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Level and Trends of Infant and Child Mortality in Nepal

Introduction

IN the absence of an established vital registration system in Nepal, it is very difficult to estimate the past trends of infant and child mortality. The vital registration programme in Nepal commenced in April 1978. This programme followed the enactment of the 1976 Registration Act, and the 1977 Household Listing Act. In January 1980, the vital registration programme was extended to 21 out of the 75 districts of Nepal. As this programme is relatively recent and has not been extended to most of the country, it will be some time before a complete coverage of vital events can be expected (Kantner, 1980).

Until the 1960s, researchers estimated infant mortality from the age-sex distribution of the census population : systematic census taking began in 1952/54. The Nepal Health Survey of 1965-66 and the Demographic Sample Surveys of 1974-75, 1976 and 1977-78 also provide estimates of infant mortality.

In recognition of the need for reliable data on population, especially with respect to the level of fertility for the country as a whole and differentials among geographic regions, Nepal Fertility Survey was carried out in 1976 [Nepal Family *Planning and* Maternal child *health (NFP-MCH) Project, 1977). This* survey was a part of the World Fertility Survey (WFS), an undertaking of the International Statistical Institute (ISI).

One of the main objectives of the Nepal Fertility Survey, 1976 was to identify meaningful differentials in patterns of fertility and fertility regulation and to clarify factors affecting fertility (NFP-MCH, Project, 1977 ; 1). However, the information gathered on the respondent's retrospective pregnancy history from the World Fertility Surveys has proved increasingly useful in the study of the

level and trends of infant and child mortality (Meegama, 1980; Somoza, 1980; Mott, 1982).

So far, of all the sample surveys conducted in Nepal, the Nepal Fertility Survey 1976 provides the most comprehensive and detailed set of data suitable for the study of levels and trends of infant and child mortality. The details of the survey methodology can be found in the Nepal Fertility Survey 1976 (First Report, NFP-MCH Project, 1977).

The present paper is divided into two parts. First, we will review the earlier estimates of infant and child mortality. Second, estimates based on the Nepal Fertility Survey 1976 will be presented. They will be derived, in turn, by direct method using retrospective pregnancy histories, and by indirect methods using the proportion of deaths among ever-born children to ever-married women, 15 to 49 years, classified by five year age groups.

Earlier Estimates

Table 1 summarizes the major early estimates of infant mortality in Nepal. The earliest estimate of 260 and 250 infant deaths per 1000 live births for males and females respectively refers to 1954 and was made by Vaidyanathan and Gaige (1973), It was based on the stable population technique applied to the adjusted age-sex distribution of the 1952/54 census of Nepal.

TABLE 1-ESTIMATES OP INFANT MORTALITY RATE BY SEX FOR NEPAL

(Rates Per 1000 Live Births)

Source	*Period*	*Male*	*Female*	*Both Sexes*
Vaidyanathan and Gaige	1954	260	250	255
Worth and Shah	1965-66	—	—	152
Gubhaju	1961-71	200	186	193
Central Bureau of Statistics	1971	—	—	172
Demographic Sample Survey	1974-75	141	123	133
Demographic Sample Survey	1976	128	138	134
Demographic Sample Survey	1977-78	110	98	104
Nepal Fertility Survey	1976	—	—	152

SOURCES. Vaidyanathan and Gaige (1973); Worth and Shah (1969); **Gubhaju** (1974); Central Bureau of Sialistic$_s$;(1974); **Bourini** (1976);jBourini (1977J; **Central Bureau of** Statistics (1978), and Nepal Family Planning and **Maternal** Child **Healh Project (1977).**

The Nepal Health Survey produced an infant mortality rate of 152 for the period 1965-66 (Worth and Shah, 1969). This estimate is low in comparison to the other estimates shown in Table 1. One of the reasons for the low level of IMR in the Nepal Health Survey may be the fact that the survey excluded most of the mountain regions which have particularly high infant mortality compared to the other two regions, the hills and *Terai.*

For the period between 1961 and 1971, life tables for Nepal using the census age-sex distribution have been constructed (Gubhaju, 1974). Infant mortality rate of 200 for males and 186 for females have been estimated. On the basis of the adjusted age-sex distribution from the 1971 census, the Central Bureau of Statistics (CBS, 1974) estimated an infant mortality rate of 172 for both sexes combined. For both sexes combined, the author's estimate is about 193 and refers to about 1966. CBS estimate of 172 would be dated to around 1970, implying a decline of about 20 points over 4-5 years. It could be a plausible decline. However, some differences in the estimates of the rates could arise from the estimation techniques and also from the adjustment of census age distribution.

The Demographic Sample Surveys of 1974/75, 1976 and 1977/78 estimated infant mortality rates for these periods (Bourini 1976; 1977; Central Bureau of Statistics, 1978). These estimates of 133 for 1974/75 and 134 for 1976 are rather low in comparison to the infant mortality rate of 152 derived from the Nepal Fertility Survey 1976. The rate of 104 for 1977/78 is definitely too low to be realistic. An examination of the sex differentials in infant mortality presented in *Table I* confirms *the doubtful reliability of the Demographic Sample* Survey estimates. While the infant mortality rate was higher for males than females in 1974/75 and 1977/78 the pattern was reversed in 1976.

Someofthv studies based on particular villages also provide estimates of infant mortality. Lang and Lang (1971) estimated an infant mortality rate of 158 and a child mortality (1-12 years) of 130 in Upper Khumbu in the mountain region. The Fertility, Mortality and Morbidity Survey of 1978 conducted in selected districts of the hills and *Terai* revealed infant mortality rates of 138 and 159 and child mortality rates (under five years of age) of 164 and 199 for the hills and *Terai* respectively [(NFP-MCH) Project, n.d.]. Although neither of these surveys is nationally representative, both confirm high levels of infant and child mortality, and point to great differentials within the country.

The most recent national estimate of infant mortality comes from the Nepal Fertility Survey 1976. According to the First Country Report, the infant mortality rate calculated by adding all reported infant deaths over a period of three years preceding the survey and dividing by the total number of live births during the same period is 152 infant'deaths per 1000 live births (NFP-MCH Project, 1977). Yet, it is mentioned in the report that :

> Despite the fact that attention has been confined to the recent past, it is likely that infant deaths have been underreportcd and hence the actual IMR

may be greater, but even this unadjusted figure reveals that the infant mortality rate in Nepal is one of the highest in Asia (NFP-MCH Project, 1977 : 48-49).

Thapa and Retherford (1983) estimated infant mortality rates from maternity histories of the Nepal Fertility Survey, 1976. They computed infant mortality rates by dividing deaths of children below one year of age among the birth cohort of a given calendar year by the number of the respective live births. Infant mortality rates were thus obtained for the birth cohorts of 1950-54, 1955-59, 1960-64, 1965-69 and 1970-74. As Goldman *ct dl.* (1979) indicated, there is heaping of reported deaths at 12 months of age. Thapa and Retherford adjusted their data for heaping at 12 months by assuming that half of the deaths recorded as occurring at age 12 months actually occurred earlier. They also noted the effect of truncation. Since the women interviewed in the NFS were 15-49 years of age, infant mortality rates pertaining to the earlier cohorts of births disproportionately relate to younger women, who have higher risk of infant death. This age truncation produces an upward bias in the infant mortality rates for the earlier birth cohorts. They made some adjustment to overcome this bias by assuming that :

> ... the infant mortality rate for the last cumulated age group—say 15-24 for 1950-4—is related to the unknown infant mortality rate for ages 15-44 for those same years in the same proportion that the infant mortality rate for ages *15-24 is related to that for ages 15-44 in 1970-4 (Thapa and Retherford,* 1983 : 63).

Their estimates are shown in Table 2. The unadjusted rates show a consistent

TABLE 2-INFANT MORTALITY RATES, ADJUSTED FOR HEAPING AND CORRECTED FOR AGE TRUNCATION, ESTIMATED FROM MATERNITY HISTORIES IN THE 1976 NEPAL FERTILITY SURVEY

(Rates Per 1000 Live Births)

Period	*Unadjusted*	*Adjusted*	
		Uncorrected	*Corrected*
1950-4	197 (206)	206(215)	179 (215)
1955-9	181 (378)	188 (393)	176(393)
1960-4	179 (585)	187(611)	182 (611)
1965-9	161 (741)	168(771)	168(771)
1970-4	151 (860)	156 (890)	156 (890)

SOURCE. Thapa and Retherford (1983).

Note. **Figures in** parentheses **denote** numbers of infant NO.1*986 Demography India* 49

decline from 1950-54 to 1970-74; in contrast, the rates adjusted for heaping and corrected for age truncation, appear to suggest a fluctuation without a marked trend for the 1950-54 to 1960-64 birth cohorts followed by a steady decline thereafter. The corrected infant mortality rales for the 1950-54 and 1955-59 birth cohorts are lower than that for the 1960-64 birth cohort. This may have been due, however, to failure to report deaths of children who died in infancy during the earlier periods rather than the fluctuation of infant mortality. For the cohort 1970-74, the unadjusted infant mortality rate was 151 and the adjusted rate of 156 was only 5 points higher. Both these rates do not differ much from the rate reported in the First Country Report of 152 for the period corresponding to the year between 1973/74 and 1975/76.

So far, there has been little information on child mortality in Nepal. Goldman *et al,* (1979) estimated child mortality in the process of their evaluation of the quality of data in the Nepal Fertility Survey, 1976. It was noted earlier that some heaping was found at ages of infant and child deaths concentrating at 12, 24, . . . months. While estimating infant and child mortality, the authors applied an adjustment procedure by assigning half of deaths at 12 months to q(1), half of deaths at 24 months to *q(2),* half of deaths at 36 months to q(3) and half of deaths at 60 months to q(5). They presented the rates for birth cohorts 1957-61, 1962-66 and 1967-71. Their estimates shown in Table 3 indicate a fairly steady decline in infant and child mortality during the 20 years prior to the survey. However, some anomalies do appear : in particular, the infant mortality rate is lower for the birth cohorts 1957-61 than for those of 1962-66. This is the same distortion as noted earlier in Thapa and Retherford's estimates and may be due—as mentioned—to omissions of infant deaths.

TABLE 3—ESTIMATES OF INFANT AND CHILD MORTALITY FROM THE DIRECT METHOD FOR VARIOUS BIRTH COHORTS, NEPAL 1976

(Rates Per 1000)

Birth Cohort	q(1)	*q(2)*	*q(5)*	*(4) q(1)*
1957-61	181	235	298	143
1962-66	183	223	272	109
1967-71	166	203	249	100

SOURCE. Adapted from : Goldman, Coale and Weinstein (1979).
Note. Rales are adjusted for heaping.

Methods of Analysis

Direct Method

Infant mortality **is defined as the probability** of dying **of a cohort of live**

births before reaching age one, denoted by 4(0). Child mortality (1-4 years of age), in turn, is defined as the probability of dying before age five for those of the cohort of births that survived to age one, denoted by (4)q(1). The advantage of this measure as opposed to the conventional one is that the infant or child deaths used in the numerator relate to those exDosed to the risk of death[3]. This method of estimating infant and child mortality, sometimes termed the direct method, has been used in this study.

Indirect Methods

The lack of a vital registration system in some countries and incomplete coverage of birth and deaths in many others where vital registration systems have been in existence—often for many decades —have necessitated the development of indirect techniques to estimate infant and child mortality. Over the past fifteen years, a number of such techniques have been developed, all of them using, in principle, the data on proportion dsad among children ever-born by age of women classified in standard age groups. The main theory behind the indirect techniques was the discovery that the proportion dead among children ever-born to women of successive five-year age groups is very close to the probability of dying before reaching exact childhood ages, or in life table notations q(x), where x is the age of the child. Brass was the first to propose a set of multipliers for converting statistics on proportion dead among children ever-born to women in age intervals **15** to 19, 20 to 24, ... into estimates of the probability of dying before attaining certain exact childhood ages (Brass and Coale, 1968; Brass, 1975). The conversion equation is given by

$$q(x) = k(i) . D(i), \qquad (1)$$

where *q (x)* is the probability of dying between birth and exact age *x, K(i)* is the multiplying factor for each age group of woman, and *D (i)* is the proportion dead among children ever-born to each age group of woman. As Brass observed, the relation between *D(i)* and *q(x)* is primarily influenced by fertility pattern and, in particular, by the pattern of onset of childbearing. This, in *turn,* influences *the* age distribution of *children,* and thus the average period for which children had been exposed to risk of dying. Originally, the appropriate multiplying factors were determined by the value of *P(1)/P(2),* where *P(i)* is the average parity observed among women belonging to age group /'. Subsequent work by Coale and Demeny suggested that *P(2)/(P(3)* might be a more satisfactory parameter since *P(1)* is sensitive both to age reporting errors at the start of childbearing and to random fluctuations due to the relatively small number of births at those ages of women (Brass, 1975 ; 54). Brass's

2. The conventional measure **of** infant mortality follows the **period approach and is defined as** the **ratio of** infant deaths that occurred in a calendar year in a **given area to** the total number of live births that occurred in the same year and same **area** (Prcssat, 1972).

evaluation of the appropriate multipliers was based on the modelling of fertility schedule as a third degree polynomial. Later, Sullivan (1972) modified Brass's method by computing another set of multipliers using regression technique applied to data obtained from observed fertility schedules. Sullivan's multiplying factor is obtained by

$$K(i) - A(i) + B(i) \cdot P(2)/P(3), \quad (2)$$

where *A(i)* arid *B(i)* are coefficients and *P(2)* and *P(3)* are average parities of women aged 20-24 and 25-29 respectively. Finally, Trussell (1975) created a third set by the same means but using data generated from the model fertility schedules developed by Coale and Trussell (1974). Trussell's multiplying factor is obtained by

$$K(i) = A(i) + B(i) \cdot P(1/P(2) + C(i) \cdot P(2)/P(3), \quad (3)$$

where *A(i), B(i)* and C(i) are coefficients and P(l), *P(2)* and P(3) are average parities of women aged 15-19, 20-24 and 25-29 respectively.

It is important to note that these methods of estimating childhood mortality are based on the assumption that fertility and childhood mortality have remained constant in the past. In the case of Nepal, fertility has virtually remained constant for the past several decades while mortality has been declining in the recent past. Thus, declining mortality may somewhat violate the underlying assumptions of these methods and consequently they may give biased estimates.

Feeney (1976; 1980) modified the model so that it can be applied to the population experiencing a linear decline in mortality. The additional advantage of his method is that it can yield estimates of the time trend in the infant mortality rate. Recently, Preston and Palloni modified the method further making use of the data on the age distribution of surviving children where they are available in the pregnancy histories. The incorporation of this information takes advantage of the actual fertility pattern as reported by the respondents rather than relying on a model as in the Brass-type procedures (Preston and Palloni, 1977 : 73). All these methods have been applied to the data from the Nepal Fertility Survey.

Direct Estimates

Table 4 presents infant mortality rates denoted as *q(l),* and child mortality rates denoted as (4)0(1). In order to make our estimates comparable with those produced by Goldman *et a!.* (1979), we also computed child mortality rates, that is, *q(2)* and *q(5).* These estimates are presented for various birth cohorts, 15 and more years, 10-14 years and 5-9 years before the survey, which correspond to the cohorts of children born before 1962, in 1962-66 and in 1967-71.

It is evident from Table 4 that infant and child mortality rates were extremely high for the cohorts born before 1962 and have been declining. These earlier

TABLE 4-ESTIMATES OF INFANT AND CHILD MORTALITY FROM THE DIRECT METHOD FOR VARIOUS BIRTH COHORTS, NEPAL 1976

(Rales Per **1000)**

Birth Cohort	*q(1)*	*q(2)*	q(5)	(4)q(1)	*Total Births*
-1962	189	238	299	136	4693
1962-66	176	222	273	118	3757
1967-71	158	198	244	102	5049

SOURCE. Nepal Fertility Survey 1976.
Note. **Rates** are based on unadjusted data.

rates may have been still higher because of the possibility that some of the deaths occurring during that period may have been omitted. Although the estimates have shown a declining trend, the infant mortality rate of 158 referring to the cohort 1967-71 is still too high, The level is comparable to the infant mortality rate of 152 for the period 1973/74-1975/76 reported in the First Country Report of the NFS, suggesting a continuation of the decline of infant mortality, though at a very slow pace.

We now compare our estimates of infant and child mortality with those provided by Goldman *et al,* (1979). Their estimates shown in Table 3 have been adapted to make them comparable with the present estimates. It is interesting to note that the estimates of *q(5)* and of *q(2)* are remarkably close to each other. The maximum amount of variation we rind between these estimates is for (4)q(1) referring to the cohort 1962-66. The difference of 9 points between the two estimates may not be considered excessive in the situation of high infant and child mortality. However, in the study of differentials in infant and child mortality one needs to be cautious in the interpretation of the results particularly where the differences among various population subgroups are small.

Indirect Estimates

BRASS, SULLIVAN AND TRUSSELL METHODS

In this section, wo will first present the estimates of infant and child mortality based on Brass, Sullivan and Trussell techniques using the 'West' model of mortality pattern of the Coale-Demeny Model Life Tables. The estimates are set out in Table 5. The 'West' model has been widely used in other Asian countries. It was confirmed that the age pattern of infant and child mortality from the NFS fits quite closely with the pattern implied in the 'West' model of the Coale and Demeny Model Life Table (Goldman *et al,,* 1979J.

As mentioned earlier, the *q(x)* values can be estimated from the multipliers based on **P(l)/P(2)** or P(2)/P(3). We used both sets of multipliers to obtain corresponding *q(x)* values and found that the estimates are identical. The results shown in Table 5 arc derived with multipliers based on P(1)/P(2).

It is apparent from Table 5 that the estimated rates based on the Brass method show a consistent increase in probability of dying before exact ages 1, 2, 3 and 5, referred to *q(1), q(2), q(3)* and *q(5).* The estimates of *q(2), q(3)* and *q(5)* derived by the Sullivan method are not consistent, the estimate of *q(2)* being slightly higher than *q(3).* The Trussell method gives consistent results in the sense that the estimates are consistently increasing. In addition, except for *q*(1), these estimates are remarkably close to the Brass estimates.

TABLE 5-ESTIMATES OF INFANT AND CHILD MORTALITY RATES BASED ON PROPORTIONS DEAD AMONG CHILDREN EVER-BORN TO EVER-MARRIED WOMEN, NEPAL 1976

(Rates **Per 1000)**

Age oj ***Women***	*x*	*q(x)*		
		Brass	*Sullivan*	*Trussell*
15-19	1	172		164
20-24	2	213	219	214
25-29	3	221	217	221
30-34	5	250	242	253

SOURCE. Nepal **Fertility** Survey 1976.

Notes. 1. Multipliers for Brass method are obtained from : Brass (1975);
2. Multipliers for Sullivan and Trussell methods are obtained from : Committee on Population and Demography (1979);
3. Data needed for this table are presented in Appendix I.

Direct estimates showed that infant and child mortality have varied in Nepal during the recent past. Therefore, an estimate of the time reference is required to affix dates to the estimates of infant and child mortality obtained from the Brass-type procedures.

The value of the length of time (measured in years before the survey) to which the corresponding mortality estimate refers, *t** can be obtained from

$$t^* = A(x) + B(x) \cdot P(1)/P(2) + C(x) \cdot P(2)/P(3), \qquad (4)$$

where *A(x), B(x)* and *C(x)* arc regression coefficients, and *P(l), P(2)* and *P(3)* are average panties to women aged 15-19, 20-24 and 25-29.

It is to be noted that the estimated value of *t** (shown in Table 6) implies that the estimates of *q(l), q(2),* y(3) and q(5) obtained by the Brass-type methods

refer to mortality conditions prevalent during approximately one year, t\vo and a half, four and a half and seven years before the survey, respectively.

TABLE 6—CORRESPONDING INFANT MORTALITY RATES BASED ON TRUSSELL METHOD AND THE **LENGTH OF TIME TO WHICH THE RATES REFER, NEPAL** 1976

(Rates **Per 1000)**

Age of Wotnen	*x*	q(x)	*Corresponding IMR*	*t**	*Corresponding Calendar Year*
15-19	1	164	164	1.3	1975.1
20-24	2	214	171	2.7	1973.7
25-29	3	221	163	4-5	1971,9
30-34	5	253	169	6.7	1969.7

SOURCE. Nepal Fertility Survey 1976.

Notes. **1.** The Coefficients for estimating t* are obtained from : Committee **on** Population **and** Demography (1979);

2. The field **work of** the Nepal Fertility Survey was carried out in the months of April-June, 1976, which roughly corresponds to the year 1976.4.

If we concentrate on the infant and child mortality estimates obtained from the Trussell procedure, the infant mortality rates related to Model 'West' Life Tables and the value of *q(2), q(3)* and q(5) are clustered between 163 and 171 (Table 6). These estimates are slightly higher than 158 obtained from the direct method shown in Table 4. The results of the direct method of infant and child mortality also showed a fairly continuous declining trend over the past fifteen years. However, it is known that in the case of declining mortality the Brass-type procedures fend to overestimate current mortality *levels (Kraly* and Norris, 1978 : 551). If that is the case, then the direct estimate appears to be close enough to the Trussell estimate.

FEENEY **METHOD**

The estimates of infant mortality based on the Fecney method arc presented in Table 7. With the exception of the younger age group of mothers (20-24 years) and the older age group (45-49 years), the estimated **IMRs** continuously decline over time. It is evident from this *calculation* that the infant *mortality* rate has declined from 170 in 1964 to 155 in 1972. The infant mortality rate of 158 which (in Feeney's method) corresponds to the year 1969 is identical with the IMR estimate from the direct method which, as we know, corresponds to the years between 1967 and 1971. With these observations it may be concluded that the IMR of 152 per 1000 live births reported in the First Country Report that corresponds to the years between 1973-74 and 1975-76 seems to

be reasonably accurate; even though there has been a some underreporting of infant deaths, this may not be enough to affect the rate substantially.

TABLE 7-ESTIMATION OF INFANT MORTALITY RATES BY FEENEY METHOD, NEPAL 1976

(Rates Per 1000)

Age of Women	*Mean Age at Child bearing*	*IMR*	*years Prior to Survey*	*Corresponding Calendar Year*
15-19	28			
20-24	28	167	2.8	1973.6
25-29	27	155	4.8	1971.6
30-34		158	7.1	1969.3
35-39		!<:4	9.7	1966.7
40-44		170	12.8	1963.6
45-49		*155*	16.2	1960.2

SOURCE. Nepal Fertility Survey 1976.

Notes. 1. The final estimate of the mean age at diildbeuring (M) is taken to be the mean **of** (28 + 28 + 27)/3 = 27.7.

2. IMRs are derived from : Feeney (1976); Display I, p. 13.

3. Years prior to the survey are derived from : Feeney (1976); Display 2, p. 13.

4. Data required for this table are presented in Appendix 1.

5. The Held work of the Nepal Fertility Survey was carried **out in** the months **of** April-June, 1976, which roughly corresponds to the year **1976.4.**

The conspicuously low infant mortality rate based on data for women aged 45-49 is hard to explain. It is most probably due to the fact that these older women underreported the deaths of children ever-born, omitting some of those who had already died or some of those who do not five with them any longer or both. There is also a spurious increase in the IMR between 1972 and 1974, The latter estimate is based on reports of women aged 20-24. This was also observed in the earlier estimates using the Brass, Sullivan and Trussel methods. There is no ready explanation for this anomaly.

PRESTON AND PALLONI METHOD

Finally, to estimate childhood mortality we applied the Preston and Palloni method which makes use of the age distribution of surviving children (Preston and Pailoni, 1977). In this method, proportions dead among children ever-born to women aged 25-29 and 30-34 are used to estimate q(4) and q(6) respectively. The method is sensitive to misstatement of ages of surviving children (McDonald, 1982). Table 8 presents the estimates of q(4) and q(6) using the

Coalc-Domcny 'West' Model Life Tables. The estimates of q(4) and q(6) are 236 and 258 respectively. The average of these two, 247, refers to *q(5)* and corresponds to the year 1969-70. It is close to the estimate of *q(5)* of 244 obtained in the direct method for the cohort 1967-71. The corresponding *q(1)* of 164 and 169 based on q(4) and *q(6)* respectively and the 'West' pattern of mortality arc also in close agreement with the estimates based on the Trussell method, Hcjice, the Preston and Pailoni technique gives resulls comparable with those obtained earlier and thus confirms and reinforces their credibility.

TABLE 8-ESTIMATES OF (4) **AND** (6) **BY PRESTON AND PALLONI TECHNIQUE, NEPAL** 1976

(Rates **Per 1000)**

Age of Women	x	*Number oj Women*	*q(x)*	*Corresponding IMR*
25-29	4	1146	236	164
30-34	6	855	258	169

SOURCE- Nepal Fertility Survey 1976.

Note. The average of 236 and 258, that is, 247 refers to *q(5)* and corresponds **to the** year **1969.7.**

Conclusion

The earlier estimates of infant and child mortality in Nepal have been severely limited owing to the paucity of the necessary data. It was only after the 1950s that it became possible to estimate infant and child mortality when the first adequate census was conducted in 1952'54. Various attempts have been made to arrive at plausible estimates of infant and child mortality using stable or quasi-stable population techniques and applying them to the age-sex distribution of the census population. Though these estimates differ from each other, they nonetheless portray the high levels of infant mortafity that *prevailed in* the past. As shown by various researchers, infant mortality in the 1950s was extremely high, possibly as much as 250 infant deaths per 1000 live births. During the 1961 to 1971 periods it fell to about 190; based on the 1971 census alone, the estimate of infant mortality was around 170.

It was only in the 1970s that the existence of national demographic surveys has made it possible to undertake more detailed studies of infant and child mortality. In the present paper, data from the Nepal Fertility Survey were utilized to study infant and child mortality in broader perspectives. Direct as well as indirect techniques \vcrc applied. The direct method was found to be extremely rewarding as with this technique it has been possible to study the time trend in infant and child mortality.

Indirect methods also provided fairly consistent estimates of infant and child

mortality from the 1976 Nepal Fertility Survey data. It was encouraging to note that the estimates based on indirect methods were in close agreement with those obtained from the direct method.

Finally, it is obvious from various estimation techniques that infant and child mortality has been steadily declining in Nepal. The estimates from the direct and indirect techniques both suggest that the estimated infant mortality rate of 152 infant deaths per 1000 live births for the period 1973/74 to 1975/76 reported in the First Country Report of the Nepal Fertility Survey is fairly accurate.

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APPENDIX

TABLE A.I—MEAN NUMBER OF CHILDREN EVER-BORN, PROPORTION DEAD AMONG CHILDREN EVER-BORN AND NUMBER OF **WOMEN** CLASSIFIED BY STANDARD AGE GROUP OF WOMEN, NEPAL 1976

Age of Women	*Children Ever-Born*	*Children Dead*	*Proportion Dead*	*Mean Parity*	*Number of Women*
15-19	236	42	.1780	.3185	741
20-24	1762	374	.2123	1.4372	1226
25-29	3327	742	.2230	2.9031	1146
30-34	3506	876	.2499	4.1006	855
35-39	3727	1015	.2723	5.0639	736
40-44	3981	1212	.3044	5.5292	720
45-49	2962	920	.3106	5.7403	516

SOURCE. Nepal Fertility Survey 1976.