

Key Findings

- **Current levels:** Early childhood mortality is declining over time. One in every 100 children dies before completing one year of life. Around 68 percent of infant mortality is attributed to deaths of children before completing 1 month.
- **Trends:** All measures of childhood mortality show a marked decline over the past 10 years.
- **Differentials:** Differentials by background characteristics in early childhood mortality rates during the past decade are small. However, neonatal mortality and infant mortality rates are lower to the extent that the mother's level of education is higher.
- **High risk births:** Of the total number of births in the five years preceding the survey, 23 percent are in at least one avoidable high risk category.

Early childhood mortality is an important measure of a country's socioeconomic development as well as the quality of life. Sri Lanka has experienced a significant decline in the probability of dying in the early childhood period during last decades. This chapter presents the levels, trends and differentials in early childhood mortality rates in Sri Lanka during the 14 years prior to the 2016 SLDHS study. The mortality rates can be considered as indices that provide a baseline for the country's initiatives on the 2030 agenda for sustainable development. These data can also be used for monitoring and evaluating existing programmes in the health sector.

The data for mortality estimation were collected in the birth history section of the women's questionnaire of the 2016 SLDHS 2016. The birth history is preceded by a short section including questions about the respondent's experience with child bearing (number of sons and daughters living with the mother, the number who live elsewhere, and the number who died). These questions were followed by a retrospective birth history in which each respondent was asked to list each of her births, starting with the first birth. For each birth, data were obtained on sex, month, and year of birth, survivorship status, and current age, or if the child was dead, age at death. This information is used to directly estimate mortality levels, differentials and trends. Age-specific mortality rates are categorized and defined as follows:

Neonatal mortality (NNM): the probability of dying within the first month of life

Post-neonatal mortality (PNNM): the probability of dying between the first month and first birthday (the difference between infant and neonatal mortality)

Infant mortality (1q0): the probability of dying before the first birthday, or IMR

Child mortality (4q1): the probability of dying between the first and fifth birthday, or CMR

Under-five mortality (5q0): the probability of dying between birth and the fifth birthday, or U5MR

All rates are expressed per 1,000 live births, except for child mortality, which is expressed per 1,000 children surviving to 12 months of age. Under-five mortality consists of deaths among children from birth until exact age five.



8.1 DATA QUALITY

The quality of mortality estimates calculated from retrospective birth histories depends upon the completeness with which births and deaths are reported and recorded. Retrospective birth history data are known to be susceptible to several possible types of errors. One source of error relates to the facts that only surviving women age 15-49 were interviewed, eliminating data on children of women who were not represented in the sample because they have already died. Resulting mortality estimates will be biased if the fertility of surviving and non-surviving women would differ substantially.

A second factor that affects childhood mortality estimates is the quality of reporting of age at death, which may distort the age pattern of mortality. If age at death is misreported, it will bias the estimates, especially if the net effect of the age misreporting results in transference from one age bracket to another. For example, a net transfer of deaths from under one month to a higher age will affect the estimates of neonatal and post-neonatal mortality. To minimize errors in reporting of age at death, interviewers were instructed to record age at death in days if the death took place in the month following the birth, in months if the child died before age two, and in years if the child was at least two years of age.

Another possible error is under-reporting of events; respondents are more likely to forget distant events than recent events. Thus, deaths that occurred in the more distant past are less likely to be reported than recent deaths, resulting in under-reporting of deaths. If selective omission of childhood deaths occurs, it is usually most severe with deaths early in infancy. Generally, if deaths are substantially under-reported, the result is a low ratio of early neonatal deaths (within the first week of life) to all neonatal deaths and a low ratio of neonatal deaths to infant deaths.

8.2 LEVELS AND TRENDS IN INFANT AND CHILD MORTALITY

Early childhood mortality in Sri Lanka has declined to a low rate. Sri Lanka was able to achieve MDG targets on infant and under-five mortality, as expected. Table 8.1 presents the levels and changes in childhood mortality rates during the past fifteen years. Under five mortality (U5MR) was estimated as 11 deaths before age 5 per 1,000 live births for the 0-4 years period before the survey. This value compares to 13 and 17 for the 5-9 and 10-14 years before the survey respectively, indicating a reduction of about 30 percent during the last 15 years.

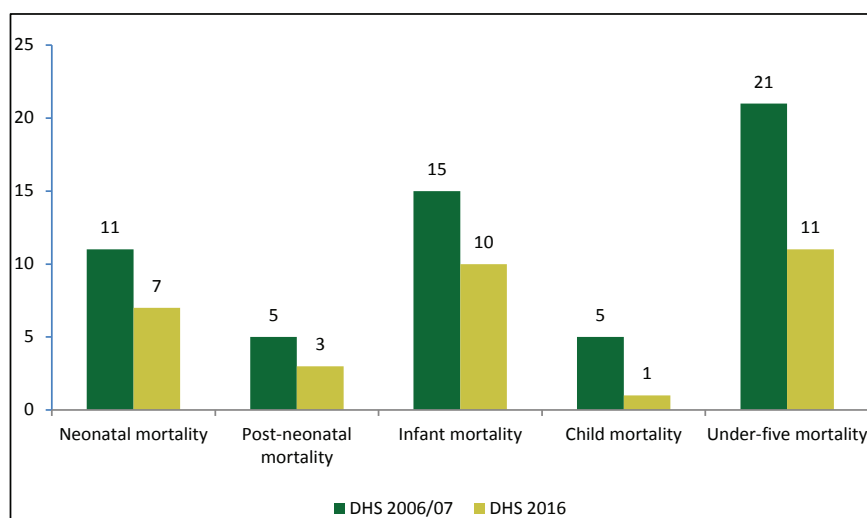
Most of the U5MR in Sri Lanka occurs within the first year of life, particularly during the first month after birth, also called the neonatal period. The infant mortality rate (IMR) was estimated at 10 per 1,000 live births during the 0-4 years before the survey, of which 7 per 1,000 correspond to the neonatal mortality rate (NNM, see Table 8.1). Data in Table 8.1 also show that post-neonatal, infant and child mortality rates have declined during the last 15 years

Table 8.1 Early childhood mortality rates					
Neonatal, post-neonatal, infant, child, and under-five mortality rates for five-year periods preceding the survey, Sri Lanka 2016					
Years preceding the survey	Neonatal mortality (NN)	Post-neonatal mortality (PNN) ¹	Infant mortality (1q0)	Child mortality (4q1)	Under-five mortality (5q0)
0-4	7	3	10	1	11
5-9	8	3	11	2	13
10-14	10	4	14	3	17

¹ Computed as the difference between the infant and neonatal mortality rates .

Figure 8.1 presents a comparison on childhood mortality rates for 0-4 years preceding the surveys conducted in 2006-07 and 2016. The results confirm the declining trend in all indicators of infant and child mortality. Notice also the expected similarity between the rates for the 0-4 period before the 2006-07 SLDHS and the ones for the period 10-14 from the 2016 SLDHS.

Figure 8.1 Estimates of NNM, PNNM, IMR, 4q1 and U5MR for the 0-4 years before the survey, obtained from the 2006-07 SLDHS and 2016 SLDHS



8.3 SOCIOECONOMIC DIFFERENTIALS IN INFANT AND CHILD MORTALITY

Differentials in early childhood mortality with socioeconomic characteristics including residence, mother's education level and wealth quintile are shown in table 8.2. The data refer to the 10-year period preceding the survey.

Children born in the estate sector have a slightly higher probability of dying before reaching year 1 of their life when compared to children in the urban and rural sectors. Neonatal and post neonatal mortality show declines with the increase of mother's education level. Wealth quintile has only a slight relationship with deaths of children of under 1 year. Neither residence nor mother's education nor wealth quintile shows significant differences in child mortality.

The highest rate in under-five mortality is reported in Kilinochchi district, with 44 per 1,000 live births, while the lowest is reported in Polonnaruwa district. Mortality estimates for most of the districts were hindered by the low number of cases.

By sector of residence, the Estates has a higher U5MR (15 per thousand live births during the 10 years period before the survey), than the urban and rural sectors (11 and 12 respectively). These differences are due to the differential NNM, with a much higher NNM levels among live births of mothers in the estate sector (see Table 8.2 below).

Sector differential in under-five mortality rate between DHS survey conducted in 2006-07 and 2016 presents in the figure 8.3. Under-five mortality rate has fallen in urban sector from 19 to 11 deaths per 1,000 live births while in estate sector from 33 to 15 deaths per 1,000 live births when compared DHS 2006-07 and DHS 2016 reporting comparatively high decline in the estate sector.

The level of education of the mother and household wealth present the expected differentials in infant and child mortality. U5MR is much higher among mothers of children with no education (14 per 1,000 live births during the 10 year period before the 2016 SLDHS) than those with degree and above (just 6 per 1,000 live births). Similarly, children of the poorest households are also experiencing higher levels of U5MR than those of the richest quintile (17 vs 9 respectively, see Table 8.2).

Please note that this rate has been calculated using less than 299 exposure cases.



Table 8.2 Early childhood mortality rates by socioeconomic characteristics

Neonatal, post-neonatal, infant, child, and under-five mortality rates for the 10-year period preceding the survey, by background characteristics, Sri Lanka 2016

Background characteristic	Neonatal mortality (NN)	Post-neonatal mortality (PNN) ¹	Infant mortality (1q0)	Child mortality (4q1)	Under-five mortality (5q0)
Residence					
Urban	7	3	10	2	11
Rural	7	3	10	1	12
Estate	8	5	13	2	15
District					
Colombo	5	4	9	0	9
Gampaha	2	3	5	2	7
Kalutara	9	7	16	0	16
Kandy	7	2	9	3	12
Matale	(10)	(4)	(14)	(1)	(14)
Nuwara Eliya	7	2	9	0	9
Galle	4	3	8	2	10
Matara	7	0	7	0	7
Hambantota	6	2	8	0	8
Jaffna	(7)	(2)	(10)	(5)	(15)
Mannar	(0)	(3)	(3)	(2)	(4)
Vavuniya	(15)	(0)	(15)	(0)	(15)
Mullaitivu	(13)	(9)	(22)	(0)	(22)
Kilinochchi	(21)	(8)	(28)	(16)	(44)
Batticaloa	8	2	10	0	10
Ampara	13	4	17	0	17
Trincomalee	25	(0)	(25)	(1)	(26)
Kurunegala	7	3	10	2	12
Puttalam	14	5	19	4	22
Anuradhapura	7	3	10	1	12
Polonnaruwa	(0)	(0)	(0)	(3)	(3)
Badulla	8	3	10	3	13
Monaragala	6	0	6	(0)	(6)
Ratnapura	9	7	17	0	17
Kegalle	3	3	6	1	7
Mother's education					
Passed Grade 1-5	9	5	13	1	14
Passed Grade 6-10	7	4	11	2	12
Passed G.C.E.(O/L) or equivalent	8	3	11	1	12
Passed G.C.E.(A/L) or equivalent	8	2	10	1	11
Degree and above	3	0	4	2	6
Wealth quintile					
Lowest	10	5	15	2	17
Second	7	2	9	0	10
Middle	6	2	8	2	10
Fourth	8	4	11	2	14
Highest	6	2	8	1	9

¹ Computed as the difference between the infant and neonatal mortality rates

Figure 8.2 Under Five Mortality Rates in Sri Lanka, 2016

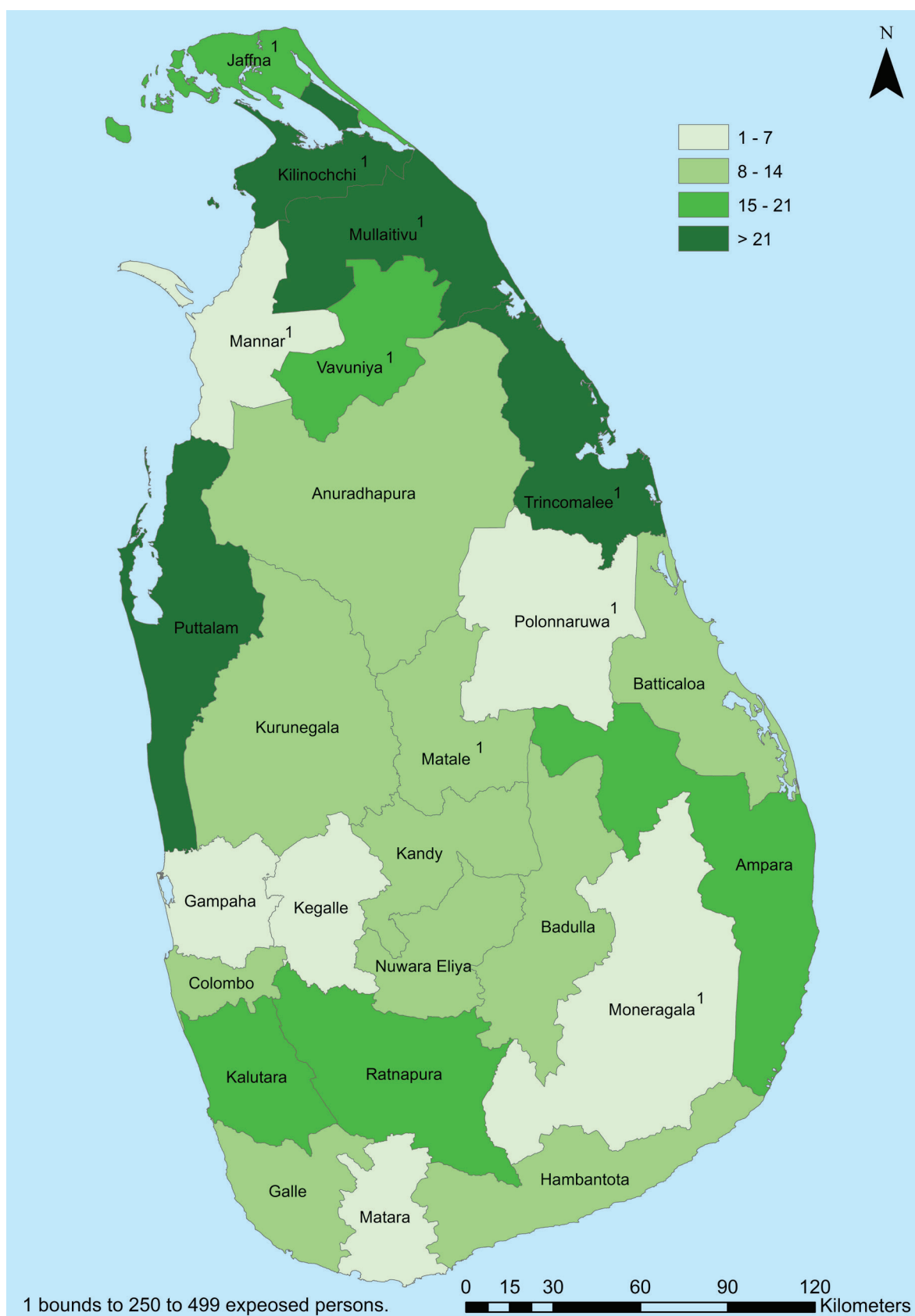
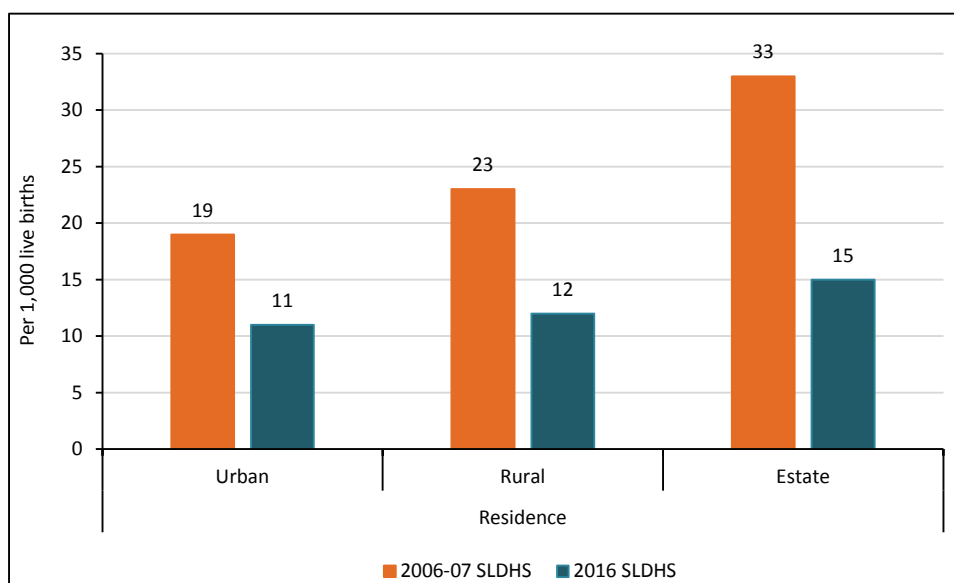


Figure 8.3 Under-five Mortality Rates in the 2006-07 SLDHS and the 2016 SLDHS



8.4 DEMOGRAPHIC DIFFERENTIALS IN INFANT AND CHILD MORTALITY

Demographic characteristics like sex of the child, mother's age at birth, birth interval and birth order are highly related to the death of a child. Table 8.3 presents the levels of early childhood mortality by demographic characteristics as observed during the 10 years period before the survey. The results included here confirm the traditional pattern of early childhood mortality by sex of the child in which males are more likely to die before age five when compared to females. The pattern is also present for the NNM, and IMR.

The data included on IMR by age of the mother at birth confirm the U-shaped pattern of higher levels of IMR at early and late ages of birth (15-19 and 40-49 respectively). The trend in NNM resembles a J-shape, high when the mother's age at birth is less than 20 and greater than 40. As expected, neonatal mortality is substantially higher in cases where birth order is 4-6, than in cases where birth order is lower. The association of the length of the previous birth interval to the neonatal mortality is marginal.

Table 8.3 Early childhood mortality rates by demographic characteristics

Neonatal, post-neonatal, infant, child, and under-five mortality rates for the 10-year period preceding the survey, by demographic characteristics, Sri Lanka 2016

Demographic characteristic	Neonatal mortality (NN)	Post-neonatal mortality (PNN) ¹	Infant mortality (1q0)	Child mortality (4q1)	Under-five mortality (5q0)
Child's sex					
Male	9	3	12	2	14
Female	6	3	9	1	10
Mother's age at birth					
<20	10	3	12	3	16
20-29	7	3	11	2	12
30-39	7	3	10	1	11
40-49	(17)	(1)	(17)	*	*
Birth order					
1	8	2	11	2	12
2-3	6	4	10	1	11
4-6	14	5	19	1	21
Previous birth interval²					
<2 years	8	5	13	3	16
2 years	10	2	12	na	na
3 years	5	5	10	na	na
4+ years	6	3	10	na	na

¹ Computed as the difference between the infant and neonatal mortality rates

² Excludes first-order births

8.5 PERINATAL MORTALITY

Perinatal mortality – comprising pregnancy losses occurring after seven completed months of gestation (still births) and deaths to live births within the first seven days of life (early neonatal mortality), provides a measurement of the quality of a country's health delivery services.

Table 8.4 presents the number of stillbirths, number of early-neonatal deaths, the perinatal mortality rate, and the number of pregnancies of 7+ months duration for the five-year period preceding the survey by background characteristics. The perinatal mortality rate, which is reported as 11 deaths per 1,000 live births, is comparatively high when compared to neonatal mortality in Sri Lanka (7). Babies born to mothers age 30 years or older and less than 20 years, experience considerably higher perinatal mortality, than those of mothers between 20-29 years of age. Slightly higher perinatal mortality was reported in the urban sector (12 deaths per 1,000 live births), compared to the perinatal mortality in the estate sector (7 deaths per 1,000 live births). For the first pregnancy as well as pregnancies occurring within less than 15 months and greater than 39 months of a previous pregnancy, higher perinatal mortality rates are observed. There is no clear relationship between perinatal mortality and mother's education level or wealth index, indicating perhaps a lower effect of the social and economic levels of the households and families in the chance for early childhood survival. Childhood mortality shows a U-shaped pattern in relation to mother's age at birth and birth interval.



Table 8.4 Perinatal mortality

Number of stillbirths and early neonatal deaths, and the perinatal mortality rate for the five-year period preceding the survey, by background characteristics, Sri Lanka 2016

Background characteristic	Number of stillbirths ¹	Number of early neonatal deaths ²	Perinatal mortality rate ³	Number of pregnancies of 7+ months duration
Mother's age at birth				
<20	1	3	10	415
20-29	14	15	7	4,209
30-39	30	20	15	3,371
40-49	5	2	35	203
Previous pregnancy interval in months⁴				
First pregnancy	14	14	10	2,940
<15	4	4	11	713
15-26	1	3	6	641
27-38	1	5	9	734
39+	29	13	13	3,171
Residence				
Urban	9	6	12	1,299
Rural	39	33	11	6,539
Estate	2	1	7	359
District				
Colombo	6	3	13	722
Gampaha	2	0	3	764
Kalutara	5	4	17	521
Kandy	1	2	6	577
Matale	3	2	22	220
NuwaraEliya	0	0	0	278
Galle	3	2	11	425
Matara	4	1	15	340
Hambantota	2	1	10	267
Jaffna	2	1	16	206
Mannar	0	0	0	41
Vavuniya	1	0	13	61
Mullaitivu	0	0	9	37
Kilinochchi	0	1	17	46
Batticaloa	0	1	3	245
Ampara	1	5	16	360
Trincomalee	1	2	15	195
Kurunegala	2	1	6	684
Puttalam	0	5	18	295
Anuradhapura	4	1	13	415
Polonnaruwa	1	0	7	188
Badulla	4	1	16	304
Monaragala	3	1	16	240
Ratnapura	3	4	17	452
Kegalle	1	1	7	313
Mother's education				
No education	0	0	0	55
Passed Grade 1-5	0	0	0	291
Passed Grade 6-10	20	17	10	3,539
Passed G.C.E.(O/L) or equivalent	17	10	14	1,838
Passed G.C.E.(A/L) or equivalent	12	11	12	1,996
Degree and above	1	2	6	480
Wealth quintile				
Lowest	9	8	10	1,638
Second	14	9	14	1,669
Middle	9	9	11	1,636
Fourth	16	4	11	1,771
Highest	2	10	8	1,483
Total	50	40	11	8,198
¹ Stillbirths are fetal deaths in pregnancies lasting seven or more months.				
² Early neonatal deaths are deaths at age 0-6 days among live-born children.				
³ The sum of the number of stillbirths and early neonatal deaths divided by the number of pregnancies of seven or more months' duration, expressed per 1,000.				
⁴ Categories correspond to birth intervals of <24 months, 24-35 months, 36-47 months, and 48+ months.				

8.6 HIGH-RISK FERTILITY BEHAVIOUR

Survival of a new born child depends, to some extent, on his/her mother's demographic and biological characteristics. In general, children under 5 years have a higher risk of dying when their mother is very young or old, born within a short birth interval or to mothers experiencing high parity. In this analysis, children are classified at risk, if the mother is younger than 18 years or older than 34 at the time of child birth. Birth intervals shorter than 24 months and birth order greater than 3 are also defined as risk factors. A child may be at elevated risk of dying due to a combination of these factors. Since each birth has a risk, lowest risk categories have been classified into two – not in any high risk category and in any unavoidable high risk category.

Table 8.5 presents the percent distribution of children born in the five years preceding the survey by category of elevated risk of mortality. Of the total births in the 5 years preceding the survey, 40 percent occurred without any of the risk factors. Twenty-three percent of the births occurred in the 5 years preceding the survey is in any avoidable high-risk category.

Single high risk ratios, the proportion dead among births in a specific high-risk category to the proportion dead among births not in any high-risk category, are 3.3 for births to mothers whose age is less than 18, followed by mothers having a birth of order greater than 3 (1.9 higher risk than those not in any high-risk category).

The last column of Table 8.5 presents the percentage of currently married women in different risk categories. A birth to a currently married woman would fall into this category if she was pregnant at the time of survey. Currently married women in single risk category (around 42 percent) and multiple risk category (16 percent) should be provided with special health care during their pregnancy period. Around 36 percent of currently married women are in “not in any high risk” category while 7 percent of women are in unavoidable risk category (first order births between ages 18-34 years). Finally, note that 57 percent of the currently married women are recognized as “in any avoidable high-risk category”.



Table 8.5 High-risk fertility behavior

Percent distribution of children born in the five years preceding the survey by category of elevated risk of mortality and the risk ratio, and percent distribution of currently married women by category of risk if they were to conceive a child at the time of the survey, Sri Lanka 2016

Risk category	Births in the 5 years preceding the survey		Percentage of currently married women ¹
	Percentage of births	Risk ratio	
Not in any high-risk category	40.4	1.00	35.7
Unavoidable risk category			
First order births between ages 18 and 34 years	36.6	0.93	7.2
Single high-risk category			
Mother's age <18	1.0	3.30	0.1
Mother's age >34	11.8	0.70	31.8
Birth interval <24 months	4.1	1.43	7.1
Birth order >3	2.6	1.85	2.5
Subtotal	19.5	1.14	41.5
Multiple high-risk category			
Age <18 and birth interval <24 months ²	0.0	*	0.0
Age >34 and birth interval <24 months	0.6	0.00	1.2
Age >34 and birth order >3	2.3	0.71	12.5
Age >34 and birth interval <24 months and birth order >3	0.1	*	0.7
Birth interval <24 months and birth order >3	0.4	(0.00)	1.2
Subtotal	3.5	0.74	15.6
In any avoidable high-risk category	23.0	1.08	57.0
Total	100.0	na	100.0
Number of births/women	8,230	na	17,257

Note: Risk ratio is the ratio of the proportion dead among births in a specific high-risk category to the proportion dead among births not in any high-risk category.

na = Not applicable

¹ Women are assigned to risk categories according to the status they would have at the birth of a child if they were to conceive at the time of the survey: current age less than 17 years and 3 months or older than 34 years and 2 months, latest birth less than 15 months ago, or latest birth being of order 3 or higher.

² Includes the category age <18 and birth order >3

a Includes sterilized women