

PJ-¹AAV-366
ISN 52520

Nutrition
e

ANNOTATED BIBLIOGRAPHY OF NUTRITION - FERTILITY INTERACTIONS

IN

DEVELOPING COUNTRIES

Women in Development
Agency for International Development
Room 3343, New State
Washington, D.C. 20523
(202) 632-3992

Date of Acquisition _____
Source _____

Prepared by:

Marian F. Zeitlin
Nina P. Schlossman
Michael J. Meurer
Patricia J. Weinthal

for:

the Office of Policy
Development and Program
Review, Agency for
International Development

June 1980

MASSACHUSETTS INSTITUTE OF TECHNOLOGY
International Nutrition Program and
International Population Initiatives Program

and

ABT ASSOCIATES INC., CAMBRIDGE, MASS.

PREFACE

The purpose of this annotated bibliography is to provide a representative sample of research findings concerning interactions between nutrition and fertility in developing countries. The abstracts that have been included fall into three main categories. The first comprises those that deal directly with the interrelationships between nutrition and fertility and includes such topics as lactation amenorrhea, fertility and infant mortality interactions, and linkages between maternal nutritional status and fertility. The second category consists of studies concerning psychosocial links between nutrition and fertility.

The third is made up of abstracts dealing with issues that must be considered in the interpretation of nutrition-fertility research findings. Much of the research relating demographic and nutritional changes to development variables such as urbanization, education, economic development, and women's employment, for example, has simultaneous implications for nutritional status and for fertility behavior. Similarly, the changing value of children and patterns of investment in children with development affect both the numbers born and the quality of food and health care invested in each child. It is not possible to understand nutrition fertility interactions in a given country setting without these covariables. Studies of data quality are likewise important for the interpretation of research findings.

In a few locations, as among the Yoruba in Nigeria, in Egypt,

Bangladesh, and in Papua New Guinea, for example, a sufficient number of studies have been conducted to make up collections of abstracts that function as mini-case studies. Many of the studies conducted in any given country, however, are not matched by corresponding data in other locations. Regional patterns exist but are not uniform within regions. For example postpartum sexual abstinence is common in much of West Africa, but not among the Akan peoples of Southern Ghana. Lactation periods generally are longer in Africa and Asia than in South America, but the Arusi Gala herdsmen of Ethiopia have traditionally breast fed for only 2 to 6 months in order to increase tribal birth rates.

The preparation of this bibliography sponsored by the Agency for International Development, Bureau of Planning and Policy Coordination under contract number AID/otr-147-79-32, by the Massachusetts Institute of Technology International Nutrition and International Population Initiatives Programs and by Abt Associates Inc. (AAI) of Cambridge, Massachusetts. The project also has produced a report entitled Nutrition-Fertility Interactions in Developing Countries: Implications for Program Design. The interested reader is referred to this report for an overview of nutrition fertility relationships and a discussion of their implications for development assistance programs.

The project staff prepared original abstracts of some of the articles represented in the bibliography. Others were quoted verbatim from professional journals, with the permission of these journals.

As project director, I would like to express my appreciation for the three student research assistants at MIT who put in long hours gathering, abstracting, and organizing entries in this bibliography. Nina Schlossman took major responsibility for abstracts from Asia, Michael Moyer from Latin America, and Patricia Weinthal from North Africa and the Middle East. Special thanks go to Patricia, who took administrative responsibility for the project's extensive filing system. Professor Barbara Underwood of MIT and Stephen Fosburg of Abt Associates also provided important encouragement and support for the preparation of this volume.

Marian F. Zeitlin
Project Director

1. ALGERIA. Tabutin, D. Mortalité Infantile et Juvenile en Algérie du Nord. Population (France) 29(1):41-60, 1974.

After reaching a very high level at the end of the war (1960-62), infant mortality and child mortality dropped sharply following liberation. Between 1963 and 1968 no clear trend was discernible except for a slight decline in urban areas. In 1967-68 the urban IMR was 109 and the rural IMR was 132.

Endogenous deaths (caused by nonviability of the newborn or complications of childbirth) accounted for 25% of infant mortality. In Northern Algeria mortality in the first week was 2.7% and in the first month 5.4%. The age specific mortality curve showed an absolute increase between the tenth and fourteenth months, following the pattern of southern countries with high rates of diarrheal disease interacting with malnutrition. High parity did not significantly increase infant mortality until a birth order of 10 or more. Endogenous mortality was marginally higher for first and second births. It was not possible to establish that a decline in infant mortality exerted any traceable influence on fertility although fertility in Algeria had been consistently rising and infant mortality consistently falling during the preceding 25 years.

2. EGYPT. Abdou, I. A. and Amer, A. K. A Study of the Nutritional Status of Mothers, Infants and Young Children, Attending Maternity and Child Health Centres in Cairo. Part II - Dietary Intake and Nutritional Status of Pregnant and Nursing Mothers. Bull Nutr Inst U.A.R. 1(1): 21-37, 1965.

Heights, weights, and dietary intake of pregnant and lactating women were studied among low income families in Cairo in 1957. Average per capita annual income was \$95 compared to a national per capita GNP estimated at \$112. The largest proportion of families -- about 36% had total monthly incomes of \$6 to \$9. Average height was about 156 cm (61 inches) or about 9 cm shorter than American women of the same age. Average weights of pregnant women were consistent with normal gains over normal baseline weights for height of American women, with an average 8.5 kg gain at 7.4 months of pregnancy. However, average weights of lactating women were 3.4 kg higher than averages for American women of the same height. Bread alone was the largest source of nutrients for all groups, contributing from 85% of both calories and protein in families with total incomes below \$3 per month to about 55% in families with incomes above \$15 per month. Broad beans (*vicia faba*) were the second most common item followed by a large variety of foods that changed seasonally.

Daily dietary intake of pregnant women averaged 2,200 calories and 76.9g total protein (including 11g animal protein). The authors suggest this low caloric intake was sufficient because pregnant women greatly curtailed their activities in order to prevent spontaneous abortion. Lactating women averaged a daily intake of 2,761 calories and 95.4g protein (including 13g animal protein). Diets of both groups supplied no more than 36% of calcium, 50% of vitamin A, 44% of riboflavin and 70% of vitamin C recommended by United States Food and Nutrition Board, National Research Council, Recommended Dietary Allowances for 1958.

3. EGYPT. Abdou, I. A., Lebshtnein, A. K., and Kassim, T. A. A Study of the Nutritional Status of Mothers, Infants and Young Children, Attending Maternity and Child Health Centres in Cairo. Part III - Weaning Practices and Supplementary Feeding of Infants and Young Children. Bull Nutr Inst U.A.R. 1(1):39-47, 1965.

All women in this sample of mothers of 0 to 24 months old infants attending MCH centers in Cairo continued breast feeding up to the second year of life. No fixed time schedule for nursing was followed by 84% of mothers. About 70% of infants were weaned abruptly at the end of the 13th month with the application of bitter substances to the nipples. Ensuing pregnancy was the reason for weaning given by 72% of mothers. The protein food most commonly given to infants 12 to 24 months was stewed broad beans (foul medammes, received by 47%) followed by milk products, and most common starches were rice, bread, and potatoes. An analysis of the nutrient content of the weaning diet found it unsatisfactory in quantity and poor in calcium, iron, and vitamins.

4. EGYPT. Abdou Issa, Mahmoud S. Modernization and the Fertility Transition, Egypt, University of Pennsylvania, 1975.

The study indicated that the level of completed marital fertility in Egypt is still high (6.3 live births), with significant regional, rural-urban and socioeconomic status fertility differentials for women under forty years of age. Current marital fertility, however, is evidently under moderate deliberate control in the urban communities which comprise about 45 percent of the total population.

Both desired family size (C_d) and infant and child mortality are negatively correlated with modernization (the level of economic development and cultural change), while potential output of surviving children in the absence of deliberate fertility control (C_n), which is determined by the level of natural fertility and infant and child survival, is positively correlated with modernization. The level of motivation as measured by the difference between potential and desired fertility ($C_n - C_d$) and the extent of contraceptive use by both directly correlated with modernization.

The observed regional fertility differentials are consistent with the interpretations of Easterlin's 'synthesis' framework for social and economic determinants of marital fertility.

5. EGYPT. El-Minawi, M. F. and Foda, M. S. Postpartum Lactation Amenorrhoea. *Am J Obstet Gynecol* 111(1):17-21, 1971.

Among 145 nursing mothers chosen at random, 86 were in the period of postpartum lactation amenorrhoea, an incidence of 59.3 percent. The duration of amenorrhoea ranged between 6 weeks and 26 months, and its incidence was higher among the fully breast-feeding mothers. A low pregnancy rate of 4.3 percent was observed among 139 postpartum lactational amenorrhoeic periods. Prolonged postpartum lactation amenorrhoea was associated with uterine hyperinvolution. Postpartum lactation amenorrhoea confers a substantial degree of infertility, as evidenced by the predominant anovular endometrial pattern of 96.1 percent of the women. The endometrial specimens obtained after one year of postpartum lactation amenorrhoea present a triad of: (1) cystic dilatation of endometrial glands, (2) arterial hyalinosis, and (3) plasma cell infiltration of the stroma. Nursing mothers who experienced relatively long or short periods of postpartum lactation amenorrhoea in connection with one baby tended to repeat the same pattern with a subsequent baby; the authors designated this as "habitual postpartum lactation amenorrhoea."

6. EGYPT. Hanafy, M. M. et al. Maternal Nutrition and Lactation Performance. Environ Child Health 18(13):187-191, 1972.

An overall nutritional status index of 41 urban moderate to low income Egyptian mothers was constructed from the results of blood, urine, and milk samples. After overnight admission to hospital, 20 ml of foremilk and 20 ml of hind milk were taken from each woman at a 10 a.m. feeding. A test feeding on the 3rd day estimated total milk yield. The mothers were previously classified as healthy (24) or malnourished (17). Caloric intake was adequate, but only 5 mothers in the healthy group had adequate protein intake.

Milk samples from both groups were of suboptimal but acceptable composition. The protein and caloric content of malnourished mothers was lower (15% and 7%) than that of the well nourished group. Malnourished mothers produced 22% less milk. Correlation between nutritional status of the mother and milk volume and content was high ($r=0.663$).

7. EGYPT. Kamal, I. et al. Clinical, Biochemical, and Experimental Studies on Lactation: I. Lactation Pattern in Egyptian Women. Am J Obstet 105(3):314-323, 1969.

The investigators interviewed 120 Egyptian mothers retrospectively once each at a Health Center concerning their last 3 lactation periods occurring within the previous 5 years. The average age for weaning from the breast was 15.1 months, and for breast milk supplementation, 6 months. Maternal age and age at weaning were positively correlated. One-third of the lactating mothers reported resuming menstruation within 3 months of delivery, two-thirds within 9 months and 87% by 15 months. More than half reported pregnancy during lactation.

8. EGYPT. Kamal, J. et al. Clinical, Biochemical, and Experimental Studies on Lactation: II. Clinical effects of gestagens on lactation. Am J Obstet Gynecol 105(3):324-334, 1969.

In a double blind study, different combinations of gestagens were given to a total of 120 mothers 6 to 10 weeks postpartum divided into four groups (Lyndiol 2.5 mg; Lyndiol 1.0 mg; 0.5 mg Lynestrenol alone; and Deladroxate injections). A fifth group (control) was given a placebo and intrauterine devices. Follow-up continued until weaning. The criteria used in evaluating the effects on lactation were: age at supplementation, subjective impressions of the mothers, amount of milk yield as obtained by mechanical suction and test feeding, feed-to-weight adequacy (i.e., the adequacy of a test feed in relation to baby's weight), infant growth curve, and percentage changes in infant's weight with age. Although 50% of the sample were lost by attrition, and although trends were not clear with regard to some of the criteria, the small dose Lynestrenol pill alone showed the least detrimental effects on lactation compared to the control on a scale combining the 5 criteria, while the high dose pill and injection yielded the worst results. Average amount of milk yield measured by mechanical suction and feed to weight adequacy appeared to be the two most sensitive criteria for measuring adequacy.

9. EGYPT. Lebshtein, A. K. and El Bahay, A. M. The Extent of Breast and Bottle Feeding of Children in Cairo and its Effect on Their Growth. The Journal of the Egyptian Public Health Association 51(5):246-257, 1976.

Low Stimulation
or
High Stimulation
see
x3

The extent of breast feeding and bottle feeding was studied on a random sample of 250 non-working and 174 working mothers in Cairo. Breast feeding was practiced by 78.8% of non working and only 5.8% of working mothers. Bottle feeding was adopted by 7.6% of non working and 78.2% of working mothers. Only 13.6% of non working and 16% of working mothers supplemented the diet of their children. The mean body weights and heights were higher in the breast-fed than bottle fed children at all age intervals. But both groups were less than U.S.A. standards after the first six months of age and attributable to the lack of diet supplementation.

10. EGYPT. Rifaie, M. R. et al. Menarche in Egypt. The Possible Modifying Factors. Ain Shams Med J 27 (3&4):331-338, 1976.

A study of the age of menarche among 1176 school girls in Dakahlia province indicated that the mean age of menarche in Egypt was 13.19±1.03 years, and was significantly higher in rural than in urban areas. Evidence suggested sexual maturation had accelerated since the revolution of 1952. Girls of higher socio-economic status got their period earlier. Late menarche was associated with protein poor diets and parasitic infections. Both parasitic infection and anemia were extremely common. Urinary bilharziasis and intestinal parasites (mainly ascariasis) delayed menarche. Girls with positive intradermal test for schistosomiasis (an estimated 20% of girls at puberty) got their first period about 1.5 years later than the mean. Mean weight of girls with menarche was significantly higher than for those without. Seasonal incidence was highest in summer and spring, lowest in winter and autumn.

11. EGYPT. Rizk, I. A., Stokes, C. S., and Nelson, M. R. The Influence of Individual and Community-Level Child Mortality on Fertility in Egypt. Paper presented at the Annual Meeting of the Population Association of America, 1980.

Variation in individual and community experience with child mortality is related to the reproductive behavior of a sample of rural Egyptian women interviewed in 1978. The influence of child mortality is examined for three dimensions of reproductive behavior: birth intervals, additional children desired, and use of contraception.

Initial differences in birth intervals between women with and without child mortality experience are largely eliminated when appropriate controls are introduced for variations in lactational amenorrhea. This finding is consistent with a growing body of research indicating little behavioral response to child mortality for birth intervals when biological factors are controlled.

In contrast to the findings on birth intervals, individual experience with child mortality is significantly related to the number of additional children desired and to the use of contraception. In addition, community-level child mortality is related to use of contraception. The findings suggest that child mortality does influence reproductive behavior, but the mechanisms through which such effects operate are more complex and less direct than has been assumed.

12. EGYPT. Sallam, A. M. Family Planning in Egypt. Statement, April 26, 1978. In U.S., Congress, House, Select Committee on Population, Population and Development: Status and Trends of Family Planning/Population Programs in Developing Countries. Vol. 2. Hearings,

April 25-27, 1978. Washington, D. C.: U.S. Government Printing Office, 1978.

In 1953 Egypt established a national commission for population problems. By 1958 the commission had founded 24 experimental family planning centers, 12 in urban areas and 12 in rural areas. In 1962 political leadership in Egypt acknowledged that the high rate of population increase was the biggest obstacle to all efforts for social and economic development. By 1978 urban areas, with 45% of the population, had 1239 centers and rural areas had 2239 centers. Oral contraceptives were the most commonly used method. Both the Egyptian family planning association (EFPA) and the Family Planning and Population Organization have been diversifying their programs. In 1977 the EFPA began a nutrition services project to integrate family planning and nutrition services. This is a 5-year project in selected family planning centers belonging to multi-purpose social welfare voluntary societies.

- GAMBIA. McGregor, I. A. et al. The Health of Young Children in a West African (Gambian) Village. Trans R Soc Trop Med Hyg 64(1):48-77, 1970.

This study of all 215 children aged 0 to 5 years in the village of Keneba, rural Gambia, during 1962 to 1963, in an area where about 40% of children had been estimated to die before the age of 7, provides detailed information concerning seasonal patterns of morbidity and growth. The data provide stronger evidence that infection caused malnutrition than that malnutrition was causally related to prevalence of infection or to death. However, the study methodology did not analyze severity of infection, duration or frequency of recurrence of each type of infection per quarter. In Keneba, as in Subsaharan Africa generally, malaria was much more prevalent and severe than in other areas of the developing world.

- GAMBIA. Thomson, A. M. et al. Body Weight Changes During Pregnancy and Lactation in Rural African (Gambian) Women. Br J Obstet Gynaecol 73:724-733, 1966.

About 73 pregnant women, 62 lactating women, and 14 non-pregnant, non-lactating women living under "bush" conditions in a rural village in The Gambia all tended to lose weight from late July to early October and to recover thereafter. Weight loss appeared related to hard physical work at the height of the agricultural season, combined with scarcity of food. At other times of the year weight was well maintained and pregnant women mostly gained weight.

The total amount of weight gained by pregnant women varied according to the season of birth. For births from mid-February to mid-August the average weight gain was about 12 pounds (5.5 kg), compared to roughly half as much at other times of year. The evidence for seasonal changes in birth weight was not statistically convincing.

Thirty-nine percent of the deliveries studied occurred between mid-November and mid-February, implying that conception had occurred when body weights were highest, from February to May. Similarly, only 11% of conceptions had occurred when body weights were low, from November to February. Apart from seasonal weight loss lactating women did not lose weight, and did appear to produce sufficient milk to sustain normal infant weight gains during the first four months of life. The data showed marginal gains in maternal weight with age and parity.

- GAMBIA. Thompson, B. and Rahman, A. K. Infant Feeding and Child Care in a West African Village. J Trop Pediatr 13:124-138, 1967.

In a study in 1962-63 of the growth and health of 224 children under 5 years old in Keneba, Gambia, it was found that infants were breast fed for 18-24 months. Sweetened rice water was introduced at 4-5 months with pieces of fruit, mangoes or oranges, when seasonally available. Boiled rice was given at 708 months plus steamed millet, maize or findo. At 11 months, ground nuts, sauces and fish were added to the diet.

- GHANA. Bleek, W. Spacing of Children, Sexual Abstinence and Breast-Feeding in Rural Ghana. Soc Sci Med 10(5):225-230, 1976.

The paper investigates three aspects of fertility behavior: child spacing, postpartum sexual abstinence, and the duration of lactation and subsequent amenorrhea. A sample of 100 males, 179 females, and 42 members from an extended family were interviewed in a rural southern town on the Kwahu Plateau. Although social attitudes strongly condemn short birth intervals, the observed average 2 year, 4 months interval results, not from intentional birth control or sexual abstinence but rather from lactationally induced postpartum amenorrhea (average 14.6 months). Lactation is generally practiced until the child is 18 months old.

GHANA. Gaisie, S. K. Levels and Patterns of Infant and Child Mortality in Ghana. Demography 12:21-34, 1975.

This paper attempts to measure infant and child mortality levels and also to determine their structure by utilizing the results of the 1968-1969 National Demographic Sample Survey which was conducted under the directorship of the author. Among the major problems encountered in the exercise are the adjustment of the current raw mortality data and the estimation of infant and child mortality from independent source material. The estimated infant mortality rates range from 56 per 1,000 live births in the Accra Capital District to 192 in the Upper Region during the late 1960's. The urban rate was 98 compared to 161 for rural areas.

A large proportion of the deaths among children aged 0-4 occur in the second year of life, and deaths in this age group account for the bulk of the deaths within the age group 1-4 years.

GHANA. Orraca-Tetteh, R. Effects of rapid growth in Ghana on nutritional needs, in Ghanaian Pop. Studies No. 3. (See preceding Addo, N. O. in Overview) pp. 57-68, 1970.

The author provides evidence that food production in Ghana did not keep pace with population growth from 1963 to 1968 and discusses the resulting nutritional problems. Nutrient adequacy was found to decrease with increasing family size as shown in the following table:

EXPENDITURE AND NUTRIENT INTAKE IN RELATION TO HOUSEHOLD SIZE
JAMES TOWN, ACCRA, GHANA, AUGUST 1967

Family Consumer Size	Total Expenditure per head per month ₵	Food Expenditure per head per month ₵	% Spent on Food	% Calories and Protein Requirement	
				Calories	Protein
1	78.00	8.00	10	101	153
2	9.11	7.05	82	81	140
3	15.59	9.00	57	90	72
4	30.25	8.00	26	71	106
4	43.75	5.00	11	79	108
6	17.05	6.07	36	67	73
7	12.43	3.00	24	72	114
8	12.48	8.00	64	59	84
10	8.66	6.00	69	82	108
14	7.60	5.00	66	73	72

GAMBIA. Weil, Peter M. The Staff of Life: Food and Female Fertility in a West African Society. Africa (London) 46(2):182-195, 1976.

The author examines the fertility situation among the Mandinka in Gambia where, as the food production became more a responsibility of females, childbearing increased in importance since children were a source of labor.

NIGERIA. Adelusi, B. and Ladipo, O. A. Preterm and Other Babies with Low Birthweights in Ibadan. Trop Geogr Med 28:316-322, 1976.

This study of birthweights in Ibadan, Nigeria produced evidence that low socioeconomic level, rather than peculiarities of geographical location or race, accounted for a high percentage of low birthweight babies. Various other factors associated with low birthweight babies in Ibadan, such as maternal anemia, were also highlighted.

The following table shows the incidence of low birthweight by socioeconomic class.

Socio-economic class	Total mothers		Total deliveries		Premature		Dysmature		Total low birth-weight		Incidence of low birthweights %
	No	%	No	%	No	%	No	%	No	%	
Upper	150	12.6	154	11.9	12	6.6	12	8.6	24	7.5	15.6
Middle	368	30.8	395	30.6	49	26.9	46	33.1	95	29.6	24.1
Lower	675	56.6	741	57.5	121	66.5	81	58.3	202	62.9	27.3
Total	1193	100.0	1290	100.0	182	100.0	139	100.0	321	100.0	24.9

Difference in overall incidence of low birthweights by class $\chi^2 = 9.51$ $P < 0.001$

NIGERIA. Caldwell, J. C. The Economic Rationality of High Fertility: An Investigation Illustrated with Nigerian Survey Data. Popul Stud 31(1):5-27, 1977.

The author demonstrates that high fertility is rational in Nigeria and in Ghana by presenting results of studies measuring children's activities, parents' feelings about the balance of cost and return on children and all money flows between parents and children. Around age 5, children's imitative play gives way to activities that relieve others of work. The amount of money that a child is said to remit to parents averages 10% of both father's income and household income. This monetary returns (in goods) may well outweigh the monetary ones. Children also provide security against disaster and in old age. Only 6% of farming families agreed that "children use up wealth," versus 25% of white collar workers in the larger urban areas. Changes in life style and values that make high fertility unprofitable are slowly occurring. With the adoption of the nuclear family, the direction of lifetime net flow of money now is from parent to child. The system in which honor was derived by activities and generosity within the local community is now being replaced by one in which the proudest achievements are performed in the wider community and are marked by examination results, appointments to new occupational positions, the achievement of high salaries, features in the press, and so on.

NIGERIA. Caldwell, J. C. and Caldwell, P. The role of marital sexual abstinence in determining fertility: a study of the Yoruba in Nigeria. Popul Stud 31:193-217, 1977.

This study draws on 1973 to 1975 data from five probability sample surveys of Yoruba women (2 studies also included men) in Nigeria having a total sample

size of 9,261. Postpartum abstinence that frequently lasted 6 months longer than lactation was the main control on fertility, which was estimated at 7 births per woman. In rural areas lactation continued longer than abstinence only for 5% of surviving children. The Yoruba believe that semen enters into and poisons breast milk and that the mother needs a period of time to recover her health after lactation and before the next pregnancy. By age 40-44 years, more than half of the women had entered the period of terminal abstinence. Three-fourths of those who were grandmothers had terminated sexual activity at this age as compared to one fourth who were not grandmothers. High rates of abstinence were common at all ages even among nonpregnant and nonlactating women and were compatible with a polygynous system in which husbands and wives did not frequently eat or socialize together and rarely slept in the same bed. Only about 15% of women claimed to miss sexual relations during postpartum and terminal abstinence. Measures of modernization, such as education, occupation, monogamous marriage and Christianity, were associated with attachment of greater value to the sexual union, shorter duration of postnatal abstinence and of lactation, and greater use of contraception. In the short term, contraception was not expected to be as effective as abstinence in controlling fertility.

NIGERIA. Caldwell, J. C. and Igun, A. The Spread of Anti-natal Knowledge and Practice in Nigeria. Popul Stud 24(1):21-34, 1970.

In March/April 1969 the Demographic Training and Research Unit, University of Ife, surveyed 8,400 respondents of both sexes to investigate their knowledge and use of anti-natal practices and the sources of that knowledge. The area sampled was a stratified cross-section of Nigeria extending inland 500 miles from Lagos. Data are analyzed by age cohorts of respondents and by the date of change in knowledge or practice. It is shown that anti-natal knowledge and practice decline with distance from Lagos, that contraception is widely practiced amongst the richer towns and those with a higher proportion of educated people, and to a smaller extent among farmers than restricted knowledge or means would alone indicate. Recently the spread of both knowledge and practice has been faster than could be explained by socioeconomic change and has largely resulted from changing attitudes to anti-natal practice and increased discussion of the subject in the world as a whole. Within Nigeria this has been helped by rising levels of urbanization and education, which are the two major determinants of anti-natal knowledge and practice in the country. The spread of such practice has led to an increased employment of traditional anti-natal methods, but this increase is small compared with the much greater resort now being made to modern contraception and induced abortion. The mass media have been of particular importance in introducing new knowledge, while the spread of such knowledge has owed most to discussions between friends of the same sex.

NIGERIA. Caldwell, J. C. and Ware, H. The Evolution of Family Planning in an African City: Ibadan, Nigeria. Popul Stud 31(3):487-508, 1977.

Data drawn from a 1973 probability sample of 6,606 Yoruba females, 15-59 years of age in Ibadan City, Nigeria, are employed to analyze changing family planning practice over time. Usage and method rates are calculated for broad age groups from 1930 to 1973. Contraceptive practice is shown to have increased rapidly during the 1960s and early 1970s, from a very low initial base with a doubling period for the proportion of contraceptors of about four years, so that by 1973 one-sixth of the women had practiced contraception and one-ninth were currently doing so. The major determinant of contraceptive practice is

education. Oral contraceptives and IUDs account for an every larger proportion of all contraception over time and together made up over 50% by 1973. The Ibadan data give strong support to a suggestion emanating from scattered findings elsewhere that there is special pattern of sub-Saharan contraceptive use: it begins with use in pre-marital and extra-marital relationships; then is increasingly employed as a substitute for post-marital sexual abstinence, and only later becomes the means for limiting the size of the family. Hence, the success of a family planning programme is indicated by rising average parity among the acceptors. Most couples in Ibadan will probably be practicing contraception at some time in the 1980s, but even then such rates will probably still be low in rural areas.

NIGERIA. Goyea, H. S. and Johnson, E. J. Benin City Mothers: Their Beliefs Concerning Infant Feeding and Child Care. Trop Geogr Med 29:130-108, 1977.

One hundred and forty-three mothers living in Benin City, Nigeria, were interviewed concerning their beliefs about child care, nutrition, and their source of information regarding child care. All mothers believed that breast feeding should begin from birth. Eighty-one percent of the mothers believed that breast feeding should be continued for a year or more. However, 58% of the mothers would introduce artificial milk within the first month after birth. Only 19% of the mothers would give breast milk alone for the first three months.

NIGERIA. Hauk, H. M. and Tabrah, F. L. Infant Feeding and Growth in Amo Omamma, Nigeria. J Am Diet Assoc 43:327-330, 1963.

Infants in Amo Omamma were commonly breast fed for at least a year, often 18 months or longer. Some solid food was usually given from about 6 months of age. The first food was usually maize pap followed later by yam. Between 6-9 months mashed or prechewed foods were given 1-3 times a day. Infants 10-12 months old were usually given some soup with yam, but some had yam mixed with palm oil only.

NIGERIA. Longo, L. D. Sociocultural practices relating to obstetrics and gynecology in a community of West Africa. Am J Obstet Gynecol 89(4):471-475, 1964.

Information in this article that concerns nutrition and fertility follows. Traditional Yoruba sanctions prohibited meat, eggs, and other protein-rich foods both for pregnant women and for infants below about 2 years. Strenuous farm labor was continued until the last weeks of pregnancy and was resumed within several days after delivery. Sexual intercourse continued until the third trimester, sometimes with the thought that this helped to nourish the child, and was not resumed until the infant was weaned from the breast two to three years later. Semi-solid foods were introduced when their first teeth appeared.

This article presents an excellent photograph of femal circumcision of the newborn, in which the anterior portion of the labia minora and the clitoris are excised by using metal or bamboo scissors to remove a piece the size of a "date stone." (Editor's note: widespread excision of the clitoris in African societies is believed by many, including Yoruba women interviewed by the writer,

to make the woman less vulnerable to sexual temptation and more willing to accept abstinence.)

NIGERIA. MacLean, C. M. Yoruba Mothers: A Study of Changing Methods of Child-rearing in Rural and Urban Nigeria. J Trop Med Hyg 69:253-263, 1966.

A study of child-rearing practices in Ibadan, Nigeria, in 1966, showed that breast feeding usually began 2-3 days after birth and continued from 2-3 years, although male children might be kept on the breast a few months longer than female. Occasionally breast feeding continued up to 4-5 years. Births were usually spaced at approximately three yearly intervals, as intercourse was prohibited until the termination of lactation. Weaning was a gradual process, starting early with a thin corn meal pap given by hand and going on to a variety of mashed purees of adult foods. Yams, a staple article of diet, were considered to make a child sluggish and "heavy," delaying walking and healthy growth.

NIGERIA. Martin, W. J., Morley, D., and Woodland, M. Intervals between Births in a Nigerian Village. J Trop Pediatr 10(3):82-85, 1964.

The average interval between births in the Yoruba village of Emesi was found to be 35.5 months for 248 women whose previous child survived and 17 months for 34 women whose preceding infant was stillborn or died before the age of one year. Average interval in the absence of mortality increased from 32.4 to about 38 months as birth order increased from 2 to 7+. Only 16% of mothers conceived while breast feeding, in part because of strong public censure against cohabitation during breast feeding. (One woman who became pregnant before weaning was so disturbed by public opinion that she left the village until the second child was born.) Average duration of lactation was 23.2 months. Mean interval between the cessation of lactation and the next birth was 13.3 months, increasing from 11.4 months to 16.5 months as birth order increased from 2 to 7+.

NIGERIA. Matthews, D. S. The Ethnological and Medical Significance of Breastfeeding: With Special Reference to the Yorubas of Nigeria. J Trop Pediatr 1(1):9-24, 1955.

The author reports the average duration of breast feeding among Yorubas to be 18-22 months and the average length of lactation amenorrhea 16 months, but often lasting 2-3 years. He observed that the longer the suckling, the longer amenorrhea would last. Parturition occurred at 4 year intervals, but the first two years of the birth interval was accompanied by a prohibition on intercourse.

NIGERIA. Morely, D., Bicknell, J. and Woodland, M. Factors Influencing the Growth and Nutritional Status of Infants and Young Children in a Nigerian Village. Trans R Soc Trop Med Hyg 62(2): 164-195, 1968.

Two groups (A and B), each of 52 children, were selected from a study population of 405 children attending the under-five's clinic in the Yoruba village of Emesi, Western Nigeria. Group A were the children whose weights fell below the 10th percentile of the local study group (2.1 to 3.3 standard deviations below the 1978 WHO standards) at 6, 9 or 12 months of age. Group B were considered to be of satisfactory weight and were always above the 50th percentile, which ranged from -1.2 standard deviations below WHO standards at 6 months to about 0.2 standard deviations below at 12 months.

The children in the two groups were found to retain their relative weight position during the succeeding 4 years. A similar poor or satisfactory weight gain was also found in their younger siblings.

Mothers of group A children were not significantly shorter (62.2 vs 62.6 in.) but weighted at 3 months following delivery an average of only 107 lb., which was 10 lb. less than mothers of group B children. Mothers in both groups gained weight with increasing parity, but group A mothers gained an average of 1.0 lb. with each birth compared to 2.3 for group B. (No significant seasonal changes in weight had been found in this population.) Prevalence of malnutrition increased with birth orders above 7 and appeared associated with inadequate lactation in older mothers.

Although almost all infants were breast-fed on demand, 83% of group A and 35% of group B children had experienced at least one month of unsatisfactory weight gain during the first 6 months of life. The fact that about 10% of female and 25% of male children in the Emesi population fell more than 2 standard deviations below WHO weight standards at the sixth month of life also suggests inadequate lactation.

NIGERIA. Omololu, A. Nutrition and the African Child. Environ Child Health 18(2):144-149, 1972.

This is an overview article discussing factors leading to the malnutrition of African children. One factor not commonly mentioned in the literature is that pregnancy is viewed as entirely normal in Sub-Saharan African culture, so that the pregnant woman is expected to continue strenuous farm labor without extra food intake. Average pregnancy weight gain in one study in rural Nigeria was 5 kg, with 14% of full term singleton infants having birth weights below 2500g. Another factor is that traditional African education before the advent of Western culture systematically taught skills for living such as group maintenance of public amenities including roads, rivers and markets, birth spacing, child care, crafts and agriculture. The traditional education system has mainly been displaced by Western formal education that fails to teach living skills. The writer stresses the need for restoration of all forms of non-formal education together with development of communications, markets, agriculture, and health services.

NIGERIA. Ware, H. Motivations for the Use of Birth Control: Evidence from West Africa. Demography 13:479-494, 1976.

A conventional assumption in the family planning literature is that birth control in developing countries is first adopted by high parity women who wish to cease childbearing. The empirical support for this belief has mainly been drawn from interview surveys on the motivations for, and the timing of, the inception of birth control among married women in areas where there is no cultural precedent for birth spacing by traditional means. This study, on the other hand, is based on data drawn from an area sample of 6,606 primarily

Yoruba women, married or single, aged 15-59, in Ibadan, Nigeria, where there is a tradition for the practice of abstinence after a birth for the purpose of birth spacing. The Nigerian data revealed the following distinctive pattern: (a) although premarital sex is prevalent, levels of premarital contraception are high; and (b) within marriage, spacing is the most prominent motivation for contraceptive practice, more important than the limitation of family size.

NIGERIA. Weiss, Eugene and Udo, A. A. The Calabar Rural MCH/FP Project: What We Have Learned about Family Planning. Paper presented at the Annual Meeting of the Population Association of America, 1980.

The Calabar Project of Cross River State, Nigeria is an attempt to demonstrate the feasibility of providing basic MCH services to a rural population at a moderate cost, integrating FP services at all levels. The present paper describes a series of different types of research efforts carried out since 1975 by the Evaluation Unit of the Project.

The problems encountered in the translation into the local language of FP terms and concepts is described as are traditional methods of birth control. The results of a follow-up study of FP acceptors showing low continuation rates and a high degree of perceived side-effects is next presented. The paper concludes by suggesting that while FP, as childspacing, is traditionally practiced through postpartum abstinence, the use of modern contraceptives which permit sexual relations during childspacing is generally seen as undesirable. Widespread use of modern birth control is not envisioned in the near future in rural Nigeria, though many unanswered questions remain.

SENEGAL. Cantrell, P. and Ferry, B. The Influence of Nutrition on Fertility: The Case of Senegal. In Nutrition and Human Reproduction, ed. W. H. Mosley. New York: Plenum Press, 1978.

The duration of breast feeding and postpartum amenorrhea in rural and urban Senegal was examined, as well as the relationship between food consumption and fertility. Data on the duration of postpartum amenorrhea and breast feeding for urban, semi-urban, and rural women were collected in two year, longitudinal studies in Pikine, Khombole, and Thienabu, and in a retrospective survey of 1460 Dakar women. The median duration of breast feeding ranged from 19.3 months in urban areas to 23.7 months in rural areas. The median duration of postpartum amenorrhea ranged from 12.4 months in urban areas to 17.9 months in rural areas. Furthermore, the duration of postpartum amenorrhea was greater in rural areas than in urban areas for a given length of breast feeding. A nationwide budget sample survey, and weighing surveys in rural Khombole and M'Bourwaye yielded nutrition data. The data indicated that the urban diet was more abundant and contained a better balance of animal protein. A better diet was correlated with lower child mortality. No evidence was found to indicate an influence of nutritional status on fertility.

SENEGAL. Cantrelle, P. and Leridon, H. Breast-feeding, Mortality in Childhood and Fertility in a Rural Zone of Senegal. Popul Stud 25:505, 1971.

This study of 8,456 live births in Niakhar district of the Fatik Department of Senegal between 1962 and 1968 found that infant mortality among this group of Serer peasant farmers was 210/1000, 2nd year mortality 202/1000 and 1-5 year mortality 355/1000, leaving only 510 survivors at age 5. Mortality rates peaked during the harvest, from September to November. Couples resumed sexual relations about 2 months after birth. Weaning from the breast was most common near the second birthday and between March and May. The average birth interval was increased by 9 months by a 12-month increase in age of weaning, when weaning occurred between 12 and 36 months. An effect of weaning on mortality was clear only when the child was weaned during the subsequent pregnancy, which tripled the probability of death of the weanling. The study found no direct effects of fertility on mortality or of duration of breast feeding on mortality. Children who died between 2 and 4 years had been weaned at an average of 25.6 months, compared to 24.3 months for survivors. The authors suggest that mothers weaned children perceived to be sickly later than those that were healthy.

SIERRA LEONE. Kande, H. B. S. Infant and Child Mortality in the Bo District of Sierra Leone. Paper presented at the Annual Meeting of the Population Association of America, 1979. Pennsylvania, 3718 Locust Walk/CR, Philadelphia, PA 19104.

A study of currently married women (15-49), residing in Bo town (the second largest town in Sierra Leone), and four smaller towns representing Chiefdom Headquarters in the Bo District. Bo town had an infant mortality rate of 186 per 1000 births and a child death rate of 26 per 1000 children aged 1-4 years. The respective figures for the other towns were 246 and 36 deaths. First order births, births by very young and very old mothers, births after short birth intervals and births to mothers with very little or no education had very high infant and child mortality rates. Policy recommendations included (a) a greater emphasis on preventive health care programs by the Ministry of Health, (b) provision of more "well baby" clinics, (c) more health education programs to enlighten parents about the mortality risks faced by their children and the preventable nature of most of the infant and early childhood causes of death.

SIERRA LEONE. Snyder, D. W. Economic Determinants of Family Size in West Africa. Demography 11:613-27, 1974.

The economic theory of fertility postulates that income and prices, broadly defined, are important determinants of family size. What follows is an attempt to test this theory against the behavior of 717 predominantly urban households in Sierra Leone. Husband's education is used as a proxy for income; the "price" of a child is accounted for by wife's education and wife's wage rate. Other important variables are wife's age, a measure of child "quality," wife's age at first birth, and child mortality. The findings of the study tend to lend support to the economic theory of fertility but contain peculiarities which indicate a need for further research.

TOGO. Kumekpor, T. K. Rural Women and Attitudes to Family Planning, Contraceptive Practice and Abortion in Southern Togo: A Report of a Pilot Survey in the Maritime Region of Republic of Togo. Legon, Ghana: Department of Sociology, University of Ghana, 1970.

A sampling technique was used to gather interviews from 293 women aged 15 or over in the three administrative districts of Anecho, Tsevie, and Tabligbo in Togo. Even though little or no family planning was practiced by these women, most of whom were under age 35, the majority were aware of the adverse effects of too many children at too short an interval. The ideal spacing was seen as three years.

The following table presents the survey findings which show that these rural women were not as conservative as usually pictured.

Recognized adverse effects of short birth interval on mother's health	87%
No adverse effects if mother in good health	9%
Too many children cause economic problems	11%
Too many children cause psychological problems for mother	11%
Short birth spacing damages health of first child, may lead to death or Kwashiorkor	72%
Short birth spacing makes it difficult for parents to provide adequately	19%
Would practice abstinence to avoid pregnancy	54%
Would do nothing to avoid pregnancy	31%
Would see a doctor.	3%
Would use herbs or induce abortion	3%
Would keep unwanted pregnancy	77%
Believed abortion is bad, criminal or against religion	90%
Believed abortion is good but dangerous	9%
Circumstances surrounding pregnancy might compel woman to abort	37%
Abortion justified if essential to mother's health, if woman too young, or had too many children	18%
Believed abortion increasing in their area	52%
Believed abortion decreasing in their area	11%

UPPER VOLTA. Laurentin, A. R. and Benoit, D. Infant Mortality and Birth Intervals. Popul Stud 30(2):279-294, 1976.

In the course of a demographic inquiry which also offered medical advice to the respondent women, information was obtained on the reproductive life and child mortality of women in three regions of Upper Volta. Foetal mortality rates are inversely correlated with fertility rates, whereas the opposite holds true of the mortality of children aged up to four years. An explanation of this phenomenon is attempted, showing how large variations in mortality rates continue to exist in developing countries.

The second section of the paper deals with spontaneous abortions which happen much more frequently than is believed in Black Africa and with the effect of pathological sterility on both intervals. Venereal disease is an important factor. Account is taken of the taboo on sexual relations after children have been born, a taboo which continues to be kept in the region studied and which has an important effect on inter-birth intervals.

UPPER VOLTA. Munson, M. L., Bumpass, L. L., and Pool, D. I. Determinants of Cumulative Fertility in Urban Upper Volta. Paper presented at Annual Meeting of Population Association of America, 1979.

This analysis of fertility differentials in a "traditional" urban population examines cumulative fertility of mothers by four exposure variables (age,

span of fertility, marital stability, and monogamous/polygynous union) and six socio-structural variables (nutrition, spouse's occupation and education, respondent's education, religion, and birthplace). Dummy variable multiple regression is used to estimate the separate and joint effects of each of the variables. The exposure variables account for 95% of the explained variance, with an R^2 of .466. The necessity of controlling for age in studies of this kind is demonstrated by the fact that nearly every zero-order relationship in the analysis is either substantially modified or reversed after age controls are introduced. For example, polygynous wives have 36 more children per hundred than monogamous wives, but when differences in their age distribution are taken into account, the polygynous wives have 26 fewer children per hundred mothers.

ETHIOPIA. Huber, A. and Ulm, R. Probleme der Laktationsamenorrhoe (Problems of Lactation Amenorrhoe: Investigations in Ethiopia). Gynaecologia 153(6):282-297, 1962.

A 1962 report on a project investigating lactation amenorrhoea in Ethiopian women undergoing treatment at the Imperial Guard Hospital in Addis Ababa revealed that 81% of the women nursed their babies fully for at least 1 year. Lactation amenorrhoea in these women averaged 13-14 months. Within 1 year 44.7% and within 2 years 95.5% of the women had menstruated. During the lactation amenorrhoea 10% of the women became pregnant. Curettings taken during amenorrhoea showed that in 73.5% there was an inactive endometrium, but in 26.5% there were signs of ovarian hormonal effects on the endometrium. Blood tests suggested that prolonged lactation could be temporarily harmful to undernourished mothers. Uterus measurements, however, revealed that prolonged lactation had only a mild and reversible effect on the size of the uterus.

ETHIOPIA. Knutsson, K. E. and Mellbin, T. Breast Feeding Habits and Cultural Context (A Study of Three Ethiopian Communities). J Trop Pediatr 15:40-49, 1969.

This study presents breast feeding habits in three rural Ethiopian villages in the provinces of Tigre, Sidamo, and Arussi. In Tigre, 92% of infants received breast milk for more than one year within a traditional group that depended on subsistence agriculture and had little outside contact. In a coffee cashcropping village in Sidamo, where Western clothing and Christian and Muslim religions were replacing local traditions, 61% were breast fed more than a year. The impoverished and displaced Arsi Gala herdsmen in Arussi, however, had cultural norms that specified 5 months as the weaning age for girls and 6 months for boys. The Arsi expressed the belief that early weaning was necessary to increase the number of children a woman could bear during her fertile years. The Arsi used a traditional gourd feeding bottle. Only 11% of infants were breast fed more than twelve months and boys were, in fact, fed longer than girls.

In the five field stations followed in Ethiopia, both the birth and child mortality rates from 1963 to 1965 were highest in the Arussi area, and resulted in about the same number of living children per family as in other areas. The authors speculate, however, that in previous generations, when the Arsi transhumance cattle economy was still functioning and was situated in the cooler highlands, cows' milk was sufficiently abundant and risk of infection was low enough to make early weaning a rewarding strategy in terms of number of surviving children.

ETHIOPIA. Selinus, R. et al. Dietary Studies in Ethiopia: Dietary Pattern Among the Rift Valley Arusi Galla. Am J Clin Nutr 24:365-377, 1971.

Infants of the Rift Valley of Ethiopia were usually breast fed up to 6 months. Children aged 2 months to 1 year might be partly breast fed. Breast feeding usually continued normally for 6 months, occasionally for 1 year, but sometimes for only 3-4 months. This rather short period for an underdeveloped area was because the Arsi believed lactation prevented pregnancy and that a high birth rate was necessary to counteract high mortality. At about 1 year the child was introduced to adult food. Often the first solid food was toasted corn, but the infants relied mainly for nourishment on butter milk in quantities as available.

ETHIOPIA. Tayback, M. and Prince, J. S. Infant Mortality and Fertility in Five Towns of Ethiopia. Ethiop Med J., 11-17.

Infant mortality and fertility performance were estimated for a sample of 5 towns in Ethiopia in 1964-1965. The infant mortality rate was 152 deaths per 1000 liveborn and 59% of this loss took place within the first two months of life. The birth rate appeared to be 40 live births per 1000 population per year or 143 annual births per 1000 women aged 15-44 years of age. This latter rate was 43% higher than that found in European and North American nations.

KENYA. Blankhart, D. M. Four Villages Survey in the Coastal Area Kwale, Kenya. Mimeographed. Amsterdam: Koninklijk Instituut Voor De Tropen, 1-10, 1971.

In 1970 a survey was done in four population centers of Kwale, Kenya, to determine the nutritional status of the following communities: Kumbani, Gozi, Mbaleni, Borani. In Kumbani it was found that breast feeding was continued for at least 18 months and was rarely done after 24 months. Gozi follows the same pattern except that breast feeding was fully absent after 30 months. In Mbaleni there was frequent breast feeding up until 24 months. In Borani there was a slight decline of breast feeding after 18 months and only complete absence after 30 months. Weaning foods common to all areas are rice, sweet potatoes, cassava, beans, peas, bananas, mangos, meat and fish. (Editor's note: This article, which was not available to the compiler of this annotated bibliography, probably contains additional relevant information.)

KENYA. Ojiambo, J. A. Maternal and Infant Dietary Practices of the Abasamia of Busia District, Western Province, Kenya. A Preliminary Study 1966-67. East Afr Med J 44:518-523, 1967.

A study of infant feeding practices in a remote area of western Kenya showed that for infants, breast milk was the staple; of 32 mothers, 15 breast fed for 2 years. A watery porridge, pounded banana, yam, rice and occasionally liver was introduced at 6 months to 1 year.

RWANDA. Bonte, M., Akingeneye, E., Gashakamba, M., Mbarutso, E., and Nolens, M. Influence of the socio-economic level on the conception rate during lactation. Internatl. J. Fertil. 19:97-102, 1974.

Factors that influence the rate of conception during lactation were studied retrospectively among 655 relatively malnourished and traditional rural women and among 253 urban women claimed to be well nourished and to have occidentalized habits. The rural infants were carried on the back and breast fed on demand whereas the urban infants were less frequently on the back and were breast fed on schedule. In non-lactating women, menstruation and conception occurred at the same time interval postpartum in the rural and urban groups. Lactating and amenorrheic rural women experienced an average 21 month delay to next conception versus an average 4.5 month delay for the urban group. Menstruating lactating rural women experienced a 22-month delay, versus 9 months for the urban group.

RWANDA. Bonte, M. and van Balen, H. Prolonged Lactation and Family Spacing in Rwanda. J Biosoc Sci 1(2):97-100, 1969.

Data from 368 women who had just given birth in a government hospital were collected by means of medical records (Groups 1 and 2) and interviews (Group 3). Group 1 consisted of 50 women whose babies lived less than one week, Group 2 contained 102 lactating women, and Group 3 consisted of an additional 102 lactating women who were assessed by interview. Conceptions among both groups of lactating women were delayed an average of 15 months as compared to non-lactators. Conceptions during lactation amenorrhea were on the order of 5.4%.

RWANDA. Saxton, G. A. and Serwadda, D. M. Human Birth Interval in East Africa. J. Reprod Fert Suppl 6:83-88, 1969.

This article reports the following birth intervals for lactating and non-lactating Banyarwanda women, who traditionally breast fed for 2-3 years and did not practice postpartum abstinence. Birth intervals for lactating women averaged 27 months compared to 15 months for women whose infants were still-born or died within a week of delivery.

BIRTH INTERVAL AMONG RWANDA WOMEN

Interval (months)	Women breast-feeding		Women not breast-feeding	
	No.	%	No.	%
8 to 11	1	0.5	19	38
12 to 14	4	2	34	68
15 to 17	16	8	37	74
18 to 20	32	15	40	80
21 to 23	60	29	42	84
24 to 26	99	47	44	88
27 to 29	141	68	46	92
30 to 32	174	83	48	96
33 to 35	195	93	49	98
36 to 38	204	98	50	100
39 to 41	208	99		
42 to 44	209	100		

PROBABILITY OF CONCEPTION DURING LACTATION

Months since delivery	Proportion menstruating and lactating (%)	Proportion conceiving (%)	Probability of new conception
6	20	1	$1/20=5\%$
12	50	10	$10/50=20\%$
18	60	40	$40/60=67\%$
24	75	75	$75/75=100\%$

TANZANIA. Everett, V. J. The relation between maternal height and cephalopelvic disproportion in Dar Es Salaam. East Afr Med J 52(5):251-256, 1975.

The mean height of 622 Dar Es Salaam primigravidae was found to be 148.5 cm, whereas that of the 21 (3.4%) who required caesarian section for cephalopelvic disproportion was only 141 cm. A definite relationship exists between disproportion and maternal height which is an indicator of early maternal nutrition in population groups where malnutrition is endemic. Disproportion entails a high risk of maternal and infant mortality.

SENSITIVITY AND SPECIFICITY OF MATERNAL HEIGHT AS
A PREDICTOR OR CEPHALOPELVIC DISPROPORTION

'At risk' maternal height	Sensitivity %	Specificity %
up to 136 cm	23.8	99.2
138.5	33.3	96.2
141	66.7	90.8
143.5	80.9	83.7
146	90.5	69.5
148.5	95.2	54.4
151	95.2	41.8

TANZANIA. Findley, S. E. and Orr, A. C. A Suggested Framework for Analysis of Urban-Rural Fertility Differentials with an Illustration of the Tanzanian Case. Paper read at 1978 Meeting of the Population Association of America. Minnesota State Planning Agency, Rm. 101, Capitol Square Bldg., St. Paul, MN 55101.

The authors offer a framework for analyzing how individual and urban or rural "place" factors interact to influence fertility decisions. The framework builds on the Davis-Blake model and additionally shows how place or community variables influence exposure to intercourse, conception, and birth, either with or without a conscious decision-making process. The framework emphasizes the way person and place related factors combine to determine a woman's perception of her life options before bearing any children, as well as how changes in these factors may affect subsequent childbearing decisions. The framework is briefly illustrated by the Tanzanian case. The analysis highlights urban-based considerations, such as education-wage differentials, which may influence the rural couple's decisions. A comparison of two rural groups shows that specific community variables, such as cultural attitudes, accessibility, general education levels, and child mortality, mediate the influence of these urban-based phenomena.

TANZANIA. Jelliffe, D. B. et al. The Children of the Hadza Hunters. J Pediatr 60:907-913, 1962.

Permissive breast feeding was the pattern of infant feeding among the Hadzas of northern Tanganyika (now Tanzania). Soft fats, gruel-like mixtures of uncooked powder and honey were given to infants in the early months. When an infant had 2-4 teeth, prechewed meat was given by the mother. By the age of 18 months, the full adult range of foods were given. Bone marrow, both raw and cooked, was introduced in the early months.

TANZANIA. Kocher, J. E. Socioeconomic development and fertility change in rural Africa. Development Discussion Paper, No. 16. Cambridge, Massachusetts: Harvard Institute for International Development, 1976.

In rural areas of Africa, demand for children typically exceeds supply. The numbers of children born and surviving are thereby limited by supply rather than demand constraints. A model is presented which postulates that socioeconomic development that initially causes the average number of surviving children (supply) to rise, later brings about a decline in the average number of children desired (demand), and that these changes eventually cause parents in later years of child-bearing to find themselves in excess supply rather than excess demand situations. As this trend continues, parents are motivated to try to prevent further births. Multiple regression is used to test separate supply and demand models of the determinants of number of children born to a sample of about 800 women, ages 20-39, in rural areas of Tanzania. The R^2 s for the supply models are large and the coefficients for the independent variables are relatively large and statistically significant. R^2 s for the demand models are low and statistical relationships are weak. These results are consistent with the hypothesis that in rural areas of Africa, supply characteristics dominate while demand characteristics have little to do with fertility levels and variations.

TANZANIA. Maletnlema, T. N. and Bavu, J. L. Nutrition Studies in Pregnancy Part I: Energy, Protein and Iron Intake of Pregnant Women in Kisarawe, Tanzania. East Afr Med J 51(7):523-528, 1974.

Dietary intakes of 70 pregnant women in Kisarawe, Tanzania were measured by the weighing and by the recall methods. The mean intake of protein, energy and iron were not up to the FAO/WHO recommendations. Less than one-third of women consumed an amount of protein satisfying the FAO/WHO recommendation of 38g of reference protein. The women on higher intakes delivered larger infants than those on low intakes. Protein intake was more highly correlated to birth weight than calorie intake. Women, who according to the recall method said that they ate mainly cassava foods, showed a lower intake of protein, energy and iron than those who had mixed diets. According to the author, maternal malnutrition, which seemed to affect about a quarter of the women, could be eliminated by improving the communication in the district, by treating and preventing diseases, and by increasing the production and utilization of agricultural products.

TANZANIA. Mayer, G. Undernutrition, Prolonged Lactation and Female Infertility. J Trop Pediatr 12(3):58-59, 1966.

Undernutrition, prolonged lactation, and female infertility were studied among an unreported number of women in a mountain village in Tanzania. A tribal

method of birth control consists of sexual abstinence for 4-6 months after delivery and prolonged lactation which is continued until the next pregnancy is recognized (2-3 years). These women depend almost entirely on breast milk as the only food for their children during the first 2-3 years. Those of the higher socioeconomic group who feed their children by other methods get pregnant nearly every year. In the low socioeconomic group no woman menstruated during the first 6 months postdelivery, 17% did so before 12 months, 48% before 18 months, 83% before 24 months, and 17% were amenorrheic for more than 2 years. All those in the high socioeconomic group started menstruating within a year in spite of lactation. The women in the low socioeconomic group menstruate only 2-5 times before they are pregnant again. Medical examinations revealed reduced estrogen production (or complete absence) in lactating malnourished women.

UGANDA. Cook, R. The Ankole Pre-school Protection Programme, 1964-1967. Mbarara, Uganda: Ankole Pre-school Protection Programme, 1967.

This preschool health and nutrition program, with a total target population of about 650,000, collected data showing marginal improvement in mean weights of children from 1965 to 1967. The program did not advocate population control because the writer "feels it an impertinence to make any such attempts in a foreign country, and in any case, opinion is divided as to whether East Africa will need a larger population in future." The program did, however, assist in the provision of family planning services for birth spacing. To avoid potential political sensitivity, the family planning program was sponsored by a private organization, the Ankole Medical Association. The Preschool Protection Program, however, paid the staff conducting the family planning clinics and provided some equipment. Clinic was held after normal working hours and was not publicly announced. The Lippes loop was most frequently used, followed by the pill. Three-fourths of target women surveyed concerning child health favored family spacing. This article indicated a demand for family planning services in Uganda despite a pronatalist political environment.

UGANDA. Jelliffe, D. B. et al. The Children of Lugbara. Trop Geogr Med 14:33-50, 1962.

A field study of the Lugbara tribe in the West Nile District of Uganda in 1961 revealed that all children were breast fed, and that 41% of the children surveyed were still on the breast at 2 years of age. In the first six months of life only a minority of children had any food besides breast milk. From 7-12 months between a quarter and a third of the children were given peas, ground nuts and millet. By 2 years of age, the whole range of Lugbara foods were given.

UGANDA. Jelliffe, D. B. et al. The Health of Acholi Children. Trop Geogr Med 15:411-421, 1963.

Among the Acholi tribe in Uganda, breast feeding is prolonged into the second year of life or longer. Soft and semi-solid foods, including millet, beans, sesame are introduced from the second 6 months of life onwards. Among urban Acholi, breast feeding is carried on for an average of 16-18 months. Mean and dried fish is eaten more frequently than in other areas, but usually only the soup is given to small children.

UGANDA. Jelliff, D. B. et al. Ecology of Childhood Disease in the Karamojong of Uganda. Arch Environ Health 9:25-36, 1964.

Karamojong babies are universally breast fed. If the mother has insufficient milk, the child may receive supplements of undiluted sheep's milk. Breast feeding is prolonged and continued through pregnancy until the next child is born. Fresh and sour milk and butter may be added to a child's diet from 1 month of age. Sorghum porridge, soft meat and beer are given regularly at about 6 months. By 2 years, a child is eating all adult foods.

UGANDA. Namboze, J. M. Weaning Practices in Buganda. Trop Geogr Med 19:154-160, 1967.

Of 73 mothers from under 19 to over 30 years old in Buganda who were interviewed, 26 stopped breast feeding at 12-14 months, for the others the age varied from 3 months to 2 years. The main reason given for weaning was the child was big enough. Another reason was insufficient milk from the mother. Solid foods were introduced gradually by 28 mothers, but 18 weaned their babies abruptly without previous introduction of solid foods. In 33 cases a child was sent to a relative after weaning.

UGANDA. Welbourn, H. F. Weaning Among the Baganda. J Trop Pediatr 9: 14-24, 1963.

A study of Baganda children attending child welfare clinics during the weaning period found that the duration of breast feeding was usually from 12-16 months. Additional foods, matoke and tea, were given from the age of 6 months or earlier. The final cessation of breast feeding was abrupt and often pre-planned for a particular day, although the mother stopped breast feeds in the day time a few weeks before she stopped the night feeds.

Weaning marked a frequently traumatic emotional separation from the mother during which period children frequently became malnourished. About 45% of children were sent away from home to live with other relatives either at weaning or during the following 2 years. The author suggested that children with strong primary attachments survived the weaning trauma with better personality adjustment than the increasing number who experienced bottle feeding and early family instability associated with modernization.

ZAMBIA. Wenlock, R. W. Birth Spacing and Prolonged Lactation in Rural Zambia. J Biosoc Sci 9:481-485, 1977.

Data were collected from 1044 mothers resident in the rural areas of Zambia during a National Nutrition Status Survey, to determine the effect of lactation on the interval between conceptions. Lactation is very prolonged with a small proportion of mothers continuing up to 33 months. A main reason for cessation of breast feeding appears to be a new pregnancy, only 1.5% of mothers being neither pregnant nor lactating up to 12 months. During lactation, conception is delayed for at least 12 months. The peak in new conceptions occurs between 25 and 27 months. The normal interval between births is 3 years for rural Zambian mothers.

ZIMBABWE RHODESIA. Davies, J. C. A. Measles and the Birth Rate. Centr Afr J Med 22(8):152-154, 1976.

This paper suggests an association between the decision to eradicate measles and an increase of family planning practice in Salisbury. Measles previously had been judged the commonest cause of death in the isolation hospital in Salisbury. By 1975, however, 40,000 of the city's 50,000 "under fives" population had been vaccinated by means of a campaign that immunized every child sick or well -- attending health services. Team members, assisted by the Health Education Unit, swept through the city with loudspeaker vans to vaccinate all resident children. Reduction in measles was estimated in 1975 to save a total of \$20,000 in hospital costs. A policy of promoting preventive, well-baby care also succeeded in increasing clinic attendance from 60,000 in 1973 to 150,000 in 1975, and resulted in a decline in the prevalence of whooping cough. Poliomyelitis, diphtheria and neonatal tetanus also had been virtually eliminated within the city.

Simultaneously, without intentional promotion, attendance at family planning clinics increased and contraceptive practice increased by 60% from 1973 to 1975. In particular, Depo Provera injections given in the maternity units immediately after birth became increasingly acceptable. The proportion of women receiving such injections increased from about one-quarter in 1974 to approximately half of those delivered in the City Health Department's units in 1975. (Editor's note: Depo Provera has been found to inhibit lactation.)

ZIMBABWE RHODESIA. Pugh, A. O. Aspects of Rural Health V: Better Maternity Services. Centr Afr J Med 24(6):123-124, 1978.

Some maternity units in Rhodesia have provided accommodations where pregnant women, particularly those with high risk of complications -- can come and wait for delivery, in order to reduce the risk of delivery along the way in areas where transportation is difficult. The local communities should provide traditional buildings in which the mothers cook and look after themselves as usual. A water standpipe, sanitation, and a washing hut would be provided by the maternity unit. The presence of women at the end of pregnancy has been found to provide an excellent opportunity for family planning, nutrition, child care, and health education.

CENTRAL AFRICAN EMPIRE. Vis, H. L. et al. The Health of Mother and Child in Rural Central Africa. Stud Fam Plann 6(12): 437-441, 1975.

Studies on food consumption and the relation of fertility to malnutrition in the great lakes region of Central Africa conducted by the Medical Mission of the Medical and Scientific Center of the Universite Libre of Brussels in Central Africa and The Institute for Scientific Research in Central Africa are summarized, and longitudinal studies on maternal and child health reported. The annual population growth rate in this area was 2.6% and death rate was 23/1000. The average woman had 6-7 live children during her fertile years. Perinatal mortality was 50-55/1000 births. Infant mortality 70-100/1000 live births. There was a low incidence of gastroenteritis and pneumopathy due to prolonged breast feeding. There are 2 nutritional subgroups in this area: 1) those who use milk as a weaning food and 2) those who are unable to ensure a good protein supply after weaning. Endemic malnutrition delayed puberty in the female to age 15-16 and caused a low level of milk production and prolonged postpartum amenorrhea. This ensured spacing of children between 33-39 months. Studies of growth indicate psychomotor development was normal and only somatic growth delayed. About 20% of children were malnourished.

NIGER. Faulkingham, R. H. and Thorbahn, P. F. Population Dynamics and Drought: A Village in Niger. Popul Stud 29(3):463-478, 1975.

The paper reports the results of demographic research in a rural village of about 1500 Hausa-speaking farmers in southern Niger, during the winter of 1973-74. The research site lies at the heart of the Ahel-sudanic zone just to the south of the Sahara, where drought, and in some areas, famine have exacted a heavy human, animal, and economic toll since 1968. The study was designed to measure and explain the change in the size and structure of the population during the years 1969-73. Social anthropological field techniques were used to ensure full and accurate reporting by community residents on all census topics. Data on rainfall and crop yields, on health and sanitary conditions, and on the political economy, social organization, and culture of the village were gathered in order to interpret the demographic situation.

The analysis of this data yields the following conclusions:

1. The population of the village appears younger (mean age: 15 years) and growing faster (mean doubling time: 23 years) than reported for Niger as a whole in 1972.
2. Contrary to what the researchers expected, the crude death rate, while relatively high to begin with, actually declined during the drought period (mean: 14.81); the crude birth rate remained very high (mean: 46.01), and the crude rate of increase rose from 1969 to 1973.
3. There was virtually no family out-migration from the target village during the drought, although the number of adult males participating in seasonal migrations to large West African towns rose from 35% in 1969-70 to 75% in 1973-74.
4. Problems of food production and distribution were acute, but thanks to the availability of donated foods, these were sufficiently short-lived during this drought cycle to make no discernible impact on population, although prolonged protein/calorie malnutrition among the very young may affect future fecundity.

- ZAIRE. Anderson, B. A. and McCabe, J. L. Nutrition and the Fertility of Younger Women in Kinshasa, Zaire. Journal of Development Economics 4:343-363, 1977.

A significant positive association was established between fertility and purchased calories per adult equivalent using individual household data for Kinshasa, Zaire. The analysis was based on a sample of women aged 20-24, none of whose children had died. Characteristics likely to influence fertility both behaviorally and biologically, such as education, were included as separate independent variables. Both the first and second closed birth intervals and conditional second birth probabilities were analyzed, with the latter providing more significant results. Evidence is also presented showing that above low levels of calorie consumption infant and child survival is positively related to protein consumption.

- ZAIRE. Carael, M. Relations Between Birth Intervals and Nutrition in Three Central African Populations (Zaire). In Nutrition and Human Reproduction, ed. W. H. Mosely. New York: Plenum Press, 1978.

The influence of various factors on postpartum amenorrhea and, therefore, on birth intervals is considered. A retrospective and cross-sectional study was conducted among 3 tribes living in 2 different ecological areas in Zaire. The ecology, dietary pattern, and health situation for the different study groups are described. Lactation was found to prolong postpartum amenorrhea in both areas studied. The 2 populations from the equatorial forest, despite differing customs, were found to have rather equal periods of amenorrhea, due probably to a similarity in nutritional patterns. The author claims that protein and lipid deficiencies caused the highland population to experience longer durations of amenorrhea. When these women moved to a relatively urban area, adoption of a balanced diet caused the period of amenorrhea to drop. Age and parity had no significant effect on the duration of amenorrhea. Partial weaning resulted in a 2-3 month shortening of the amenorrheic period.

- ZAIRE. Delyoye, P., Delogne-Desnoeck, J. and Robyn, C. Serum prolactin in long-lasting lactation amenorrhea. Tancit ii:288-289, 1976.

Summary: Basal serum-prolactin concentrations were high until 15 months postpartum in nursing mothers of Central Africa (Lwiro). There were significantly lower in menstruating than in amenorrheic nursing mothers. These results support hypothesis that prolactin is involved in the long-lasting amenorrhea which occurs in regions where breast feeding is prolonged for up to 2 years after delivery.

Bloods were collected just before and 30 minute after suckling started from 39 lactating women between 1-24 months after delivery. Controls were 20 adult men. Mean basal serum prolactin was significantly higher in a menorrheic nursing women than in menstruating nursing women. Mean basal serum prolactin was significantly three times higher in menstruating nursing mothers than adult men. There was a significant decrease in basal serum prolactin with time between 3 to 24 months postpartum -- little difference between 3-9 vs 9-15 months but these were significantly higher than 15-24 month levels. After suckling, mean basal serum prolactin increased in both amenorrheic and menstruation mothers but not significantly. Mean basal serum prolactin in menstruating mothers 30 minutes after suckling began still significantly lower than mean basal level in amenorrheic women before suckling.

Mean serum L.H. concentration was higher in menstruating than in amenorrheic mothers but the difference was not significant. Mean serum FSH concentration almost same in amenorrheic and menstruating mothers.

This data confirms Tysons work that after 3 months postpartum the increase in serum prolactin following suckling is negligible.

ZAIRE. Delvoye, P., Demaegd, M., Delogne-Desnoeck, J. and Robyn, C. The influence of the frequency of nursing and of previous lactation experience on serum prolactin in lactating mothers. J. Biosoc. Science 9:447-451, 1977.

Summary: Serum prolactin was measured in single blood samples collected within the first 22 postpartum months from 97 nursing mothers from an urban area (Bukavu) of Zaire. Nursing mothers were hyperprolactinemic, higher serum prolactin levels being associated with more frequent suckling episodes per day. Furthermore, serum prolactin declines rapidly in mothers who were giving the breast less than 4 to 6 times per day: the levels were within the normal range found in non-lactating women after the 6th postpartum month. Among mothers giving the breast more than six times per day, serum prolactin did not decline significantly during the 1st postpartum year, but returned to the normal range between 18 and 21 months postpartum.

Previous lactation experiences did not facilitate the effect of nursing on prolactin secretion during subsequent lactations.

Sixteen percent of lactating women menstruated by the end of the first year postpartum and 75% by the end of the second year.

BOTSWANA. Kolata, G. B. " !Kung Hunter-Gatherers: Feminism, Diet, and Birth Control." Science 185:932-934, 1974.

Until the 1960s, the !Kung lived as hunters and gatherers, a way of life they observed for 11,000 years. Now, less than 5% of the !Kung live as nomads. This rapid transition from nomadic to agricultural life style has among other things also resulted in dramatic changes in population growth.

The average age of menarche is later among nomadic !Kung females (15.5 years old) than it is among agrarian !Kung females. Nomadic !Kung women typically marry at puberty and have their 1st child at age 19.5. Nursing lasts 3-4 years and the average birth interval is 4 years. Nomadic !Kung population size is stable because so few children are born. Long term growth rate is 0.5% per year.

The rapid population growth among the sedentary !Kung is attributed to decreases in both the age of menarche, and to a shortening of birth intervals by 30%. Babies receive supplementary foods earlier due to the availability of grain and cow's milk. Sedentary !Kung also are taller, heavier, and fatter than nomadic !Kung.

BOTSWANA. Konner, M. Worthman, C. Nursing Frequency, Gonadal Function, and Birth Spacing among !Kung Hunter-Gatherers. Science 207 February 15:788:791, 1980.

!Kung mothers nurse their infants a few minutes at a time, several times an hour, throughout the daylight hours and reportedly also during the night. Mean interbirth interval in traditional !Kung hunter-gatherer bands is 44.1 months. Dawn to dusk observations of 45 infants found that percentage of 15 minute periods when mother-infant pairs did not nurse was less than 25%. Six hour observations of 17 mother-infant pairs, with infants ranging in age from 12 to 149 weeks (mean 63.9±9.9) yielded the following overall mean values for nursing variables: 4.06±0.41 bouts per hour; 7.83±1.27 minutes per hour; 1.92±0.18 minute per bout; with 55.16±3.79 minutes (mean± standard error) being the maximum interval. The age of the infant was unrelated to the bout length or nursing time, but was strongly related to the interval between bouts ($r=.71$). Serum levels of 17 β -estradiol (E_2) and progesterone (P) in 12 non-cycling nursing women were in the low range comparable to those found in hyperprolactinemic amenorrheic Western women. E_2 and P levels were significantly related to infant's age and to mean interbout interval, but not to bout length, parity, or sex of infant. The authors conclude that interbout interval may be a key variable in lactation infertility. They hypothesize that the key change, as the infant grows, is the lengthening of the interval between bouts, to a mean interval at 2 years that is approximately equal to the 10 to 30 minute half-life of prolactin in human plasma. This could allow prolactin levels to remain low enough, long enough, to impair antigonadal or antigonadotrophic effects, permitting cycling to be reinstated.

BOTSWANA. Wilmsen, E. N. Seasonal effects of dietary intake on Kalahari San. Fed Proc 37(1):65-72, 1978.

San bushmen living in the northwestern Kalahari Desert may be grouped according to different kinds and proportions of dietary habits. At one end of a continuous scale are those whose food is obtained almost entirely from wild bush sources; at the other extreme are those who obtain large amounts of food from domestic sources, principally milk and maize meal. The majority fall

between these poles. The region is also home to a substantial number of pastoralists and horticulturalists. Data were collected on the productivity of both the natural and domesticated environments, on resource procurement strategies, and on food consumption during a period of more than 1 year. Seasonal weight fluctuations associated with food production cycles among the San were found to be 6% of average weight. Among those San who consumed substantial amounts of domestic foods, mean weight was 4 kg higher and mean serum lipid values were higher than among bush food eaters. Thirty-two percent of all infants of bush food dependent mothers were conceived in June to August when calorie and protein intake were highest and individual weights were at their peak, while births of women consuming domestic foods were more evenly distributed.

NAMIBIA. Konner, M. and Worthman, C. Nursing Frequency, Gonadal Function, and Birth Spacing among !Kung Hunter-Gatherers. Science 207 February 15:788-791, 1980. (See BOTSWANA)

SOUTH AFRICA. Frere, G. Mean age at Menopause and Menarche in South Africa. South African Journal of Medical Sciences 36:21-24, 1971.

Mean age of menopause of 744 whites and 1319 Bantu with differing rates of cancer of the uterus were compared in a survey of the Johannesburg Hospital patients. For the former group the mean age was 51.44 while for the latter it was 50.70. The difference was significant at the 5% level. Another survey of 4838 Bantu urban school girls was made to establish whether nutrition affects the mean age at menarche. The two groups of "poor" versus "average" nutritional status did not significantly differ in terms of the mean age of menarche.

SOUTH AFRICA. Gross, R. L., Newberne, P. M. and Reid, J. V. O. Adverse Effects on Infant Development Associated with Maternal Folic Acid Deficiency. Nutr Reports International 10(5): 241-248, 1974.

Fourteen South African children aged six weeks to four years whose mothers had been severely folic acid deficient during pregnancy were assessed developmentally with the Denver Developmental Screening Test (DDST). Eight of the fourteen children showed abnormal or delayed development in one or more of the four general areas measured by the test. Eighteen control children, who were products of normal pregnancies or pregnancies associated with iron-deficiency anemia, were also studied. Only two of these control children showed a delay in development as measured by DDST. The role of adequate folic acid status during pregnancy on subsequent infant development requires further study.

SOUTH AFRICA. Moodie, A. D. Low-Weight Cape Coloured Mothers and their Infants. South Afr Med J (Supplement-South African Journal of Nutrition) pp 1400-1408, Dec. 19, 1970.

A controlled study of 55 pregnant Cape Coloured mothers was undertaken to discover whether the reproductive efficiency of underprivileged women in the community was impaired by malnutrition and whether their infants were

malnourished. The nutritional parameters used were the weight/height ratio of the mothers and their weight gain in pregnancy.

The overt reproductive efficiency of the mothers was not impaired by the degree of malnutrition that existed in the lowest economic groups. However, the women with low weight/height ratios and low pregnancy weight gains came from the poorest socioeconomic circumstances and tended to produce small infants of high morbidity and mortality.

When the mother's non-pregnant weight/height fell below 100%, both non-pregnant weight/height and pregnancy weight gain of more or less than an average of 270g per week appeared to affect birth weights and weight-for-age at 6 months. In women falling above 100% of weight/height, pregnancy weight gain appeared to make less difference than weight/height, although the sample was small. Gestational age of 38 weeks or less was found in 32% of infants of mothers with weight/height below 100%, versus 6% in those above 100%.

SOUTH AFRICA. Slome, C. Culture and the Problem of Human Weaning.
J Trop Pediatr 6:23-24, 1966.

The author defines weaning as the complete and permanent cessation of suckling. The paper involved a study of the wide variations found in different societies in time and method of weaning, reasons for cessation of breast feeding and rituals and beliefs associated with the process. For example, among the Basuto and Zulu, the onset of pregnancy leads to immediate weaning, based on the belief that breast milk would prove injurious to the suckling baby. The Chaga, believing the mother's milk is inadequate, spit food into the baby's mouth from the second day of life and with the gradual introduction of foods, the breast serves primarily as a comforter.

Among the Zulu, foods are introduced before breast feeding because of the belief that colostrum is injurious to the infant. The breast is withheld for the first 24-28 hours or longer. A finely sieved, pulped maize-and-water gruel is given as a substitute.

JORDAN. Kimmance, K. J. Failure to Thrive and Lactation Failure in Jordanian Villages in 1970. Environ Child Health 18:313-316, 1972.

Sequential weighings between birth and 3 months of 313 southern Jordanian village infants attending Save the Children Fund child health clinics were examined for evidence of lactation failure and its causes. The children were exclusively breast fed. Failure to thrive implying lactation failure was defined as rate of weight gain less than or equal to 2 standard deviations below the standards for North American children published in Fomon's Infant Nutrition. Lactation failure affected 35.8% of the mother-child pairs. None of a series of socioeconomic and biological variables were strongly associated with lactation failure. Weak but statistically significant associations included high parity, and obesity of the mother. A marginal association with maternal shortness may have existed although mothers did not permit accurate height recordings.

By six months of age 31% of the children failed to thrive, although breast feeding alone was not implicated because semi-solids were introduced at about 3 months. Of the original failure to thrive group, 69% had achieved normal rates of weight gain by 6 months, whereas 21% of the previously normal group had fallen below normal. Although there had been no sex difference at 3 months, 62.3% of infants failing to thrive at 6 months were female.

KUWAIT. Nagi, M. H. Excessive Fertility in Kuwait: Patterns and Implications. Paper presented at The Annual Meeting of the Population Association of America, 1980.

Kuwait is among those Middle East countries that today have the highest birth and population growth rates in the world. This paper presents data on recent fertility trends and differentials in Kuwait. Data analysis included; birth rates, age specific fertility rates, natural increase rates, age specific rates of female birth, and gross and net reproduction rates as well as fertility rates by: a) level of education and b) occupational groupings, computed separately for native and immigrant population.

The consistently higher level of native fertility was explained by a number of socioeconomic factors including, age of marriage, age of first pregnancy, differences in sex ratio, differences in education and occupational groupings and socioeconomic status.

The analysis has some relevance to other oil rich countries in the region. Their pattern of excessive fertility raise fundamental questions concerning the impact of their tremendous wealth on the fertility level. From the evidence it becomes necessary to reassess the value of transition theory for this region of the world at this stage of development.

LEBANON. Chamie, J. Religious differentials in Fertility: Lebanon 1971. Popul Stud 31(2):365-382, 1977.

Attempts to research population dynamics in Lebanon prior to 1970 were hampered not only by political obstructions, but by the scarcity of reliable census data. The 1970 Lebanese survey of about 1/15th of all households was the first national survey conducted since 1932. The 1971 National Fertility and Family Planning (NFFP) Survey investigated a 10% subsample of this survey population.

BANGLADESH. Anonymous. Decline in Breast Feeding Endangers Infant Health, Leads to More Births Unless Contraception is Used. Int Fam Plann Perspect D:f 4(3):95-96, 1978. (See MALAYSIA)

BANGLADESH. Barhat-e-Khuda. Value of children in a Bangladesh Village. In The Persistence of High Fertility: Population Prospects in the Third World, Vol. 2, ed. J. C. Caldwell. Family and Fertility Change, Changing African Family Project Companion Series, No. 1. Canberra: Australian National University, Department of Demography; and Ibadan: University of Ibadan, Sociology Department, 1977.

Despite severe malnutrition and overpopulation in rural Bangladesh, the author found that parents believed that large family size was beneficial to them particularly for providing old age support and that costs of children were not excessive. Almost half believed that boys and one-third believed that girls who did not attend school earned more than they cost by 11-14 years. This article, reporting a study in village Barkait in Comilla District, discusses the findings of an extensive survey of attitudes and children's work activities.

BANGLADESH. Cain, M. T. Economic Class, Economic Mobility, and the Developmental Cycle of Households: A Case Study in Rural Bangladesh. Paper presented at The Annual Meeting of the Population Association of America, 1978.

The author considers the relationship between the developmental cycle of households and their economic mobility in rural Bangladesh and proceeds to state two major assertions. First, in the current socioeconomic and demographic context of rural Bangladesh, a parental strategy of fertility maximization will tend to increase the chances of upward intra-generational mobility. Second, there are systematic economic class differences in family life cycle processes which contribute to widening the gap between rich and poor in rural Bangladesh.

The ways in which variations in the course of the household life cycle influence economic mobility are discussed. These include effects through child labor utilization, effects on the probability of property loss during economic crises, and effects on the probability of property loss at the time of household dissolution.

Data are presented which show economic class differentials in demographic factors affecting the course of the household life cycle. These include child and adult mortality and children's age at leaving the household. The implications of the analysis for population policy are discussed.

BANGLADESH. Chen, L. C. et al. A Prospective Study of Birth Interval Dynamics in Rural Bangladesh. Popul Stud 28(2):277-297, 1974.

A group of 209 married, fecund women in rural Bangladesh were studied prospectively for 24 months from 1969 to 1971 to define some of the biological and sociological factors relating to fertility performance. These women

were selected from a larger study population of 112,000 that had been followed with a daily house-to-house vital registration programme since 1966. The selected women were interviewed bi-weekly and were asked questions about menstruation, pregnancy, lactation, husband's occupational absences, and monthly urine tests for pregnancy were taken. The results for 193 non-contracepting women revealed that the seasonal pattern of births previously observed in this population could be associated with a corresponding seasonal pattern of conceptions and that this was due to a seasonal trend in fecundability. The highest conception rates were from January to June, which period includes the coolest months of the year. At this time food supplies were also relatively more adequate. Postpartum lactational amenorrhea was very prolonged, averaging 17 months for women with a surviving child. The appearance of the first postpartum menstrual flow (onset of ovulation) also had a seasonal trend which could not be adequately explained, although nutrition may have played a role because the seasonal period when menses most commonly returned started in November following the major rice harvest. The median waiting time to conception, once menstruation had resumed, was 8 months. This interval was influenced by seasonal fluctuations, as well as by the age of women and by husbands' absences. The foetal wastage rate was 15.0 per 100 conceptions, with 62% of the foetal losses occurring during the second month of gestation. Overall, the average birth interval was 33 months, with lactational amenorrhea accounting for almost 45% of this interval.

BANGLADESH. Chowdhury, A. K. M. A. Effect of Maternal Nutrition on Fertility in Rural Bangladesh. In Nutrition and Human Reproduction, ed. W. H. Mosley. New York: Plenum Press, 1978.

Prospective data was obtained on 643 Bengali women who had delivered and begun to menstruate (postpartum amenorrhea segment) and 483 of whom had conceived following reappearance of menstruation (waiting time to conception). The median duration of postpartum amenorrhea was found to be 17.9 months. The median duration of the menstruating interval between the end of amenorrhea and conception was 10.9 months. A multiple regression on the duration of postpartum amenorrhea yielded a positive correlation with age and hematocrit count, and a negative correlation with parity. A multiple regression on the duration of the menstruating interval yielded a positive correlation with age and husband's absence, and a negative correlation with parity.

No significant relationship was found between the nutritional indicators of height, weight and arm circumference and length of postpartum amenorrhea or the waiting time to conception. This study included only data on closed intervals which could have biased the measurement of fecundability by failing to delineate those women who could not conceive. The author has preliminary data to suggest that a higher percentage (17.6%) of women in lowest weight group (less than 38.5 kg) had not conceived in five years compared to higher weight groups (6.7 and 8.4%). However, analysis of these data had not yet been adjusted for age differences.

BANGLADESH. Chowdhury, A. K. M. A. et al. The Effect of Child Mortality Experience on Subsequent Fertility: Pakistan and Bangladesh. Popul Stud 30(2):249-261, 1976. (See PAKISTAN)

BANGLADESH. Chowdhury, A. K. M. A., Huffman, S. L., and Curlin, G. T. Malnutrition, Menarche, and Marriage in Rural Bangladesh. Soc Biol 24(4):316-325, Winter, 1977.

A survey of 1,555 girls aged 10 through 20 was conducted in a rural area of Bangladesh in March, 1976, to assess the impact of nutritional status on the onset of menarche and the association between age at menarche and age at marriage. In recent years there has been an increased age at onset of menarche which appears to have been associated with malnutrition caused by war, postwar inflation, floods, and famine in the period 1971-76. Body weight was highly correlated with the age of onset of menarche. A seasonal trend in onset of menarche was noted with the peak occurring in the winter months corresponding to the largest annual rice harvest. An increased age of marriage was also noted, which may be correlated with the increased age of menarche.

BANGLADESH. Chowdhury, Z. The Paramedics of Savar: An Experiment in Community Health in Bangladesh. Development Dialogue 1: 41-50, 1978.

The People's Health Centre is situated in rural Savar, some 30 miles from Dacca. It was set up in 1972, following the war of liberation, by a group of Bengali doctors. The Centre has gained an international reputation as an example of integrated development: none of the familiar problems (health, family planning, food, even poverty) are dealt with in isolation. Health, however, dominates the activities of the Centre. Better health means lower birth rates in one of the world's most heavily populated countries. Better health demands better nutrition, higher incomes, greater emancipation of women. Most of the Centre's 44 paramedics are women. Few have received extensive medical training and half at least come from the actual area. Their job is to promote as much as to heal. However, the scheme has not been without its setbacks. In 1976, a key paramedic was murdered in one of the local villages -- illustrating the kind of opposition to pioneering health that exists among the wealthy elite, and not least among the quack doctors, in the villages.

BANGLADESH. Huffman, S. L., Chowdhury, A. K. M. A., Chakraborty, J., and Mosley, W. H. Nutrition and Post-Partum Amenorrhea in Rural Bangladesh. Popul Stud 32(2):251-250, 1978.

A study was conducted among 2048 lactating, noncontracepting, and non-pregnant women from 86 rural villages in Bangladesh. The study confirmed the very long period of lactational amenorrhea in rural Bangladesh. The median length of postpartum amenorrhea among lactating women was 18-20 months. Maternal age was positively correlated with amenorrhea duration, older women remaining amenorrheic longer than younger women. Maternal nutritional status did not significantly affect the length of postpartum amenorrhea: the mean postpartum interval was 17.4 months for the "low nutritional status group" (average weight was 37.14 kg); 17.1 months for the "median nutritional status group" (average weight was 40.83 kg); and 17.3 months for the "high nutritional status group" (average weight was 44.84 kg). Average height was identical (147.8 cm) for each group. Breast feeding practices were, in fact found to be the main determinant of postpartum amenorrhea. For this reason, socio-economic status was found to be related to postpartum amenorrhea because it affects breast feeding practices. Improved supplemental infant foods led to decreased frequencies of durations of breast feeding and, subsequently, shortened birth intervals.

BANGLADESH. Huffman, S. L., Chowdhury, A. K. M. A., and Sykes, Z. M. Lactation and Fertility in Rural Bangladesh. (Popul Stud December 1978.) Presented at Annual Meeting of Population Association of America, April 1978, Atlanta, Georgia.

Analysis of data from three phases of a study on postpartum amenorrhea in rural Bangladesh (Matlab Thana) illustrated good aggregate consistency of response on menstrual status, but less individual consistency on duration of postpartum amenorrhea. Using life table techniques, the median duration of amenorrhea was calculated as 19.9 months for women with births from February to September 1974. The seasonal trend in return to menses had a substantial influence on duration, with the median duration decreasing from 21.5 months for women with February births to 16.9 months for those with September births. Seasonal pattern is similar for all weight groups. By contrast, the median duration of postpartum amenorrhea for women weighing less than 38 kg (approximately the lowest quartile of the distribution by weight of the sample) was 21.1 months compared to 19.3 months for women weighing 44 kg or more (approximately the highest quartile). Nutritional status affects duration of postpartum amenorrhea to a lesser degree than does seasonal pattern. The cause of seasonality in resumption of menses is not determined, but the authors speculate that factors associated with the harvest contribute to the pattern.

BANGLADESH. McCord, C. Integration of Health, Nutrition, and Family Planning: The Companiganj Project in Bangladesh. Food Research Institute Studies 16(2):91-105, 1977.

The Companiganj Project was conducted by the Bangladesh government with outside aid to demonstrate how nutrition, health and family planning programmes in rural areas might be integrated. The training programme for project personnel began in 1973 and the full programme has been in operation since 1975. However, the obstacles to change are strong and by the end of 1977 there was little evidence of improvement at the village level: there has been little general acceptance of the concept of integration and most of the government civil service system is run by university-educated urban-oriented officers, which makes community participation difficult. The main success of the project lay in identifying and training people to carry out health work in rural areas: local women proved to be keen recruits, and illiterate women were in many cases the most efficient workers.

BANGLADESH. Schultz, T. P. Retrospective Evidence of a Decline of Fertility and Child Mortality in Bangladesh. Demography 9:415-430, 1972.

A detailed analysis of survey data collected in 1961-1962 for a sample of 4200 families in central East Pakistan produced consistent and reasonable estimates of birth and death rates for the preceding decade. Extremely high levels of infant and child mortality declined noticeably in the period 1952-1961. Age-specific birth rates to married women also decreased in the decade for women over the age of 19, while a small increase was recorded for married women aged 15 to 19. During the 1950's total marital fertility declined about one-fifth. Birth rates remained high in 1960 according to these estimates, but there is reason to anticipate further reductions in birth rates, particularly among older women. To improve understanding of the determinants of fertility and to aid in the formulation of policy to cope with population trends, statistical analysis must increasingly consider information on families over time. Retrospective household survey data may provide the empirical base for this line of inquiry. In rural areas where 95% of the East Pakistani live, the retrospective estimate of the infant death rate fell from about 170/1000 in 1952 to 150/1000 live births in 1961. The average total number of children born to all cohorts of women over the age of 34 was about six; yet because of the exceptionally high death rates, the median number of children still alive to these women in 1960 was about three. (By 1962, 3/4 of the women aged 30-34

and older already had three living offspring. Continued high fertility among these older women will lead them to have more living children than the previous generation had.)

BANGLADESH. Stoeckel, J. and Chowdhury, A. K. M. A. Pregnancy Termination Intervals in a Rural Area of Bangladesh. Demography 11(2):207-214, 1974.

Pregnancy termination intervals, i.e., live birth to live birth (LB-LB), live birth to fetal loss (LB-FL), and fetal loss to live birth (FL-LB), are analyzed prospectively between 1966 and 1970 in a rural population (117,000) of Bangladesh. Results indicate that the mean LB-LB interval was almost 30 months, the LB-FL interval 27 months, and the FL-LB interval 18 months. In addition, postpartum amenorrhea was estimated to be about 13-14 months, and the time added by a fetal loss to a LB-LB interval about 15 months.

No relationship was found between LB-LB intervals and the number of living or dead children.

BANGLADESH. Swenson, I. Early Childhood Survivorship Related to Subsequent Pregnancy Spacing. J Trop Ped 24(6):103-106, 1978.

The analysis uses data from a population in Matlab Thana in rural Bangladesh where lactation is prolonged, nutrition limited, medical care is essentially absent, and both fertility and mortality rates are high (unspecified). The sample consists of 17,066 live births that occurred between 1966 and 1970 who: 1) were alive at the end of the first year of life; 2) could have reached age 3 by the end of the follow-up; 3) had a life span longer than the subsequent birth interval; and 4) were the first pregnancies of a closed interval. Childhood mortality is significantly higher among children whose birth is followed by another pregnancy in less than 12 months compared to those whose birth is followed by another pregnancy in more than 12 months. This relationship is apparent when the second pregnancy of the interval results in a live or a non-live birth. These results suggest that a second closely spaced pregnancy adversely affects the older child even when the second pregnancy does not terminate as live birth which competes for breast milk and other maternal attention. The period of competition from the second closely spaced pregnancy does not appear to have a significant effect on the survivorship of the older child. However, children followed by a short interval and a live birth have a higher mortality than children followed by a short interval and a non-live birth. After adjustment for previous child losses, there were no significant associations between pregnancy order, age of mother and infant and childhood mortality, or between fetal death, pregnancy order and age of mother.

INDIA. Anand, D. and Rao, A. R. Feeding Practices of Infants and Toddlers in Najafgarh Area. Indian Journal of Child Health 11:172-181, 1962.

The study was made at the township of Najafgarh and at the village of Mitraon. Nearly all the mothers, 84% in town and 90% in the village, gave their infants their first feed "ghutti," which was usually sugar and water; few gave reasons why except that it was customary. Only 24% of the mothers gave the first breast feed at 6 to 12 hours after birth, 38% did so on the third day, and 3% on the fourth day. Feeding was usually irregular and on demand thereafter.

Supplementary feeding with diluted buffalo's, cow's or goat's milk or a combination was used by 66% of mothers in the town and 63% in the village. More than half the mothers in both places gave no solid food in the first year, but 42% started in the second 6 months. In the village, 75% of the mothers said that they preferred to start the child directly on adult foods rather than cook special dishes for them; of the others, most made special dishes only if the child was unwell. Fruit in season was given by 75% of mothers in Najafgarh and 71% in Mitraon.

INDIA. Anker, R. The Effect of Group Level Variables on Fertility in a Rural Indian Sample. J Devel Studies, 14:63-76, 1977.

This paper studies reproductive behaviors (ideal family size, completed family size and family planning acceptance) in a rural Indian area which was rapidly industrializing. Two castes and eleven villages were sampled. It was found that family planning was quite common and that fertility differentials among couples were related to the couples' unique socioeconomic characteristics as well as to two group level variables (caste and village). The latter result was shown to be statistically significant, for all three measures of reproductive behavior, even after many unique socioeconomic characteristics and attitudes of each couple were accounted for statistically.

INDIA. Bia, K. and Vijayalakshmi, B. Age of Menarche in South Indian School Girls, Tirupati (A.P.). J Trop Ped 24(4):171-175, 1978.

The distribution of the age of menarche was studied among 1,698 school girls in Tirupati, Andhra Pradesh, South India. The girls, aged 10-18 years (specifically: 120-215 months, since birth) were from poor (Rs 300/month or less) and not-poor (Rs 300/month or more) households. The survey took place in May, 1973. The probit curve appears to fit the data better than either the gamma or logistic curve. (The logistic curve was a good fit in a study of South African Bantu school girls by Burell and coworkers -- Hum Biol 33:250-261, 1961.)

In the present study, the mean age of menarche was 13.5 ± 0.037 for the non-poor group and 13.94 ± 0.092 for the poor group. Season had an effect on maturation with the majority of girls attaining menarche during the hot months -- from May to August.

INDIA. Baxi, P. G. A Natural History of Childbearing in the Hospital Class of Women in Bombay. Journal of Obstetrics and Gynecology of India 8:26-51, 1957.

The reproductive histories of 529 women are analyzed using interview recall data. The interrelation between the period of postpartum amenorrhea, resumption of menses following childbirth, and the duration of lactation is discussed. Baxi found that mothers who nursed their babies experienced an amenorrhea which was 6.7 months longer than mothers who did not nurse. Among the former, lactation inhibited the resumption of menses an average of 12-51 months.

- INDIA. Belavady, B. Nutrition in Pregnancy and Lactation. Indian J Med Res 57:63-74, Aug. Supplement, 1969.

A survey was done covering different parts of South India, tracing the patterns of breast feeding and weaning. It was found that breast feeding was usually started within 2 or 3 days after delivery and was continued into the second or third year after birth. Among poorer communities, it was found that 92% of the infants were breast fed at the age of six months and one child in every five was at the breast beyond 2 years of age. In a study of the hill tribes of South India, it was found that the majority of mothers continued breast feeding until at least the end of the second year. A study of some rural communities found that more than 50% of the children were at the breast at the age of 3 years.

- INDIA. Biswas, S. A Study of Amenorrhea after Childbirth and its Relationship to Lactation Period. Indian J Public Health 7(1):9-14, 1963.

A sample of 500 mothers, residents of Calcutta City, who had been in the hospital for childbirth or miscarriage were monitored by nurse investigators for 1 year following their discharge. It was concluded that during amenorrhea the chance of conception was almost negligible in comparison to the postamenorrhea period. By the 12th month 40% of nursing mothers were still amenorrheic compared to 4.75% of the mothers who miscarried.

- INDIA. Ghosh, B. N. Feeding Habits of Infants and Children in South India (On 600 Families). Ind J Med Res, 54:889-897, 1966.

In South India, 600 mothers with children under three years were interviewed to determine their beliefs on ideal infant feeding and their actual practice and customs. Most mothers start breast feeding on the third day after delivery and continue until the infant is two years old. Supplementation with other liquid foods is started about 6 months -- 33% using fresh cow's or buffalo's milk. Solid food is introduced between 1-1.5 years; 43% use rice, 22% use rice and another cereal, 3% use meat, fish or eggs.

- INDIA. Gopalan, C. Malnutrition Among Infants and Young Children in India. J Trop Pediatr 3:3-12, 1957.

A study of malnutrition among pregnant women in South India revealed that the mothers were able to produce breast milk, at least for the first few months after delivery. Some mothers had considerable milk in the 18th and 24th months of lactation. Supplementary feeding of infants is often started in the 6th month. These supplements are mostly unmodified versions of the adult diet and consist almost entirely of cereal gruel and occasional vegetables. Milk, meat, eggs do not figure to any appreciable extent in these supplementary foods.

- INDIA. Gopalan, C. Studies on Lactation in Poor Indian Communities. J Trop Pediatr 4:87-97, 1958.

A group of fourteen lactating Indian women were studied to obtain information about 1) the extent to which breast milk contributes to the infant's nutrition, 2) whether improvement in quality and quantity of breast milk was possible, and 3) the effects of prolonged breast feeding on the mother's nutrition. Women breast feed their children for nearly two years and feeding is almost always on demand. Infant growth was adequate during the first 6 months of total breast milk diet, but when rice gruel was supplemented after the sixth month, growth became progressively inadequate. Breast milk gave 60% of the infant's protein intake between 6 and 12 months and 35% from 12 to 18 months. An increase in the mother's dietary protein by 30g daily increased milk output; however, protein content of the milk decreased. Nitrogen retention increased as protein intake increased, and nitrogen balance studies showed that the women needed 0.15g nitrogen/kg body weight/day, requiring 1.5g protein/kg body weight/day. The problem of infant feeding in poor communities is to ensure adequate improvement of the maternal diet to maintain lactation at the current level but without maternal protein depletion.

INDIA. Greaves, J. P. and Donoso, G. Relevant Health and Nutrition Education. Food & Nutrition, 2(3):14-18, 1976.

Health and nutrition information relevant to the poorer sections of the community in India is discussed. An important point to convey is that the first two years of life are a most vulnerable period. The child is totally dependent on others for his nutrition. An increase in the family income will make little difference unless the mother's understanding of her child's needs is improved. The following six points have universal validity: 1) Breast feed as long as possible with extra food from age 4 months on; 2) feed only clean food and water from clean utensils; 3) seek immediate help from available resources if the child falls ill and give child sugared water or weak tea; 4) get the child immunized; 5) a pregnant or nursing mother should eat four times a day including dark green or yellow vegetables; and 6) two or three healthy children are enough. The fact that breast feeding reduces the chances of conception is an important reason for prolonging it. Spacing children will allow the mother better nutrition which will carry on to her children.

INDIA. Jusadeson, V. and Ambujadevi, K. R. Relationship Between Socio-Economic Factors, Demographic Characteristics and Nutritional Status of Pregnant, Lactating and Weaning Mothers. J Fam Welfare, 25(1):3-19, Sept. 1978.

Twenty-two villages in 3 contiguous blocks of Mahabubnagar District of Andhra Pradesh, India, were randomly selected for study in order to examine the various factors that determine nutritional status of 501 pregnant, lactating and weaning rural mothers. The women were married, and their mean current age was 26. A causal model was proposed that postulated that socioeconomic status, demographic factors, and family structure determine fertility behavior and nutritional status.

After other variables were controlled, women in nuclear families had more pregnancies than women in joint families. Independent of the effect of number of pregnancies, older women displayed more severe nutritional deficiencies than younger women. However, in each of the age categories, the higher the parity the worse was the nutritional deficiency. Only 11% of the women did not exhibit some sign of malnutrition. When other factors were held constant, women from lower socioeconomic status were more malnourished than women from higher levels of socioeconomic status. The number of food taboos contributed a significantly to iron deficiency. Vitamin A deficiency was not correlated with fertility

behavior, but Vitamin B deficiency increased with number of pregnancies. The study concludes that although cultural norms regarding food and pregnancies may have an impact on nutritional status, nutritional status will fail to improve unless the standard of living is increased.

INDIA. Jyothi, K. K. et al. A Study of the Socio-Economic Diet and Nutritional Status of a Rural Community Near Hyderabad. Trop Geogr Med 15:403-410, 1963.

Infants of families living 20 miles from Hyderabad were breast fed after the third day postpartum. The first supplement was usually introduced between 1 and 2 years and breast feeding stopped between the 2nd and 4th year. In the well-to-do families, the first supplement given to infants was cooked rice with salt, milk and the ghee. Among the poorest sections, the same supplement was given without milk and the ghee -- which were replaced by ground nut oil. Not uncommonly, babies were straightaway placed on the adult spicy food when weaned.

INDIA. Kamat, M. Diet and Fecundity in India. In: International Planned Parenthood Federation (IPPF), the Sixth Internatl. Conf. on Planned Parenthood. Theme: Family Planning: Motivation and Methods, New Delhi, India, Feb. 14-21, 1959. London, IPPF. pp. 114-121. 1959.

Data collected from a survey in Bombay by the contraceptive testing unit have suggested an explanation of the following 3 points regarding fertility: 1) that fertility was higher among affluent groups than among the lower classes as judged by live births to every married woman at least 45 years of age; 2) that the average interval between births in India was longer than that in European countries prior to the popularity of birth control practices; and 3) that fertility rates for Indian women over 35 years of age were lower than those for European women of the same age category 100 years ago. Chronic semi-starvation prevalent in India was found associated with decrease in libido, slightly shorter fertility periods in women and longer periods of infertility following delivery, attributed by this study to protein starvation. This study does not consider lactation effects.

INDIA. Karkal, M. Infant and Child Mortality in Maharashtra - India. International Institute for Population Studies, Deonar, Bombay. Paper presented at The Annual Meeting of the Population Association of America, 1980.

In India registration of vital events is not satisfactory. Compared to the data in many other states, those in Maharashtra are better. With the help of data on age-sex distribution, from censuses and those from vital registration, estimates were made for infant and child mortality in Maharashtra and its rural and urban areas. With over 95% of registration of vital events in Greater Bombay more detailed analysis of these data has been possible.

In ages 1 to 4 and 5 to 14 mortality was higher in rural areas compared to urban areas. Deaths for female children were much higher than those for males indicating their neglect.

Data on causes of deaths were available from urban areas. Large numbers of infants died of congenital malformation, birth injury, etc. Diarrhea, dysentery and infective diseases were next in importance. There was a rise in deaths due

to respiratory diseases. Nearly 17% children (5-14) died of accidents violence and poisoning.

INDIA. Kaur, P. et al. Correlation of Amenorrhea with Age, Parity and Lactation. J Fam Welfare, 23(2):40-44, Dec. 1976.

The present study was conducted with 535 currently married women in the reproductive age group in a slum area of Varanasi to study the relationship of amenorrhea with age, parity and lactation. Amenorrhea and age were found to be significantly related as shown by the simple correlation coefficient of 0.068 ($P < 0.01$). No relationship between amenorrhea and parity was found while amenorrhea and lactational period were strongly related as indicated by statistical tests, when age was taken as a constant.

INDIA. Kishore, N. et al. Post Partum Vaginal Smear in Lactating and Non-Lactating Women. J Obstetr & Gyn of India 26(5):747-751, Oct. 1976.

A study was conducted in India to study vaginal smears of lactating and non-lactating women to determine the return of ovulation. One hundred twenty-five cases of postpartum amenorrhea were studied, 100 lactating and 25 non-lactating. Maturation index, maturation value, and karyopyknotic index were used to evaluate the smears; and the estrogenic effect of vaginal epithelium was studied according to colpocytological count obtained from smears. An atrophic type of smear was obtained in the immediate postpartum period; the malignant-like changes returned to normal in time. The cornification index increased for one year, but if lactation was prolonged it fell slightly. The ovaries started functioning much earlier in the non-lactating women than in the lactating women. The return of ovarian activity was later in multiparous than in primiparous women. The low nutritional status group experienced a later return of ovarian activity compared to the fair or good nutritional group. In lactating women ovulation occurred in 10% of the cases during amenorrhea and in non-lactating women it occurred in 16% of the cases.

INDIA. Kora, S. J. Effect of Oral Contraceptives on Lactation. Fertility & Sterility, 20(3):419-423, 1969.

The effect of the oral contraceptive (OC) Ovulen during lactation was studied in Bombay in 62 women who had participated in a pre-OC study for three weeks and then took OCs for a subsequent five weeks. The average amount of test feed during the first three months was significantly higher in the pre-OC group than in controls (P less than .01), while the average infant weight gain was almost the same. During the subsequent five week study, both the average amount of test feed and the average infant weight increase were significantly lower in the OC group than in controls (P less than .01). It is concluded that the use of Ovulen in this series resulted in a reduction in milk production and infant weight gain.

INDIA. Lala, V. R. and Desai, A. B. Feeding of Newborns and Infants (Cultural Aspects). Pediatric Clinics of India 5:191-197, 1970.

Women in a postnatal ward in Ahmedabad were interviewed with a questionnaire; 410 completed the study. Most put the infant to the breast within 12 hours after birth. The average duration of breast feeding was over 3 years. Most gave the first supplements of solid food or milk between ages 1 and 1.5 years.

INDIA. Loebner, H. and Driver, E. D. Differential Fertility in Central India: A Path Analysis. Demography, (1):329-350, 1973.

This study is one of the few multivariate path analyses of the relations of several demographic and socioeconomic variables to fertility and the use of contraception. For fertility, 56 of the 92 hypothesized paths are found to be significant at the .05 level or better. The five variables having a significant and direct effect on fertility, as shown by their path coefficients (p) are: duration of marriage ($p=.721$), spouse's cohort ($p=-.093$), spouse's age at marriage ($p=0.52$), caste ($p=-.071$), and number of siblings of husband ($p=.050$). The use of contraception is affected by, in order of importance, the spouse's education ($p=.267$), the husband's education ($p=.099$), the husband's income ($p=.089$), and surplus children, i.e., number of living children exceeding ideal number of children ($p=.059$). Child mortality, which is linked to number of living children and thus indirectly to surplus children, is affected by, in order of importance, the number of children ever born ($p=.723$), the husband's education ($p=-.166$), the spouse's absence by death or separation ($p=.084$), and family structure ($p=-.035$). The advantages and disadvantages of path analysis for this type of research are briefly mentioned.

INDIA. Malkani, P. K. and Mirchandani, J. J. Menstruation During Lactation. Journal of Obstetrics and Gynaecology of India 11:11, 1960.

The relation between duration of lactation, amenorrhea, and the use of supplemental milk is reported for 282 women. It was demonstrated that the earlier supplemental milk was given, the earlier menstruation resumed.

INDIA. Mudkhedkar, S. M. and Shah, P. M. The Impact of Family Size on Child Nutrition and Health. Indian Pediatr 12(11):1073-1077, 1975.

A random sample of 163 rural and urban families was chosen from a rural community around Palghar, 87 km north of Bombay, and in the metropolis of Bombay. Sixty-seven percent of the Palghar families were rural while 32.8% were urban, close to the actual rural-urban distribution in Maharashtra State. In the city, the sample was selected among the chawl population, as these represent 74% of the population in Bombay. Only families having at least one living child under five years of age and where both parents were alive were chosen for the investigation. Obstetric and dietary histories as well as 24-hour dietary recall were obtained. The "typical" rural family averaged 6.3 members including 3 adults and 3.3 children (of which 1.6 were aged under five). The "typical" urban family averaged 7.1 members including 4 adults and 3.1 children (of which 1.5 were aged under five). Nutritional status of the under-fives was studied in relation to family size. 64.2% of children in "small" families (3-5 children) and 62.5% of children in "large" families (more than 6 children) in the rural community showed malnutrition and weighed less than 70% of the

Haward standard. The difference in weights among the two groups was significant ($p < 0.001$). 12.5% of the children in small urban families weighed 70% or less against 25.0% of children in large urban families. In the rural group, 54.2% of children from one-child families and 60.8% of children from families with three children were moderately (weighed about 61-70% of standard) or severely malnourished (60% less of standard). Among the urban community the trend was similar, with 23.1% of children from one-child families and 45.4% of those from families with three children being moderately or severely malnourished. On the whole, 29.1% of children in one-child families were anemic versus 39.1% in families of three children. In rural areas this trend was more pronounced: the figures being 23.3% and 54.5% respectively. When rural and urban groups were combined, there was no significant difference in total caloric intake among children of small (<3 children) and large (>3) families. 15.6% of children in small families ate less than 80% of the protein requirement against 50% in large families. This was significant ($p < 0.01$). The mortality rate for children under five of small families was 0.3% against 10.2% for those of large families. The proportion of neonatal and/or infant mortality did not differ significantly in small vs large or urban vs rural families; infant mortality, however, was significantly lower in the urban sample than in the rural sample, irrespective of family size ($p < 0.01$).

INDIA. Mudkhedkar, S. N. and Shah, P. M. The Effect of Spacing of Children on the Nutrition and Mortality of Under-Fives. Indian J Med Res 64(7):953-958, 1976.

The relationship between the birth intervals of under-fives in 164 families and their nutritional status and mortality rate was studied in Bombay and nearby rural communities. When the birth interval of under-fives was one year or less, there was a high prevalence of moderate or severe malnutrition and much higher infant and neonatal mortalities in comparison with under-fives whose birth intervals were from three to four years. When the interval was more than 24 months the number of older siblings weighing above 70% weight for age was 1.9 times the number when the interval was less. Neonatal and infant mortalities were both lowest for birth intervals from 36 to 48 months. When the prevalence of malnutrition and the mortality rate of young children are both high, emphasis should be placed on the spacing of children so that birth occurs at intervals of three years.

INDIA. Parker, R. L. et al. The Narangwal Experiment on Interactions of Nutrition and Infections: III. Measurement of Services and Costs and Their Relation to Outcomes. India J Med Res 68 Suppl: 42-54, Dec. 1978.

This paper reports on 5 years of field research undertaken in 26 villages in Punjab, India with a population of about 25,000 people. Funded by numerous Indian and international agencies, and using a staff of 200, the Narangwal experiment was an important investigation on the cost-effectiveness of low cost health nutrition and family planning service delivery in rural areas. Sample findings reported in this paper (one of many papers reporting the project results) include comparisons of the cost of different programs relative to each death averted. The researchers found that prenatal child care (averting stillbirths) was the most economical intervention ranging in cost from Rs. 570 to Rs. 1010 for each perinatal death averted. Stillbirths were less expensive to prevent than infant deaths while the latter were one-seventh as expensive to prevent as child deaths. The cost of providing nutrition and health services to children under three in the Narangwal nutrition project were about Rs. 150 per child or Rs. 14 per capita per year. This cost was close to what

the Government of India was currently spending in primary health centers, making the Narangwal experiment relevant to widespread use in India.

INDIA. Potter, R. G. et al. Lactation and its Effects upon Birth Intervals in Eleven Punjab Villages, India. J. Chron Dis. 18:1125-1140, 1965.

In the Punjab villages of the Khanna study, lactation substantially prolonged postpartum amenorrhea. When an infant survived one month or more, lactation usually lasted well over a year, and the median length of postpartum amenorrhea was 11 months. Whereas if the child was stillborn or died in the first month of life the mother did not lactate and the median length of postpartum amenorrhea was in the vicinity of 2 months. From an unfinished analysis of data from the Khanna study involving 'partly retrospective' as well as 'entirely prospective' and 'truncated prospective' data from 1500 couples, it was estimated that the mean length of postpartum amenorrhea following a live birth was 11 months while that for menstruating intervals was 10 months. It was further estimated that without contraception the mean menstruating interval would be one or two months shorter. The average prolongation of birth intervals by pregnancy wastage was gauged at 2 months. These 11 months of postpartum amenorrhea, 9 months of gestation, 8 months of menstruating interval (in the absence of contraception), plus 2 months added by pregnancy wastage sum to 30 months.

If allowance was made for anovulatory cycles and for the limited contraception practised by the Khanna study couples, then their mean ovulatory exposure may be estimated as 6 or 7 months. Roughly half of the average prolongation of birth intervals by pregnancy wastage was composed of ovulatory exposure. Given all the above assumptions, the ratio of ovulatory exposure to average birth interval without contraception becomes 7:30. This result means that even if contraception was 50% effective and was doubling ovulatory exposure, it would be augmenting the total birth interval by a factor of only 7/30, or less than 25%. As mothers passed from their early twenties to their late thirties and early forties fetal wastage doubled and menstruating intervals and length of postpartum amenorrhea lengthened substantially.

INDIA. Potter, R. G., Jr., New, M. L., Wyon, J. B., and Gordon, J. E. A Fertility Differential in Eleven Punjab Villages. The Milbank Memorial Fund Quarterly, Vol. XLIII, No. 2. Milbank Memorial Fund, 40 Wall Street, New York, NY 10005, April, 1965.

In a rural population of about 12,000 in the Punjab, India, a moderate fertility differential was found between the two numerically dominant caste groups, namely, the Jat farmers who compose about half of the population and the Chamar leather workers who compose another quarter. Data come from the India-Harvard-Ludhiana Population Study, as known as the Khanna Study.

Jat wives aged 45 years or older averaged about one child less than corresponding Chamar women. Among wives of childbearing age, Jats had lower fertility than the Chamars at all ages. This last differential appears to have depended partly on the Jats' higher rates of fetal wastage and partly on their earlier stopping of pregnancies. The two caste groups reported essentially the same amount of practice of contraception, and their similar distributions of intervals from end of postpartum amenorrhea to next conception also rule against the idea of appreciably differing contraceptive practice. A practice of induced abortion is tentatively inferred from the Jats' consistently higher

rates of fetal wastage. The basis of their earlier infertility remains uncertain. Several factors may be involved, including contraception and the sterilizing effects of crude abortions.

INDIA. Potter R. G., Wyon, J. B. New, M., and Gordon, J. E. Fetal Wastage in Eleven Punjab Villages. Hum Biol 37(3):263-273, 1965.

The India-Harvard-Ludhiana Population Study (Khanna Study) collected detailed pregnancy and menstrual histories during monthly home visits, over a period varying from 3 to 5 years, from a village population of roughly 12,000 in the Punjab, India.

An overall rate of 100 abortions and 30 stillbirths per 1000 pregnancies was obtained, based on a total of 1765 pregnancies. The abortion rate, while more than five times higher than that reported by the respondents retrospectively, is still believed to be an underestimate of the true incidence of spontaneous abortion among the Khanna Study villagers. The chief limiting factor appears to have been the unwillingness and incapacity of the respondents to report early symptoms of pregnancy. The observed increase in rate of fetal losses with advancing age of mother was the same order of magnitude as found in a recent United States study.

INDIA. Ram, E. R. Des services de santé intégrés. Le Project Miraj en Inde. (Integrated health services. The Miraj project in India). Carnets de l'Enfance, Assignment Children 39:15-32, 1977. Abridged version of a paper presented at the UNICEF Special Meeting on the Situation of Children in Asia, Manila, May 17-19, 1977.

The Miraj project was undertaken in a rural district of Maharashtra State with the objective of providing primary health care services to all sections of the community by evolving an effective infrastructure out of existing facilities. The first phase of the project was the training of the local health personnel. Following a one-week course for the trainers, including the medical officers of the three primary health centres, all the uni-purpose workers (vaccinators, sanitary inspectors, nurses, midwives, etc.) underwent a six-week course to enable them to serve instead as integrated health workers in charge of: nutrition education; immunization programmes; examination of all children under five years of age, and regular follow-up of those suffering from malnutrition; provision of simple medical care, referring more difficult cases to the primary health centres; family planning; and yearly examinations of all school children. The evaluation survey conducted in January and February of 1976 revealed that this combination of preventive and curative medicine led to a significant of preventive and curative medicine led to a significant reduction of the infant and neonatal mortality rates, and a decline of over 60% in the incidence of scabies, diarrhea, and ascariasis.

INDIA. Rao, K. V. and Gopalan, C. Nutrition and Family Size. J Nutr & Dietet, 6:258-266, 1969.

A 1969 study in India was made to assess the effects of family planning on the nutritional status of the women and children. Methods used were seven day diet surveys, nutrition surveys, anthropometric data, hematological surveys, and hospital statistics. Results of the diet survey showed that 2-adult families with three or fewer children had significantly greater ($P < .01$) dietary

amounts of both protein and calories than those with three or more children, Hemoglobin levels in the last trimester were significantly higher ($P < .02$) among pregnant women who had had three or fewer pregnancies than those with four or more. Nutritional deficiency signs were higher for the latter group ($P < .01$). Signs of nutritional deficiency were found in significantly more ($P < .0001$) children in the fourth birth order or higher than in those of earlier birth orders. Anthropometric measurement in preschool children of lower birth orders were higher ($P < .001$) than for children of later birth order. Child care and duration of lactation were also better for children of lower birth order.

INDIA: Roberts, D. F. et al. A Study of Menarcheal Age in India. Ann Hum Biol, 4(4):171-177, 1977.

The question of whether climate has an influence on the age of menarche is frequently asked. However, since there is a lack of adequate birth registration in tropical countries, the adolescents' exact ages cannot be determined. In some regions of Southern Asia, however, careful entries are made regarding the date and even the hour of the birth of girls, as well as date and hour of their first menses, in order to establish their horoscope. This type of record was used in Warangal, located at 18° northern latitude, where several populations were studied according to their diet and different social classes; elaborate statistical analysis (logit) was performed. The age of menarche varies from 12.9 to 13.7 years, depending on the social class. These ages are a little different from those of adolescents of Colombo studied in 1950, but are significantly lower than of girls in rural Ceylon (12.8 and 14.4 years, respectively).

INDIA. Rosenzweig, M. R. Educational Subsidy, Agricultural Development and Fertility Change. Paper presented at The Annual Meeting of the Population Association of America, 1979.

The major focus of this paper is on testing the hypothesis that the introduction of "refueling" agricultural technical change in the rural LDC context alters household decisions regarding the allocation of resources between increments to family size and to schooling. A household survey from rural India, which distinguishes households by their exposure to agricultural development programs promoting the technologies associated with "green revolution," is used as the principal data base. Maximum likelihood tobit procedures are employed to estimate the development program effects on a measure of birth flows standardized for age-patterns of fecundity and age-standardized school enrollment rates for farm and landless households. The empirical results suggest that farm households exposed to the new technologies reduced their fertility and increased the allocation of resources to schooling despite the concomitant rise in the demand for unskilled labor. No such response is observed, however, among landless households in the same locations when income effects of the technologies are controlled for.

INDIA. Saxena, P. C. Breast Feeding: Its Effects on Post-Partum Amenorrhea. Social Biology, 24:45-51, 1977.

Data is presented on lactation and postpartum amenorrhea for 323 women in Banaras, India, ages 15-35, who had one live birth and for 250 women with two live births. Data on prolonged breast-feeding habits and amenorrhea show that the mean duration of lactation is 15.5 months and postpartum amenorrhea is 6.01

months after the first birth. It appears that an increase in the duration of breast feeding is accompanied by an increase in the length of postpartum amenorrhea. The average period of amenorrhea was shorter in cases where lactation ceased because of infant mortality under age three months. Lactation and postpartum amenorrhea had coefficients of correlation of 0.275 and 0.257 in the case of first and second births respectively.

INDIA. Schultz, T. P. Indirect Measurement and Analysis of Sex Specific Child Mortality: Interpretation of District and Household Data for Rural India in 1961 and 1970. Paper presented at The Annual Meeting of the Population Association of America, 1980.

Differentials in sex specific child survival vary substantially across societies, but because measurement presents difficulties, hypothesis testing as to the cause for this variation has not made much progress. This study proposes an indirect measure of sex specific mortality in childhood as an indicator of intrafamily allocation of resources between the sexes, and seeks to explain it in terms of (1) household wealth that contributes equally to the survival of both boys and girls, and (2) expected employment and earnings opportunities of the adult men and women in the locality. Implications of the framework are tested against parallel Indian data at two levels of aggregation -- 311 districts from the 1961 census and 1300 households from a 1970 survey. Expected earnings and employment of women are associated with relatively improved survival prospects for girls; increased wealth levels have similar effects. Religion (Muslim) effects women's roles in the labor market and only thereby affects sex specific mortality differentials among children.

INDIA. Sehgal, B. S. and Singh, S. R. Breast Feeding, Amenorrhea, and Rates of Conception in Women. Mimeographed. Lucknow, India: Planning Research and Action Institute, 1966.

Data was gathered from 886 rural Indian women. The normal duration of lactation was 22.6 months and the average period of amenorrhea was 12.5 months. Contraceptive value of breast feeding is compared with that of artificial methods and the author concludes that breast feeding has an important role to play in family planning programs.

INDIA. Seth, V. and Ghai, O. P. Feeding Habits of Infants and Preschool Children in the Urban, Semi-urban and Rural Community. Indian Pediatr 8:452-455, 1971.

In the three places studied around Delhi, almost all infants were breast fed. By the age of 1 year, 36.8% of the urban, 4.5% of the semi-urban and 2.1% of the rural children were completely weaned. By the age of 9 months artificial feeding supplemented breast feeding in 75% of the urban and 57.1% of the rural. Solid foods were introduced before 9 months in 24.5% of the urban, 13.6% of the rural children.

INDIA. Singh, K. P. Child Mortality, Social Status and Fertility in India. Social Biology, 21:385-388, 1974.

The relationship between social status (measured by educational attainment) and child mortality and fertility experience is examined using a sample of 311 Chandigarh women. High status women were less fertile and experienced less child mortality than low status women. Lowered mortality was associated with lowered fertility.

INDIA. Sundararaj, R. and Pereira, S. M. Diets of Pregnant Women in a South Indian Community. Trop Geogr Med 25:381-386, 1973.

The diets of 53 pregnant women were surveyed during the last trimester of pregnancy and the nutrients were calculated on the basis of food tables. The sample was drawn from the Harijan community, living on the outskirts of Sathuvachari Village, 3 km east of Vellore, South India. The women were of low socioeconomic status. Food taboos against eating the Jambu fruit, the fruit and root of palmyra, gingelly seeds and papaya were observed by most of the women. The women weighed between 35 and 50 kg. Daily intakes were found to be deficient in calories (51.9% of the women ingested 2000 Kcals or less); protein (range: 10.4g - 68.7g); retinal (range: 3 microg - 733 microg); riboflavine (range: 0.25 mg - 1.59 mg); ascorbic acid (range: 0 mg - 97 mg); iron (range: 8.8 mg - 44.0 mg); and calcium (range: 63 mg - 1345 mg). The requirements for niacin (range: 5.1 mg - 30.1 mg) and thiamine (range: 0.35 mg - 2.15 mg) were met according to the WHO 1965 Standards. One woman did not carry to term. Thirty-four babies born at term were weighted, and 7 were small-for-gates (less than 2500g), a parameter which is known to correlate with maternal nutritional status pre- and during pregnancy. (The authors have also shown on a subsample of 25 women that during pregnancy the women ate, on an average, 200 Kcals per day more than when they were not pregnant. It was due primarily to an increase in cereal consumption with a concomitant 5g rise in protein intake as well.)

INDIA. Sundararaj, R. and Pereira, S. M. Dietary Intakes and Food Taboos of Lactating Women in a South Indian Community. Trop Geogr Med 27:189-193, 1975.

The diets of 39 women from the Harijan community, (cf. Sundararaj and Pereira Trop Geogr Med 25:381-386, 1973), 3 km east of Vellore, were studied at regular intervals in the first year of lactation. It was shown that food taboos adversely affected the daily intake of energy (1700-2090 Kcals), protein (35 - 42g), and other nutrients in the first month. The weights of the women ranged from 35.9 to 64.2 kg (average: 43.6 kg). For at least the first month of lactation, dietary restrictions are severe. All the women breast fed their babies successfully. Thirty-eight of the women breast fed their babies for at least one year. Eight women terminated breast feeding by 18 months, and 8 more by 24 months. Fifteen mothers terminated breast feeding due to another pregnancy, 12 mothers continued to breast feed their child in the second trimester and 3 did so until the seventh month of subsequent pregnancy. Anthropometric measurements of the babies at less than 24 hours, 4 and 16 weeks showed that the infants were lighter at birth but that the rate of growth was comparable to North American standards. The period of food restriction in the first month of lactation appeared to have no adverse effect on the weight gain of the infants. The adverse effect of dietary restrictions and prolonged lactation on the women during repeated pregnancies has yet to be assessed.

INDIA. Thaman, O. P., Anand, H. L. and Manhas, R. S. A Review of Feeding Habits of Infants and Children in Kashmir. Indian Pediatr 1:428-435, 1964.

Three hundred and twelve children attending an out-patient clinic were selected at random from ages 6 months to 12 years. The time period covered was 28 months. Breast feeding was done in 96.2%, in 85% for over 6 months, 71% for over 12 months and 31% for over 2 years. The first food offered was breast milk in 35%; coffee or tea with milk and honey in 47%.

Weaning foods were introduced to 32% of the infants in the first 6 months, 37.5% between 6-12 months, 37.5% between 1-2 years, and 14% after age 2 years. Milk supplements were cow's, buffalo's, goat's or tinned milk. Other foods offered were rice or bread, biscuits, tea or coffee.

INDIA. Thaman, O. P. and Manchanda, S. S. Child Rearing Practices in Punjab. Indian J Pediatr 35:334-341, 1968.

Feeding practices and related socioeconomic factors were studied in 500 children between 1 month and 14 years old admitted to the hospital in Amritsar. About 99% of the Punjabi women breast feed, 89% of them for more than 6 months, and 82% and 40% for more than 1 year and 2 years. In comparison, 84% of children in Kashmir were breast fed for 6-12 months, 70% for 12-24 months and 31% for over 2 years. Of Punjabi mothers, 62.5% and of Kashmiri women, 37.5% introduced supplementary foods to their infants between 6-12 months. Bread, rice and biscuits were the usual initial foods.

IRAN. Aghajanian, A. and Tashakkori, A. The Value of Children in Iran: A Pilot Study Among Urban Youth. Paper presented at the Annual Meeting of the Population Association of America, 1979.

An important factor influencing fertility levels and desires and planned changes in them, is the value of children to parents. Recently there has been growing interest in the study of the value of children across societies not only for the policy aims, but also to develop a theoretical model in order to explain fertility behavior. The present paper reports on a pilot study of the value of children in Iran. After describing the Iranian socio-cultural system, we presented an expected model of the utility of children with the Hoffman & Hoffman's theoretical framework. Then, data from a sample of high school students in the city of Shiraz, a large urban center in southern Iran, is used to test the expected model. The results provide evidence on the utilities of children within the Iranian socio-cultural system. The most frequently mentioned value of children to parents is the pleasure and stimulation they provide. We find substantial evidence on the value of children as a source of prestige and power and as a way of self-expansion. Furthermore, even in this large urban center we find that almost one-third of our sample note the economic utility of children, basically as a potential source of old age security. There are, however, significant sex differences in the perceived utilities of children which are explained in terms of the differences in sex-role socialization within Iranian society.

IRAN. Froozani, M. D. et al. Maternal and Newborn Iron Status in a Public and A Private Maternity Hospital at Delivery in Tehran. J Trop Pediatr:182-185, Aug, 1978.

Iron and diets of 194 pregnant women and their newborns at a public and a private Maternity Hospital were studied. Blood samples were withdrawn from each woman before delivery and from cord at the delivery of the placenta. The following determinations were made: hemoglobin, hematocrit, serum iron, and total iron-binding capacity (TIBC). The mean value of maternal hemoglobin was 13.8g/100 ml in the private group vs. 11.1g/100 ml in the public group. Mean birth-weight was 3.34 kg and hemoglobin was 15.57g/100 ml in the private vs. 3.17 kg and 14.72g/100 ml in the public group. Mean values of serum iron, percent saturation of transferrin and MCHC were significantly lower; and TIBC and hematocrit level were significantly higher in cordblood of the public group when compared to the private group.

The private, higher socioeconomic status group had reached menarche at an average age of 14, versus 15 years for the public group. Diets calculated from total family weekly food consumption, showed that the private group received nearly twice as much meat and eggs and three times as much citrus fruits (686g per mother per day) as the public group. Less than 7% of either group had taken vitamin or mineral supplements. Average parity was 1.8 in the private versus 2.3 in the public group.

The study concluded that the higher hemoglobin concentration and the reduction of several associated biochemical signs of iron-deficiency in the private group was possibly due to a lower parity and also to a higher intake of animal protein and vitamin C.

IRAN. Geissler, C. Lactation and Pregnancy in Iran II: Diet and Nutritional Status. Am J Clin Nutr 31(1):341-354, 1978.

This paper examines the role of diet and nutritional status in lactation failure of Iranian urban women of lower and middle socioeconomic status. Dietary intake during pregnancy close to term and in the third month postpartum was assessed by the 24 hour recall method. Blood samples were taken for hormonal and nutritional evaluation. The low socioeconomic group ate less animal products, fruit, and vegetables. Both groups consumed less than 80% of recommended energy, vitamin B6, folacin, calcium, iron, and zinc. In the lower group, only average intakes of vitamin C, thiamin and protein met the standards. Significant differences were found between the groups in hemoglobin, hematocrit, serum total protein, and protein fractions, but not in weight and heights. The only parameters of nutritional status significantly correlated with adequacy of lactation were postpartum weight and percent of standard weight for height in the low group, and hematocrit values in the middle group. Differences between pregnant and postpartum individual values of the blood parameters were in general greater in the middle group than the low group.

IRAN. Geissler, C., Calloway, D. H., and Margen S. Lactation and Pregnancy in Iran: 1. Social and Economic Aspects. Am J Clin Nutr 31(1):160-168, 1978.

Adequacy of lactation was assessed in Teheran, Iran, among women of low (LSE) and lower-middle (MSE) socioeconomic status in the 3rd month postpartum as part of a study linking nutrition, hormonal status, and lactation. Subjects were selected randomly from women with uncomplicated pregnancies who attended 2

clincs in Teheran within 2 weeks of the expected date of birth. The study collected anthropometric data, a blood sample for hormonal and nutritional evaluation, socioeconomic data, medical history, and dietary intake information. The criteria of lactation adequacy used were based primarily on the classification of nutritional status in early childhood as proposed by McLaren and Read. Fifteen to thirty percent of the LSE and 40-55% of the MSE mothers had a fully adequate milk supply in the 3rd month. Substitutes used and affordable by the LSE mothers were nutritionally inadequate, and reflected traditional food beliefs. The low percentage of lactation adequacy even among the MSE mothers indicates that other social or health factors associated with urban living conditions may be as important as economic and nutritional factors in lactation failure.

IRAN. Ghadimi, H. Child Care in Iran. J Pediatr 50:620-628, 1957.

Breast feeding on demand was the rule in Iran, and it was continued for two years or more. It was generally believed that girls should be breast fed for 24 months and boys for 22 months. In the second year bread, rice, soup, sour milk and cheese were introduced gradually. However, meat was rarely given.

IRAN. Hedayat, S. H., Koohestan, P. A., Ghassemi, H., and Kamali, P. Birth Weight in Relation to Economic Status and Certain Maternal Factors, Based on an Iranian Sample. Trop Geogr Med 23:355-364, 1971.

This statistical survey is of 2123 single live births at three hospitals, in Teheran, during the period October 1969 to August 1970. The patients admitted to the hospitals were from various socioeconomic levels of the community. The results were as follows:

The male infants were found to be heavier than the females.

A significant direct positive correlation between economic status and birth weight was found.

There was a systematically increasing trend in the birth weight for the maternal age group up to 30 years. The correlation was significant.

The birth weight increases according to the order of birth up to the third, and shows a significant correlation.

The mean birth weight according to level of education was significant when the illiterate was compared with secondary and the primary with university level of education.

A significant correlation between birth weight and the intake level of eggs and milk was found.

Maternal age at first delivery was significantly higher for those with a better economic status.

The occurrence of complications of pregnancy was higher in the lower income groups.

IRAN. Polak, H. E., Toubia, N., and Bamdad, N. Problems of Infant Nutrition Amongst the Urban Population of Iran. J Trop Pediatr 9:98-104, 1964.

Of 95 infants born during 1959 to parents in poorer urban households, 44 were entirely breast fed to 12 months of age; the others at from 3-12 months received supplements of dried skimmed milk. Only small quantities of fruit juice, soup and vegetable puree were given during the nursing period. In another series of 60 infants born in 1961, 19 received breast milk alone for up to 12 months and supplements of skimmed or full cream dried milk or fresh milk were given to 4, 17 and 20 between birth and 3 months, 3-6 months, and 6-12 months respectively.

IRAN. Sadre, M., Emawis, E., and Donoso, G. The Changing Pattern of Malnutrition. Ecology Food Nutr 1:55-58, 1971.

The authors describe a change in the pattern of malnutrition in young children in Teheran, Iran, with declining lactation performance. The trend is towards marasmus in the first year of life.

IRAN. Tolnay, S. E. The Experience of Visitors to Family Planning Clinics

IRAN. Polak, H. E., Toubia, N., and Bamdad, N. Problems of Infant Nutrition Amongst the Urban Population of Iran. J Trop Pediatr 9:98-104, 1964.

Of 95 infants born during 1959 to parents in poorer urban households, 44 were entirely breast fed to 12 months of age; the others at from 3-12 months received supplements of dried skimmed milk. Only small quantities of fruit juice, soup and vegetable puree were given during the nursing period. In another series of 60 infants born in 1961, 19 received breast milk alone for up to 12 months and supplements of skimmed or full cream dried milk or fresh milk were given to 4, 17 and 20 between birth and 3 months, 3-6 months, and 6-12 months respectively.

IRAN. Sadre, M., Emawis, E., and Donoso, G. The Changing Pattern of Malnutrition. Ecology Food Nutr 1:55-58, 1971.

The authors describe a change in the pattern of malnutrition in young children in Teheran, Iran, with declining lactation performance. The trend is towards marasmus in the first year of life.

IRAN. Tolnay, S. E. The Experience of Visitors to Family Planning Clinics in Shiraz, Iran; Contraceptive Practice, Side Effects and Rumors. Pahlavi Med J 9:367-387, 1978.

This paper describes the characteristics of a random sample of 357 visitors to urban family planning clinics in Shiraz, Iran. It finds them to be relatively young, uneducated women who married and began childbearing at an early age. An inquiry into their contraceptive practices shows that most repeat the national family planning slogan as a reason for contracepting ("Fewer children -- better life"). It further shows that few of them were non-contraceptors before visiting a clinic. Many of the women claimed to have experienced some side effect from their contraceptive, but did not change methods because of the difficulty. The 30% of women who had heard rumors concerning side effects were more likely to report side effects than those who had not. Nervous problems, headaches, dizziness and bleeding or discharge accounted for 65% of side effects reported.

NEPAL. Nepal Ministry of Health, Nepal Family Planning and Maternal Child Health Project, and the World Fertility Survey (London). Nepal Fertility Survey, 1976. First Report, Kathmandu, August 1977.

Nepal is a country of 145, 689 square kilometers and of over 12 million inhabitants. The agricultural sector provides two-thirds of the total gross national product. There are severe regional disparities in gross domestic product and in general development. The Fifth Plan has identified 20 small ... areas for integrated development purposes in order to close the gap in regional development. Many are in the less developed hill region and the extreme Western region. One of the goals is to reduce migration to urban areas by involving rural populations in an integrated development program in forestry, home science, nutrition and family planning. Popular support, evaluation of progress and demographic factors are mentioned among criteria for success.

PAKISTAN. Ahmad, I., Roghani, M. T., and Shaha, W. A Study of 123 New Born Infants. J Pakistan Med Assoc 26(7):165-166, July 1976.

Thirty private ward (upper social class) and 93 general ward (lower and middle social class) neonates were weighed and measured. The average weight of the babies born to women on the private ward was 3.44 kg, higher than the 2.75 kg average for babies born on the general ward. Average chest and head circumferences were also higher on the private ward (34.3 cm and 35.5 cm respectively) than on the general ward (31.5 cm and 34.3 cm respectively). Higher rates of prematurity (19.3% vs 0%) and small-for-date babies (2.15% vs 0%) were noted in the general ward, as well as higher incidence of congenital anomalies. It was postulated that better nutritional status among the private ward women was the major cause of the differences. There was no difference in average length of the babies (47 cm).

PAKISTAN. Baum, H. M. A Comparison of the Factors Influencing Husband/Wife Use of Contraceptives in Pakistan. Paper read at 1978 Meeting of the Population Association of America, Richard Katon Associates, One Central Plaza, Box 22, N300 Rockville Pike, Rockville, MD 20852.

The decision to use contraceptives should represent a consensus arrived at by the couple. Most studies of contraceptive practice focus on either husbands or wives. This study focuses on both, with the aim of showing that the factors influencing use are different for husbands and wives.

Two models were formulated linking selected socioeconomic and demographic variables to use. The first omitted the prior decisions, opinion of family planning, and desire to use; while the second included them. The difference between the results for the two models were extreme for husbands, but minor for wives. Desire to use was an important part of the final husband model, but was not part of the final wife model. This could indicate a dominance by husbands in the realm of family planning.

The study found distinct sexual differences, which implies that neither spouse can be used as a proxy for the couple.

PAKISTAN. Chowdhury, A. K. M. A., Kahn, A. R., and Chen, L. C. The Effect of Child Mortality Experience on Subsequent Fertility: Pakistan and Bangladesh. Popul Stud 30(2):249, 261, 1979.

This paper presents an empirical analysis of the effects, behavioral and biological, of child mortality experience on subsequent fertility in two South Asian Islamic nations. Data for the investigation came from retrospective pregnancy histories of 2,910 currently married women interviewed in the Pakistan National Impact Survey (1968-69) and from longitudinal vital registration data (1966-70) of 5,236 women residing in a rural area of Bangladesh collected by the Cholera Research Laboratory. The aim of this study was to assess the importance of the child-replacement motivational response to child death experience after biological effects had been controlled adequately.

A common approach employed previously has been to examine cumulative fertility according to child death experience. In Pakistan and Bangladesh, a consistently positive relationship was demonstrated between the number of children ever born and the number of child deaths. This method, however, did

not exclude the inverse relationship, the influence of fertility on mortality, nor did it dissect our behavioral from biological effects. Utilizing the measure of subsequent fertility, live-birth-to-live-birth intervals, the study further illustrates another common pitfall. Since the risk of infant death, which leads to shorter birth intervals is associated with the mothers' reproductive history, women with child mortality experience are more likely to experience shorter intervals because of the biological effect of subsequent infant death. Behavioral influences may, therefore, be observed by considering only those birth intervals in which the first-born child survives to the end of the interval.

With these limitations controlled, very few, if any, behavioral influences were noted in the Pakistan and Bangladesh data. Median birth intervals in Pakistan varied between 35.0 and 41.2 months, increasing with parity. Within each parity group, no consistent difference was observed between women with and without previous child loss. In Bangladesh, the median birth interval for all women with a surviving infant was 37.2 months. This was shortened to 24.1 months by an infant death. When intervals with infant deaths were excluded, little or no behavioral influence was detected among women of the same parity, but with varying levels of previous child loss.

Even without behavioral effects, elimination of infant mortality in Bangladesh would reduce fertility by prolonging the average period of postpartum sterility. In the Bangladesh setting, however, the size of the effect was only about four percent. This modest effect, moreover, was counterbalanced by an overall increase of net reproduction by seven percent due to better survivorship of infants.

PAKISTAN. Khan, M. A. and Sirageldin, I. Son Preference and the Demand for Additional Children in Pakistan. Demography 14:481-496, 1977.

This paper tries to take into account the sequential element in fertility decisions and continues an investigation originally begun by Namboodiri. We examine the extent to which the "desire to have additional children" can be explained by a variety of economic, sociological, and demographic variables. The probit maximum likelihood estimation procedure is utilized, and the analysis is based on cross-sectional data on 2,910 currently married women obtained from a national survey conducted in Pakistan in 1968-1969. The principal finding is the presence of a strong son preference both for the husband and for the wife.

PAKISTAN. Rahimtoola, R. J., Qureshi, A. F., and Ramzan, M. A Study of New-Born Infants at Jinnah Postgraduate Medical Centre, Karachi. J Pakistan Med Assoc:258-261, Jan. 1977.

Thirty-one hundred fifty-six newborn infants, delivered consecutively from January to December, 1973 in the Department of Obstetrics, Jinnah Postgraduate Medical Centre, Karachi, were studied. The rate of prematurity was 24.3% and that of perinatal mortality was 96/1000 compared to 10/1000 in the U.S.A. The highest rate of perinatal deaths occurs in premature infants (45.3%). The incidence of congenital defects was 2.5%. Infants of diabetic mothers showed an average fasting blood sugar level of 65.9 mg% and none were born hypoglycemic.

High rate of prematurity (39%) but low rate of perinatal mortality (8.2%) were found among infants of anemic mothers. The authors were intrigued by,

did not determine the causes of the high incidence of small-for-dates in the sample. The authors also recommend establishing more maternity and child health centers in refugee colonies where prematurity and perinatal mortality are high.

PAKISTAN. Shah, N. M. and Smith, P. C. Non-Familial Roles of Women and Fertility: Pakistan and the Philippines Compared. Paper presented at the Annual Meeting of the Population Association of America, 1979.

Distinct and large differences between the occupational structures of Pakistani and Filipino women raise some interesting questions about the possible significance of such differences for the roles and status of working women in the two countries. Many more of the employed Filipino women were employed in professional and clerical activities compared to Pakistani women -- 20% and 3% respectively. Similarly, a very large proportion of Filipino women were in sales occupations compared to Pakistani women. More than fifty percent of all Pakistani women were working as self-employed craftswomen compared to less than one-fifth of Filipino women in this category.

Work participation seems to have a strong negative effect on fertility (births in 5 years prior to survey) in the Philippines while the relationship is negative but insignificant in Pakistan. Working women in Pakistan, however, have a significantly smaller number of children-ever-born than non-working women.

SRI LANKA. Robinson, P. Infant Feeding in Ceylon. Q Rev Pediatr 12:208-209, 1957.

Breast feeding was almost universal in Ceylon. However, only 50% of the infants were fully breast fed at three months of age. Partial breast feeding combined with feeding of condensed and dried milks was continued for long periods. In poorer classes, the average period of partial breast feeding was twenty months; among the middle classes, the average was nine months. There was a weaning ceremony at about the 14th month. The weaning food was usually rice gruel diluted with water. As soon as rice was given, milk was discontinued because of the belief that a mixture of rice and milk breeds worms.

ASIA. Integrating Family Planning with Nutrition and Parasite Control. Asian Population Programme News 6(3):11, 1977.

At the Inter-governmental Coordinating Committee workshop on an integrated approach towards family planning and health programs held at Kuala Lumpur from March 23 to 25, 1977, the feasibility of integrating family planning with nutrition and parasite control through the proper planning of motivational considerations, resource allocation and coordination was studied in detail. Discussion focused on the experience of participating countries in generating community participation in total health programs. Malaysia reported that in the expansion of the national program into the rural areas functional integration has been the approach. In Indonesia nutrition has been an important objective of maternal and child health services. A total integrated development approach has been the objective in the Philippines where family planning information-education-communication has been integrated with nutrition programs and a pilot project on integration of family planning and parasite control has been conducted. Thailand reported on the introduction of an integrated family planning and parasite control program, while Sri Lanka reported on an integrated approach that included family planning with maternity and child health services. A recommendation of the meeting was that experimental pilot projects be established which include nutrition and parasite control elements within the framework of family planning services.

BURMA. Fells, C. V. The Perils of Childhood in Upper Burma. J. Trop Pediatr 4:122-26, 1958.

A study in Chouk, Upper Burma, in 1956, found that the majority of the children were breast fed on demand for at least two years, and a few for up to five or six years. Generally no milk other than human was given to an infant, although a few mothers attempted bottle feeding with condensed milk, usually with poor consequences for the infant. Rice was introduced at about 2 years. The child was then weaned directly onto curry and rice with fresh fruits and vegetables when available.

BURMA. Robinson, P. Infant Feeding in Burma. Q Rev Pediatr 12:14-15, 1957.

Breast feeding was not found to be as universally in Burma as in India. Mothers usually began to breast feed their infants, but by the second quarter of the first year of life the prevalence of breast feeding had dropped considerably. The reasons for early weaning were varied: many women worked, practitioners encouraged weaning if mother was deficient in certain nutrients because they claimed the milk produced was poisonous to the child, mothers feared excessive development of the breast. The main weaning food was polished rice. Although milk drinking was not traditional, milk was given to infants if it was consensed or dried milk and did not come from the "sacred" cow.

IRAN. Ajami, I. Differential Fertility in Peasant Communities, A Study of Six Iranian Village, Pop STUDIES 30:453, 1976.

Fertility behavior is affected by changes in socioeconomic status. The author interviewed 235 husband and wife households in 6 rural villages North of Shiraz. A socioeconomic status (SES) index was constructed based on landholding, ownership of durable goods, husband's occupation, and husband's level of education.

If SES rises, this may promote fertility. A positive association existed between landholding and fertility. Large farm operators had 5.8 mean-number of children were born compared to 4.9 for small and medium owners and 3.8 to landless couples. The relationship between landholding and number of living children also correlated positively. Husband's occupation and number of children was positive but not significant. Literacy and fertility was inversely positive but not significant.

Peasant couples desired large family, the mean fertility value was 5.9. High fertility value was attributed not only to children's labor value but to high prevailing rates of infant mortality, mean value 27% per couple. Contraceptive use did not impact on fertility, as ♀ began to use contraceptives only after a large number of children had been born, regardless of SES.

In order to treat the complexity of the relationship between SES and fertility, variables such as miscarriage, sterility, stillbirth, nutrition, location and postpartum abstinence must be included in rural surveys. Efforts to curtail fertility only through promotion of contraception will be inadequate unless an integrated approach including education and public health measures is undertaken.

MALAYSIA. Anonymous. Decline in Breast Feeding Endangers Infant Health, Leads to More Births Unless Contraception Is Used. Int Fam Plann Perspect Dig 4(3):95-96, 1978.

A survey was conducted among more than 1200 ever-married Malaysian women in 1976. Survey data included information on childbearing, breast feeding, contraceptive practice, and menstrual experience. The data indicated that the average birth interval has become shorter for all age groups in the last 30 years due to a marked decline in the practice of breast feeding. Use of contraception increased in recent years, causing a decline in fertility rates, but contraceptive practice is not widespread enough to counteract the effects of declining breast feeding. The decline in breast feeding carries with it an increased risk of child mortality. For these reasons, family planning clinic personnel have been trained to support breast feeding.

MALAYSIA. Balakrishnan, S. and Hussein, H. B. H. Breast Feeding in Kelantan. J Trop Pediatr 23:80-82, 1977.

Four hundred and sixty-one mothers were interviewed to determine the duration of breast feeding (without supplemental foods), at what age solids were introduced and to assess the mothers' awareness of the benefits of breast milk. Eighteen percent of mothers were breast feeding fully up to three months and 9% without added solids up to six months. Seventy-eight percent of the mothers were introducing solids before the third month; of these, one-third as early as the first month. Eighty-six percent agreed that breast milk was

the best milk but only 59% agreed that breast fed children got infections less frequently. Sixty-five percent were aware that after six months, solids should be introduced.

MALAYSIA. Palmore, J. A.; Hirsch, P. M.; and Marzuki, A. Interpersonal Communication and the Diffusion of Family Planning in West Malaysia. Demography 8:411-425, 1971.

Using data from a 1966-1967 probability sample of West Malaysian married women 15-44 years of age, this paper analyzes the characteristics of women who were active in diffusing information about family planning. The woman's age and her parity, her educational attainment, her race, her present residence (urban-rural), and whether or not she wanted more children were significantly related to opinion leadership in bivariate tables. However, these relationships appeared to be substantial mainly because these social and demographic characteristics were highly related to whether the woman participated in discussions about family planning with other women. Among women who did participate in such discussions, the social and demographic variables were not substantially related to opinion leadership. In fact, the critical variables for opinion leadership appeared to be participation in the discussions, greater knowledge of family planning, and a higher level of family planning use. An attempt is also made to assess the effect of interpersonal communication on the adoption of family planning among women in the sample.

PHILIPPINES. Balderrama-Guzman, V. and Tantengco, V. O. Effect of Nutrition and Illness on the Growth and Development of Filipino Children (0-4 years) in a Rural Setting. Journal of the Philippine Medical Association 47:323-336, 1971.

The diet of 589 children of the town of Victoria, Laguno, from the ages of 1-4 years were studied. Of the children, 75% were breast fed to 6 months of age, 20% were given mixed diet and 5% were bottle fed. Most babies were weaned at 12 to 18 months. Within 3 days after birth, over 70% of babies had their diet supplemented with a rice bran extract. The usual weaning diet of the children was rice mixed with fish broth and a little fish.

PHILIPPINES. Bulato, R. A. Values and Disvalues of Children in Sequential Childbearing Decisions. Paper presented at the Annual Meeting of the Population Association of America, 1979.

The values and disvalues that wives and husbands at different parities attach to having another child are described and analyzed. It is argued that the value of children is not unidimensional, but involves different kinds of values and disvalues, often incommensurable, relevant at different parities. The data come from national surveys in the Philippines, South Korea, and the United States. Loglinear models applied to value rankings demonstrate that country is an important determinant of which value is ranked first but sex is not. Parity, on the other hand, has interesting and consistent effects, with values and disvalues changing across parities in a predictable though nonlinear manner. Further controls are introduced for education, residence, and marriage duration, but the basic patterns across parities hold up. It is argued, finally, that these patterns are consistent with changes in the value of children in the fertility transition.

PHILIPPINES. Cruz, P. S. et al: Maternal and Infant Nutritional Practices in the Rural Areas. Journal of the Philippine Medical Association. 46:668-680, 1970.

Ninety children aged 7-18 months were chosen at random from 417 registered births in 1968 in the town of Bay, Laguna. Of the 90 children, 9 were bottle fed, 48 were breast fed and the rest fed by both methods.

Most mothers weaned at 13-18 months. Supplementary foods in the form of "Kanin clurog", "am", "pula ng itlog" and potatoes were given as early as one month, but the majority of mothers interviewed (72%) would give these foods at 5-8 months of age only.

PHILIPPINES. del Mundo, F. and Adiao, A. C. Lactation and Child Spacing as Observed among 2,102 Rural Filipino Mothers. Philippine J Pediatr 19(3):128-132, 1970.

A comparative study of nursing and non-nursing mothers in non-urban communities was carried out by interviews. A child-spacing of 24-35 months was observed in 51.2% of the lactating mothers who breast fed beyond the sixth month. This study emphasizes the importance of prolonged breast feeding (7-12 months) for maximum child-spacing effect, in the absence of any other family limitation measures.

PHILIPPINES. Engel, R. W. and Caedo, M. Nutrition, Population, and Family Planning. Paper presented at the Nutrition Forum, "Nutrition in National Development," University of the Philippines at Los Banos, January 6-7, 1975.

This paper presents data relating family size and birth intervals to prevalence of malnutrition and to subsistence costs in Bulacan Province, Philippines. Prevalence of malnutrition among preschool children is shown to increase from 35.5% to 48.5% as number of preschoolers in the family increases from 1 to 3. Prevalence of malnutrition by interval until next sibling in families with 2 children only is 55% for an interval of 18 months or less, declining to 28.5% for intervals of 31 months or more. The minimum daily cost of food is shown to increase from 41% of the minimum wage for a family of 3 to 101% for a family of 7.

The impact of nutrition and family planning programs on births, deaths, and net population growth is also presented. Family planning alone reduced population growth over the rate of a control population by 12%, without major changes in mortality rates. Integrated family planning and nutrition programs reduced population growth by 11% and also achieved significant reductions in infant and child mortality.

PHILIPPINES. Guthrie, H. A. Infant Feeding Practices in a Corn-Eating Area of the Philippines. Trop Geogr Med 19:48-55, 1967.

Mothers of 41 infants from the lower and middle class urban areas of Cebu City in the Philippines and 33 infants in a small rural town near the sea were interviewed about their infant feeding practices when the infants were 18-36 months old. Equal percentages of rural and urban children were completely breast fed for 6 months; the average length of time for breast feeding was 7-9 months for both groups, but 30% of the urban and 43% of the rural mothers breast fed for more than 10 months. Rice in the form of a prepared product, "Pablum", or as a thin gruel or porridge called linugraw was chosen by most mothers as the first supplement to milk, as it was considered more easily digested than other cereals. A maize porridge was added several months later. Fish was used much more by the rural mothers and eggs and meat by urban mothers. Urban infants were more likely to have carbonated beverages, vegetables and fruits other than bananas, but otherwise rural and urban practices did not differ significantly.

PHILIPPINES. Madigan, F. C. et al. Purposive Concealment of Death in Household Surveys in Misamis Oriental Province. Popul. Stud 30(2):295-304, 1976.

The randomized response technique was used in a household survey of approximately 2,000 rural and 2,000 urban households in Misamis Oriental Province in the southern Philippines in order to determine the extent of purposive concealment of death. The estimated number of deaths deliberately not revealed to the interviewers was 50 percent or higher. Adjusted crude death rates of 11.5 and 13.4 per 1,000 population were computed for urban and rural areas, respectively, by adding estimated concealed deaths to deaths reported to the interviewers. Application of stable population techniques and of model life tables suitable to the Philippine setting, while not permitting definite conclusions, provided reasons for believing that these adjusted death rates are close to the true mortality situation in the study areas. Randomized response data further indicate that approximately 75 percent of urban deaths and 47 percent of rural deaths of the population studies were not registered with municipal authorities. The authors postulate that failure to register deaths with municipal authorities, together with fear of legal involvement if this failure becomes known outside the immediate neighbourhood, is a major reason for the purposive concealment of death in household surveys.

PHILIPPINES. Nurge, E. Infant Feeding in the Village of Guinhangdon, Leyte, Philippines. J Trop Pediatr 3: 89-96, 1957.

Neonates in Ghinhangdon, Philippines, are given a purgative immediately after birth and are not nursed until the second or third day of life. Occasionally a child is breast fed by a wet nurse for various reasons. Some mothers make use of canned condensed milk that is diluted with water as a supplement or as a weaning food. Most mothers begin supplementary feeding at 6-8 months. The first foods are usually mashed bananas or rice and water gruel. Weaning is usually completed between 1 and 1 1/2 years. Reasons for earlier weaning may be pregnancy or the child is judged to be ready. Complete weaning is accomplished in from 3 days to 2 weeks.

- PHILIPPINES. Osteria, T. S. Variations in Fertility with Breast Feeding Practice and Contraception in Urban Filipino Women: Implications for a Nutrition Program. In Nutrition and Human Reproduction, ed. W. H. Mosley. New York: Plenum Press, 1978.

This is a prospective, truncated study among 794 married women resident in Manila who delivered at one urban hospital in two month interval. Follow up was at monthly intervals for 24 months by questioning with regard to breast feeding and infant supplementation practices, amenorrhea, contraceptive usage and eventual pregnancy. Nutritional status was not related to either the proportion or duration of breast feeding. The median duration of breast feeding was 10.3 months. The median interval between resumption of menses and conception was more than 24 months. This is a careful study in which the findings are disaggregated in more detail than can be readily summarized.

- PHILIPPINES. Popkin, B. M. Economic Determinants of Breast Feeding Behavior: The Case of Rural Households in Languna, Philippines. In Nutrition and Human Reproduction, ed. W. H. Mosley, New York: Plenum Press, 1978.

Selected determinants of breast feeding behavior were analyzed in a multivisit survey of 314 infants in the higher-income province of Languna, Philippines. Depending on whether household wealth fell above or below 5000 pesos, the sample was divided into "rich" and "poor" groupings. Ninety-three percent of the infants were breast fed, a practice more frequent among less educated and lower-income mothers, for a mean duration of 11.4 months. While working mothers had a lower probability of breast feeding, they did so longer than their nonworking counterparts. Mothers regarding breast milk as better for the child were 22% more likely to breast feed. The value of the working mother's time (measured by her wage rate) was related to the extent of breast feeding, with higher wage rate associated with decreased breast feeding. Breast feeding was not significantly related to compatibility of mother's job with child care or to her nutritional status. The presence of girls aged 13-15 in the household reduced breast feeding participation in poor homes but significantly increased both participation and duration in rich homes. The presence of other household members allows nonworking mothers to increase their child care and breast feeding time. Visits by milk company representatives did not produce a significant effect. The regression results explained less than 25% of the variance in breast feeding behavior.

- PHILIPPINES. Shah, N. M. and Smith, P. C. Non-familial Roles of Women and Fertility. Paper presented at the Annual Meeting of the Population Association of America, 1979. (See PAKISTAN)

PHILIPPINES. Stinner, W. F. and Mader, P. D. Sons, Daughters or Both? An Analysis of Family Sex Composition Preferences in the Philippines. Demography 12:67-79, 1975.

This study presents an analysis of family sex composition preferences as well as the relationship between actual family sex composition and desire for no additional children among a national sample of Filipino women. An emphasis on balance or son-daughter equivalence was strongest in Metropolitan Manila. Son preference was highest in rural Mindanao and Sulu, primarily due to the concentration of Muslims in this section of the country and secondarily to its pioneer environment and the presumed utility of sons in such a milieu. The importance of eliciting sex composition preferences from both husbands and wives as well as distinguishing the "striking for a balance" from sex-linked preferences in future research is discussed.

PHILIPPINES. Zeitlin, M., Masangkay, Z., Consolacion, M. and Nass, M. Breast Feeding and Nutritional Status in Depressed Urban Areas of Greater Manila, Philippines. Ecology of Food and Nutrition, 1978, Vol. 7, pp. 10-113.

Marasmic infants were weaned from the breast earlier than nutritionally normal infants in depressed areas of Greater Manila, Philippines. However, bottle feeding was not a statistically significant cause of malnutrition in a sample of 513 six to forty-eight month old children. Marasmic children were affected by other significant variables such as mother's education, birth order, morbidity, parental employment, and family stability.

Among six to twelve-month-old infants, mean weight for age of those bottle fed or weaned by two months was slightly greater than for those still breast fed, although both groups were severely malnourished. Incidence of bottle feeding was highest in depressed neighborhoods in which the nutritional status of infants was highest.

Because poor urban Filipina mothers, with an average sixth grade education, do bottle feed as adequately as they breast feed, they could theoretically feed their infants well if instead of purchasing milk they breast fed and used the savings to buy weaning foods.

SINGAPORE. Millis, J. The Feeding of Chinese, Indian, and Malay Infants in Singapore. Q Rev Pediatr 14:42-48, 1959.

A study of 680 Chinese, Indian and Malayan infants in Singapore revealed that the mothers preferred to breast feed.

Chinese mothers used processed cow's milk for artificial and complementary feedings and delayed the introduction of foods other than milk until the infant was 6 months, although well-to-do mothers introduced foods earlier. Most infants receive a mixed diet at 12 months. The consumption of milk dropped rapidly after the introduction of a mixed diet.

Indian mothers used powdered and condensed milks for artificial and complementary feedings. Their infants seldom received solid foods in the first 6 months, but after 8 months, the majority were eating cereals.

Prolonged breast feeding was common among the Malayan mothers who continued into the second or third year. Among poor women, the major cause of weaning was failure of lactation. Among wealthier women, breast feeding was usually discontinued because of the inconvenience.

Some mothers gave rice porridge as early as 3 months. Condensed cow's milk was the usual complementary feeding. The majority of infants received only milk and starchy foods during the first 12 months.

SINGAPORE. Nevill, W. The Birth Rate in Singapore. Popul Stud 32(1):113-134, 1978.

A declining birth rate in Singapore since the 1950s has been in keeping with official policy and an active programme of family planning. However, while there is no doubt that such measures have contributed to a notable real fertility decline, age structure and patterns of nuptiality have also played a major role in influencing the direction and scale of change in the birth rate. The relative significance of change in age-sex distribution, nuptiality patterns and marital fertility to birth-rate decline are examined by a decomposition procedure for each of the main ethnic groups. Association of certain social and economic characteristics with fertility levels is then discussed briefly. The concluding section attempts to assess overall policy implications.

THAILAND. E.S.C.A.P. Population Growth and Economic Development in Subnational Regions: Report of an Expert Group Meeting. Section IV: Case Studies of Subnational Planning. In Asian Population Studies Series #40. Bangkok, Thailand, 1977.

Planning was described at four levels: national, regional, provincial, and subdistrict. The country was divided into five regions and 72 provinces for development planning purposes. Grass roots planning and implementation occurred at the subdistrict level. The local units provided training and education, aid to agriculture, women and youth programmes, family planning programmes, roads and other infrastructure, and so on. Each subdistrict designed its development projects with the cooperation of elected village headmen and government officials. The plans were then submitted first to the provincial government, then to the community development unit of the Ministry of Interior for approval. Maldistribution of social services, land tenancy problems, disparity of income, and the dominance of Bangkok in all spheres of activity were cited as major obstacles to development at the subnational level.

THAILAND. Goldstein S. Interrelations Between Migration and Fertility in Thailand. Demography 10:225-241, 1973.

Based on special tabulations of 1960 census data on migration within Thailand, this analysis attempts to assess the role of migration in the urbanization process and the relation between migration and fertility. The importance of migration to urban growth was evidenced by the clearcut positive relationship between the percentage of persons classified as either lifetime or 5-year migrants and the urban character of their 1960

place of residence. Yet, the evidence also pointed to an increasing proportion of urban growth in recent decades attributable to natural increase. The specific relation between fertility and migration varied depending on the measure of migration used: Compared to nonmigrants in their place of destination, the fertility levels of lifetime migrants were not very different; but those of 5-year migrants were considerably lower. Regardless of migration status, however, fertility level was markedly lower for the urban than for the rural population.

THAILAND. Khanjanasthiti, P., and Dhanamitta, S. Breast Feeding Practice and Growth of Infants in Thailand. J. Med. Assoc. Thailand, 61(6):340-344, 1978.

Trends in breast feeding are studied among three groups: rural, semi-rural and "marginal" urban. Breast feeding incidence declines and weaning occurs earlier, in that order (going from rural to urban). In the rural area (6 Mae Kong Provinces), 95% of children were breast fed at birth; 81% were still breast fed at 7-12 months; and 37% were still breast fed at 19-24 months, according to a 1976 survey. For the semi-rural Bang Pa-In area, breast feeding was practiced by approx. 62% (in 1972) and 66% (in 1975) of mothers surveyed, but breast feeding dropped off sharply when the child was 13-18 months old. In the "marginal" urban areas of Bangkok (Ban Manangkasila, Prempracha, Wat Lard, Bou Kaw, and Makasan), 75% of women surveyed breast fed at birth in 1971, with the other 25% bottle feeding their children. By one month, however, only 46% were still breast feeding exclusively, and another 18% were supplementing with milk or formula. By 13-24 months only 6% were still breast feeding. While the semi-urban Bang Pa-In infants followed the Bangkok standard weight curve for the first six months, their weights dropped off thereafter. The "marginal" Bangkok areas showed a drop of the curve at 1.5 months, with children developing primary protein-calorie malnutrition (PCM) by six months. The prevalence of PCM is 71-78% in these areas (three times that of Bang Pa-In). The authors attribute this to improper bottle feeding by working mothers and non-working mothers who turn away from traditional breast feeding practice.

THAILAND. Knodel, J. and Prachuabmoh, V. Desired Family Size in Thailand: Are the Responses Meaningful? Demography 10: 619-637, 1973.

Data for both rural and urban women in Thailand indicated that the large majority of respondents were able to provide numerical responses to questions concerning desired family size. Although there was evidence that some women rationalized the number of children they had when stating the number they would want if they were recently married, the vast majority of respondents preferred a number which was different from the number of living children they had at the time of the interview. Women who had already reached or exceeded their desired number almost universally stated that they wanted no additional children, whereas only a minority of women who had yet to reach their desired family size said they wanted no more children. The proportion of women who practiced family planning was substantially greater among women who had already achieved or exceeded their desired family size than among women who had fewer than their desired number. The results thus suggest that, in Thailand at least, responses to family size preferences need to be interpreted with caution but nevertheless can be of use to the population analyst.

THAILAND. Koetsawang, S. Injected Long-Acting Medroxyprogesterone Acetate Effect on Human Lactation and Concentrations in Milk. J. Med. Assoc. Thailand, 60(2):57-60, 1977.

In a study of 165 mothers at Siriraj Hospital complaining of inadequate milk supply, 92 received a 150 mg intramuscular injection of depot medroxyprogesterone acetate (DMPA), (a contraceptive,) while 73 who used nonhormonal contraceptives acted as controls. After three months nearly half of the DMPA-treated mothers reported moderately increased lactation, compared with only 14% of the controls. In six mothers receiving DMPA, concentrations of medroxyprogesterone-related material in milk as measured by radioimmunoassay were low (6.6 to 16.5 ng/ml) one week after injection, and undetectable by four weeks. In four patients the assay was unable to distinguish between the drug and its metabolites, which may or may not be biologically active. No ill effects were observed in the nursing infants.

THAILAND. Pongthai, S. et al. Return of Ovulation at First Postpartum Visit. J Med Assoc Thailand 16(11):627-632, 1968.

The return of ovulation in 210 healthy, recently delivered women at Ramathibodi Hospital was studied by endometrial biopsy. Ovulation occurred in 3.4%, 8.5% and 8.9% of the women making their first postpartum visits at the 6th, 7th and 8th week respectively. Pattern of breast feeding plays the major role in delaying ovulation. 12.8% of women who partially breast fed ovulated prior to first checkup while only 7.1% of women who breast fed ad libitum around the clock ovulated. Age plays a role. In the under 20 year old women and over 35 year old women, no ovulation occurred prior to the first postpartum visit, while 10% of the women aged 21-35 ovulated. Parity also is associated with resumption of ovulation: 12% of primiparous women ovulated compared to 1.4% of multiparous women. Resumption of sexual relations seems to be a factor in early occurrence of ovulation in women who partially breast fed their babies and in those who artificially feed their babies. Type of supplementary foods and nutritional status of the mothers were not discussed.

THAILAND. Rodgers, G. B. Fertility and Desired Fertility: Longitudinal Evidence from Thailand. Popul Stud 30(3): 511-526, 1976.

The validity and usefulness of 'desired additional children' and 'ideal family size' as predictors of fertility are analysed in this paper on the basis of longitudinal survey data from Thailand. First, the extent of measurement error in these variables is considered, and it is concluded that the error variance and the true variance are of similar orders of magnitude. Secondly, the changes in attitudes subsequent to births and deaths of children are investigated. It is found that the number of additional children desired is decreased by births and increased by deaths, but less than would be expected if 'desired additional children' represented an unchanging target family size. 'Ideal family size' is almost unaffected by births and deaths. Thirdly, the contribution of attitudinal variables to behavioural models is examined. It is found that desired fertility is explained no better than fertility in a standard economic model. A birth function separating desired children from identifiable physiological factors as explanatory variables indicated that the former was just significant. A model of contraceptive acceptance also found desired fertility to be a

significant determinant. Thus, desired fertility can be successfully integrated into behavioural models. But on the whole, its explanatory power was weak, and it was concluded that the independent use of this variable does not significantly improve on models which relate fertility to socio-economic variables directly.

THAILAND. Supalert, Y., and Chindavaning, S. Effects of Oral Contraceptive Medication on Serum Lipids. J Med Assoc Thailand 59(6):249-256, 1976.

204 women taking various combinations of oral contraceptives were compared with 100 controls. This study was undertaken because of the potential relationship between elevated serum lipids and lipoproteins and the increased incidence of atherosclerosis in women taking combination hormonal contraceptives. Fasting levels of serum triglycerides, cholesterol, and total lipids were significantly increased in the study group. There was no significant change, however, in fasting serum cholesterol or in beta-lipoprotein. Serum alpha-lipoprotein was found to be decreased. A slight increase in serum triglycerides and pre-beta-lipoprotein was observed in women taking the combination of 0.05 mg ethinyl estradiol and 4.00 mg norethindrone acetate, while the highest increase was found in those taking the combination of 0.15 mg ethinyl estradiol and 5.00 mg lynestrenol. A dose-effective relationship of estrogen to serum lipids was observed. No dietary or nutritional implications were discussed.

THAILAND. Temcharoen, P., Temcharoen, P., and Sirivunaboot, P. Mother Attitude Toward Breast Feeding. J Med Assoc Thailand, 62(2), 1969.

From February, 1977, to August, 1977, 210 mothers were interviewed by questionnaire to determine their attitude towards breast feeding. The study was conducted at the well-baby clinic of Children's Hospital and at Ramathibodi Hospital, and data were analyzed by one-way analysis of variance and student rank test using the Newman-Keul method. The average attitude score for all subjects was 137.96 (range: 91-167) out of 180, signifying a favorable overall attitude towards breast feeding. There was no statistical difference in maternal attitude in relation to hometown, educational level, occupation, or economic status. There was a significant difference (p. 0.05) with regard to age (35 years and over scored higher than women in the 15-24 year old age group). Younger women felt that breast feeding would be detrimental to their health.

THAILAND. Valyasevi, A.; Benchakarn, V.; and Dhanamitta, S. Anemia in Pregnant Women, Infants and Pre-School Children in Thailand. J Med Assoc Thailand, 57(6):301-306, 1974.

The study included pregnant women attending the Ubol and Ramathibodi (Bangkok) hospitals in 1971 and children below age six in the rural Ubol (Northeast Region of Thailand) and Bang Pa-In (rural area 60 km from Bangkok) villages. The incidences of anemia by age and group was as follows:

Age	Bang Pa-In	Ubol	Bangkok
1-6 mo	38%	31%	23%
6-24 mo	34%	16%	16%
2-6 yrs	11%	8%	6%

The authors suggest that better diet is responsible for the drop (in anemia with age). The age distribution was similar for the Ubol and Bangkok women, with 70%-75% in their twenties and thirties. Parity distribution was different, however: out of 154 urban mothers, 54, 85 and 15 were of parity 1, 2-4, and 5 or more, respectively, whereas 77, 100 and 82 of 259 rural women were of those parities. The age distributions being similar suggests a higher parity/age group ratio for the rural women. There is no significant difference between the incidence of anemia for the women in the two groups (31% in Bangkok versus 38% in Ubol) as determined by hemoglobin levels, despite lower socioeconomic status and higher parity of the Ubol women. The authors infer that dietary intake and habits are similar in these rural and urban regions, although they do not describe the nutritional status of their subjects.

THAILAND. Viseshakul, D., Premwatama, P., and Kewsiri, D. The Nutritional Status of Hill-Tribe Children and Their Lactating Mothers. *J Med Assoc Thailand* 61(1):26-32, 1978.

The nutritional status of 149 Hill-Tribe children under six years old and of their 64 lactating mothers was studied in April and July, 1976 in Chiang Rai Province (North Thailand). The average mother was 30 years old (range: 15 to 40), and her average parity was 5.1 (range: 1 to 12 children). The lactating women were undernourished at an average 32.8 kg (80% of 1966 WHO standards) for a mean height of 145.8 cm (equal to standard), and relatively lean (estimated 15% fat). The mean arm circumference was 24.4 cm (compared to 22 mm standard).

The children are breast fed on demand during the first year of life. This practice is feasible since the infants accompany their mother to the fields. The infants' diets are supplemented with rice until age three, after which they share the family diet. Breast milk appears to be adequate for the first 18 months, as the child's weight is nearly 95% of Bangkok standards for children until that time.

The NFFP examined the extent of fertility differentials within Muslim and Christian groups. Chamie concluded that sect or denomination must be considered in studies of Lebanese fertility differentials. Differentials must be examined in terms of 5 religious subgroups, rather than 2 major religions. Significant fertility differences exist within both Muslim and Christian groups. Compared to the National average fertility rate, Shi'as range 20-40% above the national average, Sunnis 6-26% above. Druze, Catholics, and non-Catholics were consistently below the national average: Druze (5-10%), Catholics (10-20%), and non-Catholic (18-20%). However, religious differentials were significant only at low SES levels as measured by low educational level of the wife. Moslem and Christian women with secondary education or higher had the same low levels of fertility.

LEBANON. Chamie, M. and Harfouche, J. K. Indigenous midwives in Lebanon. In The Organization of Family Planning Programs: India, China, Costa Rica, Venezuela, Lebanon. Smithsonian Institution, Interdisciplinary Communications Program, Occasional Monograph Series No. 8: Washington, D. C.; 1976. pp. 183-223.

In 1970 over one-third of the infants ever born in Lebanon had been delivered by indigenous midwives (dayas). This study interviewed a representative sample of about 60 dayas. Dayas recommend breast feeding as a birth control method. About half of those of childbearing age personally used birth control, mainly withdrawal. The majority of younger dayas with some schooling recommended Western birth control methods to their clients. Urban dayas tended to feel the number of children in their neighborhoods was too high. Twice as many urban as rural dayas viewed family planning as the solution. Urban dayas believed in older age at marriage and smaller ideal family size than rural dayas (5 versus 7 children, with 3 boys to 2 girls). Most dayas believed there should be a two-year interval between marriage and the first birth and between births. Dayas generally were open to further training and to incorporation into the formal health care system.

LEBANON. Harfouche, Jamal K. Feeding Practices and Weaning Patterns of Lebanese Infants. Khoyats, Beirut, Lebanon, pp. 1-116, 1965.

A prospective study was done on the feeding practices and weaning pattern of 379 Lebanese mothers in the low-income group in 1960. Out of 379 mothers, 370 (97.6%) had planned to breast feed their infants during the prenatal period. At the age of 1 month, 96.8% of their infants were breast fed, either completely (78.7%) or partially (18.1%) and 9.5% continued to breast feed partially through the 18th month of life. The peak incidence of partial breast feeding (58.0%) was attained by the age of 6 months and only 9.9% of infants in the three groups were still completely breast fed at this time. 99.2% of the mothers fed their infants on demand. 91.8% of the infants were weaned gradually and 8.25% were weaned abruptly. None of the infants were abruptly weaned after the age of one year. The commonest causes of weaning were milk inadequacy or pregnancy. By the end of the 7th month, all infants but one were given water, fruit juices; beverages and soft drinks were usually given between 4-6 months. The highest frequency for starting cereals was between 4-6 months.

LEBANON. Yaukey, D. Fertility Differences in a Modernizing Country: A Survey of Lebanese Couples. Princeton: Princeton University Press, 1961. pp. 55-59.

This study found the following rate of fertility and lactation by education and social background in Lebanon, see table below.

MONTHS NURSING PER CHILD BY SOCIAL BACKGROUND TYPE			
Social Background Type	Number of Women	Total Fertility Rate	Months nursing per living child, with nursing unlimited by next pregnancy
<u>Village, uneducated</u>			
1. Moslem	184	7.43	18.9
2. Christian	76	8.16	15.5
<u>City, uneducated</u>			
3. Moslem	136	7.35	12.0
4. Christian	96	4.14	11.5
<u>City, educated</u>			
5. Moslem	49	5.56	10.6
6. Christian	107	3.44	7.0
TOTAL	648		

Mothers believed that prolonged lactation delayed pregnancy. However, the major involuntary cause of observed fertility differences was the age of marriage, which apparently overrode the effects of prolonged lactation. The study did not investigate contraceptive use.

SOUTHWEST ASIA. Cook, R. Nutrition and mortality of females under 5 years of age compared with males in the "Greater Syria" region. J. Trop. Ped. 10(3) Dec. 1964, 76-81.

The author presents evidence from Jordan, Lebanon, Syria and Palestinian Arab populations showing consistently poorer nutrition and higher mortality rates among girls than among boys in the 0 to 5 year age group. Under conditions of equal treatment mortality rates for males are known to be higher than for females. The author suggests that the marked cultural preference for male infants leads to uneven distribution of limited resources.

YEMEN. Allman, J. and Hill, A. G. Fertility, Mortality, Migration and Family Planning in the Yemen Arab Republic. Popul Stud 32(1): 159-172, 1978.

The paper presents an analysis of the current demographic situation in the Yemen Arab Republic using data from a 1972 survey of Sana'a City, the preliminary

census results of February 1975 and a small survey of breast feeding and birth intervals conducted in April and May 1976. The data imply a very low expectancy of life at birth (less than 40 years) and a very high level of infant mortality, probably in excess of 200 per thousand. Fertility appears to be moderate by Middle Eastern standards; the crude birth rate is probably close to 45 per thousand and the total fertility rate is estimated at 6.8 for all women. Average duration of lactation ranged from 9 to 13 months depending on age of the mother and average length of amenorrhea was 5 to 8 months for the above lactation periods. Rural women and older women lactated longer than urban and younger women. An exception were the oldest group aged 35-39 years who breast fed an average of only 10 months. Partly responsible for the low level of fertility are the large numbers of males in the prime ages working outside Yemen. These temporary migrants are estimated to number 400,000. The natural increase rate of the Yemeni population is at present below two percent per annum but the rate is certain to rise as mortality is reduced, largely because of external assistance being used to improve public health. Surprisingly large proportions of clinic-attenders knew of and used one or more contraceptive methods (16% with marriage durations of 0-4 years were contracepting) and it is suggested that further extension of family planning services in Yemen may help to alleviate some of the problems which will arise as population growth accelerates.

- KOREA. Park, C. B., Han, S. H., and Choe, M. K. Risk of Childbirth Following Infant Mortality in Korea. Paper presented at the Annual Meeting of the Population Association of America, 1978.

This study is based on 23,635 retrospective birth records of 6,285 Korean women who were respondents in the 1971 National Fertility Survey. The findings indicate that during the days prior to the introduction of the family planning program only the "physiological effects" of infant mortality had an influence on subsequent fertility; infant mortality reduced the birth interval but it did not increase the probability of bearing an additional child. Since contraceptive methods were made available throughout the country, marked differences have been observed both in birth intervals and parity progression ratios according to the fate of the last infant, suggesting the emergence of an infant mortality "replacement effect." The proportion of births attributable to infant mortality in this way has increased tremendously in recent years in spite of the decrease in infant mortality. However, the overall magnitude of such births remains rather small.

- KOREA. Repetto, R. Fertility Decline in Korea and Its Relationship to Development Patterns. Paper presented at the Annual Meeting of the Population Association of America, 1978.

The fertility decline in the Republic of Korea between 1960 and 1975 was one of the fastest in history. It can be explained partly by the end of the 1950s baby boom and partly by the rapidity of economic development. Development provided alternative sources of security, raised the costs of children, and increased both rewards and access to education. It induced rapid urbanization and female labor force participation, especially by unmarried women in urban jobs. Yet, fertility fell equally rapidly among rural, uneducated, nonworking women. The rapid convergence of socioeconomic fertility differentials is related to the relative absence of vertical stratification. Evidence from econometric analysis also supports the important role of the very equal distribution of income in Korea's rapid fertility decline.

- SOUTH KOREA. Bongaarts, J. A Framework for Analyzing the Proximate Determinants of Fertility. Popul & Devel Rev 4(1):105-132. 1978.

This paper presents a framework of analyzing the relationship between intermediate fertility variables and fertility levels. An intermediate fertility variable is defined as any behavioral or biological factor through which socioeconomic, cultural, or environmental variables affect fertility. The study proposes a complete set of eight intermediate variables and concludes that only four are important determinants of fertility differentials among populations: proportions married, contraception, induced abortion, and lactational infecundability. A simple model that allows quantitative estimation of the fertility effects of each of these four variables is outlined, and its application (to data from South Korea and the United States) is illustrated.

- SOUTH KOREA. Kim, M., Rider, R. V., Harper, P. A., and Yang, M. Age at Marriage, Family Planning Practices, and Other Variables as Correlates of Fertility in Korea. Demography 11:641-656, 1974.

The relationship between fertility and 13 variables were examined in three groups of married Korean women, about 400 each from urban, rural, and semirural areas. Data were obtained by interview. Age at marriage and family planning practice were the strongest predictors of fertility, accounting for about 10% and 7% of the total variance, respectively. Other factors which accounted for lesser fractions of variability were ideal number of children, rural versus urban residence, education, aspiration for daughters, exposure to mass media, and economic status. Most of the relationships appeared to be stable over time; others, which were associated with modernization, appeared to be changing. The 13 variables combined accounted for a maximum of 40% of variance in fertility.

TAIWAN. Coursin, D. B. Maternal Nutrition and the Offspring's Development. Nutrition Today 8(2):12-13, 15-18, 1973.

A study in Taiwan comparing the effects of a vitamin-calorie-supplement with a vitamin-calorie-protein supplement on the incidence of low-birth-weight babies, showed that the mothers receiving no protein in their supplement had significantly smaller babies.

TAIWAN. Hermalin, A. I. and Lavelly, W. R. Agricultural Development and Fertility Change in Taiwan. Paper presented at the Annual Meeting of the Population Association of America, 1979.

The island of Taiwan, having experienced a modern "green revolution" early in the century, a land reform in the 1950s, and subsequently, a sustained fertility decline in rural areas, offers a relatively unique and well documented perspective on the question of the relations between agricultural development and fertility. Using individual and areal level data from Taiwan, this paper sets out to clarify relations between agricultural and fertility-related variables. Farm size, tenure, crop types, and agricultural extension services are tested for their influence on fertility, and the growth of off-farm employment and part-time farming is considered as a possible factor in Taiwan's rural fertility decline. Farm households that derive income from off-farm sources are found to consider their children more useful, and to have higher fertility, than purely agricultural households. Agricultural variables, salient in conditions of high and stable fertility, have diminished in explanatory power as rural fertility has declined. Ecological variables remain important, however, in explaining the transition from an agricultural to a semi-agricultural rural economy.

TAIWAN. Hsu, S. C. Possible Improvement in Quality of Human Progeny by Maternal Dietary Intervention: Implications for Programs of Family Planning and Food Production. Nutr Reports International 7(5):569-583. 1973.

A report is made on the family planning program in Taiwan which emphasizes the integrated problems of population growth, nutrition and health, and food supplies. Nutrition and food supply have greatly improved in Taiwan since 1950, particularly in increases in food energy and protein availability. There has been a corresponding, though not necessarily resultant, decline in maternal and infant mortalities and deaths from gastrointestinal diseases. An official family planning program was instituted in Taiwan in 1964 with the goal of reducing the rate of natural increase from 3.0% to 1.5%. In 1971 the rate

2.1%. Legalizing sterilization and abortion has been an important part of this program. A major goal is improvement in the quality of people. Reducing the size of the population results in more and better food and educational opportunities. A government study in Sui-Lin Township of Taiwan is investigating the effect of improved maternal health and nutrition on the quality of the offspring. The study is seeking to determine the minimum maternal food intake for proper health and which phase of the maternal diet (pre-pregnancy, pregnancy, lactation) or of the infant's diet is the most important to offspring quality. Also being studied is the possible existence of a maximum level of maternal nourishment beyond which detrimental effects might occur. The answers to these questions may provide important information for national nutrition policies, which are important factors in the family planning program.

TAIWAN. Jain, A. K. Pregnancy Outcome and the Time Required for Next Conception. Popul Stud 23(3):421-433, 1969.

In this study of 2,443 Taiwanese women, the average interval between births was 17 months. The average length of lactation amenorrhea was estimated at 8.7 months when the infant lived one year. This was five months longer than for women whose infants died.

TAIWAN. Jain, A. K. et al. Demographic Aspects of Lactation and Postpartum Amenorrhea. Demography 7(2):255-271, 1970.

Data from a 1966 Follow-up Survey of Acceptors of an IUD in Taiwan involving 5,000 married women established a positive association between lactation and postpartum amenorrhea. It was found that breast feeding delayed the resumption of menstruation by about 7 months. Multiple regression analysis was used to assess the effects of age, parity, education, and place of residence on lactation and amenorrhea.

TAIWAN. Jejeebhoy, S. J. The Transition from Natural to Controlled Fertility in Taiwan: A Cross-Sectional Analysis of Demand and Supply Factors. Paper presented at the Annual Meeting of the Population Association of America, 1978.

Three factors are usually proposed as inducing the transition from natural to regulated fertility. Fertility regulation may occur when the demand for children is reduced, when general attitudes towards fertility regulation become positive, and when factors such as infant and child survival prospects and natural fertility conditions increase the potential supply of surviving children. Applying the Easterlin framework for fertility determination, the author considers the effect of these three factors in the shift from natural to regulated fertility in Taiwan in 1965. Cross-sectional data for continuously married women aged 35.44 are used. The results indicate that at the initial stages of the fertility transition the regulating subpopulation can be distinguished from the natural fertility subpopulation primarily by an increase in the potential output of surviving children and a decline in the drawbacks associated with fertility regulation. These two factors, rather than a decline in desired fertility, may be said to induce the transition from natural to regulated fertility.

TAIWAN. Mosher, S. W. Birth Seasonality Among Peasant Cultivators: The Interrelationship of Workload, Diet and Fertility.

An analysis of the monthly distribution of live births over a 51-year period, 1926-1976, for Cross Harbor a rural Taiwan fishing community, discovered no birth seasonality. This finding reflects the fact that there was no seasonality in food production because there were enough fish in all seasons to provide for the villagers' protein needs.

This case is shown to be consistent with the suggestion, developed by Pasternak during a study of birth seasonality in two Taiwan farming communities, that for peasant cultivators the annual cycle of food production exerts a more decisive influence on birth seasonality than time of marriage or attributes of temperature, rainfall, or workload.

This paper proceeds to use several sets of data on monthly births in different populations to test the hypothesis that nutritional effects largely explain the seasonality of conceptions and births in population groups that experience significant seasonal variation in diet.

TAIWAN. Seasons of Birth and Marriage in Two Chinese Localities. Human Ecology. 6(3):299-324. September 1978.

The author examines the effect of variations in the food supply on fertility in two rural agricultural villages in Taiwan, particularly as they affect first births, the timing of births, and the number of children per family. The study concludes that the agricultural harvest cycle of food production exerts a greater influence on birth seasonality than other seasonal factors, such as time of marriage or attributes of temperature, rainfall, or workload.

TAIWAN. Sullivan, J. M. The Influence of Cause-Specific Mortality Conditions on the Age Pattern of Mortality with Special Reference to Taiwan. Popul Stud 27(1):135-159. March 1973.

The relationship between childhood and adult mortality from 1957 to 1968, a period of rapid mortality decline, was investigated in Taiwan. In 1957, the Taiwanese data reflected the severe childhood mortality of the South Model Life Tables. However, by 1968, due to an especially large decline in childhood mortality, this relationship was more moderate and resembled the mortality pattern of the West or East Model, Tables. Analysis revealed that a dramatic decline in childhood mortality from gastro-enteritis was primarily responsible for the shift in the relationship between childhood and adult mortality in Taiwan.

While any of several diseases which result in fatalities primarily among children of preschool ages, could cause relatively severe childhood mortality, gastro-enteritis is likely to be a primary contributor to such an age pattern. In the developing areas of the world, malnutrition and gastro-enteritis are usually precipitating and complicating factors of other childhood diseases. Consider the causal components of childhood mortality rates in two populations, Spain and Portugal, known, for certain periods, to have exhibited relatively severe childhood mortality conditions. For the years in which those populations were characterized by the South mortality pattern, gastro-enteritis was

principal cause of mortality in childhood. Moreover, with the decline in mortality from gastro-enteritis, the mortality pattern in Spain and Portugal no longer exhibited childhood mortality rates which were severe relative to those of adult life.

In circumstances where there is evidence indicating substantial childhood mortality from this syndrome and no evidence indicating compensating severe adult mortality, there is reason to suspect that the existing mortality pattern reflects the relatively severe childhood mortality conditions of the South Model Tables. Additionally, where mortality from the gastro-enteritis mal-nutrition syndrome has been severe in past years, but has been reduced to low levels in recent years, it is probable that the relationship between childhood and adult mortality will shift in favor of the former -- quite possibly, in the manner of Taiwan, from a South to an East or West age pattern.

CANADA. Ellestad-Sayed, J., Coodin, F. J., Dilling, L. A., and Haworth, J. C. Breast Feeding Protects Against Infection in Indian Infants. Canad Med Assoc J 120(3):295-298, 1979.

A retrospective study of two Manitoba Indian communities, where infant morbidity and mortality were high, was conducted to determine the relation of type of infant feeding to incidence of infection during the first year of life. 158 infants were divided into three feeding groups: Group A (fully breast fed); Group B (initially breast fed and then changed to bottle feeding); and Group C (bottle fed from birth). The protective effect of breast feeding against infection was confirmed by the very low incidence of infection (mostly lower respiratory tract infection such as pneumonia and bronchitis) and mean number of hospital admissions of breast fed babies. In contrast, bottle fed infants had 10 times more infections and were hospitalized 10 times more than the fully breast fed infants. The protective effect of breast feeding, which lasted even after weaning, did not correlate significantly with family size, overcrowding in home, family income, and education of parents. The nutritional (superiority of human milk to other types of infant formula), psychological (fosters maternal-child bonding) and economic (costs less to produce and reduces cost of hospitalization) advantages of breast feeding should encourage health professionals to promote breast feeding in all communities.

CANADA ESKIMO. McAlpine, P. J. and Simpson, N. E. Fertility and Other Demographic Aspects of the Canadian Eskimo Communities of Igloolik and Hall Beach. Hum Biol 48(1):113-138, 1976.

The reproductive histories of 89 mothers in Igloolik and 43 in Hall Beach, two neighboring Canadian Eskimo communities in the eastern Canadian Arctic were compared according to the mothers' reproductive status. A total of 945 fetuses, consisting of 826 (87.4%) livebirths, 28 (3.0%) stillbirths, 90 (9.5%) spontaneous abortions and one (0.1%) unknown outcome were reported. Approximately 25% of all livebirths died before 15 years of age. On the average, premenopausal mothers in Hall Beach experienced menarche about 11 months earlier and had their first baby about 12 months earlier than did their counterparts in Igloolik. The natural reproductive period ranged from 28 to 43 years with the mean age of menopause at 52 years. The average family size per naturally postreproductive female was 11.1 ± 0.9 livebirths plus stillbirths for the two communities combined. Premenopausal women had another child sooner when their previous birth died at less than one year than when it lived longer. If the previous birth lived for more than one year, premenopausal mothers had a subsequent child about 4 months sooner after male than after female births. No patterns of child spacing were found in the records of naturally postreproductive women. Birth rates in Igloolik and Hall Beach were 51.4 and 36.3, respectively. 11.7 sets of multiple births per thousand births were reported. The average birth weight was 3.12 kg Caucasian admixture, as calculated from pedigree analysis, was estimated to be about 3% in both communities. The coefficient of inbreeding in Igloolik was estimated to be about 0.001; no consanguineous matings were reported in Hall Beach.

- U.S.A. French, J. G. Relationship of Morbidity to the Feeding Patterns of Navajo Children from Birth Through 24 Months. Amer J Clin Nutr 20:375-384, 1967.

This study of 139 Navajo infants from birth through 24 months of age shows breast feeding as the feeding pattern of choice in 73% of the babies at birth. Bottle feeding took place in 10% of the babies at birth; the other 17% were on both breast and bottle feedings.

Observation of methods used in preparing formula and in feeding indicates that the present methods provide ample opportunity for contamination and the spread of infection.

Breast fed babies show a better gain in weight during the first 7 months of life than bottle fed babies. Both groups showed a sharp decline in weight after 7 months of age, and the decline continued through the age of 24 months.

Bottle fed babies had a significantly higher incidence of diarrhea from birth through 12 months of age than breast fed babies. There was very little difference in the experience of total illness in these two groups. The incidence of hospital experience of the bottle fed babies was significantly higher than that of the breast fed babies for the first 9 months of life, but there was no difference in the morbidity pattern of bottle fed and breast fed babies after that time.

- U.S.A. Masnick, G. S. and Katz, S. H. Adaptive Childbearing in a North Slope Eskimo Community. Hum Biol 48(1):37-58, 1976.

Examination of Eskimo data in 11 censuses from 1940 to 1970 of Barrow, Alaska, permitted identification of surviving births with their mothers. The fertility of women was traced through several periods of economic depression. Population pyramids, period fertility and cohort fertility were recorded. Women who began reproduction during periods of prosperity had high fertility and short birth intervals which persisted through periods of adversity. Those cohorts which met economic hardship when young had reduced fertility and longer birth intervals then and in subsequent periods of adversity. These findings are at variance with traditional demographic transition theory.

- U.S.A. Schaefer, O. Nature's Contraceptive. In When The Eskimo Comes to Town. Nutr Today :8-16, Nov.Dec., 1971.

A portion of this article dealing with changing eating habits among Eskimos discusses the advent of bottle feeding and changing fertility patterns. Schaefer reports a jump from 40 births per 1000 in the mid-1950s to 64 per 1000 ten years later. He states that there is a "clear relationship" between the increasing use of bottle feeding, shortening of lactation, and the Eskimos' population explosion.

CENTRAL AMERICA. Teller, C. H. and Bent, V. Demographic Factors and Their Food and Nutrition Policy Relevance: The Central American Situation. Paper presented at the Annual Meeting of the Population Association of America, 1978.

The authors examine the contribution that the applied population field can make to food and nutrition policy planning. A conceptual framework is presented which indicates how demographic processes and structures interact with agro-economic structures to affect three important policy areas: family health, food availability, and service demand.

Trends in selected demographic factors related to the food and nutrition situation are presented for Central America and Panama. They suggest the potential advantages in nutrition for a country such as Costa Rica in which the demographic structure has recently been changing radically. Trends in malnutrition for Central America as a whole reveal little evidence of improvement, and a substantial increase in the number of malnourished children aged 0-4 has occurred between 1965 and 1975. There was a modest average yearly increase in per capita calorie and protein availability in 1960-1970, but the increase declined in 1970-1974.

It is concluded that in countries which do not effectively promote income, land, and employment distributive policies, demographic dynamics can place serious constraints on improving the nutritional situation.

COSTA RICA. May, J. M. and McLellan, D. L. The Ecology of Malnutrition in Mexico and Central America. New York: Hafner, 1972.

This study found that 10% of the Costa Rican women were anemic in the 3rd trimester of pregnancy and that 21% of pregnant and 17% of lactating women had low levels of riboflavin in their red cells.

COSTA RICA. Menchu, M. T.; Flores, M.; and Lara, M. Y. Lactancia y deteste en el area rural de Centro America y Panama (Lactation and weaning in rural areas of Central America and Panama) Arch Latinoam Nutr 22:83-99, 1972.

Lactation and weaning practices were studied in rural villages by interviewing mothers about their youngest child. The lactation period in Costa Rica was the shortest in Central America; about 40% of the children were already weaned at 4 months. Supplementation also began earlier in Costa Rica than elsewhere in Central America. Weaning was generally gradual. The first supplementary foods introduced in order of frequency were milk, rice, eggs and bean broth. At 12 months the percentage of children given supplementary cow's milk was higher in Costa Rica than elsewhere in Central America. By 18 months the children's diet was basically the same as an adult diet.

COSTA RICA. Zaltman, G.; Altwood, J.; and Graciela, C. Child-feeding Practices and the Influence of Educational Level and Mass Media in Costa Rica. Bull WHO 45:827-834, 1971.

Three hundred and twenty-two rural mothers were surveyed about their child-feeding practices. The child-feeding practices are in need of improvement.

particularly among mothers with relatively little formal education and especially during the first year of life and during periods of sickness. More mothers, regardless of their educational level, should be encouraged to breast-feed and to do so for longer periods. Currently, the median duration of breast-feeding is approximately 4 months. The most frequent explanation given by the women for cessation of breast feeding is "their milk had dried up." No significant relationships are found between the duration of breast-feeding and exposure to individual mass media, education or receipt of medical care while pregnant. The adequacy of the child's diet (in terms of composition, not quantity) is determined retrospectively. Education is positively correlated with adequacy for children less than one year old. Fatalism is uncorrelated with the adequacy of child-feeding.

EL SALVADOR. Menchu, M. T.; Flores, M.; and Lara, M. Y. Lactancia y deteste en el area rural de Centro America y Panama (Lactation and weaning in rural areas of Central America and Panama). Arch Latinoam Nutr 22:83-99, 1972.

Lactation and weaning practices were studied in rural villages in El Salvador by interviewing mothers about their youngest child. About half of the children finished breast feeding by 1 year. Weaning is generally gradual. The first supplementary foods introduced in order of frequency were milk, bananas, maize tortilla and wheat bread. By 18 months the children's diet was basically the same as an adult diet.

EL SALVADOR. Wishik, S. M. and Van der Vynckt, S. Collaborative Study on Relationships Between Nutrition and Fertility. Report to Pan American Health Organization. March, 1974. (Unpublished)

The relationship between fertility and nutrition was studied in more than 800 Salvadorean women. Age-specific parity was found to correlate with pre-school child survival. Maternal age and parity accounted for 83% of the family variance in child survival, and the variables of maternal weight and height accounted for 12.3%. Sixty-six percent of the pre-school children who showed "better" nutrition were from families of 4 or less children, while 65% of those of "poorer" nutrition were from families of 5 or more children. Child mortality patterns correlated with the nutritional status of the surviving children. The physical stature of the women correlated with the nutrition of the pre-school children as did body weight, though not as distinctly. Regardless of the present age of the mother, her youngest child was more likely to be in a poor nutritional state if her first pregnancy occurred before she was 18 years old. Postponement of the first pregnancy appeared to be a less crucial factor in child survival than wider birth spacing. A dual program intervention approach is recommended. The first aim would be to improve the caloric and/or protein intake of women during their fertile years and of adolescent women approaching this period. This would also include support for encouraging the appropriate duration of breastfeeding and providing dietary supplements during the post-weaning period. The second aim is to lengthen the birth interval by emphasizing postpartum contraception.

GUATEMALA. Anonymous, Guatemalan Program Emphasizes Value of Breast Milk. World Neighbors 11(2E):7, 1978.

A World Neighbors-assisted program in San Jose Poaquil, Guatemala has

taught women to prepare good food using local resources. Three hundred and three women from 24 different groups were attending weekly classes and learning the nutritional value of native leafy green vegetables and breast-feeding. Among Guatemalan women the superstition has long prevailed that the mother's "first milk" was harmful to the infant. The mother would have a friend breast-feed the child or feed it sugar water until she began her regular flow.

GUATEMALA. Bongaarts, J., and Delgado, H. Effects of Nutritional Status on Fertility. In International Union for the Scientific Study of Population (IUSSP). International Population Conference, Mexico, 1977. Vol. 1. Liege, Belgium: IUSSP, 1977.

Detailed reproductive and nutritional data were gathered from 400 rural Guatemalan women to analyze the effect of nutritional status on fertility. The population is largely agricultural with good free basic medical care. Due to the clinic system, infant mortality dropped from 150-200/1000 in the 1960s to 50/1000 in the 1970s. At the time of study the crude birthrate was 42.5 and death rate 6.9. Weight, height, arm circumference, and skinfold were used to determine nutritional status. Analysis showed nutrition was positively related to fertility and negatively related to duration of postpartum amenorrhea. However, it had no significant correlation with probability of conceiving or the risk of spontaneous abortion. Women with low nutritional status had a total marital fecund fertility rate of 15.1, those with medium status 16.0, and those with high 16.8. These variations seem to be explained almost entirely by length of postpartum amenorrhea. Several explanations are offered: 1) If under-nutrition reduces volume of breast milk, infants may attempt to compensate by increasing intensity and duration of suckling. This would prolong amenorrhea because the antiovarian effect of lactation is apparently the consequence of nipple stimulation. 2) Low nutritional status may indicate low availability of food for the family and greater dependence on breast milk to nourish the infant. 3) An undiscovered relationship between nutrition, lactation, and ovulation may exist. (Editor's note: high nutritional status may also be correlated with higher socioeconomic status and a reduced tendency to breast-feed frequently on demand.)

GUATEMALA. Delgado, H. et al. Effect of Improved Nutrition on the Duration of Post-partum Amenorrhea in Moderate Malnourished Populations. In Proceedings of the X International Congress on Nutrition, Kyoto, Japan. Aug. 3-9, 1975. p. 605 (Abstract) See fuller article AJCN 31: 1978.

In this study we tested the hypothesis that an improvement in maternal nutritional status would be associated with a decrease in the duration of postpartum amenorrhea. We found in 334 moderately malnourished rural Guatemalan mothers that adequate food supplementation during pregnancy shortened the duration of postpartum amenorrhea ($r = -.142$, $p = .01$). In addition, other indicators of maternal nutritional status, such as home diet, height, weight, head circumference and arm circumference were negatively associated with duration of postpartum amenorrhea. These data suggest that improvement of maternal nutritional status is associated with a decrease in the duration of postpartum amenorrhea and thus may increase the probability of a shorter birth interval. This interaction between nutritional status and postpartum amenorrhea has important implications for population dynamics. (Note: the editor's would wish to know whether changes in breast-feeding patterns and frequency resulted from contact between the mothers and the supplementation program staff.)

GUATEMALA. Delgado, H. et al. Nutrition and Birth Interval Components: The Guatemalan Experiences. In Nutrition and Human Reproduction, ed. W. H. Mosley. New York: Plenum Press, 1978.

In order to test the hypothesis that mild to moderate protein-calorie malnutrition adversely affects the physical growth and mental development of infants and preschool children, a quasi-experimental design was employed and food supplementation was provided in 4 Spanish speaking, subsistence agricultural villages in the department of El Progreso, Guatemala. In 2 of the villages, a high protein calorie drink was made available daily in a central dispensary. In the other 2 villages, a non-protein, low calorie drink was provided daily. In all villages free outpatient preventive and curative medical services were provided, and these services also provided nutritional rehabilitation when prescribed. The analyses presented included as subjects all pregnant and lactating women with infants less than age 2 in the 4 villages. Food supplementation during pregnancy is the main experimental treatment and groups of mothers were categorized by the amounts of supplemental calories and proteins they ingested during pregnancy, their home diet, and their total calorie-protein intake. The total sample for analysis was made up of all mothers in the 4 communities who had a delivery between January 1, 1969 and February 28, 1973, and who had been followed up to January 1973. Because reliable information on menstruation and lactation was not collected prospectively until the end of 1970, there is prospective information for only 438 intervals. The median duration of lactation was 18 months. The median duration of postpartum amenorrhea was 14 months. The following were found to be positively correlated with the duration of postpartum amenorrhea: the duration of lactation, weight gain of the infant during the first 9 months, parity, age of the mother, and length of previous birth interval. Caloric supplementation ingested by lactating infants, caloric intake during pregnancy, and anthropometric measures of maternal nutrition were negatively correlated with the duration of postpartum amenorrhea.

GUATEMALA. Early, J. D. The Structure and Change of Mortality in a Maya Community. Milbank Mem Fund Q 48:179-200, 1970.

This paper reports the findings of a demographic analysis of mortality among the Atiteco Indians of Santiago Atitlan during the 1950's and 1960's. Infant mortality was expected to be highest during the first month, decline, and then reach a second peak at 2 years of age. However, it actually declined from birth without a second peak. Mortality during the first month was primarily caused by respiratory infection and difficulties connected with fetal development and birth. During the next 4 months mortality due to respiratory infection remained high. From 6 months to 3 years much mortality was associated with diet. Children were breastfed 3 years, but the milk was nutritionally insufficient after 6 months. Supplemental foods, such as corn, beans, coffee and fruit, were deficient in protein. Consequently, many infants suffered from protein deficiency and kwashiorkor. Weanling diarrhea was also a common cause of death.

GUATEMALA. Flores, M.; Flores, Z.; and Lara, M. Y. Food intake of Guatemalan Indian Children, Ages 1 to 5. J Am Diet Assoc 48:480-487, 1966.

A study of 300 children showed that all had been breast fed usually to about 18-20 months and some were breast fed up to 36 months. Foods usually introduced into the diet were white bread, coffee, maize tortilla, bean broth, oatmeal and later banana, rice, green pear and tomato; milk and eggs were given if available.

- GUATEMALA. Grossbard, A. A Theory of Marriage Formality: The Case of Guatemala. Paper presented at the Annual Meeting of the Population Association of America, 1978.

In this paper, the author considers the determinants of choice between formal and consensual marriage. A theory based on the assumptions of voluntary individual choice and the existence of markets predicts asymmetry in male and female attitudes to formal marriage. That theory is then tested on data from a 1974 Rand INCAP (Institute of Nutrition of Central America and Panama) survey of six Guatemalan communities. Regression analysis confirms the theory by showing that female income and general resources increase the probability of formal marriage for the woman, while this is not so for the male.

- GUATEMALA. Habicht, J. et al. Relationships of Birthweight, Maternal Nutrition and Infant Mortality. Nutr. Reports International 7:533-549, 1973.

Calorie supplementation during pregnancy is associated with heavier babies in a rural Guatemalan sample. This paper outlines other possible maternal and environmental factors related to birthsize and suggests that increased birthweight is the prime factor in reducing infant mortality among babies born to supplemented mothers. Caloric supplementation during pregnancy has less effect on birthweight than do maternal height and weight at conception, indicating that efforts to improve maternal nutrition should begin in childhood for optimum infant survival, and that during pregnancy, small thin mothers should be supplemented to prevent the birth of "small for date" babies.

- GUATEMALA. Habicht, J. et al. Maternal Nutrition, Birth Weight and Infant Mortality. In Size at Birth, eds. K. Elliot and J. Knight. Amsterdam: Associated Scientific Publishers, 1974.

This study of 405 Guatemalan births shows that birth weight increases with maternal caloric intake, but the effect levels off as adequate nutritional status is reached. The relationship is supported by evidence that changes in birth weight between successive siblings are associated with changes in maternal energy intake between successive pregnancies.

- GUATEMALA. Lechtig, A. et al. Food Supplementation During Pregnancy, Maternal Anthropometry and Birth Weight in a Guatemalan Rural Population. J Trop Pediatr 24:217-222, 1978.

A study on the relationship between food supplementation and maternal nutrition, as assessed through anthropometric measurements, was carried out in four rural villages of Guatemala; the relationship of these measurements to birth weight was also explored. Findings revealed that caloric supplementation was positively associated with maternal monthly weight gain during pregnancy after controlling for maternal home diet, height, head circumference, gestational age, parity, birth interval, morbidity, socioeconomic status, and type of supplement (protein-calorie and calorie) ($r=0.213$; $m=294g$ of weight gain during pregnancy per 10^4 supplemented calories; $No.=135$; $p 0.05$). The proportion of mothers with a monthly weight gain equal to or less than 0.5 kg was 15% in the low-supplemented group (10,000 Cal/pregnancy) and 2.4% in the high-supplemented group (20,000 Cal/pregnancy) (t test: $p 0.10$). Direct associations between birth weight and all maternal measurements of mass and length

(weight at first, second, and third trimester, weight gain during pregnancy, height, and sitting height); with all the perimeters measured (biacromial and bicondylar) were also observed. Associations between birth weight and skin-folds (subscapular, bicipital, tricipital, midaxilar, lateral and anterior thigh, and leg) were less consistent. These results support the hypothesis that food supplementation improves not only birth weight but maternal nutritional status as well. Furthermore, the associations found between birth weight and parameters of maternal size allow the building of simple risk indicators of low birth weight babies (< 2.5 kg), useful to select population groups requiring priority attention in public health programs.

GUATEMALA. Lechtig, A. et al. Maternal Nutrition and Fetal Growth in Developing Societies. Am J Dis Child 129(4):434-437, 1975.

In developing countries, the differences between upper and lower socioeconomic groups are often sharp. Women from the latter are shorter, have a lower intake of protein and calories when pregnant and are more likely to give birth to small babies. This study, which is part of a long term investigation by INCAP (Institute of Nutrition of Central America and Panama) on nutrition and mental development, reports some of the interrelationships among socio-economic factors, maternal nutrition and birth weight. The data were collected from four rural "ladino" villages in Guatemala.

A scale was devised based on characteristics of housing, clothing and education of children. As the socio-economic score increases, the percentage of low birth weight babies decreases. The score is also significantly associated with maternal height and head circumference, third trimester weight and maternal morbidity. The findings suggest that socioeconomic status reflects conditions which result in maternal malnutrition and disease, and, in turn, produce fetal growth retardation.

The interrelations of food supplementation, socioeconomic score and maternal height were also investigated. Mothers recording a low score in the tests and subsequently given supplementary food during pregnancy have a much lower proportion of low birth weight babies. Mothers of a higher score are minimally affected by supplementation.

GUATEMALA. Lechtig, A. et al. Effect of Food Supplementation During Pregnancy on Birthweight. Pediatrics 56:508-520, 1975.

A prospective study of women in four Guatemalan villages was conducted. The study consisted of giving pregnant women in all four villages daily dietary supplements. In two villages the supplement was a refreshing cool drink (fresco) which provided 59 kcal per cup but no protein. In the other two villages, a gruel (atole) containing 163 kcal and 11 g protein per cup was given. The low-supplement group consisted of 192 women who received on the average 43 kcal per day extra whereas the 165 women in the high-supplement group got 233 kcal. In neither group was there a significant positive correlation between the supplemented calories and birth weight, nor did the fresco group have a significantly greater increase in birth weight per unit of calories supplemented than those receiving atole.

When the two groups were considered together the correlation between supplement and birth weight became significant, the babies gaining on an average 29 g birth weight per 10,000 kcal supplement. The incidence of infants weighing 2500 g or less was 18 to 19 percent in those women who took less than 20,000 extra calories compared with 9 to 10 percent in those who had more than

20,000 kcal. A halving of the incidence of low-birth weight by this modest degree of caloric supplementation is an impressive result. Multiple regression analyses showed that this result was not due to third factors.

GUATEMALA. Lechtig, A. et al. Effect of food supplementation on blood pressure and on the prevalence of edema and proteinuria during pregnancy. J Trop Pediatr 24(2):70-76, 1978.

Pregnant women in 4 rural villages of Guatemala were given 2 types of food supplement: "atole" containing protein and energy and "fresco" without protein. At the end of the 3rd trimester of pregnancy, the proportion of mothers with diastolic blood pressure over 70 mmHG was 19.7% in those given more than 20,000 kcal extra energy compared with 30.3% in those given less than 10,000 kcal. All 7 women with systolic blood pressure over 130 mmHG were within the group taking less than 10,000 kcal. The proportion of mothers and oedema of lower limbs was 13.1% in the group given more than 20,000 kcal and 7.2% in the other group. There was no association between energy supplement and presence of proteinuria. There was no significant difference between the protein-energy and energy supplements in their associations with diastolic blood pressure and oedema of lower limbs. Those relations were basically unchanged after allowing for maternal home diet, height, head circumference, parity, gestational age, duration of disease during pregnancy and socioeconomic status.

GUATEMALA. Lechtig, A. et al. Maternal Nutrition, Human Milk Composition and Infant Nutrition in a Rural Population of Guatemala. In Proceedings of the Western Hemisphere Nutrition Congress V, eds. P. L. White and N. Selvey. Monroe, Wisconsin: AMA, 1978.

The objective of this study was to examine the hypothesis that maternal nutrient intake during pregnancy is associated with human milk output and infant nutrition. For this purpose, we studied the relationships between calorie intake during pregnancy and several components of blood, urine and milk in 55 lactating mothers and their infants during the first six months after delivery. It was found that home caloric intake during pregnancy was inversely associated with the non-essential (NE)/Essential (E) serum amino acid ratio ($r = -0.34$; $n=55$; $p .05$) and positively associated with maternal serum albumin ($r = -0.34$; $n=55$; $p .05$), the maternal urinary area/creatinine ratio (U/C) ($r=0.40$; $n=83$; $p 0.01$). Moreover, the ratio of infant weight x U/C, an indicator of infant daily protein intake, was associated with maternal home caloric intake during pregnancy ($r=0.48$; $n=21$; $p .05$). These results are compatible with the hypothesis that home caloric intake during pregnancy is one determinant of maternal and infant nutrition status during the first six months of lactation. In addition, age of the infant was inversely associated with concentration of human milk protein, energy and fat, possibly because of the corresponding increase in total milk volume. Also, high degree of covariation was observed between concentration of several milk components, suggesting that concentration of one component (i.e., fat) may be a useful indicator of the level of the other components of human milk.

GUATEMALA. Mata, L. J. et al. Antenatal events and postnatal growth and survival of children in a rural Guatemalan village. Ann Hum Biol 3(4):303-315, 1976.

The biological features of all pregnant women and newborn infants in a

typical rural village of Guatemala were studied from 1964 to the present; 458 pregnancies were analyzed. The mothers had an average height 143.1 cm, weight 52.9 kg and triceps skin fold 9mm. The diet of most was adequate in protein but inadequate in Fe and other nutrients. Infection was common, 2 or more episodes occurring in 40% of pregnancies.

The newborn population had a mean birth weight 2533 g and length 45.6 cm; 34% were less than 2501 g at 37 weeks gestation or over; 7% were pre-term. The infants' growth was followed till age 6 years. Survival correlated strongly with birth weight and gestational age. Pre-term infants showed the poorest survival in neonatal and postneonatal infancy, but the survivors thrived thereafter. The full-term small-for-gestational age infants had poor survival in infancy and during the second and third years. Term infants with adequate weight for gestational age had the best survival rate. Postnatal physical growth correlated with birth weight and gestational age but pre-term adequate-for-gestational age infants showed a rate of growth as good as that of term infants.

GUATEMALA. Mata, L. J. The Children of Santa Maria Canque: A Prospective Field Study of Health and Growth. Cambridge, Massachusetts: MIT Press, 1978.

The relationship of nutrition to fetal growth and infant survival, and child feeding practices were studied in rural Guatemala. The sample was 465 pregnancies to 203 women during a 36 year period. Birth weight was negatively correlated with parity, and positively correlated with maternal weight and maternal animal protein intake. Short birth intervals were correlated with poor fetal growth. Furthermore, birth weight, gestational age and long birth intervals were correlated with survival. Maternal undernutrition limited fetal growth and thus increased the risk of mortality. Weaning began at 2-5 months and was completed at 23-24 months.

GUATEMALA. May, J. M. and McLellan, D. L. The Ecology of Malnutrition in Mexico and Central America. New York: Hafner, 1972.

Lactation and weaning practices in Guatemala are discussed. Black Caribs add gruel to a baby's diet during the second week, and other solid food is introduced in 10-18 months. Weaning is completed by 2 years. Lower class rural Ladinos wean at 18 months, and lower class urban Ladinos wean before 6 months. In rural areas pregnant and lactating women frequently suffer iron deficiency.

GUATEMALA. Menchu, M. T.; Flores, M.; and Lara, M. Y. Lactancia y deteste en el area rural de Centro America y Panama (Lactation and weaning in rural areas of Central America and Panama). Arch Latinoam Nutr 22:83-99, 1972.

Lactation and weaning practices were studied in rural villages by interviewing mothers about their youngest child. More than half of the children continued breast feeding longer than 1 year. Weaning was gradual; the introduction of solid, or semisolid foods was very slow. The first supplementary foods introduced in order of frequency were maize tortilla, kidney bean broth, coffee, cereal flours and wheat bread. At 12 months of age the percentage of children given supplementary cow's milk was lower in Guatemala than elsewhere in Central America. By 18 months the children's diet was basically the same as an adult diet.

- GUATEMALA. Pebley, A. R.; Delgado, H.; and Brineman, E. Fertility Desires and Child Mortality Experience: A Study of Guatemalan Women. Paper presented at the Annual Meeting of the Population Association of America, 1978.

Using survey data collected by the Institute of Nutrition of Central America and Panama (INCAP) in rural and semi-urban Guatemalan communities, the authors examine the relationship between differential child mortality experience and the desire for an additional child among women of childbearing age. The model assumes that fertility decisions are made at each life cycle stage. Couples may either consciously make fertility decisions based on current mortality conditions, or their fertility desires may be subconsciously influenced by personal experience with child death. The sample is divided into groups based on the number of living children at the time of interview, and a separate discriminant function is derived for each group. The results indicate that child mortality experience appears to influence the fertility decisions only of those who already have five or more living children, and that this effect appears to be subconscious.

- GUATEMALA. Schutz, Y.; Lechtig, A.; and Bradfield, R. B. Energy Intakes, Energy Expenditures and Weight Changes of Chronically Malnourished Lactating Women in Guatemala. In Proceedings of The Western Hemisphere Nutrition Congress V, eds. P. L. White and N. Selvey. Monroe, Wisconsin: AMA, 1978.

Total energy intakes and expenditures were assessed in 18 lactating women (mean = 10 months postpartum) and in 6 similarly-sized, non-lactating, non-pregnant women living in the same rural villages in the Guatemalan Highlands. Energy intakes were estimated by the 24-hour recall method for four consecutive days. Energy expenditures were determined (by indirect calorimetry) for two days by monitoring heart rates daily and relating heart-rate to oxygen consumption (VO_2) by individually determined regression lines. Six typical activities of different energy expenditure levels were chosen to calculate the individual regression line. The mean of the two-day energy intakes that corresponded to the days in which energy expenditures were measured was estimated to be 1885 ± 369 kcal/day for the lactating women and 1959 ± 445 kcal/day for the non-lactating women. (The mean of the four consecutive days was not significantly different: 1929 ± 360 kcal/day lactating, 1976 ± 404 kcal/day non-lactating). The two-day mean energy expenditure (not corrected for milk output) was estimated to be 2007 ± 292 kcal/day for the lactating women (41.8 kcal/kg body weight) and 1966 ± 382 kcal/day for the non-lactating women (42.3 kcal/kg body weight). The way of life of both groups was judged "moderately active" by FAO/WHO classification (1973). Most of the lactating women had been losing weight progressively during the last six months. Over the ten-week period prior to our measurements, the mean weight loss was more than ten times greater in the lactating group (-34 gm/month). There was a significant correlation ($r = 0.87$, $n = 24$) between weight change and the change in the sum of three skinfolds, suggesting that fat loss mainly accounted for the weight change.

There were no significant differences between the two groups in terms of daily energy intake, daily energy expenditure, the energy cost of specific typical activities and the pattern of activities throughout the day. At the group level, the "balance" between mean energy intake and expenditure, excluding weight loss, was -6% for the lactating group and less than -1% for the non-lactating group. This preliminary study suggests that the total energy cost of lactation for these chronically malnourished women was met to a greater extent by fat loss than by increased energy intake, reduced energy expenditure, or both.

GUATEMALA. Scrimshaw, N. S.; Taylor, C. E.; and Gordon, J. E. Interactions of Nutrition and Infection. Geneva: WHO, 1968.

Field observations of acute diarrheal disease among rural Mayal Indian populations of the Guatemalan highlands made during 1958 through 1964 are reported. The peak incidence of diarrheal disease and the mode for completed weaning coincided at about 1 year. Deaths from diarrhea reached the highest rate between 1 and 2 years at 35.6 deaths per 1000 population. Diarrhea accounted for 41% of the deaths in this age group. Diarrheal disease occurred with significantly greater frequency in the malnourished, and attack rates increased progressively with the degree of malnutrition.

GUATEMALA. Solien de Gonzalez, N. Breast Feeding, Weaning and Acculturation. J Pediatr 62:577-581, 1963.

The incidence of breast feeding and time of weaning were studied among Indians and rural and urban Guatemalans of Latin ancestry in Guatemala in 1962. Among the Indians, children were never weaned earlier than 18 months of age. The latest age for weaning was 4 years. The ideal age was 2-2½ years. Nursing continued throughout the next pregnancy and the older child was weaned a few weeks after the new birth. Among the rural lower-class Ladinos, weaning took place between 12-24 months. During the first 3-4 days of life, a child was not breast fed by the mother, sometimes a wet nurse was employed or the infant was given sugar water or nothing at all. Early weaning sometimes took place if it was felt that the milk of the mother had become immature. Weaning took place when another pregnancy occurred. If pregnancy did not occur, the usual age for weaning was 18 months. The urban low-class Ladinos frequently weaned their infants before 6 months of age. Children received bottles with very dilute cow's milk or cereal gruel made of cornstarch, oatmeal or cassava starch. Most children in this group were weaned by 18 months. Reasons given for early weaning were: impairing the health of the mother, advice of doctors or nurses, insufficient milk, mother's return to work. The author believed that breast feeding became less common and shorter in the urban group as medical advice became more available.

GUATEMALA. Solien De Gonzalez, N. L. Patterns of Diet, Health and Sickness in a Black Carib Community. Trop Geogr Med 15:422-430, 1963.

The Black Caribs of Guatemala initiated breast feeding shortly after birth. In the first 2 weeks breast feeding was supplemented by a past of cassave starch, sugar and flavoring. At about 2 months a bottle of dried milk and water or sweetened tea once or twice daily was often introduced. Solid foods were introduced at about 10-18 months. Weaning was almost always complete by 2 years but often earlier.

GUATEMALA. Sosa, R., Kennell, J. H., Klaus, M. and Urrutia, J. J. The effect of early mother-infant contact on breast feeding, infection and growth.

Studies from several areas suggest that early brief separation of the mother and infant during the first minutes and hours after delivery can alter the behaviour of the mother with her child months and years later.

To determine the physical benefits for the infant of early skin-to-skin contact with the mother we studied the effects of early mother-infant contact on breast feeding in poor urban populations of Guatemala City. The mothers in the experimental groups were given their naked infants on the delivery table and then spent 45 min alone with them in a private room. The control group of mothers were separated from their infants according to hospital practices, usually 12 h. We made follow-up home visits when the child was 35 days and at 3, 6, 9, and 12 months old to obtain accurate information about breast feeding habits, infection and weight gain.

In two of the three populations studied there were significant differences between the experimental and the control groups in the mean number of days that the infants were breast fed. In all three studies, infants of early-contact mothers had fewer episodes of infections.

To explore the timing of this sensitive period, we studied another 60 primiparous mothers: 40 mothers had either the experimental or control conditions, as in the previous studies and the other 20 mothers first received their nude infant at 12 h. Observations at 36 h of maternal behaviour showed that only those given early contact (45 min) had significantly more affectionate behaviour.

These studies suggest that (1) the maternal sensitive period is less than 12 h and (2) early mother-infant contact postpartum has far-reaching effects on infant health during the first year.

GUATEMALA. Wyatt, R. G. and Mata, L. J. Bacteria in Colostrum and Milk of Guatemalan Indian Women. J Trop Pediatr 15:159-162, 1969.

Fifty-one samples of colostrum and milk were collected from 31 mothers and analyzed. The range of bacterial concentration is from 10^3 to 10^6 /ml, with an average of $3(10^4)$ /ml. The duration of lactation is uncorrelated to bacterial concentration. *Escherichia coli* is present in 18% and *Alkaligenes* in 14% of the samples. The presence of enterobacteriaceae in human colostrum and milk may play a role in intestinal colonization.

HONDURAS. May, J. M. and McLellan, D. L. The Ecology of Malnutrition in Mexico and Central America. New York: Hafner, 1972.

The nutritional status of lactating and pregnant women is measured. They have no greater vitamin A deficiency than other women, but they have a greater incidence of anemia.

HONDURAS. Menchu, M. T.; Flores, M.; and Lara, M. Y. Lactancia y deteste en el area rural de Centro America y Panama (Lactation and weaning in rural areas of Central America and Panama). Arch Latinoam Nutr 22:83-99, 1972.

Lactation and weaning practices were studied in rural villages by interviewing mothers about their youngest child. More than half of the children continued breast feeding longer than 1 year. Weaning was generally gradual. The first supplementary foods introduced in order of frequency were milk, rice, wheat bread, and broth. By 18 months the children's diet was basically the same as an adult diet.

- MEXICO. Chavez, A. et al. Ecological Factors in the Nutrition and Development of Children in Poor Rural Areas. In Proceedings of the Western Hemisphere Nutrition Congress III, eds. P. L. White and N. Selvey. Mount Kisco, New York: Futura, 1972.

Several significant differences exist between well-nourished and malnourished children of the same socioeconomic class in the town of Solis. Among malnourished children 65% were girls against only 39% among the well nourished. The mother's diet was significantly lower in quantity and quality for the malnourished group. Weaning occurred earlier and more suddenly. Mothers of the malnourished were less Westernized. Both groups were similar with respect to family size, family integration, family and child diseases, literacy of the father, tenure of land and family income. Longitudinal study of a group of supplemented pregnant women and a control group showed that supplemented mothers gave birth to children of significantly greater birth weight. And mother's milk production in the supplemented group reached higher volumes which were sustained longer. The supplemented group of infants were also five times more active than the control group.

- MEXICO. Chavez, A., and Martinez C. Nutrition and Development of Infants From Poor Rural Areas: III. Maternal Nutrition and Its Consequences on Fertility. Nutr Reports International 7:1-14, 1973.

To test the hypothesis that malnutrition alters fertility, the reproductive pattern of a poor rural community with a high natality rate was studied. Late menarche (15 ± 1.5 years) and early menopause (40.4 ± 2.5 years) were found to result in a short reproductive period of 25 years. In all this period women had 8.8 ± 2.7 pregnancies and 7.9 ± 2.9 deliveries, but only 4.8 ± 2.2 children reached adulthood.

A longitudinal observation was made of two groups, one supplemented and one non-supplemented, both similar in all other respects and both lactating almost continuously between pregnancies. The control group recovered "fertility" 14.0 ± 4.0 months after a delivery while the supplemented group did it after only 7.5 ± 2.6 months; this difference, as well as the difference in recovery times in the experimental group before and after supplementation were highly significant (p 0.001).

The study concludes that undernutrition reduces mothers' fertility through possibly two mechanisms: by reducing the length of the women's reproductive life and by increasing the period between deliveries by more than 40%. (Editor's note: Infants of the supplemented mothers also received food supplements from the third month of life. The effect of supplementation and possibly of contact with the study team in reducing the total sucking time of the infants may have had a stronger effect in shortening the duration of amenorrhea than the supplements to the mothers.)

- MEXICO. Chavez, A.; Martinez, C.; and Bourges, H. Role of Lactation in the Nutrition of Low Socio-Economic Groups. Ecology Food Nutr 4:159-169, 1975.

A two-year longitudinal study was made of the production and consumption of milk of 17 mother-child units in a poor and inadequately nourished rural community. A comparable group was studied with the exception that the diet of the mother was supplemented from the 45th day of gestation until weaning. The children of these mothers were also given food supplements, vitamins and minerals from the third month of age onwards. It was found that in the first six

months of lactation, the consumption of milk by infants in the non-supplemented group followed a curve with a maximum peak of 650 ml. per day. After the sixth month, there was a tendency towards a plateau of about 560 ml. In supplemented mothers, the curve for the first semester was smoother and the volume secreted was 15 percent higher. There was also a decrease in production after the sixth month. It was also found that the milk of the supplemented mothers was more dilute, but it did not differ significantly in its total solid content from the milk produced by the non-supplemented mothers.

MEXICO. Garcia Garma, I. O. Fertility Determinants in Rural Mexico, Paper presented at the Annual Meeting of the Population Association of America, 1979.

A theoretical framework of fertility determinants which incorporates the mechanisms through which socioeconomic factors affect fertility is applied to a sample of women in rural Mexico (1970). The paper analyzes the contribution of each of the "intermediate variables" to fertility and evaluates the role played by socioeconomic factors in determining the level of these variables. The findings suggest that contraceptive practice is not widespread in rural Mexico and that conditions of natural fertility prevail. Any given fertility level is mainly determined by age of entry into sexual unions. While the contribution of secondary sterility, lactation and effective fecundability is especially relevant, the contribution of foetal mortality, coital frequency and contraceptive practice is not. Finally, socioeconomic factors are found to have an important effect on lactation, age at marriage and use of contraception, but their influence on fecundability, secondary sterility, coital frequency and foetal mortality is considerably less and often not significant.

MEXICO. Hicks, W. W. Economic Development and Fertility Change in Mexico, 1950-1970. Demography 11:407-421, 1974.

This paper is an attempt to isolate the determinants of fertility in Mexico. Of the variables included, two were significant in accounting for differences in the level of completed fertility in the 32 "states" in 1970. They were the share of the labor force in agriculture, which was directly related to fertility, and the percentage of the population speaking an indigenous language, which showed an inverse relationship.

The most important factors acting to reduce total fertility rates over time were increases in life expectancy and declines in the share of the labor force in agriculture. However, based on the estimated linear relationship, these two variables by themselves were not adequate to achieve a rapid decline in fertility in the future.

MEXICO. Martinez, C. and Chavez, A. Nutrition and Development in Infants of Poor Rural Areas: I. Composition of Mother's Milk By Infants. Nutr Reports International 4:139-149, 1971.

This study was designed to know the pattern of mother's milk consumption of infants from poor Mexican rural areas. A standardized sample of 17 mother-infant units was longitudinally studied, in ad-libitum conditions, estimating milk volumes by difference of body weights before and after each breast feed. Average total milk consumption during the first year of life was 183+23 liters. Daily milk consumption started low (423+85ml), raised to a peak of about

650+113 ml, then decreased to a prolonged plateau at 450+80 ml and finally dropped to about 350+44 ml at 18 months. About one half of the cases reached the peak at 8 weeks and the rest at 24 weeks; this difference in presentation of the peak showed relation only with mother's parity and nutritional status. Consumption seems to depend on mother's production since the baby keeps a high demand evidenced by high feeding frequencies and long suckling-times. The gap resulting from decreasing milk production at a time when nutritional needs increase, progressively affects the baby's development and nutritional status.

MEXICO. May, J. M. and McLellan, D. L. The Ecology of Malnutrition in Mexico and Central America. New York: Hafner, 1972.

Malnutrition strikes early in Mexico, at 3 to 4 months, because of insufficient mothers' milk. Malnutrition frequently leads to child mortality due to decreased resistance to infection in the malnourished child. Malnutrition also afflicts mothers as revealed by the fact that iron serum levels are inadequate in 68% of pregnant women.

MEXICO. Rowe, P. M. and Way, P. O. Patterns of Recent Rapid Fertility Declines in Brazil, Columbia and Mexico, paper presented at the Annual Meeting of the Population Association of America, 1980.

See Brazil.

MEXICO. Sanjur, D.; Cravioto, J.; and Van Veen, A. G. Infant Nutrition and Socio-Cultural Influences in a Village in Central Mexico. Trop Geogr Med 22:443-451, 1970.

In a village in central Mexico in summer of 1967, 125 Mestizo families with infants under 12 months were interviewed. All infants were breast fed at first. The foods given in the first 6 months were: herb teas, other milk including fresh cow's, powdered or evaporated and goat's; fruit, especially banana, bean soup, tortillas. Infants generally were weaned at 12 to 18 months; 34% because of a new pregnancy, 27% for teething, 20% for low milk yield, and 6% because the mothers felt weakened by breast feeding. The better educated women weaned earlier and gave a greater variety of foods; the older women weaned later than the younger.

NICARAGUA. Culbertson, R. E. and Sarn, J. E. Health Sector Assessment for Nicaragua. U.S.A.I.D. Mission: Feb. 6, 1976.

The leading causes of infant mortality in Nicaragua are gastroenteritis, perinatal and respiratory disease and tetanus. Of the children under 5 years of age 42% are suffering Grade I malnutrition, 13% are Grade II and 2% are Grade III according to the Gomez classification.

NICARAGUA. May, J. M. and McLellan, D. L. The Ecology of Malnutrition in Mexico and Central America. New York: Hafner, 1972.

The nutritional status of lactating and pregnant women is measured. They have no greater vitamin A deficiency than other women, but they have a greater incidence of anemia.

NICARAGUA. Menchu, M. T.; Flores, M.; and Lara, M. Y. Lactancia y deteste en el area rural de Centro America y Panama (Lactation and weaning in rural areas of Central America and Panama). Arch Latinoam Nutr 22:83-99, 1972.

Lactation and weaning practices were studied in rural villages by interviewing mothers about their youngest child. About half of the children finished breast feeding by 1 year. Weaning was generally gradual. Supplementation began earlier in Nicaragua than elsewhere in Latin America. The first supplementary foods introduced in order of frequency were milk, maizena, corn starch and oatmeal, and wheat bread. By 18 months the children's diet was basically the same as an adult diet.

PANAMA. May, J. M. and McLellan, D. L. The Ecology of Malnutrition in Mexico and Central America. New York: Hafner, 1972.

Lactational practices and the nutritional status of women are discussed. Weaning was begun after 6 months by the Cuna Indians. Pregnant and lactating women were less anemic than other women of the same age.

PANAMA. Menchu, M. T.; Flores, M.; and Lara, M. Y. Lactancia y deteste en el area rural de Centro America y Panama (Lactation and weaning in rural areas of Central America and Panama). Arch Latinoam Nutr 22:83-99, 1972.

Lactation and weaning practices were studied in rural villages by interviewing mothers about their youngest child. About half of the children finished breast feeding by 1 year. Weaning was generally gradual. The first supplementary foods introduced in order of frequency were soups, gruel, fruit juice and milk. By 18 months the children's diet was basically the same as an adult diet.

CARIBBEAN

112.1

1

BARBADOS. Reddy, S. K. Artificial Feeding in Jamaica and Barbados. West Indian Med J 20:198-207, 1971.

320 women were interviewed about bottle feeding of their children. The bottle was introduced at less than 1 month by 61.3% of the women. The reasons for introducing the bottle in order of frequency were: to get the child accustomed to the bottle, insufficient breast milk, bottle feeding was good, the mother works, and it was the correct age. Although mothers understood the importance of cleanliness, 82% use too dilute a mixture of powdered milk in the bottle. The median age for complete cessation of breast feeding was approximately 4 1/2 months.

BARBADOS. Reddy, S. K. Transition to Family Diet in Jamaica and Barbados. West Indian Med J 20:218-224, 1971.

Data from a survey of 320 women revealed that the median age at which solid food was given children was 6 1/2 months. Children started eating from the family pot at 20 months; however, seldom were the protein rich items chosen. Mothers tended to feed children high carbohydrate foods in preference to high protein foods.

BELIZE. May, J. M. and McLellan, D. L. The Ecology of Malnutrition in Mexico and Central America. New York: Hafner, 1972.

In Belize City bottle feeding is introduced early, accounting for a high level of fatal diarrhea.

CARIBBEAN. Aykroyd, W. R. Nutrition in the Caribbean. J Hyg, Camb 63: 137-153, 1965.

The nutritional status of the people of the following Caribbean territories is discussed: Jamaica, Puerto Rico, St. Thomas, Surinam, Guyana, Grenada, Barbados, St. Lucia, Martinique, Dominica, Antigua, St. Kitts, Trinidad and Curacao. In many parts of the Caribbean there is a high mortality between 6 months and 2 years due to malnutrition and gastro-enteritis. These two conditions are so closely inter-connected that they can conveniently be regarded as a single syndrome called 'weanling diarrhea'. The prevalence of malnutrition and gastro-enteritis in infants and young children is the result of child-feeding practices characteristic of the area. The duration of breast-feeding is shorter than in Africa and Asia. After 3 months or so breast-feeding, if it does not cease altogether, becomes partial, and in general there is a steady change in the direction of less breast milk. In some territories weaning at an even earlier stage in infancy seems to result in the common occurrence of malnutrition in infants under 6 months of age. The foods given to supplement or replace breast milk include processed cow's milk, starchy roots and fruits and cereals. Imported processed milk supplies good quality protein otherwise lacking in the child's diet, but the use of expensive proprietary infant milk foods, out of line with family purchasing power and given in over-diluted form, is among the causes of malnutrition. The use in infant and child feeding of dried skim milk -- much the cheapest kind of milk in terms of nutritive value -- is increasing and this trend should be encouraged.

CARIBBEAN. Gurney, J. M. Weaning Practices from Guyana, Rural Trinidad, Grenada, Montserrat and Antigua. West Indian Med J 20: 227-236, 1971.

Considerable variation was found in the pattern of breast feeding. Seven percent of Guyanese and 4% of Trinidadian mothers did not breast feed their infants at all. Ten percent of mothers who did breast feed stopped before the infant was 4 months old. "Mixed milk" feeding was common. Half the babies were receiving semi-solids by 6-7 months in Trinidad, Grenada and Antigua. The most frequent foods used were potato, plantain flour, maize flour or tinned cereal. Legumes, animal products (fish, meat, eggs) and dark green leafy vegetables were given in the latter part of the first year, but probably in small quantities.

CUBA. Diaz-Briquets, S. Income Redistribution and Mortality Change: The Cuban Case. Paper presented at the Annual Meeting of the Population Association of America, 1978.

A casual relationship can be posited between mortality and income distribution: at similar levels of development, countries having a more equitable income distribution tend to have lower mortality than countries where income is less equally distributed. The evidence for Cuba reviewed in this paper supports this contention. Beginning in the early 1960s, Cuba began to experience a series of drastic social and economic changes that brought about a substantial reduction in income differentials. These changes, by emphasizing the elimination of social and regional differentials, had a marked effect on mortality decline as health facilities, superior housing, better educational opportunities, etc., were placed within the reach of previously disadvantaged population subgroups. Of particular interest is that the mortality improvements occurred in an economic context that until recently was characterized by an uncertain performance. The Cuban experience suggests that low income countries can substantially accelerate mortality declines by the institution of policies geared to the elimination of social differentials. Some qualifications are noted regarding some of the social and political costs of the Cuban model and its applicability to other developing countries.

HAITI. Jelliffe, D. B. and Jelliffe, E. F. P. The Nutritional Status of Haitian Children. Acta Trop 18:1-44, 1961.

From a study attempting to discover the significance of malnutrition in early childhood in Haiti, it was found from a sample of mothers that breast feeding was usually successful (99%) in the first six months of life. In the second half of the first year, it fell to 81%. From 12-18 months, over half of the women were still breast feeding, while from 18-24 months this dropped to 9%. No children appeared to be breast fed after two years of age. Cow's milk was not common in the diet of most Haitian infants. If it was given, it was only in small amounts. However, between 3-6 months many starchy foods were introduced. In the second half of the first year, the diet usually included a variety of carbohydrates. Early in the second year of life, children received the full range of carbohydrate foods consumed by the adult population.

HAITI. Wiese, H. J. C. Maternal Nutrition and Traditional Food Behavior in Haiti. Human Organization 35 (2):193-200, 1976.

In Haiti, malnutrition is especially widespread among pregnant and lactating rural women. While numerous attempts have been made to refashion their dietary habits, traditional food ways have usually prevailed. This article posits that successful intervention has not been forthcoming because change agents either have not been cognizant of or have decided to ignore the cultural rationale for dietary behavior.

Local herbalist/midwives are influential among rural folk and supply much of their obstetrical care. A study undertaken of the dietary advice provided by these paraprofessionals suggests that much of it is based on the "hot/cold classification system of foods," which the author discusses.

Two tables are provided. The first presents 74 foods most available to rural women. It places these foods in their respective hot/cold categories. Annotations delineate those foods which are considered staples, those which are only available seasonally, and those which are prohibited to pregnant women. The second table analyzes the nutrient content of the foods available to pregnant women. The data illustrate non-income related reasons for nutrient insufficiency in the breast-feeding group. (Editor's note: the fact remains, however, that income in much of rural Haiti is not sufficient to sustain adequate nutrition.)

JAMAICA. Caribbean Food and Nutrition Institute. Interim Report on Dried Milk Powder and Liquid Milk for Infant Feeding. Sept., 1974.

The promotion of infant formulas by commercial nurses was studied. A researcher accompanied nurses from five companies on their visits to hospitals, clinics and homes. The nurses promoted their companies' products as well as giving advice on breast feeding, weaning practice and child care in general. The nurses appeared to have inadequate knowledge of weaning practices. While mothers were not adequately prepared for breast feeding at hospitals.

JAMAICA. Grantham-McGregor, S. M. and Back, E. H. A Note on Infant Feeding in Kingston. West Indian Med J 19:111-115, 1970.

By 6 weeks of age 77% of the 300 infants were receiving bottle feeds of milk and usually a combination of bottle and breast was continued until 6 months. By 6 weeks of age 51% were getting orange juice, by 3 months 41% were receiving meal, usually maize, and by 8 months 99%. By 4 months 25% were getting egg and cheese. The percentage rose to 94% at 1 year. The percentage getting vegetables and fruit rose from 26 at 4 months to 100 at 1 year. The percentage getting meat and fish rose to 17 at 6 months, 39 at 8 months and 93 at 1 year.

JAMAICA. Grantham-McGregor, S. M. and Back, E. H. Breast Feeding in Kingston, Jamaica. Arch Dis Child 45:404-409, 1970.

A longitudinal study was carried out on 300 Kingston infants born at the University Hospital of the West Indies. To age 6 weeks most infants were breast fed, then combined feeding methods were used. After 5 months straight bottle feeding was the more popular method. The commonest reason for changing from breast to bottle was that the baby refused the breast. A higher percentage of non-working mothers breast fed their children than those who were working and more mothers in the lower economic groups breast fed, which indicated that socioeconomic and cultural factors played a large part in the choice of methods for feeding infants.

A higher incidence of gastro-enteritis was found in the first 4 months of life among partly or wholly bottle fed babies than among breast fed babies. Weight increments were calculated for the first 3 months of life. A higher proportion of infants with increments in the lowest 25% were bottle fed than those infants with increments in the remaining 75%.

JAMAICA. Jelliffe, D. B.; Bras, G.; and Stuart, K. L. Kwashiorkor and Marasmus in Jamaican Infants. West Indian Med J 3:43-55, 1954.

Breast feeding of Jamaican infants was carried out for a variable length of time, depending largely upon whether the mother was working and upon the occurrence of another pregnancy. Children were usually breast fed from 7-9 months. Longer periods were more common in country districts. Feeds might be widely spaced if a mother was working. Complementary feeds were usually given consisting of cornmeal porridge and sugar, mixed with a little sweetened condensed milk. Weaning was usually a gradual process. Weaning foods were usually sweetened cornmeal gruel, crushed Irish potato, and green banana gruel.

JAMAICA. Landman, J. P. and Shaw-Lyon, V. Breast Feeding in Decline in Kingston, Jamaica, 1973. West Indian Med J 25:43-57, 1976.

A prospective study of 81 mothers' breast feeding attitudes and practices were conducted. Although 74% of the mothers felt that breast feeding alone was best, only 38% planned to practice it. In fact, only 25% were breast feeding completely after 3 weeks. Four months was the median age at which breast feeding ended completely. The mothers' reasons for introducing bottle feeding, in order of frequency, were: insufficient milk, samples and advice, to accustom the baby, breast troubles and ill mother. The median age for introduction of semi-solid food was 3 months. Abnormal deliveries, high parity, age and mother working were all inversely related to the duration of breast feeding.

JAMAICA. Miall, W. E.; Desai, P.; and Standard, K. L. Malnutrition, Infection and Child Growth in Jamaica. J Biosoc Sci 2: 31-44, 1970.

A semi-longitudinal study of factors influencing child growth in a rural community in Jamaica provided an opportunity to explore the relationships between diarrhoea, respiratory infections and body weight.

Respiratory infections and diarrhoea both reached peak incidences between the ages of 6 and 24 months when children were at highest risk of malnutrition. Respiratory infections had no demonstrable influence on growth. Diarrhoea was more common in boys than in girls and more common in underweight children. It had no apparent influence on long-term weight increases, though it did have the expected influence on short-term increments.

The findings suggested that much of the diarrhoea seen in the community of children may have been secondary to undernutrition rather than a cause of it.

JAMAICA. Morales, A. De. and Larkin F. A. Influence of the availability of commercial infant foods on feeding practices in Jamaica. Ecology Food Nutr 1 (2):131-135, 1972.

Jamaican mothers, 150 aged 13 to 49 years, were asked about their marital status, occupation, weekly income, the number of pregnancies, abortions and stillbirths and the feeding practices used for the youngest child. The children were aged from less than 1 month to 10 years. Most of the 40% of the children breast fed at the time of the interview were under 6 months old and most children studied were weaned by 1 year of age. Age of weaning was not affected by income or residence and appeared to have no physiological basis. Mothers who obtained information about weaning from friends and relations weaned their babies earlier than those whose information came from doctors or public health nurses in private clinics. Of all mothers 27% used 2 and 14% used 3 or more commercial milk products.

JAMAICA. Reddy, S. K. Transition to Family Diet in Jamaica and Barbados. West Indian Med J 20:218-224, 1971.

Data from 5 surveys about child feeding practices are compiled. The data show that the median age at introduction of semi-solid food is approximately 5 months, solid food 9 months, and food from the family pot at 21 months. The middle income group tends to introduce solid and semi-solid food at an earlier age. Families generally exhibit little knowledge of nutrition, and often avoid giving children protein rich food.

JAMAICA. Roopnarinesingh, S.; Morris, D.; and Chang, E. The underweight Jamaican parturient. Br J Obstet Gynaecol 78(4): 379-382, 1971.

At week 14 of pregnancy 146 underweight women weighed a mean 94.9 lb. (range 76 to 100) and 146 controls 14 weeks pregnant weighed 135.89 lb. (range 110 to 220). All were Black women of low or middle socioeconomic status. Of the underweight women 38 had anaemia and 15 had prolonged labour; corresponding values for the controls were 14 and 6. Only 5 of the underweight women but 9 of the controls had pre-eclampsia. Mean birth-weight for infants of the underweight group was 6.49 lb and for those of the controls was 7.26 lb; 27 babies of underweight mothers and 10 babies of controls were premature.

PUERTO RICO. Pollitt, E.; Gilmore, M.; and Valcarcel, M. Maternal and Infant Behaviors Regulating Early Growth. In Nutrition in Transition: Proceedings, Western Hemisphere Nutrition Congress V, eds. P. L. White and N. Selvey. Chicago: American Medical Association, 1978.

Earlier work has suggested that the interactions of a mother and her infant may determine the child's early physical growth and mental development. According to the author, "nutritional and non-nutritional behaviors of both mother and infant during feedings and weight gain during the first month of life," are related.

An experiment was conducted involving 21 male and 19 female infants selected from the population of newborns at the Central Medico of the University of Puerto Rico Medical School, San Juan, Puerto Rico. Infants were from low income families. Each was full term and weighed at least 2500 grams. The babies were weighed 48 hours after birth, when the mother was brought to a behavioral laboratory with her infant. At this time, the mother was videotaped during a fifteen minute feeding of the baby. Four weeks later, the mother and infant returned to the hospital, and the baby was weighed again.

The tapes were analyzed using a coding system of 60 different behaviors by the mother and 40 of the infant. It was believed that some of these were "nutritionally functional," such as holding the nipple in the mouth. Others, such as talking, however, are not clearly related to intake.

The results indicated that the mothers of heavy infants cleaned, inspected, spoke to and adjusted the blankets of their babies more often than those of light babies. Mothers of the small babies were busier encouraging their babies to suck, while the heavier infants held the nipple in their mouths longer. For those bottle feeding, replacing the sanitary paper nipple cover on the bottle was positively related to weight gain, although cleaning activities were negatively related. Sex was found to have a significant effect on two of the maternal and infant variables. The paper discusses other findings, and the nature of the analyses performed.

In populations with high prevalence rates of malnutrition the problem may further be aggravated by behaviors of the caretaker, by the infants or by the interaction between mother and child. This may explain malnutrition among highly industrialized communities in developed countries.

ST. VINCENT. Antrobus, A. C. K. Child Growth and Related Factors in Rural Community in St. Vincent. J Trop Pediatr 17: 187-210, 1971.

In this survey, combined or "mixed" feeding of breast and cow's milk was usual. Breast feeding was stopped between 4-15 months, with a median age of 9.6 months. The median age for the introduction of cow's milk was 2.5 months. Semi-solids were introduced from 1-9 months (median 3 months), and consisted of arrowroot, Irish potatoes, starches and various proprietary cereals.

TRINIDAD. Chopra, J. G. and Gist, C. A. Food Practices Among Trinidadian Children. J Am Diet Assoc 49:497-501, 1966.

The mothers of 38 Black and 19 East Indian infants under 1 year old and of 30 and 19 between 1 and 5 years, were interviewed. It was found that breast feeding was a diminishing practice. No East Indian infants and only 26.3% of the Black infants were solely breast fed; 73.6 and 42.1%, respectively were bottle fed only. Orange juice was given daily to 68.4% of the East Indian infants and 94.7% of the Negro infants from a fairly early age. Cereals, which consisted of arrowroot, sago and parched flour, were started as early as 1 month or as late as 10 months. Fruit and vegetables were gradually introduced but green and yellow vegetables were not frequently used. Weaned children were given some milk but animal protein was given only once or twice weekly to Black children and 2-3 times weekly to East Indian children. Dried legumes were given 7-10 times weekly to Black and once to 7 times to East Indian children; mangoes and citrus fruits were eaten fairly frequently.

TRINIDAD. Gueri, M.; Jutsum, P.; and Hoyte, R. Breast Feeding Practices in Trinidad. Bull Pan Am Health Organ 12:316-322, 1978.

Efforts are underway in Trinidad to encourage the practice of breast feeding infants beyond the first few weeks of life. This article reports the results of a survey of current infant feeding practices on the island. Survey data reveal where nutrition education is needed and how health personnel can foster breast feeding.

The original sample consisted of 418 mothers, representing the lower and lower-middle socioeconomic classes who delivered healthy infants over 2,500 grams at either of two general hospitals. All participants resided within 20 miles of the hospital. Women were surveyed by specially trained nurses within 48 hours of delivery. Race, education, age, occupation and feeding plans were ascertained along with participant knowledge about breast feeding. A follow-up interview on actual feeding practices was conducted on 348 of these mothers approximately four months after the first interview.

The survey revealed that 98.3% of the women initially planned to breast feed their babies. Over 60% believed that bottle feeding, as a supplement, was necessary before the baby was two months old. The most frequent explanation given for introducing artificial feeding was that the mother had insufficient milk. Unfortunately the supplement used was usually a highly diluted, often contaminated, expensive artificial product made from milk powder.

For 87.1% of the babies, eight hours or more elapsed between delivery and the first nursing experience. And in those infants nursed before the first interview, 45% had received milk powder formula before being put to the breast. This practice of artificial feeding prior to the first nursing session was significantly associated with the end of breast feeding by the second interview.

Almost one-half (40.8%) of the infants had been completely weaned from the breast by the time of the follow-up interview and only a minority relied solely on breast milk.

TRINIDAD. Jelliffe, D. B.; Symonds, E. R.; and Jelliffe, E. F. P. The Pattern of Malnutrition in Early Childhood in Southern Trinidad. J Pediatr 57:922-935, 1960.

An investigation of malnutrition in early childhood was undertaken in South Trinidad in 1959. Of the 70 children admitted to San Fernando General Hospital and diagnosed as having protein-calorie malnutrition, 86% were between the ages of 1-12 months of age. Studies of their dietary histories revealed that during the first 3 months of life, breast feeding was successful, although in 10% of the mothers some lactation failure had occurred. Also during this 3 month period some haphazardly prepared cow's milk formulas were used. Carbohydrate gruels were also used. During the 4-6 month period, there was a decline in complete breast feeding. Occasional breast feeding (twice a day) was used by some mothers. Bottle feedings increased from 80% to 83%. During the 6-12 month period, breast feeding had stopped in 41% of East Indian and in 33% of Black mothers. Of those children admitted with the primary diagnosis of severe diarrhea the majority were malnourished. In 36% breast feeding had not been initiated; in 39% breast feeding had been stopped at least 2 weeks before the onset of diarrhea; and in 18% breast feeding was only partial. 26% of the children with kwashiorkor had a history suggestive of antecedent bronchopneumonia, and 18% diarrhea. For non-kwashiorkor protein-calorie syndromes, antecedent diarrhea was present in 48% of the cases, while bronchopneumonia in only 1%.

TRINIDAD. Roopnarinesingh, S. et al. Vitamin B₁₂ and Folate Status in Pregnancy in Trinidad. Trop Geogr Med 28: 206-210, 1976.

This study shows that 58 of 109 pregnant Indian and Black women studied are anemic. The mean vitamin B₁₂ level for anemic Blacks and the mean level for anemic and non-anemic Indians is deficient. Furthermore, both serum folic acid and vitamin B₁₂ concentration aggravates folate deficiency. This is cause for concern since folate deficient women are more prone to accidental hemorrhage and abortion.

ANDES. Abelson, A. E. Altitude and Fertility. Hum Biol 48:83-92, 1976.

Evidence from physiological studies indicates that hypoxia may act as a stress that reduces fecundity; and in human populations resident at high altitude there is evidence of reduced fertility (James, 1966). In this paper the fertility of high Andean populations is described with reference to the ecological and social context. An analysis of high Andean energy flow (Thomas, 1972) indicates that children are an economic asset and consideration of the social organization of high Andean rural communities supports this view. A study of the fertility of migrants from high to low altitude indicates that reproductive performance increased with the removal of the stress of hypoxia (Abelson et al. 1974). It is therefore concluded that the reduced fertility observed in high Andean populations is due to the effect of hypoxia on human fecundity.

BRAZIL. Merrick, T. W. Interregional Differences in Fertility in Brazil, 1950-70. Demography 11:423-440, 1974.

Trends and interregional differences in the birth rate in Brazil between 1950 and 1970 are examined. Estimates are based on data from the 1950 and 1970 censuses. Regional differences in birth measures (crude and general rates) were found to widen between 1950 and 1970 despite a decline in fertility at the national level and a narrowing of regional differences in important socio-economic variables like income and urbanization. The substantial interregional migration flows which occurred in Brazil between 1950 and 1970 are examined for their possible impact on differentials. The effects are mixed, but the conclusion is that migration contributed to widening differences.

BRAZIL. Merrick, T. W. Fertility and Land Availability in Rural Brazil. Demography 15:321-336, 1978.

Differences between the marital fertility of the agricultural frontier and that of the more settled rural areas of southern Brazil are analyzed in this paper. Fertility rates derived from 1970 census data appear to decrease as the degree of settlement increases, suggesting an experience parallel to the decline in U.S. rural fertility in the late nineteenth century, which Easterlin and others have attributed to increased scarcity of land for starting new farm households. Multivariate analysis of the Brazilian data shows parallels between the two situations but also reveals that the importance of literacy, child survival, and access to land is relatively greater than that of the availability of land for explaining fertility differentials in Brazil.

BRAZIL. Rosen, B. S., and Simmons, A. B. Industrialization, Family, and Fertility: A Structural-Psychological Analysis of the Brazilian Case. Demography 8:49-69.

This paper addresses itself to some linkages between macro-social structure (industrialization, social class), social psychological variables (husband-wife decision making), psychological variables (attitudes), and fertility. A total of 726 currently mated women with proven fertility in five Brazilian communities were interviewed to determine various attitudes, their work experience, their participation in family decisions, their fertility ideals, and actual fertility. The five communities were selected along a rural-urban-industrialization

continuum to include a village, two non-industrial cities, and two industrial cities (one of which was Sao Paulo). Family size in the industrial cities was small in all social strata, while in the non-industrial cities family size was large in the lower strata and declined in the upper strata. Further analysis revealed that smaller family size is associated with generally higher levels of status among women - higher educational levels, greater social contacts and more skilled employment, and equality in family decision making. Our analysis supports the hypotheses that industrialization influences fertility through shifts in the social status of women, both in their work and at home. New education and work opportunities facilitate the emergence of modern conceptions of the role of women in society and egalitarian decision making in the family. These attitudes and patterns of husband-wife interaction are related to smaller family size ideals and lower fertility.

BRAZIL. Rosenberg, O. Aleitamento no primeiro ano de vida de crianças internadas em hospital assistencial de municipio de Sao Paulo, Brazil (Feeding of infants during the first year of life admitted to a welfare hospital in Sao Paulo, Brazil). Rev Saude Publica 7(4):381-388, 1973.

The data presented are for 667 infants in 1969 and 249 in 1972, as recorded on admission to a children's hospital. Excluded were children of municipal employees who received assistance from the hospital, but were of a different social class. Data are tabulated under the headings: natural feeding, mixed feeding, cow's milk, dried milk, other and total, for the 2 years separately and for the 6-month periods separately. The whole-year data are summarized as follows: in the first month breast feeding totalled 23.21% in 1969 and 23.07 in 1972. There was a steep fall to the second month, with 4.06 and 3.33%. Exclusive artificial feeding totalled 89% in 1969 and 92% in 1972. Over the whole year, breast feeding reached 5.85% in 1969 and 3.61% in 1972.

BRAZIL. Rowe, P. M. and Way, P. O. Patterns of Recent Rapid Fertility Declines in Brazil, Colombia and Mexico. Paper presented at the Annual Meeting of the Population Association of America, 1980.

Recent surveys indicate that between the mid-1960's and the mid-to-late 1970's fertility fell 29% in Brazil, 41% in Colombia, and 25% in Mexico. This paper examines the relationship of these fertility declines to family planning activities, education, patterns of marriage and other socioeconomic factors.

In Brazil, increasing age at marriage appears to have contributed most to the recent fertility decline, as family planning program activities have been relatively limited. Colombia, with a strong family planning program, had nearly 50% of married women using contraception in 1976. Changes in the age at marriage and in literacy, however, have been relatively minor. Mexican family planning efforts, combined with increases in educational attainment, have contributed to recent declines. Patterns of age at marriage in Mexico have changed very little.

For each of the countries in this analysis, a time series of fertility levels is presented, and changing patterns of fertility are examined.

BRAZIL. Santos, I. Dos. Investigacao interamericana de mortalidade na infancia: alguns aspectos do aleitamento materno em Recife e acoes em desenvolvimento (Inter-American study of infant

mortality: breast feeding in Recife and current programmes).
Bol Of Sanit Panam 81(5):399-404, 1976.

In Recife, of 1029 children under 5 years, 64.7% belonging to the lowest socioeconomic group, only 24% were breast fed for 1 month or longer. Breast feeding is encouraged by the use of tape recordings, before and after parturition, to explain its importance to mothers, by educational programmes in outpatient services and by emphasis on its nutritional value in courses for nurses.

BRAZIL. Yunes, J. and Ronchezel, V. S. C. Estudo da lactacao em mulheres do distrito de Sao Paulo, Brasil (Lactation in women of Sao Paulo District, Brazil). Rev Saude Publica 9(2):191-213, 1975.

Published data on lactation are briefly discussed, especially in relation to inhibition of ovulation and temporary sterility during lactation. The population studied consisted of 2857 women, 15 to 49 years of age, resident in the District of Sao Paulo in 1965, of whom 2647 had had at least one live-born infant at the time of the survey. Most women suckled their infants, the percentage varying from 87 for parity 4 to 89 for parity 2; duration of lactation rose with age of the mother and parity from 30 weeks for parity 1 to 35 weeks for parity 5. Women who did not use contraceptives had longer lactations than those who did, except at parity 5. In those who used contraceptives there was no correlation of duration with interval between pregnancies; in those who do not, the mean interval increased with longer duration of lactation. Ignoring parity, there was a tendency for women with a higher standard of education to have shorter lactations, and women born in rural areas have longer lactations than women born in the capital.

CHILE. Mardones, Francisco. La Mortalidad Infantil y Sus Ultimos Descensos (Infant Mortality and Its Recent Decrease). Mensaje: 577-582, Nov. 1976.

Chile reported a 22% decrease in infant mortality between 1972 and 1975, dropping from 71.1 to 55.4 deaths per thousand live births. This paper argues that the decrease was caused by demographic changes rather than directly as a result of either economic factors (official data show a deterioration in economic standard-of-living, especially unemployment) or changes in national health or feeding programs.

During the period 1972-75, Chile experienced more births in mothers aged 20-34, and proportionately fewer births in large families. A table showing infant mortality as a function of mother's age and birth order in Chile in 1969 demonstrates significantly lower infant mortality for mothers aged 20-34 and birth orders of four or less. By combining this data, the paper arrives at its conclusion that the decrease in infant mortality in Chile from 1972 to 1975 "is not related to increases in the standard-of-living of the population, but is significantly related to a concentration of births in the optimal groups with respect to mother's age and parity."

CHILE. Monckeberg, F. Factors Conditioning Malnutrition in Latin America. In Malnutrition is a Problem of Ecology, eds. P. Gyorgy and O. L. Kline. New York: Karger Press, 1970.

Chile has the lowest mortality rate for preschool children and the highest

infant mortality rate in Latin America. The reason is the extremely short duration of maternal lactation. At the third month only 25% of mothers feed their children exclusively breast milk. The median age of complete weaning is approximately 6 months. A sample of 1830 children in the Curico province showed that those only breast feeding exhibited normal growth compared to the Iowa 50th percentile, while infants who received only formulas from the early months of life had varying degrees of malnutrition.

CHILE. Oberg, J. Natality in a Rural Village in Northern Chile. In Culture and Population: A Collection of Current Studies, ed. S. Polgar. Chapel Hill: Technical Information Service, Carolina Population Center, University of North Carolina at Chapel Hill, 1971.

The structure of the birth interval for 29 parous women was analyzed and discussed. Oberg calculates that lactation amenorrhea accounted for 11.33 months of the 34.10 months between live births. The average period of nursing was 13.33 months.

CHILE. Perez, A. et al. Timing and Sequence of Resuming Ovulation and Menstruation after Childbirth. Popul Stud 23(3):491-503, 1971.

The first postpartum ovulation of 200 Chilean mothers was diagnosed by basal body temperature charts, vaginal cytology, and endometrial biopsies. The average period of lactation was 4 months. A significant difference between full and partial breast feeders obtained. During full breast feeding, the resumption of menstruation was preceded by ovulation less than one-half the time, but during partial breast feeding resumption of menstruation was preceded by ovulation in almost 75% of cases. Suspended breast feeding resulted in ovulation preceding first menses in 90% of cases. Conceptions during amenorrhea were low, about 7%.

CHILE. Plank, J. and Milanesi, M. L. Infant Feeding and Infant Mortality in Rural Chile. Bull WHO 48:203-210, 1973.

During 1969-70, 1712 rural Chilean mothers were interviewed to see if their feeding practices contributed to infant mortality. There were three times as many deaths among babies given bottles before the age of 3 months as among those who were wholly breast fed. Nearly half the children had started bottle feeding by that age, and it was thus a major factor in infant mortality. Although the death rates per bottle fed babies were similar, whether they continued to receive breast milk or not, mortality was about 70% higher during both the second and third trimesters for those children not given any food but milk. As living standards improved, weaning was accelerated and a higher proportion of children were fed on the bottle alone. The anomalous consequence was that infant mortality rose with income. These observations support the opinion that early weaning is a concomitant of economic development; they also suggest that the risk associated with bottle feeding may be reduced by adding other foods to the diet.

CHILE. Rona, R. and Pereira, G. Factors that Influence Age of Menarche in Girls in Santiago, Chile. Hum Biol 46:33-42, 1974.

In 1970 a study was made of 354 girls 10 to 17 years old, who attended 2 private and 5 public schools in Santiago, Chile.

The age of menarche calculated by the probit method was of 12.6 years for the total group. Age of menarche was lower in girls of worse socioeconomic status (12.3 years), than in those of high status (12.97).

The total sample was partitioned into subgroups, according to the number of foreign grandparents and to the presence or absence of shovel shape incisors. It was observed that among the girls with a greater number of foreign grandparents as well as among those with shovel-shape teeth the age of menarche was higher than among those with no foreign grandparents (12.8, 13.0 and 12.4 years respectively). This suggests that genetic factors as well as nutrition may be important in determining the age of menarche.

Age of menarche was analyzed according to the amount of subcutaneous fatty tissue, measured with a caliper in the sub-tricipital, subscapular and sub-costal regions. It was observed that menarche ensued significantly earlier in girls with more subscapular or subcostal adipose tissue. This was not observed in respect to tricipital subcutaneous tissue.

CHILE. Taucher, E. Infant Mortality in Child, Trends, Differentials and Causes, paper presented at the Annual Meeting of Population Association of America, 1979.

The paper analyzes the infant mortality trends in Chile from 1961 to 1976. The purpose is to attempt to identify and explain the determinants of the recent mortality decline from 109 to 54 per thousand birth between the two mentioned dates.

Analysis is made by considering birth parity, age of mother, and occupation and education of parents. Neonatal, postneonatal, mortality is also analyzed by birth order in different socio-economic groups. Furthermore, the changing proportion of births from different socioeconomic groups due to the decline of the birth rate from 38 to 29 per thousand is also taken into account in this mortality analysis. The paper points out particular aspects that should be taken into account for future reduction of infant mortality.

COLOMBIA. Birdsall, W. A cost of siblings: Child Schooling in Urban Colombia. Paper presented at the Annual Meeting of the Population Association of America, 1978.

Data for this investigation comes from a 1967-1968 family budget study. The main result is that additional siblings are costly to living children because all children in the family will receive less education. Two stage least squares estimation of jointly determined fertility and investment shows that large family size has a negative effect on child investment in a causal sense. The principal implication is that the high fertility/low education pattern can be broken given improvement in economic conditions through a change in fertility patterns.

COLOMBIA. Mora, J. O. et al. Nutritional Supplementation and the Outcome of Pregnancy. III. Preinatal and Neonatal Mortality. Nutr Reports International 18:167-175, 1978.

As part of a longitudinal study of malnutrition and intellectual

development, a randomized trial of the effects of nutritional supplementation (856 calories and 38.4 g of protein) during the last trimester of pregnancy was conducted. Four hundred fifty-six poor families with malnourished children were enrolled in a uniform health care program consisting of free medical care for the mothers during pregnancy and for all children under seven years of age. Nutritional supplements were provided to 226 families while 230 families were not supplemented. No effects of supplementation were noted on the length of gestation. Still-birth, neonatal and perinatal mortality rates were all lower in the supplemented group. Stillbirth rate was approximately one-fourth, whereas the neonatal and perinatal mortality rates were about one-half the rate noted in the control group. The sample was too small to test for significance of the differences observed in specific death rates but when still-births and neo-natal deaths were pooled, significant differences between the two groups were found by the chi-squared test ($p .05$). These data suggest that supplementation begun during the last trimester of pregnancy in a sample of families at risk of malnutrition resulted in a substantial reduction of perinatal and neonatal mortality in addition to the previously reported effects of supplementation on maternal weight gain during the last trimester of pregnancy and on birth weight.

COLOMBIA. Mora, J. O. et al. The Effect of Nutritional Supplementation on Calorie and Protein Intake of Pregnant Women. Nutrition Reports International 17:217-225, 1978.

Four hundred fifty-six pregnant mothers and their families were enrolled in a health program and subsequently randomly assigned either to a supplemented (N=226) or an unsupplemented (N=230) group. Distribution of enriched bread, milk and cooking oil was initiated during the sixth month of pregnancy. Sufficient supplements were given to meet a substantial proportion of the recommended dietary allowance for all family members. Dietary surveys by the 24-hour recall method were conducted during the sixth month of pregnancy prior to supplementation of the intervened group and repeated two months later. The dietary intake of the control group did not change significantly. Delivery of 850 calories and 38 g of protein per day per capita to the pregnant women in the intervened group resulted in net intake increments of 133 calories and 20 g of protein. Three hundred sixty-three of the calories provided were not ingested and 360 replaced calories in the usual diet. Twelve g of the protein provided were not ingested while 6.8 g replaced protein in the usual diet. For both calorie and protein, replacement correlated positively with initial intake. Although significant, the effect of supplementation on calorie and protein intake was much lower than expected. The importance of understanding the causes of replacement and misuse in order to improve planning of supplementation programs is emphasized.

COLOMBIA. Mueller, W. H. Fertility and Physique in a Malnourished Population. Hum Biol 51:153-166, 1979.

Anthropometric measures and fertility histories were obtained from 403 rural, moderately malnourished Mestizo families in Andean Colombia. Average family size was found to be $6.5 \pm S.D. 2.5$. Two classes of body measures were correlated with fertility. First, there is a positive, linear association of fertility with body fat. The wealthier are both fatter and have larger families in this population, suggesting that this trend is the result of socio-economic factors. Secondly, bony measurements tended to have a curvilinear relationship to fertility such that large and small boned individuals have fewer surviving offspring, the same pattern of stabilizing selection observed in samples from well-nourished industrial societies.

- COLOMBIA. Oberndorfer, L., and Mejia, W. Statistical Analysis of the Duration of Breast Feeding (A Study of 200 Mothers of Antioquia Province, Colombia). J. Trop. Pediatr. 14:27-42, 1968.

Interviews were obtained with 100 mothers who attended a university hospital for delivery and 100 mothers who were entitled to medical care under social security in Medellin, Colombia. Only mothers who had previously nursed at least 4 children exclusive of the new born were included. Statistical evaluation of the data for 1412 babies showed that for the hospital group the average time of breast feeding alone was 3-5 months. The average time of the total lactation period was 6 months. For the other group, corresponding times were 3.3 and 6 months. Thus the duration of breast feeding was practically the same in both groups, in spite of the lower socioeconomic and nutritional status of the hospital group.

- COLOMBIA. Ribe, H. Comparisons of Migrant and Native Fertility in Colombia. Paper presented at the Annual Meeting of the Population Association of America, 1980.

Since internal migration is proceeding rapidly in many low income countries and fertility is lower in urban than in rural areas, it is important to know the actual level of immigrant fertility and the speed with which it adapts to the urban environment in order to understand better the recent decline in Colombian fertility.

Analysis of the 1973 Colombian Census sample reveals no clear association between fertility and migration status among urban residents when age, education and marital status are held constant, except for recent migrants who have fertility slightly lower than city natives. The evidence indicates, however, that some migrants (mostly young low educated city immigrants) delay marriage in comparison to city natives and this lowers their lifetime fertility. It is concluded that migrants are selectively drawn and oriented toward labor force participation and smaller family size goals. The analysis suggests that migration has contributed to Colombia's rapid demographic transition.

- COLOMBIA. Rowe, P. M. and Way, P. O. Patterns of Recent Rapid Fertility Declines in Brazil, Colombia and Mexico. Paper presented at the Annual Meeting of the Population Association of America, 1980.

See Brazil.

- COLOMBIA. Wray, J. D. and Aguirre, A. Protein-Calorie Malnutrition in Candelaria, Colombia: I. Prevalence; Social and Demographic Causal Factors. J Trop Pediatr 16:76-98, 1969.

The interaction of breast feeding and demographic factors with malnutrition and mortality was examined using data from a nutritional survey covering 1094 children in Candelaria. The median duration of breast feeding was 18 months; one fourth of all mothers were exclusively breast feeding at this time. Forty percent of the children were malnourished. Absence of breast feeding was associated with PCM and diarrhea. PCM was associated with diarrhea. Parity, birth order, and number of pre-school children were all associated with PCM.

ECUADOR. Scrimshaw, S. C. M. Culture, Environment and Family Size: A Study of Urban In-Migrants in Guayaquil, Ecuador. Ph.D. Thesis, Columbia University, 1974.

An anthropological study of child rearing practices in Ecuador shows that many child care practices have the effect of encouraging infant mortality. The age of weaning in mountain areas is 12 to 16 months; typical for rural underdeveloped areas. The traditional intrafamily food distribution pattern is designed so that children receive only low protein foods. The response to measles or diarrheal infection is to severely restrict food intake. Infant mortality is most frequent when births are closely spaced, especially if the previous child survived.

ECUADOR. Wolfers, D. and Scrimshaw, S. Child Survival and Intervals between Pregnancies in Guayaquil, Ecuador. Popul Stud 29(3): 479-496. Nov. 1975.

Intervals between births to 1934 women from poor areas of Guayaquil, Ecuador, were subjected to analysis to determine what effect on survival chances of their children, if any, was exerted by differences in these intervals. The analysis showed that risks of miscarriage and stillbirth were increased when the interval between last termination of pregnancy and conception was either very short or very long.

Post-neo-natal mortality was strongly influenced by the length of the interval, reaching a minimum where the interval was around three years. The influence of interval length diminished as the level of mortality fell (with improving health standards over time). The possibility could not be discarded that for neo-natal mortality and mortality in the second year of life, extremely short intervals (under three months) carried significant additional risks.

For both periods, intervals longer than three years increased the risk of infant mortality.

Evidence was found that the survival chances of the first child of a pair were seriously impaired during the first year of life where a fresh conception supervened during that period (the earlier this happened the more serious the impairment).

An analysis of 'double intervals' (not presented here) showed that the effects of short intervals were exaggerated when two such intervals succeeded one another.

The principle conclusions remained valid when competing sources of association between short intervals and mortality were excluded, thus lending plausibility to the view that the two are connected by a causal chain.

While no great precision can be claimed, it seems likely that if effective measures were taken to prevent the occurrence of pregnancy intervals shorter than 27 months (corresponding to birth intervals of less than three years) spontaneous abortions might be reduced by one-third and infant mortality by one-half in populations similar to that studied here. These results justify a recommendation that the prescription of contraception for a limited period post-partum in areas of moderate or high neo-natal mortality should become a routine of responsible obstetric or maternity and child welfare care.

- PERU. Frisancho, A. R.; Klayman, J. E.; and Matos, J. Symbiotic Relationship of High Fertility, High Childhood Mortality and Socio-Economic Status in an Urban Peruvian Population. Human Biol 48:101-111, 1976.

The reproductive, biological and socio-economic characteristics of a sample of 4,952 subjects derived from a Peruvian population of low and medium socioeconomic status were studied. The study suggests that under conditions of poverty there exists a symbiotic relationship whereby low socioeconomic status is associated with a less efficient mechanism to control family size. This characteristic permits the mother of low socioeconomic status to attain a more complete child-bearing period. As childhood mortality is inversely related to socioeconomic status, so, with an increase in childhood deaths there is an increase in live births in a compensatory fashion. High fertility is the net result of these interactions. The implications of these findings to attempts to decrease population fertility through birth control alone are discussed.

- PERU. Harrison, P. Mothers' Milk and Mortality in Peru. People 4(2): 29-30, 1977.

The reasons for the high infant mortality rates in Peru and efforts to improve conditions are discussed. The Baby Jesus Clinic in Pamplona Alta is trying to break the chain of bad sanitation, poor nutrition, and the decline of breast feeding. The polluted water sold to the shanty dwellers and stored inadequately is a frequent cause of stomach infections and diarrhea. If a child is at preweaning age and develops diarrhea, it may be the beginning of a fatal progression since a child with diarrhea has trouble tolerating milk. A tin of powdered milk is so expensive that mothers are unable to provide enough of it for normal growth. The food is also made up of contaminated water, making the child more likely to be exposed to infection. A nutrition program was started in 1974 at the Baby Jesus Clinic, and Hilary Creed, an English dietician, and doctors at the clinic have developed special diets to pull children back from certain death.

- PERU. Kerrins, J. F. Responsible Parenthood Program in the Barriadas of Lima. Paterson, New Jersey: U.S.A.I.D., 1967.

Women attending a family planning clinic in Lima reported the effect of pill use on milk supply. Seventy-five and five-tenths percent of the women taking Ovulen, (a mixture of the progestogen, ethyndiol acetate, and the estrogen, mestanol), experienced reduced milk supply, while 53.3% of those taking Q1-Q2, (a combination of the progestogen, quinquestanol, and the estrogen, quinestrol), experienced reduced milk supply.

- SOUTH AMERICA. Hout, M. The Role of Household Production and Commodity Trade in Latin American Fertility: 1900-1975. Paper presented at the Annual Meeting of the Population Association of America, 1980.

Despite substantial urbanization, educational expansion, and technical development during the 20th Century mainly Latin American populations have not experienced the fertility declines characteristic of European populations at similar levels of economic development. This paper attributes the weak effect of economic development on fertility in Latin American to the role of trade

dependence in economic development. Trade dependence fosters inequality in the distribution of the benefits of development and permits pronatalist family structures to persist along side Western forms. Both inequality and family structure increase fertility indirectly by mediating the fertility reducing effect of development. Analysis of data from throughout the 20th Century confirms that the effect of economic development on fertility is stronger in Latin American countries with little dependence on foreign trade than in countries that are highly dependent on trade.

SURINAM. Van Staveren, W. A. et al. Food Habits of Infants and Preschool Children in Surinam. J Am Diet Assoc 58:127-132, 1971.

In 1967 a team of home economists surveyed mothers regarding the food habits of their preschool children from birth to two years. It was found that breast feeding is rather prolonged, only a minor percentage of infants were not breast fed. In all ethnic groups, the majority of women terminated breast feeding between the age of 9 months and 1 year, although some continued until 2 years or even 4 years, based on the arrival of the next baby. Working mothers replaced breast feeding by bottle feeding after 6 weeks to 3 months. The first additional food might consist of several kinds of porridge, fruit juice or soft drinks. Soft rice was often mixed with soft vegetables or enriched infant biscuits. After 6 months, infants were given fish, cow's milk, rice flours and breads.

VENEZUELA. Velez Boza, F. and Baumgartner, J. General Clinical and Nutritional Study on Native Tribes of the Amazon. Federal Territory of Venezuela. Archives of Venezuelan Nutrition 12:143-225, 1962.

A study of native tribes in Venezuela showed that infants were breast fed usually for 2 years and sometimes longer. From 6 months of age, supplementary feeds were prepared from sweet potato and different fruits and other diet items as available and in season.

COOK ISLANDS. Neave, M. The Nutrition of Polynesian Children. Trop Geog Med. 21:311-322, 1969.

The Nutrition of four groups of Polynesian children under 6 years old was studied in the large island of Upolo, on West Samoa, on 2 atolls of the Tokelaus, and one atoll and one high volcanic island in the Cook group. Mothers were questioned about practices regarding breast feeding, weaning, and introduction of solid foods. Average values for duration of 6-fig. ranged from 6.6 - 10.4 months, age at first solid food (immature coconut or pawpaw) 4.5 to 5.9 months, and fish was introduced between 6.7 to 9.5 months.

TABLE 1

Results of Dietary Enquiry

	No. of children	Duration of breast feeding (mths)	Age First Solids (mths)	First solid food given
Fakaofu 1968 Tokelau	148	10.4	5.9	Immature Coconut
Nukunonu 1968 Tokelau	93	9.1	5	Immature Coconut
Pukapuka 1964	192	9	4.5	Immature Coconut
Rarotonga 1964 Southern Cook Islands	273	6.6	4.5	Pawpaw
Aitutaki 1964 Southern Cook Islands	177	7.6	5.2	Pawpaw

GILBERT ISLANDS. Jansen, A. A. J. Malnutrition and Child Feeding Practice Among the Gilbertese (Including Information on Pregnant and Lactating Women and Attitudes towards Family Planning). Environmental Child Health 23(4): 161-185, August, 1977.

A survey to assess the nutritional status and feeding practices of infants, preschool, and school children in Betio and Tabiteuau-North (Gilbert Islands) was conducted in 1971. Anthropometric and clinical tests indicated a deterioration in nutritional status after the 6th month of life. In addition to moderate protein-calories deficiency, specific deficiencies such as lack of vitamin A, Riboflavin, and iron were prevalent, especially among preschoolers. To gather data on child feeding practices, a questionnaire was administered to 196 Betio mothers of children under three and to 70 Tabiteuau mothers, all located at mother and child health clinics. Eighty-three percent of families surveyed were found to have incomes inadequate to provide a sufficient diet. Ninety-two percent of Betio infants and 97% of those on Tabiteuau were breast fed within three days after birth, and few were weaned in the first year of life. On Betio, approx. 25% of children 4-8 months old were receiving some form of solid food, 50% were in the 9-12 months age group, and 90% were by the end of the first year. It is suggested that the earlier introduction of solid foods (in the 2nd trimester after birth) could overcome the prevalence of growth

retardation. The diet of pregnant women was found to be largely centered around local foodstuffs. Numerous taboos and restrictions surrounding the diet of both pregnant and lactating women were recorded. The tradition of abstinence (sexual) during lactation served as a form of birth control to some, but its influence was decreasing. The pill and injections were found to be the best known birth control methods on Betio, while the loop was more familiar to Tabiteuau women. Ninety-five percent of Protestant and 83% of Catholic women on Betio thought family planning was worth practicing, while only 50% of the Tabiteuau women surveyed agreed. Seventy percent of Protestant women and 49% of Catholic women wanted intervals of four years or more between children, indicating that a well-prepared family planning program could be successful among the Gilbertese.

OCEANIA. LeNoir, R. G. and Gundlach, J. H. The Effect of Integrating Family Planning into an Existing Free Medical Care System on Fertility: An Analysis of the Fertility of American Indians, Guam and American Samoa. Paper presented at the Annual Meeting of the Population Association of America, 1979.

This paper is an indirect assessment of the effect of integrating a family planning program into an existing free medical care delivery system upon fertility.

Beginning in June of 1965 the Indians of the different states and the natives of U.S. trust islands in the Pacific were provided federally funded family programs that, at different levels, were integrated into free medical care delivery systems that served different proportions of the populations. The amounts fertility declined over four years and during the fourth year of the program are calculated and regressed upon the percentages of the appropriate populations served by free medical systems that include family planning programs.

After we control for education, income and female employment, we find that the effect on integrating family planning into free medical systems is to reduce fertility by eleven percent over four years and by twenty-one percent during the fourth year.

PAPUA NEW GUINEA. Bailey, K. V. and Whiteman, J. Dietary Studies in the Chimbu, New Guinea Highlands. Trop Geogr Med 15:377-388, 1963.

Infants were entirely breast fed in the Chimbu area until the eruption of the first teeth. Breast feeding was continued until the age of 3 years. The first solid food offered was usually pit-pit (*Setaria palmaefolia*, the white inner stem) when two or four teeth had erupted (8-12 months of age). Baked sweet potato was the next food introduced, followed (usually beyond 12 months) by other staples like taro, banana, leafy greens and finally beans.

PAPUA NEW GUINEA. Becroft, T. C. Child-Rearing Practices in the Highlands of New Guinea: A Longitudinal Study of Breast Feeding. Med J Aust 2:598-601, 1967.

A survey of 125 children of the Engas of Baiyer River, New Guinea Highlands was done in 1962-65 to study child rearing practices. Surviving children

were spaced five years apart. If a child died, the average interval was 1 year 5 months. A child was weaned at about 4 years 6 months. Ten percent of the group studied were still on the breast at 5 years 6 months. Solid food was not given until the first teeth were cut, or later.

PAPUA NEW GUINEA. Jelliffe, D. B. and Maddocks, I. Ecologic Malnutrition in the New Guinea Highlands. Clin Pediatr 3:432-438, 1964.

In the New Guinea Highlands, breast feeding was the mainstay of infant nutrition. Breast feeding was also traditionally prolonged. Another pregnancy might not occur until 2-3 years after lactation. Introduction of foods other than breast milk is often delayed until the later months of the first year of life. As no semi-solid foods are available, softer portions of adult foods are given. As an extension of the solid food approach to infant feeding, the use of peanut butter as a regular infant food has been successful in some Chimbu villages, using home grown and processed peanuts.

PAPUA NEW GUINEA. Malcolm, L. A. Growth of the Asai Child of the Madang District of New Guinea. J Biosoc Sci 2:213-226, 1970.

A total of 249 children and 805 adults living in the Asai valley of the New Guinea highlands and consuming a primarily sweet potato diet was examined and measured for height, weight, sitting height and skinfold thickness. Mean ages for groups of children were calculated from regression equations of height on age for different dental stages.

The growth of the Asai child in all measured parameters appeared to be slower than that reported from any other world situation. Average height at age 12 years fell more than four standard deviations below the 1978 WHO reference media, with boys more severely stunted than girls. Menarche was estimated to occur at 19.7 years.

Adult males averaged about 150 cm in height versus about 142 cm for females. Weights and skinfold thickness, in common with other New Guinean populations, show a progressive fall with age, which was more pronounced in women than in men, but did not depend on parity after initial weight loss following the first pregnancy. Breast feeding lasted nearly four years with prolonged post partum sexual taboo. Average number of pregnancies for females past childbearing was 4.6, with 3.5 surviving children. Under five mortality was about 250/1000.

PAPUA NEW GUINEA. Malcolm, L. A. Growth and Development in New Guinea: A Study of the Bundi People of the Madang District. Monograph Series No. 1. Madang: The Institute of Human Biology, 1970.

A study of infant feeding patterns among the Bundi of New Guinea showed that a Bundi infant was breast fed until a mean age of 4 years. Breast feeding was on demand and is limited only by the mother's work schedule. Mashed sweet potato, sugar cane, banana and pit-pit were introduced as early as 3-4 months.