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Nutritional status is the result of complex interactions between food consumption and the overall status of health and care practices. Poor nutritional status is one of the most important health and welfare problems facing Kenya today and afflicts the most vulnerable groups: women and children. At the individual level, inadequate or inappropriate feeding patterns lead to malnutrition. Numerous socioeconomic and cultural factors influence the decision on patterns of feeding and nutritional status. The 2003 KDHS collected data on feeding practices, that is, breastfeeding, complementary feeding, and use of feeding bottles. Heights and weights of all children under five years and women age 15-49 were measured to determine the adult female and child nutritional status. This chapter presents the findings on infant feeding practices and nutritional status of women and children.

10.1 BREASTFEEDING AND SUPPLEMENTATION

Feeding practices play a pivotal role in determining optimal development of infants. Poor breastfeeding and infant feeding practices have adverse consequences for the health and nutritional status of children, which in turn has consequences on the mental and physical development of the child.

Initiation of Breastfeeding

Women delivering in health facilities and at home are encouraged to initiate breastfeeding within the first 30 minutes after birth, except for an HIV-positive mother who has chosen not to breastfeed (Ministry of Health, 2000). Bottle-feeding is discouraged, and mothers are educated to breastfeed exclusively for six months. Early breastfeeding increases chances of breastfeeding success and generally lengthens the duration of breastfeeding. Mixed breastfeeding (breastfeeding combined with other liquids and foods) may increase the risk of HIV infection and is discouraged.

Table 10.1 indicates that 97 percent of children are breastfed at some point, the same proportion as in 1998. Overall, 52 percent of children are breastfed within one hour of birth and 82 percent within one day after delivery, indicating a slight decline when compared with the 1998 KDHS. The proportion of women initiating breastfeeding within one hour of birth is highest in Eastern Province (67 percent) and lowest in Coast Province (22 percent).

Two-thirds (65 percent) of children are given something before breastfeeding (prelacteal feed). Mothers in rural areas (67 percent) are more likely to practise prelacteal feeding than those in urban areas (57 percent). Prelacteal feeding is also common in Western and Coast provinces and least common in Central Province.

Table 10.1 Initial breastfeeding

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

| Background characteristic | Percentage ever breastfed | Number of children | Percentage who started breastfeeding within 1 hour of birth | Percentage who started breastfeeding within 1 day of birth ¹ | Received a prelacteal feed ² | Number of children ever breastfed |
|----------------------------------|---------------------------|--------------------|---|---|---|-----------------------------------|
| Sex | | | | | | |
| Male | 96.2 | 3,110 | 50.5 | 80.7 | 65.9 | 2,993 |
| Female | 97.4 | 2,992 | 54.1 | 82.8 | 64.1 | 2,913 |
| Residence | | | | | | |
| Urban | 96.5 | 1,143 | 51.2 | 80.0 | 57.2 | 1,103 |
| Rural | 96.9 | 4,959 | 52.5 | 82.1 | 66.8 | 4,803 |
| Province | | | | | | |
| Nairobi | 96.2 | 398 | 55.1 | 82.3 | 51.3 | 383 |
| Central | 98.2 | 652 | 61.8 | 86.4 | 30.1 | 641 |
| Coast | 95.0 | 510 | 22.4 | 69.0 | 82.9 | 484 |
| Eastern | 96.8 | 946 | 66.6 | 92.3 | 57.7 | 916 |
| Nyanza | 97.9 | 1,000 | 46.2 | 77.5 | 73.1 | 980 |
| Rift Valley | 96.8 | 1,639 | 62.4 | 84.0 | 67.1 | 1,587 |
| Western | 97.3 | 776 | 30.7 | 76.5 | 83.8 | 755 |
| North Eastern | 88.9 | 181 | 54.9 | 68.3 | 66.8 | 160 |
| Education | | | | | | |
| No education | 94.9 | 938 | 56.7 | 80.5 | 67.4 | 890 |
| Primary incomplete | 97.2 | 2,222 | 48.0 | 78.8 | 71.1 | 2,159 |
| Primary complete | 97.5 | 1,678 | 54.4 | 86.2 | 62.0 | 1,636 |
| Secondary+ | 96.6 | 1,263 | 53.7 | 81.9 | 56.6 | 1,221 |
| Assistance at delivery | | | | | | |
| Health professional ³ | 96.3 | 2,536 | 55.6 | 83.5 | 54.9 | 2,443 |
| Traditional birth attendant | 96.7 | 1,710 | 49.6 | 81.7 | 76.7 | 1,654 |
| Other | 97.1 | 1,347 | 51.4 | 81.3 | 68.8 | 1,308 |
| No one | 98.2 | 488 | 48.6 | 76.9 | 68.0 | 479 |
| Place of delivery | | | | | | |
| Health facility | 96.2 | 2,447 | 56.0 | 83.2 | 54.2 | 2,355 |
| At home | 97.1 | 3,584 | 50.2 | 81.1 | 72.7 | 3,481 |
| Other | 100.0 | 51 | 39.2 | 81.4 | 60.8 | 51 |
| Wealth quintile | | | | | | |
| Lowest | 96.0 | 1,509 | 49.8 | 80.2 | 74.1 | 1,449 |
| Second | 98.0 | 1,271 | 54.0 | 82.3 | 68.8 | 1,245 |
| Middle | 97.5 | 1,159 | 52.2 | 83.0 | 65.4 | 1,130 |
| Fourth | 96.6 | 1,032 | 54.6 | 84.0 | 54.1 | 997 |
| Highest | 96.0 | 1,131 | 51.6 | 79.7 | 58.1 | 1,085 |
| Total | 96.8 | 6,102 | 52.3 | 81.7 | 65.0 | 5,906 |

Note: Table is based on all births, whether the children are living or dead at the time of interview. Total includes 21 children with information on assistance at delivery missing and 19 children with place of delivery missing.

¹ Includes children who started breastfeeding within one hour of birth

² Given something other than breast milk during the first three days of life before the mother started breastfeeding regularly

³ Doctor, nurse, or midwife

Breastfeeding Patterns

For optimal growth, it is recommended that infants should be exclusively breastfed for the first six months of life. Exclusive breastfeeding in the early months of life is correlated strongly with increased child survival and reduced risk of morbidity, particularly from diarrhoeal diseases. Table 10.2 and Figure 10.1 show that only 29 percent of children under the age of two months are exclusively breastfed. This represents no change in breastfeeding patterns when compared with the 1998 KDHS. The propensity to feed infants under 2 months with plain water (26 percent), water-based liquids/juices (14 percent), other milk (15 percent), and food (16 percent) is high. At two to three months, almost half of all children are given complementary foods. By six to seven months, 81 percent of infants have been introduced to these foods. Overall, only 13 percent of infants under 6 months are exclusively breastfed. The implication of this duration is important since it is recommended that all infants be exclusively breastfed for six months.

Table 10.2 also shows that bottle-feeding is common in Kenya. More than one-quarter (27 percent) of children under six months are fed with a bottle with a nipple. Bottle-feeding practices may potentially result in increased morbidity because of the unsafe water and preparation facilities.

Table 10.2 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, Kenya 2003

| Age in months | Not breast-feeding | Exclusively breast-fed | Breastfeeding and consuming | | | | Total | Number of children | Percentage using a bottle with a nipple ¹ | Number of children |
|---------------|--------------------|------------------------|-----------------------------|---------------------------|------------|---------------------|-------|--------------------|--|--------------------|
| | | | Plain water only | Water-based liquids/juice | Other milk | Complementary foods | | | | |
| <2 | 0.8 | 29.3 | 25.8 | 13.6 | 15.0 | 15.5 | 100.0 | 171 | 16.9 | 173 |
| 2-3 | 0.0 | 9.3 | 13.4 | 8.3 | 21.0 | 48.0 | 100.0 | 232 | 28.0 | 237 |
| 4-5 | 0.0 | 2.6 | 3.0 | 5.4 | 19.6 | 69.3 | 100.0 | 204 | 33.8 | 210 |
| 6-7 | 3.7 | 2.1 | 1.8 | 0.9 | 10.5 | 81.1 | 100.0 | 199 | 38.1 | 202 |
| 8-9 | 3.3 | 0.6 | 2.7 | 2.7 | 3.4 | 87.2 | 100.0 | 204 | 20.4 | 206 |
| 10-11 | 3.3 | 0.7 | 1.0 | 2.0 | 2.6 | 90.4 | 100.0 | 220 | 26.6 | 222 |
| 12-15 | 7.9 | 0.3 | 0.7 | 0.3 | 2.5 | 88.3 | 100.0 | 394 | 18.3 | 408 |
| 16-19 | 25.2 | 0.4 | 0.2 | 0.4 | 2.1 | 71.7 | 100.0 | 335 | 14.5 | 362 |
| 20-23 | 42.7 | 0.0 | 0.4 | 0.4 | 1.0 | 55.5 | 100.0 | 307 | 11.3 | 361 |
| 24-27 | 65.3 | 0.2 | 0.0 | 0.2 | 0.4 | 33.9 | 100.0 | 259 | 6.0 | 339 |
| 28-31 | 77.6 | 0.0 | 0.0 | 0.0 | 0.3 | 22.1 | 100.0 | 224 | 5.2 | 337 |
| 32-35 | 89.0 | 0.0 | 0.0 | 0.0 | 0.1 | 10.8 | 100.0 | 193 | 5.5 | 355 |
| <6 | 0.2 | 12.7 | 13.4 | 8.8 | 18.8 | 46.1 | 100.0 | 607 | 26.9 | 619 |
| 6-9 | 3.5 | 1.3 | 2.3 | 1.8 | 6.9 | 84.2 | 100.0 | 403 | 29.2 | 408 |

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.

¹ Based on all children under three years

Figure 10.1 Breastfeeding Practices by Age

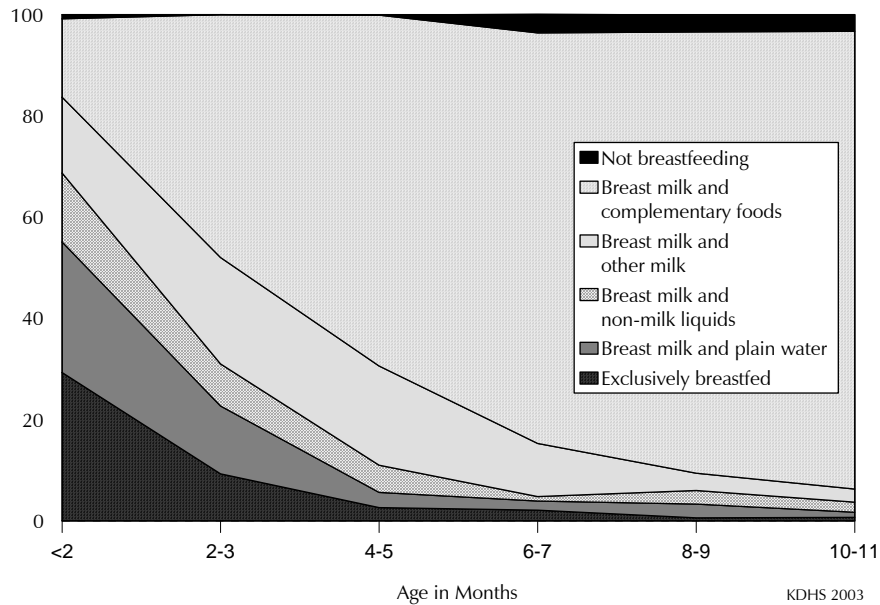


Table 10.3 shows that the median duration for any breastfeeding among Kenyan children is 20 months, which is similar to the duration documented in the 1993 KDHS and the 1998 KDHS, suggesting that for a decade the patterns have not changed significantly. The median duration of exclusive breastfeeding is estimated at less than one month.

The median duration of any breastfeeding is slightly higher in rural areas (20 months), compared with urban (19 months). At the provincial level, duration of breastfeeding is longest in Eastern Province (25 months) and shortest in North Eastern Province (13 months).

Analysis by background characteristics of the mother indicates that educational level and socio-economic status as measured by the wealth index are related to breastfeeding practices. Women with no education are more likely to breastfeed longer (24 months) than those who have at least some secondary education (19 months). Median duration of breastfeeding declines steadily with increasing wealth.

Frequent breastfeeding of children is a common occurrence in Kenya. More than nine in ten (92 percent) infants under six months of age were breastfed six or more times in the 24 hours prior to the survey.

Table 10.3 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 and who were breastfed six or more times in the 24 hours preceding the survey; and mean number of feeds (day/night), by background characteristics, Kenya 2003

| Background characteristic | Median duration (months) of breastfeeding ¹ | | | | Breastfeeding children under six months ² | | | |
|---------------------------|--|--------------------------|--|--------------------|--|--------------------------|----------------------------|--------------------|
| | Any breast-feeding | Exclusive breast-feeding | Predomi-nant breast-feeding ³ | Number of children | Percentage breastfed 6+ times in last 24 hours | Mean number of day feeds | Mean number of night feeds | Number of children |
| Sex | | | | | | | | |
| Male | 19.1 | 0.5 | 1.5 | 1,882 | 93.6 | 6.2 | 4.4 | 301 |
| Female | 21.0 | 0.5 | 1.7 | 1,821 | 90.6 | 5.9 | 4.2 | 309 |
| Residence | | | | | | | | |
| Urban | 19.0 | 0.5 | 2.1 | 698 | 94.4 | 5.9 | 4.5 | 118 |
| Rural | 20.4 | 0.5 | 1.4 | 3,004 | 91.6 | 6.1 | 4.2 | 492 |
| Province | | | | | | | | |
| Nairobi | 16.7 | 0.6 | 2.1 | 242 | 93.1 | 5.8 | 4.4 | 43 |
| Central | 19.0 | 0.4 | 1.4 | 381 | 95.9 | 6.4 | 5.0 | 65 |
| Coast | 21.5 | 0.5 | 2.1 | 318 | 95.9 | 6.6 | 4.8 | 50 |
| Eastern | 24.7 | 0.6 | 1.6 | 570 | 92.6 | 5.7 | 4.0 | 94 |
| Nyanza | 18.2 | 0.6 | 2.0 | 619 | 83.2 | 4.9 | 3.4 | 110 |
| Rift Valley | 19.4 | 0.4 | 0.6 | 1,008 | 96.8 | 6.8 | 4.6 | 159 |
| Western | 18.9 | 0.6 | 1.7 | 459 | 89.4 | 6.3 | 4.4 | 73 |
| North Eastern | 12.8 | 0.4 | 0.7 | 106 | 87.3 | 6.0 | 3.8 | 17 |
| Education | | | | | | | | |
| No education | 23.8 | 0.5 | 1.2 | 565 | 94.8 | 6.5 | 4.6 | 102 |
| Primary incomplete | 19.2 | 0.5 | 1.6 | 1,371 | 92.2 | 6.0 | 4.1 | 229 |
| Primary complete | 20.5 | 0.5 | 1.6 | 1,013 | 91.7 | 5.9 | 4.2 | 167 |
| Secondary+ | 19.4 | 0.6 | 1.7 | 753 | 90.2 | 6.0 | 4.3 | 112 |
| Wealth quintile | | | | | | | | |
| Lowest | 21.6 | 0.6 | 1.9 | 908 | 89.5 | 5.9 | 4.1 | 135 |
| Second | 21.2 | 0.5 | 1.1 | 768 | 89.2 | 5.7 | 4.0 | 130 |
| Middle | 19.9 | 0.5 | 1.6 | 695 | 95.1 | 6.2 | 4.3 | 117 |
| Fourth | 18.9 | 0.5 | 1.1 | 636 | 92.5 | 6.2 | 4.7 | 113 |
| Highest | 18.5 | 0.5 | 2.0 | 696 | 95.1 | 6.3 | 4.4 | 115 |
| Total | 20.1 | 0.5 | 1.6 | 3,702 | 92.1 | 6.1 | 4.3 | 610 |
| Mean for all children | 20.7 | 1.6 | 3.1 | na | na | na | na | na |

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

na = Not applicable

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

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

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

Complementary Feeding

Given that babies need nutritious food in addition to breast milk from the age of six months, it is recommended that children should begin receiving complementary foods at this age. To obtain full information on weaning practices, the 2003 KDHS collected data on breastfeeding and nonbreastfeeding children. Table 10.4 presents information on the types of complementary (weaning) foods received by children less than three years of age in the day or night preceding the survey. As observed in previous KDHS data, use of infant formula milk is minimal. Only 5 percent of children under six months receive commercially produced infant formula.

Table 10.4 Foods consumed by children in the day or night preceding the interview

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

| Child's age in months | Infant formula | Other milk/cheese/yogurt | Other liquids ¹ | Food made from grains | Fruits/vegetables ² | Food made from roots/tubers | Food made from legumes | Meat/fish/shellfish/poultry/eggs | Fruits and vegetables rich in vitamin A ³ | Any solid or semi-solid food | Number of children |
|----------------------------------|----------------|--------------------------|----------------------------|-----------------------|--------------------------------|-----------------------------|------------------------|----------------------------------|--|------------------------------|--------------------|
| BREASTFEEDING CHILDREN | | | | | | | | | | | |
| <2 | 2.6 | 17.8 | 23.4 | 3.8 | 5.4 | 2.5 | 0.7 | 0.4 | 2.7 | 22.9 | 169 |
| 2-3 | 2.9 | 37.3 | 36.0 | 31.9 | 21.3 | 8.7 | 3.1 | 1.8 | 12.0 | 56.0 | 232 |
| 4-5 | 8.8 | 49.4 | 45.4 | 44.7 | 40.0 | 16.7 | 5.8 | 8.4 | 32.7 | 78.4 | 204 |
| 6-7 | 6.1 | 63.0 | 48.2 | 59.5 | 59.1 | 20.6 | 14.8 | 8.9 | 46.3 | 90.1 | 192 |
| 8-9 | 4.0 | 53.6 | 55.5 | 67.8 | 69.3 | 24.7 | 23.2 | 22.0 | 55.7 | 91.9 | 197 |
| 10-11 | 7.5 | 65.5 | 61.3 | 74.3 | 78.5 | 30.7 | 24.6 | 26.9 | 69.0 | 96.0 | 213 |
| 12-15 | 4.5 | 58.3 | 61.6 | 78.9 | 83.6 | 28.1 | 29.2 | 28.1 | 77.7 | 97.1 | 363 |
| 16-19 | 3.1 | 62.7 | 65.3 | 78.8 | 81.6 | 36.3 | 38.9 | 27.9 | 74.3 | 97.4 | 250 |
| 20-23 | 2.5 | 62.7 | 64.9 | 80.6 | 84.3 | 25.3 | 35.6 | 26.3 | 78.1 | 96.8 | 176 |
| 24-35 | 3.6 | 56.7 | 61.2 | 80.5 | 86.8 | 30.5 | 33.7 | 24.7 | 84.6 | 99.2 | 161 |
| <6 | 4.8 | 35.9 | 35.7 | 28.4 | 23.2 | 9.7 | 3.4 | 3.6 | 16.4 | 54.3 | 606 |
| 6-9 | 5.0 | 58.2 | 51.9 | 63.7 | 64.3 | 22.7 | 19.0 | 15.6 | 51.1 | 91.0 | 389 |
| NONBREASTFEEDING CHILDREN | | | | | | | | | | | |
| 16-19 | 1.1 | 71.3 | 67.2 | 75.2 | 85.2 | 38.3 | 25.8 | 25.4 | 82.2 | 98.8 | 84 |
| 20-23 | 1.9 | 58.3 | 71.3 | 83.9 | 88.2 | 37.6 | 33.9 | 33.0 | 81.1 | 100.0 | 131 |
| 24-35 | 3.6 | 63.5 | 66.9 | 85.1 | 87.4 | 36.3 | 38.9 | 38.6 | 83.4 | 98.7 | 515 |

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

¹ Does not include plain water

² Includes fruits and vegetables rich in vitamin A

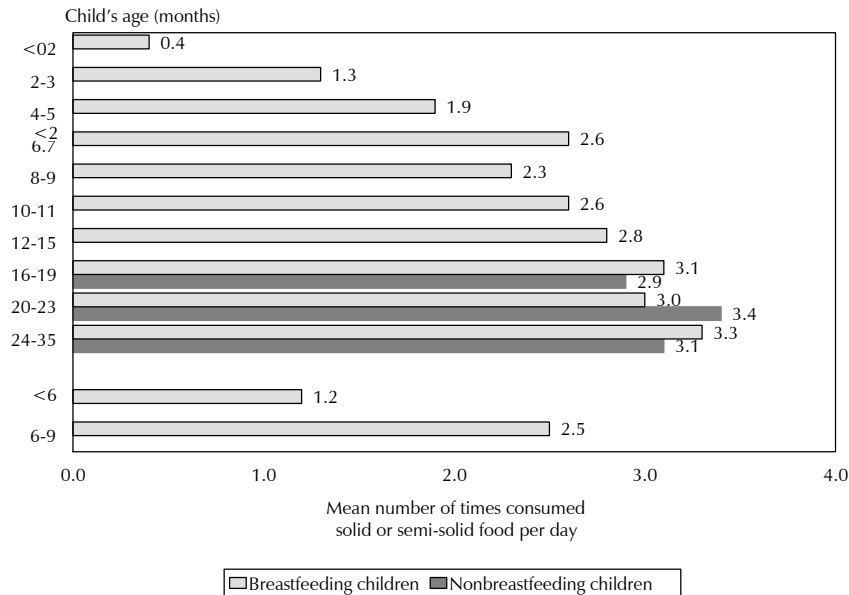
³ Includes pumpkin, red or yellow yams or squash, carrots, red sweet potatoes, green leafy vegetables, mangoes, papayas, and other locally grown fruits and vegetables that are rich in vitamin A

Fifty-four percent of children under six months receive solid or semi-solid foods. The most commonly used complementary foods for breastfeeding children under six months include milk products other than breast milk (36 percent), food made from grains (28 percent), and fruits and vegetables (23 percent). Foods made from cereals are introduced to children by two to three months (32 percent); by six to seven months, 60 percent are already receiving these foods. On the other hand, foods made from roots/tubers and legumes are introduced gradually from four to five months. By the age of 10-11 months, 31 percent are receiving root/tuber-based food, and 25 percent get legumes.

Consumption of protein-rich foods (meat, fish, poultry, and eggs) generally begins at four to five months (8 percent) and increases to 27 percent by the first year of life. Generally, for all children under the age of three years, the percentage consuming protein-rich foods in the previous 24 hours does not rise above 39 percent. Fruits and vegetables rich in vitamin A are consumed much earlier. By two to three months, some children eat fruits and vegetables; this proportion rises to 69 percent by the first year of life.

Figure 10.2 shows the mean number of times that solid or semi-solid food was given to young children in the 24 hours preceding the survey. As expected, as children get older, they are given more meals per day. Those who are over one year of age are generally given solid or semi-solid foods about three times per day.

Figure 10.2 Frequency of Meals Consumed by Children under 36 Months of Age Living with Their Mother



KDHS 2003

10.2 MICRONUTRIENT INTAKE

Vitamin A is an essential micronutrient for the immune system and plays an important role in maintaining the epithelial tissue in the body. High levels of vitamin A deficiency (VAD) can cause eye damage leading to blindness and can increase the severity of infections such as measles and diarrhoeal diseases in children. Ensuring that children between 6 and 59 months receive enough vitamin A may be the single most effective child survival intervention. Additionally, adequate intake of the vitamin during pregnancy may reduce maternal deaths. According to the 1990 World Summit for Children goals and the national plan of action developed by the Government of Kenya in 1994, the target was to virtually eliminate VAD disorders by 2000 (Central Bureau of Statistics and UNICEF, 2003).

Micronutrient Intake among Children

Table 10.5 shows the percentage of youngest children under three years who consumed foods rich in vitamin A in the 24 hours preceding the survey and the percentage of children under age 6-59 months who received vitamin A supplements in the six months preceding the survey. Overall, 62 percent of children under three years consume food rich in vitamin A, and 33 percent of children under five receive vitamin A supplements.

Table 10.5 Micronutrient intake among children

Percentage of youngest children under age three living with the mother and who consumed fruits and vegetables rich in vitamin A in the 24 hours 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, Kenya 2003

| Background characteristic | Consumed fruits and vegetables rich in vitamin A ¹ | Number of children | Consumed vitamin A supplements | Number of children |
|------------------------------|---|--------------------|--------------------------------|--------------------|
| Age in months | | | | |
| <6 | 16.4 | 607 | na | 0 |
| 6-9 | 51.5 | 403 | 29.9 | 408 |
| 10-11 | 69.6 | 220 | 34.3 | 222 |
| 12-23 | 77.8 | 1,036 | 36.6 | 1,131 |
| 24-35 | 83.7 | 676 | 33.0 | 1,031 |
| 36-47 | na | 0 | 32.9 | 1,123 |
| 48-59 | na | 0 | 31.8 | 1,026 |
| Sex | | | | |
| Male | 61.5 | 1,474 | 35.3 | 2,493 |
| Female | 63.0 | 1,469 | 31.4 | 2,447 |
| Birth order | | | | |
| 1 | 61.1 | 683 | 35.4 | 1,228 |
| 2-3 | 64.1 | 1,032 | 34.6 | 1,760 |
| 4-5 | 64.0 | 632 | 32.4 | 983 |
| 6+ | 58.5 | 596 | 29.3 | 971 |
| Breastfeeding status | | | | |
| Breastfeeding | 55.0 | 2,158 | 32.4 | 1,605 |
| Not breastfeeding | 82.2 | 782 | 33.9 | 3,309 |
| Residence | | | | |
| Urban | 66.0 | 560 | 40.4 | 945 |
| Rural | 61.4 | 2,383 | 31.7 | 3,996 |
| Province | | | | |
| Nairobi | 67.1 | 196 | 37.5 | 326 |
| Central | 72.6 | 330 | 35.0 | 557 |
| Coast | 58.8 | 251 | 33.2 | 416 |
| Eastern | 70.4 | 485 | 22.4 | 786 |
| Nyanza | 68.0 | 441 | 26.5 | 720 |
| Rift Valley | 55.2 | 807 | 36.5 | 1,372 |
| Western | 60.0 | 356 | 46.8 | 617 |
| North Eastern | 17.6 | 78 | 24.6 | 146 |
| Mother's education | | | | |
| No education | 40.6 | 453 | 25.9 | 746 |
| Primary incomplete | 60.3 | 1,040 | 30.3 | 1,748 |
| Primary complete | 67.1 | 819 | 36.1 | 1,372 |
| Secondary+ | 74.7 | 631 | 40.0 | 1,074 |
| Mother's age at birth | | | | |
| <20 | 58.6 | 480 | 34.7 | 866 |
| 20-24 | 60.1 | 884 | 35.0 | 1,553 |
| 25-29 | 64.9 | 704 | 32.5 | 1,165 |
| 30-34 | 65.5 | 508 | 33.2 | 777 |
| 35-49 | 62.6 | 367 | 28.8 | 580 |
| Wealth quintile | | | | |
| Lowest | 53.1 | 701 | 29.9 | 1,204 |
| Second | 62.1 | 619 | 32.7 | 1,027 |
| Middle | 64.6 | 561 | 31.5 | 936 |
| Fourth | 68.4 | 503 | 36.9 | 842 |
| Highest | 66.0 | 559 | 37.2 | 931 |
| Total | 62.2 | 2,943 | 33.3 | 4,941 |

Note: Information on vitamin A supplements is based on mother's recall. Total includes 27 children with information on breastfeeding status missing.

na = Not applicable

¹ 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

The consumption of food rich in vitamin A and the intake of supplements vary substantially by background characteristics. Male children are slightly more likely than females to consume vitamin A supplements (35 and 31 percent, respectively). Children who are not breastfeeding (82 percent) are more likely to consume fruits and vegetables rich in vitamin A, compared with their breastfeeding counterparts (55 percent), presumably because they are older than breastfeeding children. Analysis of data on area of residence and provinces also reveals differences. In general, children in urban areas are more likely to eat fruits and vegetables rich in vitamin A and also receive vitamin A supplements (66 and 40 percent, respectively) compared with those in rural areas (61 and 32 percent, respectively). The proportion of children consuming foods rich in vitamin A is highest in Central (73 percent) and Eastern (70 percent) provinces and lowest in North Eastern Province (18 percent). Consumption of vitamin A supplements is highest in Western Province (47 percent) and lowest in Eastern (22 percent) and North Eastern (25 percent) provinces. It appears that children in North Eastern Province are less likely to consume fruits and vegetables rich in vitamin A as well as to receive vitamin A supplements.

Micronutrient Intake among Women

Table 10.6 presents the percentage of women with a birth in the five years preceding the survey who received a vitamin A dose in the first two months after birth and who took iron tablets or syrup during pregnancy. In general, 14 percent received a postpartum vitamin A dose, but this varies with area of residence, province, and educational attainment. Women in urban areas (20 percent) are more likely to receive vitamin A supplements than those in rural areas (13 percent). At the provincial level, the percentage of women who reported receiving a postpartum vitamin A dose is highest in Coast Province (23 percent) and lowest in Central Province (11 percent).

With regard to educational level, women with no education (12 percent) or those with incomplete primary education (11 percent) are less likely to receive vitamin A doses. The data show that 21 percent of women with some secondary education reported having received a postpartum vitamin A dose. Vitamin A supplementation is strongly associated with wealth, rising from 10 percent of the poorest mothers to 22 percent of the wealthiest.

As seen in the table, the intake of iron tablets and syrup during pregnancy is low. Overall, more than half of women (54 percent) did not take iron tablets or syrup during pregnancy. Intake varies considerably by province. Seventy-nine percent of women in North Eastern Province and 70 percent in Central Province did not take any iron supplements during pregnancy, compared with 35 percent in Coast Province and 36 percent in Nyanza Province. Coast and Nyanza Provinces are malaria-endemic areas, and as such, women are more likely to receive iron tablets or syrup. Among women who took iron supplements during pregnancy, the vast majority took them for less than 60 days.

Table 10.6 Micronutrient intake among mothers

Percentage of women with a birth in the five years preceding the survey who received a vitamin A dose in the first two months after delivery and percentage who took iron tablets or syrup for a specific number of days during pregnancy, by background characteristics, Kenya 2003

| Background characteristic | Received vitamin A dose post-partum ¹ | Number of days iron tablets/syrup taken during pregnancy | | | | Don't know/missing | Number of women |
|-------------------------------------|--|--|------|-------|-----|--------------------|-----------------|
| | | None | <60 | 60-89 | 90+ | | |
| Age at birth | | | | | | | |
| <20 | 16.7 | 54.9 | 37.5 | 1.2 | 2.2 | 4.3 | 647 |
| 20-24 | 15.2 | 56.8 | 33.9 | 1.4 | 1.8 | 6.1 | 1,172 |
| 25-29 | 14.3 | 50.3 | 39.4 | 1.9 | 3.1 | 5.4 | 964 |
| 30-34 | 13.4 | 51.0 | 38.0 | 2.3 | 3.1 | 5.6 | 685 |
| 35-49 | 10.2 | 53.9 | 30.8 | 3.8 | 2.7 | 8.8 | 584 |
| Number of children ever born | | | | | | | |
| 1 | 18.1 | 57.4 | 32.7 | 1.2 | 2.6 | 6.2 | 946 |
| 2-3 | 15.9 | 54.0 | 36.3 | 1.8 | 2.3 | 5.6 | 1,404 |
| 4-5 | 12.2 | 51.7 | 39.3 | 1.8 | 1.7 | 5.5 | 842 |
| 6+ | 8.9 | 50.3 | 36.1 | 3.3 | 3.7 | 6.6 | 859 |
| Residence | | | | | | | |
| Urban | 19.9 | 53.1 | 34.2 | 2.0 | 3.2 | 7.5 | 835 |
| Rural | 12.7 | 53.7 | 36.5 | 2.0 | 2.3 | 5.5 | 3,217 |
| Province | | | | | | | |
| Nairobi | 20.3 | 56.9 | 30.8 | 1.4 | 3.9 | 6.9 | 307 |
| Central | 10.7 | 70.4 | 24.8 | 0.6 | 0.8 | 3.3 | 495 |
| Coast | 22.9 | 34.8 | 49.5 | 3.5 | 3.9 | 8.3 | 336 |
| Eastern | 12.2 | 68.0 | 26.4 | 0.7 | 0.0 | 5.0 | 646 |
| Nyanza | 13.7 | 36.0 | 45.3 | 3.8 | 3.6 | 11.3 | 643 |
| Rift Valley | 13.6 | 53.4 | 36.3 | 2.2 | 2.8 | 5.3 | 1,052 |
| Western | 11.9 | 46.1 | 45.4 | 1.8 | 3.9 | 2.9 | 470 |
| North Eastern | 15.6 | 78.9 | 18.3 | 0.4 | 1.4 | 1.1 | 102 |
| Education | | | | | | | |
| No education | 12.0 | 52.5 | 38.7 | 2.5 | 1.4 | 4.8 | 582 |
| Primary incomplete | 10.9 | 52.1 | 37.7 | 2.0 | 3.2 | 5.0 | 1,395 |
| Primary complete | 14.2 | 57.2 | 34.1 | 1.2 | 1.4 | 6.1 | 1,143 |
| Secondary+ | 20.5 | 51.9 | 34.2 | 2.6 | 3.6 | 7.8 | 932 |
| Wealth quintile | | | | | | | |
| Lowest | 9.6 | 53.3 | 38.6 | 1.8 | 2.7 | 3.5 | 869 |
| Second | 13.6 | 52.6 | 37.5 | 1.3 | 2.3 | 6.3 | 830 |
| Middle | 11.9 | 52.3 | 37.2 | 3.0 | 2.3 | 5.2 | 777 |
| Fourth | 13.8 | 56.6 | 32.6 | 1.9 | 1.2 | 7.7 | 725 |
| Highest | 21.8 | 53.2 | 33.8 | 1.9 | 3.8 | 7.3 | 851 |
| Total | 14.2 | 53.5 | 36.0 | 2.0 | 2.5 | 5.9 | 4,052 |

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

¹ In the first two months after delivery

10.3 NUTRITIONAL STATUS OF CHILDREN UNDER FIVE

The growth patterns of healthy and well-fed children are reflected in positive changes in their height and weight. Inadequate food supply, among other factors, often leads to malnutrition, resulting in serious consequences on the physical and mental growth and development of the children. Monitoring of nutrition indicators will provide information on the progress made in achieving the Millennium Development Goals,¹ as well as targets set in the Economic Recovery Strategy (Ministry of Planning and National Development, 2003).

In addition to questions about infant and young children's feeding practices, the 2003 KDHS included an anthropometric component, in which all children under five years of age were both weighed and measured. Each interviewing team carried a scale and measuring board. The scales were lightweight, bathroom-type scales with a digital screen designed and manufactured under the authority of the United Nations Children's Fund (UNICEF). The measuring boards were specially produced by Shorr Productions for use in survey settings. Children younger than 24 months were measured lying down on the board (recumbent length), and standing height was measured for older children.

In previous KDHS surveys, anthropometric measurements were restricted to children born to women interviewed with the Women's Questionnaire. However, these data do not represent all children, since they exclude children whose mothers were not in the household (either because they did not live there or because they had died), children whose mothers were not eligible for the individual interview (i.e., under age 15 or age 50 and over), and children whose mothers did not complete an individual interview. To overcome these biases, in the 2003 KDHS, workers weighed and measured all children who were born in the five years preceding the survey and listed in the Household Questionnaire.

Evaluation of nutritional status is based on the rationale that in a well-nourished population, there is a statistically predictable distribution of children of a given age with respect to height and weight. In any large population, there is variation in height and weight; this variation approximates a normal distribution. Use of a standard reference population as a point of comparison facilitates the examination of differences in the anthropometric status of subgroups in a population and of changes in nutritional status over time. One of the most commonly used reference populations, and the one used in this report, is the U.S. National Center for Health Statistics (NCHS) standard, which is recommended for use by the World Health Organisation (WHO). The use of this reference population is based on the finding that young children of all population groups have similar genetic potential for growth.

Three standard indices of physical growth that describe the nutritional status of children are presented:

- Height-for-age (stunting)
- Weight-for-height (wasting)
- Weight-for-age (underweight).

Each of the three nutritional indicators is expressed in standard deviations (Z-scores) from the mean of the reference population.² Deviations of the indicators below -2 standard deviations (SD) indicate that the children are moderately and severely affected, while deviations below -3 SD indicate that the children are severely affected. A total of 5,913 (weighted) children under age five were eligible to be weighed and measured. Six percent of these children were not measured, 3 percent had implausibly high or low values for the height and weight measurements, and 1 percent had incomplete age information.

¹ One of the 48 Millennium Development indicators is to reduce by half the proportion of malnourished children by 2015.

² The distribution of the standard reference population has been normalised and hence the mean and median coincide.

The following analysis focuses on the 5,307 children under five for whom complete and plausible anthropometric data were collected.

Stunting

Height-for-age is a measure of linear growth. A child who is below -2 SD from the median of the NCHS reference population in terms of height-for-age is considered short for his/her age, or “stunted,” a condition reflecting the cumulative effect of chronic malnutrition. If the child is below -3 SD from the reference median, then the child is considered to be severely stunted. A child between -2 and -3 SD is considered to be moderately stunted. Stunting reflects failure to receive adequate nutrition over a long period of time and may also be caused by recurrent and chronic illness. Height-for-age, therefore, represents a measure of the long-term effects of malnutrition in a population and does not vary appreciably according to the season of data collection. Stunted children are not immediately obvious in a population; a stunted three-year-old child could look like a well-fed two-year-old.

Table 10.7 shows the nutritional status of children under five as measured by stunting (height-for-age) indicator and various background characteristics. At the national level, 30 percent of children under five are stunted, while the proportion severely stunted is 11 percent. This represents a small decline from the 1998 KDHS results.³ Analysis of the indicator by various age groups shows that stunting is highest (43 percent) in children age 12-23 months and lowest (7 percent) in children age less than 6 months. Severe stunting shows a similar trend, where children age 12-23 months have the highest proportion of severely stunted children (16 percent) and those less than 6 months have the lowest proportion (1 percent).

A higher proportion (33 percent) of male children under five years are stunted, compared with 28 percent of female children. The survey data show that children living in urban areas are moderately and severely stunted to a lesser extent (24 percent), when compared with rural children (32 percent). At the provincial level, Coast Province (35 percent) has the highest proportion of stunted children, while Nairobi Province has the lowest (19 percent).

The mother’s level of education has an inverse relationship with stunting levels. For example, children of mothers with at least some secondary education have the lowest stunting levels (19 percent), while children whose mothers have no education have the highest level of stunting (36 percent).

³ Tabulating the data for 2003 only for children whose mothers were interviewed and omitting the northern areas of Kenya so as to be comparable to prior KDHS data shows that the proportion stunted has declined from 33 percent in 1998 to 31 percent in 2003 while the proportion severely stunted has declined from 13 to 11 percent.

Table 10.7 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, Kenya 2003

| Background characteristic | Height-for-age | | | Weight-for-height | | | Weight-for-age | | | Number of children |
|---|-------------------------|--------------------------------------|-------------------|-------------------------|--------------------------------------|-------------------|-------------------------|--------------------------------------|-------------------|--------------------|
| | Percent-age below -3 SD | Percent-age below -2 SD ¹ | Mean Z-score (SD) | Percent-age below -3 SD | Percent-age below -2 SD ¹ | Mean Z-score (SD) | Percent-age below -3 SD | Percent-age below -2 SD ¹ | Mean Z-score (SD) | |
| Age in months | | | | | | | | | | |
| <6 | 0.9 | 7.4 | (0.1) | 0.6 | 3.9 | 0.5 | 0.0 | 2.4 | 0.4 | 511 |
| 6-9 | 3.6 | 12.1 | (0.6) | 0.7 | 4.8 | (0.0) | 1.9 | 10.2 | (0.5) | 395 |
| 10-11 | 4.3 | 21.2 | (0.9) | 2.7 | 8.1 | (0.3) | 3.9 | 24.1 | (1.0) | 215 |
| 12-23 | 15.9 | 43.1 | (1.7) | 2.3 | 9.5 | (0.4) | 7.8 | 26.8 | (1.3) | 1,086 |
| 24-35 | 13.6 | 35.5 | (1.5) | 1.4 | 5.5 | (0.3) | 5.2 | 25.3 | (1.2) | 1,005 |
| 36-47 | 13.3 | 34.1 | (1.4) | 0.8 | 4.3 | (0.3) | 3.2 | 20.8 | (1.1) | 1,100 |
| 48-59 | 10.1 | 27.9 | (1.3) | 0.5 | 3.4 | (0.3) | 2.9 | 17.8 | (1.0) | 995 |
| Sex | | | | | | | | | | |
| Male | 11.6 | 32.9 | (1.4) | 1.3 | 6.4 | (0.3) | 4.6 | 22.0 | (1.0) | 2,663 |
| Female | 10.4 | 27.7 | (1.1) | 1.2 | 4.8 | (0.2) | 3.6 | 17.7 | (0.9) | 2,643 |
| Birth order | | | | | | | | | | |
| 1 | 8.5 | 26.3 | (1.2) | 1.2 | 5.5 | (0.2) | 2.8 | 17.6 | (0.9) | 1,127 |
| 2-3 | 9.8 | 29.6 | (1.2) | 0.9 | 5.1 | (0.2) | 3.5 | 17.5 | (0.9) | 1,774 |
| 4-5 | 13.1 | 33.5 | (1.3) | 1.8 | 6.6 | (0.2) | 5.3 | 22.8 | (1.0) | 1,035 |
| 6+ | 12.7 | 34.6 | (1.3) | 1.4 | 5.6 | (0.3) | 5.0 | 24.1 | (1.0) | 995 |
| Birth interval in months | | | | | | | | | | |
| First birth | 8.8 | 26.4 | (1.2) | 1.2 | 5.5 | (0.2) | 2.8 | 17.8 | (0.9) | 1,132 |
| <24 | 14.5 | 34.5 | (1.4) | 0.9 | 6.3 | (0.2) | 5.5 | 23.9 | (1.0) | 810 |
| 24-47 | 10.9 | 33.0 | (1.3) | 1.7 | 6.1 | (0.3) | 4.6 | 20.8 | (1.0) | 2,091 |
| 48+ | 9.8 | 27.0 | (1.1) | 0.6 | 4.2 | (0.1) | 3.0 | 17.1 | (0.8) | 898 |
| Size at birth | | | | | | | | | | |
| Very small | 20.5 | 40.7 | (1.7) | 0.2 | 8.7 | (0.4) | 11.2 | 34.1 | (1.4) | 166 |
| Small | 17.6 | 40.3 | (1.7) | 1.5 | 8.4 | (0.5) | 7.4 | 33.6 | (1.5) | 601 |
| Average or larger | 9.4 | 28.9 | (1.2) | 1.3 | 5.1 | (0.2) | 3.3 | 17.4 | (0.9) | 4,147 |
| Residence | | | | | | | | | | |
| Urban | 9.3 | 23.6 | (1.0) | 1.0 | 4.2 | 0.1 | 2.8 | 12.6 | (0.6) | 882 |
| Rural | 11.3 | 31.7 | (1.3) | 1.3 | 5.8 | (0.3) | 4.4 | 21.3 | (1.0) | 4,425 |
| Province | | | | | | | | | | |
| Nairobi | 5.3 | 18.7 | (0.7) | 1.2 | 4.5 | 0.2 | 1.9 | 6.3 | (0.3) | 304 |
| Central | 8.7 | 27.0 | (1.1) | 1.1 | 4.4 | (0.0) | 2.2 | 14.6 | (0.7) | 571 |
| Coast | 13.9 | 34.9 | (1.5) | 0.0 | 5.7 | (0.3) | 5.9 | 25.4 | (1.2) | 426 |
| Eastern | 12.9 | 32.5 | (1.4) | 0.9 | 4.2 | (0.3) | 4.2 | 21.4 | (1.1) | 888 |
| Nyanza | 7.9 | 31.1 | (1.2) | 0.1 | 2.3 | (0.0) | 2.4 | 15.6 | (0.7) | 826 |
| Rift Valley | 12.3 | 31.6 | (1.3) | 1.6 | 7.7 | (0.4) | 5.2 | 24.0 | (1.1) | 1,427 |
| Western | 11.8 | 30.2 | (1.3) | 1.2 | 4.5 | (0.2) | 4.2 | 19.0 | (0.9) | 739 |
| North Eastern | 12.3 | 24.3 | (0.6) | 10.9 | 26.5 | (1.2) | 9.9 | 33.7 | (1.4) | 127 |
| Education | | | | | | | | | | |
| No education | 16.3 | 36.4 | (1.4) | 3.5 | 14.8 | (0.6) | 9.9 | 33.1 | (1.3) | 731 |
| Primary incomplete | 12.5 | 34.8 | (1.4) | 1.2 | 5.1 | (0.2) | 4.0 | 21.9 | (1.1) | 1,838 |
| Primary complete | 9.9 | 30.5 | (1.3) | 0.6 | 2.8 | (0.2) | 2.9 | 17.3 | (0.9) | 1,387 |
| Secondary+ | 5.2 | 19.2 | (0.8) | 0.5 | 3.6 | 0.1 | 1.7 | 10.6 | (0.5) | 1,069 |
| Mother's age | | | | | | | | | | |
| 15-19 | 12.6 | 32.5 | (1.3) | 1.7 | 7.7 | (0.2) | 4.9 | 20.3 | (0.9) | 322 |
| 20-24 | 9.7 | 30.8 | (1.3) | 1.1 | 5.4 | (0.2) | 3.1 | 18.3 | (0.9) | 1,324 |
| 25-29 | 10.9 | 29.2 | (1.3) | 1.6 | 5.9 | (0.3) | 4.6 | 21.3 | (1.0) | 1,421 |
| 30-34 | 9.6 | 29.7 | (1.2) | 0.8 | 4.4 | (0.2) | 3.2 | 19.8 | (0.9) | 988 |
| 35-49 | 12.7 | 32.2 | (1.3) | 1.0 | 5.6 | (0.2) | 5.2 | 19.8 | (0.9) | 968 |
| Wealth quintile | | | | | | | | | | |
| Lowest | 14.2 | 38.1 | (1.5) | 2.3 | 9.0 | (0.5) | 7.8 | 29.6 | (1.3) | 1,312 |
| Second | 11.3 | 32.6 | (1.3) | 1.0 | 5.9 | (0.3) | 3.0 | 20.3 | (1.1) | 1,163 |
| Middle | 11.1 | 29.9 | (1.3) | 0.6 | 3.7 | (0.1) | 3.6 | 18.4 | (0.9) | 1,041 |
| Fourth | 10.3 | 27.3 | (1.2) | 0.8 | 4.1 | (0.1) | 3.0 | 17.2 | (0.8) | 928 |
| Highest | 6.3 | 19.2 | (0.8) | 1.0 | 3.8 | 0.1 | 1.9 | 9.2 | (0.4) | 864 |
| Children of interviewed mothers | 10.8 | 30.7 | (1.3) | 1.2 | 5.6 | (0.2) | 4.0 | 19.9 | (1.0) | 4,931 |
| Children of noninterviewed mothers | | | | | | | | | | |
| Mother in the household | 10.4 | 22.5 | (0.9) | 0.0 | 1.7 | (0.2) | 4.9 | 15.9 | (0.8) | 93 |
| Mother not in the household | 14.5 | 27.0 | (1.1) | 0.9 | 5.9 | (0.3) | 5.1 | 20.0 | (0.9) | 283 |
| Total | 11.0 | 30.3 | (1.2) | 1.2 | 5.6 | (0.2) | 4.1 | 19.9 | (0.9) | 5,307 |

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 units (SD) 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 International Reference Population (-3 and -2 SD) are shown according to background characteristics. Table is based on children with valid dates of birth (month and year) and valid measurement of both height and weight. Total includes 14 children with size at birth missing.

¹ Includes children who are below -3 SD from the International Reference Population median

² Excludes children whose mothers were not interviewed

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

⁴ For women who are not interviewed, information is taken from the Household Questionnaire. It excludes children whose mothers are not listed in the household schedule.

⁵ Includes children whose mothers are deceased

There seems to be no discernible relationship between the mother's age group and stunting levels. Wealth is negatively related to stunting; that is, stunting declines as wealth increases.

Wasting

Weight-for-height measures body mass in relation to body length and describes current nutritional status. A child who is below -2 SD from the reference median for weight-for-height is considered to be too thin for his/her height, or "wasted," a condition reflecting acute malnutrition. Wasting represents the failure to receive adequate nutrition in the period immediately preceding the survey and may be the result of inadequate food intake or recent episodes of illness causing loss of weight and the onset of malnutrition. As with stunting, wasting is considered severe if the child is below -3 SD from the reference mean. Severe wasting is closely linked to an elevated risk of mortality. Prevalence of wasting may vary considerably by season.

Table 10.7 also shows the nutritional status of children under five years as measured by wasting children. Nationally, 6 percent of children are wasted, and the proportion of severely wasted children is 1 percent. This represents only a 1 percentage point decline since 1998 (from 6 percent in 1998 to 5 percent in 2003, when the northern areas have been excluded).

Wasting is highest (10 percent) in children age 12-23 months and lowest (3 percent) in children age 48-59 months. The survey data show few sharp differences in wasting by background characteristics except that the level among children in North Eastern Province is extraordinarily high (27 percent). Eleven percent of children in North Eastern Province are severely wasted. These levels may reflect food stress in the province, which is traditionally a region with food deficits. Women with no education also have very high levels of wasted and severely wasted children (15 and 4 percent, respectively).

Underweight

Weight-for-age is a composite index of height-for-age and weight-for-height and, thus, does not distinguish between acute malnutrition (wasting) and chronic malnutrition (stunting). A child can be underweight for his age because he is stunted, wasted, or both. Weight-for-age is a useful tool in clinical settings for continuous assessment of nutritional progress and growth. Children whose weight-for-age is below -2 SD from the median of the reference population are classified as "underweight." In the reference population, only 2.3 percent of children fall below -2 SD for each of these three indices.

As shown in Table 10.7, 20 percent of children under five are underweight, representing a slight decline from the 1998 KDHS results (22 percent). The proportion of severely underweight children is 4 percent. The proportion of underweight children is highest (27 percent) in the 12-23 months age group and lowest (2 percent) for those less than six months of age. Male children (22 percent) are more likely to be underweight than female children (18 percent).

Urban children are less likely to be underweight (13 percent) than rural children (21 percent). At the provincial level, North Eastern Province has the highest proportion of moderate and severely underweight children (34 percent), while Nairobi Province has the lowest proportion (6 percent).

The proportion of underweight children is negatively correlated with the level of education of the mother. Children whose mothers have no education have the highest levels of being underweight (33 percent), while the proportion for children of mothers with some secondary education is lowest (11 percent). Wealth is also negatively correlated with the proportion of children who are underweight.

Trends in Nutritional Status of Children

Table 10.8 compares the nutritional status indicators of children under five years from KDHS 2003 with previous surveys (Multiple Indicator Cluster Survey 2000 and 1998 KDHS). The trends show that the nutrition status of children under five years has improved only slightly at the national level. At the provincial level, Nairobi and Nyanza Provinces show remarkable declines in stunting, wasting, and underweight indicators when compared with previous surveys. Data from North Eastern Province cannot be compared since previous surveys did not fully cover this province.

| Background characteristic | Height-for-age (stunting) | | | Weight-for-height (wasting) | | | Weight-for-age (underweight) | | |
|------------------------------|---------------------------|-------------------|-------------------|-----------------------------|-------------------|-------------------|------------------------------|-------------------|-------------------|
| | 1998 ¹ | 2000 ² | 2003 ³ | 1998 ¹ | 2000 ² | 2003 ³ | 1998 ¹ | 2000 ² | 2003 ³ |
| Age in months | | | | | | | | | |
| <6 | 7.1 | 12.4 | 7.6 | 5.2 | 2.4 | 3.7 | 2.3 | 3.0 | 2.5 |
| 6-11 | 17.5 | 24.5 | 15.7 | 7.8 | 3.9 | 5.7 | 14.8 | 14.6 | 14.9 |
| 12-23 | 41.8 | 47.5 | 43.7 | 9.1 | 9.9 | 8.3 | 26.9 | 28.4 | 25.9 |
| 24-35 | 37.8 | 34.8 | 35.4 | 4.9 | 6.6 | 5.0 | 28.3 | 22.5 | 24.4 |
| 36-47 | 35.6 | 34.5 | 34.7 | 4.9 | 4.1 | 3.0 | 23.8 | 19.4 | 19.5 |
| 48-59 | 38.0 | 34.7 | 27.7 | 4.0 | 4.9 | 2.6 | 22.7 | 21.9 | 16.9 |
| Sex | | | | | | | | | |
| Male | 35.2 | 37.9 | 33.3 | 5.9 | 6.6 | 5.5 | 22.2 | 22.6 | 20.8 |
| Female | 30.8 | 32.6 | 27.8 | 6.2 | 5.3 | 4.0 | 22.0 | 19.6 | 17.3 |
| Residence | | | | | | | | | |
| Urban | 24.7 | 26.6 | 23.5 | 5.1 | 3.3 | 3.5 | 13.3 | 12.4 | 11.7 |
| Rural | 34.7 | 38.0 | 32.0 | 6.2 | 6.8 | 5.1 | 23.9 | 23.9 | 20.6 |
| Province | | | | | | | | | |
| Nairobi | 25.7 | 29.6 | 18.7 | 7.1 | 3.1 | 4.5 | 11.4 | 12.4 | 6.3 |
| Central | 27.5 | 27.4 | 27.0 | 5.6 | 4.6 | 4.4 | 14.3 | 15.4 | 14.6 |
| Coast | 39.1 | 33.7 | 34.9 | 4.3 | 6.4 | 5.7 | 27.4 | 21.1 | 25.4 |
| Eastern | 36.8 | 42.8 | 32.7 | 4.7 | 7.8 | 4.2 | 25.7 | 29.6 | 21.2 |
| Nyanza | 30.8 | 35.9 | 31.1 | 7.0 | 5.2 | 2.3 | 22.2 | 19.9 | 15.6 |
| Rift Valley | 33.1 | 36.8 | 32.0 | 7.4 | 7.6 | 6.8 | 24.9 | 24.9 | 22.8 |
| Western | 35.0 | 38.1 | 30.2 | 4.6 | 5.5 | 4.5 | 19.1 | 21.5 | 19.0 |
| Education⁴ | | | | | | | | | |
| No education | 46.4 | 37.2 | 41.9 | 8.8 | 7.1 | 11.8 | 36.8 | 24.1 | 32.4 |
| Primary incomplete | 39.7 | na | 34.8 | 6.5 | na | 5.2 | 26.9 | na | 21.9 |
| Primary complete | 31.5 | na | 30.3 | 6.4 | na | 2.7 | 19.9 | na | 17.0 |
| Secondary+ | 19.2 | 25.6 | 19.2 | 3.9 | 3.4 | 3.6 | 11.0 | 13.7 | 10.7 |
| Total | 33.0 | 35.3 | 30.6 | 6.1 | 6.0 | 4.8 | 22.1 | 21.2 | 19.1 |

Note: Numbers refer to the percentage of children who are more than two standard deviation units (SD) from the median of the NCHS/CDC/WHO International Reference Population. Table is based on children who stayed in the household the night before the interview and who have valid dates of birth (month and year) and valid measurement of both height and weight.
na = Not applicable
¹ 1998 KDHS; excludes children whose mothers were not interviewed
² 2000 Multiple Indicator Cluster Survey (CBS, 2001); total includes areas in urban Northeast Province
³ 2003 KDHS; excludes northern districts
⁴ For women who are not interviewed, information is taken from the Household Questionnaire. Excludes children whose mothers are not listed in the household schedule.

10.4 NUTRITIONAL STATUS OF WOMEN

The 2003 KDHS also collected data on the height and weight of women. The data are used to derive two measures of nutritional status: height and body mass index (BMI). A woman's height can be used to predict the risk of having difficulty in pregnancy, given the relationship between height and pelvic size. The cutoff point at which mothers can be considered at risk because of low stature is normally taken to be between 140 and 150 centimetres (cm). The BMI or Quetelet index is used to measure thinness or obesity. It is defined as weight in kilograms divided by height in metres squared (kg/m^2). A cutoff point of 18.5 is used to define thinness or acute undernutrition. A BMI of 25 or above usually indicates overweight or obesity.

Table 10.9 shows nutritional indicators for women by various background characteristics. At the national level, the mean height for women is 159 cm., with only 1 percent of women falling below the 145-cm. cutoff. Variation by background characteristics is minimal.

The mean BMI for women age 15-49 is 23. Analysis by background characteristics shows that the mean BMI is less than 25 for all classifications. Since 1998, the mean BMI has increased very slightly from 22 to 23, when the same areas of the country are compared.

At the national level, the proportion of severely thin women stands at 2 percent (BMI < 16.0). Differentials are few except that North Eastern Province stands out with the highest proportion of severely thin women (7 percent).

The proportion of overweight or obese women stands at 23 percent. The proportion of overweight or obese women is positively correlated with the woman's age. Thus, the group age 45-49 has the highest proportion (41 percent) of overweight or obese women, while the group age 15-19 has the lowest (8 percent) proportion of overweight or obese women.

The data show that the proportion of women living in urban areas who are overweight or obese (39 percent) is higher than that for women in rural areas (18 percent). Provincial comparison shows that North Eastern Province has the lowest proportion of overweight or obese women (8 percent), while Nairobi Province has the highest proportion of overweight or obese women (39 percent). Education has a positive relationship with overweight levels; better educated women are more likely to be overweight or obese (34 percent) than those with no education (15 percent).

Table 10.9 Nutritional status of women by background characteristics

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

| Background characteristic | Height | | | BMI ¹ (kg/m ²) | | | | | | | | | Number of women |
|---------------------------|-------------------|--------------------------|-----------------|---------------------------------------|--------------------|--------------|-------------------------|-----------------------------|-----------------------|---------------------------|-------------------------|---------------|-----------------|
| | Mean height in cm | Percent-age below 145 cm | Number of women | Normal | | | Thin | | | Overweight/obese | | | |
| | | | | 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 (obese) | |
| Age | | | | | | | | | | | | | |
| 15-19 | 158.0 | 2.0 | 1,746 | 20.9 | 71.7 | 20.4 | 12.7 | 4.1 | 3.6 | 7.9 | 7.5 | 0.4 | 1,612 |
| 20-24 | 160.0 | 1.0 | 1,605 | 22.2 | 73.7 | 9.3 | 6.8 | 1.9 | 0.6 | 17.0 | 14.6 | 2.4 | 1,378 |
| 25-29 | 160.2 | 0.4 | 1,289 | 22.4 | 68.9 | 11.0 | 8.5 | 1.5 | 1.0 | 20.1 | 15.4 | 4.8 | 1,128 |
| 30-34 | 159.8 | 0.9 | 1,033 | 23.5 | 59.2 | 9.6 | 7.1 | 1.5 | 0.9 | 31.3 | 22.7 | 8.6 | 934 |
| 35-39 | 159.8 | 0.5 | 828 | 24.1 | 53.4 | 9.8 | 6.5 | 2.6 | 0.7 | 36.8 | 24.2 | 12.6 | 783 |
| 40-44 | 159.7 | 1.0 | 749 | 24.2 | 50.2 | 10.9 | 6.7 | 2.3 | 2.0 | 38.9 | 24.2 | 14.7 | 725 |
| 45-49 | 158.8 | 1.0 | 488 | 24.4 | 51.0 | 8.3 | 5.5 | 1.9 | 0.9 | 40.7 | 26.8 | 13.9 | 487 |
| Residence | | | | | | | | | | | | | |
| Urban | 159.6 | 0.8 | 1,899 | 24.5 | 55.9 | 5.4 | 4.1 | 0.9 | 0.4 | 38.7 | 26.4 | 12.3 | 1,759 |
| Rural | 159.4 | 1.1 | 5,840 | 22.1 | 67.1 | 14.6 | 9.7 | 2.9 | 2.0 | 18.3 | 14.0 | 4.4 | 5,288 |
| Province | | | | | | | | | | | | | |
| Nairobi | 160.0 | 0.7 | 786 | 24.6 | 56.4 | 4.5 | 3.8 | 0.4 | 0.4 | 39.1 | 26.9 | 12.2 | 721 |
| Central | 158.9 | 1.5 | 1,120 | 23.8 | 59.1 | 7.1 | 4.6 | 1.9 | 0.6 | 33.9 | 24.3 | 9.5 | 1,046 |
| Coast | 157.1 | 2.5 | 634 | 23.0 | 60.2 | 13.3 | 8.1 | 3.4 | 1.8 | 26.5 | 16.6 | 9.9 | 567 |
| Eastern | 157.2 | 1.8 | 1,249 | 22.2 | 68.4 | 13.0 | 9.1 | 2.5 | 1.4 | 18.6 | 14.3 | 4.3 | 1,160 |
| Nyanza | 160.9 | 0.7 | 1,178 | 22.1 | 72.8 | 10.6 | 7.5 | 1.1 | 2.0 | 16.6 | 12.8 | 3.8 | 1,050 |
| Rift Valley | 160.2 | 0.4 | 1,722 | 22.1 | 60.4 | 18.6 | 12.4 | 3.8 | 2.3 | 21.1 | 15.6 | 5.5 | 1,579 |
| Western | 160.9 | 0.3 | 902 | 22.1 | 71.6 | 11.9 | 8.4 | 2.5 | 1.0 | 16.4 | 13.2 | 3.2 | 798 |
| North Eastern | 160.6 | 2.0 | 148 | 19.9 | 65.0 | 27.5 | 14.2 | 6.0 | 7.3 | 7.5 | 7.1 | 0.4 | 125 |
| Education | | | | | | | | | | | | | |
| No education | 159.2 | 1.1 | 969 | 21.2 | 60.6 | 24.5 | 15.2 | 5.6 | 3.7 | 15.0 | 10.6 | 4.4 | 858 |
| Primary incomplete | 158.4 | 1.8 | 2,554 | 21.6 | 67.4 | 16.8 | 11.0 | 3.1 | 2.7 | 15.8 | 12.8 | 3.0 | 2,300 |
| Primary complete | 159.8 | 0.8 | 1,943 | 23.0 | 67.2 | 8.5 | 6.2 | 1.7 | 0.6 | 24.3 | 18.0 | 6.3 | 1,746 |
| Secondary+ | 160.4 | 0.5 | 2,274 | 24.1 | 60.1 | 5.7 | 4.4 | 0.9 | 0.3 | 34.2 | 23.5 | 10.7 | 2,142 |
| Wealth quintile | | | | | | | | | | | | | |
| Lowest | 159.1 | 1.2 | 1,299 | 20.7 | 68.3 | 22.9 | 14.3 | 4.9 | 3.6 | 8.9 | 7.3 | 1.6 | 1,149 |
| Second | 159.1 | 1.2 | 1,409 | 21.4 | 70.3 | 16.9 | 11.7 | 2.9 | 2.3 | 12.9 | 10.5 | 2.4 | 1,256 |
| Middle | 159.6 | 0.8 | 1,426 | 22.3 | 68.6 | 12.3 | 8.7 | 2.3 | 1.3 | 19.1 | 14.4 | 4.7 | 1,303 |
| Fourth | 159.4 | 1.2 | 1,625 | 23.1 | 63.6 | 9.9 | 6.6 | 2.2 | 1.2 | 26.5 | 20.2 | 6.3 | 1,497 |
| Highest | 159.7 | 0.8 | 1,979 | 24.7 | 55.2 | 4.5 | 3.4 | 0.8 | 0.3 | 40.2 | 27.1 | 13.2 | 1,841 |
| Total | 159.4 | 1.1 | 7,739 | 22.7 | 64.3 | 12.3 | 8.3 | 2.4 | 1.6 | 23.4 | 17.1 | 6.3 | 7,047 |

¹ Excludes pregnant women and women with a birth in the preceding two months