

A RAND NOTE

EVIDENCE OF A REVERSAL OF THE BREASTFEEDING
DECLINE IN PENINSULAR MALAYSIA

John G. Haaga

March 1986

N-2147-AID

Prepared for

The U.S. Agency for International Development



This research was supported by the U.S. Agency for International Development under Grant No. DAN-1010-G-SS-2109-00.

This Note contains an offprint of Rand research originally published in a journal or book. The text is reproduced here, with permission of the original publisher.

The Rand Publications Series: The Report is the principal publication documenting and transmitting Rand's major research findings and final research results. The Rand Note reports other outputs of sponsored research for general distribution. Publications of The Rand Corporation do not necessarily reflect the opinions or policies of the sponsors of Rand research.

A RAND NOTE

EVIDENCE OF A REVERSAL OF THE BREASTFEEDING
DECLINE IN PENINSULAR MALAYSIA

John G. Haaga

March 1986

N-2147-AID

Prepared for

The U.S. Agency for International Development



Evidence of a Reversal of the Breastfeeding Decline in Peninsular Malaysia

JOHN G. HAAGA, PHD

Abstract: Data from the Malaysian Family Life Survey show an increase in the percentage of infants breastfed, at least initially, from 75 per cent in 1970-74 to 79 per cent in 1975-77. Contrary to what would be expected if Malaysia were following the trends observed in the United States and Western Europe, the increase has occurred among poor and uneducated women as well as among the more fortunate.

The increase was especially marked for infants born in hospitals and private clinics, which had very low rates of breastfeeding in the

early 1970s. The change may be due partly to a shift in the practices and recommendations of health professionals.

Trends in infant feeding practices in Malaysia during the whole period 1950-77 are reviewed. Reasons for thinking the increase in the mid-1970s an artifact of the survey are presented and provisionally rejected. The implications of these findings for child health policy in Malaysia and for theories of infant feeding trends in developing countries are discussed. (*Am J Public Health* 1986; 76:245-251.)

Introduction

In the 1960s and 1970s, there was growing concern about the implications for child health of an apparent decline in many parts of the developing world in both the percentage of infants ever breastfed and in the duration of breastfeeding. Such a secular decline in breastfeeding had already taken place in North America and Western Europe.^{1,2} Infant mortality rates had, in fact, fallen dramatically in North America and Western Europe during the first half of the twentieth century, despite the trend away from breastfeeding, because of improvements in standards of living, hygiene, and medical care. But in the circumstances of poverty and poor hygiene prevailing in most parts of Latin America, Africa, and Asia, abandonment of breastfeeding and unsafe use of artificial milks could have serious consequences. The nutritional and immunological advantages of breast milk are crucial in determining whether infants survive the hazards of diarrhea and respiratory disease. Careful studies controlling for other factors affecting mortality risk have shown significantly higher probabilities of death for artificially fed than for breastfed infants in developing countries.^{3,4}

Trends in breastfeeding were not well documented for developing countries until recently. The fears of widespread decline were usually based on comparisons of survey data from two or three different years, often using different sampling methods, unclear definitions of populations at risk, varying definitions of feeding practices, and the like. Berg summarized such information as was available by the early 1970s, most of it from East Asia and Latin America.⁵ Since then, a great deal more information has been produced by cross-sectional surveys of breastfeeding, conducted as part of the World Fertility Survey,⁶ the World Health Organization Collaborative Study on Breastfeeding,⁷ and various national nutrition surveys. It has become clear that breastfeeding into the second year of life is still the rule in most parts of Africa and South Asia. Only in East and Southeast Asia and urban Latin America are large percentages of infants either not breastfed at all or weaned in the first few months of life.⁸

Besides these cross-sectional surveys, a few longitudinal studies have documented and analyzed declines in breastfeeding, based either on successive surveys in Taiwan and Thailand using comparable methods^{9,10} or retrospective questions about infant feeding in Malaysia covering several decades.¹¹ In each of these three Asian countries, the decline in breastfeeding has been greatest among the urban and more educated women.

In the United States, at present, the younger and better educated women are more likely than their less educated counterparts to breastfeed. The trend thus appears to be the opposite of that feared in the developing countries.^{12,13}

Various theories have been put forward to explain infant feeding trends of recent years. The decline in breastfeeding has been ascribed to changes in the perceived cost and availability both of breastfeeding and breastmilk substitutes.¹⁴ For example, mothers who have to, or want to, work outside the home may face a high "opportunity cost" for the time needed to breastfeed their infants. Other causal models focus on the diffusion of norms from the developing countries to elites and then to the urban poor in developing countries, often exacerbated by the promotional efforts of companies making breast milk substitutes.¹⁵ The incipient return to breastfeeding in some Western countries has been ascribed to such factors as greater awareness of the health benefits of breastfeeding or to a general increase in preferences for natural as opposed to artificial foods.¹⁵

A recent WHO publication attempts to explain breastfeeding trends in both developing and developed countries with the same model of cultural diffusion.¹⁶ In this formulation, populations passing through different stages of "development time" exhibit changes in breastfeeding, going through stages in which first elite groups, then the urban poor, and finally the rural population adopt artificial feeding methods; they then reach a turnaround point where the elite start breastfeeding again, ultimately to be followed by the rest of society. The authors offer examples of countries where the whole process has scarcely begun (India, Zaire), where breastfeeding has declined among the urban elite only (Nigeria), where it seems to be declining among all groups, with the elite leading the way (Philippines, Brazil), where the elite are in a "resurgence" phase with the other classes still lagging behind (Singapore, US), and lastly, at the most advanced stage, countries where the resurgence is under way in all groups (Sweden is the only example cited). "It is possible to confirm the hypothesis that population groups and hence countries seem to pass through the phases or stages in

This paper, submitted to the Journal April 16, 1985, was revised and accepted for publication October 7, 1985.

© 1986 American Journal of Public Health. Reprinted by permission.

a sequential manner and that the most developed countries act as lead groups to countries in the same way as the richest population subgroups act as lead groups within countries."¹⁶

The WHO model thus proposes that the same groups in society would lead a resurgence in breastfeeding that had led in its decline—namely, the wealthier, better-educated families. If this were the case, the differentials now observed in the US and Western Europe would be the pattern of the future for Malaysia, with the more affluent, better educated women breastfeeding more than the rural, poor, and less educated. A further implication would be that it would take a very long time, if ever, for any health impact of a return to breastfeeding to be apparent, since the women presumed to be leading the way would be just the ones whose children are least likely to suffer severe morbidity or mortality in infancy.

On the other hand, if the return to breastfeeding in developing countries where it has declined takes place simultaneously among both rich and poor, urban and rural, educated and uneducated people, then the improvement in terms of reductions of rates of mortality and serious morbidity could be apparent soon. If trends in infant feeding are not universal and inexorable, then there is reason to believe that active public health measures can discourage the harmful trends and encourage safe practices.

We present evidence from Malaysia suggesting that a return to breastfeeding has begun in most parts of the population, contradicting the theory that the better-off groups must always lead the way.

We used the same data from Malaysia that Butz and DaVanzo used (the Malaysian Family Life Survey [MFLS]) but incorporate data from later rounds of the survey. The key finding is that the long-term decline in the percentage of infants breastfed seems to have been reversed in the mid-1970s. The evidence for this reversal is not conclusive, but in the MFLS data the increase in breastfeeding initiation after the low point in the early 1970s occurs for women in all income categories and all ethnic groups.

Methods

The MFLS was a multipurpose survey of households in Peninsular Malaysia, conducted in three rounds in 1976-77, as part of an economic and demographic research project described by Butz and DeVanzo.¹⁷

The survey was based on an area probability sample designed to be self-weighting. In 1,262 randomly selected households, one ever-married woman (EMW) under age 50 was chosen at random and asked questions covering a number of events since the time of her first marriage or fifteenth birthday, whichever was earlier. These included questions about all pregnancies and their results, whether each child was breastfed (and if so, for how long), and at what age supplementary foods or liquids were first given on a regular (at least daily) basis. Women were also asked about contraceptive use, their education, employment, where they had lived, and the types of facilities available in their houses. At Rounds 2 and 3, the record was updated for 1,236 and 1,207 households, respectively, by questions about births, deaths, weaning, and other household changes since the time of the first interview. Sixty-four women in the sample gave birth during the period separating Round 1 and Round 3 interviews. Women were asked again at Round 2 whether their first child had been breastfed, and if so, for how long. The re-test reliability of the breastfeeding questions was high for all sub-samples, including uneducated women. The major problem with recall data quality appears to be digit prefer-

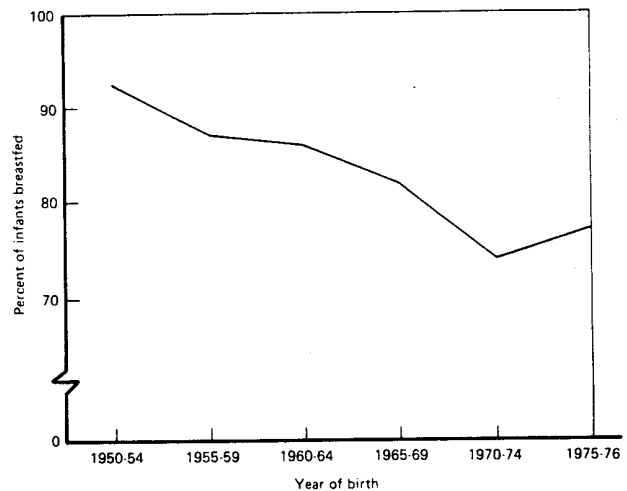


FIGURE 1—Percentage of Infants Breastfed, by Year of Infant's Birth, Peninsular Malaysia, 1950-76

ence, since durations of 6, 12 and 24 months were reported with implausible frequency. This problem is one of the motivations for presenting trends in breastfeeding duration in terms of medians and centiles rather than means, which would be more sensitive to a few very high values. Further details of reliability checks can be found in an earlier study.¹⁸ Questionnaires and interviewer instructions for the MFLS have also been published.¹⁹

Results

The MFLS data show a decline in the proportion of infants ever breastfed from just above 92 per cent in the early 1950s to below 78 per cent in the 1970s (Figure 1).

This decline is less precipitous than that estimated for Taiwan, where the prevalence of breastfeeding fell from about 90 per cent in 1966 to 50 per cent in 1980.⁹ If trends for Malaysian ethnic groups are examined separately, however, as in Figure 2, it can be seen that the prevalence of breastfeeding declined most sharply among the Chinese, to levels about as low as those of Taiwan, but is barely discernible for Malays. Similar differences between Malaysia's ethnic groups have been found in other studies of breastfeeding initiation.²⁰⁻²²

Because the Chinese are the most urbanized of Malaysia's ethnic groups, this ethnic difference partly overlaps with differences in breastfeeding prevalence among rural areas, small towns, and metropolitan areas (i.e., Kuala Lumpur, Georgetown, and Ipoh). In these three largest cities, the prevalence of breastfeeding has fallen from around 90 per cent to 50 per cent; the prevalence has declined less sharply in rural areas and smaller cities. (Figure 3).

In multivariate analyses of infant feeding choices using these data, the ethnic differences have been shown to persist even when potential confounding factors (family income, education, urban residence) are controlled.^{11,18}

Long-term Trends in Duration of Breastfeeding

In the same years in which the proportion of babies ever breastfed declined, the duration of breastfeeding also declined for those babies who were breastfed. Median durations declined from about a year in the 1950s to under 10 months in the 1970s. Breastfeeding throughout the first year of life is

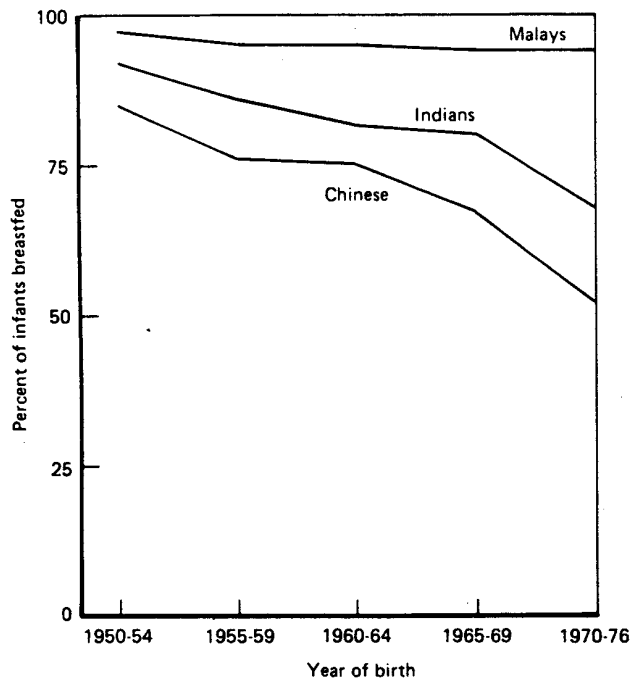


FIGURE 2—Percentage of Infants Breastfed, by Ethnic Group and Year of Infant's Birth, Peninsular Malaysia, 1950-76

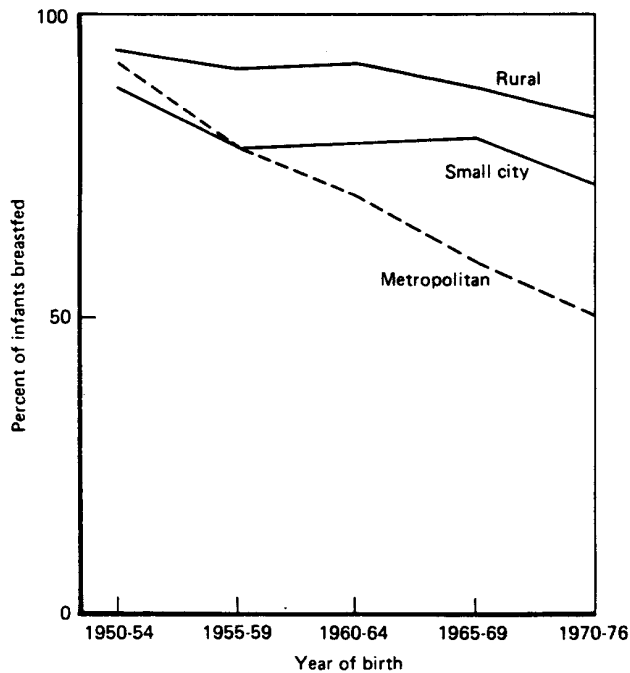


FIGURE 3—Percentage of Infants Breastfed, by Urban/Rural Residence and Year of Infant's Birth, Peninsular Malaysia, 1950-76

still common, nevertheless, being the feeding pattern for about 25 per cent of Malaysian infants who begin breastfeeding (or 20 per cent overall) even in the mid-1970s.

The ethnic differences in the duration of breastfeeding are very pronounced, however. Figure 4 shows the median

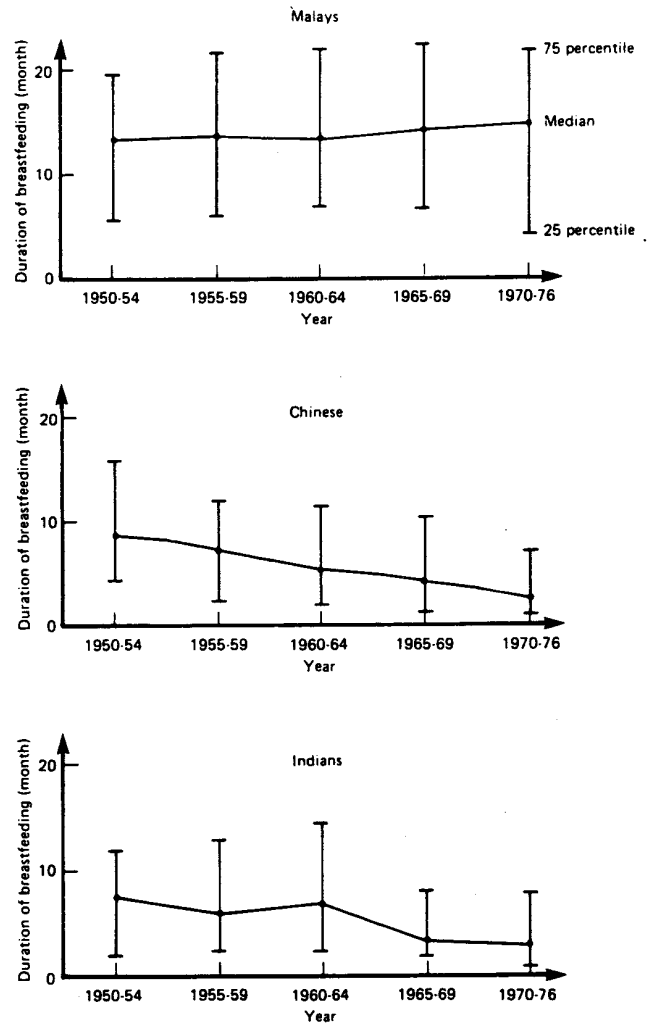


FIGURE 4—Duration of Breastfeeding for Breastfed Infants, by Ethnic Group and Year of Infant's Birth, Peninsular Malaysia, 1950-76

length of breastfeeding for babies in the MFLS sample born in each half-decade, along with the 25th percentile (the age in months by which 25 per cent of the MFLS infants born in those years who initiated breastfeeding have been entirely weaned) and the 75th percentile of the same distribution.

The duration of breastfeeding has not declined among Malays; for those Chinese infants who are breastfed, the median duration of breastfeeding is under three months, down from 8.7 months in the early 1950s. Fully 25 per cent of all Chinese infants who are breastfed are entirely weaned before they are a month old. Indian infants, for whom the median duration of breastfeeding was shorter than that of Chinese in the 1950s, have since followed trends similar to the Chinese. Besides the interethnic differences, Figure 4 also shows the very considerable variation among individuals within the major ethnic groups in duration of breastfeeding. Among the Malays, in particular, this variation in recent years has been great; 25 per cent of Malay infants who begin breastfeeding continue for 22 months or more; while another 25 per cent are entirely weaned before reaching five months of age.

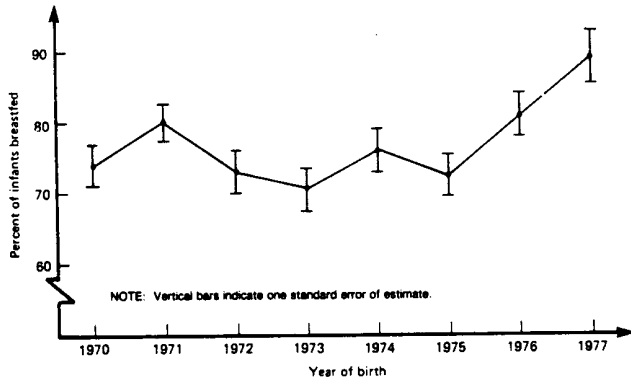


FIGURE 5—Percentage of Infants Breastfed, by Year of Infant's Birth, Peninsular Malaysia, 1970-77

Part (but not all) of the decline in both initiation and duration of breastfeeding in Malaysia is explained by an increase in women's participation in the non-agricultural labor force, since work outside the house is associated in multivariate analyses of these data with less breastfeeding.^{11,18} Work in agriculture outside the home is not associated with a lower probability of breastfeeding, however, even controlling for rural residence.

Increase in Breastfeeding in the 1970s

The trend during the years covered by the MFLS was thus clearly a decline in breastfeeding initiation, particularly among those of Chinese and Indian ethnicity and urban residents. If the data are examined separately for each year in the 1970s, however, there is evidence of a reversal in the long-term trend.

Figure 5 shows the proportion of infants in the MFLS sample breastfed in each year in the 1970s, along with vertical bars measuring one standard error of the estimate of the proportion above and below the point estimate. The sample contains about 200 babies per year, except in 1975, when 170 births were reported, and 1977, when there were 82, due to the fact that the last round of interviews took place in mid-year. It is difficult to assign a precise date to the point of inflection—the upturn may be said to have begun either after 1973 or after 1975, but this possible reversal of the decades-long trend toward less breastfeeding is sufficiently interesting to warrant more detailed investigation.

One reason for the reversal might be a simple Hawthorne effect of the survey itself. Many of the infants born in 1976 and nearly all of those born in 1977 were reported on the second or third rounds of the MFLS. In most cases, the respondents had already answered several questions on the feeding of each of their children during the Round 1 interview which could have heightened their interest in the subject. But if this were the case, then one would expect the incidence of breastfeeding to have increased more among such women. Yet, as Table 1 shows, the increase in the proportion breastfed was greater for first-born infants than for those of higher birth order.

The apparent increase in the recent years could be due to selection bias or some other form of non-sampling error, such as greater recall error for births in the earlier year. But changes in the composition of the sample do not account for the observed differences. For important characteristics such as the proportion of infants in different ethnic groups, birth

TABLE 1—Percentage of Infants Breastfed by Birth Order and Year of Birth, Peninsular Malaysia, 1950-77

Birth Order	Year of Birth		
	1950-69 % (N)	1970-74 % (N)	1975-77 % (N)
1	85 (619)	66 (184)	76 (88)
2-4	88 (1494)	70 (445)	74 (211)
5+	87 (1022)	84 (420)	88 (146)
TOTAL	87 (3135)	75 (1049)	79 (445)

SOURCE: MFLS

TABLE 2—Percentage of Infants Breastfed by Ethnic Group and Year of Birth, Peninsular Malaysia, 1950-77

Ethnic Group	Year of Birth		
	1950-69 % (N)	1970-74 % (N)	1975-77 % (N)
Malays	97 (1534)	94 (521)	96 (225)
Chinese	74 (1143)	50 (405)	54 (170)
Indians	84 (424)	72 (113)	85 (48)
TOTAL	87 (3128)	75 (1049)	79 (445)

SOURCE: MFLS

NOTE: Other or unknown ethnic groups are included in total.

order, age of mother, rural/urban residence, income, mother's working status, etc., there is no notable difference between the early and mid-1970s. Investigations of data reliability reported in an earlier study did show a greater probability of digit preference in reporting the duration of breastfeeding in the early 1970s compared with the mid-1970s, but there was no tendency for answers to "yes-no" questions, like the one on whether a child was breastfed, to be less reliable in the earlier years.¹⁸ In any case, there is no explanation for a reporting error causing a sudden discontinuity in one long-term trend (the tendency toward less initiation of breastfeeding) but not others (the tendency toward earlier supplementation, for example). Assuming, then, that the increase in the mid-years of the decade is not an artifact of reporting error or the survey activity itself, what could account for it?

The three major ethnic groups differ greatly in infant feeding patterns, but in all three, the incidence of breastfeeding is greater in the later years than the earlier years of the decade (Table 2). The increase was greatest among the Indians: Although accounting for only 11 per cent of the infants, they accounted for more than a third of the overall increase.

In each category of mother's education, and in each urban/rural classification, a higher percentage of infants was breastfed in the mid-1970s than in the early 1970s (Table 3). The increase was greatest among women with more than primary education (from 59 per cent to 77 per cent), but women with no education also breastfed more, and their percentage increase appears greater than that of the larger

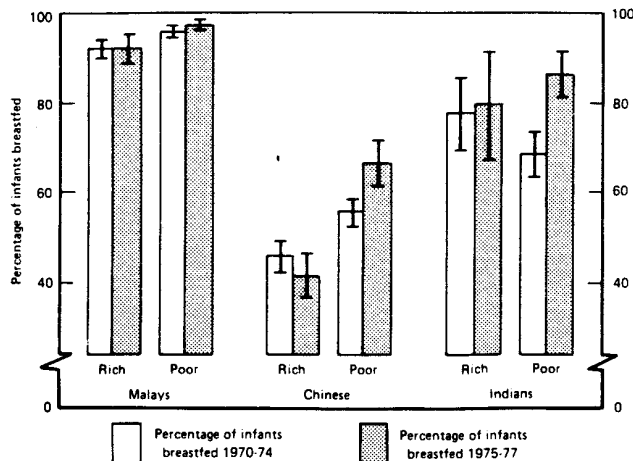


FIGURE 6—Percentage of Infants Breastfed, by Ethnic Group, Family Income, and Year of Infant's Birth, Peninsular Malaysia, 1970-77

group of women with some primary education. Stratifying the sample by income, in fact, shows that the increase occurred among poorer women, not among the richer (Table 3).

If the sample is dichotomized by both ethnicity and level of income, as in Figure 6, then no significant change is apparent in the percentage of babies breastfed among the wealthier Malays or Indians; among the wealthier Chinese, a slight decline is even discernible. Among the poor, however, the percentage of Chinese and Indian infants breastfed was greater in 1975-77 than in 1970-74.

This apparent increase in breastfeeding in Peninsular

TABLE 3—Percentage of Infants Breastfed, by Mother's Education, Family Income, Urban/Rural Residence, and Year of Birth, Peninsular Malaysia, 1950-77

Place of Residence	Year of Birth		
	1950-69 % (N)	1970-74 % (N)	1975-77 % (N)
Mother's Education			
None	91 (1551)	81 (334)	86 (101)
1-6 years	85 (1423)	75 (590)	77 (258)
6+ years	63 (161)	59 (125)	77 (86)
Family Income*			
Low	—	81 (598)	87 (285)
High	—	66 (451)	64 (160)
Place of Residence			
Rural	93 (1928)	85 (633)	88 (256)
Urban	80 (691)	67 (224)	76 (96)
Metropolitan ^b	71 (516)	51 (191)	57 (93)
TOTAL	87 (3135)	75 (1049)	79 (445)

SOURCE: MFLS
 *Low income = below sample mean of family income deflated by consumer price index (includes in-kind income).
^bKuala Lumpur, Ipoh, Georgetown.

TABLE 4—Percentage of Infants Breastfed, by Age of Mother at Infant's Birth Year, Peninsular Malaysia, 1950-77

Mother's Age (at time of infant's birth)	Year of Birth		
	1950-69 % (N)	1970-74 % (N)	1975-77 % (N)
14-24	90 (1665)	74 (355)	82 (157)
25-34	84 (1303)	75 (529)	75 (217)
35-49	80 (160)	76 (165)	87 (71)

SOURCE: MFLS
 NOTE: The oldest MFLS respondents were aged 50 in 1976, thus 44-48 in 1970-74 and 24-43 in 1950-69.

TABLE 5—Percentage of Infants Breastfed, by Place and Year of Birth, Peninsular Malaysia, 1950-77

Place of Birth	Year of Birth		
	1950-69 % (N)	1970-74 % (N)	1975-77 % (N)
Home	95 (399)	93 (198)	97 (152)
Hospital	77 (395)	20 (256)	70 (159)
Private maternity clinic	55 (69)	20 (59)	47 (53)

SOURCE: MFLS
 NOTE: Sample sizes are smaller than for other tables because place of birth is known only for oldest and youngest child in each family.

Malaysia appears to have occurred among the youngest as well as the oldest mothers in the MFLS sample. The percentage of infants born to women aged 14-24 years who were breastfed at least initially rose from 74 per cent in 1970-74 to 82 per cent in 1975-77 (Table 4). In the later period, the younger mothers were more likely to breastfeed their infants than were the 25-34 year old mothers. If the younger cohorts of Malaysian women continue to breastfeed the infants they bear at later ages, then the incipient return to breastfeeding will be well established.

The increase in the prevalence of breastfeeding took place mainly among infants born in hospitals or private maternity clinics. In the early 1970s, only 20 per cent of such infants were breastfed, compared to 93 per cent of infants born at home (Table 5). This difference persists in multivariate analyses of births during the whole period 1950-77, controlling for other factors that affect the likelihood of breastfeeding, such as ethnicity, age, education, and income. The difference in the prevalence of breastfeeding between hospital and home births appears to have narrowed considerably for infants born in 1975-77, after widening in the 1960s and early 1970s. Among infants born to poor Chinese or Indian families, 51 per cent of the hospital- or clinic-born infants were breastfed in 1970-74, increasing to 70 per cent in 1975-77.

Duration of Breastfeeding in the 1970s

Durations along with the prevalence of breastfeeding were lower in 1970-74 than in earlier years. The median duration was 10 months for the period 1950-69 and four months in the early 1970s. But there is no discernible

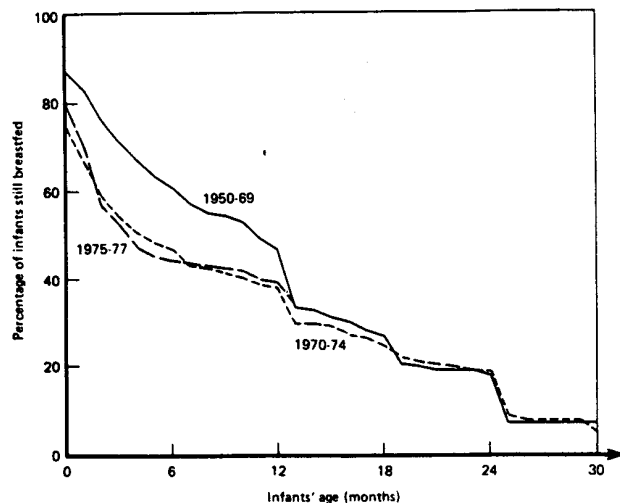


FIGURE 7—Estimated Percentage of Infants Still Breastfeeding at Successive Ages, by Year of Birth, Peninsular Malaysia, 1950-77

difference between the "survival curve" for breastfeeding for infants born in 1970-74 and the curve for infants born in 1975-77, both of which are shown in Figure 7. The sample sizes for estimating durations past a year for the 1975-77 cohort are very small and consist only of infants born in the earlier part of the period.

Discussion

The increase in the proportion of infants breastfed in the mid-1970s is an unexpected finding from the MFLS. Official efforts to promote breastfeeding for infant health had not really been under way in those years. For example, the seminar to launch the National Breastfeeding Campaign was held August 1976.²³ There were efforts by individual physicians and volunteer groups before then, but these presumably would not be expected to have had any discernible impact nationwide. University Hospital in Kuala Lumpur has had a successful program to encourage and support breastfeeding in its obstetrics wards, however; since many of Malaysia's physicians and nurses receive training there, it is possible that the success will be replicated elsewhere.²⁴ Thus far, the evidence of a revival in breastfeeding only pertains to initiation, not duration of breastfeeding, but the results from University Hospital and those presented here do suggest that obstetric and nursery practices in health care facilities have a large impact at least on initial feeding choices, as Winikoff and Baer have argued.²⁵

New surveys of nationally representative samples in Malaysia since 1977 would allow a more conclusive inference about whether the long-term decline in breastfeeding initiation really has reversed, and also a more powerful test of possible changes in breastfeeding duration than reported here. It will be interesting to see if results from Malaysia's new nutritional surveillance system show a continued increase in the early 1980s.

The effect of an increase in breastfeeding initiation on morbidity and mortality rates would be expected to be greatest among Indian children, since the Chinese as a group already have low mortality rates and the great majority of Malay mothers still breastfeed their infants. Among the poor, Indians appear to have changed their infant feeding behavior the most in the 1970s, followed by the Chinese.

TABLE 6—Age-specific Mortality Rates by Ethnic Group, Peninsular Malaysia, 1970 and 1982

		All Ethnic Groups	Malays	Chinese	Indians
Post Neonatal infant Mortality*:	1970	17.9	23.5	8.8	18.0
	1982	7.1	8.5	3.1	9.2
Child Mortality**:	1970	4.2	5.6	2.1	3.8
	1982	1.7	2.1	0.8	1.9

SOURCE: Vital statistics of Peninsular Malaysia

* = deaths of infants aged 1-11 months per 1000 live births.

** = deaths of children aged 1-4 years per 1000 children in age group at mid-year.

However, the mortality indicators that would likely be most affected by improved infant feeding and nutrition, namely the postneonatal infant mortality rate and the child mortality rate, both show larger improvements in recent years for Malays and Chinese than for the Indians. In 1982, both postneonatal infant mortality and child mortality were well under half their 1970 levels for Malays and Chinese, compared to about half the 1970 levels for Indians (Table 6). (Birth and death registration in Peninsular Malaysia is classified as "virtually complete" by the United Nations Secretariat.) Perhaps increase in the initiation of breastfeeding needs to be followed up with measures to promote longer breastfeeding and improved weaning practices. Another possibility is that the chief causes of infant and child mortality at this point in Malaysia are no longer affected by infant feeding choices. If the latter proposition proves true, one should hesitate in extrapolating inferences to other developing countries, since these 1982 mortality rates are among the lowest in Asia. In Malaysia, there has been a rapid decline in infant and child mortality throughout the period studied here, despite the long-term trend during 1950-74 away from breastfeeding. This is a tribute to the success of Malaysia's development policies in general and health sector policies in particular.

ACKNOWLEDGMENTS

The research was funded by grant No. DAN-1010-G-SS-2109-00 from the US Agency for International Development, Office of Nutrition, to the Rand Corporation, Santa Monica, CA. William Butz, Julie DeVanzo, Daniel Relles, and Albert Williams of the Rand Corporation and Professors Khairuddin Yusuf and Chen Siew Tin of University Hospital, Kuala Lumpur, and Jean-Pierre Habicht of Cornell University, all provided very helpful comments and advice, but cannot be assumed to agree with all the conclusions reported here.

REFERENCES

1. Wray J: Maternal nutrition, breastfeeding, and infant survival. In: Mosley WH (ed): Nutrition and Human Reproduction. New York: Plenum Press, 1977.
2. Cunningham A: Breastfeeding and morbidity in industrialized countries: an update. In: Jelliffe D, Jelliffe EFP (eds): Advances in International Maternal and Child Health. New York: Oxford Univ. Press 1981; 128-167.
3. Plank SJ, Milanese M: Infant feeding and infant mortality in rural Chile. Bull WHO 1973; 48:203-210.
4. Butz WP, Habicht JP, DeVanzo JS: Environmental factors in the relationship between breastfeeding and infant mortality: the role of sanitation and water in Malaysia. Am J Epidemiol 1984; 119:516-525.
5. Berg A: The Nutrition Factor: Its Role in National Development. Washington, DC: Brookings Institution, 1973.
6. Kent MM: Breast-feeding in the Developing World: Current Patterns and Implications for Future Trends. Washington, DC: Population Reference Bureau, June 1981.
7. World Health Organization: Contemporary Patterns of Breastfeeding, Report on the WHO Collaborative Study on Breast-Feeding. Geneva: WHO, 1981.

BREASTFEEDING IN MALAYSIA

8. Popkin B, Bilsborrow R, Akin J: Breastfeeding patterns in low-income countries. *Science* 1982; 218:1089-1093.
9. Millman S: Breastfeeding in Taiwan: A Study of Change. PhD dissertation, Ann Arbor: U of Michigan, 1982.
10. Knodel J, Debalvaya N: Breastfeeding in Thailand: trends and differentials, 1969-79. *Stud Fam Plann* 1980; 11:355-376.
11. Butz WP, DaVanzo J: Determinants of Breastfeeding and Weaning Patterns in Malaysia. Santa Monica, CA: Rand Corp, 1981.
12. Hendershot G: Trends and Differentials in Breastfeeding in the United States, 1970-1975. Working Paper No. 5. Hyattsville, MD: National Center for Health Statistics, June 1981.
13. Hirschman C, Butler M: Trends and differentials in breastfeeding: an update. *Demography* 1981; 18:39-54.
14. Butz WP: Economic Aspects of Breastfeeding. In Mosely H (ed): *Nutrition and Human Reproduction*. New York: Plenum Press, 1977.
15. Jelliffe D, Jelliffe E: *Human Milk in the Modern World*. New York: Oxford University Press, 1978.
16. World Health Organization, Division of Family Health: *The Prevalence and Duration of Breastfeeding: A Critical Review of Available Information*. *World Health Stat Q* 1983; 92-116.
17. Butz WP, DaVanzo J: *The Malaysian Family Life Survey: Summary Report*. Santa Monica: Rand Corporation, R-2351-AID, 1978.
18. Haaga J: *Infant Feeding and Nutrition Policy in Malaysia*. PhD dissertation, Santa Monica: Rand Graduate Institute, 1983.
19. Butz WP, DaVanzo J, Fernandez D, Jones R, Spoelstra, N: *The Malaysian Family Life Survey: Appendix A, Questionnaires and Interviewer Instructions*. Santa Monica: Rand Corporation, R-2351/1-AID, 1978.
20. DaVanzo J, Haaga J: Anatomy of a Fertility Decline: Peninsular Malaysia. *Popul Stud* 1982; 36:373-394.
21. Pathmanathan I: Breastfeeding—a study of 8750 Malaysian infants. *Med J Malaysia* 1978; 33:113-119.
22. Chander R, et al: *The Malaysian Family and Fertility Survey 1974 (First Country Report)*. Kuala Lumpur: Department of Statistics, 1977.
23. Government of Malaysia, Ministry of Health: *National Seminar on Breastfeeding in the Context of National Development, August 26, 1976*. Kuala Lumpur: Govt printer, n.d.
24. *Asia-Pacific Population Program News*. Honolulu: East-West Center, July 1981.
25. Winikoff B, Baer E: The obstetrician's opportunity: translating "beast is best" from theory to practice. *Am J Obstet Gynecol* 1980, 138:105-117.

