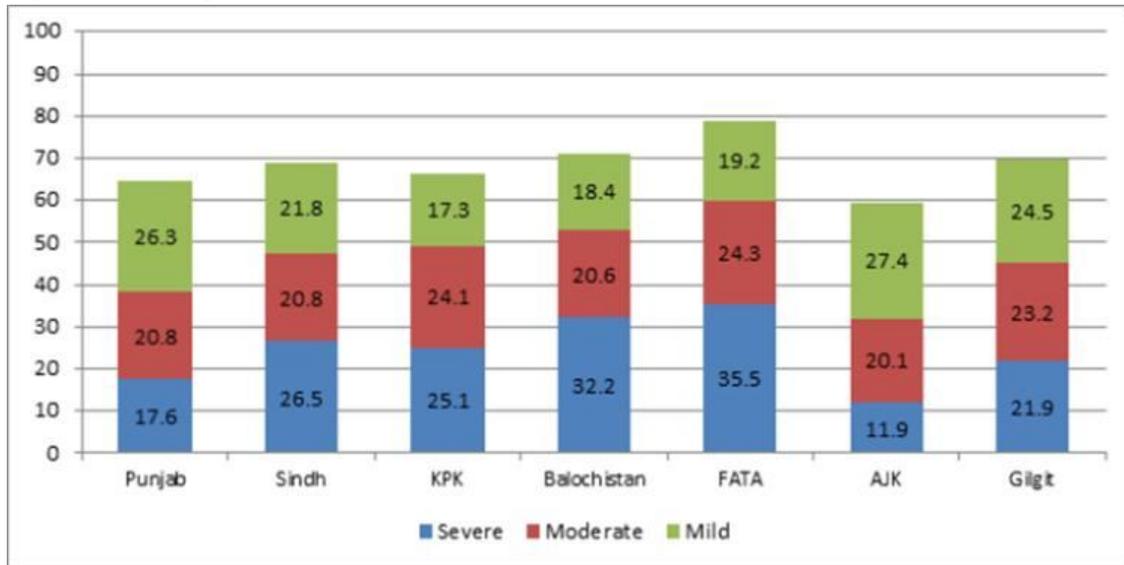
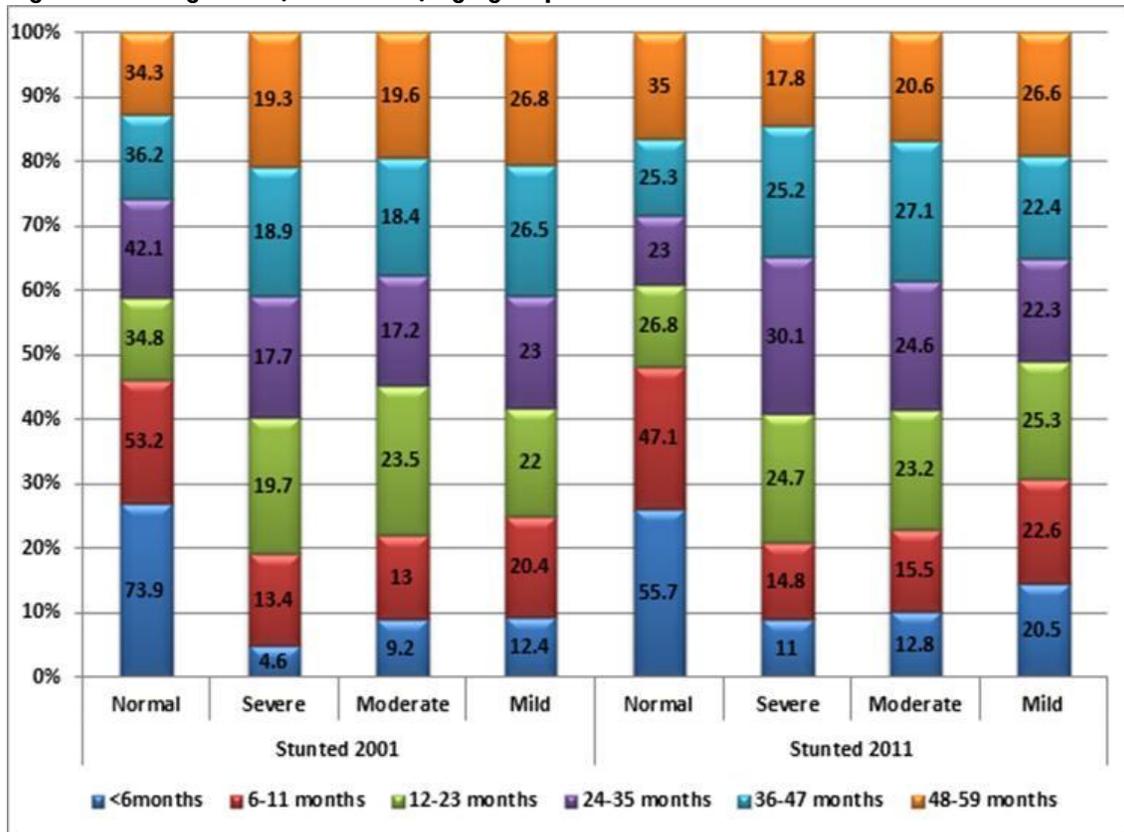
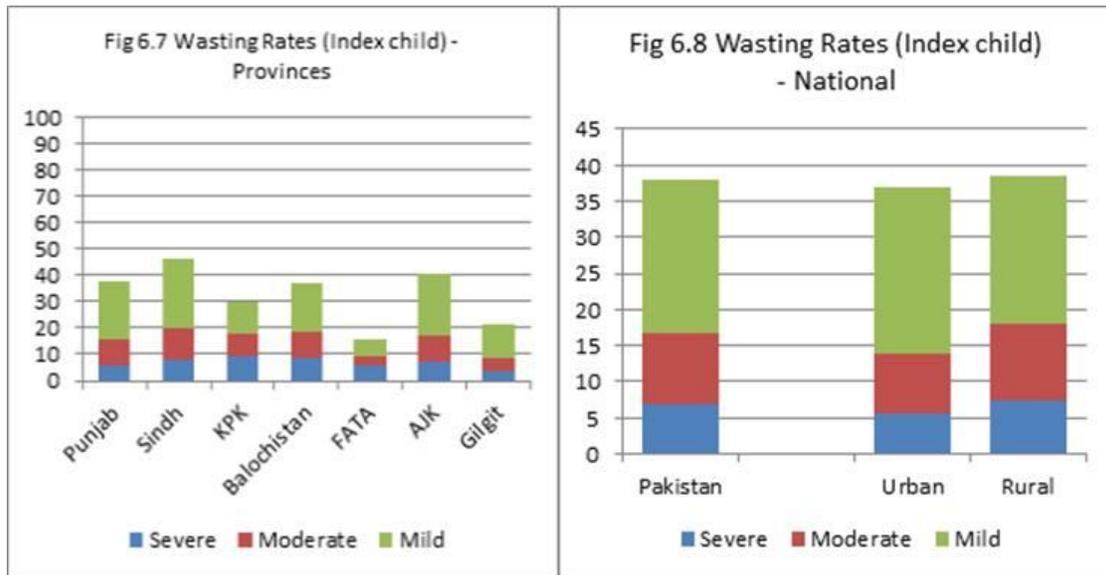


Fig 6.6 Stunting rates (Index child) age group wise



However for moderate stunting, KPK, FATA and Gilgit had almost similar trends (24%) and Punjab, Sindh, Balochistan and AJK around 20 percent. The prevalence of severe stunting gradually increased since birth up to 35 months and has decreased in similar manner from 36 to 59 months.

6.1.5 Wasting (Index Children)

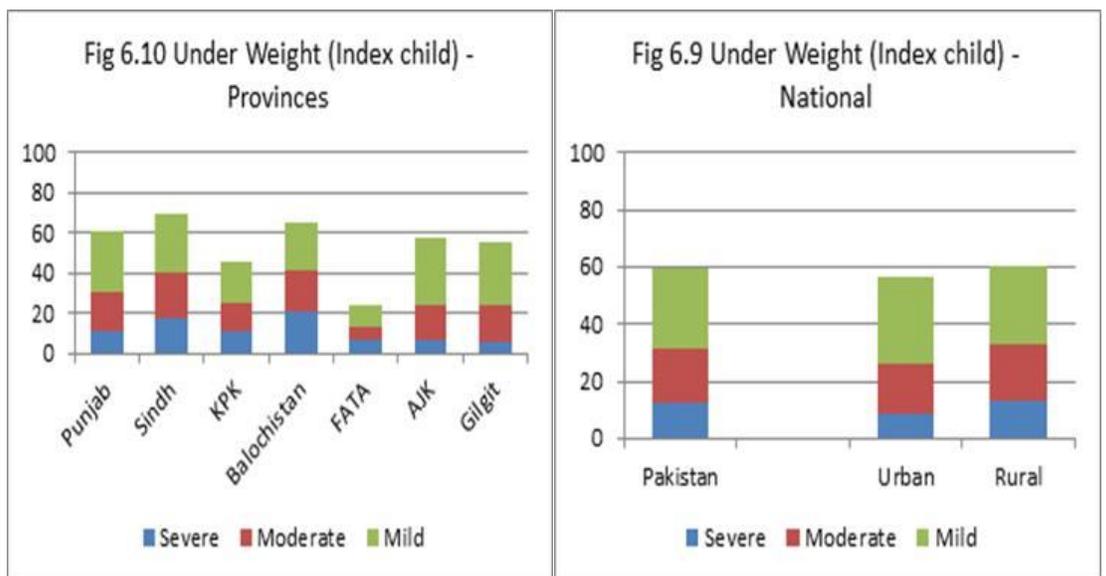


As stunting, the prevalence of wasting also increases with age however the prevalence of wasting is much lower than that of stunting. Wasting rate at national level was 16.8 percent and was high in urban area (23 %) than in rural area (18%).

Prevalence of wasting of index children was high in Sindh (19.4 %) followed by Balochistan (18.6 %) and then KPK (17.9 %), lowest in Gilgit (8.6 %). FATA results were also showed lower wasting rate (9.6 %) as compare to other regions.

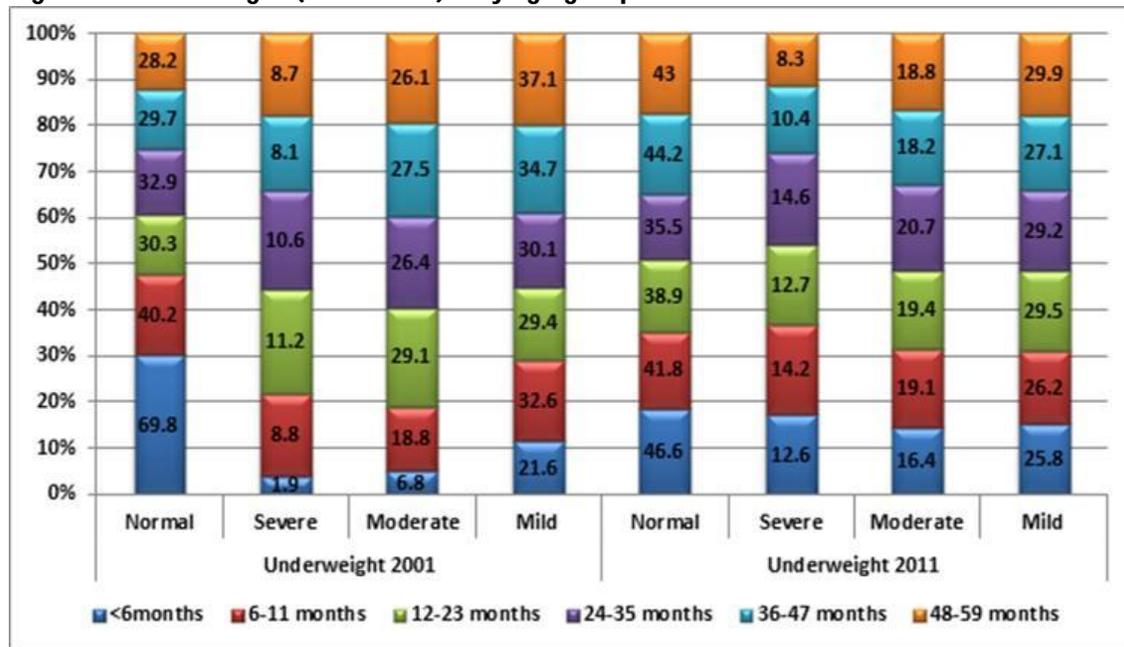
6.1.6 Underweight (Index Children)

31.2 percent children were underweight at national level. The prevalence of underweight was high (33.1%) in rural area as compare to urban (26.5%).



In regional and provincial comparison, FATA data showed the lowest rate of underweight (12.9%) while Balochistan had highest (41.8%) followed by Sindh (39.8%).

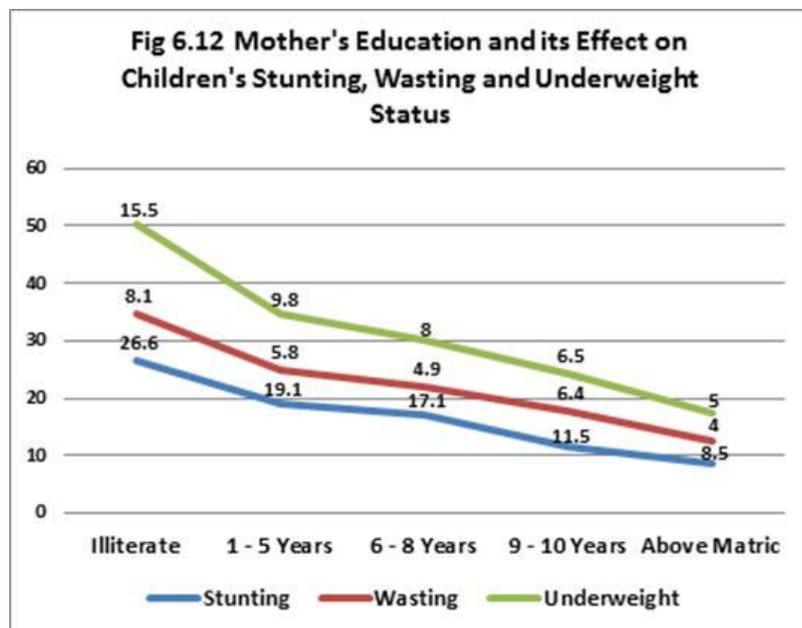
Fig 6.11 Under Weight (Index child) – by age group



Unlike the variations in stunting and wasting by different age groups, Percentage of underweight children remained constant or increased with age.

6.1.7 Education of Index Mothers and its Effect on Stunting, Wasting and Underweight Status of Children

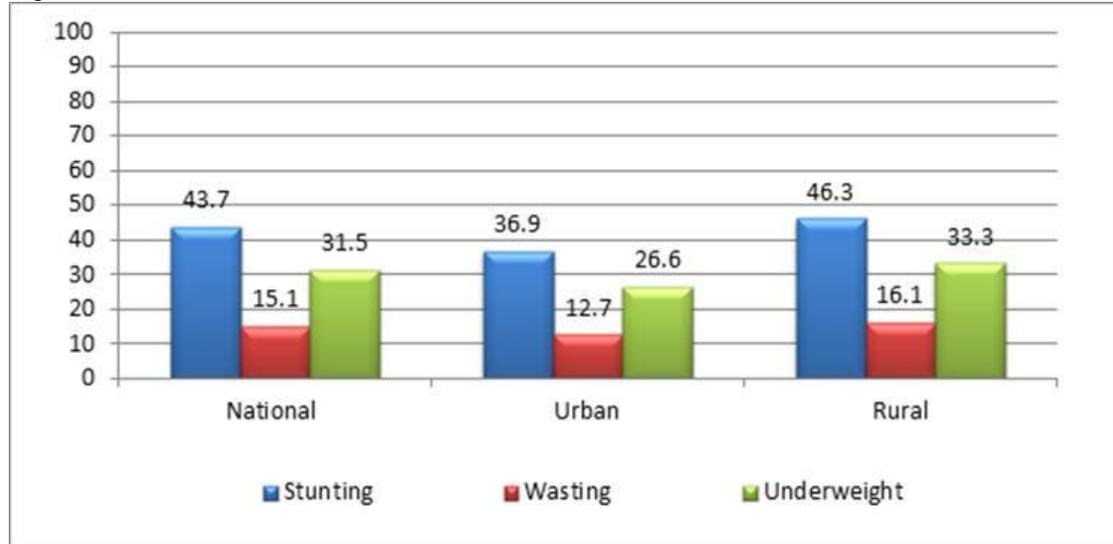
It is evident from the literature that employment and education of mother has a direct association with nutrition status of children. The finding of the NNS 2011 revealed that education of mother was closely associated with child stunting, wasting and underweight status. Malnutrition declined with higher education status of mothers.



6.1.8 Anthropometry (All Children)

In addition to the assessment of index children, we also undertook anthropometric measurement of all children under 5 (N=29525) available in selected households.

Fig 6.13 Prevalence of Malnutrition in Pakistan (All Children <5)

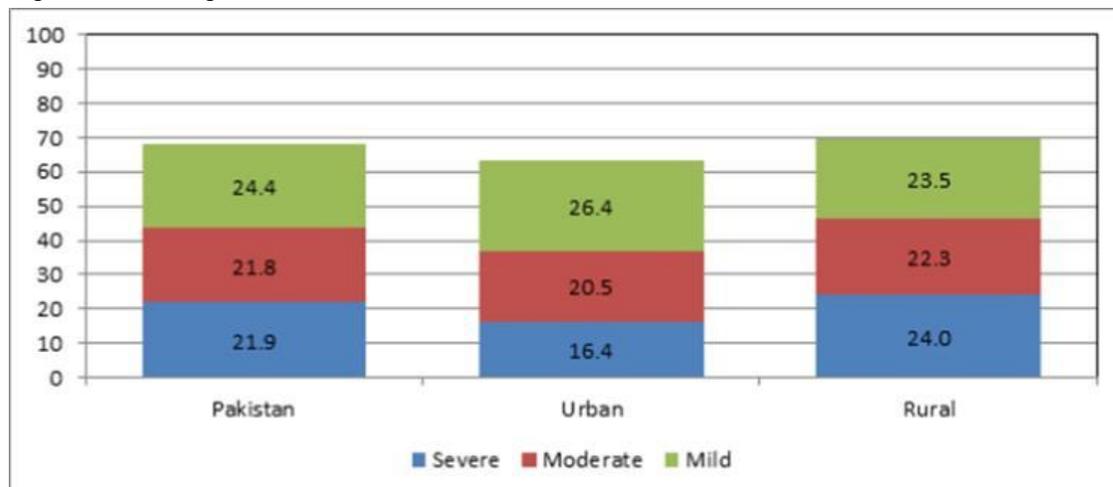


In Pakistan 43.7 percent children <5 were stunted. In rural area the stunting in children was high (46.3%) than in urban area (36.9%). Wasting rate was 15.1 percent and fewer children were wasted in urban areas (12.7%) as compared with rural areas (16.1%). 31.5 percent of the children were underweight, with higher rates in rural areas (33.3%). The indicators of malnutrition appeared to be higher in rural areas than in urban areas.

6.1.9 Stunting (All Children <5)

The severe stunting in children showed an alarming picture (24.4%) across Pakistan. It was high in urban areas (26.4%) than in rural areas (23.5%).

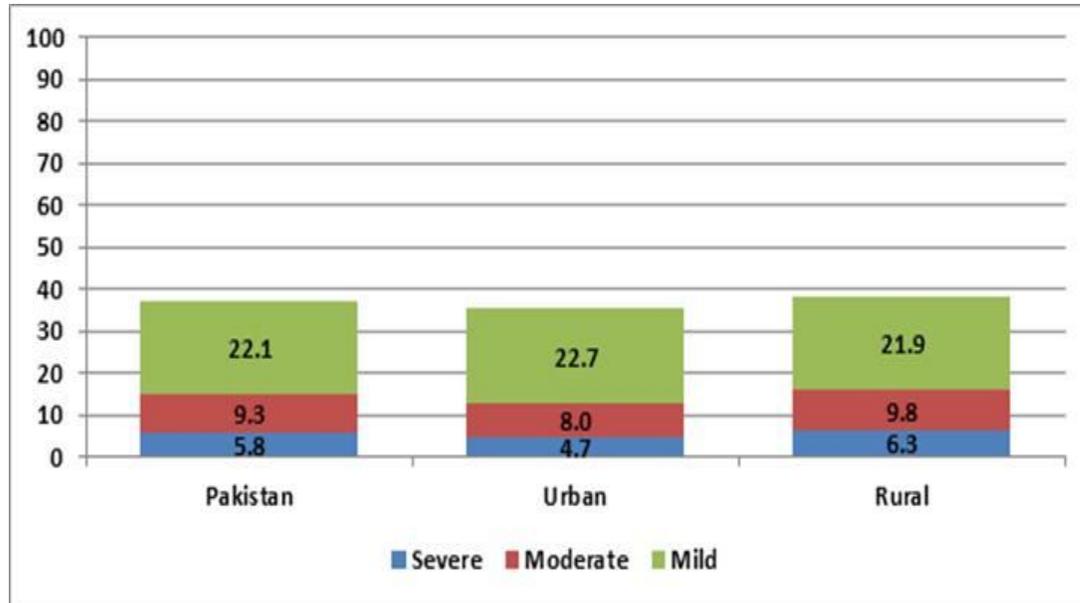
Fig 6.14 Stunting Rates (All Under 5) - National



6.1.10 Wasting (All Children <5)

The wasting rate at national level for all children < 5 was 15.1 percent, higher in rural areas (16.1%) than in urban areas (12.7%)

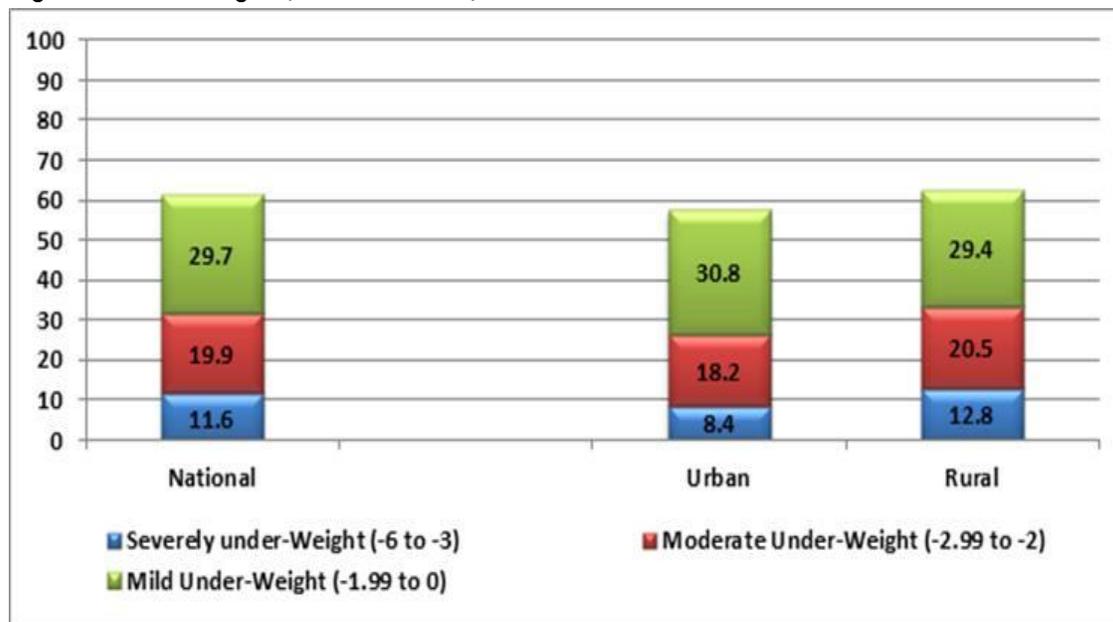
Fig 6.15 Wasting Rates (All Under 5) - National



6.1.11 Underweight (All Children <5)

29.7 percent children were severely underweight across Pakistan. There was slight difference in rural and urban areas.

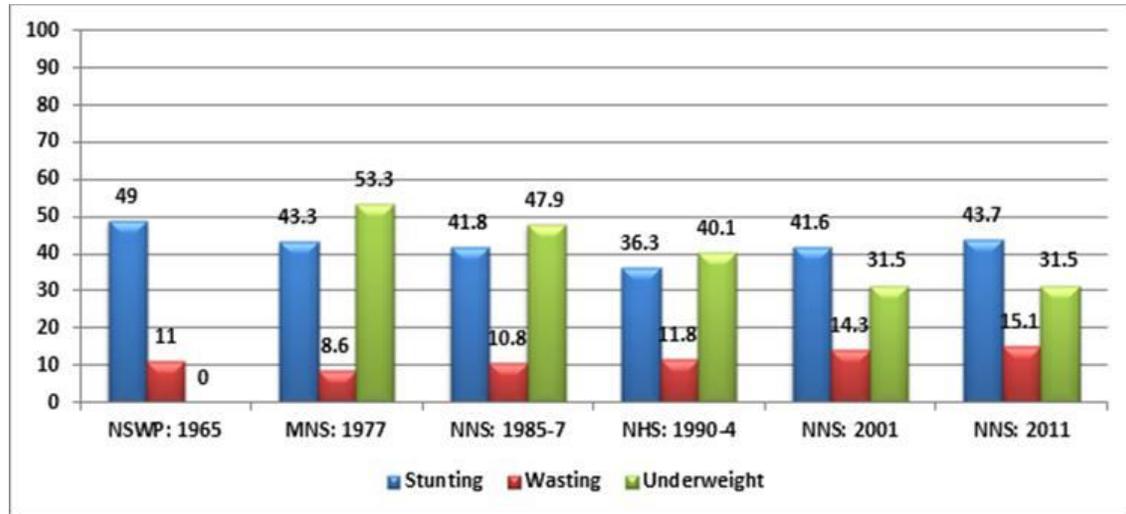
Fig 6.16 Underweight (All Children <5) National



6.1.12 National Trends in Malnutrition (All Children)

The malnutrition status of children under 5 years did not show any improvement since the last 46 years despite the fact that many nutrition intervention programs were launched by the UN organizations, Int'l and national NGOs. Even the establishment of Nutrition Wing in 2002 under the Ministry of Health did not make any significant improvement in the nutrition status of children in Pakistan.

Fig 6.17 Malnutrition National Trends (All Children)



NNS 2011 results revealed that indicators of stunting and wasting were worsening during last 10 years. 43.7 percent children were stunted; this was relatively high than NNS 2001 (41.6 percent). Similar trends observed for wasting, 15.1 percent children in Pakistan were suffering from wasting in NNS 2011 as compare to 14.3 percent in NNS 2001. But luckily underweight rates remained constant during last one decade (31.5%).

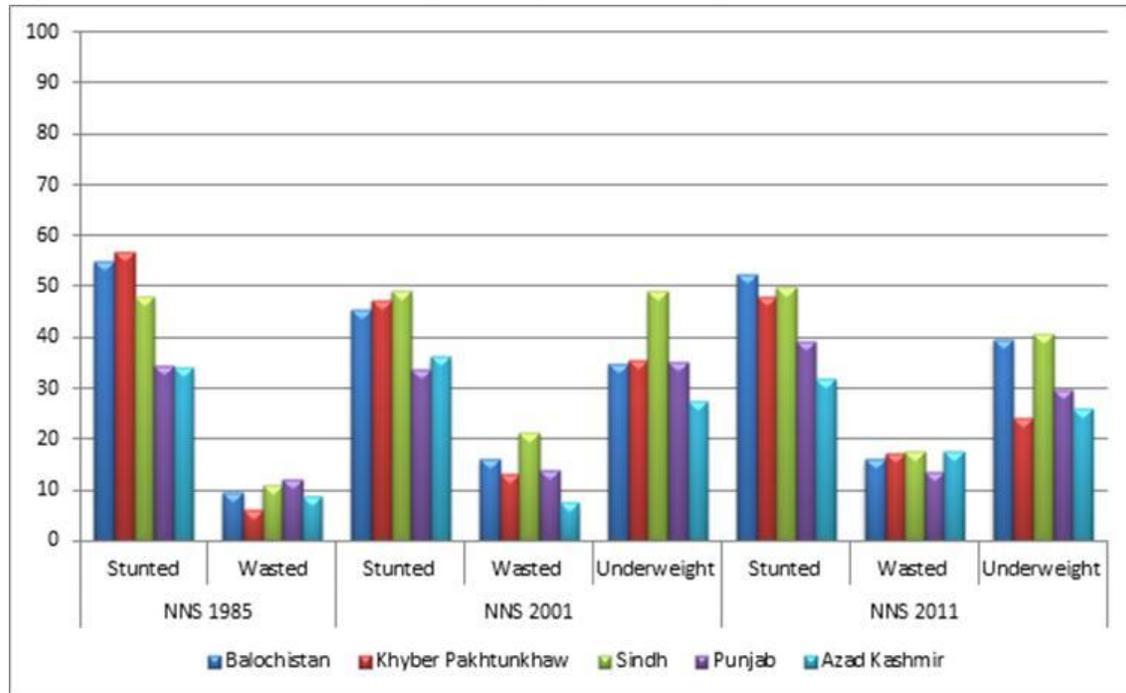
(NNS 1987 used NCHS standards and shown for comparison only)

6.1.13 Provincial Trends in Malnutrition (All Children) – Pakistan

Except in AJK where stunting rate had decreased from 36.4 percent (NNS 2001) to 31.7 percent (NNS 2011), the situation had worsened in all other provinces. Dramatically the wasting rate in AJK increased from 7.6 percent to 17.7 percent during the last decade whereas province shown steady improvement in other nutrition indicators. Except KPK where wasting rate increased other provinces shown some improvement.

KPK showed a remarkable improvement in underweight children which has been reduced to 24.1 percent in NNS 2011 from 35.5 percent in NNS 2001. In contrast, underweight rate in Balochistan had increased from 34.8 percent in NNS 2001 and 39.6 in NNS 2011.

Fig 6.18 Provincial Trends of Stunting, Wasting and Underweight (All Children -5)

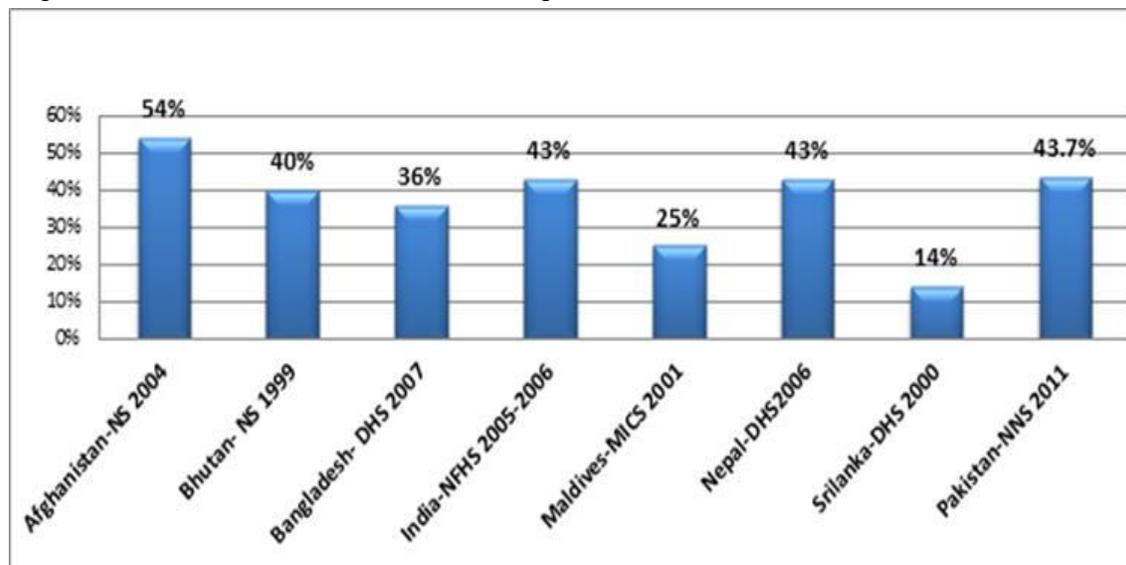


* Only NNS 2011 was powered for provincial specificity

6.1.14 Regional Trends in Malnutrition (All Children) – SAARC Countries Comparison

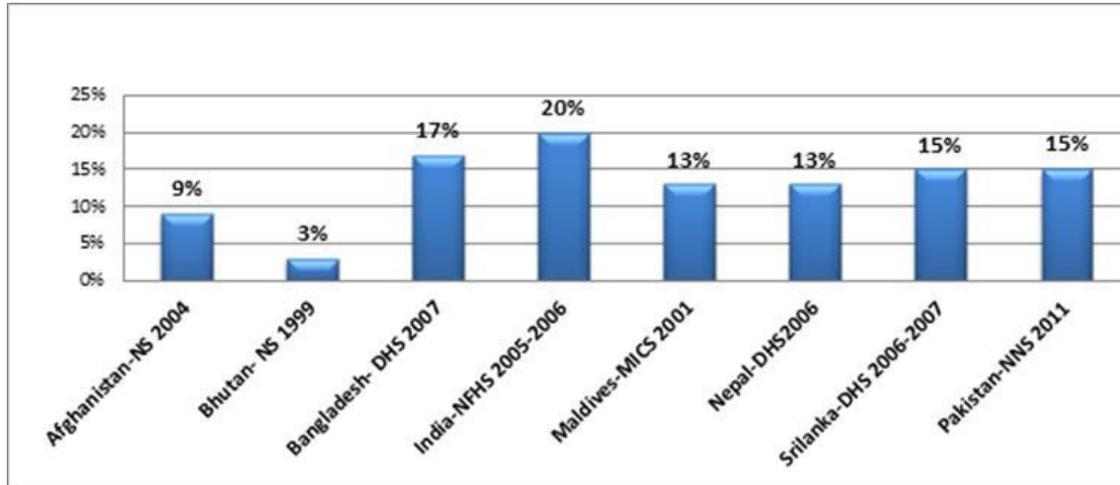
Pakistan stands second highest in the stunting rate (43.7%) since many decades, after Afghanistan which suffered with all odds (Social, Political, Economic, etc. Nepal and India jointly shared the stunting rate at 43 percent. Even Bhutan had better indicators than Pakistan.

Fig 6.19 SAARC Countries National Stunting Trends



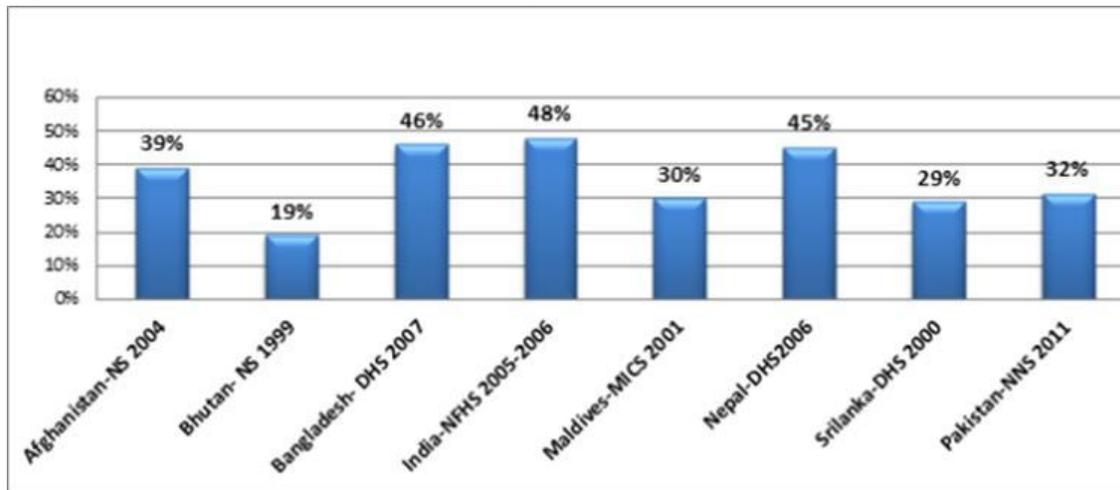
Pakistan however made some improvement in wasting rate (15%). Pakistan and Srilanka had third highest wasting rates in the region. Even Afghanistan had better situation than Pakistan.

Fig 6.20 SAARC Countries National Wasting Trends



Pakistan had lower rates of underweight as compare to other SAARC countries, but still Bhutan, Srilanka and Maldives had better rates of underweight.

Fig 6.21 SAARC Countries National Underweight Trends



Section 2: Biochemical Analysis

Biochemical assessment is one of the established methods (Clinical observation and examination, anthropometric measurements, dietary history) for the study of the nutritional status of populations. Biochemical assessments are much more accurate and precise. Many micronutrient deficiencies do not produce signs or symptoms until they are quite severe. As a result, mild micronutrient deficiencies can only be diagnosed using biochemical indicators. Biochemical tests have the advantage of providing objective measures of micronutrient status. They usually reflect the immediate

past intake of nutrients or the changes produced by a long-standing deficient intake of a nutrient and not its current intake. The common biochemical assessments are haemoglobin estimation for Iron Deficiency Anemia, Serum Vitamin A Level for Vitamin A Deficiency and Urinary Iodine Level for Iodine Deficiency. Iron status may also be quantified by measuring a number of different components including serum ferritin, serum transferrin receptor, zinc protophorphyrin, and transferrin saturation.

We analyzed following important and essential biochemical assessments to determine the status of micronutrient deficiencies in children less than 5 years of age.

Iron: Iron deficiency anaemia adversely affects the cognitive ability of children. It is estimated that the decline of half a standard deviation in adult IQ and cognitive test performance is the outcome of iron deficiency anaemia in child hood.¹

Vitamin Deficiencies: Vitamin A is an essential micronutrient required for normal vision, growth and development, immune function and reproduction. Vitamin A deficiency is a contributing factor in the 2.2 million deaths each year from diarrhoea among children under 5 and nearly 1 million deaths from measles. Severe deficiency can also cause irreversible corneal damage, leading to partial or total blindness.

Iodine: Iodine deficiency leads children to suffer from varying degrees of brain damage, physical impairment, mental retardation and goitres.

Zinc: Zinc deficiency is associated with complications of pregnancy and birth outcomes, impaired immune function, and increased duration and severity of diarrhoea in children. It also causes growth retardation, and several studies have shown that zinc supplementation can produce significant

6.2.1: Hemoglobin Level - Index Child

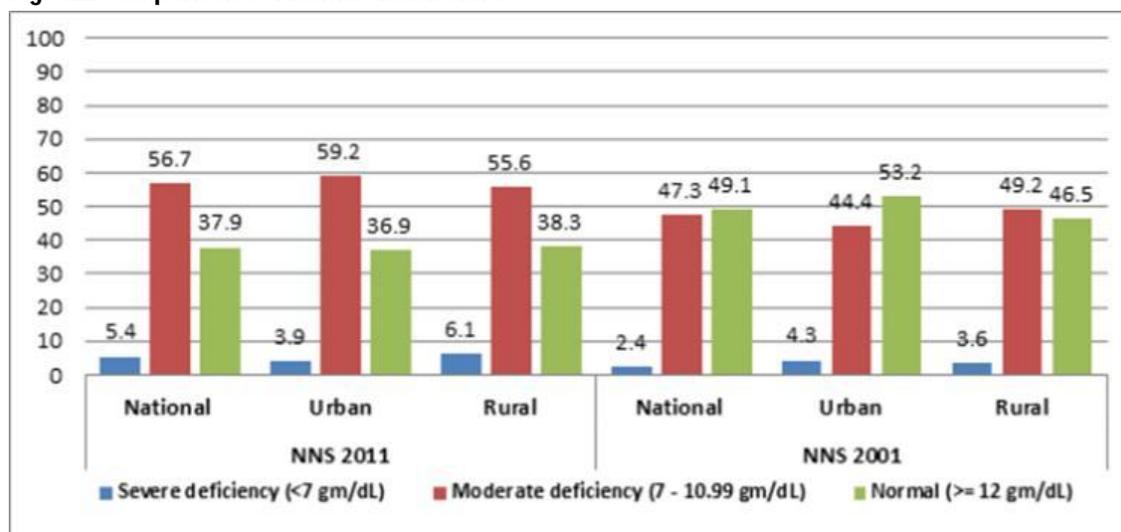
Overall 62.1% (severe deficient 5.4 and Moderate deficiency 56.7%) of children were found to be anaemic (<10.99gm\dl) at national level. Regional differences in the prevalence of anaemia were substantial, ranging from 40 % in Gilgit to 86.3 % in FATA. The prevalence of severe anaemia was observed comparatively high in rural areas (6.1%) compare to urban areas (3.9%).

Table 6.1 haemoglobin levels Index child

	National	Residence		Province / Region						
		Urban	Rural	Punjab	Sindh	KPK	Balochistan	FATA	AJK	Gilgit
Severe deficiency (<7 gm/dL)	5.4	3.9	6.1	4.4	6.3	6.5	9.9	43.7	1.8	1.4
Moderate deficiency (7 - 10.99 gm/dL)	56.7	59.2	55.6	56	67	40.4	47.7	42.6	43.7	38.6
Normal (>= 12 gm/dL)	37.9	36.9	38.3	39.7	26.6	53.2	42.4	13.7	54.6	60
N	11882	4745	7137	6128	2895	798	783	110	801	367

¹ Ross J; Horton

Fig 6.22 Comparison of Anemia- Index child



The table below compares the prevalence of anemia among under-5 children in various surveys since 1990 using comparable methods. Anemia in children under five years (in percentage)

Table 6.2 comparison of hemoglobin levels

	Males		Females		Urban		Rural	
	Moderate	Severe	Moderate	Severe	Moderate	Severe	Moderate	Severe
NHS 1990-94	40.4	5	41.9	4.7	-	-	-	-
NNS 2001-02	46.9	3.4	47.9	3.8	49.2	4.3	44.5	2.4
NNS 2011	57.1	5.5	56.3	5.3	59.2	3.9	55.6	6.1

Source: NHS; NNS

6.2.2: Ferritin Level - Index Child

The ferritin deficiency level was 43.8% among index children in Pakistan during NNS 2011. Regional differences in the prevalence of ferritin deficiency were high, ranging from 14.7 % in FATA to 48.4 % in Punjab. Comparatively high prevalence was noted in urban areas (45.8%) as compare with rural areas (42.9%).

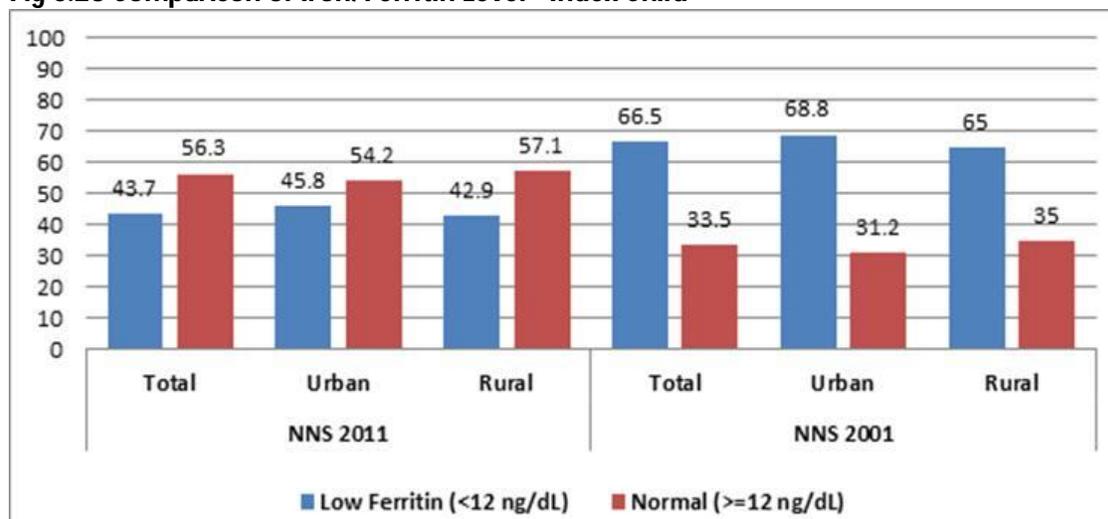
Table 6.3 Ferritin deficiency level- Index Child

	Total	Residence		Province / Region						
		Urban	Rural	Punjab	Sindh	KPK	Balochistan	FATA	AJK	Gilgit
Low Ferritin (<12 ng/dL)	43.7	45.8	42.9	48.4	40.1	21.2	35	14.7	43.6	36.2
Normal (>=12 ng/dL)	56.3	54.2	57.1	51.6	59.9	78.8	65	85.3	56.4	63.8
N	8080	3124	4956	4354	2010	488	396	46	442	344

We compared the data of anaemia between NNS 2011 and NNS 2001, the data revealed a clear difference in the prevalence of anaemia, during NNS 2001 the prevalence of anaemia was 65.5%

and currently it come down 43% and similar trends was noted residence level (rural /Urban. Comparative trends among both surveys are given in below figure.

Fig 6.23 Comparison of Iron/Ferritin Level - Index Child



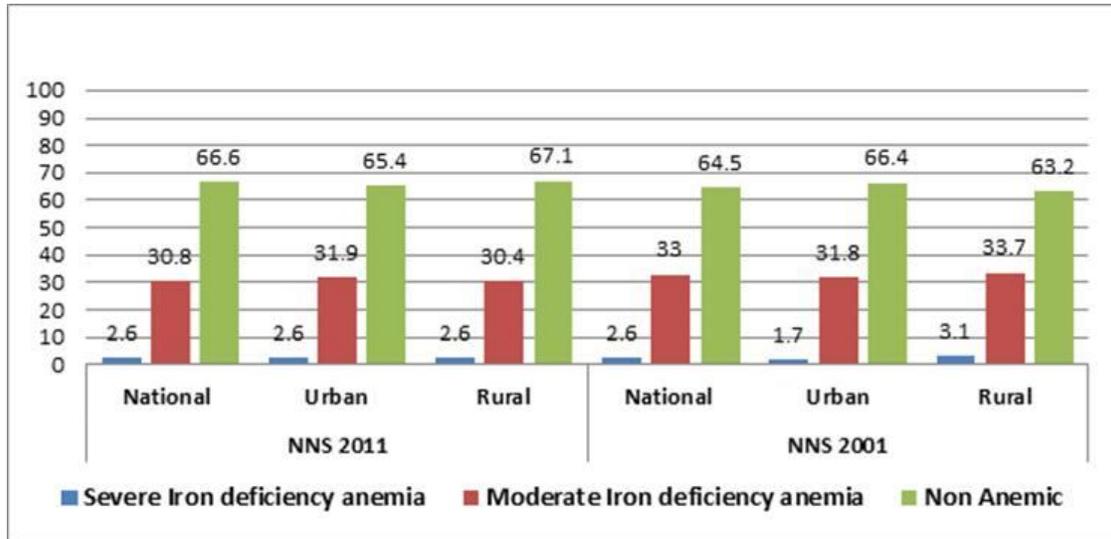
6.2.3: Iron Deficiency Anemia (IDA) - Index Child

Iron deficiency anaemia was also assessed for index children, about one third (33.4%) of the index children were found with iron deficiency anaemia at national level. Regional differences were substantial, ranging from 13.4% in KPK to 36.4% in Punjab. The prevalence of Severe Iron deficiency anemia among index children is 2.6% and moderate anaemia 30.8%. No notable variations were observed at area of residence level.

Table 6.4 Iron Deficiency Anemia (IDA) - Index Child

	Total	Residence		Province / Region						
		Urban	Rural	Punjab	Sindh	KPK	Balochistan	FATA	AJK	Gilgit
Severe Iron deficiency anemia	2.6	2.6	2.6	2.8	2.6	0.1	0.8	26.3	0.8	0.6
Moderate Iron deficiency anemia	30.8	31.9	30.4	33.6	29.2	13.3	21.9	0	27.5	20.2
Non Anemic	66.6	65.5	67	63.6	68.2	86.6	77.3	73.7	71.7	79.2
	7589	2989	4600	4150	2004	298	364	16	441	316

Fig 6.24 Comparison of Iron Deficiency Anemia - Index Child



Findings of Iron deficiency anemia were compared with NNS 2001. Below figure reflect that there is no major change in the prevalence of iron deficiency anemia Since NNS 2001 at national and area of residence level.

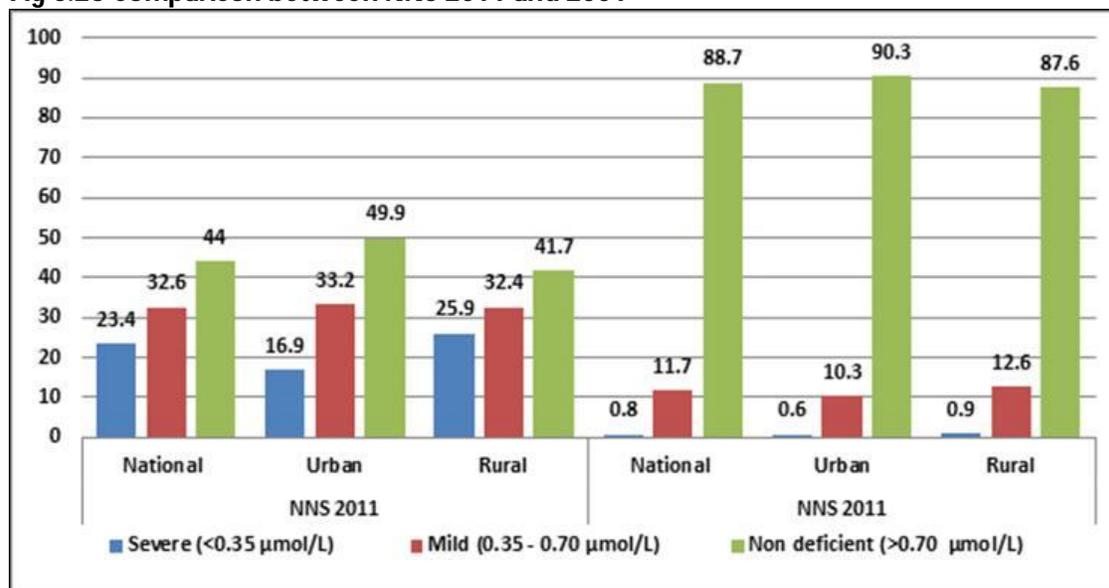
6.2.4: Vitamin A Deficiency - Index Child

Vitamin A is an essential micronutrient required for normal vision, growth and development, immune function and reproduction. During NNS 2011 vitamin A deficiencies were assessed among index children. The data from NNS 2011 showed that overall 56% index children were found vitamin A deficient (23.2% severely deficient 32.7% were mild deficient). The scenario in FATA was depressing where 94.6% index children were found severely Vitamin A deficient, this might be due to the small number of samples analyzed from FATA right away. The high prevalence of mild Vitamin A deficiency was found in Gilgit region (49.6%).

Table 6.5 Vitamin A Deficiency - Index Child

	Total	Residence		Province / Region						
		Urban	Rural	Punjab	Sindh	KPK	Balochistan	FATA	AJK	Gilgit
Severe (<0.35 µmol/L)	23.3	16.9	25.9	20.3	23.2	51.4	48.8	94.6	2.6	32.1
Mild (0.35 - 0.70 µmol/L)	32.7	33.2	32.4	32.6	34.4	26.1	31.9	5.4	34.7	49.6
Non deficient (>0.70 µmol/L)	44	49.9	41.7	47.2	42.5	22.4	19.3	0	62.7	18.3
N	7128	2718	4410	4165	1566	399	290	38	395	275

Fig 6.25 Comparison between NNS 2011 and 2001



6.2.5: Zinc Deficiency - Index Child

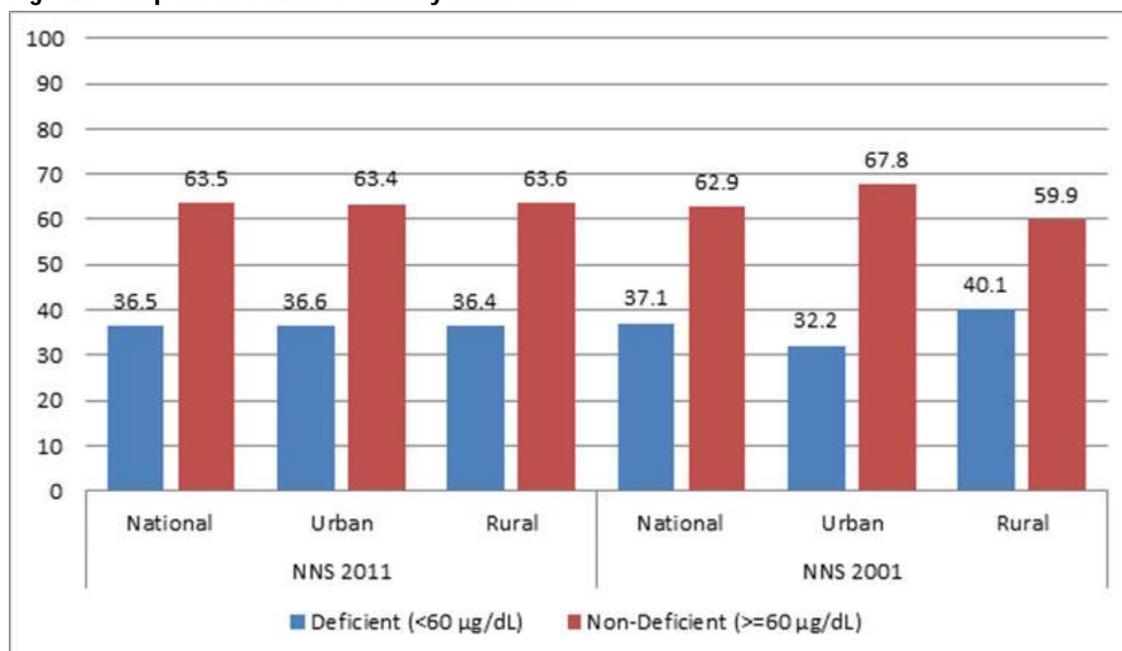
The survey revealed that overall prevalence of zinc deficiency among index children in Pakistan was 36.5% (36.6% in urban and 36.4% in rural areas), whereas 35.2% in Punjab, 38.8% in Sindh, 34% in KPK, 34.3% in Balochistan, 34.2 in FATA, 49.1% in AJK and 32.6% in Gilgit are deficient using comparable cut offs.

Table 6.6 Zinc Deficiency - Index Child

	Total	Residence		Province / Region						
		Urban	Rural	Punjab	Sindh	KPK	Balochistan	FATA	AJK	Gilgit
Deficient (<60 µg/dL)	36.5	36.6	36.4	35.2	38.8	34	34.3	34.2	49.1	32.6
Non-Deficient (60 - 150 µg/dL)	63.5	63.4	63.6	64.8	61.2	66	65.7	65.8	50.9	67.4
N	6847	2643	4204	3523	1883	360	334	26	376	345

Zinc deficiency data of NNS were compared with the data of NNS 2001. Data shows that there was a slight change in the proportion of zinc deficient children as measured by serum zinc concentrations between NNS 2001 (37.1%) and 2011 (36.5%).

Fig 6.26 Comparison of Zinc deficiency Index child



6.2.6: Vitamin D Deficiency - Index Child

The prevalence of vitamin D deficiency among index children at national level was 41.1% (Sever 10.1% and deficient 31%). High prevalence of sever vitamin D deficiency (19.7) were noted in urban areas as compare to rural areas (6.8) and similar trend was observed in deficient group. Substantial variations were noted at regional level, ranging from 2.1% in FATA to Sindh.

Table 6.7 Vitamin D Deficiency - Index Child

	Total	Residence		Province / Region						
		Urban	Rural	Punjab	Sindh	KPK	Balochistan	FATA	AJK	Gilgit
Severe Deficiency (<8.0 ng/mL)	10.1	19.7	6.8	10.4	11.6	7	9	2.1	2.4	3.1
Deficiency (8.0 - 20.0 ng/mL)	31	32.9	30.4	31.7	31.3	22.7	31.4	23.9	30.1	28.5
Desirable (>20.0 - 30.0 ng/mL)	27.5	19.8	30.1	27.2	25.7	31.2	23.5	56.6	35.6	38.5
Sufficient (>30.0 ng/mL)	31.4	27.6	32.7	30.7	31.4	39.1	36.1	17.4	31.9	29.9
N	5613	2071	3542	3223	1218	273	299	40	352	208

6.2.7: Urinary Iodine - 6-12 years Children

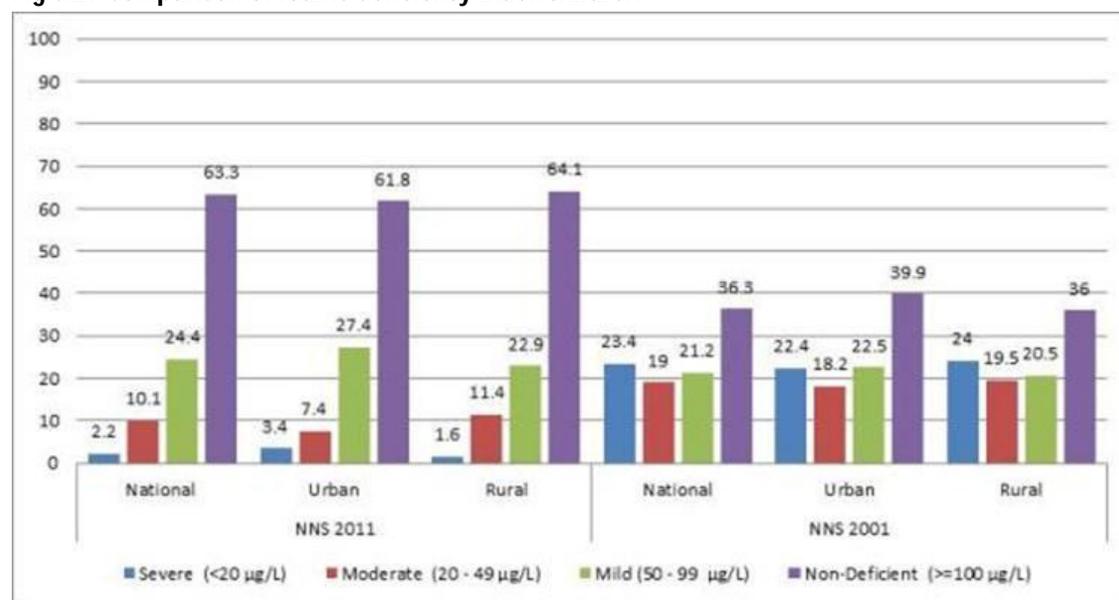
Iodine deficiency leads children to suffer from varying degrees of brain damage, physical impairment, mental retardation and goitres. To assess the prevalence of iodine deficiency 6-12 years age children category was chosen for comparison with the NNS 2001. Overall the data show improvement in comparison to 2001. With regards to Urinary Iodine Excretion

among children aged 6-12 years, 63.3% of the children (urban 61.8% and rural 64.6%) showed normal values, 24.4% of children (Urban 27.4% and rural 22.9%) were mild deficient, 10.1% of children (Urban 7.4% and rural 11.6%) moderately deficient and only 2.2% of children (Urban 3.4% and rural 1.6%) were categorized as severely iodine deficient at national level. Comparatively, FATA region has the highest percentage (78.4%) of normal children, followed by KPK with 74.2%, Sindh and Balochistan 65%, Punjab 60.7, AJK 34.6 while Gilgit-Baltistan has the lowest percentage of non-deficient children (30.1%). In consonance with the above, the overall percentage of severely deficient children at national was 2.1%, with Gilgit (18.2%) and AJK (6.5%) showing the highest percentage.

Table 6.8 Urinary Iodine - 6-12 years Children

	Total	Residence		Province / Region						
		Urban	Rural	Punjab	Sindh	KPK	Balochistan	FATA	AJK	Gilgit
Severe (<20 µg/L)	2.2	3.4	1.6	2.1	2.1	1	5.5	0	6.5	18.2
Moderate (20 - 49 µg/L)	10.1	7.4	11.4	11.8	7.2	5.8	7.3	0	30.5	20.3
Mild (50 - 99 µg/L)	24.4	27.4	22.9	25.3	25.6	18.9	21.9	10.3	28.5	31.3
Non-Deficient (>=100 µg/L)	63.3	61.8	64.1	60.7	65	74.2	65.3	89.7	34.6	30.1
N	1222	524	698	585	307	162	61	13	65	29

Fig 6.27 Comparison of Iodine deficiency Index children



A sizable improvement was observed in the prevalence of iodine deficiency between NNS 2001 and 2011, in NNS 2001 the prevalence of severe iodine deficiency was 23.4% and currently this come down to 2.2% at national level and same observation in moderate group, the prevalence of moderate iodine deficiency in NNS 2001 was 19% and in NNS 2011 10.1%,

however there is a slight increase in mild group, the prevalence of mild iodine deficiency increased to 24% (NNS 2011) from 21.2% (NNS 2001).

Median Urinary Iodine Excretion in 6-12 years Children

The median of urinary iodine excretion was also determined in mothers as it was revealed that the Median iodine excretion in mothers was 124.2 ug/l, 117.2 ug/l in urban areas and 129.9 ug/l in rural areas. The provincial distribution of Median Urinary iodine excretion was 115.9 ug/l in Punjab, 133.1 ug/l in Sindh, 154 ug/l in KP, 136.4 ug/l in Balochistan, 183.8 ug/l in FATA, 63.9 ug/l in AJK and 68.2 ug/l in Gilgit.

Clinical Examination (Index Child)

During the NNS 2011 clinical examination of index children was performed. This examination was done by trained nurses. This is the direct assessment of micronutrient malnutrition and depends upon the clinical signs and symptom. The index children were examined for Anemia, Edema, Jaundice, Goiter and Bitot's spot, each of these sign and symptom represents a micronutrient deficiency.

The survey revealed that overall 31.7% of the index children were anemic of which 17.6% were from urban and 24.9% were from rural. Regional variations were found in the prevalence of clinical anemia ranging from 31.7% in AJK, to 3.4% in KPK. from Gilgit. The prevalence for edema was 0.4% (0.2% urban and 0.2% rural) with no significant variance among provinces except for Gilgit where no single case found during examination. Bitot's spot was found in 0.2% of the index children (0.1% Urban and 0.3% rural).

Table: 6.9 Clinical Examinations (Index Child)

Clinical Examination	Pakistan	Residence		Province / Region						
		Urban	Rural	Punjab	Sindh	KPK	Balochistan	FATA	AJK	Gilgit
Edema	0.4	0.2	0.4	0.2	0.1	1.3	1.2	0.1	0.2	0
Jaundice	0.4	0.4	0.4	0.4	0.4	0.4	0.9	0.7	0.1	0
Pallor / Anemia	22.8	17.6	24.9	27.4	28.9	3.4	13.1	4.5	31.7	15
Goiter	0.2	0.1	0.3	0.3	0.2	0.2	0.2	0.4	0.2	0
Bitot's Spot	0.2	0.1	0.3	0	0.1	0.1	0.8	3.8	0.1	0
N	20537	7929	12608	9174	4409	2458	1677	888	1292	639

Section 3: Child Immunization:

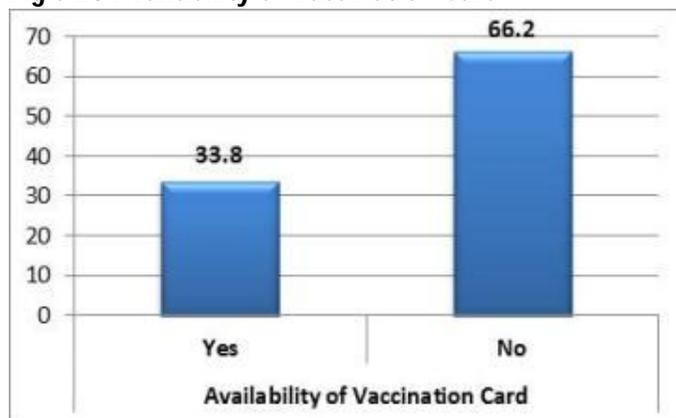
The government of Pakistan is providing the vaccine free of cost at, basic health units, rural health centers, Tehsil/District and other state-run hospitals, as part of its national immunization programme. The programme guidelines recommend that all children receive a BCG vaccination against tuberculosis; three doses of DPT vaccine for the prevention of diphtheria, pertussis (whooping cough), and tetanus; three doses of polio vaccine; three doses of the hepatitis vaccine; and a vaccination against measles during the first year of the child's life. In addition to the programme of routine immunizations, since 1994 Pakistan has also conducted a number of special national immunization days (NID) in the effort to eradicate polio. Although health indicators are steadily improving in Pakistan, the nation is still far away from achieving its child health-related Millennium Development Goal (MDG).

The vaccination has reduced burden of mortality and morbidity of vaccine preventable diseases in the industrial countries. However, the coverage of the immunizations has not reached to optimal level in some developing countries including Pakistan. The reasons of non-immunization or under immunization in the some segments of population are multiple and integrated with socio cultural, politico economic and behavioral barriers to vaccination.

According to the EPI programme, approximately 5.1 million children are given immunization services every year. Morbidity and mortality are significantly reduced due to the immunization programme in Pakistan. It is estimated that more than 100,000 deaths due to measles, 70,000 cases of neonatal tetanus, and 20,000 paralytic cases of poliomyelitis are being prevented each year in Pakistan due to these vaccinations (NIH, 2008).

In NNS 2011, mothers were asked to show the interviewer the vaccine cards of all children under the age of five. The interviewer copied from the card 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 including the number of doses for each vaccination.

Fig 6.28 Availability of Vaccination Card



The data of 19927 children showed that one-third households reported availability of vaccination card at the time of survey.

Vaccination Coverage:

Information on vaccination coverage according to the source of information used to determine coverage is presented in Table 7.1, i.e., the vaccination card or mother's recall report. Data are presented for children less than 5 years of age.

Table 6.10: 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 card shown that only 31.5% were received BCG vaccination.

Measles trends show that only 64.4% children <5 were vaccinated however only 23.1% were verified from the vaccination card.

An overwhelming majority (95%) of mothers reported that their children received **Oral Polio drops**. However the record shown that only 27.2% children were received oral polio drops. Half (52.3%) of reported vaccinated children were received polio drops more than 7 times, 26.1% 7 times, 19.3% 3 times while rest of the mothers could not recall.

The Pentavalent Vaccine a new combination of five vaccines that protects children against the bacterium Haemophilus influenzae type b (Hib) and four other common childhood diseases was introduced in Pakistan in November 2008. Pakistan is the first low-income country in South Asia, who introduced the Hib vaccine. Almost 85% children were taken all 3 doses of Pentavalent vaccine. But only 30% was verified by vaccination card.

Fig 6.29 Provincial Trend: Pentavalent Dose Rate

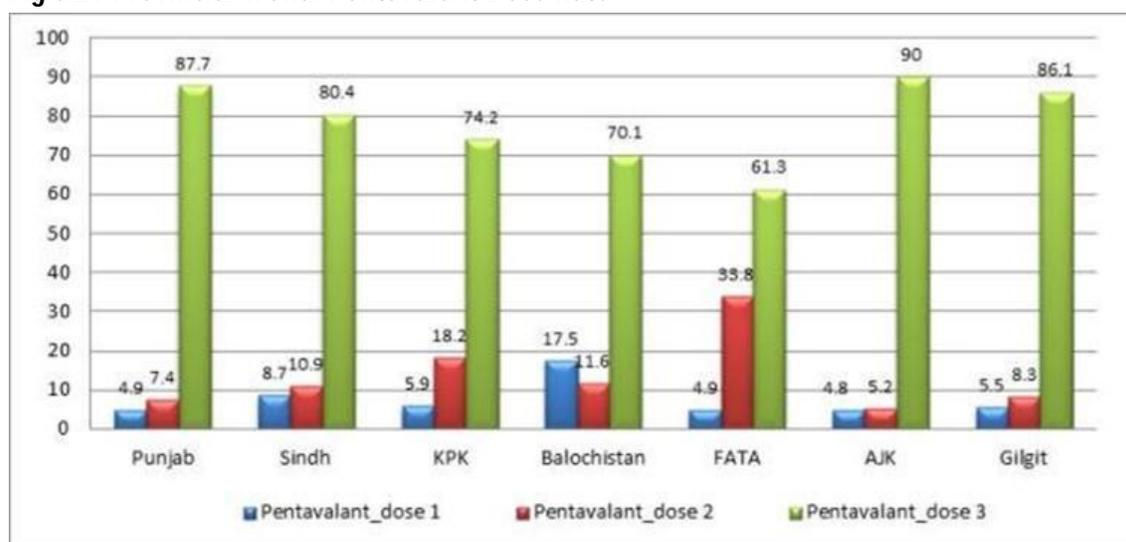
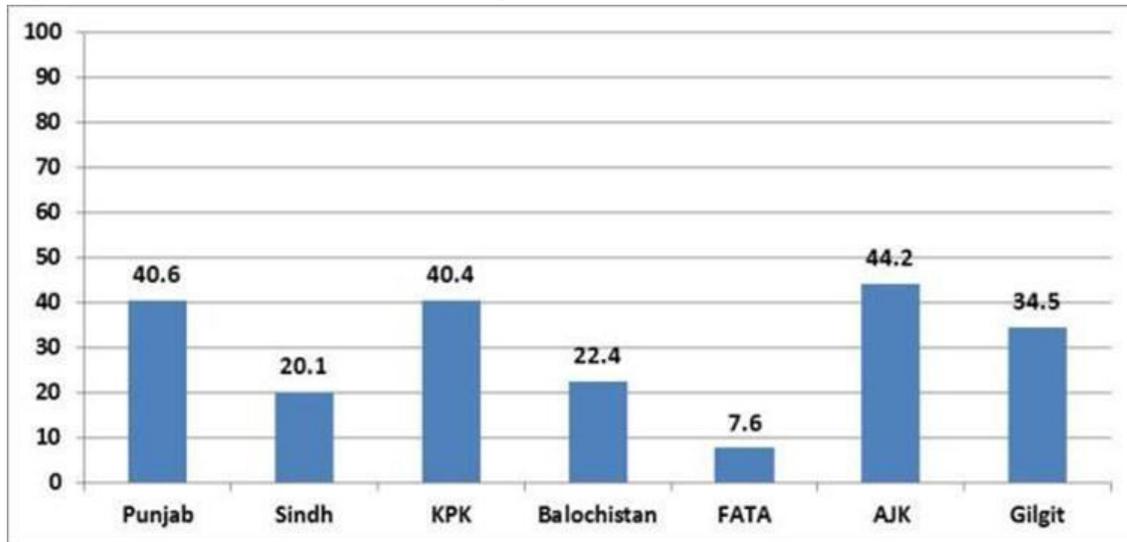


Fig 6.30 Provincial Trends for Availability of Vaccination Card



Among all provinces and regions AJK families kept the vaccination card (44.2%) in safe place more than in any other part of the country, while the lowest was in FATA i.e. only 7.6%.

Table 6.11: Pakistan and Regional Immunization Trends by Source of Information (Mother's recall & vaccination card)

Regions	BCG		Pentavalent		OPV		Measles	
	Recall	Card	Recall	Card	Recall	Card	Recall	Card
Pakistan	86.6	31.5	76.0	30.1	95.0	27.2	64.6	23.1
Urban	91.2	39.7	79.0	36.5	95.8	34.8	69.9	29.1
Rural	84.7	28.2	74.8	27.6	94.6	24.2	62.5	20.6
Punjab	91.2	38.2	86.0	36.8	98.0	34.2	67.3	27.0
Sindh	81.6	19.0	54.2	16.7	94.5	15.6	54.9	14.3
KPK	90.2	35.4	85.2	36.6	94.0	28.4	78.8	31.2
Balochistan	58.2	20.3	48.8	19.4	83.3	17.4	39.5	14.5
FATA	70.9	6.7	63.4	3.1	74.1	2.2	64.9	1.8
AJK	93.8	42.7	89.7	40.5	97.5	38.3	67.4	26.3
Gilgit	82.5	33.7	77.3	33.0	99.4	33.1	63.5	27.0

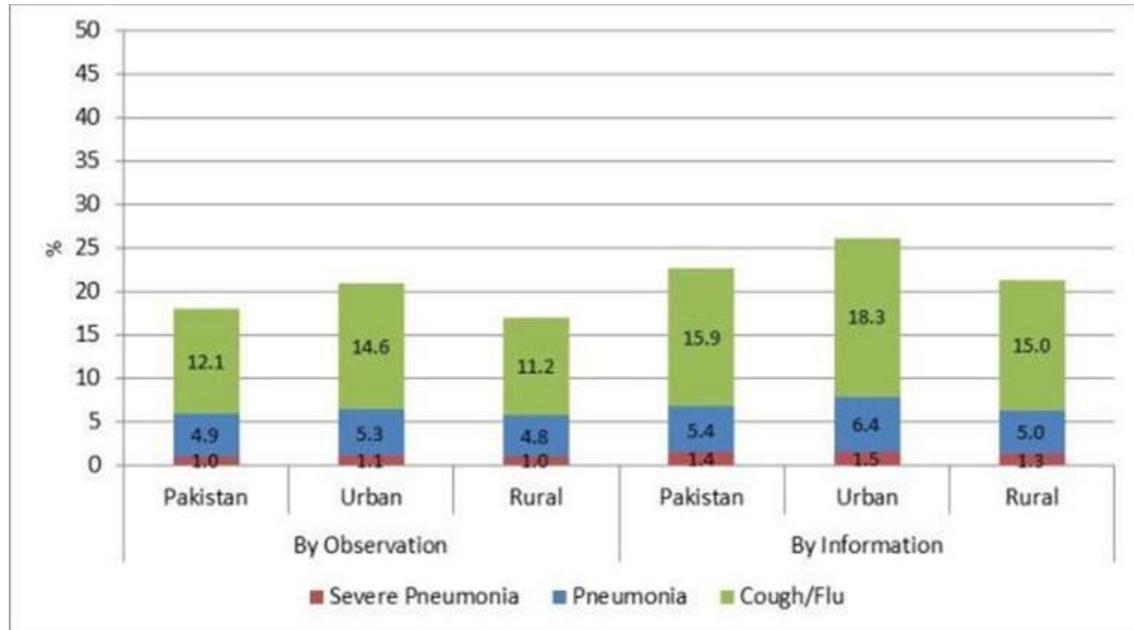
According to the data shown in Table 7.2 for various vaccinations; BCG, Measles, OPV and Pentavalent the provincial trends shown mixed trends for each vaccine in different provinces and regions.

Table 7.2 shows that vaccination coverage was higher in urban areas than in rural areas. Immunization coverage varies substantially across provinces. AJK (94% & 42%) and Punjab (91% & 38%) had highest coverage of BCG by mother's recall and vaccination card, while FATA (71% & 7%) and Balochistan (58% & 20%) had considerably lower BCG coverage. Availability of vaccination card was also varies across provinces, ranging from 6.7 percent in FATA to 42.7 percent in AJK.

Section 4: Morbidity Trends in Children:

Apart from neonatal disorders, diarrhea and pneumonia are the major causes of death in children under five worldwide (Black et al., 2003). In the NNS 2011, mothers of children under five were asked if the children had symptoms associated with acute respiratory illness (cough/flu, pneumonia, severe pneumonia and diarrhea) on the day of interview or two weeks preceding the survey.

Fig 6.31 Current ARI Status (Index Child)



6.4.1: Prevalence of ARI

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

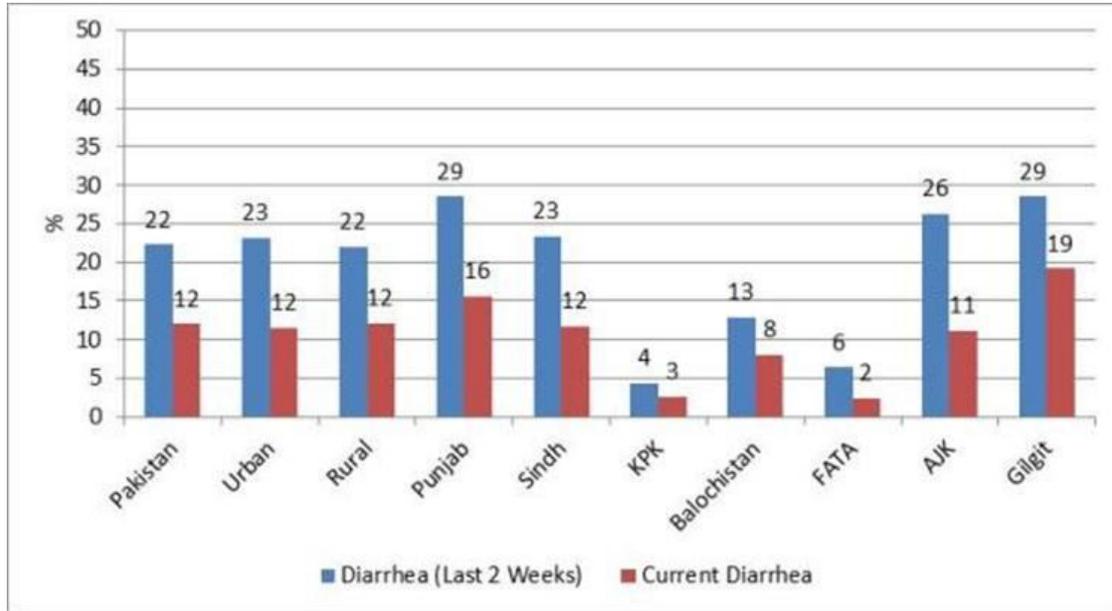
According to mothers of index children 4.9 percent of the children had pneumonia on the day of interview; however upon observation by community nurse 5.4 percent children had signs consistent with Pneumonia. The survey findings revealed that either by observation or reported by mother; the ARI (cough/flu,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

6.4.2: Prevalence of Diarrhea:

Diarrhea is also a major cause of mortality among children. Childhood diarrhea 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 government priority list.

The prevalence of diarrhea was determined on the basis of WHO definition reported two weeks prior to survey, and on the day of interview. The households were asked to report whether a child had diarrhea on the day of interview or two weeks preceding the survey.

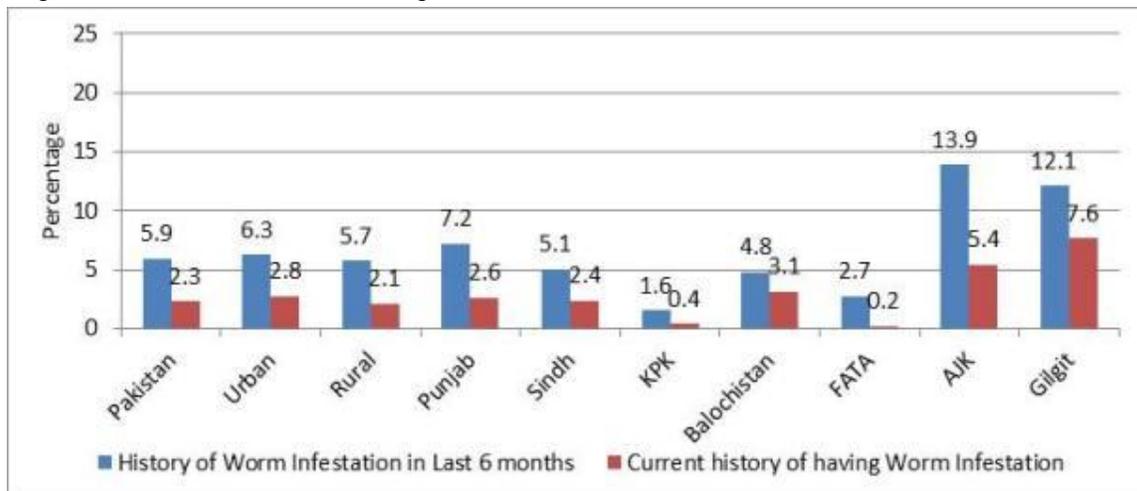
Fig 6.32 Prevalence of Diarrhea



12 percent children reported to be suffering from diarrhea at the time of visit and 20 percent had diarrhea during last two weeks across Pakistan. The prevalence of diarrhea (current and last two weeks) was similar between urban and rural areas.

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

Fig 6.33 Worm Infestation among children



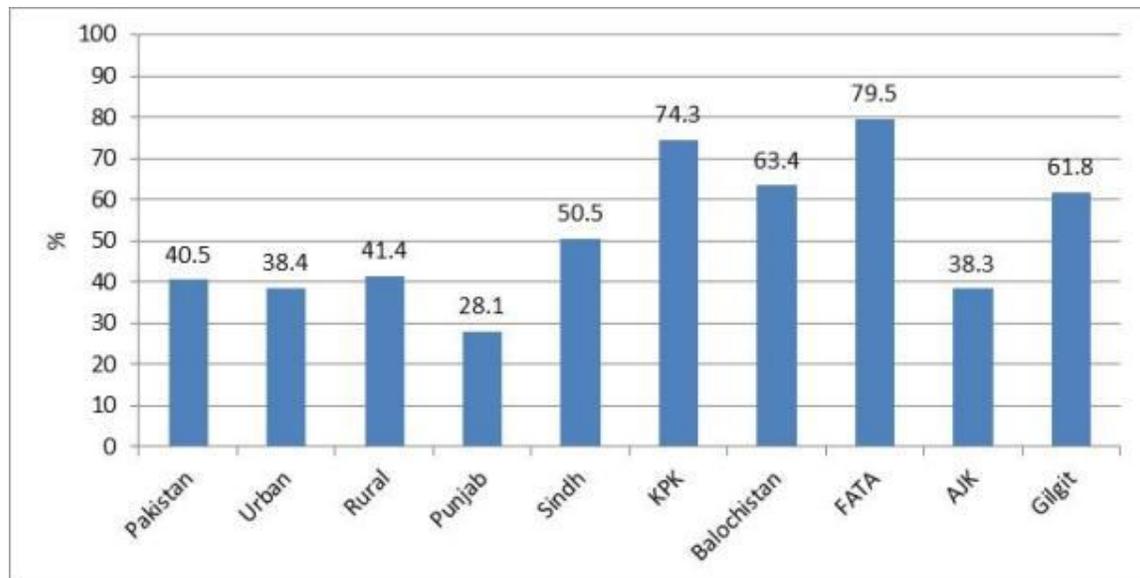
During last six months, about 5.9 percent of the children reported to have been diagnosed with worm infestation across Pakistan especially from AJK (13.9%) and Gilgit (12.1%). The prevalence was high in urban areas (6.3%) than in rural areas (5.7%). Overall, only 2.3% of the children reported having worm infestation at the time of household visit during data collection with highest proportion reported from Gilgit (7.6% and AJK (5.4%).)

Chapter 7: INFANT AND YOUNG CHILD FEEDING PRACTICES

Infant and young child feeding practices directly affect the nutritional status of children under two years of age and, ultimately, impact child survival. Improving infant and young child feeding practices in children 0–23 months of age is therefore critical to improved nutrition, health and development of children.

Exclusive Breast feeding (EBF) 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”. The proportion of EBF is estimated on the basis of feeding practices in the past 24 hours dietary recall.

Fig 7.1: Initiation of breastfeeding within one hour



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

Survey analysis showed that 65 percent of mothers exclusively breastfed their children under-6 months and 78 percent continued breast feeding up to 12- 15 months. Exclusive breastfeeding was higher in rural (67%) than in urban areas (59%). The rate of exclusive breastfeeding was highest in KPK (83.6%) and lowest in FATA (83.6%). 72 percent mothers continued breast-feeding practice (12-15months) in urban areas and 80 percent in rural areas.

Fig 7.2: Exclusive Breast Feeding

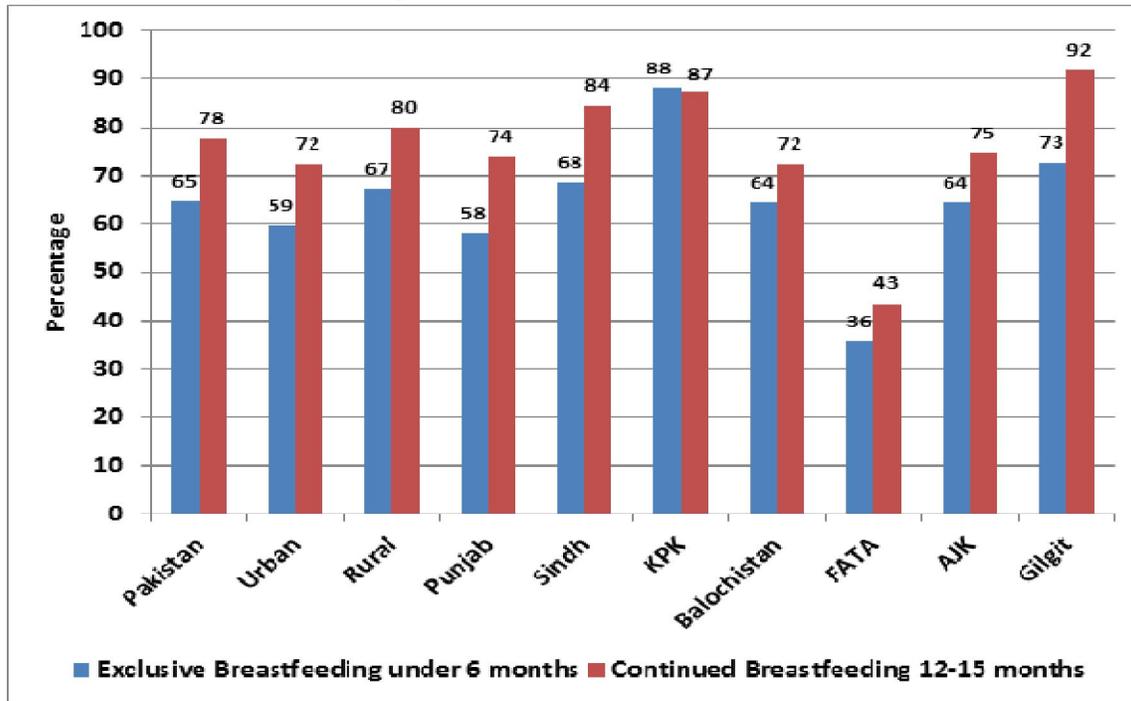
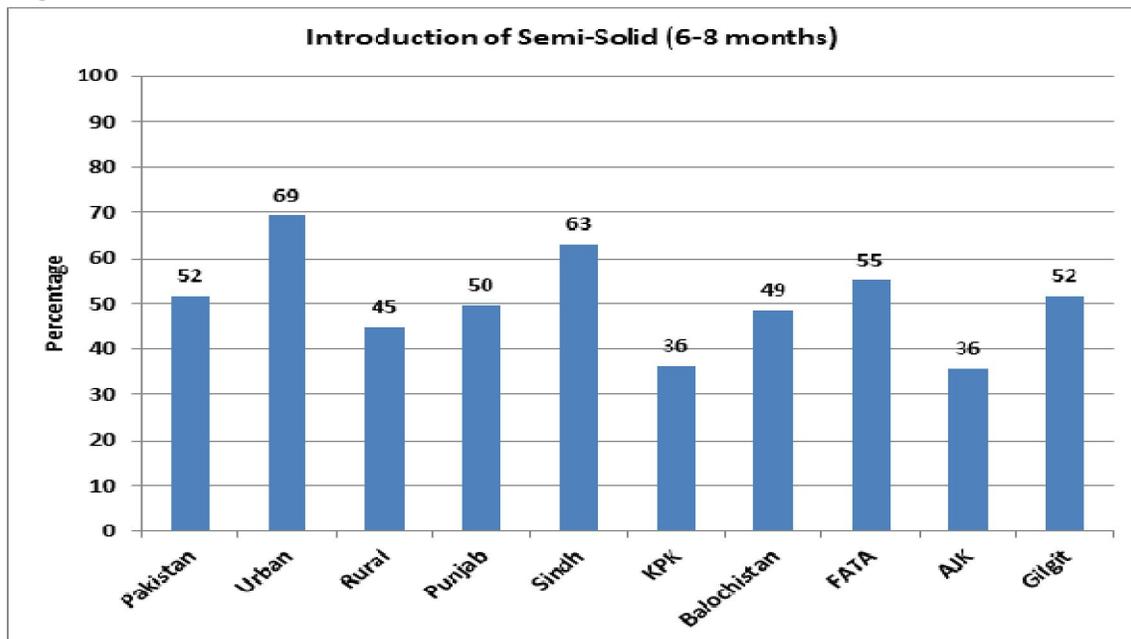
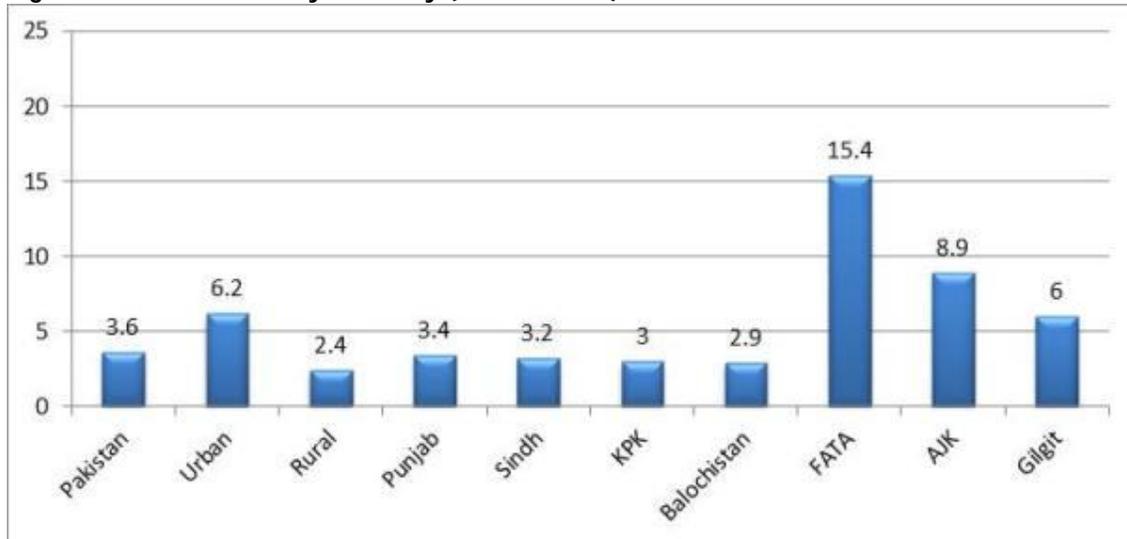


Fig 7.3: Introduction of Semi solid food



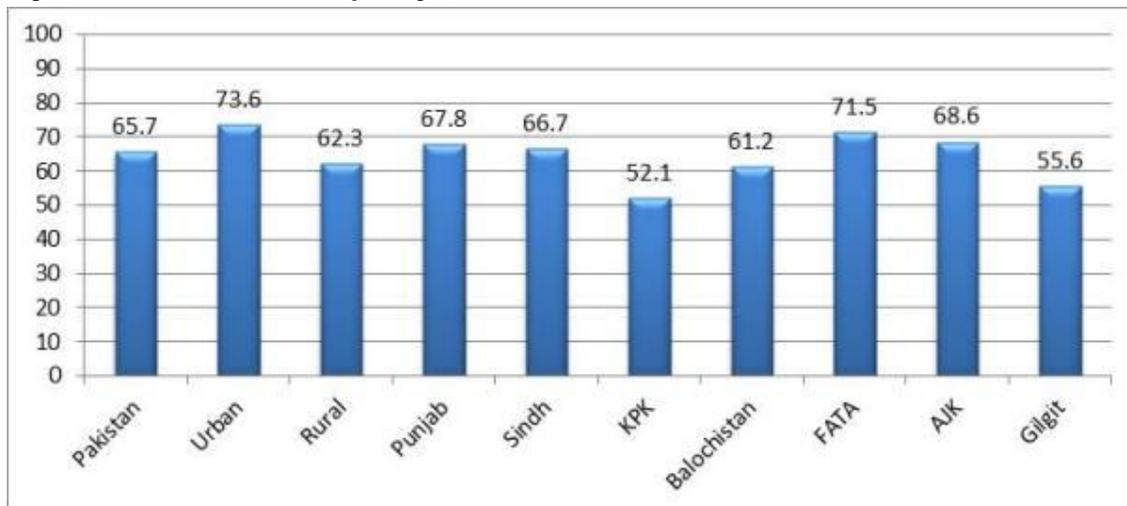
More than half (52%) of mothers across Pakistan reported that they had started giving semi solid foods to their children at 6 -8 months. The percentage was higher (69%) in urban areas than in rural areas (45%). KPK (36%) & AJK (36%) had lower trends of introduction of food at 6-8 months in comparison to other provinces.

Fig 7.4: Minimum Dietary Diversity (6-23 months)



Dietary diversity is estimated as proportion of children 6-23.9 months of age who received foods from 4 or more food groups. NNS 2011 survey finding revealed that 3.6% mothers practiced dietary diversity for their children. Mothers of urban areas practiced minimum dietary diversity at higher rate than mothers of rural areas. 6.2% vs. 2.4%). FATA (15.4%) and AJK (8.9%) ranked highest in minimum dietary diversity amongst other provinces.

Fig 7.5: Minimum Meal Frequency (6-23 months)

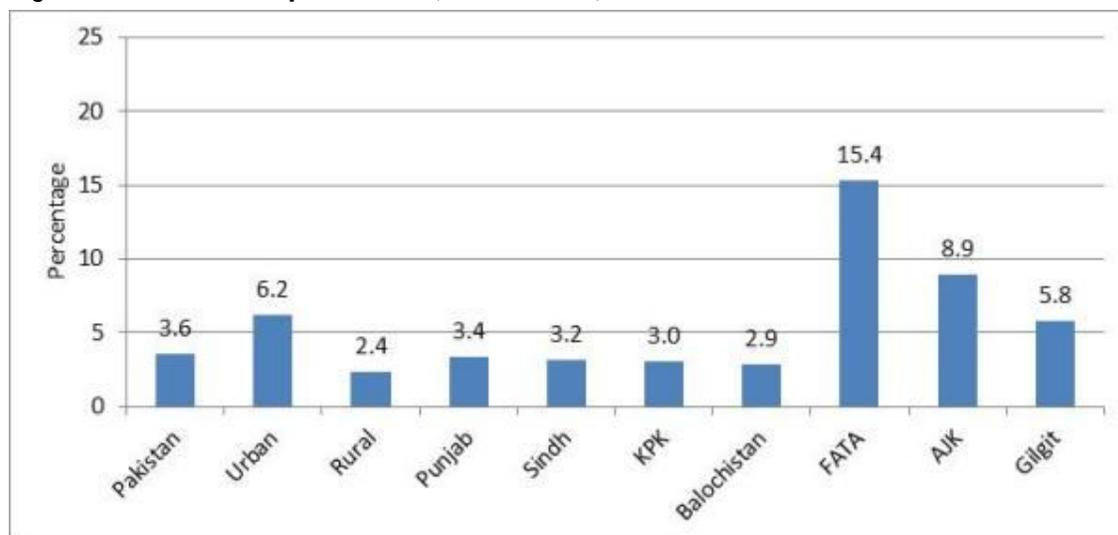


Minimal meal frequency is estimated as proportion of breastfed and non-breastfed children of 6-23.9 months of age, who receive solid, semi-solid, or soft foods (also includes milk feeds for children not -breastfed) the minimum number of times or more.

Overall 65.7% mothers provided foods to their children at a minimally acceptable meal frequency ("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).

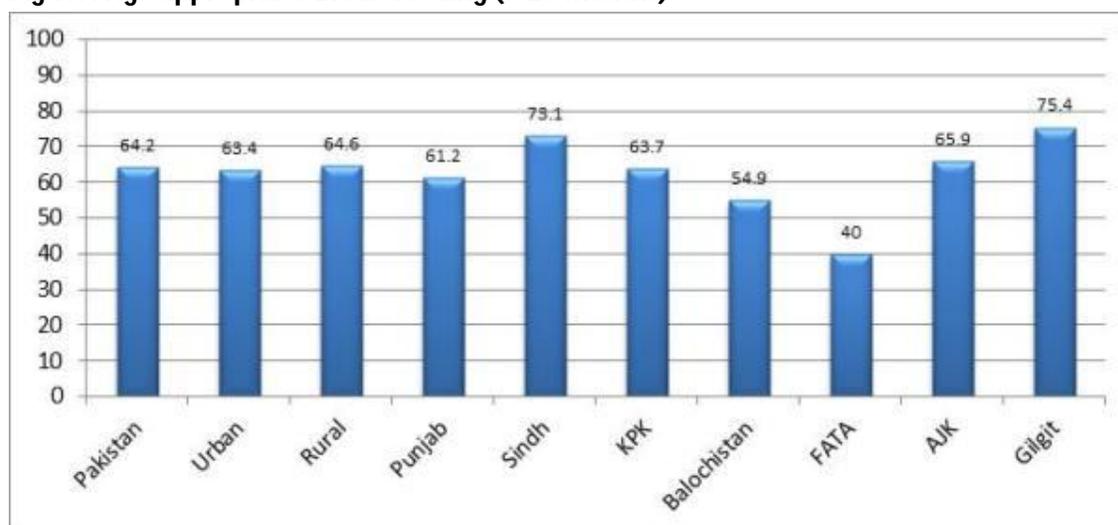
The minimum meal frequency practice was high in urban 73.6 percent vs. 62.3 percent in rural area. About half of all mothers practiced minimal meal frequency practice in all regions/provinces.

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



Minimum acceptable diet defined as proportion of children 6–23 months of age who receive a minimum acceptable diet (apart from breast milk).

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



Age-appropriate breastfeeding was defined as proportion of children 0–23 months of age who were appropriately breastfed. The proportion of age- appropriate breastfeeding children was 64.2 percent in Pakistan. Similar trends were recorded both in urban and rural areas. Except FATA, all other provinces showed higher trends with highest in Gilgit (75.4 %).

Chapter 8: FOOD INTAKE & PRACTICES

Dietary intake of the target groups is one component of this survey. In NNS 2011 the survey team obtained the dietary information administrating the dietary section from the target households.. Therefore, information on dietary intake has been obtained on two selected members of the household, a child 0-23 months of age and his/her mother. Dietary pattern and the food/nutrient intake of these two members were determined using food frequency for a given period of time in combination with the 24-hour recall for the previous day. Frequencies indicate the 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 estimation on food intake during the previous day and its conversion in to nutrients giving estimated nutrients availability, using food composition tables.

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

When we estimated the share of calories and other nutrients following was revealed

Energy:

The 0-23 months children in Pakistan are utilizing 692.2 K.Cal/day, the urban population was consuming 852.7 K.Cal/day whereas the rural population was consuming 691.4 K.Cal/day. When the energy intake was observed provincially it was revealed that the consumption of energy in children in Punjab was utilizing 615.9 K.Cal, in Sindh was 715.7 K.Cal/day, in KPK 939 K.Cal/day, in Baluchistan 1165 K.Cal/day, in FATA 998.3 K.Cal/day, in AJK 815.5 K.Cal/day and in Gilgit 563.4 K.Cal/day.

Proteins:

When the data was assessed for Protein consumption it was revealed that the children in Pakistan were consuming an average of 26.8 grams of protein/day. In urban areas the consumption of proteins was 30.7 grams compared to 24.8 grams/day in rural areas. When the Protein intake was determined on the provincial basis it was found that the consumption of protein in Punjab was 23.9 gm/day, in Sindh it was 25.4 gm/day, in KPK it was 40.4 gm/day, in Baluchistan it was 47.4 gm/day, in FATA it was 48.4 gm/day, in AJK it was 27 gm/day and in Gilgit it was 21.6 gm/day.

Fats

The dietary data was assessed for Fat utilization it was discovered that the children in Pakistan were consuming an average of 20.5 gm of fats/day. In urban areas the consumption of proteins was 26.8 grams compared to 17.7 grams/day in rural areas. When the Fat intake was assessed on the provincial basis it was found that the consumption of fats in Punjab was 21.7 gm/day, in Sindh it was 18.6 gm/day, in KPK it was 14.2 gm/day, in Baluchistan it was 26.7 gm/day, in FATA it was 27.7 gm/day, in AJK it was 26.3 gm/day and in Gilgit it was 12.2 gm/day.

Carbohydrates:

When the data was assessed for Carbohydrate consumption it was revealed that the children in Pakistan were consuming an average of 78.8 gm of carbohydrates/day. In urban areas the consumption of carbohydrates was 94.3 grams compared to 71.2 grams/day in rural areas. When the Carbohydrate consumption was determined on the provincial basis it was found that the consumption of carbohydrates in Punjab was 63.9 gm/day, in Sindh it was 87.2 gm/day, in KPK it was 118.4 gm/day, in Baluchistan it was 148.1 gm/day, in FATA it was 135.1 gm/day, in AJK it was 96.1 gm/day and in Gilgit it was 80.7 gm/day.

Calcium:

When the data was assessed for daily calcium intake it was revealed that the children in Pakistan were consuming an average of 607.5 mg of calcium/day. In urban areas the consumption of calcium was 654.3 mg compared to 584.5 mg/day in rural areas. When the calcium intake was determined on the provincial basis it was found that the consumption of calcium in Punjab was 637 mg/day, in Sindh it was 460 mg/day, in KPK it was 714.2 mg/day, in Baluchistan it was 853.3 mg/day, in FATA it was 734.7 mg/day, in AJK it was 675.8 mg/day and in Gilgit it was 396.5 mg/day.

Iron:

When the data was assessed for Iron consumption it was revealed that the children in Pakistan were consuming an average of 11.7mg of iron /day. In urban areas the consumption of proteins was 13 mg compared to 11.1 mg/day in rural areas. When the Iron intake was determined on the provincial basis it was established that the consumption of iron in Punjab was 8.4 mg/day, in Sindh it was 13.1 mg/day, in KPK it was 24.7 mg/day, in Baluchistan it was 29 mg/day, in FATA it was 29.2 mg/day, in AJK it was 7.8 mg/day and in Gilgit it was 12.3 mg /day.

Zinc:

The dietary data was also assessed for daily zinc intake it was found that the children in Pakistan were consuming an average of 2.8 mg of Zinc/day. In urban areas the consumption of zinc was 3.2 mg compared to 2.6 mg/day in rural areas. When the zinc intake was determined on the provincial basis it was found that the consumption of zinc in Punjab was 2.3 mg/day, in Sindh it was 3.0 mg/day, in KPK it was 4.6 mg/day, in Baluchistan it was 5.6 mg/day, in FATA it was 5.4 mg/day, in AJK it was 2.3 mg/day and in Gilgit it was 2.4 mg/day.

Vitamin C:

The dietary data was also assessed for daily Vitamin C intake it was revealed that the children in Pakistan were consuming an average of 21.2 mg of Vitamin-C /day. In urban areas the consumption of vitamin C was 36.3 mg compared to 13.7 mg/day in rural areas. When the vitamin C intake was determined on the provincial basis it was found that the consumption of vitamin C in Punjab was 11.4 mg/day, in Sindh it was 36.7 mg/day, in KPK it was 18.8

mg/day, in Baluchistan it was 57.8 mg/day, in FATA it was 7.8 mg/day, in AJK it was 38.5 mg/day and in Gilgit it was 23.8 mg/day.

Table 8.1: Share of Calories & Nutrients - Children (0-23 months)

	Pakistan	Residence		Province / Region						
		Urban	Rural	Punjab	Sindh	KPK	Baluchistan	FATA	AJK	Gilgit
Energy (K.cal)	696.2	852.7	619.4	615.9	715.7	939.7	1165.0	998.3	815.5	563.4
Protein (gm)	26.8	30.7	24.8	23.9	25.4	40.4	47.4	48.4	27.0	21.6
Fats (gm)	20.5	26.8	17.7	21.7	18.6	14.2	26.7	27.7	26.3	12.2
Carbohydrate (gm)	78.8	94.3	71.2	63.9	87.2	118.4	148.1	135.1	96.1	80.7
Calcium (mg)	607.5	654.3	584.5	637.0	460.8	714.2	835.3	734.7	675.8	396.5
Iron (mg)	11.7	13.0	11.1	8.4	13.1	24.7	29.0	29.2	7.8	12.3
Zn (mg)	2.8	3.2	2.6	2.3	3.0	4.6	5.6	5.4	2.3	2.4
Vit.C (mg)	21.2	36.3	13.7	11.4	36.7	18.8	57.8	7.8	38.5	23.8
N	6761	2882	3879	3489	1637	435	493	60	440	207

Comparison of Nutrient Intake with the RDA

When the data was compared with the daily dietary allowance it was revealed that the children were consuming almost half of the recommended daily energy, the utilization of protein was more than the RDA, the consumption of carbohydrates and fats was lower than the RDA. When the micronutrients were compared with the RDAs it was revealed that the consumption of calcium was more than the RDA whereas the consumption of Iron was almost equal to the RDA, the consumption of zinc was lower than the RDA while the consumption of Vitamin C was higher than the RDA.

Table: 8.2: Comparison of Nutrient Intake with the RDA

Nutrient	Pakistan NNS 2011	Urban NNS 2011	Rural NNS 2011	RDA
Energy (K.cal)	696.2	852.7	619.4	1200
Protein (gm)	26.8	30.7	24.8	13
Fats (gm)	20.5	26.8	17.7	30
Carbohydrate(gm)	78.8	94.3	71.2	100
Calcium (mg)	607.5	654.3	584.5	500
Iron (mg)	11.7	13.0	11.1	11
Zn (mg)	2.8	3.2	2.6	3
Vit.C (mg)	21.2	36.3	13.7	15

Utilization of Food Groups:

The dietary data of children 0-23 months was further analyzed for the utilization of various food groups and it was revealed that the utilization of average wheat per day among children of this age group was 14.1 gm, 15.0 gm in urban areas and 13.6 gm in rural areas, the utilization of wheat was found to be pretty low about 6 grams in KPK and Gilgit. The average utilization of rice was 11.2 grams in children of 0-23 months of age in Pakistan, 12.7 grams in urban areas and 10.5 grams in rural areas. Sindh had the lowest utilization of rice in this age group. The average utilization of pulses was 15.8 grams, 26.1 grams from urban areas and 11.1 grams from rural areas. Gilgit had the lowest utilization of pulses.

Egg utilization was found to be 1.6 grams, 2.9 grams from urban areas and 1.0 grams from rural areas. The utilization of egg was almost the same in all provinces except Gilgit where it is a bit high up to 4.1 grams. The average utilization of meat in this group was 1.8 grams/day, 2.1 from urban areas and 1.6 grams from rural areas. Surprisingly FATA had the highest 27.2 grams utilization of meat compared to the rest of the provinces. The average utilization of vegetables in this group was 5 grams/day, 6.5 grams in urban areas and 4.3 grams in rural areas, on provincial estimation it was found that Baluchistan had the highest 13.5 grams and AJK had the lowest 1.3 grams intake of vegetables. The average utilization of fruits was 6.1 grams/day, 9.2 grams in urban areas and 4.7 grams in rural areas. FATA had the maximum utilization of fruits which was 32.4 grams/day

Table 8.3: Consumption of Food Groups

Food Groups	Pakistan	Residence		Province / Region						
		Urban	Rural	Punjab	Sindh	KPK	Baluchistan	FATA	AJK	Gilgit
Wheat (gm)	14.1	15.0	13.6	14.9	15.7	6.1	12.7	20.2	12.9	6.0
Rice (gm)	11.2	12.7	10.5	10.6	9.9	13.0	12.1	28.3	23.5	12.3
Pulses (gm)	15.8	26.1	11.1	10.1	22.8	26.8	27.9	16.2	11.0	4.2
Egg (gm)	1.6	2.9	1.0	1.3	1.6	3.0	1.3	2.1	2.3	4.1
Meat (gm)	1.8	2.1	1.6	1.1	1.4	1.7	8.9	27.2	2.0	1.3
Milk (ml)	162.1	171.8	157.8	209.5	84.7	92.9	139.1	163.7	189.9	62.1
Vegetable (gm)	5.0	6.5	4.3	4.0	4.9	7.6	13.5	4.7	1.3	7.3
Tea (ml)	15.1	15.5	14.9	9.5	16.4	26.7	50.9	73.2	4.0	16.8
Fruits (gm)	6.1	9.2	4.7	6.4	3.7	7.7	3.9	32.4	12.9	3.3
others (gm)	2.9	4.6	2.2	2.7	2.3	3.7	4.1	20.8	3.5	1.3
N	6761	2882	3879	3489	1637	435	493	60	440	207

The data was also analyzed for the consumption of milk and tea; it was found that the average utilization of milk in 0-23 month's old children was 162.1 ml/day, 171.8 ml in urban areas and 157.8 in rural areas. The maximum utilization of milk was in Punjab 209.5 ml while the minimum was in Gilgit 62.1 ml. Similarly on an average these children were utilizing 15.1

ml of tea, 15.5 ml in urban areas and 14.9 in rural areas. The maximum utilization of tea was in FATA and minimum was in AJK.

Section 2: Food consumption in Mothers of Index Child:

The Share of Calories and other nutrients were estimated for the mothers of index child, following is the description.

Energy:

The mothers of index child in Pakistan were utilizing 1984 K.Cal/day, the urban population was consuming 2073.4 K.Cal/day whereas the rural population was consuming 1949.8 K.Cal/day. When the energy intake was observed provincially it was revealed that the consumption of energy in children in Punjab was utilizing 1854 K.Cal, in Sindh was 1855 K.Cal/day, in KPK 2414 K.Cal/day, in Baluchistan 2098.6 K.Cal/day, in FATA 2283.8 K.Cal/day, in AJK 2094.5 K.Cal/day and in Gilgit 2155 K.Cal/day.

Proteins:

When the data was assessed for Protein consumption it was revealed that the mothers of index child were consuming an average of 87.8 grams of protein/day. In urban areas the consumption of proteins was 92.9 grams compared to 85.8 grams/day in rural areas. When the Protein intake was determined on the provincial basis it was found that the consumption of protein in Punjab was 81.1 gm/day, in Sindh it was 84.3 gm/day, in KPK it was 103.3 gm/day, in Baluchistan it was 98.8 gm/day, in FATA it was 104.8 gm/day, in AJK it was 91 gm/day and in Gilgit it was 95.9 gm/day.

Fats

The dietary data was assessed for Fat utilization it was discovered that the mother of index child were consuming an average of 37.5 gm of fats/day. In urban areas the consumption of proteins was 43.5 grams compared to 35.1 grams/day in rural areas. When the Fat intake was assessed on the provincial basis it was found that the consumption of fats in Punjab was 34.3 gm/day, in Sindh it was 28.8 gm/day, in KPK it was 60.4 gm/day, in Baluchistan it was 27.8 gm/day, in FATA it was 47.5 gm/day, in AJK it was 35.5 gm/day and in Gilgit it was 31.7 gm/day.

Carbohydrates:

When the data was assessed for Carbohydrate consumption it was revealed that the mothers of index children were consuming an average of 349/3 gm of carbohydrates/day. In urban areas the consumption of carbohydrates was 351.7 grams compared to 348.4 grams/day in rural areas. When the Carbohydrate consumption was determined on the provincial basis it was found that the consumption of carbohydrates in Punjab was 327.1 gm/day, in Sindh it was 339 gm/day, in KPK it was 398.5 gm/day, in Baluchistan it was 393.8

gm/day, in FATA it was 386.9 gm/day, in AJK it was 376.3 gm/day and in Gilgit it was 398.6 gm/day.

Calcium:

When the data was assessed for daily calcium intake it was revealed that the mothers of index children were consuming an average of 953.2 mg of calcium/day. In urban areas the consumption of calcium was 977.8 mg compared to 943.6 mg/day in rural areas. When the calcium intake was determined on the provincial basis it was found that the consumption of calcium in Punjab was 922.3 mg/day, in Sindh it was 924.5 mg/day, in KPK it was 1014.9 mg/day, in Baluchistan it was 1062.5 mg/day, in FATA it was 1066.6 mg/day, in AJK it was 956.4 mg/day and in Gilgit it was 1058.8 mg/day.

Iron:

When the data was assessed for Iron consumption it was revealed that the mothers of index children were consuming an average of 60.2 mg of iron /day. In urban areas the consumption of proteins was 60.9 mg compared to 59.9 mg/day in rural areas. When the Iron intake was determined on the provincial basis it was established that the consumption of iron in Punjab was 54.4 mg/day, in Sindh it was 58.9 mg/day, in KPK it was 71.5 mg/day, in Baluchistan it was 71.3 mg/day, in FATA it was 70.4 mg/day, in AJK it was 63.6 mg/day and in Gilgit it was 68.4 mg /day.

Zinc:

The dietary data was also assessed for daily zinc intake it was found that the mothers of index children were consuming an average of 13.9 mg of Zinc/day. In urban areas the consumption of zinc was 13.8 mg compared to 13.9 mg/day in rural areas. When the zinc intake was determined on the provincial basis it was found that the consumption of zinc in Punjab was 12.9 mg/day, in Sindh it was 13.0 mg/day, in KPK it was 16.6 mg/day, in Baluchistan it was 16.2 mg/day, in FATA it was 16.1 mg/day, in AJK it was 14.2 mg/day and in Gilgit it was 15.9 mg/day.

Vitamin C:

The dietary data was also assessed for daily Vitamin C intake it was revealed that the mothers of index children were consuming an average of 32.2 mg of Vitamin-C /day. In urban areas the consumption of vitamin C was 32.1 mg compared to 32.2 mg/day in rural areas. When the vitamin C intake was determined on the provincial basis it was found that the consumption of vitamin C in Punjab was 34.7 mg/day, in Sindh it was 28.6 mg/day, in KPK it was 31.5 mg/day, in Baluchistan it was 38.8 mg/day, in FATA it was 21.2 mg/day, in AJK it was 31.2 mg/day and in Gilgit it was 27.4 mg/day.

Table 8.4: Share of Calories & Nutrients - Mothers

	Pakistan	Residence		Province / Region						
		Urban	Rural	Punjab	Sindh	KPK	Baluchis- tan	FATA	AJK	Gilgit
Energy (K.cal)	1984.5	2073.4	1949.8	1854.0	1855.3	2414	2098	2283.8	2094.8	2155
Protein (gm)	87.8	92.9	85.8	81.1	84.3	103.3	98.8	104.8	91.0	95.9
Fats (gm)	37.5	43.5	35.1	34.3	28.8	60.4	27.8	47.5	35.5	31.7
Carbohy- drate(gm)	349.3	351.7	348.4	327.1	339.0	398.5	393.9	386.9	376.3	398.6
Calcium (mg)	953.2	977.8	943.6	922.3	924.5	1015	1062.5	1066.6	956.4	1058.8
Iron (mg)	60.2	60.9	59.9	54.4	58.9	71.5	71.3	70.4	63.6	68.4
Zn (mg)	13.9	13.8	13.9	12.9	13.0	16.6	16.2	16.1	14.2	15.9
Vit.C (mg)	32.2	32.1	32.2	34.7	28.6	31.5	38.8	21.2	31.2	27.4
N	17324	6527	10797	7112	4186	2432	1484	881	820	409

Comparison of Nutrient Intake with the RDA

When the data was compared with the daily dietary allowance it was revealed that the mothers of index children were consuming less energy of the recommended daily energy, the utilization of protein was more than the RDA, the consumption of carbohydrates is twice as higher than the RDA whereas the utilization of fats was also a bit higher than that of the RDA. Calcium intake is a bit lower than that of the RDA while the intake of iron and zinc is higher than that of the RDA. The women were consuming less vitamin C compared to the recommendations.

Table 8.5: Comparison of Nutrient Intake with the RDA

Nutrient	Pakistan NNS 2011	Urban NNS 2011	Rural NNS 2011	RDA
Energy (K.cal)	1984.5	2073.4	1949.8	2100
Protein (gm)	87.8	92.9	85.8	50
Fats (gm)	37.5	43.5	35.1	30
Carbohydrate(gm)	349.3	351.7	348.4	130
Calcium (mg)	953.2	977.8	943.6	1000
Iron (mg)	60.2	60.9	59.9	18
Zn (mg)	13.9	13.8	13.9	10
Vit.C (mg)	32.2	32.1	32.2	75

Utilization of Food Groups:

The dietary data of mothers of index children was further analyzed for the utilization of various food groups and it was revealed that the utilization of average wheat per day among mothers was 215.4 gm, 211 gm in urban areas and 217 gm in rural areas, the utilization of wheat was found to be pretty low about 156.2 grams in KPK, where as it was found stable in the rest of the provinces. The average utilization of rice was 52.9 grams in mothers of index children, 67.4 grams in urban areas and 47.3 grams in rural areas. KPK had the lowest utilization of rice in this group. The average utilization of pulses was 42.7 grams, 50.6 grams from urban areas and 39.6 grams from rural areas. Gilgit had the lowest utilization of pulses while in rest of the provinces the average utilization of pulses was almost the same.

Egg utilization was found to be 4.6 grams, 7.4 grams from urban areas and 3.5 grams from rural areas. The utilization of egg was almost the same in all provinces except KPK where it is a bit high up to 7.9 grams. The average utilization of meat in the mothers of index children was 46.9 grams/day, 61.1 from urban areas and 41.3 grams from rural areas. FATA had the highest 82.6 grams utilization of meat whereas Gilgit had lowest utilization 17.0 gm compared to the rest of the provinces.

The average utilization of Tubers and roots in mothers of index children was found to be 51.9 gm/day, 41.4 gm in urban areas and 56.1 gm in rural areas. Sindh had the maximum utilization of tubers and roots followed by Baluchistan and rest of the provinces, whereas Gilgit had lowest utilization. The average utilization of vegetables in this group was 106.8 grams/day, 105.8 grams in urban areas and 107.2 grams in rural areas, on provincial estimation it was found that KPK had the highest 123.3 grams followed Punjab and rest of the provinces lowest utilization of vegetables was in Sindh and Gilgit. The average utilization of fruits was 26.5 grams/day, 33.1 grams in urban areas and 23.9 grams in rural areas. AJK, Gilgit and FATA had the maximum utilization of fruits respectively. Minimum utilization of fruits was observed in Sindh.

The data was also analyzed for the consumption of milk and tea; it was found that the average utilization of milk in mothers of index children was 115.6 ml/day, 90.9 ml in urban areas and 125.2 in rural areas. The maximum utilization of milk was in Punjab 152.7 ml while the minimum was in KPK 58.7 ml. The data was also analyzed for the tea consumption and it was explored that the average utilization of tea in mothers of index children was 144.9 ml/day, 149.9 in urban areas and 142.9 in rural areas. This utilization of tea was more than the utilization of milk in this age group. When the data was analyzed on provincial basis it was revealed that the maximum average utilization of tea was in Baluchistan followed by FATA, KPK, Gilgit and AJK.

Table 8.6: Consumption of food groups

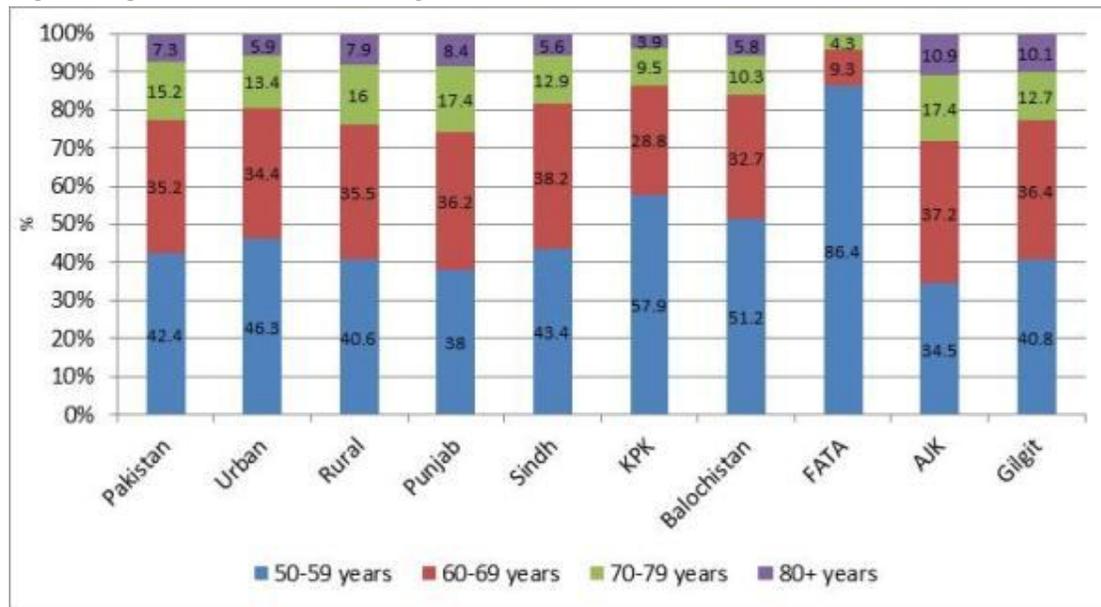
Food Groups	Pakistan	Residence		Province / Region						
		Urban	Rural	Punjab	Sindh	KPK	Baluchistan	FATA	AJK	Gilgit
Wheat (gm)	215.4	211.5	217.0	242.6	208.0	156.2	188.8	192.3	271.3	198.7
Rice (gm)	52.9	67.4	47.3	47.5	69.1	42.8	46.1	50.4	85.1	48.2
Pulses & Legumes (gm)	42.7	50.6	39.6	45.1	42.7	35.6	39.0	47.0	46.1	29.1
Meat (gm)	46.9	61.1	41.3	40.6	41.2	63.2	54.9	82.6	37.8	17.0
Egg (gm)	4.6	7.4	3.5	4.0	3.4	7.9	3.7	5.9	4.9	5.9
Tuber & Roots (gm)	51.9	41.4	56.1	44.6	74.3	47.4	63.7	24.0	30.9	15.7
Vegetables (gm)	106.8	105.8	107.2	119.0	77.2	123.3	103.7	93.1	94.4	77.9
Fruits (gm)	26.5	33.1	23.9	29.3	16.7	21.6	35.0	41.3	53.0	51.1
Milk / Milk Products (ml)	115.6	90.9	125.2	152.7	89.6	58.7	96.7	121.3	72.4	103.7
Tea (ml)	144.9	149.9	142.9	122.7	153.2	173.1	182.1	177.9	154.8	167.6
others (gm)	4.3	6.3	3.6	4.0	5.7	3.7	4.0	3.0	1.7	16.7
N	17324	6527	10797	7112	4186	2432	1484	881	820	409

Chapter 9: ELDER PERSONS HEALTH STATUS

Studies suggest that people's perceptions of their own health generally gives a good indication of their mental and physical condition and are also predictors of mortality for those aged 50 and over. There are a number of factors which are known to have an impact on the general health of the population and which can contribute to an increased risk of diseases such as cardiovascular disease and cancer. These factors include cigarette smoking, excessive alcohol and fat consumption, high blood pressure and cholesterol levels, limited exercise and being overweight. Elder people mostly spend time taking care of their health, whether it is **preventive or on-going care**, or attention to a specific health problem.

In the NNS 2011, elder persons were exclusively interviewed to determine the health status of old-age population in Pakistan. In all 7612 elder person were interviewed at their residence.

Fig 9.1: Age distribution of Elderly Persons



There were 30.4 percent male and 69.6 female respondents in this sample because mostly women were at their home during day-time. Majority of the elder population belonged to the age-group 50-59 years (42.4 %), 46.3 percent urban and 40.6 percent rural. In FATA 86.4 percent elder persons belonged to this age-group.

Figure 9.2: Gender distribution of Elderly persons

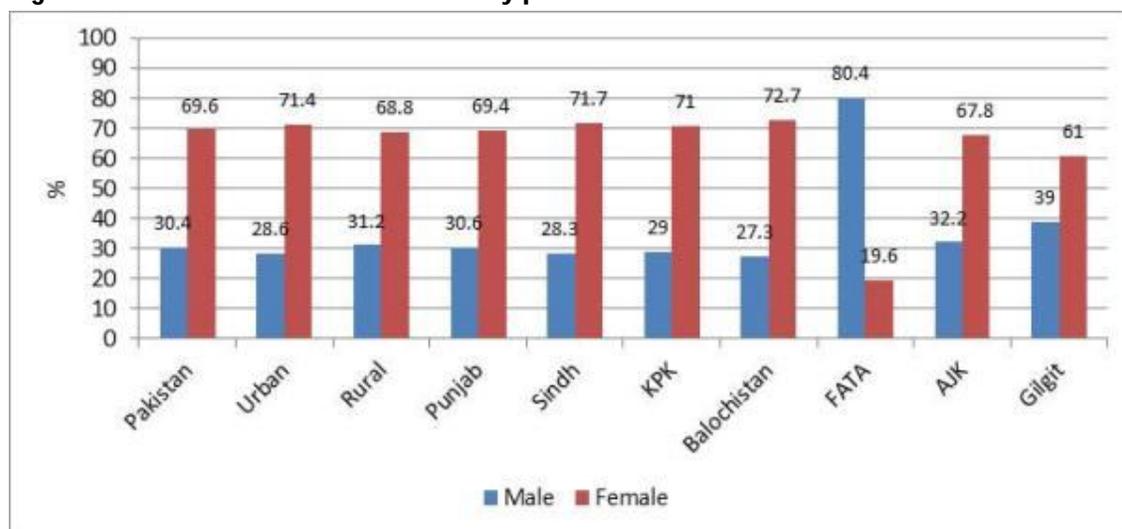


Table 9.1: Morbidities of Elderly persons

Illnesses	Pakistan	Residence		Province / Region						
		Urban	Rural	Punjab	Sindh	KPK	Balochistan	FATA	AJK	Gilgit
Arthritis	49.3	45.5	51.0	52.5	51.8	26.0	61.6	35.8	64.6	60.7
Congestive heart failure	4.9	4.8	5.0	4.9	6.0	2.7	9.0	5.4	5.0	2.3
Coronary heart disease	2.2	3.2	1.8	2.2	3.1	1.6	1.5	3.2	3.5	0.1
Angina	9.1	8.8	9.3	8.0	12.5	7.4	21.1	10.0	11.5	1.4
Heart Attack	3.1	4.3	2.5	3.2	2.8	2.5	2.6	6.7	5.2	1.8
Stroke	2.9	2.8	2.9	3.0	2.4	2.3	3.8	5.8	3.2	0.7
Emphysema	1.5	1.6	1.4	1.4	2.4	0.7	1.2	2.3	1.2	0.0
Thyroid Problem	1.8	1.8	1.8	1.7	1.9	1.5	1.6	3.6	4.1	2.2
Chronic bronchitis	9.9	8.4	10.6	10.4	11.4	4.4	17.9	13.8	6.0	14.0
Liver disorder	5.4	5.2	5.4	5.6	5.3	4.9	4.2	9.4	4.2	0.5
Hypertension	39.4	44.3	37.2	38.3	36.2	45.4	42.1	50.2	46.5	34.7
Diabetes Mellitus	14.0	20.3	11.1	14.4	12.7	15.5	9.9	14.3	9.6	3.9
Urinary Complains	10.2	10.1	10.2	11.1	10.5	5.6	9.5	8.3	11.7	13.1
N	7612	3135	4477	4289	1118	1053	417	83	392	260

Elder persons were found suffering from chronic illnesses. Fifty percent of the elderly population was suffering from arthritis followed by hypertension (39.4%), heart disease (19.4)

percent), diabetes (14%) and urinary complains (10.2%). In AJK alone 64.6 percent elderly population suffered from arthritis.

Body Mass Index

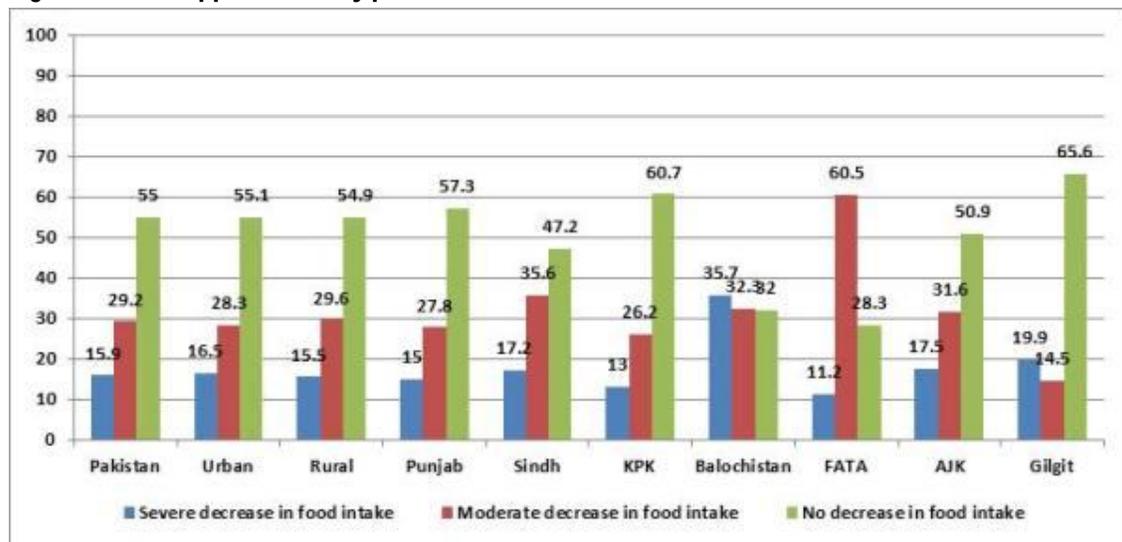
The results showed that 46.1 percent elder persons were maintaining normal weight while 24.2 percent were overweight and 12.9 percent were obese. In FATA 33.3 percent population of elder percent was overweight.

Table 9.2: Body Mass Index of Elderly person

BMI	Total	Residence		Province / Region						
		Urban	Rural	Punjab	Sindh	KPK	Balochistan	FATA	AJK	Gilgit
<16	4.7	2.5	5.7	5.1	5.7	2.4	4.7	0	5.4	2.3
16-16.99	3.4	1.6	4.2	3.6	4	1.2	5.7	0	5.7	1.6
17-18.49	7.7	4	9.4	8.4	7.7	3.9	9.2	0	9.9	11.9
18.5-24.99	46.1	37.5	49.9	46.3	46.2	43.2	48.2	19.3	51.9	61.6
25-29.99	24.2	31.4	21	23.8	22.1	30	19.4	47.4	19.1	18.3
30-39.99	12.8	21	9.3	11.8	13.5	18.4	10.5	33.3	7.8	3.6
>=40	1	2	0.6	1.1	0.8	0.9	2.4	0	0.1	0.7
N	6700	2717	3983	3776	1048	924	294	30	378	250

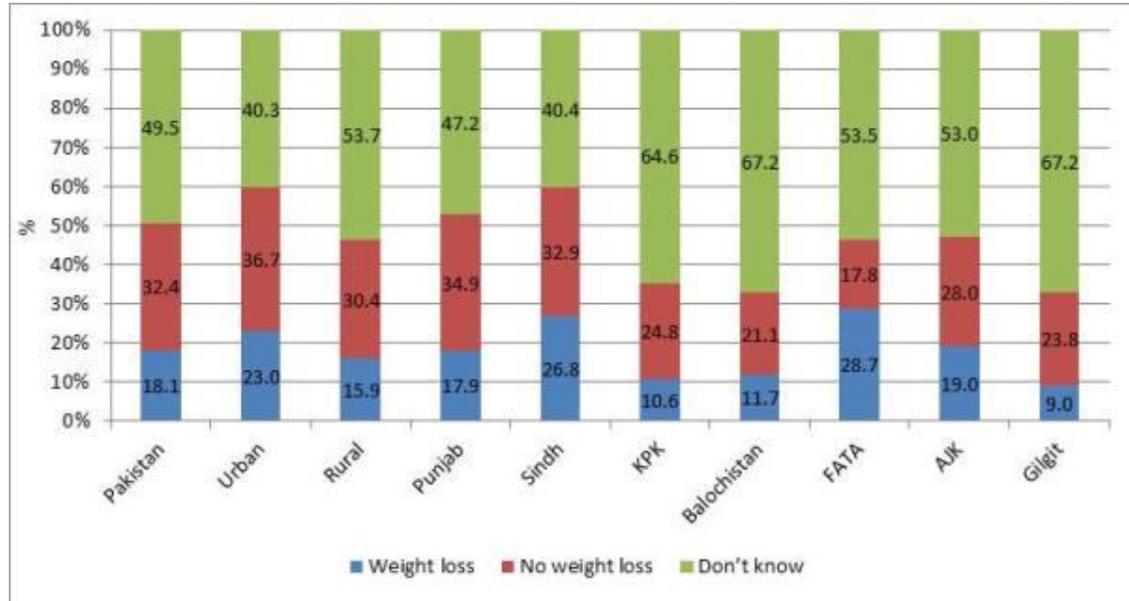
In context to loss of appetite, primarily there are three levels severe, moderate and normal. Overall 29.2 percent of the elders reported moderate decrease and 15.9 percent severe decrease in appetite. In Sindh, moderate loss of appetite was the highest (35.6%) while it was lowest in Gilgit (14.5%) however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

Fig 9.3: Loss of Appetite Elderly person



Nationwide 49.5 percent elderly were unaware of any weight loss in past three months. 32.4 percent elders confirmed that they did not lose weight. However 10 percent stated 1-3 kg weight loss during last three months.

Fig 9.4: Weight loss in Elderly person (by recall)



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

Chapter 10: QUALITATIVE COMPONENT OF NNS 2011 (KEY FINDINGS)

The purpose of qualitative component of NNS 2011 was to describe and explore the nutrition and food behavior of women and children of different cultural settings living across the Pakistan. The overall aim of this study was to identify nutrition behavior about children feeding pattern and dietary practices. These factors include breastfeeding, the connection between diet, disease and health, beliefs about certain foods, dietary practices, consumption of local versus imported foods, and other factors relating to food choices. In the NNS 2011, we used both important methods of qualitative research; focus groups discussions (FGDs) and in-depth interviews (IDIs).

Qualitative Results

Motherhood

The results revealed that a child's mental as well as physical well-being are interdependent and has direct impact on their diet. Participants from all sites were of the view that child's emotional state is determined through observation of verbal and non-verbal communication and behavior. They also showed an understanding that well-being of their child is depend on providing healthy food, quality education and hygienic environment.

Children's Need, Pre-lacteal Feeding and Breastfeeding

Almost all participants across the Pakistan were unanimously said "The breast milk is the first need of child immediate after birth" which has been now practicing in all parts of the country. "If initiation of early breasting is avoided then there should have been certain reasons behind – either no or insufficient milk or mother or baby was ill" or "Working mothers in urban area do not breastfeed to maintain their physic and introduce top feed immediately following birth". However, the traditional practice of pre-lacteal feeding (*Ghutti*) still continues and cannot be avoided due centuries' old practice. Probing revealed that "*Honey*" is used as the first pre-lacteal feed across the country. The cultural variation also existed; other forms of pre-lacteal feed included "*Gurr*" (Jaggery) more commonly given in Northern Punjab, clarified butter in Northern Punjab/KP/Gilgit-Baltistan, fennel-flavored sherbet also given in KP. It was an astonishing finding that besides water "Donkey's milk, which is perceived to prevent epilepsy, is also given, in Gilgit Baltistan", albeit by the minority.

Mother-in-law still influences the decision regarding lactation, (stated by majority across all regions) however husband, and elders, especially in Upper Sindh, Balochistan and Southern Punjab have more influence. Those who are least involved in decision making were mothers themselves (Except working mothers in urban area), their own mothers. Medical practitioners were of view that now the behavior is changing and mothers did start understanding of the benefits of early initiation of breastfeeding.

Exclusive Breastfeeding

Majority of the participants revealed "The duration of exclusive breastfeeding for children is from birth up to 6 months". The regions where this is commonly practiced were KP and Balochistan and not fully practiced in Sindh, Punjab, Gilgit Baltistan and Azad Jammu and Kashmir. An interesting revelation was made during discussions in Upper Sindh where the community believed the age of exclusive breastfeeding depends on the seasons, which according to them are 6 months in winter and less duration in the summer.

Advantages of Lactation

Participants were also asked about the advantages of lactation. Majority of the Participants across the country without any cultural consideration believed that it prevents child from illness and strengthens immunity. Similarly, they also said "It is convenient and readily available".

Disadvantages of Top Feed

Participants were asked about the disadvantages of top feeds (not giving breast milk) to their children. Majority of the participants in all cities reported that no-breastfeeding causes infections, indigestion and weaken the child's immune system. Few participants in women FGDS considered "Preparation of top milk as time consuming" and "Difficult to maintain hygiene all the times". Few participants in Balochistan and KP said "*Preparation of milk is time consuming and inconvenient which also causes psychological hurt to the hungry baby if not immediately fed*".

Introduction of Complementary Feeding

There was not variation was found on the basis of cultural diversities across the Pakistan in the introduction of complementary diet also practicing breastfeeding. However the ingredients varied from place to place on the basis of affordability. "We are poor and cannot afford special complementary diet for our children – we feed them what we cooked for ourselves" remarked by the parents in the Southern Punjab and Upper Sindh. Age introduction of complimentary diet showed divided opinion, while sizeable participants said from the 4th month but majority believed the introduction of solid / semi-solid food for children from the 6th month. The complementary foods were told in long detail but major were semolina, egg, rice, bread, sago, rice and milk dessert (*kheer*), buttermilk, banana, tea, porridge, chapatti, potato curry, lentils, meat and broth, fish and vegetables. Milk referred to either breast milk or fresh or powdered milk as top feed.

Breastfeeding and Complementary Food Duration

Duration of breast feeding along with complementary foods differs largely in different cultural settings. In Lower Sindh is 1.5 to 2 years or until the mother conceives at the time of lactation, until 2 years in Balochistan and Northern Punjab, 1 year in Southern Punjab and Azad Jammu Kashmir (AJK) and 2 to 3 years in Gilgit Baltistan. In KP, duration of lactation men-

tioned 2 years for male and 2.5 years for female child. Care providers also confirmed that the duration for girls is less for girls, (1.5 to 2 years) and more for boys (2 to 2.5 years).

Perception regarding Health and Illness (Mother and Child)

Participants were asked about the common illnesses in children. Majority of the participant across the country reported fever, cough, diarrhea and intestinal worms. When asked about the perception of health and illness regarding the women majority mothers said "Until we are able to perform household chores and care of children then considered healthy". Many participants of all FGDs said in consensus 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, leucorrhoea, backache, lower body pain, blood pressure, irregular menstruation were mentioned by the majority of participants the major illnesses of women. However participants of Upper Sindh and Southern Punjab mentioned that most of the women are suffering from health problem due to low or insufficient diet. "We do not have enough food to eat". "We are poor cannot afford eating as desired". Even if "We fell sick we cannot afford outside care except to use some home remedies for our treatment".

When asked about the methods of treatment, majority of participants in all FGDS said "If not so serious than some self-medication is done from the leftover drugs". "We consult the nearby health care provider" was also mentioned by the participants. LHWs remarked "Women called us for taking advice". On the other hand, same question was asked about the trained health professionals. According to them majority does not follow doctors' advice and when they do, it is only until the time of recovery from illness. In some communities of Gilgit Baltistan and KPK, majority women were only permitted to consult 'lady' doctors due to the cultural barriers.

Alternative treatments include 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 treatment for leucorrhoea is a mixture comprising cardamom, ginger and lemon, which is consumed for a week

Psychological Care of Children

The pediatricians and gynecologist interviewed stated that the dietary intake of mother and child and the suffocated environment around like poverty, not affordability of food to eat, intra family disputes, and physical violence affected their mental well-being and also on physical fitness. The Gynecologist in AJK told "All issues pervading in the 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 preference of male members within the household starting from birth, drug and alcohol addiction of husband, fertility problems because of early marriage made the women psychic and they cannot provide the desired psychosocial care to their children and this vicious cir-

cle continuing producing non-productive population in society which may lead to social anarchism

Differences in Dietary Intake between Girls and Adult women

According to the medical practitioners interviewed during the survey, younger women all over the country are consuming fast food where available and unhealthy junk food like chips in rural area too. Incidentally, this contradicts high level of awareness and nutrition education present in the younger generations than the older. Older, mature women are more health conscious. On the other hand rest of the participant in almost all FGDs across the country said "Eating on choice is almost not existing" "There has been many weeks that we cannot eat meat". "We just think that we should eat something to survive no matter 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". Same findings were repeated in forcefully in Upper Sindh and Southern Punjab. So it revealed that food insecurity among the families across the Pakistan leaves no choice on desired dietary intake.

Intra Household Food Distribution

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

Women participant of FGDs gave a different scenario. The traditional and cultural taboo of male chauvinism also worked there. Women participants insisted to serve men first on the basis that they (The men) work outside, do more labor and spent hours and hours for earning livelihood for their family. In AJK and Karachi some participants said that young girls are treated with partiality in food distribution in the family because they are regarded as future mothers who require extra nutrients. "Now here the girls are more clever and do not allow their brothers to eat more than them". However in case of food shortage children are prioritized.

The care providers were not in agreement with opinion of FGDs' participant. They unanimously said females are still neglected in their households, and males are given preference over them. This was the main reason why females frequently suffer from nutrient deficiencies and illnesses such as anemia. All women consult them for treatment complained of general physical weakness, for which they are commonly prescribed iron/folic acid/vitamin supplements, because girls are either not given a proper diet or themselves do not eat well because they are busy tending to children or in the household chores or contributing in some way to meet the financial needs of the family.

Common Perception and Physiological Effects of “Hot”/“Cold” Food

The general perception in regions is based on food are either hot or cold and precaution should be observed when consuming them. ‘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 influenza during wintertime. Common perception in all regions: 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 in Southern Punjab, lentils, and dairy products and Apricot extract in Gilgit.

Hot food includes seafood in Lower and Upper Sindh, meat in Upper Sindh, Northern and Southern Punjab and Gilgit Baltistan, okra in Southern Punjab, AJK, green vegetables in Southern Punjab, clarified butter and eggs in GB, lentils in GB/AJK and soup, spinach and spices in AJK.

Purchasing Practices – Local versus Imported Food

All participants of all FGDs and IDIs across the country despite of cultural and ethnic background unanimously said that they do not purchase imported foods. “Participants in Upper Sindh, Southern Punjab, AJK, KP and Balochistan said “We cannot afford local foods due to high price then can we opt for imported foods which are more costly”. Eating out is either infrequent or almost nil mostly in middle and low-income groups. Home cooked meals were preferred in community segments because (i) they cost less and (ii) are fresh compared to pre-packaged/imported food. Results from Karachi showed “We prefer to eat at home and buy local foods” However few participants of Karachi, AJK, Hub, Jhelum said that “Sometimes we purchased packed foreign foods”. The weekly grocery expenses per month region wise on a minimum to maximum range area PKR 3000 to 12000 in Gilgit Baltistan, PKR 2000 to 5000 in Lower Sindh and AJK, PKR 1800 to 5000 in Balochistan, PKR 1000 to 5000 in Southern Punjab, PKR 1000 to 7000 in Upper Sindh, Northern Punjab, KPK and Central Punjab.

Purchasing Practices – Foods and Affordability

The purchasing of food stuff varied a lot among the regions from daily, weekly, monthly or on a fortnightly basis especially vegetables and even food needed to cook daily. The frequency of purchasing grocery depends firstly on availability of the refrigerators and as such food cannot be stocked for long. Secondly, depend upon preference toward fresh rather than stocked food. Above all on the “Availability of money”, mostly laborer and working people cannot afford to buy things in bulk. Participants of FGDs in parts of Pakistan said “Day by day it is becoming so difficult to meet our daily basic needs – we cannot eat at full”.

Again in Upper Sindh and Southern Punjab participants said that “Sometimes we have to prefer children in foods because of shortage – so elders sacrifice” the Female and male participants stated it is generally men who are mainly responsible for food purchase and expenditure.

Food Safety – Thawing and Food Storage

Cooked food rarely stored in the low-income communities, because they have large families with several children, most people do not have a refrigerator and even do not afford to cook in large quantity due to poverty. Some working women of middle class families stated “If we cook for more than one time for our convenience and do not have refrigerator then immerse the utensil containing food in water to keep it cool. For those who can afford enough food and have refrigerators, majority store cooked food/leftovers in them. For thawing meat, majority immerses it in water in lower income groups or defrost in the microwave oven if afford to have it. “The current frequent and long electricity breakdown affected food storage”.

Violence against Women

Instigators of violence include mother-in-law, stated by majority participants. Others responsible for inciting violence against women included family members, the illiterate, feudalists and the mentally unstable persons. Participants of FGDs and IDIs all over Pakistan accepted that “Emotional and physical violence of women do exist in our society and very common”. The crux of the dilemma was that some participant in most of the FGDs believed “Physical violence is justified in some situations”. LHWs said “We are witnessed of physical violence and emotional abuse on women mostly common in rural area but also in urban area too”. Majority of participants across the Pakistan felt the need of specific interventions through community level women groups and broad minded men must be done because victims do not seek justice from police, legal help or government and private institutions. They usually seek help from within their family and friends.

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, but is counterbalanced by substantial deterioration in vitamin A status and little to no gains in other areas of micronutrient deficiencies. These are reflective of a patchy response to the nutrition situation in Pakistan and lack of coordination in developing and implementing a coherent nutrition strategy. A draft nutrition strategy was developed in 2003-4 and even approved by the Planning Commission. However, its final approval and implementation never took place. Neither have the efforts of the bilateral agencies and the World Bank translated into a tangible response. Although the floods of 2010 and 2011 once again highlighted the plight of undernutrition in Pakistan, the response was largely reactive with little movement towards a national strategy for addressing undernutrition.

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 a 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 importance of nutrition in the health and development of the populace, and nutrition has thus remained the key element missing from 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, especially among women and girl children in Pakistan, and few cogent interventions targeting 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 particularly 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 interven-

tions 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 aids and grants. These include vitamin A supplementation, wheat flour fortification and promotion of iodized salt use. A huge amount of resources have been expended in therapeutic feeding of malnourished children in the wake of the floods but relatively less in preventive and promotive 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 wanting. Not surprisingly therefore, the net impact of all of such interventions have 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 our women and children have been subjects of national awareness or public education campaigns. In addition to well-designed interventions, we need a mass campaign for public awareness of the importance and impact of malnutrition towards the nation's health.

There is thus an overwhelming argument for making an investment in adequate nutrition for 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 redressing the root causes and effects of malnutrition. To illustrate, although a food aid initiative has been in place for several years under the auspices 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 thus imperative that it be part of a community-based intervention also 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 across a range of interventions for women and children. These include the review of existing programs for quality such as the vitamin A supplementation program, other mi-

cronutrient 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 which necessitates a multi-sectoral approach for interventions. Some of the activities to be accomplished are embedded 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) wherein the roles and activities of the production and social sectors converge to attain the overall objective of socio economic uplift including a better quality of life.

The strategic territories where multisectoral support/coordination is imminently required are institutionalization of nutrition, food safety & regulatory mechanisms, food fortification and social change communication. The interventions that fall within the ambit of the health sector are in the areas of maternal, infant and child, adolescent, adult and elderly 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 for this unit could also be the requisite linkages with social safety nets, agriculture, issues of food safety and food industry regulation.

Social change communication is the key to success for any programme or product in the masses. Innovative and effective communication strategies would be evolved to bring about a social and behavioral change in the community for acceptance of interventions under the nutrition programme that are in line with cultural bindings and yet targeted to clear misconceptions. Keeping in view the multiplicative effect of malnutrition, on mortality assigned to infectious diseases, 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 undernutrition 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, inappropriate child spacing and 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 and the NNS 2011 also provides illustrative data on the increasing need to address nutrition issues of the elderly. 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 undernutrition and obesity within rural and urban women of reproductive age. 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. This needs greater attention in the years to come.

Adult nutrition is marred by a complex interplay of a host of factors such as industrialization, urbanization, sedentary life styles, imbalanced diets and shifting socio-cultural norms giving crest to diseases such as hypertension, stroke, coronary heart disease, diabetes, cancers and others. They tip the nutritional balance in many ways and require a multifaceted approach for interventions ranging from surveillance, research, social change communication to simply healthy eating habits. Another area of vital significance is geriatric nutrition, or nutrition of the elderly. This emerging and growing age group of persons, over sixty years of age, has 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, stroke, coronary artery disease, sarcopenia (loss of muscle mass), glucose intolerance and other metabolic disorders, osteoporosis and bone fractures, cancers and others. Efforts will be geared to assimilate and disseminate information on old age health issues and nutrition. Emphasis will also be laid on focusing on this emerging priority area for provision of rehabilitative and consultative services for the needy elderly.

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 endeavors to address malnutrition.

Chapter 11: REFERENCES & BIBLIOGRAPHY

- 1- "Population clock", Population Census Organization, Government of Pakistan
- 2- Country level data from Euro Monitor Int'l 2006.
- 3- Andrew M. Prentice, M. Eric Gershwin, Ulrich E. Schaible, Gerald T. Keusch, Cesar G. Victora, and Jeffrey I. Gordon. New challenges in surveying nutrition-disease interactions in the developing world Review series personal perspective. The Journal of Clinical Investigation Volume 118 Number 4 April 2008
- 4- WHO 2002: <http://www.who.int/inf-fs/en/fact119.html> , <http://www.who.int/nut>
<http://www.who.int/nut/nutrition2.htm>
- 5- Pelletier D. Potentiating effects of malnutrition on child mortality: Epidemiologic evidence and policy implications. Food and Nutrition Bulletin. 1995; the United Nations University Press. Volume 16, Number 3
- 6- UNICEF/ROSA 1997: Gillespie S, ed. Malnutrition in South Asia: A regional profile. Katmandu: UNICEF Regional Office for South Asia, 1997
- 7- Hunt J. ed. Investing in Child Nutrition in Asia. Asian Development Bank, 2000. Nutrition and Development series No 1.
- 8- Yasmin S, Osrin, D., Paul, E., Costello, A. d. L. Neonatal mortality of low-birth-weight infants in Bangladesh. Bull. World Health Organ. 2001; 79: 608–614.
- 9- De Onis M, Frongillo EA, Blossner M. Is malnutrition declining? An analysis of changes in levels of child malnutrition since 1980. Bull World Health Organ 2000; 78:1222-33.
- 10- Stephenson LS, Latham MC, Ottesen EA. Global malnutrition. Parasitology 2000; 121 Suppl: S5-22.
- 11- UNICEF. Poverty and Children: Lessons of the 90s for least developed countries. New York: UNICEF, 2001.
- 12- Frongillo EA, Jr., de Onis M, Hanson KM. Socioeconomic and demographic factors are associated with worldwide patterns of stunting and wasting of children. J Nutr 1997; 127:2302-9.
- 13- Khan A. Adolescents and Reproductive Health in Pakistan: A Literature Review. In: Fund UNP, ed. Research Report No. 11. Islamabad: The Population Council, 2000: ii-73.
- 14- Bhutta ZA. Why has so little changed in maternal and child health in south Asia? BMJ 2000; 321:809-12.
- 15- Pakistan Medical & Dental Council. National Health Survey of Pakistan-1990-94: Network Publishing Service, 1998.
- 16- FAO. Nutrition country profiles: Pakistan. Rome: FAO, 1998.
- 17- WHO. Complementary feeding of young children in developing countries: a review of current scientific knowledge. Geneva: World Health Organization, 1998.
- 18- Fikree FF, Rahbar MH, Berendes HW. Risk factors for stunting and wasting at age six, twelve and twenty-four months for squatter children of Karachi, Pakistan. J Pak Med Assoc 2000; 50:341-8.
- 19- Jalil F, Karlberg J, Hanson LA, Lindblad BS. Growth disturbance in an urban area of Lahore, Pakistan related to feeding patterns, infections and age, sex, socio-economic factors and seasons. Acta Paediatr Scand Supply 1989; 350:44-54.
- 20- Zaman S, Jalil F, Karlberg J. Early child health in Lahore, Pakistan: IV. Child care practices. Acta Paediatr Supply 1993;82 Supply 390:39-46.

- 21- Durkin MS, Hasan ZM, Hasan KZ. Prevalence and correlates of mental retardation among children in Karachi, Pakistan. *Am J Epidemiol* 1998; 147:281-8.
- 22- Pollitt E, Gorman KS, Engle PL, Rivera JA, Martorell R. Nutrition in early life and the fulfillment of intellectual potential. *J Nutr* 1995; 125:1111S-1118S.
- 23- World Health Organization. A critical link- Interventions for physical growth and psychological development: A review. Geneva: World Health Organization, 1999.
- 24- Ashfaq A. Infant feeding survey. WHO report? Islamabad. 1984
- 25- Jalil F, Karlberg J, Hanson LA, Lindblad BS. Growth disturbance in an urban area of Lahore, Pakistan related to feeding patterns, infections and age, sex, socio-economic factors and seasons. *Acta Paediatr Scand* 1989;350:44-54
- 26- Karlberg J, Jalil F, Lindblad BS. Longitudinal analysis of infantile growth in an urban area of Lahore, Pakistan. *Acta Paediatr Scand* 1988;77:392-401
- 27- Government of Pakistan , National Nutritional Survey of Pakistan , 2001-2, Islamabad
- 28- Manila forum 2000: Strategies to Fortify Essential Foods in the Asia and Pacific. Asian Development Bank, 2000. Nutrition and Development Series No.2.
- 29- Gary Bickel, Mark Nord, Cristofer Price, William Hamilton, John Cook, "Guide to Measuring Household Food Security" Revised 2000. USDA
- 30- WHO, "UN Inter-agency assessment mission on impact of food crisis in Pakistan, Impact of food crisis on health" 2008
- 31- Bhutta ZA. The enigma of maternal and childhood malnutrition in Pakistan: can we break the vicious cycle? *Journal of College of Physicians & Surgeons Pakistan*. 2002
- 32- Government of Pakistan. Pakistan economic survey 2001-2, economic advisors wing, finance division, Islamabad.