

Eritrea 2002

Nutrition of Young Children and Mothers



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ORC Macro

A

AFRICA NUTRITION CHARTBOOKS

**NUTRITION OF YOUNG CHILDREN AND MOTHERS
IN ERITREA**

Findings from the 2002 Eritrea Demographic and Health Survey

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Introduction

Malnutrition¹ is one of the most important health and welfare problems among infants and young children in Eritrea. It is a result of both inadequate food intake and illness. Inadequate food intake is a consequence of insufficient food available at the household level, improper feeding practices, or both. Improper feeding practices include both the quality and quantity of foods offered to young children as well as the timing of their introduction. Poor sanitation puts young children at increased risk of illness, in particular diarrheal disease, which adversely affects their nutritional status. Both inadequate food intake and poor environmental sanitation reflect underlying social and economic conditions.

Malnutrition has significant health and economic consequences, the most serious of which is an increased risk of death. Other outcomes include an increased risk of illness and a lower level of cognitive development, which results in lower educational attainment. In adulthood, the accumulated effects of long-term malnutrition can be a reduction in workers' productivity and increased absenteeism in the workplace; these may reduce a person's lifetime earning potential and ability to contribute to the national economy. Furthermore, malnutrition can result in adverse pregnancy outcomes.

The data presented here are from the 2002 Eritrea Demographic and Health Survey (EDHS 2002), a nationally representative survey of 9,389 households, conducted by the National Statistics and Evaluation Office (NSEO). ORC Macro furnished the technical assistance to the survey as part of the MEASURE DHS+ Program, while funding was provided by the U.S. Agency for International Development (USAID) and the Ministry of Health through the Technical Assistance and Support Contract (TASC) with John Snow, Inc. The United Nations Population Fund (UNFPA) and the Canada International Agency (CIDA) supported the survey by supplying 20 field vehicles.

Of the 6,156 children age 0-59 months who were part of the study, there were 5,241 who were alive, whose mothers were interviewed and who had complete anthropometric data. All nutritional analysis includes these children unless otherwise noted. Nutritional data collected on these children include height, weight, age, breastfeeding history, and feeding patterns. Information was also collected on the prevalence of diarrhea and acute respiratory infection (ARI) in the two weeks prior to the survey and on relevant sociodemographic characteristics. For comparison, data are presented from Demographic and Health Surveys conducted in other sub-Saharan countries.

¹ The technical method of identifying a *malnourished* population as defined by the U.S. National Center for Health Statistics (NCHS), the Centers for Disease Control and Prevention (CDC), and the World Health Organization (WHO) is presented in Appendix 2.

Figure 1: Infant and Child Mortality, Eritrea Compared with Other Sub-Saharan Countries

Malnutrition compromises child health, making children susceptible to illness and death. Infectious diseases such as acute respiratory infections, diarrhea, and malaria account for the greatest proportion of infant and under-five mortality. The infant mortality rate (under-one rate) is a commonly used measure of infant health and is a sensitive indicator of the socioeconomic conditions of a country. The under-five mortality rate is another informative indicator of infant and child survival.

- **Eritrea's under-one mortality rate (48 deaths per 1,000 births) indicates that almost 5 percent of children born in Eritrea will die before their first birthday.** This rate is the lowest of all sub-Saharan countries surveyed.
- **Eritrea's under-five mortality rate (93 deaths per 1,000 births) indicates that over 9 percent of children born in Eritrea will die before their fifth birthday.** This rate also places Eritrea on the low end of the sub-Saharan countries surveyed.

Figure 1

Infant and Child Mortality, Eritrea Compared with Other Sub-Saharan Countries

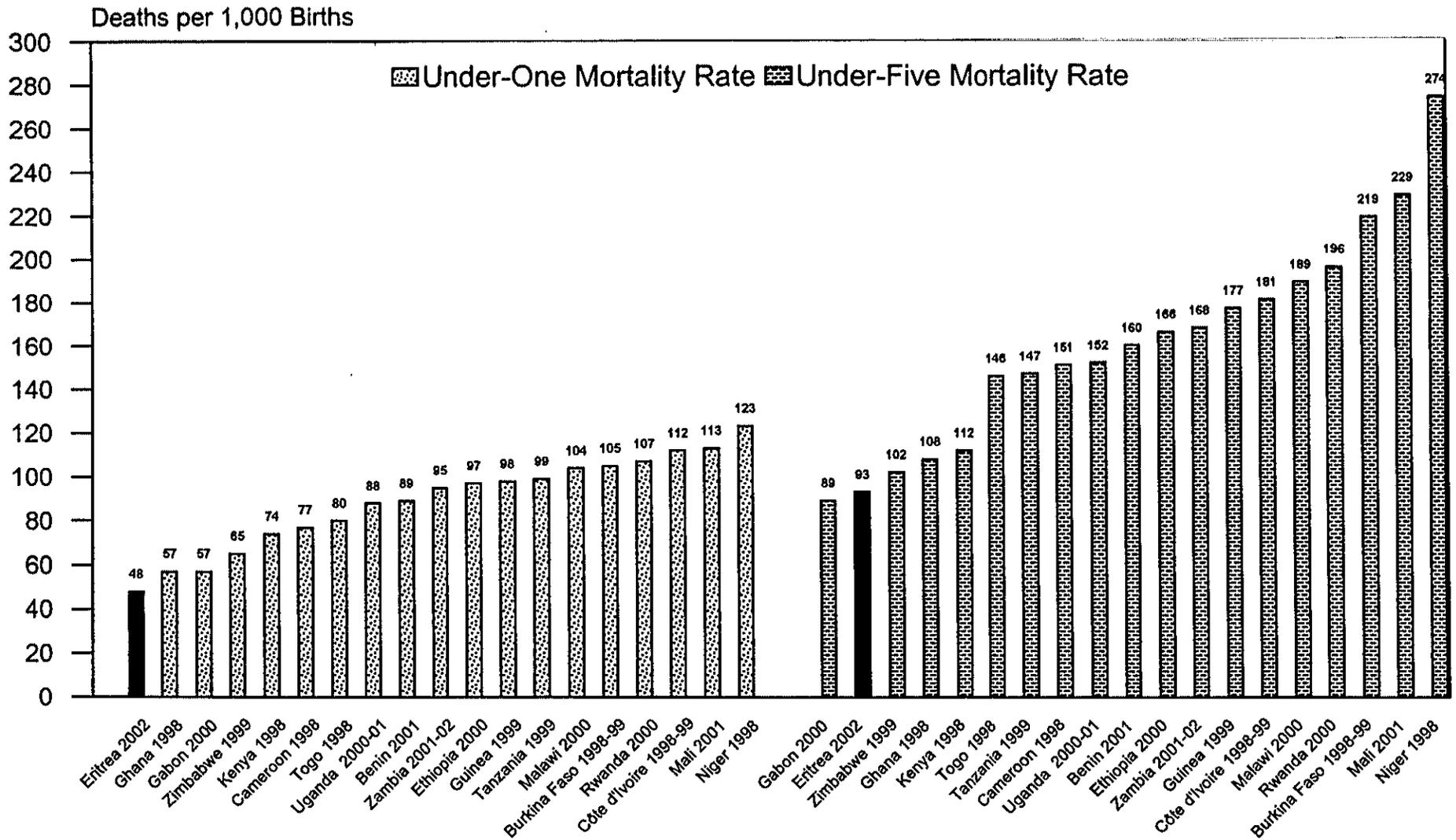


Figure 2: Contribution of Undernutrition to Under-Five Mortality, Eritrea

Undernutrition is an important factor in the death of many young children. Even if a child is only mildly malnourished, the mortality risk is increased. Under-five mortality is largely a result of infectious diseases and neonatal deaths in developing countries. Respiratory infections, diarrhea, malaria, measles, and other infectious diseases take their toll on children.

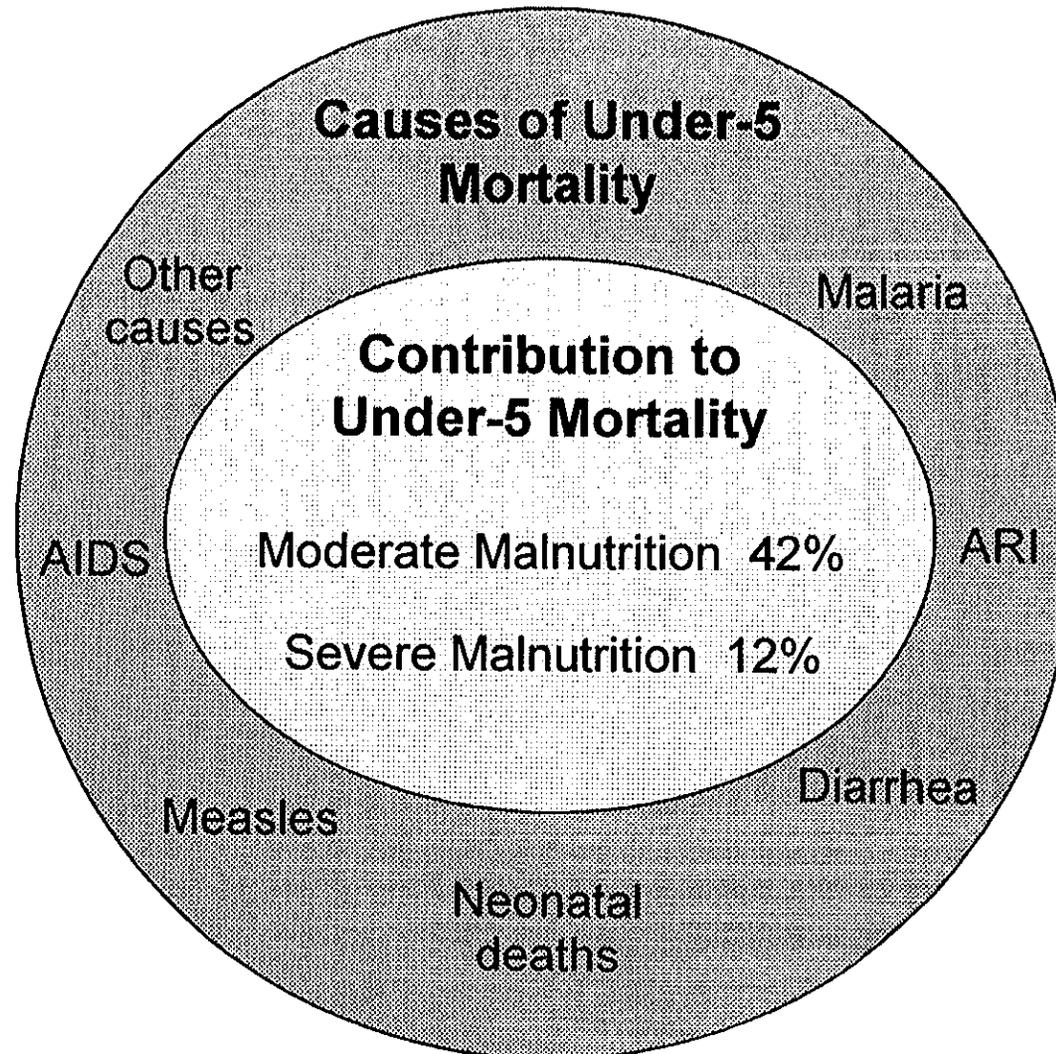
Formulas developed by Pelletier et al.¹ are used to quantify the contributions of moderate and severe malnutrition to under-five mortality.

In Eritrea,

- **Fifty-four percent of all deaths that occur before age five are related to malnutrition (severe and moderate malnutrition).**
- **Because of its extensive prevalence, moderate malnutrition (42 percent) contributes to more deaths than severe malnutrition (12 percent).**
- **Moderate malnutrition is implicated in 78 percent of deaths associated with malnutrition.**

¹ Pelletier, D.L., E.A. Frongillo, Jr., D.G. Schroeder, and J.P. Habicht. 1994. A methodology for estimating the contribution of malnutrition to child mortality in developing countries. *Journal of Nutrition* 124 (10 Suppl.): 2106S-2122S.

Figure 2
Contribution of Undernutrition to Under-Five Mortality, Eritrea



Note: Calculation based on Pelletier et al., 1994.

Figure 3: Survival and Nutritional Status of Children, Eritrea

Malnutrition and mortality both take a tremendous toll on young children. This figure illustrates the proportion of children who have died or are undernourished at each month of age.

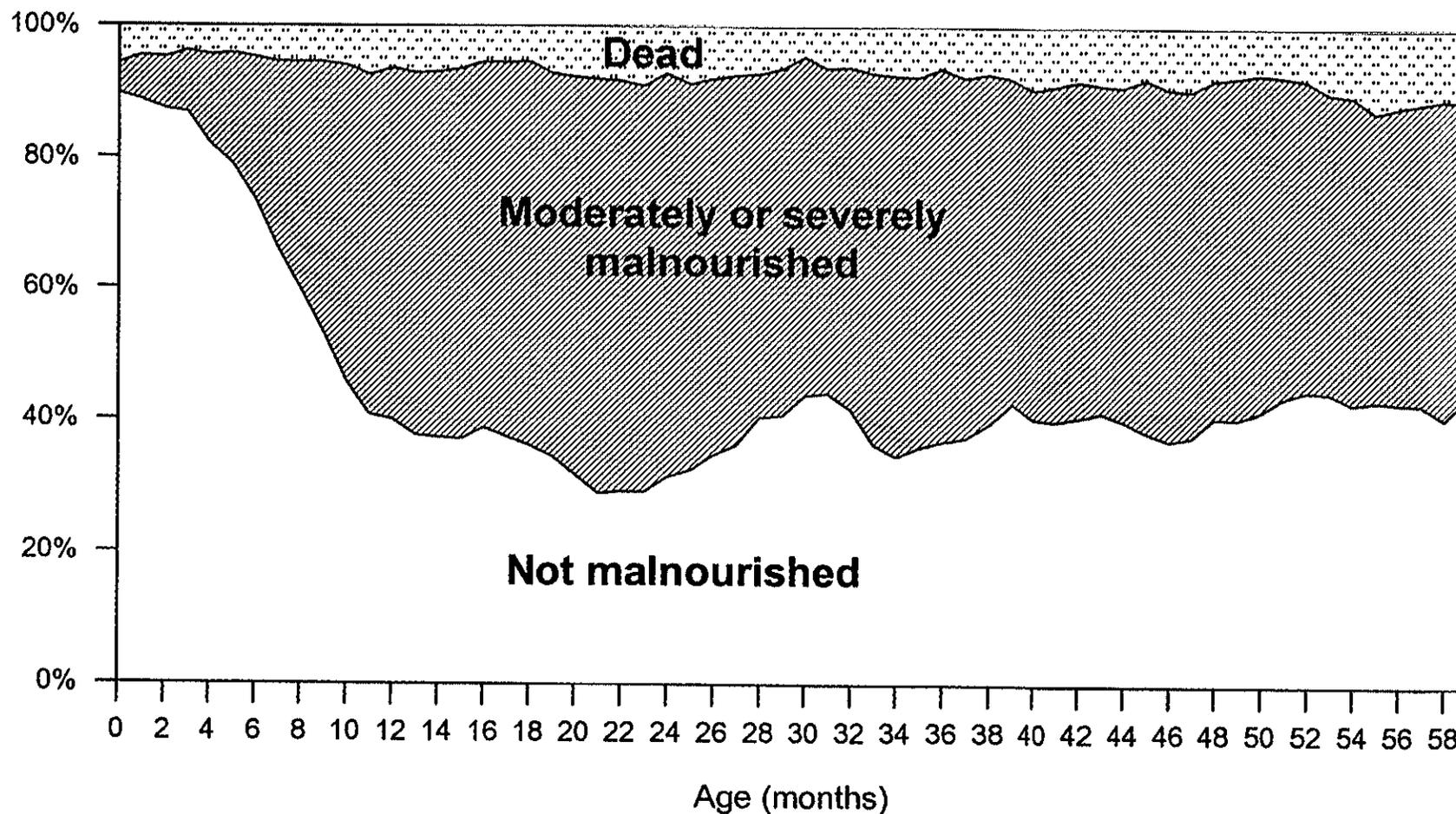
In Eritrea,

- **Between birth and 21 months of age, the percentage of children who are alive and not malnourished drops rapidly from about 90 percent to 29 percent.** Thereafter, the rate rises to 43 percent at 39 months and remains about 44 percent through 59 months.
- **Between birth and 22 months of age, the percentage of children who are moderately or severely malnourished¹ increases dramatically from 5 percent to 64 percent.** This percentage declines to 49 percent at 36 months and then declines to 45 percent at 59 months.
- **From birth until 59 months, the percentage of children who have died increases gradually, ranging from 6 percent at birth to 9 percent at 25 months;** the rate declines to 5 percent at 30 months, increases to 13 percent at 55 months, and finally declines to 11 percent through 59 months.

¹ A child with a Z-score below minus three standard deviations (-3 SD) on the reference standard is considered severely malnourished, while a child with a Z-score between -2 SD and -3 SD is considered moderately malnourished.

Figure 3

Survival and Nutritional Status of Children, Eritrea



Note: A child with a Z-score below -3 SD on the reference standard is considered severely malnourished (stunted, wasted, or underweight), while a child with a Z-score between -3 SD and -2 SD is considered moderately malnourished. Values have been smoothed using a five-month rolling average.

Malnutrition in Eritrea

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Figure 4: Malnutrition among Children under Five Years, Eritrea

In Eritrea,

- **Thirty-eight percent of children age 0-59 months are chronically malnourished.** In other words, they are too short for their age, or *stunted*.¹ The proportion of children who are stunted is 19 times the level expected in a healthy, well-nourished population.
- **Acute malnutrition, manifested by *wasting*,**² results in a child being too thin for his or her height. It affects **12 percent of children**, which is 6 times the level expected in a healthy population.
- **Forty percent of children under five years are *underweight***³ for their age. This is 20 times the level expected in a healthy, well-nourished population.
- **Only 4 percent of children under five are *overweight*.**⁴ This is one-fourth the level expected in a healthy, well-nourished population.

¹ A stunted child has a height-for-age Z-score that is below -2 SD based on the NCHS/CDC/WHO reference population. Chronic malnutrition is the result of an inadequate intake of food over a long period and may be exacerbated by chronic illness.

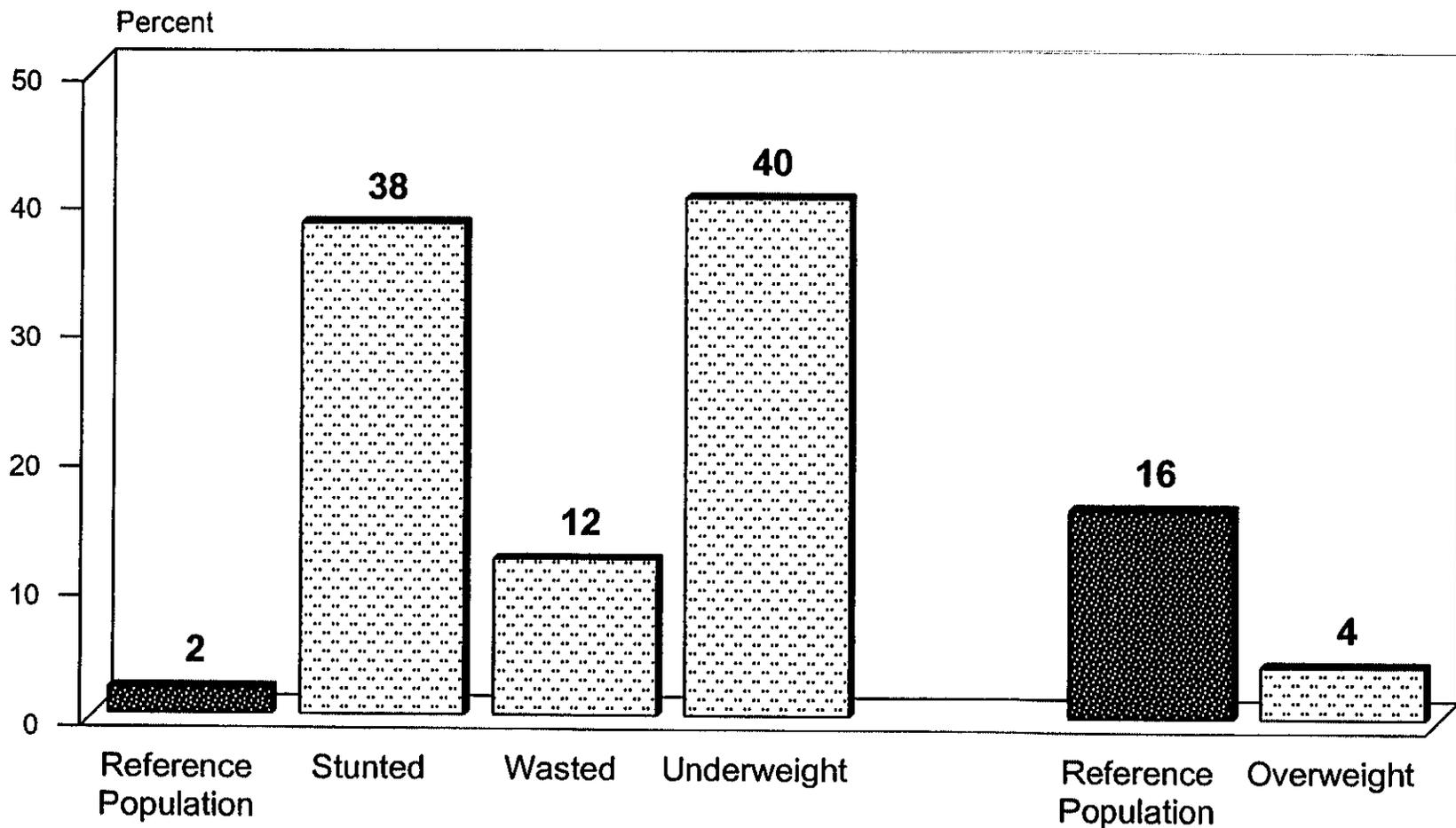
² A wasted child has a weight-for-height Z-score that is below -2 SD based on the NCHS/CDC/WHO reference population. Acute malnutrition is the result of a recent failure to receive adequate nutrition and may be affected by acute illness, especially diarrhea.

³ An underweight child has a weight-for-age Z-score that is below -2 SD based on the NCHS/CDC/WHO reference population. This condition can result from either chronic or acute malnutrition or a combination of both.

⁴ An overweight child has a weight-for-height Z-score that is above 1 SD based on the NCHS/CDC/WHO reference population.

Figure 4

Malnutrition among Children under Five Years, Eritrea



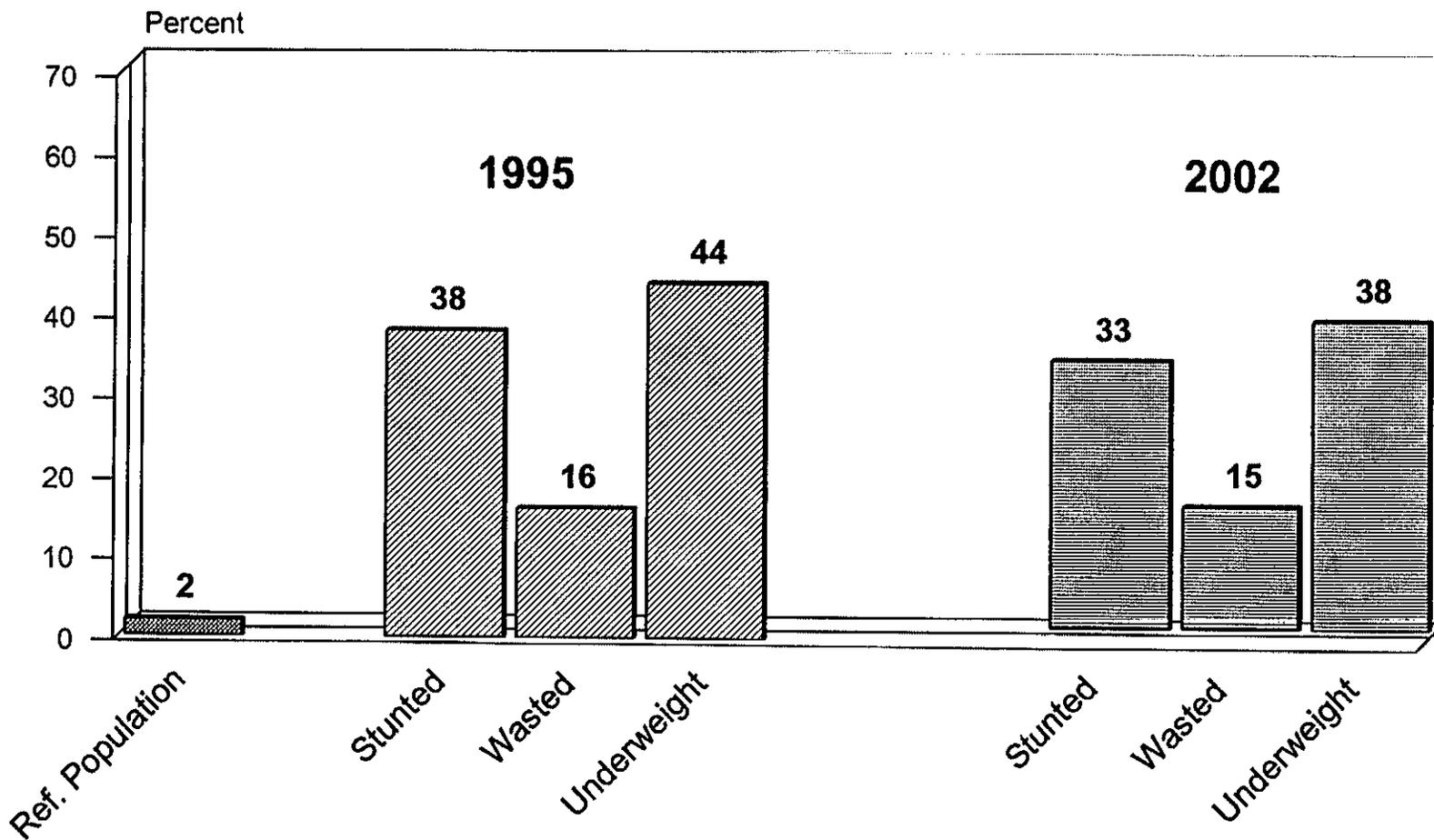
Note: *Stunting* reflects chronic malnutrition; *wasting* reflects acute malnutrition; *underweight* reflects chronic or acute malnutrition or a combination of both.

Figure 5: Changes in Undernutrition Rates among Children under Three Years, Eritrea 1995 and 2002

- **The findings of the 2002 EDHS suggest that both acute and chronic malnutrition rates in Eritrea have declined since the 1995 survey.**
- From 1995 to 2002, stunting decreased from 38 to 33 percent and underweight decreased from 44 to 38 percent. Change in the rate of wasting among children under three was not significant; however, there was a slight decline (from 16 to 15 percent).

Figure 5

Changes in Undernutrition Rates among Children under Three Years, Eritrea 1995 and 2002



Note: *Stunting* reflects chronic malnutrition; *wasting* reflects acute malnutrition; *underweight* reflects chronic or acute malnutrition or a combination of both.

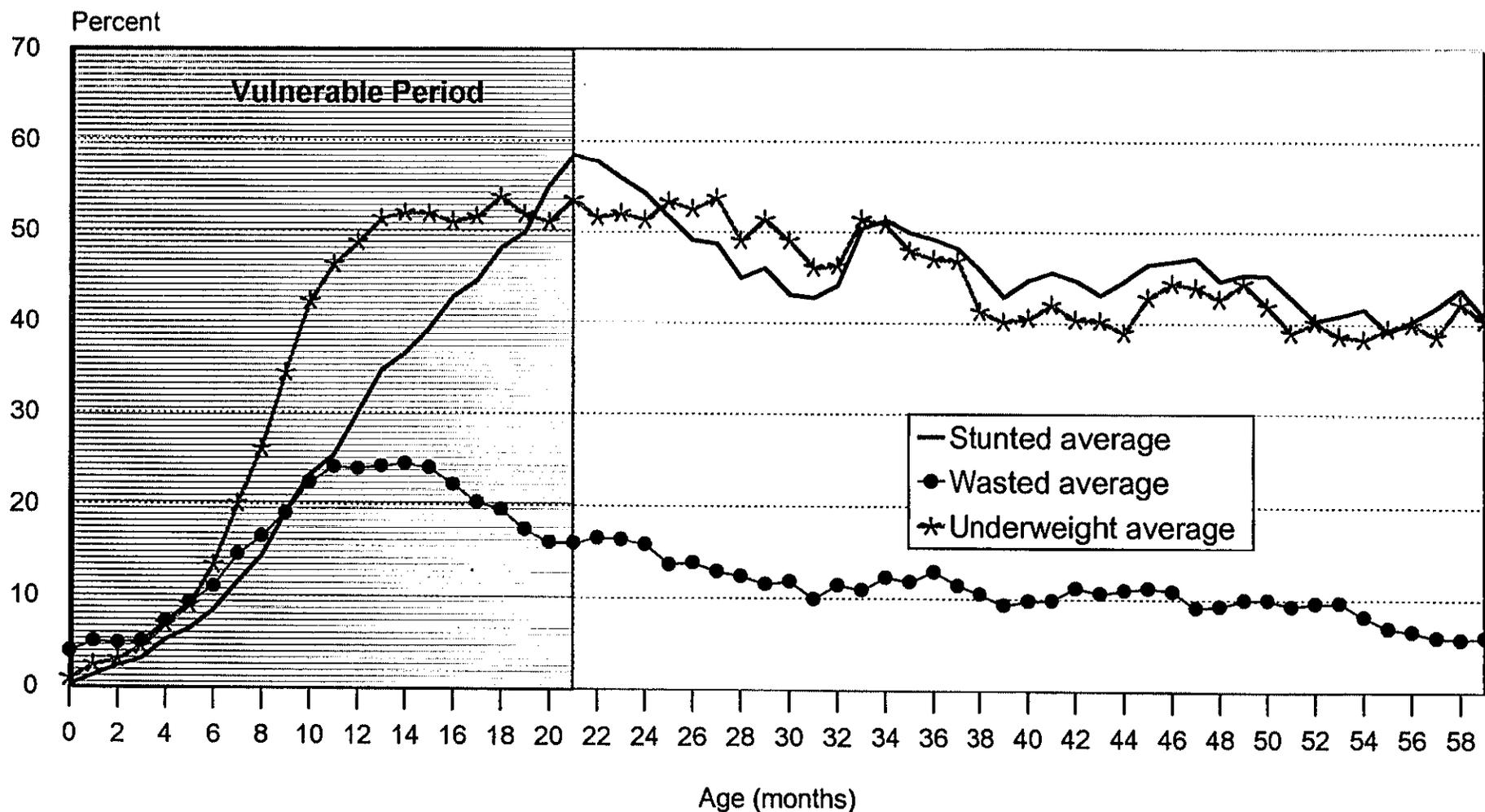
Figure 6: Stunting, Wasting, and Underweight by Age, Eritrea

In Eritrea, the time between two months and 20 months of age is a vulnerable period.

- **The proportion of children stunted rises sharply between four and 21 months of age, peaking at 58 percent.** The proportion stunted then moves downwards, ranging from 42 to 51 percent, and declines to 41 percent at 59 months.
- **The proportion of children wasted rises to 25 percent at 14 months and then declines slowly to 10 percent at 31 months.** The proportion wasted continues to decline, reaching 6 percent at 59 months.
- **The proportion of children underweight rises sharply from three to 25 months of age, reaching 53 percent.** The proportion underweight drops to a low of 39 percent at 44 months, then rises again to 40 percent at 59 months.

Figure 6

Stunting, Wasting, and Underweight by Age, Eritrea



Note: *Stunting* reflects chronic malnutrition; *wasting* reflects acute malnutrition; *underweight* reflects chronic or acute malnutrition or a combination of both. Plotted values are smoothed by a five-month moving average.

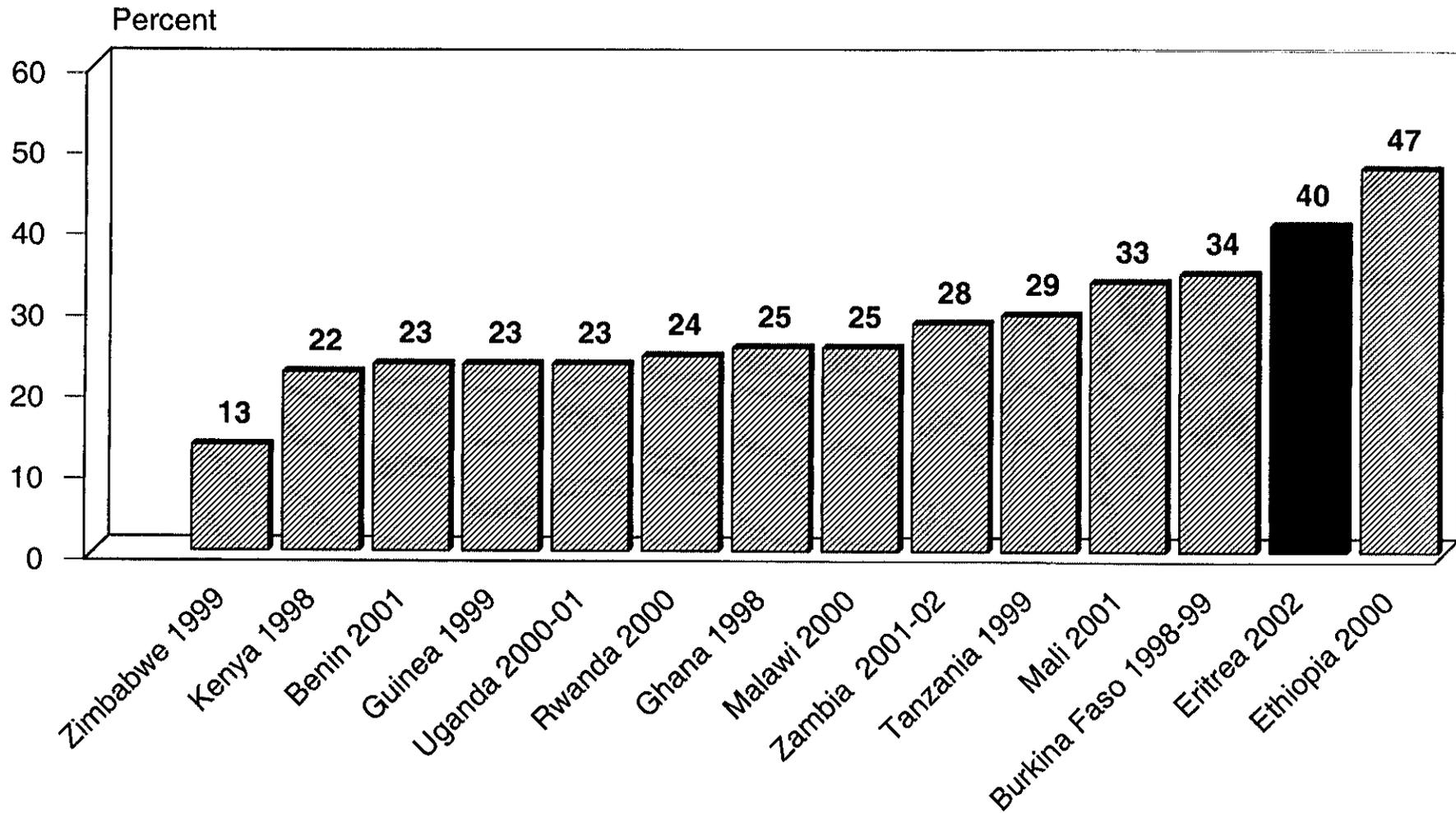
Figure 7: Underweight among Children under Five Years, Eritrea Compared with Other Sub-Saharan Countries

Among the sub-Saharan countries surveyed,

- The percentage of children **under five years** who are *underweight* ranges from 13 to 47 percent. **With 40 percent of children under five years underweight, Eritrea has the second highest proportion of underweight children among the sub-Saharan countries surveyed.** Underweight status is indicative of children who suffer from chronic or acute malnutrition, or both, and may be influenced by both short- and long-term determinants of malnutrition. Underweight is often used as a general indicator of the status of a population's health.

Figure 7

Underweight among Children under Five Years, Eritrea Compared with Other Sub-Saharan Countries



Note: *Underweight* reflects chronic or acute malnutrition or a combination of both.

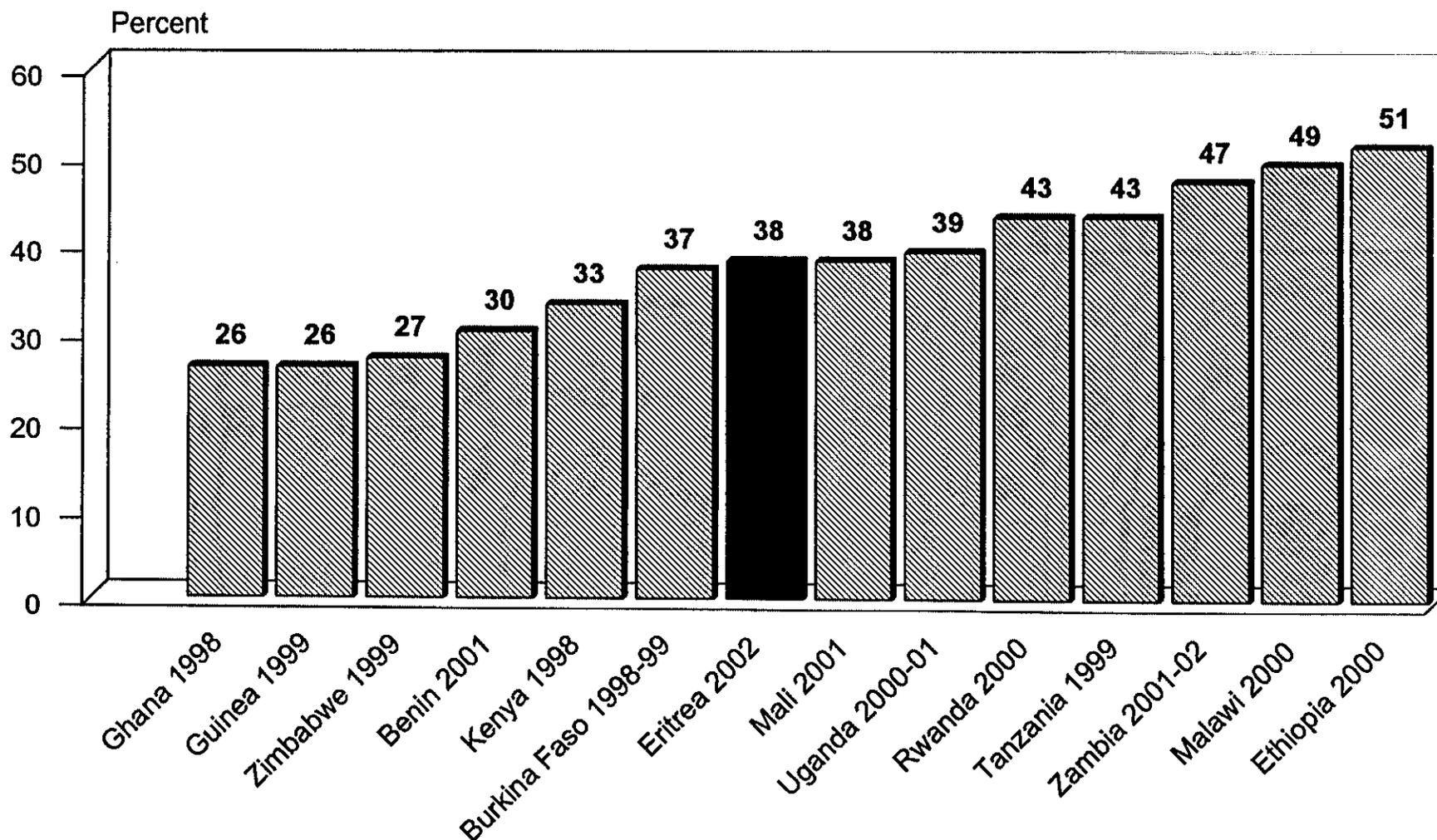
Figure 8: Stunting among Children under Five Years, Eritrea Compared with Other Sub-Saharan Countries

Among the sub-Saharan countries surveyed,

- The percentage of children **under five years** who are *stunted* ranges from 26 to 51 percent. **At 38 percent, the proportion of children under five years who are stunted in Eritrea is in the mid-range of the sub-Saharan countries surveyed.** Stunting is a good long-term indicator of the nutritional status of a population because it is not markedly affected by short-term factors such as season of data collection, epidemic illnesses, acute food shortages, and recent shifts in social or economic policies.

Figure 8

Stunting among Children under Five Years, Eritrea Compared with Other Sub-Saharan Countries



Note: *Stunting* reflects chronic malnutrition.

Conceptual Framework for Nutritional Status

Nutrition is directly related to food intake and infectious diseases such as diarrhea, acute respiratory infection, malaria, and measles. Both food intake and infectious diseases reflect underlying social and economic conditions at the household, community, and national levels that are supported by political, economic, and ideological structures within a country.

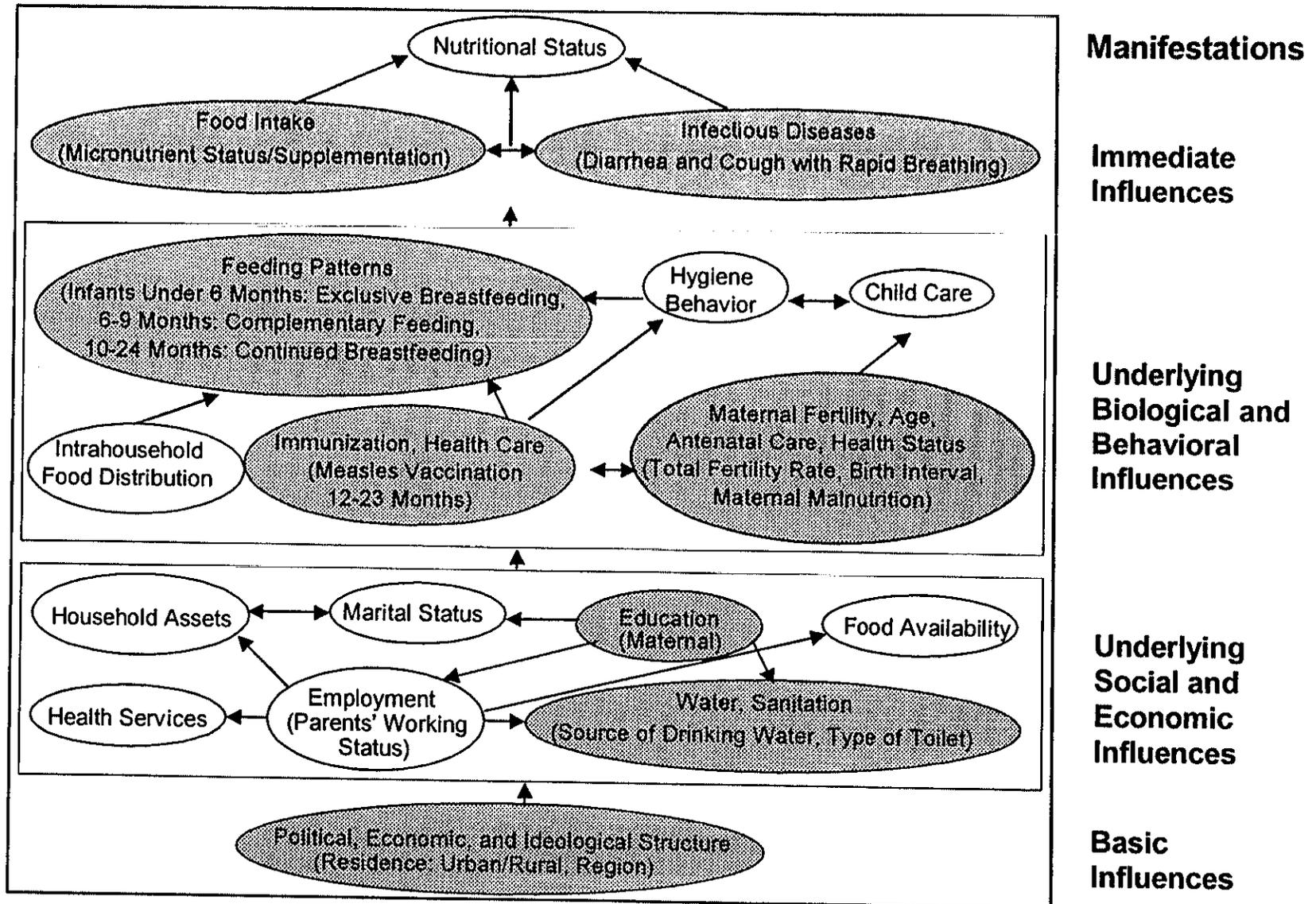
The following diagram is a conceptual framework for nutrition adapted from UNICEF.¹ It reflects relationships among factors and their influences on children's nutritional status. Although political, socioeconomic, environmental, and cultural factors (at the national and community levels) and poverty (at the household level) affect the nutritional status of women and children, the only variables included in this chartbook are those that can be collected as part of a national household survey. The highlighted areas of the framework depict selected factors.

These factors are:

- **Immediate influences**, such as food intake (micronutrient status and supplementation) and infectious diseases (diarrhea and respiratory infections).
- **Underlying biological and behavioral influences**, such as maternal fertility, measles vaccinations, and feeding patterns of children under two years.
- **Underlying social and economic influences**, such as maternal education, drinking water, and sanitation.
- **Basic influences**, such as area of residence.

¹ *State of the World's Children, 1998*

Conceptual Framework for Nutritional Status



Immediate Influences of Malnutrition

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Figure 9: Children under Five Years Living in Households with Iodized Salt by Region, Eritrea

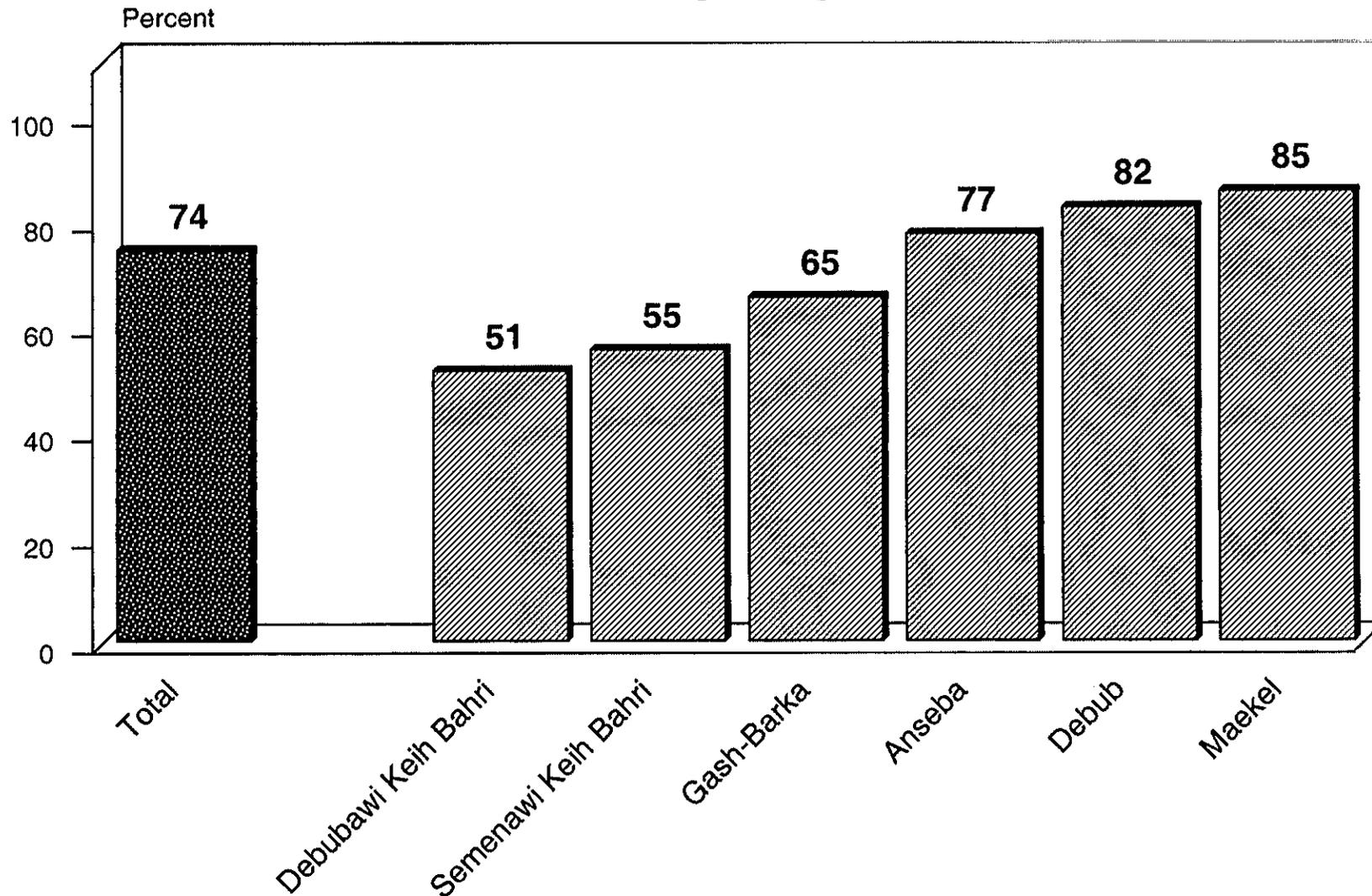
Iodine deficiency is known to cause goiter, cretinism (a severe form of neurological defect), spontaneous abortion, premature birth, infertility, stillbirth, and increased child mortality. One of the most serious consequences to child development is mental retardation caused by iodine deficiency disorder (IDD), which puts at stake social investments in health and education. IDD is the single most common cause of preventable mental retardation and brain damage in the world. It decreases the production of hormones vital to growth and development. Children with IDD can grow up stunted; apathetic; mentally retarded; and incapable of normal movement, speech, or hearing. IDD in pregnant women may cause miscarriage, stillbirth, and mental retardation in infants.

The remedy for IDD is relatively simple. A teaspoon of iodine is all a person requires in a lifetime. Since iodine cannot be stored for long periods by the body, tiny amounts are needed regularly. In areas of endemic iodine deficiency, where soil and therefore crops and grazing animals do not provide sufficient dietary iodine to the population, food fortification and supplementation have proven to be highly successful and sustainable interventions. The fortification of salt or oil with iodine is the most common tool to prevent IDD. Iodized salt that is commercially packaged in plastic sacks and not stored properly can lose its concentration of iodine. Proper packaging and storage of iodized salt is essential to ensure that the population benefits from iodine fortification.

- **In Eritrea, 74 percent of children under five years live in a household that uses salt containing some iodine.** Use of iodized salt is lowest in the Debubawi Keih Bahri region (51 percent) and is highest in Maekel (85 percent).

Figure 9

Children under Five Years Living in Households with Iodized Salt by Region, Eritrea



Note: The N for this table includes all alive children of interviewed mothers, with or without complete anthropometric measurements.

Figure 10: Night Blindness among Mothers of Children under Five Years, Eritrea

Globally, vitamin A deficiency (VAD) is the leading cause of childhood blindness. The damage to vision (xerophthalmia) is only one of the harmful outcomes of VAD. Vitamin A is crucial for rapid growth and recovery from illness or infection. Children who are vitamin A deficient have reduced immunity and are less likely to recuperate from common childhood illnesses, such as diarrhea, ARI, and measles, and are twice as likely to die as children who are not vitamin A deficient.

A mother's vitamin A status during pregnancy can be an indicator of the vitamin A status of her child. One sign of VAD in women during pregnancy is night blindness.

- **In Eritrea, 12 percent of all women who had given birth in the previous five years reported having some form of night blindness during their last pregnancy.**
- **However, only 4 percent of women reported having trouble with their vision during the night but not during the day during their last pregnancy.** Although this figure corrects for women with vision problems, in general, it may slightly underestimate the rate of night blindness.

Figure 10

Night Blindness among Mothers of Children under Five Years, Eritrea

Twelve percent of all women had reported some form of night blindness during their last pregnancy.

Four percent of women had trouble with their vision during the night but not during the day during their last pregnancy.



Figure 11: Vitamin A Supplementation among Mothers of Children under Five Years by Region, Eritrea

Recent studies show that pregnant women who are vitamin A deficient are at a greater risk of dying during or shortly after delivery of the child. Pregnancy and lactation strain women's nutritional status and their vitamin A stores. For women who have just given birth, vitamin A supplementation helps to bring their level of vitamin A storage back to normal, aiding recovery and avoiding illness.

Vitamin A supplementation also benefits children who are breastfed. If mothers have vitamin A deficiency, their children can be born with low stores of vitamin A. Low birth weight babies are especially at risk. Additionally, infants often do not receive an adequate amount of vitamin A from breast milk when mothers are vitamin A deficient. Therefore, supplementation is important for postpartum women within the first eight weeks after childbirth.

In Eritrea,

- **Fourteen percent of mothers received vitamin A supplements within two months after delivery.**
- **Vitamin A supplementation of mothers varies by region.** Only 8 percent of mothers in the Dehub region received vitamin A, while 26 percent of mothers in Maekel did.

Figure 11
Vitamin A Supplementation among Mothers of Children under Five Years by Region, Eritrea

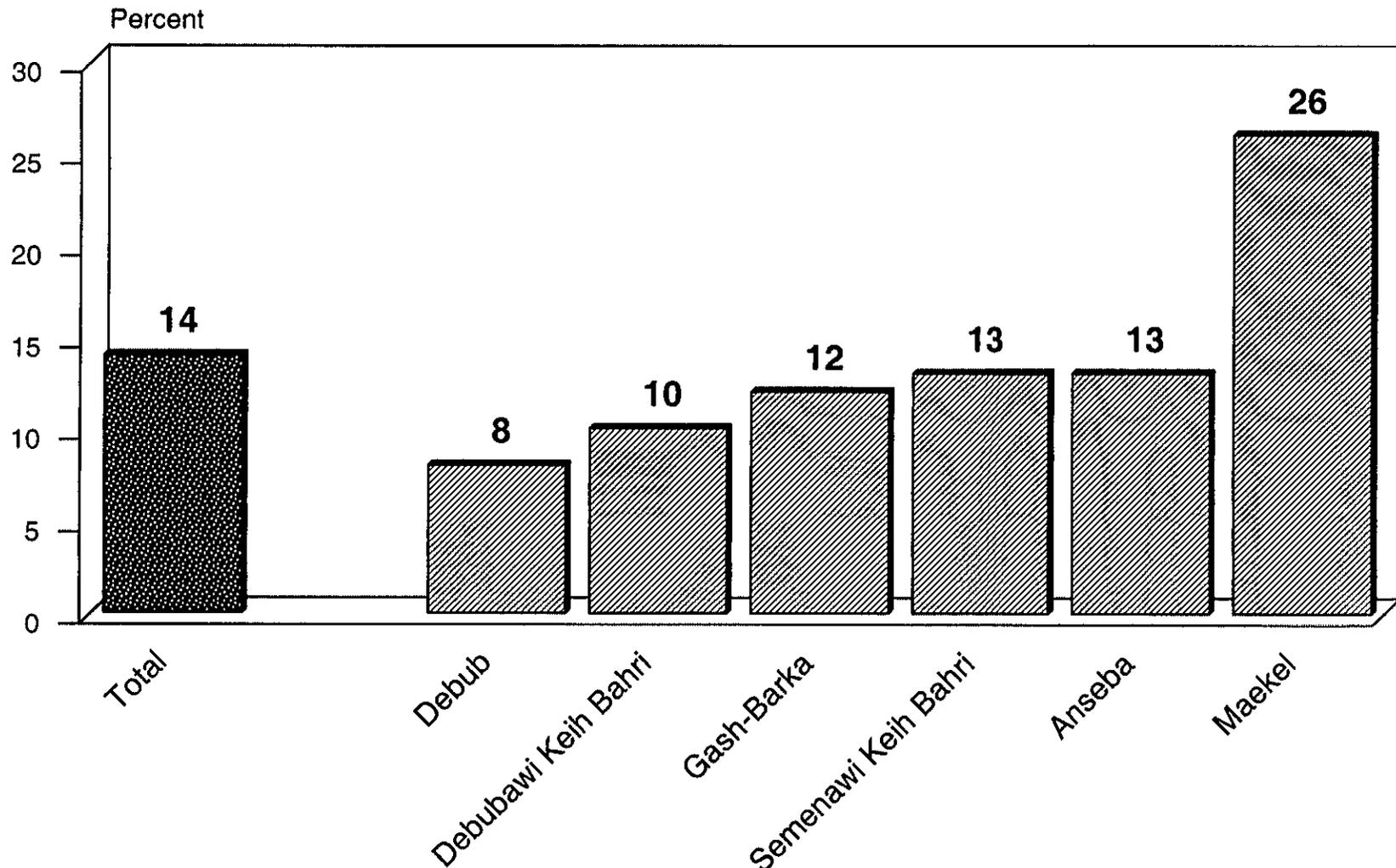


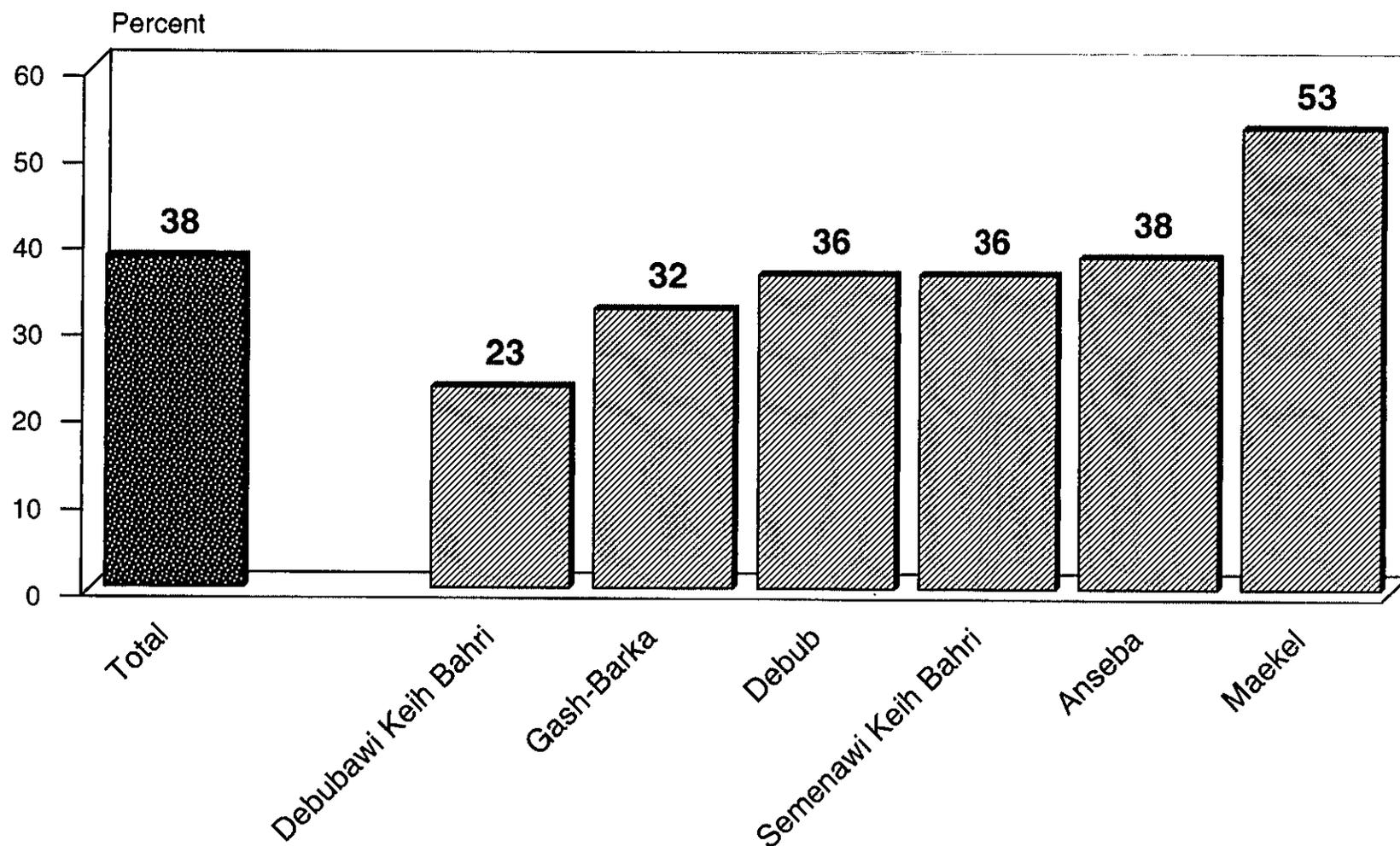
Figure 12: Vitamin A Supplementation among Children 6-59 Months in the Past Six Months by Region, Eritrea

Vitamin A deficiency (VAD) is common in dry environments where fresh fruits and vegetables are not readily available. Vitamin A is found in breast milk, other milks, liver, eggs, fish, butter, red palm oil, mangos, papayas, carrots, pumpkin, and dark leafy greens. Unlike iron or folate, vitamin A is a fat-soluble vitamin, which means that consumption of oils or fats are necessary for its absorption into the body. The liver can store an adequate amount of the vitamin for four to six months. Periodic dosing (every four to six months) with vitamin A supplements is a rapid, low-cost method of ensuring children at risk do not develop VAD. National Immunization Days for polio or measles vaccinations reach large number of children with vitamin A supplements as well.

In Eritrea,

- **Thirty-nine percent of children under 6-59 months received a vitamin A dose in the last six months.**
- **The rate of vitamin A supplementation of children varies throughout Eritrea.** The rates of supplementation were lowest in the Debubawi Keih Bahri region (23 percent) and highest in Maekel (53 percent).

Figure 12
Vitamin A Supplementation among Children 6-59 Months in the Past Six Months by Region, Eritrea



Note: The N for this table includes all alive children of interviewed mothers, with or without complete anthropometric measurements.

Figure 13: Iron Supplementation among Mothers of Children under Five Years, Eritrea

Anemia is the lack of an adequate amount of hemoglobin in the blood. It can be caused by several different health conditions; iron and folate deficiencies are some of the most prevalent conditions related to anemia. Vitamin B₁₂ deficiency, protein deficiency, sickle cell disease, malaria, and parasite infection also cause anemia.

Iron-deficiency anemia is the most common form of nutritional deficiency worldwide. This type of nutritional deficiency develops slowly and does not manifest symptoms until anemia becomes severe. Diets that are heavily dependent on one grain or starch as the major staple often lack sufficient iron intake. Iron is found in meats, poultry, fish, grains, some cereals, and dark leafy greens (such as spinach). Foods rich in vitamin C increase absorption of iron into the blood. Tea, coffee, and whole-grain cereals can inhibit iron absorption. Anemia is common in children 6-24 months of age who consume purely a milk diet and in women during pregnancy and lactation. Iron-deficiency anemia is related to decreased cognitive development in children, decreased work capacity in adults, and limited chances of child survival. Severe cases are associated with the low birth weight of babies, perinatal mortality, and maternal mortality.

In Eritrea,

- **Forty percent of mothers received some iron supplementation during pregnancy.**
- **Of those women who received iron supplementation, only 2 percent reported taking iron the recommended minimum number of days during their pregnancy (90 or more days).**

Figure 13

Iron Supplementation among Mothers of Children under Five Years, Eritrea

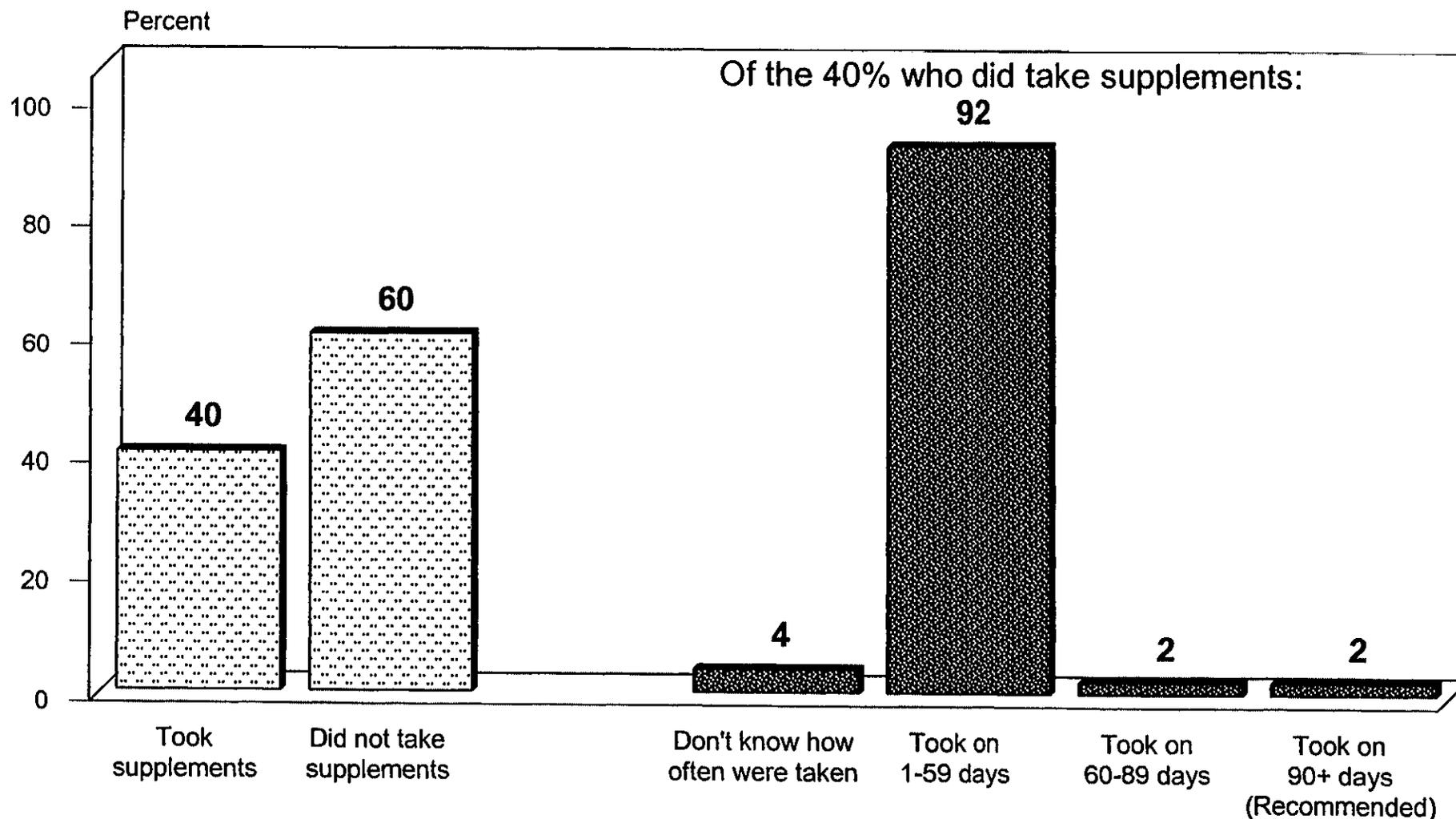


Figure 14: Diarrhea and Cough with Rapid Breathing among Children under Five Years Compared with Malnutrition Rates, Eritrea

Acute respiratory infection and dehydration due to diarrhea are major causes of morbidity and mortality in most sub-Saharan countries. To estimate the prevalence of ARI, mothers were asked whether their children under five years had been ill with coughing accompanied by short, rapid breathing in the past two weeks. For diarrhea, mothers were asked whether their children under five years had symptoms of diarrhea in the past two weeks. Early diagnosis and rapid treatment can reduce the rates of illness or death caused by these conditions.

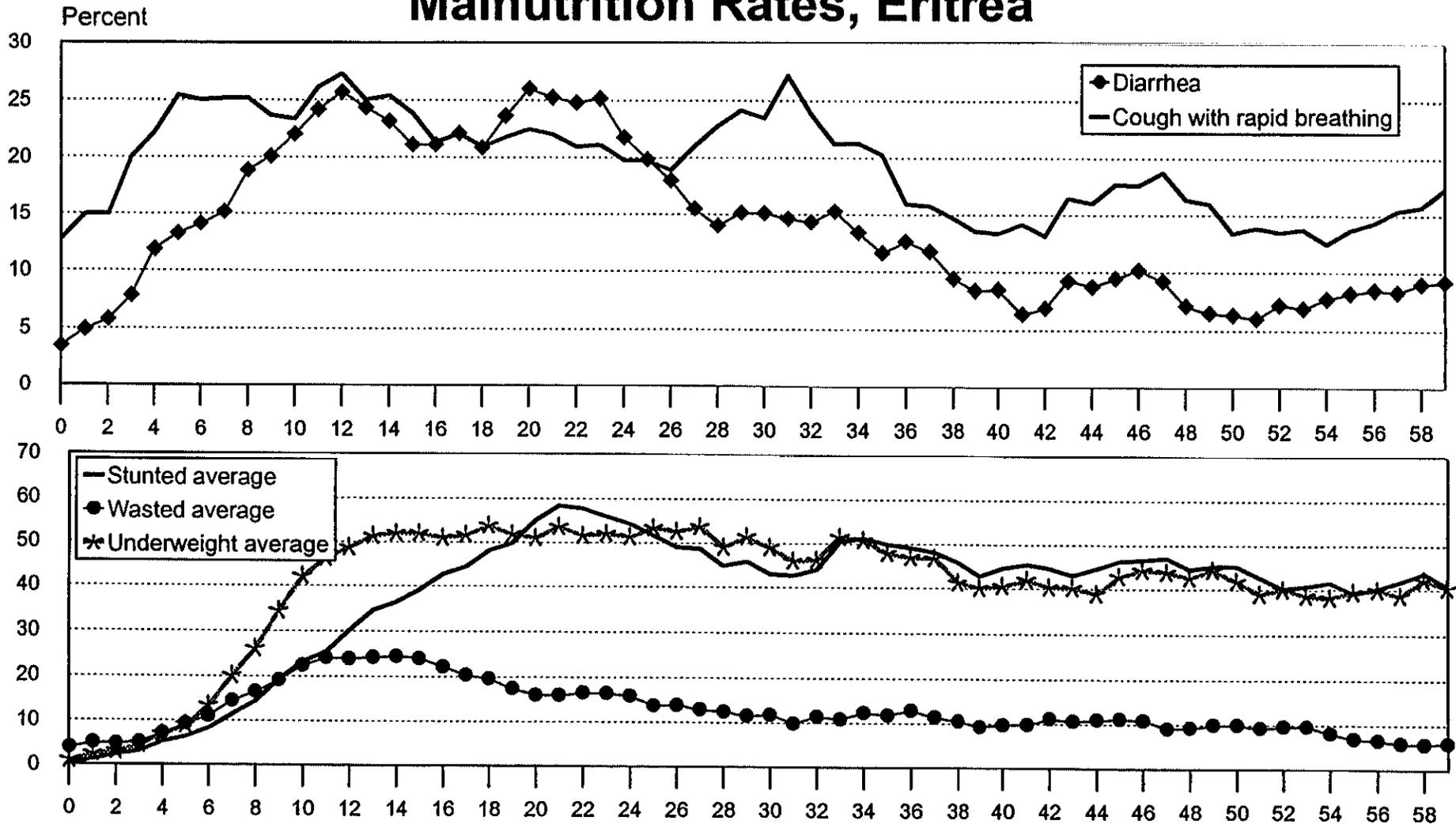
In Eritrea,

- **Nineteen percent of children under five years of age experienced cough with rapid breathing in the two weeks preceding the survey.** Eritrea's prevalence of cough with rapid breathing increases from 12 percent to 27 percent in the first 12 months and then declines. A bimodal distribution can be seen from 28 to 34 months, with the highest prevalence around 31 months. Thereafter, the prevalence of cough with rapid breathing decreases to between 13 and 18 percent from 36 to 59 months of age.
- **Fourteen percent of children under five years of age had diarrhea in the two weeks preceding the survey.** The prevalence of diarrhea increases rapidly from birth to 12 months when it peaks twice between 12-25 months at 25 percent. The rate then decreases steadily to 9 percent by 59 months.

The rapid rise in the prevalence of diarrhea during infancy reflects the increased risk of pathogen contamination associated with the early introduction of water, other liquids, and solid foods. In addition, when infants begin to crawl and move around, they tend to put objects in their mouth, again increasing the risk of pathogen contamination.

Figure 14

Diarrhea and Cough with Rapid Breathing among Children under Five Years Compared with Malnutrition Rates, Eritrea



Note: Plotted values are smoothed by a five-month moving average.

Underlying Biological and Behavioral Influences of Malnutrition

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Figure 15: Fertility and Birth Intervals, Eritrea Compared with Other Sub-Saharan Countries

High fertility rates, especially when accompanied by short birth intervals, are detrimental to children's nutritional status. In most countries in sub-Saharan Africa, families have scarce resources to provide adequate nutrition and health care for their children. As the number of children per woman increases, fewer household resources are available for each child. High fertility also has a negative impact on maternal health, thus influencing a mother's ability to provide adequate care for her children. The most widely used measure of current fertility is the total fertility rate, which is defined as the number of children a woman would have by the end of her childbearing years if she were to pass through those years bearing children at the currently observed age-specific rates.

Information on the length of birth intervals provides insight into birth spacing patterns. Research has shown that children born too soon after a previous birth are at increased risk of poor nutrition and health, and at increased risk of dying when that interval is less than 24 months. The odds of stunting and underweight have been shown to be higher when birth intervals are less than 36 months. Short birth intervals are associated with small birth size and low birth weight, both of which are precursors to poor nutritional status in early childhood.

- **At current fertility rates, a woman in Eritrea will have an average of 4.8 children by the end of her childbearing years.** This rate puts Eritrea in the lowest one-third of the sub-Saharan countries surveyed between 1998 and 2002.
- **Eritrea's mothers have a median birth interval of 34 months.** This interval is in the midrange of the countries surveyed.

Figure 15

Fertility and Birth Intervals, Eritrea Compared with Other Sub-Saharan Countries

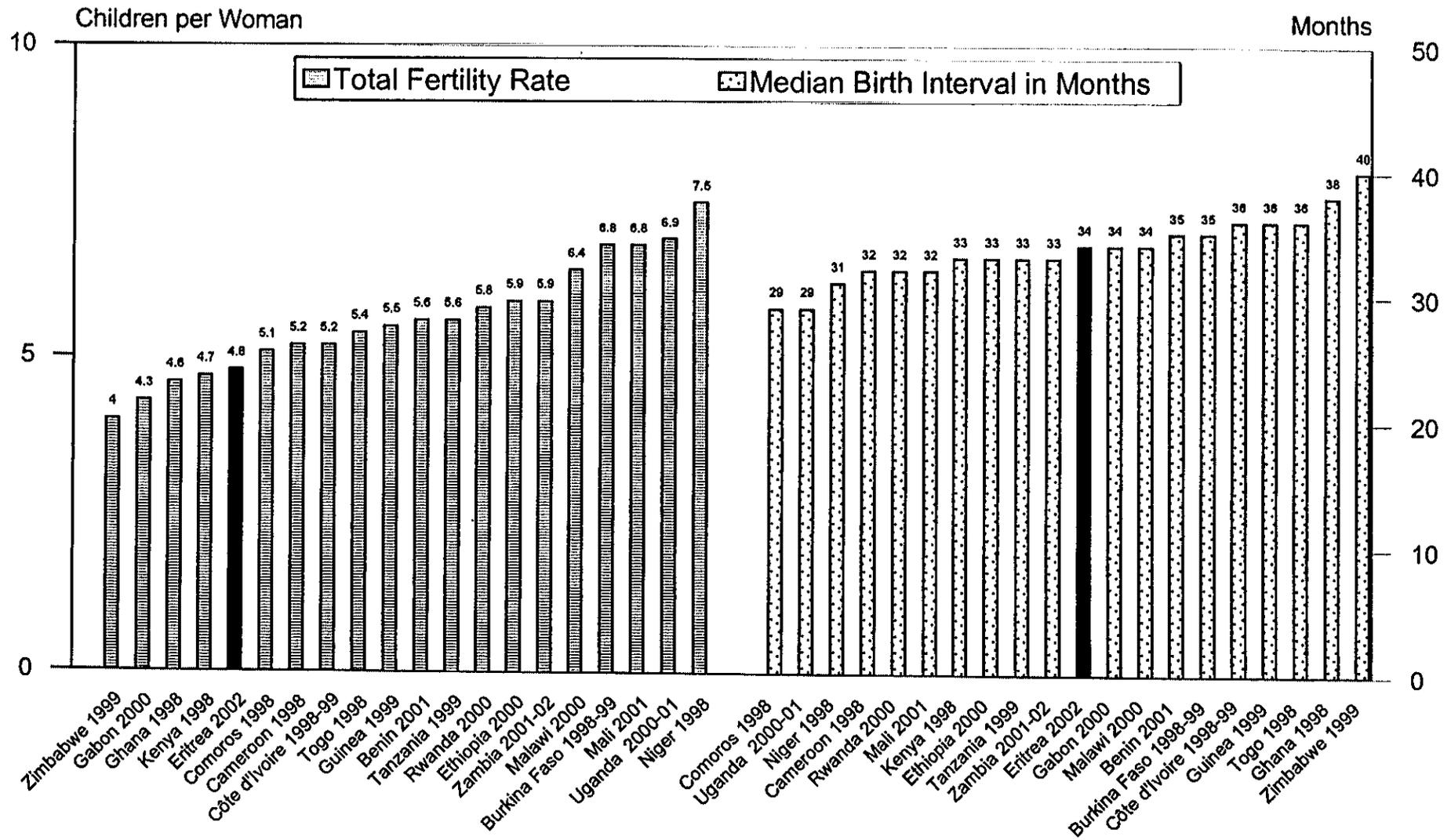


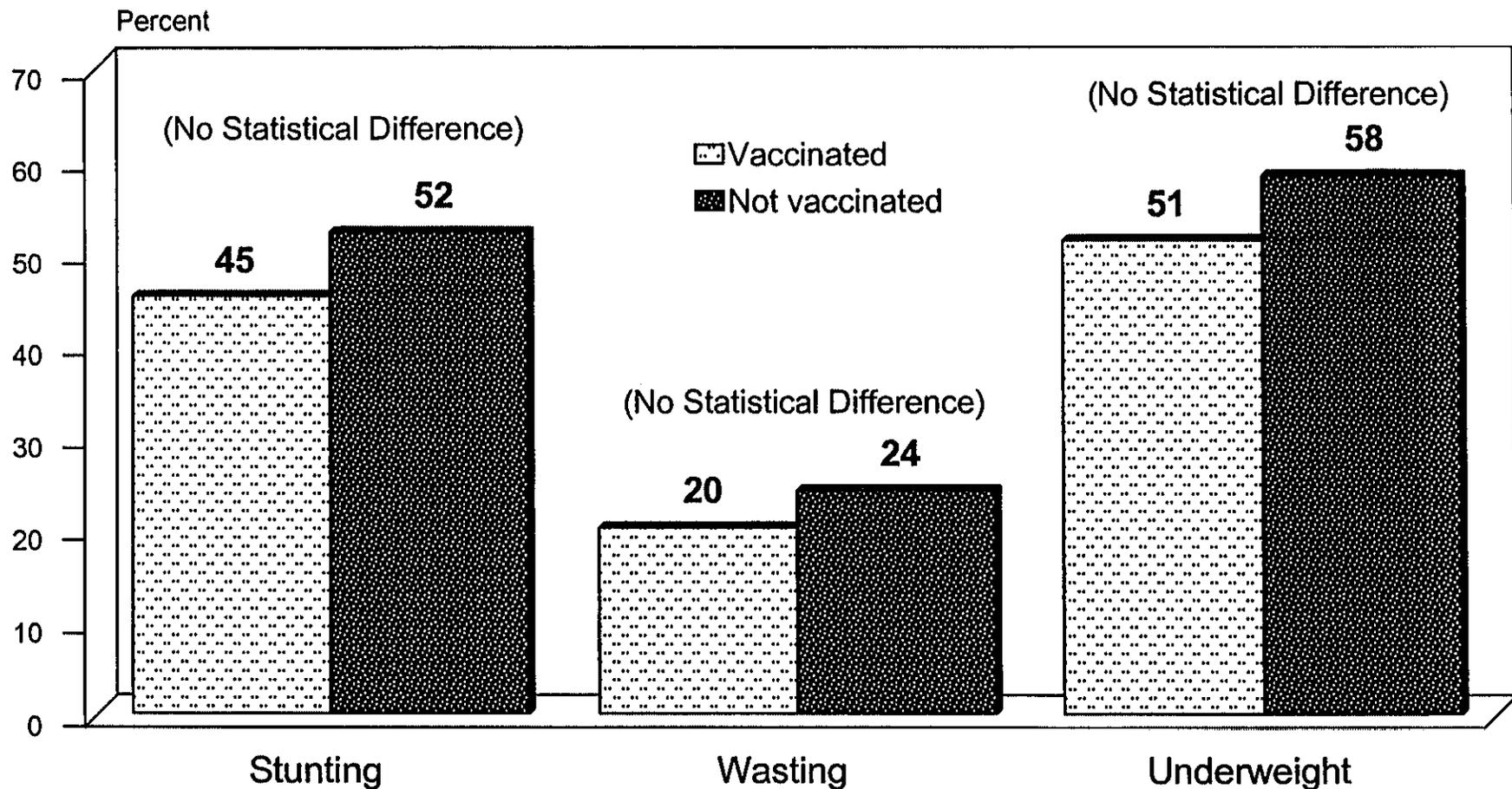
Figure 16: Undernutrition among Children Age 12-23 Months by Measles Vaccination Status, Eritrea

Measles is estimated to kill two million children a year, all in developing countries. It is one of the most common diseases during childhood in areas with low immunization coverage. Measles not only increases the risk of death but is also a direct cause of malnutrition. The occurrence of measles in poor environments is associated with faltering growth, vitamin A deficiency, and immune suppression. Although infants are not protected from measles after birth by their mother's breast milk, they are protected while in the womb by their mother's measles antibodies. These antibodies can last up to 15 months in infants, but due to malnutrition, last only eight or nine months in children in developing countries. Therefore, measles vaccination is an important child health strategy.

- **In Eritrea, stunting, wasting, and underweight are not statistically related to measles vaccination status.**

Figure 16

Undernutrition among Children Age 12-23 Months by Measles Vaccination Status, Eritrea



Note: *Stunting* reflects chronic malnutrition; *wasting* reflects acute malnutrition; *underweight* reflects chronic or acute malnutrition or a combination of both.

Figure 17: Measles Vaccination Coverage among Children Age 12-23 Months, Eritrea Compared with Other Sub-Saharan Countries

- Measles vaccination ranges from 23 to 87 percent among the sub-Saharan countries surveyed.
- **In Eritrea, 84 percent of children 12-23 months of age have been vaccinated against measles.** This level of coverage puts Eritrea in the upper one-third of the sub-Saharan countries surveyed.

Figure 17

Measles Vaccination Coverage among Children Age 12-23 Months, Eritrea Compared with Other Sub-Saharan Countries

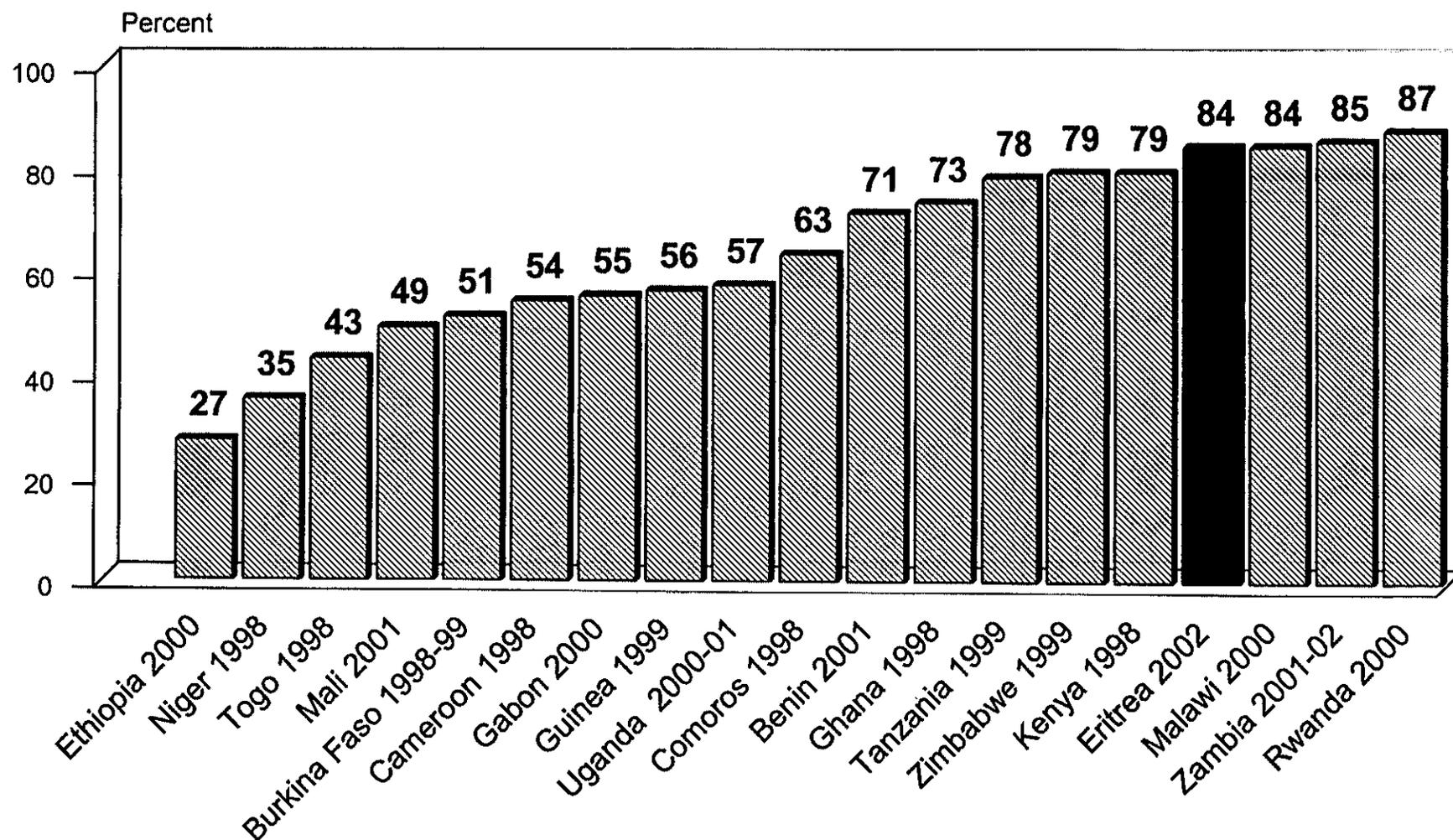


Figure 18: Feeding Practices for Infants under Six Months, Eritrea

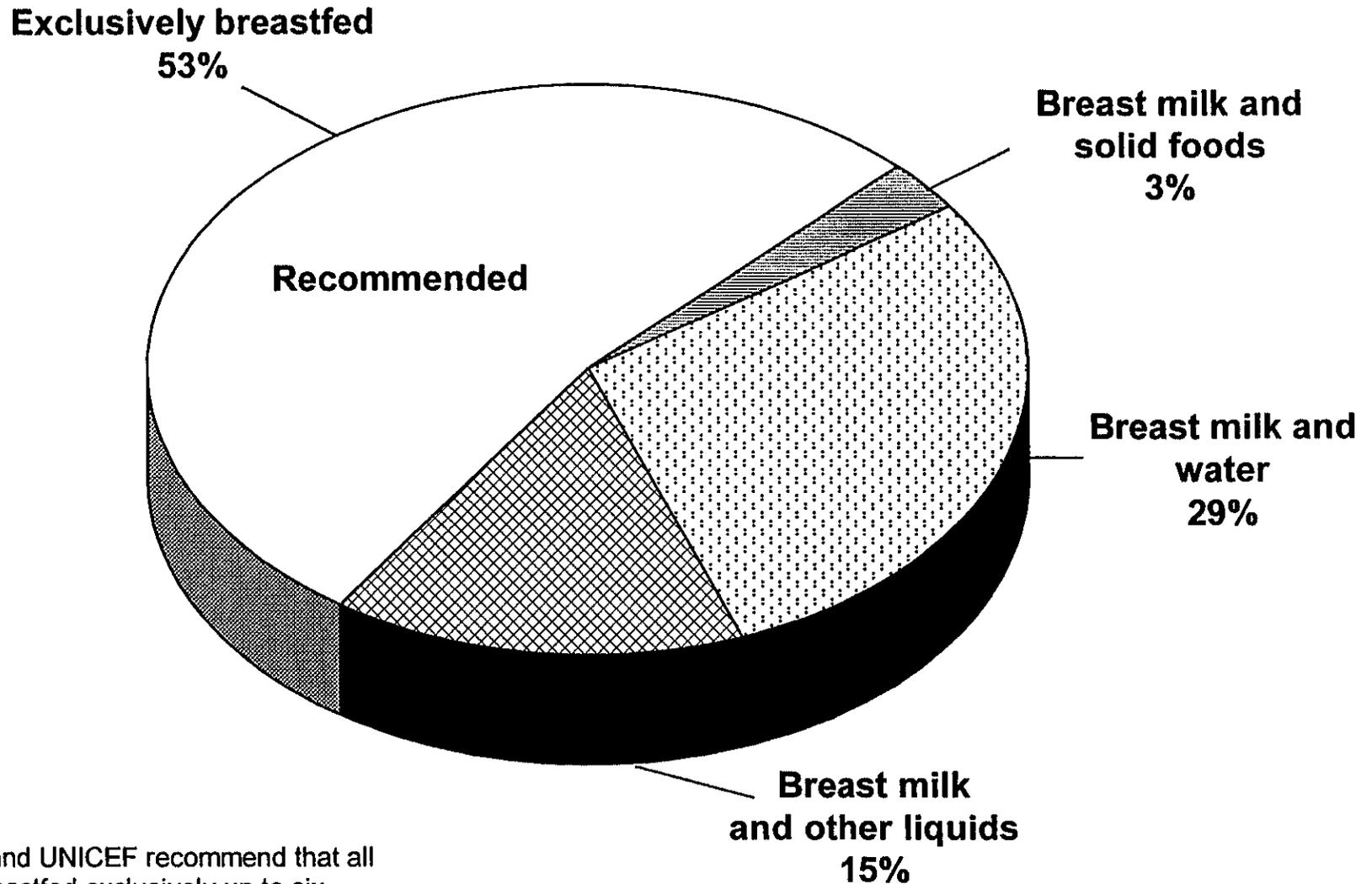
Improper feeding practices, in addition to diarrheal disease, are important determinants of malnutrition. WHO and UNICEF recommend that *all infants be breastfed exclusively from birth until six months of age*. In other words, infants should be fed only breast milk during the first six months of life.

In Eritrea, the introduction of liquids, such as water, sugar water, and juice, formula, and solid foods, takes place earlier than the recommended age of about six months. This practice has a deleterious effect on nutritional status for a number of reasons. First, the liquids and solid foods offered are nutritionally inferior to breast milk. Second, the consumption of liquids and solid foods decreases the infant's intake of breast milk, which in turn reduces the mother's supply of milk. (Breast milk production is determined, in part, by the frequency and intensity of suckling.) Third, feeding young infants liquids and solid foods increases their exposure to pathogens, thus putting them at greater risk of diarrheal disease.

- **In Eritrea, 53 percent of children under the age of six months are exclusively breastfed, as is recommended by WHO and UNICEF.**
- **Eighteen percent of infants under six months are given some form of liquid or solid food other than breast milk and/or water. Another 29 percent are given only breast milk and water.**
- **No infants under six months are fully weaned.**

Figure 18

Feeding Practices for Infants under Six Months, Eritrea



Note: WHO and UNICEF recommend that all infants be breastfed exclusively up to six months of age.

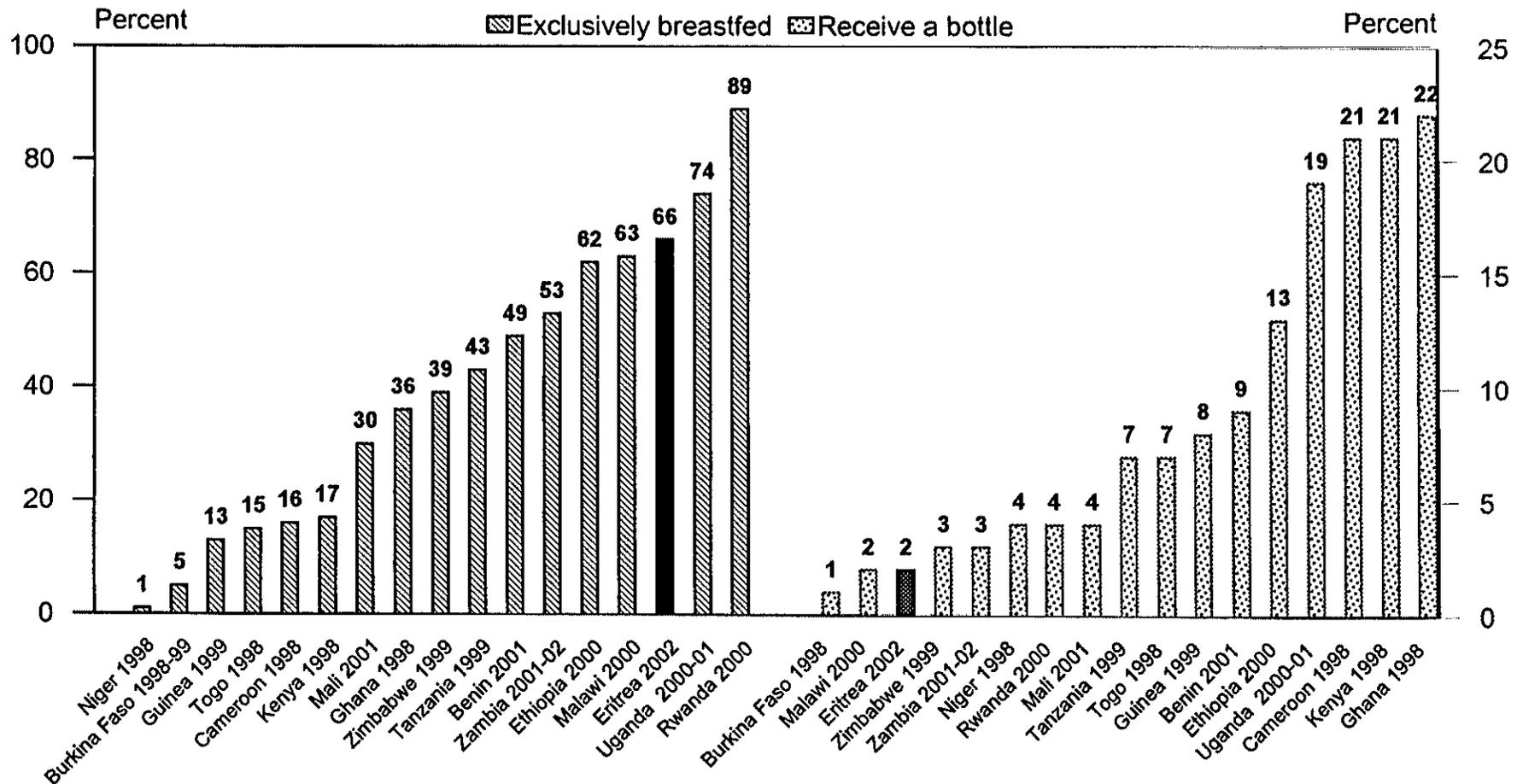
Figure 19: Infants under Four Months Who Are Exclusively Breastfed and Those Who Receive a Bottle, Eritrea Compared with Other Sub-Saharan Countries

Not breastfeeding young infants exclusively and introducing liquids and solid foods at too early an age increases the risk of diarrheal disease, an important cause of childhood mortality in Africa.

- In most of the sub-Saharan countries surveyed, relatively few mothers of infants under four months follow the recommended practice of breastfeeding exclusively. **In Eritrea, 66 percent of these mothers breastfeed their young infants exclusively.** This puts Eritrea in the high end of the sub-Saharan countries surveyed, and is a one percent increase from 1995.
- **Bottle-feeding is practiced by 2 percent of mothers of infants under four months in Eritrea.** This rate puts Eritrea in the lower one-third of the sub-Saharan countries surveyed and is about the same as the rate in 1995. **Bottle-feeding is not recommended** because improper sanitation and formula preparation with bottle-feeding can introduce pathogens to the infant, putting the child at a greater risk of illness and malnutrition.

Figure 19

Infants under Four Months Who Are Exclusively Breastfed and Those Who Receive a Bottle, Eritrea Compared with Other Sub-Saharan Countries



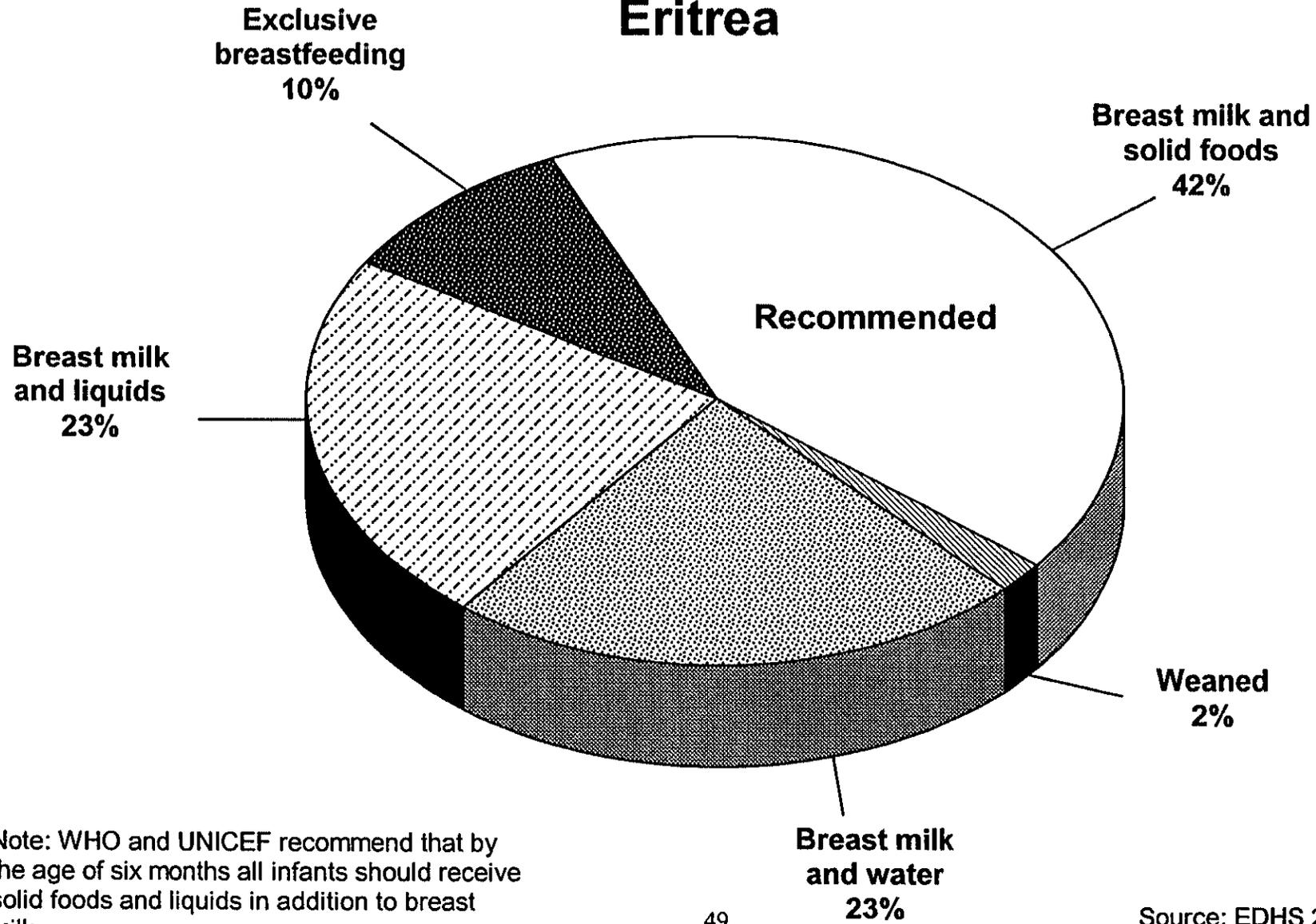
Note: Information on feeding practices is based on the 24 hours before the survey. WHO and UNICEF recommend that all infants should receive nothing but breast milk up to six months of age.

Figure 20: Feeding Practices for Infants Age 6-9 Months, Eritrea

UNICEF and WHO recommend that solid foods be introduced to infants around the age of six months because breast milk alone is no longer sufficient to maintain a child's optimal growth. Thus, *all infants over six months of age should receive solid foods* along with breast milk.

- **In Eritrea, 42 percent of infants age 6-9 months are fed solid foods in addition to breast milk.** This means that only about one-third of infants age 6-9 months are fed according to the recommended practice.
- **Fifty-six percent of infants age 6-9 months are not fed solid foods in addition to breast milk, which puts these children at risk of malnutrition.**
- **Two percent of infants age 6-9 months are fully weaned and are thus not receiving the additional nutritional and emotional support of breastfeeding.**

Figure 20
Feeding Practices for Infants Age 6-9 Months,
Eritrea



Note: WHO and UNICEF recommend that by the age of six months all infants should receive solid foods and liquids in addition to breast milk.

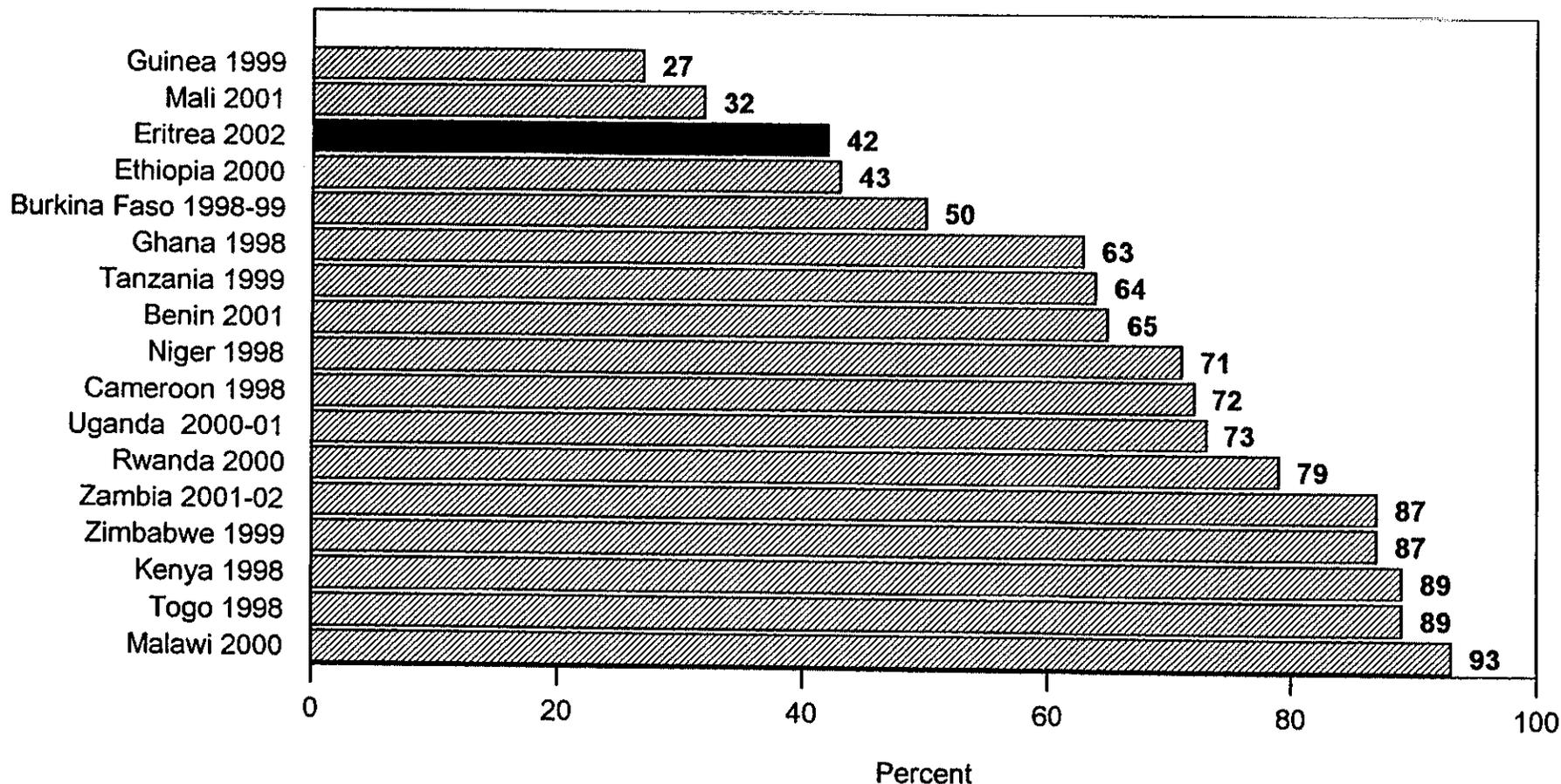
Figure 21: Infants Age 6-9 Months Receiving Solid Foods in Addition to Breast Milk, Eritrea Compared with Other Sub-Saharan Countries

Optimal infant feeding practices include the introduction of complementary foods at about six months of age. The introduction of complementary feeding is necessary because breast milk is no longer sufficient to satisfy the developing infant's energy, protein, and micronutrient needs. All infants age 6-9 months should receive complementary foods in addition to breast milk.

- The percentage of infants 6-9 months receiving solid food in addition to breast milk ranges from 27 to 93 percent among the sub-Saharan countries surveyed.
- In Eritrea, **42 percent of infants age 6-9 months receive solid food in addition to breast milk.** This is one of the lowest levels among the sub-Saharan countries surveyed.

Figure 21

Infants Age 6-9 Months Receiving Solid Foods in Addition to Breast Milk, Eritrea Compared with Other Sub-Saharan Countries



Note: WHO and UNICEF recommend that by the age of six months all infants should receive solid foods and liquids in addition to breast milk.

Figure 22: Children 10-23 Months Who Continue to Be Breastfed, Eritrea Compared with Other Sub-Saharan Countries

For older infants and toddlers, breast milk continues to be an important source of energy, protein, and micronutrients. Studies have shown that, in some populations, breast milk is the most important source of vitamin A and fat among children over 12 months of age. Breastfeeding older infants also reduces their risk of infection, especially diarrhea.

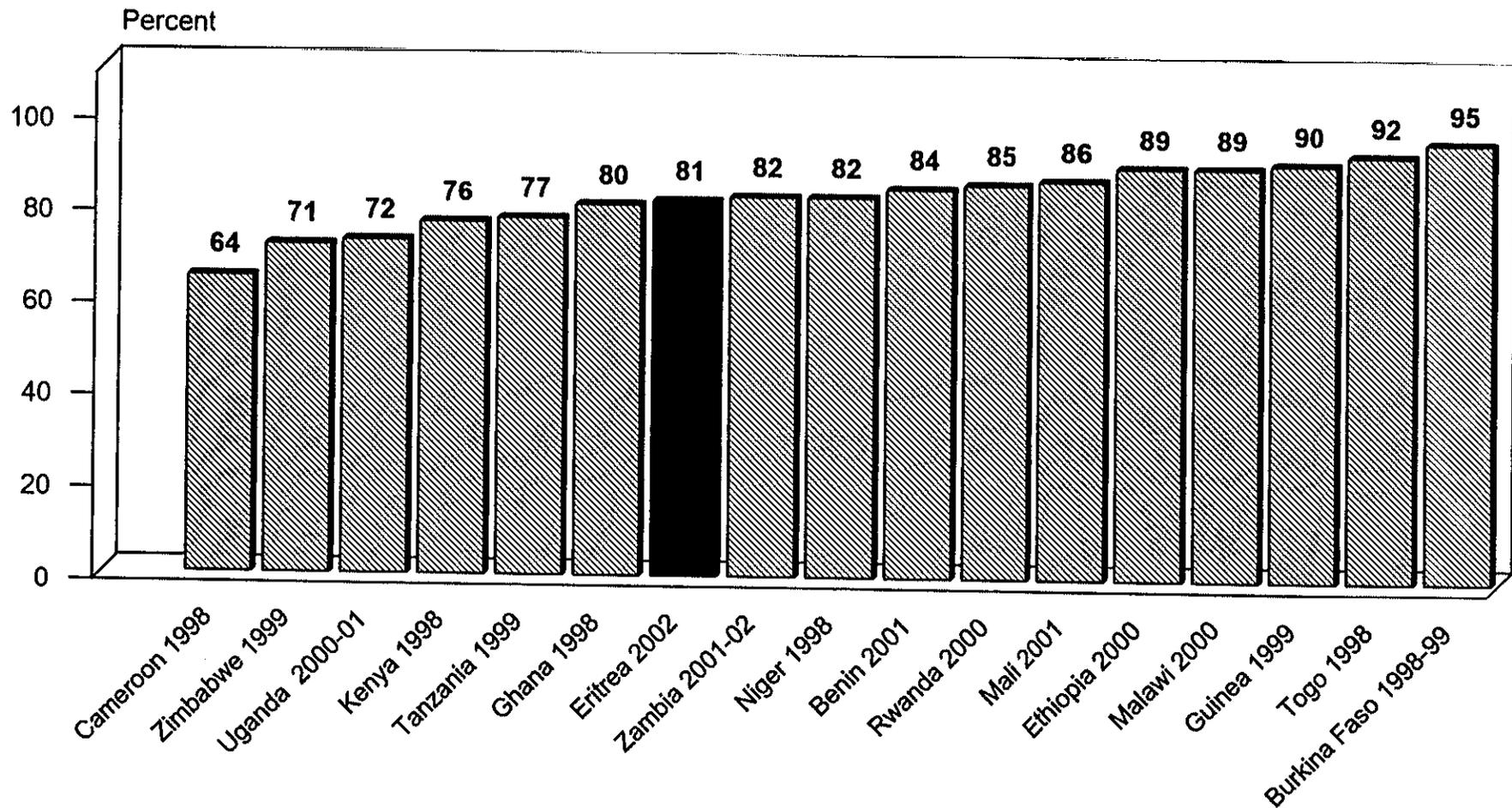
Additionally, breastfeeding up to 24 months can help reduce a woman's fertility, especially in areas where contraception is limited. Women who breastfeed for longer periods have lower fertility rates than women who breastfeed for shorter periods.

In Eritrea,

- **Eighty-one percent of children age 10-23 months are still given breast milk.** This is in the midrange of the sub-Saharan countries surveyed.

Figure 22

Children 10-23 Months Who Continue to Be Breastfed, Eritrea Compared with Other Sub-Saharan Countries



Note: Information on feeding practices is based on the 24 hours before the survey. WHO and UNICEF recommend that all children should continue to be breastfed up to 24 months of age.

Underlying Social and Economic Influences of Malnutrition

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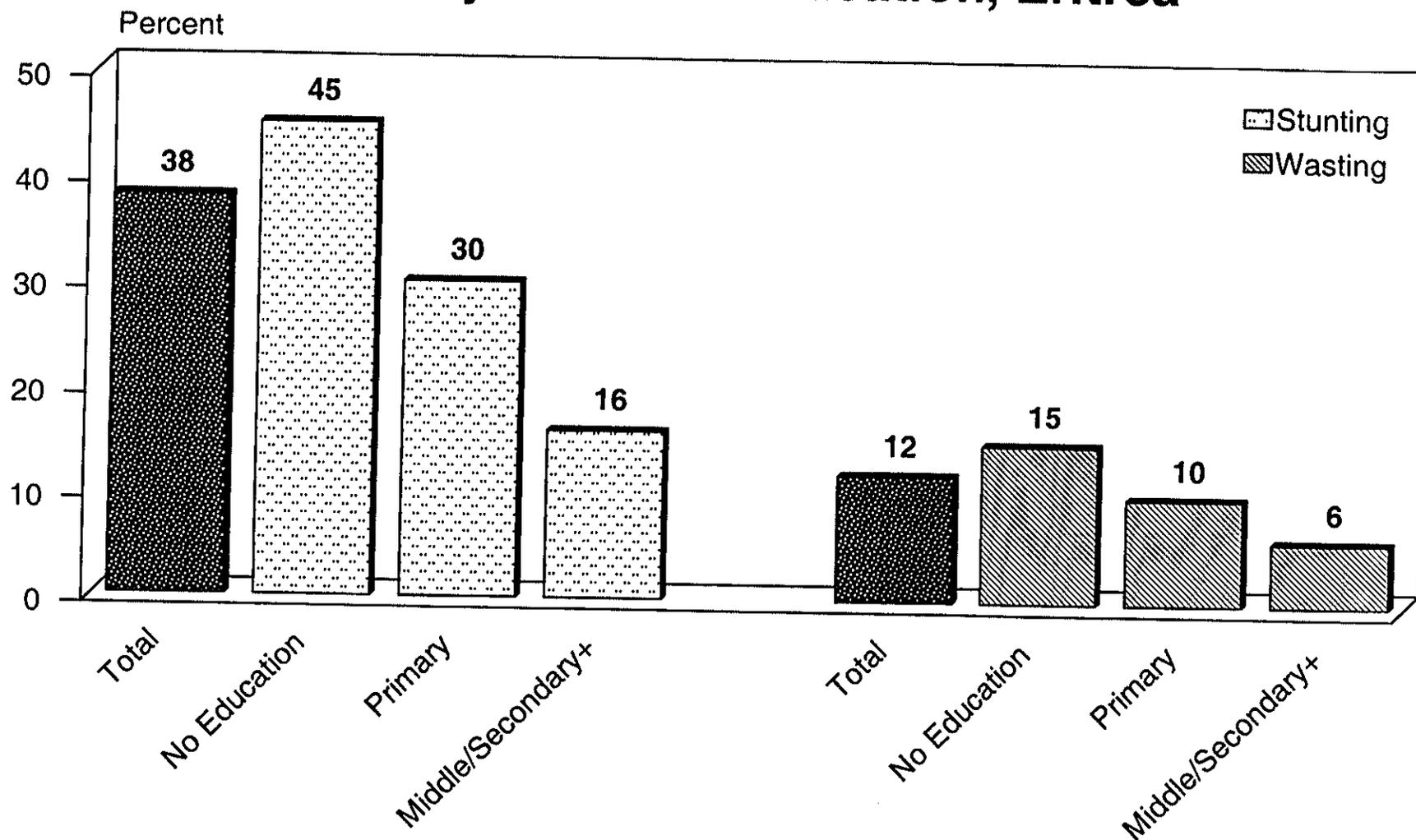
Figure 23: Stunting and Wasting among Children under Five Years by Mother's Education, Eritrea

Maternal education is related to knowledge of good child care practices and to household wealth. In Eritrea, 62 percent of the mothers of children under five years of age have never attended school, while 25 percent have some primary education and 13 percent have a secondary or higher education. There are variations in school attendance, especially between urban and rural areas. In the rural areas, 79 percent of the mothers have never attended school, 20 percent have attended primary school, and only 2 percent have gone to secondary school or higher. In contrast, 10 percent of mothers in the capital and large cities and 45 percent of the mothers in small cities and towns have never attended school, while 55 percent in the capital and large cities and 18 percent in small cities and towns have gone to secondary school or higher. Mothers in Maekel had the highest percentage of receiving at least a secondary school education (45 percent) followed by 17 percent in Debubawi Keih Bahri, compared to 2 to 6 percent in the rest of Eritrea's regions.

- Maternal education has an inverse relationship with stunting and wasting in Eritrea. **As the level of maternal education increases, the level of stunting and wasting decreases.**
- The difference in the level of stunting between children of mothers with no education and those whose mothers have a primary education is 15 percent. The difference between children of mothers with no education and children of mothers with a middle/secondary education or higher is 29 percent.
- The difference in the level of wasting between children of mothers with no education and those with a middle/secondary education or higher is 9 percent.

Figure 23

Stunting and Wasting among Children under Five Years by Mother's Education, Eritrea



Note: *Stunting* reflects chronic malnutrition;
wasting reflects acute malnutrition

Figure 24: Stunting and Wasting among Children under Five Years by Source of Drinking Water, Eritrea

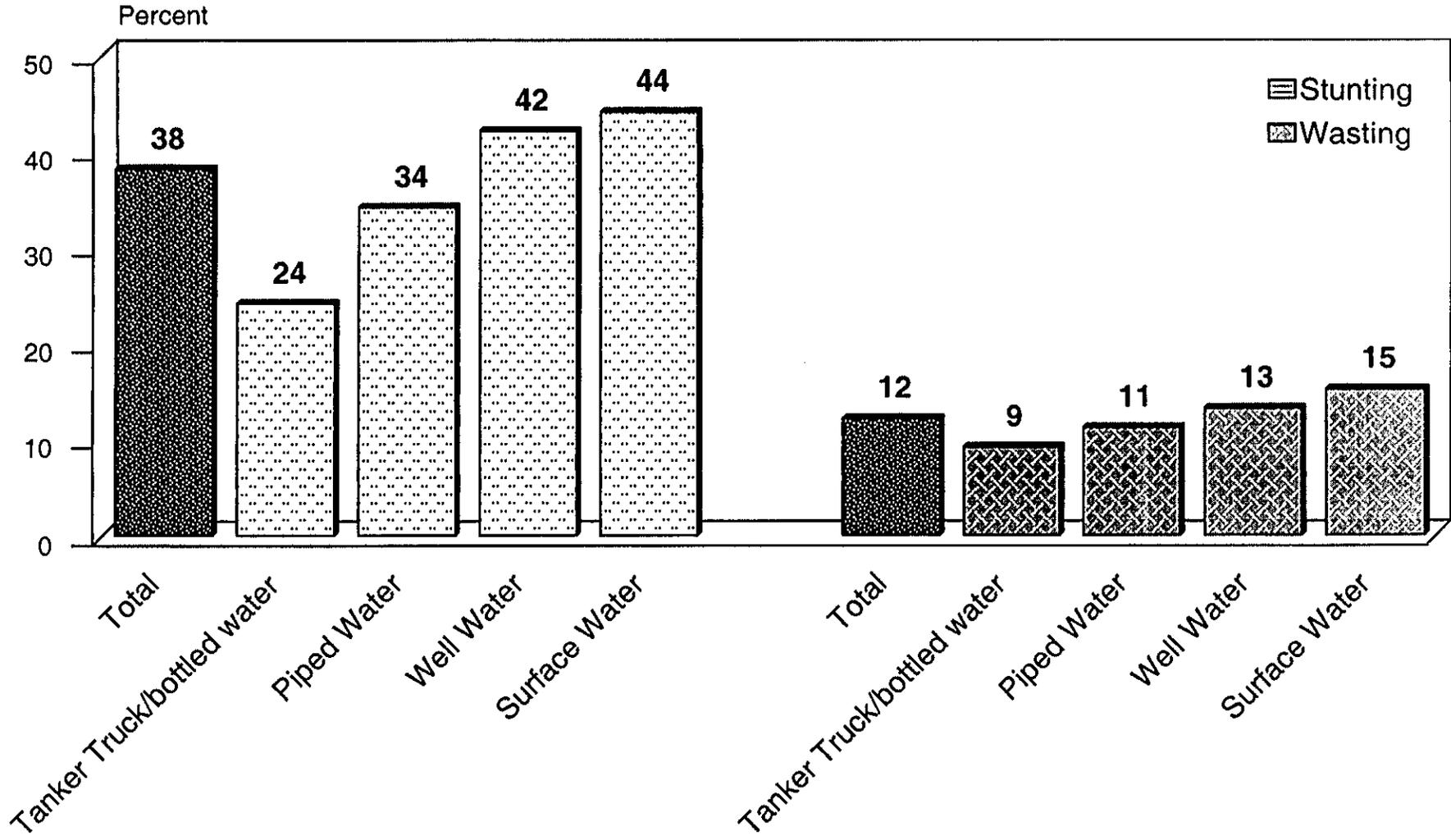
A household's source of drinking water is linked with its socioeconomic status. Poor households are more likely to obtain drinking water from contaminated sources such as surface water or open wells. Without an adequate supply of good-quality water, the risks of food contamination, diarrheal disease, and malnutrition rise. Infants and children from households that do not have a private tap are at greater risk of being malnourished than those from households with this amenity. Among the households surveyed with children under five years, 33 percent use piped water, 35 percent obtain their drinking water from a well, 18 percent use surface water, and 12 percent use tanker truck or bottled water.

In Eritrea,

- **Children whose drinking water is well water or surface water are more likely to be stunted (42 and 44 percent, respectively) than children with access to piped water or tanker truck/bottled water (34 and 24 percent, respectively).**
- **Children whose drinking water is well water or surface water are more likely to be wasted (13 percent or 15 percent, respectively) than children with access to piped water or tanker truck/bottled water (11 and 9 percent, respectively).**

Figure 24

Stunting and Wasting among Children under Five Years by Source of Drinking Water, Eritrea



Note: *Stunting* reflects chronic malnutrition; *wasting* reflects acute malnutrition.

Figure 25: Stunting and Wasting among Children under Five Years by Type of Toilet, Eritrea

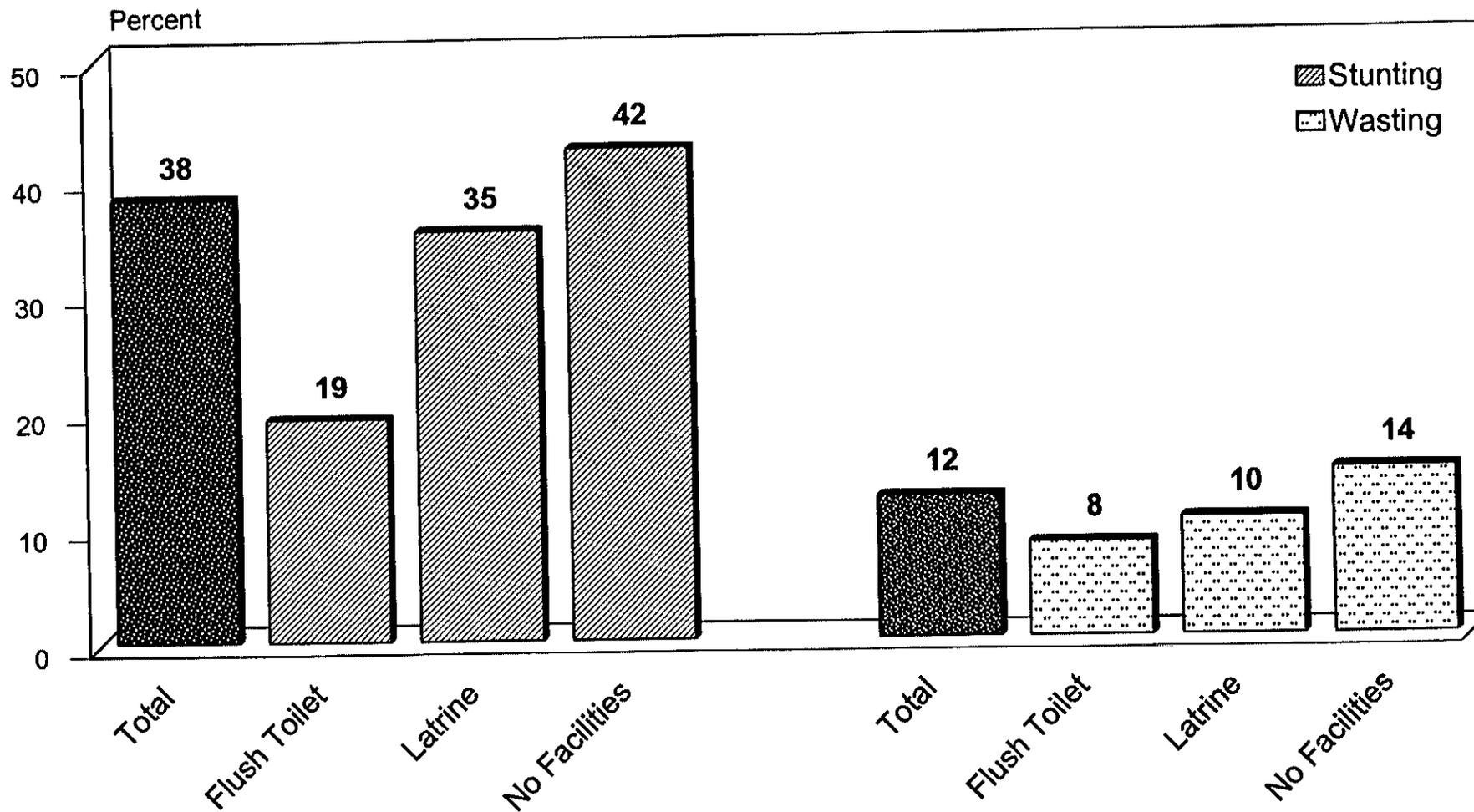
The type of toilet used by a household reflects its wealth, and poor households are less likely to have adequate toilet facilities. Inadequate sanitation facilities result in an increased risk of diarrheal disease, which contributes to malnutrition. Infants and children from households that do not have ready access to a flush toilet are at greater risk of being malnourished than children from households with this amenity. In Eritrea, only 8 percent of households surveyed with at least one child under five years have access to a latrine, 76 percent have no facilities, and 14 percent of surveyed households have access to a flush toilet.

In Eritrea,

- Children who have no access to toilet facilities or those who have access to a latrine are more likely to be stunted (42 percent and 35 percent are stunted, respectively) than children with access to a flush toilet (19 percent).
- Children who have no access to toilet facilities or those who have access to a latrine are more likely to be wasted (14 percent and 10 percent are stunted, respectively) than children with access to a flush toilet (8 percent).

Figure 25

Stunting and Wasting among Children under Five Years by Type of Toilet, Eritrea



Note: *Stunting* reflects chronic malnutrition; *wasting* reflects acute malnutrition.

Basic Influences

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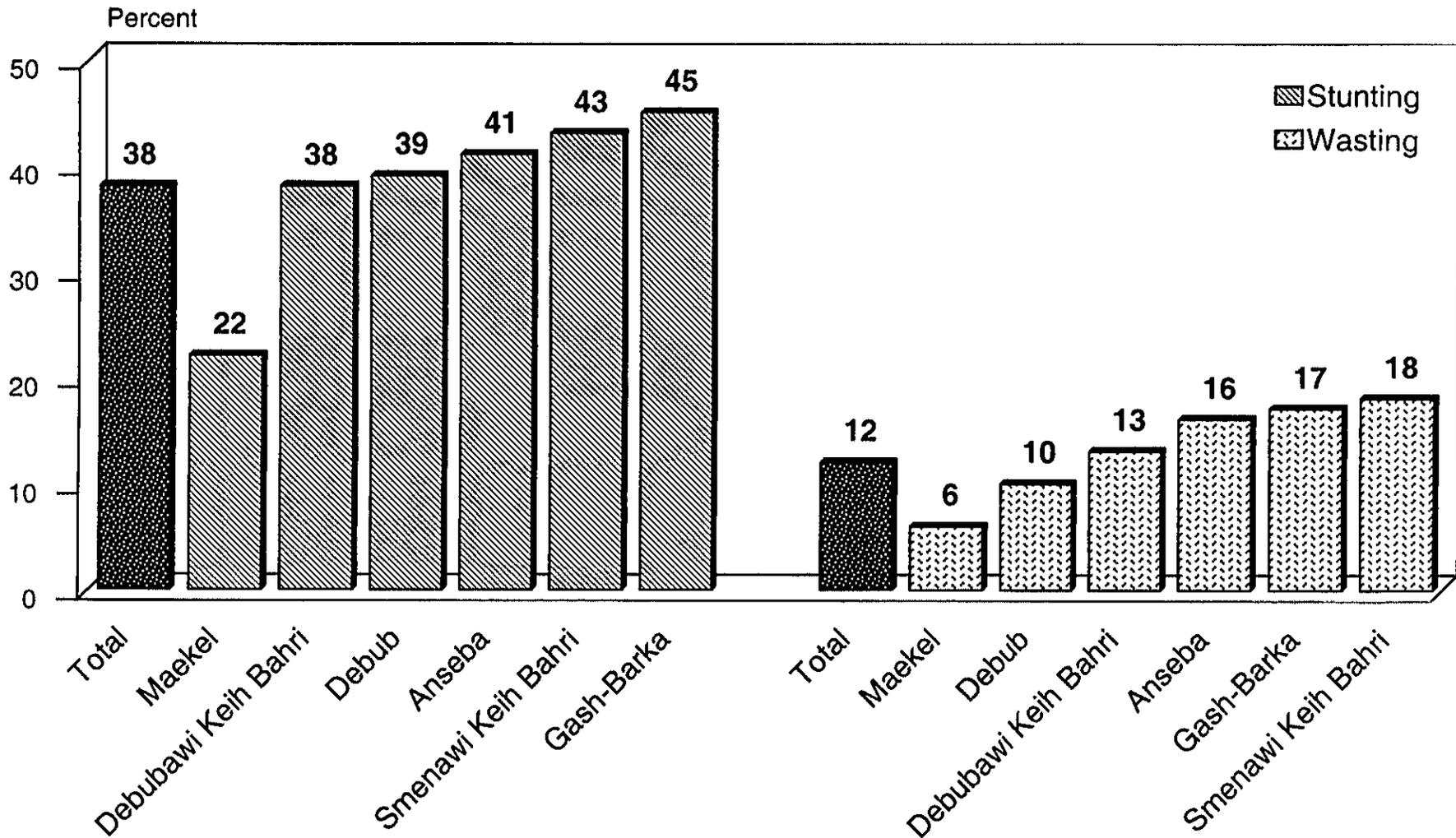
Figure 26: Stunting and Wasting among Children under Five Years by Zoba, Eritrea

In Eritrea,

- **Stunting ranges from 22 to 45 percent among children in the 6 zobas.** Stunting rates are the lowest in zoba Maekel (22 percent) and highest in zoba Gash-Barka (45 percent).
- **Wasting ranges from 6 to 18 percent among children in the 6 zobas.** Wasting rates are the lowest in zoba Maekel (6 percent) and highest in zoba Smenawi Keih Bahri (18 percent).

Figure 26

Stunting and Wasting among Children under Five Years by Region, Eritrea



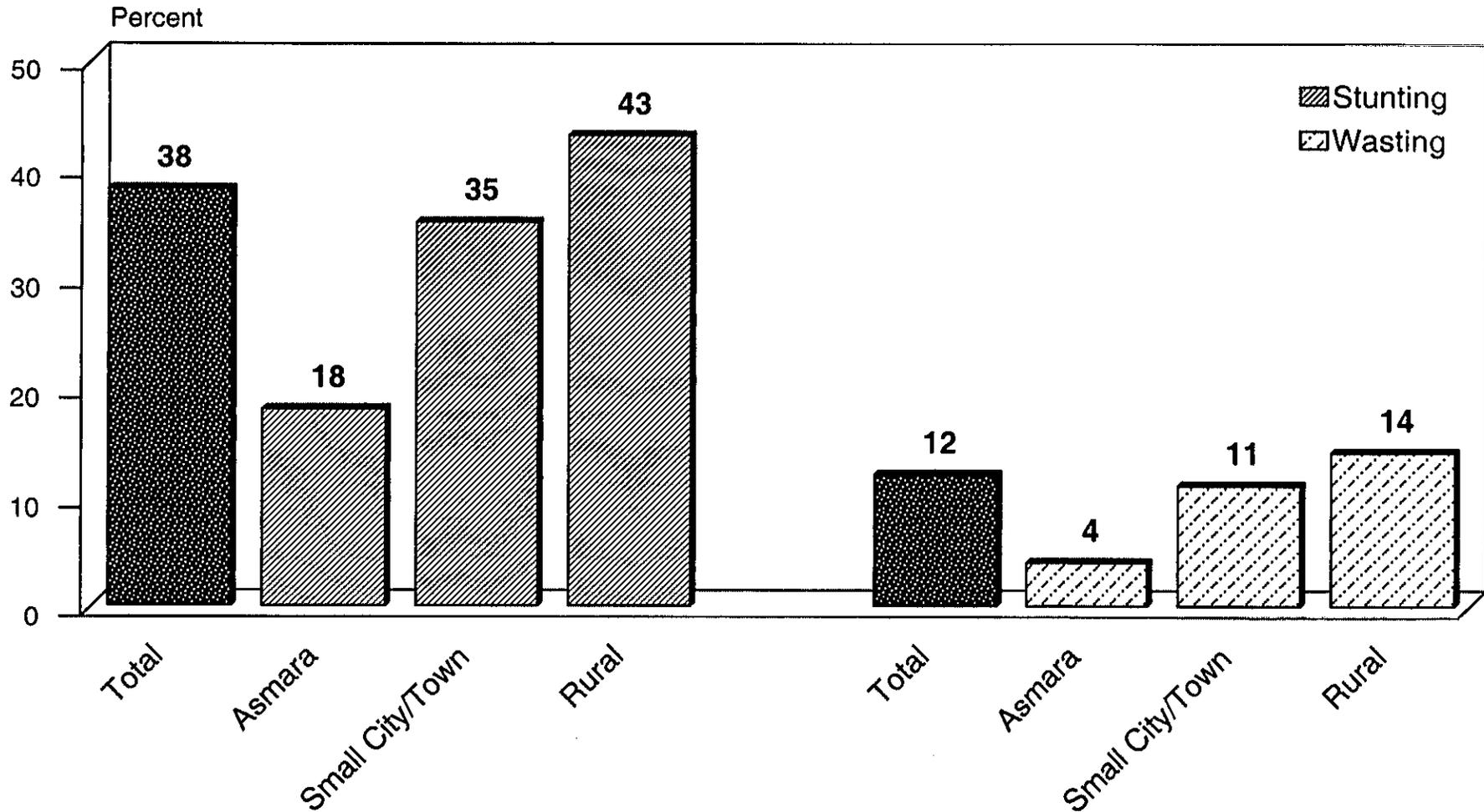
Note: *Stunting* reflects chronic malnutrition; *wasting* reflects acute malnutrition.

Figure 27: Stunting and Wasting among Children under Five Years by Urban-Rural Residence, Eritrea

In Eritrea,

- **Forty-three percent of rural children are stunted.** In the capital, Asmara, 18 percent of children are affected by chronic malnutrition, and in other urban areas (small cities or towns), the rate of stunting is 35 percent.
- **Fourteen percent of rural children are wasted.** In Asmara, 4 percent of children are affected by acute malnutrition, and in other urban areas (small cities or towns), the rate of wasting is 11 percent.

Figure 27
Stunting and Wasting among Children under Five
Years by Urban-Rural Residence, Eritrea



Note: *Stunting* reflects chronic malnutrition; *wasting* reflects acute malnutrition.

Maternal Nutritional Status

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Figure 28: Malnutrition among Mothers of Children under Five Years by Zoba, Eritrea

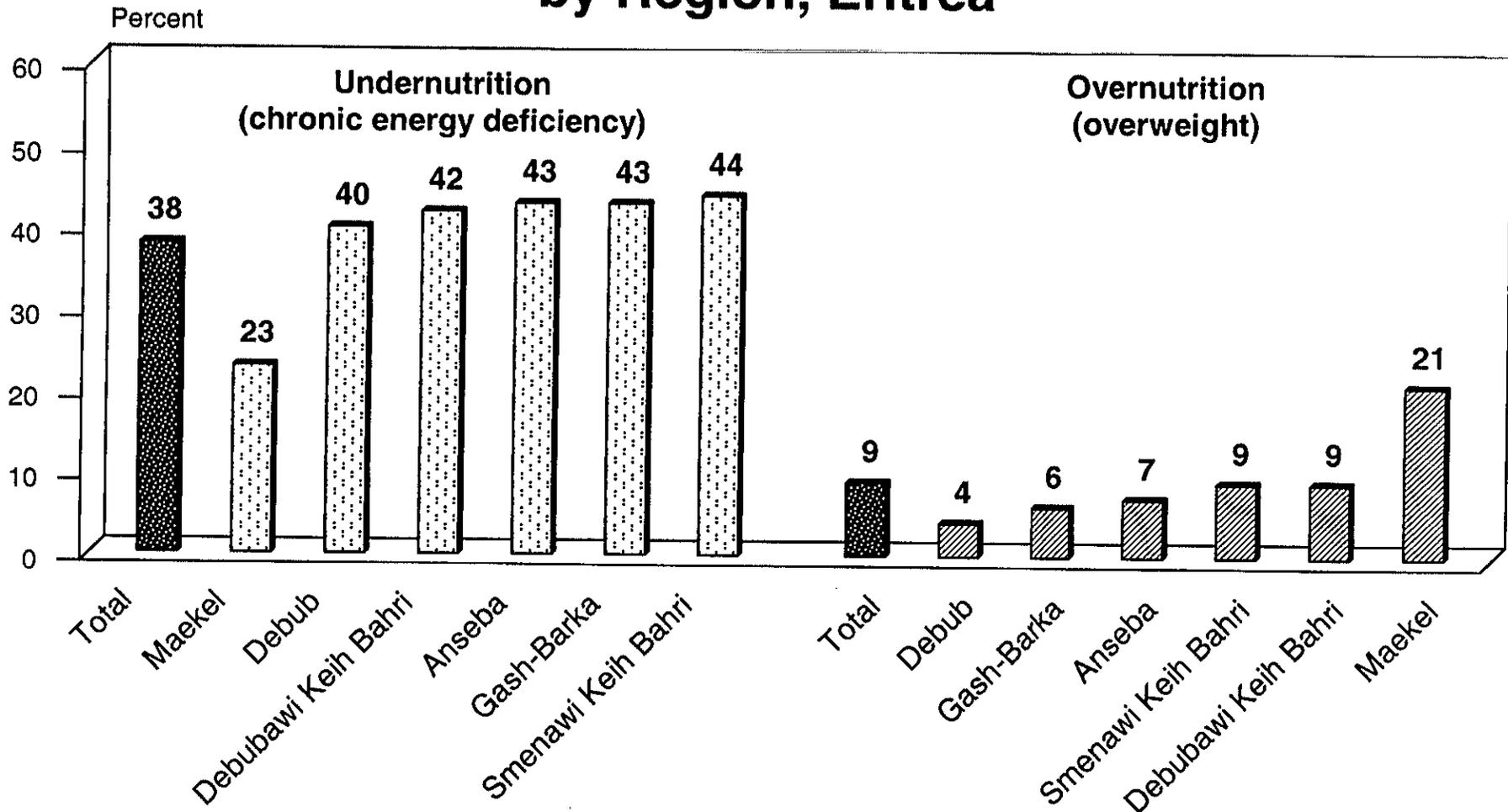
Besides being of concern in its own right, a mother's nutritional status affects her ability to carry, deliver, and care for her children successfully. There are generally accepted standards for indicators of malnutrition among adult women that can be applied.

Malnutrition in women can be assessed using the body mass index (BMI), which is defined as a woman's weight in kilograms divided by the square of her height in meters. Thus, $BMI = \text{kg}/\text{m}^2$. When the BMI is below the suggested cutoff point of 18.5, this indicates chronic energy deficiency or undernutrition for nonpregnant, nonlactating women. When the BMI is above 25, women are considered overweight.

- **Thirty-eight percent of mothers of children under age five in Eritrea are undernourished.** The highest level of maternal undernutrition is in zoba Semenawi Keih Bahri (44 percent). The lowest level is in zoba Maekel (23 percent).
- **Nine percent of mothers of children under five are overweight.** The highest level of maternal overnutrition is in zoba Maekel (21 percent). The lowest level is in zoba Debub (4 percent).

Figure 28

Malnutrition among Mothers of Children under Five Years by Region, Eritrea



Note: Maternal undernutrition is the percentage of mothers whose BMI (kg/m^2) is less than 18.5. Maternal overnutrition is the percentage of mothers whose BMI is greater than 25.

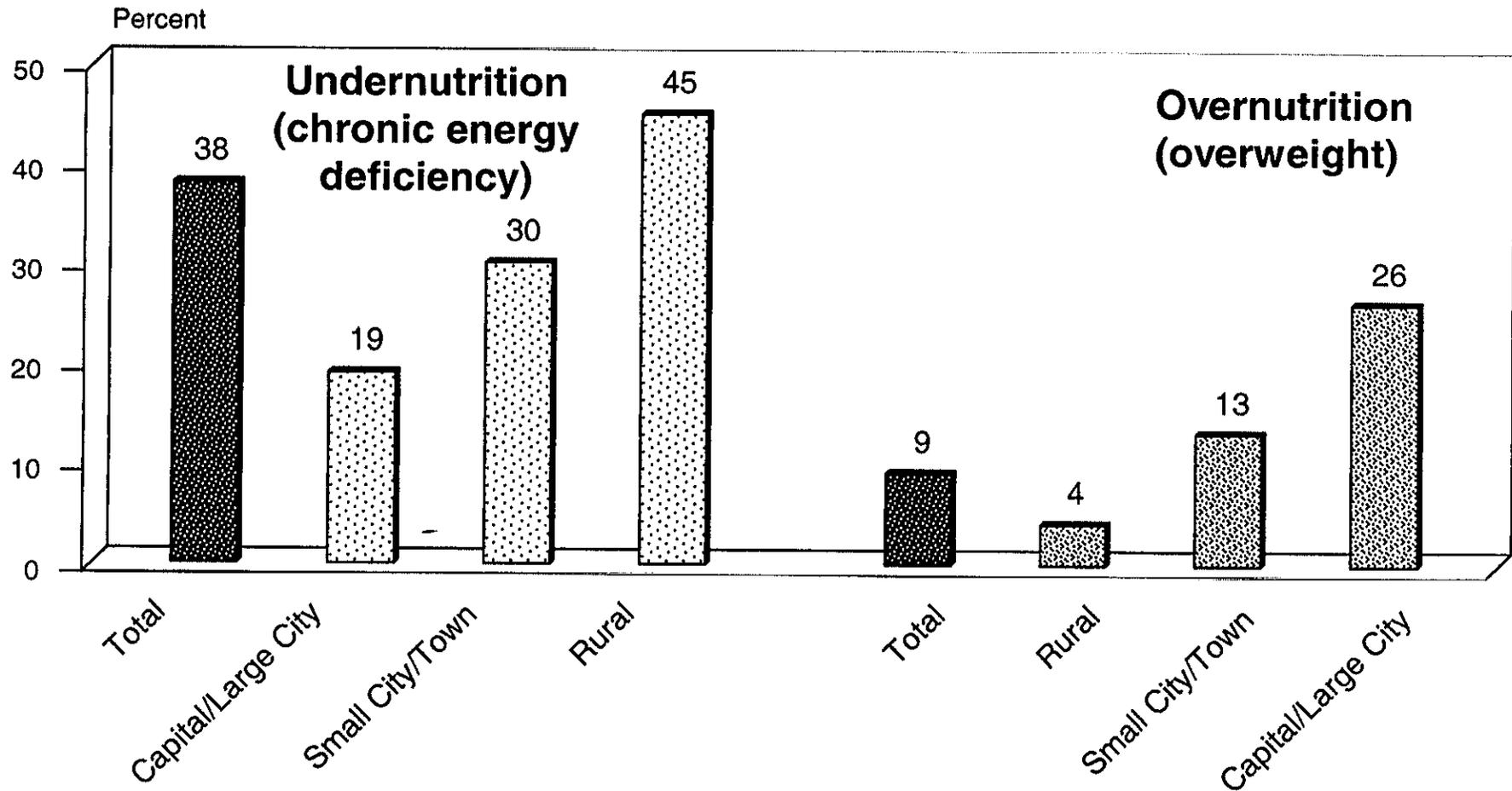
Figure 29: Malnutrition among Mothers of Children under Five Years by Residence, Eritrea

In Eritrea,

- **The undernutrition rate (chronic energy deficiency) for mothers of children under five is 19 percent in the capital and other large cities, 30 percent in small cities and towns and 45 percent rural areas.**
- **The overnutrition rate (overweight) for mothers of children under five is lowest in rural areas (4 percent) and highest in the capital and other large cities (26 percent).**

Figure 29

Malnutrition among Mothers of Children under Five Years, by Residence, Eritrea



Note: Maternal undernutrition is the percentage of mothers whose BMI (kg/m²) is less than 18.5. Maternal overnutrition is the percentage of mothers whose BMI is greater than 25.

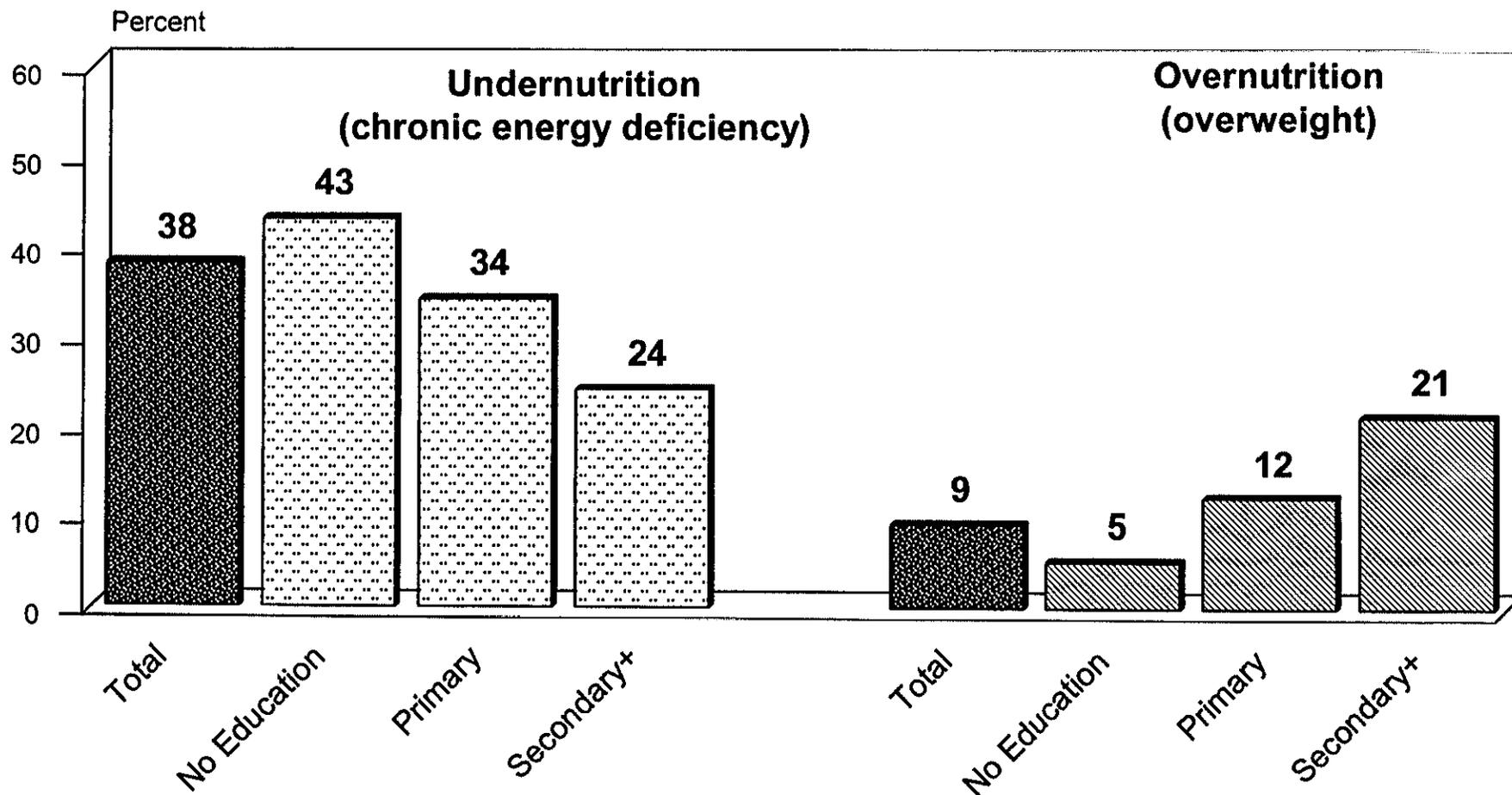
Figure 30: Malnutrition among Mothers of Children under Five Years by Education, Eritrea

In Eritrea,

- **The rate of maternal undernutrition is highest among women with no education (43 percent) and lowest among those with at least a secondary school education (24 percent).**
- **The rate of maternal overnutrition is highest among women with at least a secondary school education (21 percent) and lowest among those with no education (5 percent).**

Figure 30

Malnutrition among Mothers of Children under Five Years, by Education, Eritrea



Note: Maternal undernutrition is the percentage of mothers whose BMI (kg/m²) is less than 18.5. Maternal overnutrition is the percentage of mothers whose BMI is greater than 25.

Figure 31: Malnutrition among Mothers of Children under Three Years, Eritrea Compared with Other Sub-Saharan Countries

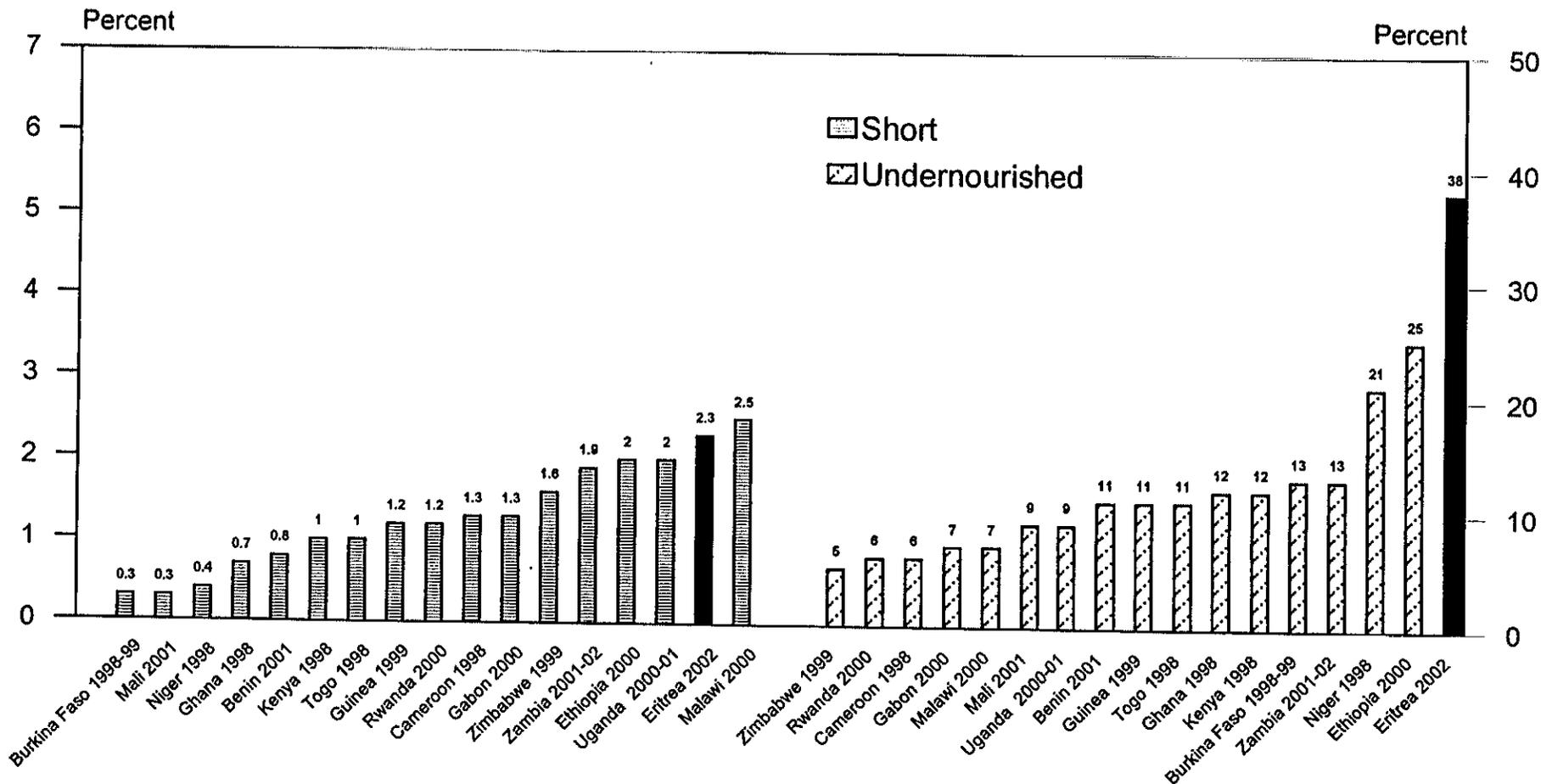
Malnutrition among mothers is likely to have a major impact on their ability to care for themselves and their children. Women less than 145 centimeters in height are considered too short. Mothers who are too short (a condition largely due to stunting during childhood and adolescence) may have difficulty during childbirth because of the small size of their pelvis. Evidence also suggests there is an association between maternal height and low birth weight. Underweight status in women assessed using the body mass index is also presented. Pregnant women are not included in the malnourished analysis due to weight considerations.

In Eritrea,

- **Slightly more than 2 percent of mothers of children under three are too short (<145 cm).** This proportion puts Eritrea among the highest of the sub-Saharan countries surveyed.
- **Thirty-eight percent of mothers of children under three are undernourished (BMI<18.5).** This is the highest level among the sub-Saharan countries surveyed.

Figure 31

Malnutrition among Mothers of Children under Three Years, Eritrea Compared with Other Sub-Saharan Countries



Note: *Short* is the percentage of mothers under 145 cm; *undernourished* is the percentage of mothers whose BMI (kg/m²) is less than 18.5. Pregnant women and those who are less than two months postpartum are excluded from BMI calculation.

Appendices

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Appendix 1
Stunting, Wasting, Underweight, and Overweight Rates by Background Characteristics
Eritrea 2002

Background characteristic	Stunted	Wasted	Underweight	Overweight	Background characteristic	Stunted	Wasted	Underweight	Overweight
Child's age in months					Zoba				
0-5	3.0	5.6	4.3	10.8	Debulawi Kein Bahri	38.3	13.4	41.3	5.2
6-11	17.6	17.4	30.4	5.1	Bahri				
12-17	36.9	24.8	51.8	3.2	Maekel	22.5	5.9	23.0	5.7
18-23	55.6	16.1	51.8	3.0	Semenawi Keih Bahri	42.6	17.7	51.3	1.9
24-29	49.3	13.4	52.7	0.7	Anseba	40.8	15.6	47.3	2.4
30-35	47.5	11.7	49.8	3.0	Gash-Barka	44.8	16.6	49.6	3.3
36-47	45.3	10.6	42.0	2.7	Debul	38.6	9.8	34.4	3.7
48-59	42.5	8.4	40.1	2.1					
	p<0.000 n=5,242	p<0.000 n=5,241	p<0.000 n=5,239	p<0.000 n=5,242		p<0.000 n=5,240	p<0.000 n=5,241	p<0.000 n=5,241	p<0.000 n=5,241
Gender of child					Urban-rural residence				
Female	36.0	11.2	38.5	3.4	Capital or large city	17.8	4.0	18.4	5.9
Male	39.1	13.5	40.5	3.8	Small city or town	35.0	11.5	36.3	2.8
					Rural	42.6	14.4	45.0	3.3
	p=0.020 n=5,241	p<0.014 n=5,241	NS n=5,242	NS n=5,242		p<0.000 n=5,242	p<0.000 n=5,242	p<0.000 n=5,241	p<0.001 n=5,241
Overall	37.6	12.4	39.5	3.6	Overall	37.6	12.4	39.5	3.6

Note: Level of significance is determined using the chi-square test. NS=Not significant at p≤0.05.

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Appendix 2

WHO/CDC/NCHS International Reference Population Compared with the Distribution of Malnutrition in Eritrea

The assessment of nutritional status is based on the concept that in a well-nourished population, the distributions of children's height and weight, at a given age, will approximate a normal distribution. This means that about 68 percent of children will have a weight within one standard deviation of the mean for children of that age or height and a height within one standard deviation of the mean for children of that age. About 14 percent of children will be between one and two standard deviations above the mean; these children are considered relatively tall or overweight for their age or relatively overweight for their height. Another 14 percent will be between one and two standard deviations below the mean; these children are considered relatively short or underweight for their age or relatively thin for their height. Of the remainder, 2 percent will be very tall or obese for their age or obese for their height; that is, they are more than two standard deviations above the mean. Another 2 percent will fall more than two standard deviations below the mean and be considered moderately or severely malnourished. These children are very short (stunted), very underweight for their age, or very thin for their height (wasted). For comparative purposes, nutritional status has been determined using the International Reference Population defined by the United States National Center for Health Statistics (NCHS standard) as recommended by the World Health Organization and the Centers for Disease Control and Prevention.

Appendix 2 includes four curves: weight-for-age, height-for-age, and weight-for-height graphed against the normal curve. The weight-for-height, height-for-age, and weight-for-age curves are greatly to the left of the standard curve, indicating that there is a large number of malnourished children. The implications are that interventions are necessary to address widespread malnutrition in order to improve child health, which will result in a shift in the curves closer to the reference standard.

Appendix 2

WHO/CDC/NCHS International Reference Population Compared with the Distribution of Malnutrition in Eritrea

