

Nutritional deficiencies have been found to contribute to the high rates of disability, morbidity, and mortality in Nigeria, especially among infants and young children (NPC and UNICEF, 2001). Thus, the importance of adequate nutrition for women and children cannot be overemphasized and remains a great concern in the country.

The 2003 Nigeria Demographic and Health Survey (NDHS) collected data on various factors related to the nutrition of women and children. This chapter examines infant feeding practices, including duration of breastfeeding, use of a feeding bottle with a nipple, introduction of complementary foods, and the intake of micronutrients, such as vitamin A, iron supplements, and iodized salt. The nutritional status of all children under age five and all women age 15-49 is analyzed using anthropometric indices (height and weight measures).

## 11.1 BREASTFEEDING

Initiation of breastfeeding at birth is crucial for the health of both child and mother. Suckling at the breast immediately after birth aids the expulsion of the placenta and reduces the risk of postpartum haemorrhage in the mother, helps maintain the body temperature of the baby, and encourages bonding between the mother and child, which enhances their physical and psychological well-being.

Breast milk, a good source of nutrients and natural immunity for infants, is sufficient for newborns; they need not be given anything else to eat or drink besides breast milk. Giving the newborn the first breast milk, which contains colostrum, and exclusive breastfeeding during the first six months of a child's life are recommended because they protect the infant from disease agents as well as provide all required nutrients.

Table 11.1 shows the percentage of children who were ever breastfed, and among children ever breastfed, the proportion who started breastfeeding within one hour and within one day of birth, and those who received a prelacteal feed. Breastfeeding is almost universal in Nigeria, with 97 percent of children born in the five years preceding the survey having been breastfed. However, just one-third of children were given breast milk within one hour of birth (32 percent), and less than two-thirds were given breast milk within 24 hours of birth (63 percent), indicating a delay in the initiation of breastfeeding.

Initiation of breastfeeding in the first hour and in the first 24 hours after birth varies by background characteristics. Women who delivered in a health facility and those assisted at delivery by health professionals are more likely to initiate breastfeeding early (within 1 hour or within 24 hours of delivery). There is considerable variation by region, ranging from a low of 13 percent of women in the South West initiating breastfeeding within one hour of giving birth to a high of 58 percent of women in the South East. Only about half of women in the North West and North East start breastfeeding within the first day (48 and 55 percent, respectively), compared with more than seven in ten women in other regions. Furthermore, women with the least education and women in households that are in the lowest quintile of the wealth index initiate breastfeeding later than those with at least some education and those living in households that are ranked higher on the wealth index.

**Table 11.1 Initial breastfeeding**

Percentage of children born in the five years preceding the survey who were ever breastfed, and among children ever breastfed, the percentage who started breastfeeding within one hour and within one day of birth, and percentage who received a prelacteal feed, by background characteristics, Nigeria 2003

Background characteristic	Among all children:		Among children ever breastfed, percentage who:			
	Percentage ever breastfed	Number of children	Started breastfeeding within 1 hour of birth	Started breastfeeding within 1 day of birth <sup>1</sup>	Received a prelacteal feed <sup>2</sup>	Number of children ever breastfed
<b>Sex</b>						
Male	97.0	3,186	30.9	61.2	69.7	3,090
Female	97.7	3,033	32.9	64.4	67.2	2,965
<b>Residence</b>						
Urban	97.6	1,795	34.7	73.6	63.5	1,752
Rural	97.3	4,424	30.8	58.4	70.5	4,303
<b>Region</b>						
North Central	97.9	897	46.6	83.5	39.8	878
North East	96.3	1,472	25.9	54.6	83.2	1,418
North West	98.1	2,161	27.1	48.3	78.7	2,121
South East	97.1	371	57.5	81.9	53.6	360
South South	96.8	789	40.3	77.9	49.0	763
South West	97.4	529	12.7	73.4	74.2	515
<b>Mother's education</b>						
No education	97.9	3,224	27.0	50.7	78.4	3,156
Primary	96.7	1,465	35.9	72.2	63.4	1,417
Secondary	97.0	1,316	35.9	78.0	54.4	1,277
Higher	95.8	215	53.9	88.5	39.6	206
<b>Assistance at delivery</b>						
Health professional <sup>3</sup>	96.9	2,253	40.0	79.7	55.8	2,182
Traditional birth attendant	97.8	1,268	29.9	49.8	77.5	1,240
Other	97.4	1,593	26.0	57.4	74.7	1,552
No one	97.6	1,051	27.0	52.5	77.5	1,027
<b>Place of delivery</b>						
Health facility	97.1	2,025	40.3	80.9	55.2	1,967
At home	97.4	4,129	28.1	54.3	75.9	4,024
Other	(100.0)	22	(29.1)	(80.0)	(38.3)	22
<b>Wealth quintile</b>						
Lowest	97.7	1,394	22.4	46.8	77.8	1,363
Second	96.7	1,379	30.6	54.6	72.9	1,334
Middle	96.7	1,255	36.8	65.5	67.2	1,214
Fourth	97.7	1,157	35.4	75.8	64.4	1,131
Highest	98.2	1,033	36.5	77.2	56.2	1,014
Total	97.4	6,219	31.9	62.8	68.5	6,055

Note: Table is based on all births in the past five years whether the children were living or dead at the time of interview. Total includes 54 and 43 children with data missing on assistance at delivery and place of delivery, respectively. Figures in parentheses are based on 25-49 unweighted cases.

<sup>1</sup> Includes children who started breastfeeding within one hour of birth

<sup>2</sup> Children given something other than breast milk during the first three days of life before the mother started breastfeeding regularly

<sup>3</sup> Doctor, nurse/midwife, or auxiliary midwife, or CHEW

The practice of giving something other than breast milk in the first three days of life (prelacteal feeding) is discouraged because it limits the frequency of suckling by the infant and exposes the baby to infections. Prelacteal feeding is widely practiced in Nigeria. Approximately seven in ten newborns receive a prelacteal feed. There are differences in prelacteal feeding practices by region, level of education, place of delivery, assistance at delivery, and wealth quintile. The practice is more common among women with little or no education and those living in households in the lowest wealth quintile than among women with higher education and those in households in the highest wealth quintile. In addition, women who received delivery assistance from a health professional and those who delivered in a health facility are less likely to give prelacteal feeds than those who delivered at home or without the assistance of a trained medical professional. These differentials may be due in part to the Baby-Friendly Hospital Initiative, which promotes exclusive breastfeeding and policies that support breastfeeding in hospitals.

### 11.1.1 Age Pattern of Breastfeeding

UNICEF and WHO recommend that children be exclusively breastfed (receive only breast milk) during the first six months of life and that children be given solid and/or semisolid complementary food starting at age six months (WHO and UNICEF, 1998). Children require adequate complementary foods to follow normal growth patterns. Lack of complementary foods (given at the appropriate age) may lead to malnutrition, frequent illness, and even death. However, even after complementary foods have been introduced, UNICEF recommends that breastfeeding continue for at least the first two years of the child's life (NPC and UNICEF, 2001).

Table 11.2 shows the percent distribution of youngest children under age three living with the mother, by breastfeeding status, according to age. In Nigeria, exclusive breastfeeding of infants is not practiced in compliance with the WHO/UNICEF recommendations. The data show that only 17 percent of infants below six months are exclusively breastfed. Indeed, just one-quarter of infants under two months of age are exclusively breastfed. Among children 4-5 months of age, fewer than one in ten is exclusively breastfed. This is a result of early supplementation of breast milk with plain water. Almost half (48 percent) of newborns under two months of age receive plain water as well as breast milk. An additional 19 percent receive other milk or liquids.

Complementary feeding also starts early. Among children age 4-5 months, more than one-third (36 percent) receive complementary food in addition to breast milk (Table 11.2). Although complementary feeding is introduced early in Nigeria, not all children are in compliance with UNICEF's recommendation of introducing semisolid and/or solid complementary food at six months of age. One in four children age 6-9 months is either exclusively breastfed or receives breast milk and plain water only. Regarding the duration of any breastfeeding, two-thirds of children age 20-23 months have discontinued breastfeeding.

The use of a bottle with a nipple regardless of the content (formula or other liquid) requires attention in terms of hygiene and handling. Because of inadequate and insufficient cleaning and ease of contamination after cleaning, the nipple may house disease-causing agents. Bottle-feeding is common in Nigeria, even among children who should be exclusively breastfed; 23 percent of children under two months and one-quarter of children age 2-3 months drink from a bottle with a nipple.

Table 11.2 Breastfeeding status by child's age

Percent distribution of youngest children under three years living with the mother by breastfeeding status and percentage of children under three years using a bottle with a nipple, according to age in months, Nigeria 2003

Age in months	Breastfeeding and consuming:						Total	Number of children	Using a bottle with a nipple <sup>1</sup>	Number of living children
	Not breast-feeding	Exclusively breast-fed	Plain water only	Water-based liquids/juice	Other milk	Complementary foods				
<2	4.0	26.2	47.5	8.9	8.6	4.7	100.0	182	22.5	183
2-3	0.9	19.3	49.2	6.5	14.1	10.0	100.0	230	25.1	231
4-5	0.6	8.7	38.1	9.9	7.1	35.6	100.0	247	17.6	250
6-7	1.3	3.9	26.5	4.4	7.3	56.6	100.0	230	14.4	239
8-9	1.2	1.6	17.8	1.6	6.9	70.8	100.0	231	16.3	240
10-11	4.5	2.6	10.1	2.3	0.2	80.4	100.0	184	14.7	189
12-15	10.1	3.8	3.9	0.6	1.3	80.2	100.0	387	10.4	403
16-19	33.7	2.1	2.3	1.6	0.4	59.9	100.0	313	6.3	323
20-23	65.9	0.9	0.4	0.9	0.0	31.9	100.0	248	8.3	272
24-27	90.9	0.3	0.0	0.0	0.0	8.8	100.0	361	12.6	441
28-31	90.5	0.0	0.3	0.0	0.0	9.1	100.0	210	5.0	303
32-35	94.8	0.0	0.5	0.0	0.0	4.7	100.0	154	3.2	305
<6	1.7	17.2	44.6	8.4	10.0	18.1	100.0	659	21.6	663
6-9	1.3	2.8	22.1	3.0	7.1	63.7	100.0	460	15.3	478

Note: Breastfeeding status refers to a 24-hour period (yesterday and last night). Children classified as *breastfeeding and consuming plain water only* consume no supplements. The categories of not breastfeeding, exclusively breastfed, breastfeeding, and consuming plain water, water-based liquids/juice, other milk, and complementary foods (solids and semi-solids) are hierarchical and mutually exclusive, and their percentages add to 100 percent. Thus, children who receive breast milk and water-based liquids and who do not receive complementary foods are classified in the water-based liquid category even though they may also get plain water. Any children who get complementary food are classified in that category as long as they are breastfeeding as well.

<sup>1</sup> Based on all children under three years

### 11.1.2 Duration and Frequency of Breastfeeding

Table 11.3 shows the median duration of any breastfeeding, exclusive breastfeeding, and predominant breastfeeding among children born in the three years preceding the survey. The percentages of breastfeeding children under six months who were breastfed at least six times in the 24 hours preceding the survey and mean number of daytime and nighttime feeds, by background characteristics, are also presented.

At the national level, the median duration of any breastfeeding among children born in the three years preceding the survey is 18.6 months (Figure 11.1). The median duration of exclusive breastfeeding is half a month, while the median duration of predominant feeding is 4.6 months (Table 11.3). Predominant breastfeeding refers to either exclusive breastfeeding or receiving plain water, water-based liquids, and/or juice in addition to breast milk.

Table 11.3 Median duration and frequency of breastfeeding

Median duration of any breastfeeding, exclusive breastfeeding, and predominant breastfeeding among children born in the three years preceding the survey, percentage of breastfeeding children under six months living with the mother who were breastfed six or more times in the 24 hours preceding the survey, and mean number of feeds (day/night), by background characteristics, Nigeria 2003

Background characteristic	Median duration (months) of breastfeeding <sup>1</sup>				Breastfeeding children under six months <sup>2</sup>			
	Any breast-feeding	Exclusive breast-feeding	Predominant breast-feeding <sup>3</sup>	Number of children	Percentage breastfed 6+ times in last 24 hours	Mean number of day feeds	Mean number night feeds	Number of children
<b>Sex</b>								
Male	18.6	0.5	4.7	1,947	96.5	7.8	6.0	326
Female	18.6	0.5	4.4	1,867	98.2	7.5	5.6	306
<b>Residence</b>								
Urban	17.2	0.5	3.8	1,137	96.7	8.0	6.5	179
Rural	19.2	0.5	4.8	2,677	97.5	7.5	5.5	453
<b>Region</b>								
North Central	19.0	0.7	3.8	553	97.6	7.8	5.3	85
North East	20.5	0.4	6.6	875	99.2	7.7	6.0	143
North West	19.9	0.4	5.4	1,310	96.5	7.8	4.9	220
South East	13.3	0.4	0.5	245	97.7	6.8	7.8	33
South South	15.8	0.6	2.9	503	97.8	7.7	6.6	82
South West	15.9	0.7	3.4	328	94.5	7.4	6.7	68
<b>Mother's education</b>								
No education	20.0	0.4	5.5	1,893	97.7	8.0	5.6	315
Primary	18.4	0.5	3.7	901	97.6	7.7	6.3	145
Secondary	16.9	0.6	3.3	887	95.9	6.8	5.8	157
Higher	15.7	2.5	4.7	134	100.0	8.6	5.2	15
<b>Wealth quintile</b>								
Lowest	20.2	0.5	5.4	811	96.0	8.4	5.7	135
Second	20.0	0.4	4.9	831	97.0	7.5	5.5	133
Middle	19.1	0.5	3.6	758	96.8	7.3	5.2	105
Fourth	18.4	0.7	4.4	736	99.5	7.7	5.9	135
Highest	14.3	0.5	3.7	679	96.9	7.3	6.4	123
Total	18.6	0.5	4.6	3,815	97.3	7.7	5.8	632
Mean for all children	18.2	2.0	6.3	na	na	na	na	na

Note: Median and mean durations are based on current status.

na = Not applicable

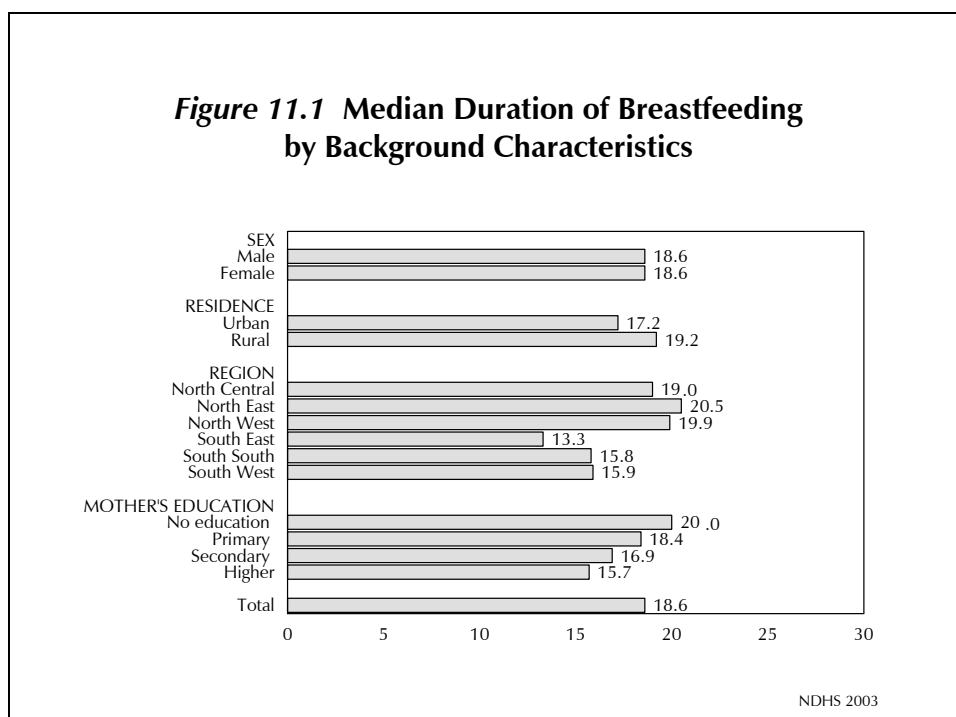
<sup>1</sup> It is assumed that non-last-born children or last-born child not living with the mother are not currently breastfeeding.

<sup>2</sup> Excludes children who do not have a valid answer on the number of times breastfed

<sup>3</sup> Either exclusively breastfed or received breast milk and plain water, water-based liquids, and/or juice only (excludes other milk)

There is little variation in exclusive breastfeeding: women of all backgrounds exclusively breastfeed for a median of less than one month, with the exception of women with higher education who exclusively breastfeed for 2.5 months. The median duration of any breastfeeding varies by region, education, and household economic status. The results of the 2003 NDHS confirm the findings of the 1999 NDHS, which followed a similar pattern.

**Figure 11.1 Median Duration of Breastfeeding by Background Characteristics**



Mothers were asked about the frequency of breastfeeding among children under six months of age in the preceding 24 hours. Table 11.3 shows that almost all children under six months of age are breastfed at least six times per day in Nigeria, which meets the international recommendation (NPC and UNICEF, 2001). The mean number of feeds is eight in the daytime and six at night.

## 11.2 TYPES OF FOOD CONSUMED BY CHILDREN

Table 11.4 shows the percentage of youngest children under three years of age living with the mother who consumed specific foods during the day or night preceding interview. The table shows that 13 percent of breastfeeding infants under six months of age consume infant formula, 11 percent consume milk or other dairy products, and 18 percent consume other liquids. Breastfeeding children under six months also commonly eat food made from grains (15 percent). At age 6-9 months, when complementary foods should be introduced, three-quarters of breastfeeding infants receive solid or semisolid foods; 56 percent receive food made from grains; 25 percent receive meat, fish, shellfish, poultry, or eggs; and 24 percent receive fruits or vegetables. Fruits and vegetables rich in vitamin A are consumed by one-fifth of breastfeeding infants 6-9 months old.

At almost one year of age (10-11 months), a higher proportion of breastfeeding children receive these complementary foods. By 20-23 months of age, three in ten breastfeeding children receive other milk products, nine in ten eat foods made from grains, six in ten receive fruits and vegetables, and the same proportion gets eggs and animal products. Less than half receive food with oil or butter added.

Table 11.4 Foods consumed by children in the day or night preceding the interview

Percentage of children under three years of age living with the mother who consumed specific foods in the day or night preceding the interview, by breastfeeding status and age, Nigeria 2003

Child's age in months	Solid/semisolid foods										Any solid or semi-solid food	Number of children
	Infant formula	Other milk/cheese/yogurt	Other liquids <sup>1</sup>	Food made from grains	Fruits/vegetables <sup>2</sup>	Food made from roots/tubers	Food made from legumes	Meat/fish/shellfish/poultry/eggs	Food made with oil/fat/butter	Fruits and vegetables rich in vitamin A <sup>3</sup>		
<b>BREASTFEEDING CHILDREN</b>												
<2	5.5	7.2	11.9	4.2	2.0	1.7	1.3	0.3	1.8	2.0	11.6	175
2-3	14.6	7.3	14.5	8.9	2.0	0.8	0.9	1.2	1.9	2.0	15.2	227
4-5	15.7	16.5	25.1	27.1	15.1	6.5	6.3	10.3	7.3	13.5	50.2	246
6-7	11.3	15.6	25.5	49.6	17.6	8.5	13.4	16.6	18.7	14.2	69.1	227
8-9	14.1	21.7	25.5	61.5	30.8	10.4	14.1	32.8	27.3	26.0	83.0	228
10-11	12.3	26.4	30.6	78.3	41.3	26.9	27.5	47.0	33.0	39.4	89.3	176
12-15	10.6	30.8	36.1	83.6	57.6	26.7	29.3	55.2	45.0	52.9	96.4	348
16-19	6.0	26.5	36.5	81.4	64.2	27.2	32.5	58.2	42.6	56.6	96.2	208
20-23	8.5	30.3	36.7	89.3	59.6	26.9	30.1	56.6	45.6	53.6	98.8	85
24-35	16.0	30.5	47.1	89.5	73.1	35.0	31.3	55.3	37.6	73.1	98.9	61
<6	12.6	10.7	17.8	14.5	6.9	3.2	3.1	4.4	3.9	6.3	27.5	648
6-9	12.7	18.7	25.5	55.6	24.2	9.5	13.8	24.7	23.1	20.1	76.1	455
<b>NONBREASTFEEDING CHILDREN</b>												
16-19	11.0	37.4	57.3	83.7	78.2	37.7	35.6	79.4	40.1	72.0	99.5	105
20-23	3.7	32.5	40.5	86.5	74.8	46.2	39.6	73.0	50.3	66.9	99.6	163
24-35	9.5	40.1	51.6	88.2	75.8	40.7	36.6	71.3	57.0	71.7	99.6	664

Note: Breastfeeding status and food consumed refer to a 24-hour recall period (yesterday and last night).

<sup>1</sup> Does not include plain water

<sup>2</sup> Includes fruits and vegetables rich in vitamin A

<sup>3</sup> Includes pumpkin, red or yellow yams or squash, carrots, red sweet potatoes, green leafy vegetables, mangoes, papayas, and other locally grown fruits and vegetables that are rich in vitamin A

As previously shown in Table 11.2, few children under age 16 months are not breastfed in Nigeria. Table 11.4 shows that among those who are not breastfed by age 20-23 months, the proportion receiving milk products is almost the same as among children who are breastfeeding and receiving other milk products. There are only slight differences between breastfeeding and nonbreastfeeding children receiving food made from grains, but the proportion of children receiving other complementary foods is higher among the latter group of children.

Table 11.5 presents the frequency of consumption of specific foods by children less than three years of age in the day or night preceding the interview. Among breastfeeding children age 6-9 months, who should be receiving complementary foods, grains are consumed slightly more than once a day. All other foods are consumed less than once a day. Beginning at age two, grains are received twice a day, as are fruits and vegetables. The frequency of foods consumed by nonbreastfeeding children is similar to that of breastfeeding children.

Table 11.5 Frequency of foods consumed by children in the day or night preceding the interview

Mean number of times specific foods were consumed in the day or night preceding the interview by youngest children under three years of age living with the mother, according to breastfeeding status and age, Nigeria 2003

Child's age in months	Solid/semisolid foods										Number of children
	Infant formula	Other milk/cheese/yogurt	Other liquids <sup>1</sup>	Food made from grains	Fruits/vegetables <sup>2</sup>	Food made from roots/tubers	Food made from legumes	Meat/fish/shellfish/poultry eggs	Food made with oil/fat/butter	Fruits and vegetables rich in vitamin A <sup>3</sup>	
BREASTFEEDING CHILDREN											
<2	0.1	0.2	0.2	0.1	0.1	0.0	0.0	0.0	0.0	0.0	175
2-3	0.4	0.1	0.2	0.2	0.1	0.0	0.0	0.0	0.0	0.1	227
4-5	0.3	0.3	0.5	0.6	0.5	0.1	0.1	0.2	0.2	0.4	246
6-7	0.3	0.3	0.5	1.0	0.4	0.1	0.2	0.2	0.3	0.3	227
8-9	0.3	0.4	0.6	1.2	0.7	0.1	0.2	0.5	0.5	0.5	228
10-11	0.3	0.5	0.6	1.7	1.0	0.4	0.3	0.8	0.6	0.8	176
12-15	0.2	0.6	0.8	1.7	1.4	0.4	0.4	0.9	0.7	1.1	348
16-19	0.1	0.5	0.8	1.8	1.6	0.4	0.4	1.0	0.7	1.1	208
20-23	0.2	0.6	0.7	2.0	1.3	0.4	0.4	0.8	0.7	1.0	85
24-35	0.3	0.4	0.7	2.1	2.3	0.4	0.4	0.7	0.6	1.8	61
<6	0.3	0.2	0.3	0.3	0.2	0.1	0.0	0.1	0.1	0.2	648
6-9	0.3	0.4	0.5	1.1	0.6	0.1	0.2	0.4	0.4	0.4	455
NONBREASTFEEDING CHILDREN											
16-19	0.2	0.7	1.3	1.6	2.0	0.7	0.4	1.5	0.8	1.5	105
20-23	0.1	0.5	0.9	1.9	2.1	0.7	0.5	1.3	1.1	1.5	163
24-35	0.2	0.7	1.1	1.9	2.1	0.5	0.4	1.2	1.0	1.6	664

Note: Breastfeeding status and food consumed refer to a 24-hour recall period (yesterday and last night).

<sup>1</sup> Does not include plain water

<sup>2</sup> Includes fruits and vegetables rich in vitamin A

<sup>3</sup> Includes pumpkin, red or yellow yams or squash, carrots, red sweet potatoes, green leafy vegetables, mangoes, papayas, and other locally grown fruits and vegetables that are rich in vitamin A

Table 11.6 shows the average number of days specific foods were consumed by youngest children under age three in the seven days preceding the survey. Among breastfeeding children, less than age six months, plain water is consumed about six days a week. Food from grains is given one day a week. All other types of food or drink were given less than one day a week. Breastfeeding children age 6-9 months drank plain water daily in the week preceding the interview. They consumed food made from grains almost four days a week. Meat, fish, shellfish, poultry or eggs were consumed less than two days a week, as were foods made with oil, fat, or butter.

The mean number of days that various nutritious foods are consumed by children who are no longer breastfeeding should be higher than for children who are breastfeeding. Among children 16 months and older, most semisolid or solid foods and fruits and vegetables rich in vitamin A are consumed with greater frequency among nonbreastfeeding than breastfeeding children.



Table 11.6 Frequency of foods consumed by children in preceding seven days

Mean number of days specific foods were consumed in the seven days preceding the interview by youngest children under three years of age living with the mother, according to breastfeeding status and age, Nigeria 2003

Child's age in months	Solid/semisolid foods																	Number of children
	Liquids						Fruit and vegetables rich in vitamin A											
	Plain water	Infant formula	Other milk	Fruit juice	Herbal tea	Other liquids	Food made from grains	Food made from roots/tubers	Fruits and vegetables not rich in vitamin A	Food made from legumes	Cheese/yogurt	Meat/fish/shellfish/poultry/eggs	Food made with oil/fat/butter	Pumpkin/red or yellow yams or squash/carrots/red sweet potatoes	Green leafy vegetables	Mango/papaya/other local fruits rich in vitamin A		
<b>BREASTFEEDING CHILDREN</b>																		
<2	5.0	0.4	0.5	0.1	0.8	0.1	0.3	0.1	0.0	0.0	0.1	0.0	0.1	0.1	0.0	0.0	0.0	175
2-3	5.7	1.0	0.4	0.0	0.6	0.2	0.6	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.0	0.0	227
4-5	6.4	1.0	0.8	0.2	0.9	0.6	1.9	0.3	0.2	0.3	0.2	0.5	0.4	0.3	0.4	0.3	0.3	246
6-7	6.7	0.8	0.7	0.3	0.7	0.6	3.2	0.4	0.4	0.6	0.2	1.0	1.1	0.2	0.6	0.3	0.3	227
8-9	6.8	0.9	0.8	0.5	0.8	1.0	4.1	0.6	0.8	1.1	0.4	1.7	1.6	0.4	0.9	0.6	0.6	228
10-11	6.8	0.8	1.1	0.4	0.9	1.0	5.3	1.3	1.1	1.3	0.6	2.7	2.1	0.7	1.7	0.8	0.8	176
12-15	6.8	0.5	0.7	0.6	0.7	1.4	5.6	1.3	1.2	1.4	1.0	3.0	2.6	1.1	1.5	1.4	1.4	348
16-19	6.8	0.3	0.8	0.5	0.8	1.7	5.6	1.4	1.5	1.6	1.0	3.3	2.7	1.2	1.9	1.7	1.7	208
20-23	6.8	0.6	0.7	0.6	0.8	1.4	6.0	1.3	1.1	1.7	0.9	2.8	2.7	0.7	2.0	1.2	1.2	85
24-35	6.8	0.7	0.9	0.6	0.9	1.9	6.6	1.3	1.3	1.3	1.1	3.1	2.4	0.8	2.6	2.1	2.1	61
<6	5.8	0.8	0.6	0.1	0.8	0.3	1.0	0.1	0.1	0.1	0.1	0.2	0.2	0.2	0.2	0.1	0.1	648
6-9	6.8	0.9	0.8	0.4	0.8	0.8	3.7	0.5	0.6	0.8	0.3	1.4	1.4	0.3	0.7	0.5	0.5	455
<b>NONBREASTFEEDING CHILDREN</b>																		
16-19	6.4	0.9	1.7	0.8	0.9	2.7	5.2	2.2	2.1	1.8	0.9	4.9	2.3	1.8	2.4	1.7	1.7	105
20-23	6.7	0.2	1.1	1.0	0.7	1.9	5.4	2.3	1.9	2.2	0.6	4.4	3.0	1.5	2.4	1.9	1.9	163
24-35	6.6	0.5	1.3	0.9	0.7	2.5	5.9	2.1	2.0	1.8	1.2	4.1	3.5	1.4	2.7	2.1	2.1	664
Total	6.6	0.5	1.3	0.9	0.7	2.4	5.6	2.1	2.0	1.9	1.0	4.2	3.3	1.5	2.6	2.0	2.0	997

Note: Breastfeeding status refers to a 24-hour recall period (yesterday and last night).

## 11.3 MICRONUTRIENT SUPPLEMENTATION

Micronutrients are necessary for normal body function and play a vital role in ensuring good health. Children can receive micronutrients from foods, food fortification, and direct supplementation. Deficiency of these elements contributes to childhood morbidity and mortality. The 2003 NDHS collected various data useful for assessing the intake of micronutrients by women and young children.

### 11.3.1 Use of Iodized Salt in Households

Disorders induced by dietary iodine deficiency constitute a major global nutrition concern. A lack of sufficient iodine can lead to goiter, hypothyroidism, impaired mental and physical development, and diminished school performance. Iodine deficiency in the fetus leads to increased rates of abortion, stillbirths, congenital anomalies, cretinism, psychomotor defects, and neonatal mortality. Iodine deficiency can be avoided by using salt that has been fortified with iodine (iodized salt). Fortified salt, which contains 15 parts per million of iodine, prevents iodine deficiency.

The survey undertook a rapid test, using a test kit supplied by UNICEF, to assess whether the household was using iodized salt for cooking. The data presented in Table 11.7 are based on the 94 percent of households where salt was tested. Almost all households in Nigeria use adequately iodized salt (97 percent). The region with the lowest prevalence of adequately iodized salt is North Central (93 percent).

Table 11.7 Iodization of household salt

Percent distribution of households by level of iodine in salt (parts per million), according to background characteristics, Nigeria 2003

Background characteristic	Level of iodine in household salt:			Total	Number of households tested	Percentage of households tested	Percentage of households with no salt	Number of households
	None (0 ppm)	Inadequate (<15 ppm)	Adequate (15+ ppm)					
<b>Residence</b>								
Urban	0.9	0.6	98.5	100.0	2,398	92.3	5.3	2,598
Rural	2.2	1.2	96.7	100.0	4,354	94.1	2.9	4,627
<b>Region</b>								
North Central	5.7	1.6	92.7	100.0	966	92.9	4.4	1,040
North East	0.9	0.3	98.8	100.0	1,095	92.4	5.2	1,185
North West	0.7	1.1	98.2	100.0	1,758	92.0	3.1	1,911
South East	2.6	0.4	97.0	100.0	640	92.6	3.3	690
South South	1.0	1.0	98.0	100.0	1,261	95.9	3.4	1,315
South West	0.9	1.1	98.0	100.0	1,032	95.3	3.4	1,083
Total	1.7	1.0	97.3	100.0	6,752	93.5	3.8	7,225

### 11.3.2 Micronutrient Status of Young Children

Vitamin A is a micronutrient that is essential for the proper development of children's immune and visual systems. It is present in certain fruits and vegetables, such as pumpkin, red or yellow yams or squash, carrots, green leafy vegetables, mango, and paw-paw. Women in Nigeria should receive vitamin A supplements after childbirth. This enhances the micronutrient status of the mothers and their breastfeeding children and, consequently, the survival status of the child.

Table 11.8 shows the percentage of the youngest children under three years of age who consumed fruits and vegetables rich in vitamin A in the seven days preceding the survey. The data show that 43 percent of children ate such foods. The consumption of fruits and vegetables rich in vitamin A varies considerably by the age of the child and breastfeeding status. Although children under six months are recommended to receive no complementary foods, 6 percent received fruits and vegetables rich in vitamin A. The proportion increases from 21 percent among children age 6-9 months to 72 percent among children age 24-35 months. Nonbreastfeeding children are more than twice as likely to consume fruits and vegetables rich in vitamin A as breastfeeding children. This is expected since nonbreastfeeding children are older and should receive more complementary foods than the younger breastfeeding children. The consumption of fruits and vegetables rich in vitamin A is lowest in North Central (29 percent) and highest in South East (56 percent).

Table 11.8 Micronutrient intake among children

Percentage of youngest children under age three living with the mother who consumed fruits and vegetables rich in vitamin A in the seven days preceding the survey, and percentage of children age 6-59 months who received vitamin A supplements in the six months preceding the survey, by background characteristics, Nigeria 2003

Background characteristic	Children under age three living with the mother		Children age 6-59 months	
	Percentage who consumed fruits and vegetables rich in vitamin A <sup>1</sup>	Number of children	Percentage who received vitamin A supplements	Number of children
<b>Age in months</b>				
<6	6.4	659	na	na
6-9	20.8	460	30.8	478
10-11	40.1	184	32.6	189
12-23	58.7	949	31.2	999
24-35	71.8	724	40.0	1,050
36-47	na	na	31.2	1,067
48-59	na	na	34.1	899
<b>Sex</b>				
Male	40.7	1,497	34.3	2,370
Female	46.0	1,480	33.2	2,312
<b>Birth order</b>				
1	43.0	597	36.5	939
2-3	41.2	907	36.2	1,471
4-5	44.7	675	37.7	1,046
6+	44.7	798	25.3	1,226
<b>Breastfeeding status</b>				
Breastfeeding	30.0	1,980	27.8	1,397
Not breastfeeding	70.3	980	36.5	3,229
Missing	*	16	23.7	55
<b>Residence</b>				
Urban	49.4	907	48.9	1,438
Rural	40.7	2,070	27.0	3,244
<b>Region</b>				
North Central	29.2	437	32.4	693
North East	43.3	671	25.1	1,075
North West	44.7	1,046	15.2	1,584
South East	55.6	175	60.4	312
South South	50.5	378	55.8	597
South West	42.8	269	76.4	421
<b>Mother's education</b>				
No education	41.3	1,501	16.8	2,340
Primary	41.8	685	40.4	1,106
Secondary	47.6	690	58.8	1,053
Higher	53.7	101	65.6	182
<b>Mother's age at birth</b>				
<20	44.2	540	24.0	816
20-24	43.6	720	35.4	1,310
25-29	42.0	799	39.6	1,185
30-34	42.1	470	32.2	712
35-49	45.6	448	33.5	660
<b>Wealth quintile</b>				
Lowest	40.5	644	22.6	1,013
Second	42.6	630	18.4	977
Middle	46.3	599	24.5	959
Fourth	40.2	568	43.6	887
Highest	47.7	536	64.9	847
Total	43.3	2,977	33.7	4,682

Note: Information on vitamin A supplements is based on mother's recall. An asterisk indicates that a figure is based on fewer than 25 unweighted cases and has been suppressed. na = Not applicable

<sup>1</sup> Includes pumpkin, red or yellow yams or squash, carrots, red sweet potatoes, green leafy vegetables, mango, papaya, and other locally grown fruits and vegetables that are rich in vitamin A

Table 11.8 also shows that one-third of children age 6-59 months received vitamin A supplements in the six months preceding the survey. Children residing in urban areas and in the south are much more likely to receive vitamin A supplementation than those in rural areas and in the north. There is a positive relationship between mother's education and supplementation. Vitamin A supplementation ranges from a low of 17 percent for children of women with no education to a high of 66 percent for children of the most educated mothers. Less than one-quarter of children living in households in the three lowest wealth quintiles receive vitamin A supplementation, compared with 44 percent of children in the fourth quintile and 65 percent of children in the highest quintile.

### 11.3.3 Micronutrient Intake Among Women

A mother's nutritional status during pregnancy is important both for the child's intrauterine development and for protection against maternal morbidity and mortality. Table 11.9 shows that only one-fifth of women who gave birth in the five years preceding the survey received a vitamin A dose within two months of giving birth. There is variation in postpartum vitamin A supplementation by age at birth, residence, region, level of education, and wealth quintile. Supplementation is higher among women over 20 years of age than among younger women and much higher among women in the south than in the north. Urban women are more than twice as likely as rural women to have received a postpartum vitamin A dose. Furthermore, there is a positive relationship between education and household economic status and postpartum vitamin A supplementation.

Night blindness is an indicator of severe vitamin A deficiency, and pregnant women are especially prone to suffer from it. Table 11.9 shows that 8 percent of women with a recent birth reported that they experienced night blindness. After adjusting for women who also reported vision problems during the day, an estimated 2 percent of women suffered from night blindness. The small percentages make it difficult to examine variation among subgroups of Nigeria's population.

Anaemia usually results from a nutritional deficiency of iron, folate, vitamin B<sub>12</sub>, or some other nutrients. Anaemia may have detrimental effects on the health of women and children and may become an underlying cause of maternal mortality and perinatal mortality. Anaemia also results in an increased risk of premature delivery and low birth weight. Early detection of anaemia can help to prevent complications related to pregnancy and delivery, as well as child-development problems. Anaemia is a serious concern for young children because it can result in impaired cognitive performance, behavioural and motor development, coordination, language development, and scholastic achievement, as well as increased morbidity from infectious diseases. It is recommended that iron tablets be taken daily for at least three months during pregnancy. Thus, information on the prevalence of iron supplementation can be useful for the development of health-intervention programs, such as iron-fortification programs, designed to prevent anaemia.

The 2003 NDHS asked women who had a recent birth whether they received or purchased any iron tablets during the last pregnancy. If so, the woman was asked to report the number of days that the tablets were actually taken during that pregnancy. Table 11.9 shows that one-fifth of women (21 percent) reported taking iron supplements for at least 90 days during the pregnancy, which is the recommended supplementation. Forty percent of women received no iron at all.

There is significant variation by background characteristics. Almost half of women in rural areas did not receive any iron supplementation, which is more than twice the proportion in urban areas. Pregnant women living in the South West are the most likely subgroup to have taken iron for at least 90 days (63 percent). This compares with just 10 percent of women in the North West. Iron supplementation is positively correlated with education and household economic status.

Table 11.9 Micronutrient intake among mothers

Among women who gave birth in the five years preceding the survey, percentage who received a vitamin A dose in the two months after delivery, percentage who had night blindness during pregnancy, and percent distribution by whether iron tablets or syrup were taken during pregnancy for specific numbers of days, by background characteristics, Nigeria 2003

Background characteristic	Received vitamin A dose post-partum <sup>1</sup>	Suffered night blindness during pregnancy		Number of days took iron tablets or syrup during pregnancy					Total	Number of women
		Reported	Adjusted <sup>2</sup>	None	<60	60-89	90+	Don't know/missing		
<b>Age at birth</b>										
<20	11.1	7.3	2.7	48.5	25.4	5.1	13.6	7.4	100.0	719
20-24	18.4	7.5	3.1	40.5	23.9	6.6	20.9	8.1	100.0	921
25-29	24.2	7.1	1.5	34.7	25.7	6.2	24.1	9.3	100.0	965
30-34	20.3	8.9	1.4	37.5	25.4	4.8	23.3	9.0	100.0	628
35-49	23.2	8.0	2.1	38.8	25.6	3.4	23.5	8.7	100.0	678
<b>Number of children ever born</b>										
1	19.4	5.6	1.1	37.5	26.9	6.0	20.9	8.7	100.0	803
2-3	21.1	7.2	2.4	36.6	25.6	6.5	24.4	6.8	100.0	1,102
4-5	23.4	8.9	2.7	37.5	25.3	5.6	22.4	9.1	100.0	874
6+	15.4	8.5	2.4	46.1	23.5	3.7	17.3	9.5	100.0	1,132
<b>Residence</b>										
Urban	33.0	5.6	0.9	19.7	28.1	6.2	35.2	10.7	100.0	1,144
Rural	14.1	8.5	2.7	48.1	24.0	5.0	15.4	7.6	100.0	2,766
<b>Region</b>										
North Central	18.5	5.6	0.1	29.8	23.8	6.5	17.1	22.8	100.0	575
North East	11.5	11.1	3.8	45.2	25.0	6.7	20.6	2.6	100.0	862
North West	6.5	4.9	2.4	58.8	23.2	3.4	9.5	5.0	100.0	1,341
South East	51.7	5.3	0.3	4.0	39.4	5.3	30.9	20.4	100.0	222
South South	33.6	11.0	1.9	29.7	34.1	5.6	22.9	7.8	100.0	544
South West	48.0	9.3	2.3	9.4	13.1	7.4	63.4	6.7	100.0	367
<b>Education</b>										
No education	8.1	7.4	2.8	58.8	20.8	3.8	10.3	6.4	100.0	1,989
Primary	25.5	9.0	1.5	27.5	29.1	6.8	25.7	10.9	100.0	918
Secondary	34.7	7.5	2.0	14.0	29.5	7.1	38.1	11.3	100.0	862
Higher	51.1	3.8	0.0	8.3	36.0	8.0	42.2	5.5	100.0	143
<b>Wealth quintile</b>										
Lowest	10.3	15.5	5.5	61.0	21.0	3.2	8.1	6.7	100.0	852
Second	10.4	5.4	1.6	61.1	19.3	3.2	11.2	5.2	100.0	846
Middle	13.7	5.8	1.2	39.4	28.5	6.7	15.2	10.3	100.0	808
Fourth	24.2	5.0	1.1	21.8	30.3	6.8	29.0	12.1	100.0	735
Highest	45.2	5.6	1.0	6.0	28.4	7.8	49.1	8.8	100.0	670
Total	19.6	7.7	2.2	39.8	25.2	5.4	21.2	8.5	100.0	3,911

Note: For women with two or more live births in the five-year period, data refer to the most recent birth.

<sup>1</sup> In the first two months after delivery

<sup>2</sup> Women who reported night blindness but did not report difficulty with vision during the day

## 11.4 Nutritional Status of Children

Malnutrition places children at increased risk of morbidity and mortality and has also been shown to be related to impaired mental development. Anthropometry provides one of the most important indicators of children's nutritional status. Height and weight measurements were obtained for all children born in the five years preceding the 2003 NDHS. The height and weight data are used to compute the following three summary indices of nutritional status: height-for-age, weight-for-height, and weight-for-age. The indices are expressed as standardized scores (Z-scores) or standard deviation units from the median for the international reference population recommended by WHO. Children who fall more than two stan-

standard deviations below the reference median (-2 SD) are regarded as undernourished, while those who fall more than three standard deviations below the reference median (-3 SD) are considered severely undernourished. Table 11.10 shows the nutritional status of children under five years of age, by background characteristics.

Children whose height-for-age is below -2 SD from the median of the reference population are considered *stunted* or short for their age. Stunting is the outcome of failure to receive adequate nutrition over an extended period and is also affected by recurrent or chronic illness. Almost two in five children are short for their age; half of these undernourished children are severely stunted.

Children whose weight-for-height is below -2 SD from the median of the reference population are considered *wasted* (or thin). Wasting represents the failure to receive adequate nutrition in the period immediately before the survey and typically is the result of a recent episode of illness, especially diarrhoea, or a rapid deterioration in the food supply. Almost one in ten children is wasted.

Children whose weight-for-age is below -2 SD from the median of the reference population are considered *underweight*. The measure reflects the effects of both acute and chronic malnutrition. Twenty-nine percent of all children are underweight; almost one in three of these children is severely underweight.

Nutritional status varies substantially by background characteristics. The impact of weaning can be seen in younger children, whose nutritional status deteriorates after six months of age, when children are being weaned. Rural children and children of younger or less educated mothers are disadvantaged in terms of nutritional status. Children living in the North West stand out as being particularly disadvantaged in terms of nutritional status (Figure 11.2).

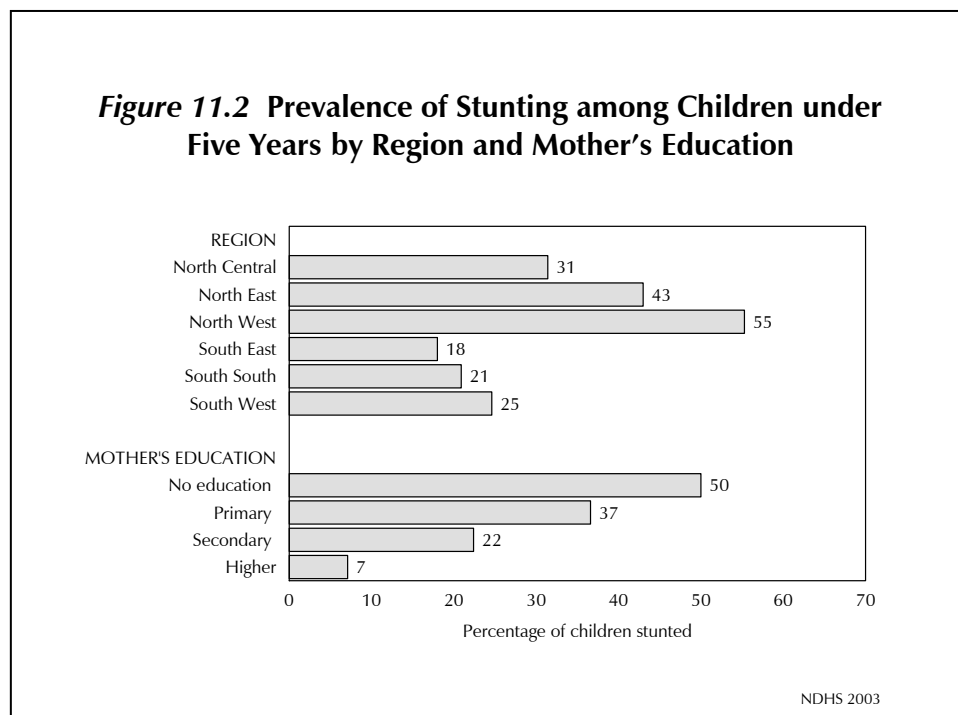


Table 11.10 Nutritional status of children

Percentage of children under five years classified as malnourished according to three anthropometric indices of nutritional status: height-for-age, weight-for-height, and weight-for-age, by background characteristics, Nigeria 2003

Background characteristic	Height-for-age (stunted)			Weight-for-height (wasted)			Weight-for-age (underweight)			Number of children
	Percent-age below -3 SD	Percent-age below -2 SD <sup>1</sup>	Mean z-score -SD	Percent-age below -3 SD	Percent-age below -2 SD <sup>1</sup>	Mean z-score -SD	Percent-age below -3 SD	Percent-age below -2 SD <sup>1</sup>	Mean z-score -SD	
<b>Age in months</b>										
<6	2.7	7.4	-0.0	2.9	7.9	0.1	0.5	6.6	0.2	527
6-9	9.3	24.7	-0.9	3.5	14.2	-0.5	6.8	20.4	-1.1	425
10-11	17.1	36.2	-1.4	1.6	9.8	-0.3	10.9	31.7	-1.4	179
12-23	24.9	49.4	-2.0	4.0	15.0	-0.7	15.6	41.4	-1.8	889
24-35	21.7	43.3	-1.6	1.5	5.9	-0.4	11.3	34.8	-1.3	972
36-47	21.7	43.9	-1.7	1.7	8.0	-0.3	8.0	26.6	-1.3	985
48-59	23.6	41.3	-1.7	0.7	6.4	-0.3	5.8	27.9	-1.3	812
<b>Sex</b>										
Male	20.3	40.8	-1.5	2.2	9.3	-0.4	9.3	29.2	-1.2	2,390
Female	18.2	35.9	-1.4	2.2	9.2	-0.4	8.4	28.1	-1.2	2,399
<b>Birth order<sup>2</sup></b>										
1	16.3	36.9	-1.4	2.2	9.3	-0.4	8.2	28.5	-1.2	885
2-3	18.9	36.1	-1.4	1.9	9.6	-0.3	9.3	28.5	-1.2	1,392
4-5	20.2	35.7	-1.4	2.0	8.0	-0.4	9.1	28.1	-1.2	1,009
6+	22.0	45.0	-1.7	2.6	10.0	-0.4	9.4	29.9	-1.3	1,143
<b>Birth interval in months<sup>2</sup></b>										
First birth <sup>3</sup>	16.3	36.8	-1.4	2.2	9.4	-0.4	8.2	28.6	-1.2	888
<24	27.1	44.5	-1.8	2.1	9.1	-0.4	12.1	33.0	-1.4	808
24-47	19.1	38.8	-1.5	2.1	8.7	-0.4	8.8	29.1	-1.2	2,092
48+	15.7	32.1	-1.2	2.4	11.0	-0.3	7.2	22.7	-1.0	641
<b>Size at birth<sup>2</sup></b>										
Very small	27.7	50.4	-1.9	2.6	15.0	-0.6	16.6	42.2	-1.6	243
Small	21.4	42.2	-1.6	2.4	12.3	-0.7	13.8	37.9	-1.6	353
Average or larger	18.9	37.4	-1.4	2.2	8.6	-0.3	8.1	27.1	-1.2	3,801
<b>Residence</b>										
Urban	12.9	28.8	-1.1	1.6	8.3	-0.4	6.8	22.2	-1.0	1,553
Rural	22.3	42.9	-1.6	2.5	9.7	-0.4	9.9	31.8	-1.3	3,236
<b>Region</b>										
North Central	11.3	31.4	-1.1	1.2	5.5	-0.4	4.9	19.6	-1.0	758
North East	21.6	43.0	-1.6	1.2	7.9	-0.4	9.5	33.1	-1.4	1,089
North West	34.4	55.3	-2.2	3.8	12.5	-0.3	14.7	42.9	-1.6	1,452
South East	5.3	19.7	-0.5	0.7	4.9	0.0	2.1	8.5	-0.3	338
South South	6.3	20.9	-0.7	2.5	11.1	-0.5	6.4	18.0	-0.9	643
South West	8.6	24.6	-1.0	2.1	8.6	-0.4	4.7	19.1	-1.0	510
<b>Mother's education<sup>4</sup></b>										
No education	28.7	50.0	-2.0	2.2	10.2	-0.4	11.7	37.6	-1.5	2,172
Primary	15.9	36.6	-1.4	2.6	9.4	-0.4	8.6	26.1	-1.2	1,105
Secondary	7.3	22.4	-0.8	2.3	6.9	-0.3	5.3	16.9	-0.8	1,068
Higher	2.3	7.1	-0.3	0.6	10.3	-0.3	2.1	8.9	-0.5	194
<b>Mother's age<sup>4</sup></b>										
15-19	18.0	40.8	-1.5	4.1	12.0	-0.4	10.6	31.2	-1.3	294
20-24	23.9	41.8	-1.7	2.2	8.5	-0.4	11.3	34.5	-1.4	913
25-29	18.4	36.7	-1.4	2.6	9.1	-0.3	8.8	27.9	-1.1	1,389
30-34	19.7	37.7	-1.4	1.8	9.6	-0.4	8.8	29.2	-1.2	903
35-49	17.0	37.5	-1.4	1.9	9.0	-0.4	7.1	23.5	-1.2	1,039
<b>Mother's status</b>										
Mother interviewed	19.5	38.5	-1.5	2.2	9.3	-0.4	9.0	28.8	-1.2	4,429
Mother not interviewed but in household	16.4	34.8	-1.4	5.9	8.4	-0.3	8.3	26.4	-1.1	110
Mother not interviewed and not in the household <sup>5</sup>	16.1	38.1	-1.2	0.8	8.1	-0.4	6.4	27.2	-1.1	247
<b>Wealth quintile</b>										
Lowest	26.4	48.8	-1.8	2.4	10.4	-0.4	10.8	34.8	-1.4	977
Second	26.0	47.7	-1.9	2.8	11.2	-0.4	12.0	37.5	-1.5	971
Middle	22.5	44.2	-1.6	2.6	8.1	-0.3	10.3	30.7	-1.3	954
Fourth	15.8	32.5	-1.3	1.6	8.2	-0.4	7.8	26.6	-1.2	934
Highest	5.2	17.9	-0.6	1.6	8.2	-0.3	3.4	13.4	-0.7	952
Total	19.2	38.3	-1.5	2.2	9.2	-0.4	8.9	28.7	-1.2	4,789

Note: Table is based on children who stayed in the household the night before the interview. Each of the indices is expressed in standard deviation (SD) units from the median of the NCHS/CDC/WHO International Reference Population. The percentage of children who are more than three or more than two standard deviations below the median of the reference population (-3 SD and -2 SD) are considered malnourished. Table is based on children with valid dates of birth (month and year) and valid measurements (height and weight). Total includes 25 cases with missing information on size at birth.

<sup>1</sup> Includes children who are below -3 SD

<sup>2</sup> Excludes children whose mothers were not interviewed

<sup>3</sup> First-born twins (triplets, etc.) are counted as first births because they do not have a previous birth interval.

<sup>4</sup> For women who were not interviewed, information is taken from the Household Questionnaire. Excludes children whose mothers were not listed in the household schedule.

<sup>5</sup> Includes children whose mothers are dead

## 11.5 NUTRITIONAL STATUS OF WOMEN

The 2003 NDHS collected anthropometric data from all women age 15-49. Women's nutritional status is important both as an indicator of overall health and as a predictor of pregnancy outcome for both mother and child. Two indices of women's nutritional status—height and body mass index (BMI)—are presented in Table 11.11.

Maternal height is a measure of past nutritional status and reflects in part the cumulative effect of social and economic outcomes on access to nutritional foods during childhood and adolescence. It can be used to predict the risks associated with difficult deliveries since small stature is often associated with small pelvis size and a greater likelihood of obstructed labor. Short stature is also correlated with low birth weight in infants, high risk of stillbirths, and high rates of miscarriage. The height below which a woman is considered to be at nutritional risk is in the range of 140 to 150 centimeters. The mean height of Nigerian women is 158 centimeters, and varies little by background characteristics. However, short stature is more prevalent among teenagers, with 5 percent of women age 15-19 below 145 centimeters tall.

The BMI, which incorporates both height and weight and provides a better measure of thinness and obesity than weight alone, is defined as weight in kilograms divided by the square of the height in meters ( $\text{kg}/\text{m}^2$ ). For the BMI, a cutoff of 18.5 has been recommended for indicating chronic energy deficiency among nonpregnant women. To avoid bias in the measurement of women's nutritional status, pregnant women and women who had given birth in the two months preceding the survey were excluded from the calculation of weight and body mass measures. Table 11.11 shows that the mean BMI of Nigerian women (22.3) falls well within the internationally accepted normal range. Almost two-thirds of women (64 percent) have BMIs in the normal range, 15 percent are thin, and 2 percent are severely thin. The youngest women are the most likely subgroup to be thin; one-quarter of women age 15-19 have a BMI of less than 18.5. There is significant regional variation, with the prevalence of thinness ranging from 7 percent in the North Central to 23 percent in the North East.

The BMI is also used to evaluate the proportion of women who are overweight or obese. A cutoff point of 25.0 has been recommended for defining overweight, while 30.0 is the cutoff point for defining obesity. According to the 2003 NDHS, one-fifth of Nigerian women weigh more than they should: 15 percent are overweight, and 6 percent are obese. There is a strong relationship between age and high BMI. For example, only 7 percent of women age 15-19 are overweight or obese, compared with one-third (34 percent) of women age 45-49. There are marked variations by residence, education, and household economic status.



**Table 11.11 Nutritional status of women by background characteristics**

Among women age 15-49, mean height, percentage under 145 cm, mean body mass index (BMI), and percentage with specific BMI levels, by background characteristics, Nigeria 2003

Background characteristic	Height			Body mass index BMI <sup>1</sup> (kg/m <sup>2</sup> )									
	Mean height in cm	Percent-age below 145 cm	Number of women	Normal		Thin			Overweight/obese			Number of women	
				Mean BMI	18.5-24.9 (normal)	<18.5 (thin)	17.0-18.4 (mildly thin)	16.0-16.9 (moderately thin)	<16.0 (severely thin)	≥25.0 (over-weight/obese)	25.0-29.9 (over-weight)		30.0 or higher (obese)
<b>Age</b>													
15-19	155.8	4.5	1,641	20.5	69.0	24.5	17.5	4.0	3.0	6.5	5.5	0.9	1,504
20-24	158.4	1.1	1,461	21.8	71.2	14.4	10.2	3.1	1.2	14.3	11.3	3.1	1,201
25-29	159.0	0.9	1,347	22.6	65.0	11.9	8.7	2.4	0.8	23.1	17.6	5.5	1,080
30-34	158.9	1.5	924	23.2	62.7	10.4	7.4	1.9	1.2	26.9	18.2	8.6	746
35-39	159.0	1.0	795	23.7	55.0	12.7	10.0	1.3	1.4	32.3	21.8	10.5	664
40-44	158.8	0.7	667	23.5	56.2	13.1	9.0	3.4	0.7	30.7	20.9	9.8	620
45-49	157.8	2.3	559	23.8	57.4	9.2	4.5	2.7	2.0	33.5	22.2	11.3	546
<b>Residence</b>													
Urban	159.0	1.3	2,544	23.2	59.2	13.1	9.1	2.4	1.6	27.7	18.1	9.6	2,258
Rural	157.6	2.2	4,850	21.8	67.1	16.3	11.6	3.1	1.6	16.6	13.0	3.6	4,105
<b>Region</b>													
North Central	157.8	1.5	1,086	23.1	70.3	6.6	5.3	1.0	0.3	23.1	16.9	6.2	944
North East	158.2	1.6	1,320	21.4	62.9	23.0	16.1	4.3	2.7	14.1	10.4	3.7	1,095
North West	157.2	2.5	2,022	21.5	65.3	19.7	12.9	4.3	2.5	15.0	10.7	4.2	1,630
South East	158.8	2.9	707	23.6	57.9	8.2	6.2	1.4	0.5	33.9	25.5	8.4	648
South South	158.3	1.3	1,308	22.9	64.2	11.1	8.7	1.6	0.8	24.7	16.8	8.0	1,173
South West	159.1	1.6	950	22.3	62.5	16.7	11.9	3.1	1.7	20.8	15.0	5.9	872
<b>Education</b>													
No education	157.5	2.1	3,052	21.6	65.4	19.8	13.5	4.2	2.1	14.8	11.2	3.5	2,503
Primary	157.3	2.5	1,606	22.6	64.8	12.8	9.4	1.9	1.4	22.4	16.4	6.0	1,385
Secondary	158.7	1.7	2,312	22.5	64.6	13.1	9.6	2.2	1.2	22.3	16.1	6.2	2,080
Higher	161.1	0.0	425	25.0	53.7	4.9	2.9	0.8	1.2	41.4	24.7	16.7	394
<b>Wealth quintile</b>													
Lowest	157.2	3.6	1,364	21.1	67.8	21.5	14.6	4.1	2.8	10.7	8.6	2.1	1,141
Second	157.4	1.3	1,386	21.3	70.0	18.2	12.8	3.6	1.8	11.8	9.0	2.8	1,155
Middle	157.4	2.1	1,464	22.0	66.7	16.0	11.2	3.4	1.3	17.4	12.7	4.6	1,238
Fourth	158.1	1.6	1,492	22.5	65.2	13.1	9.8	1.8	1.5	21.7	15.9	5.8	1,300
Highest	159.7	1.1	1,688	24.0	54.7	9.2	6.5	1.8	0.9	36.1	24.5	11.6	1,528
<b>Total</b>	158.0	1.9	7,394	22.3	64.3	15.2	10.7	2.9	1.6	20.5	14.8	5.8	6,362

<sup>1</sup> Excludes pregnant women and women with a birth in the preceding 2 months