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International Maternity Care Monitoring: Results of a Pretest

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ABSTRACT

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This report gives the preliminary results of a pretest cosponsored by the International Fertility Research Program and the International Federation of Gynaecology and Obstetrics. It includes data on 33 116 deliveries in 20 maternity centers in Latin America, Europe, Africa and Asia. The findings are organized around four themes: (a) family formation and reproductive history, (b) family health, (c) management of this delivery and (d) desired family size and family planning practices.

INTRODUCTION

The health care provided the mother and infant before, during and after delivery can profoundly affect the health of the family and, indeed, on a macroscopic level, the entire community. Much of the morbidity and mortality associated with the process of human reproduction is preventable. In developing countries, in particular, adequate maternity care can contribute significantly to improving maternal and child health. In order to accelerate improvement in maternity care, it is necessary to sensitize those responsible for health care services in both rural and rapidly urbanizing areas by providing information useful for improving reproductive health care. Maternity Care Monitoring (MCM) is a fast-growing effort designed to provide, systematically and rapidly, this much-needed information.

Developing countries are faced with the need to monitor maternity care at three distinct service levels: (a) institutional, (b) trained midwives in urban and rural areas and (c) traditional birth attendants. The greatest need is to monitor services among the least accessible of these groups, the traditional birth attendants.

No general mechanism exists that would enable the staff of an obstetric clinic in a city, much less in a rural maternity home, to receive rapid and meaningful feedback on the outcomes of different methods of obstetric management that would help them to avoid repetitive errors in judgment and standard practices and allow them to plan more effectively for their parents' needs.

By comparing the performance of different obstetric institutions, health care administrators can obtain the information necessary to suggest changes in manpower, training and allocation of space and resources that can improve maternity services. There is a need to establish an institutional baseline from the nation's leading maternity care centers as standard for rural obstetric care and criteria for early identification and referral of high-risk pregnancies.

A single-sheet maternity record, suitable for gathering routine information at the institutional level, was developed by the International Fertility Research Program (IFRP) for this purpose. A midwife maternity record system is being developed by altering and abbreviating the single-sheet institutional maternity record to include only questions relevant to rural institutional obstetric care. The IFRP and the International Federation of Gynaecology and Obstetrics (FIGO) cosponsored an international pretest of the record designed for use in institutions in the summer of 1976 (8, 14). Early findings showed the potential of this approach and, therefore, the pretest was expanded. This report gives early results of the expanded pretest, including data available through August 1977.

RATIONALE OF MATERNITY CARE MONITORING

The general objective of MCM is to provide information about the quality of maternal care in national health services, including the relevant factors that affect the outcome of pregnancies.

MCM is viewed as a continuous process that should have the following objectives:

1. To describe the women attending maternity centers by accounting for their past reproductive events and age/parity structure in order to identify subgroups that are at higher risk of morbidity and mortality.
2. To provide information on selected antenatal conditions that may contribute to the identification of factors affecting the outcome of pregnancies and maternal health.
3. To provide information on the management and outcome of delivery that may help identify specific management techniques that improve pregnancy outcome.
4. To provide information on family size expectations and contraceptive behavior to assess the perceived and real needs for contraceptive services, and thereby reduce morbidity by lengthening pregnancy intervals or terminating fecundity.
5. To provide a source of up-to-date information for developing instructional materials for improved standards of teaching and training in health professions.
6. To provide information on changes over time in maternal care management.

THE EXPANDED MCM PRETEST

IFRP had developed various maternity records from 1974 to 1977. This report restricts itself to the systems 900, 901 and 902, which were superseded at the end of 1977 by the 903 system. The findings in this section will refer to the items on the 903 record (13).

Data source and handling

The selected findings are based on records of 33 116 deliveries from 20 maternity centers in 12 countries (see Table I). The majority of these deliveries were recorded in 1977.

Similar data from three centers in Bombay were pooled, and in Singapore the records of 1976 and 1977 were treated separately, thus leading to 19 data sets for this analysis.

Maternity records were completed using definitions and criteria provided in the Maternity Record Instruction Manual (21). Completed records were mailed in monthly batches to IFRP or cooperating national fertility research programs. Initial batches of records were visually examined and all records were checked by computer range and contingency checks. Illogical, out-of-range or missing codes were automatically designated as unknowns, and these cases were excluded from relevant standard tables within the standard computer program. A frequency distribution of unknown items was provided to the centers. When codes for important selected pregnancy outcome events and risk factors were missing

Table I. Identification of selected data sets (IFRP-FIGO 1976/1977).

		Place[1]	Institution	Contributor	System	Inclusive Delivery Dates		Number of Cases	Data Set
LATIN AMERICA	Chile	Santiago	Hospital Felix Bulnes	H. Eyzaguirre	902	May 1977	August 1977	1278	1
	El Salvador	San Salvador-1	Centro Medico del ISSS	E. Moran	902	January 1977	March 1977	1763	2
		San Salvador-2	Hospital de Maternidad	A. Quan	902	March 1977	March 1977	922	3
	Honduras	Tegucigalpa	Hospital Materno-Infantil	J. Nuñez	902	March 1977	August 1977	4997	4
		San Pedro Sula	Hospital Leonardo Martinez	B. Mena	902	March 1977	May 1977	1609	5
EUROPE	Sweden	Umea	Umea University Hospital	I. Joelsson	901	March 1977	August 1977	760	6
	Austria	Vienna	Dr. I. Semmelweis Frauenklinik	A. Rockenschaub	901	January 1977	June 1977	743	7
	Yugoslavia	Rijeka	U. of Rijeka Dept. Ob/Gyn	L. Randić	901	March 1977	July 1977	795	8
	Hungary	Debrecen	Clinica Ob/Gyn Universitatis	L. Lampe	901/2	January 1977	July 1977	1980	9
AFRICA	Nigeria	Ibadan	U. of Ibadan Medical College	O. A. Ojo	901/2	January 1977	July 1977	1243	10
	Egypt	Cairo	El-Galaa Maternity Hospital	F. Hefnawi	901	March 1977	July 1977	1502	11
	Sudan	Khartoum-1	Omdurman Maternity Hospital	Sudan FCA*	900	April 1974	November 1976	1849	12
		Khartoum 2	Khartoum General Hospital	Sudan FCA	900	October 1974	December 1976	1459	13
		Khartoum-3	Khartoum North Hospital	Sudan FCA	900	January 1975	December 1976	1554	14
ASIA	India	Baroda	Baroda Medical College	India FRP**	900/1	July 1976	July 1977	1170	15
		Bombay (Pool)	N. Wadia Maternity Hospital	India FRP	900				
			K.E.M. Hospital	India FRP	900	May 1976	November 1976	1012	16
			L.T.M. General Hospital	India FRP	900				
		Manipal	Kasturba Medical College	India FRP	900	January 1976	December 1976	1360	17
	Singapore	Singapore-76	U. of Singapore Dept. Ob/Gyn	S. S. Ratnam	900	July 1976	December 1976	4358	18
		Singapore-77	U. of Singapore Dept. Ob/Gyn	S. S. Ratnam	901/2	January 1977	June 1977	2762	19
TOTAL	12 Countries	15 Cities	20 Institutions/Contributors		3 Systems	October 1974	August 1977	33,116	19

*Sudan Fertility Control Association
**India Fertility Research Programme

[1] *The place names stand for selected maternity centers as identified by institution and delivery dates.*

or unlikely, these records were rejected and resubmitted if codes could be clarified or confirmed. This system was designed to encourage contributing centers to produce high-quality records on a continuous basis.

At specified intervals, the contributors receive standard tabular computer outputs containing information for use in evaluating patient management and meeting reporting requirements. This report is based on standard computer outputs generated in September 1977.

Methodology of analysis

Because data were collected using similar records (900, 901, 902) and similar definitions at all centers, the data sets are comparable for most variables. Although a few questions were added, deleted or improved in successive versions, there is much overlap. Broad insights into different standards of care and health are generated, and transitions from one state to another (such as from high to low perinatal mortality) relative to other centers are illustrated by ranking comparable data sets from a variety of sociocultural backgrounds. Application of the ranking approach to intracountry samples is the next logical step, in this way, specific problems can be identified and action can be taken to improve human reproductive care in the context of available economic and human resources.

Results are based on data on women from particular clinic settings and are not meant to be interpreted as representative of more than the patient population of the clinic for this maternity service for the reported period.

Preliminary findings and MCM scope

The preliminary findings are derived from the Maternity Care Monitoring Series (MCM-2), a collection of graphic illustrations, and organized into four sections: (a) family formation and reproductive history, (b) family health and reproduction, (c) management of delivery and (d) desired family size and family planning practices (6).

Family formation and reproductive history. As with any obstetric history, the maternity record (13) includes inquiries into some general patient characteristics and the patient's reproductive history. Data from these items form the basis for constructing profiles of fertility attainment, pregnancy wastage, infant and child mortality and pregnancy intervals.

A measure of the reproductive attainment of these clinical groups is obtainable by plotting the mean number of previous live births against maternal age at this delivery (Fig. 1). The curves are smooth yet show different slopes. For women aged 35–39 years, the mean number of previous live births is between 4.0 and 6.0 for the African and Latin American centers and 1.6 for the combined European centers. For centers in Bombay and Europe, the flattening of the curves at higher ages reflects a decline in age-specific fertility. In the Singapore center, the drop at higher ages of the 1977 curve compared with the 1976 curve signifies a trend of decreasing fertility attainment for women aged 30 years and over. This parity by maternal age plot show the regional/sociocultural specificity of fertility attainment that is known to exist for these clinics through data sources other than MCM (11, 38).

Because the risk of unfavorable birth outcome is higher for women younger than 20 years of age (24), MCM should routinely measure the institutional frequency of deliveries to this high-risk group. Fig. 2 ranks the centers by the proportion of deliveries occurring to women less than 20 years of age (right side) and gives the corresponding proportion of women less than 18 years of age (left side). The percentage of teenagers giving birth in these centers ranged from 29.0% in San Salvador to 2.1% in Umea, Sweden. Actually, the rank classification (inset) shows clustering with a decreasing proportion of teenagers from centers in Latin America, Africa, India, Singapore and Europe, where different proportions of teenage deliveries coexist.

Stillbirth is an indicator of both management of pregnancy/delivery and the women's general health status. Ranking of stillbirth rates for this delivery shows in Fig. 3 a range from 69.0/1000 total births in an Indian center to 3.8/1000 total births in the center in Umea, Sweden. Overall, stillbirths were most frequent for the African and Indian centers, followed by Central America, Europe and Singapore The stillbirth rates for this delivery show a positive association with the stillbirth rates for previous deliveries. In the Singapore center, the stillbirth rate decreased from 1976 to 1977.

By monitoring maternity care, health professionals can obtain the information necessary to identify subgroups that are at higher risk of morbidity and mortality for the present and future pregnancies. Over time, the need for and impact of various kinds of services can be evaluated.

Family health and reproduction. Each patient entering the maternity ward carries with her valuable information on the health status of her family in general. The maternity record collects the following data pertaining to health: (a) the mother's antenatal condition, which is recorded according to definitions and classifications of the 9th revision of the International Classification of Diseases (ICD-9) (17); (b)

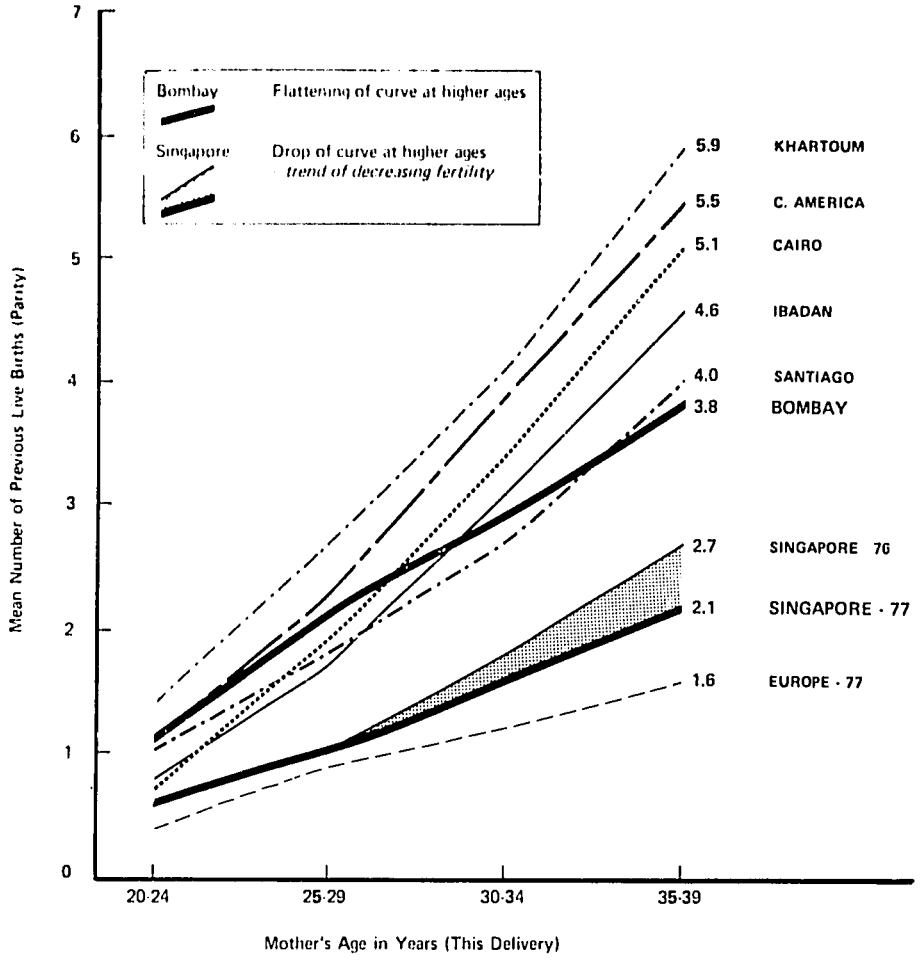

Fig. 1. Parity by age.

hemoglobin at admission; (c) pregnancy duration; (d) birth weight; (e) duration of breastfeeding of last live birth; and (f) smoking during pregnancy. This report concentrates on hemoglobin, an indicator of health that reflects the woman's general nutritional status (36).

Aggregation of the data by region shows a geographic sequence of decreasing maternal anemia (defined as hemoglobin [Hb] less than 10 gm/100 ml) (26) that extends from Indian centers to centers in Europe, where anemia is virtually absent. As shown in Fig. 4, anemia is inversely associated with both gestational age and birth weight, the latter two being, of course, in positive association. The observed disappearance of the inverse association with decreasing anemia (regional stacking and slope change of curves) indicates that data for these variables were reliably recorded.

In Fig. 5, the regionally aggregated data show the expected positive association between mean birth weight and gestational age as well as a reversed stacking of the curves when compared with Fig. 4. For deliveries at 39–42 weeks' gestation, the average weight of newborn infants in the Indian centers was slightly more than 0.5 kg less than the average weight for newborns in European centers. One may hypothesize that birth weight may be causally related to an anemia correlate such as malnutrition, but a genetic factor may also be involved. In nutritional anemia, the incidence of stillbirth and prematurity increases (5). This place effect on both anemia and birth weight merits further study.

An impressive positive association between parity and anemia is shown in Fig. 6 for data pooled from the Indian centers. Around 40% of the grand multiparas were anemic, while only 20% of the primiparas were anemic. The same geographic stacking of curves is shown. In European centers, the association almost disappears. The similarity of the curves' stacking points to the operation of a place effect; the

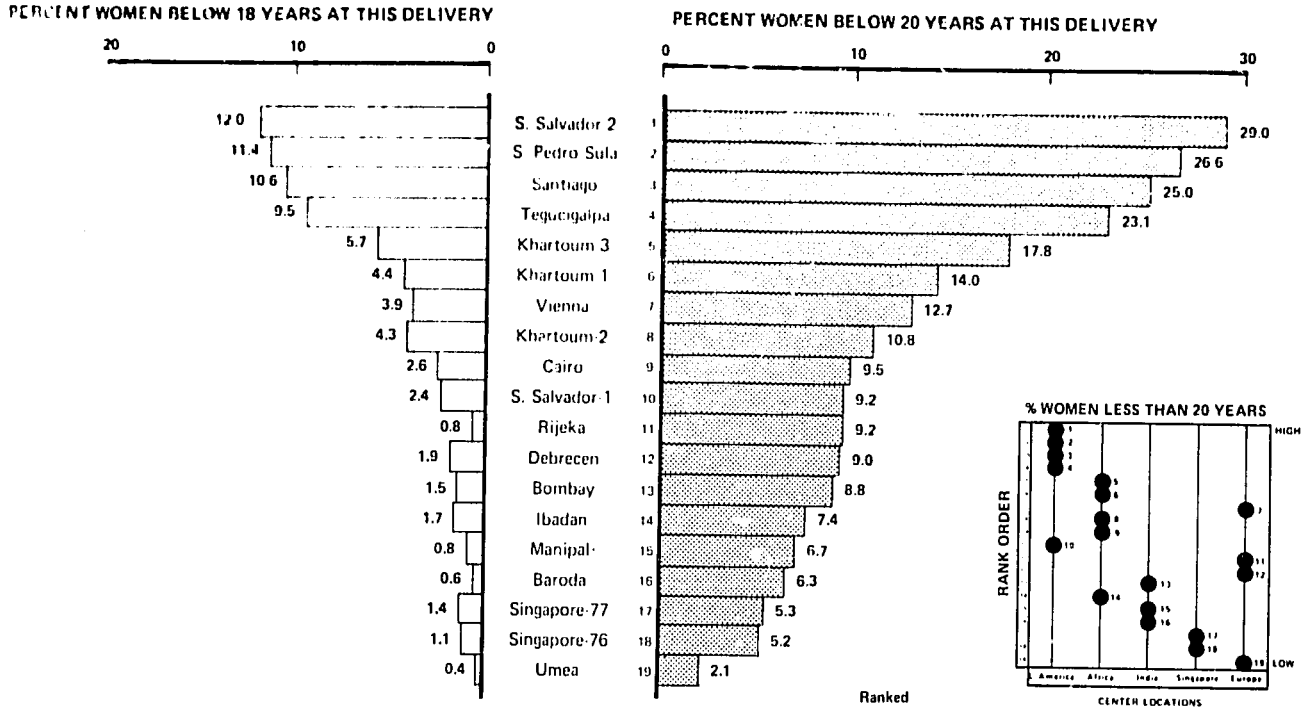

Fig. 2. Births to teenagers.

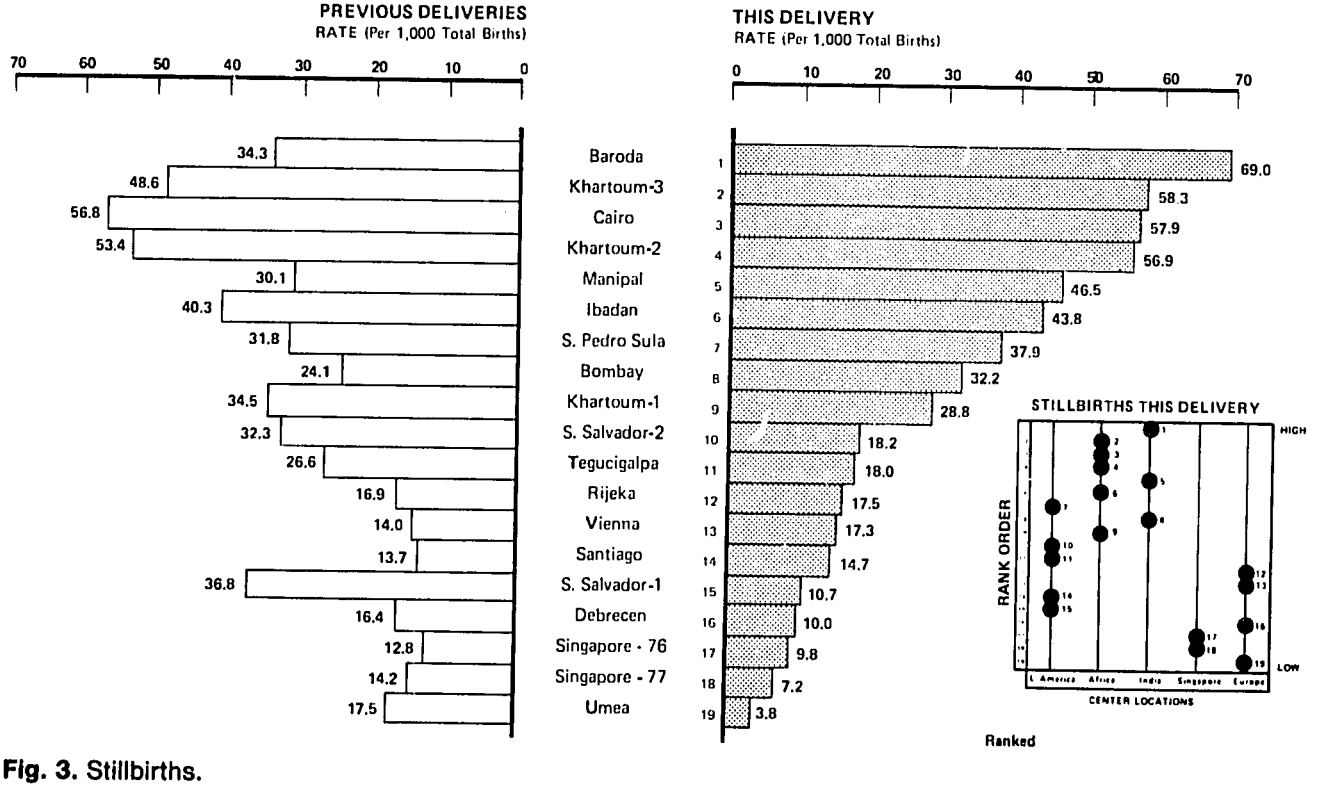

Fig. 3. Stillbirths.

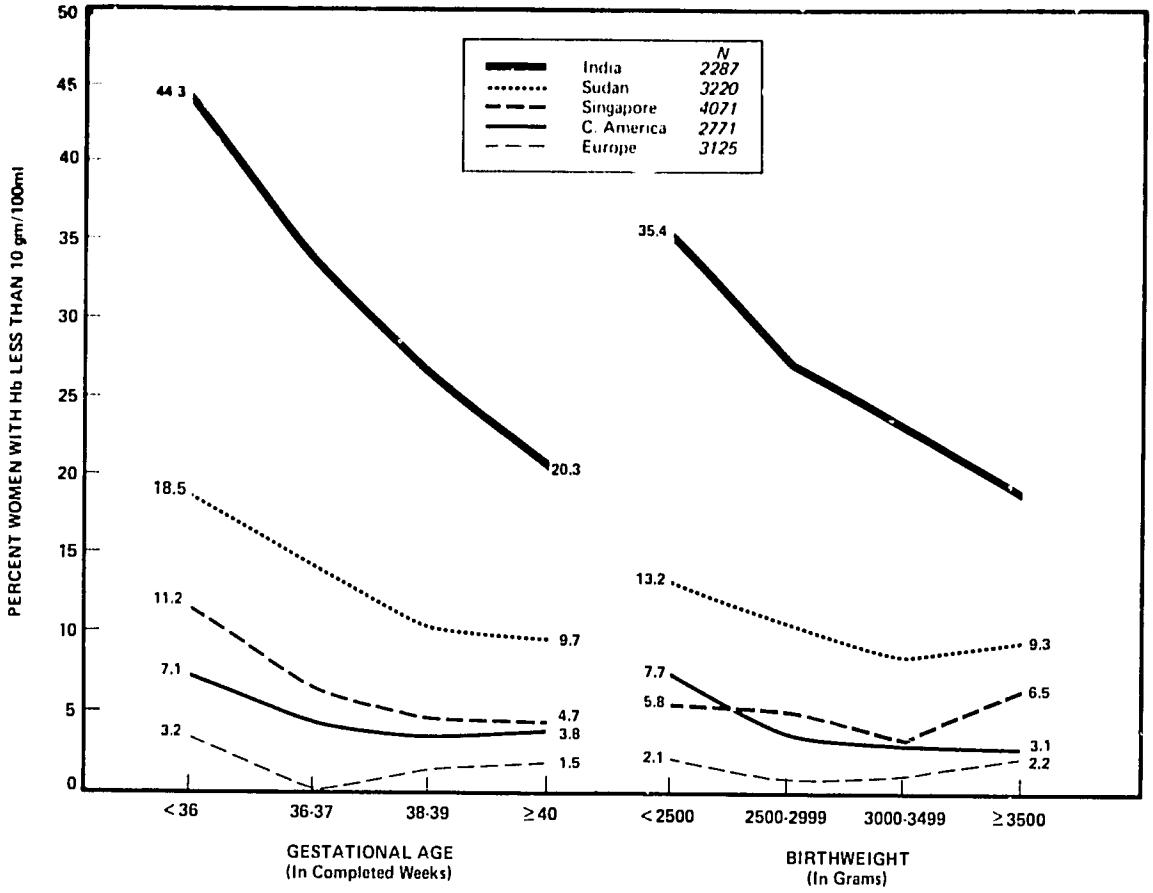

Fig. 4. Anemia by gestational age and birth weight.

greatest effect is in India and the smallest in Europe. This observation appears to strengthen the hypothesis that an anemia correlate such as malnutrition is operating and it needs further study.

MCM can also provide a data base to inquire into a possible relationship between nutritional anemia and other factors affecting intrauterine growth retardation (low weight for gestational age) (4). More than 21 million low birth weight babies are estimated to be born throughout the world each year; almost 20 million of these births are in developing countries (33). After reviewing accumulated epidemiologic knowledge on birth weight through June 1977, an expert committee concluded that birth weight v n indicator of socioeconomic development, according to A. Petros-Barvazian (personal communication, June 1977).

The maternity record is also designed to measure the smoking experience during pregnancy, which has been found to influence birth weight (10, 15, 27).

Recording whether and how long the mother breast-fed her last live birth will allow health professionals to review changing patterns and trends (31) of breast-feeding and the effect of breast-feeding on the birth interval (16, 22, 32). In developing countries in particular, the vast majority of health problems in early childhood are due to the interacting ill-effects of poor nutrition, infectious diseases and too closely spaced birth; breast-feeding has dramatic potential to correct these problems (18, 25).

Management of delivery. Reducing rates of maternal and perinatal morbidity and mortality is the prime objective of MCM. Recording methods of delivery management case-by-case and correlating these with pregnancy outcome would allow maternity centers to account for and then take steps to reduce morbidity and mortality.

Optimal management of delivery starts with early and regular antenatal care. The expanded pretest showed a strong inverse relationship between stillbirths and antenatal visits in the broader context of education (6). The work hypothesis to be derived and systematically tested is that the upgrading and expansion of antenatal care services in maternity care institutions will reduce stillbirths (and other

losses) quite independently of general educational levels (29). The systematic review of correlates of antenatal care in various sociocultural settings is needed to help identify situations that may test this hypothesis.

Institutional baseline information is needed on the relative frequency and relation of birth weight and late fetal death as well as on the specific risk of fetal and neonatal deaths associated with birth weight. Similarities and differences among institutions in patterns of the two components of perinatal mortality should lead to productive hypotheses on needed institution-specific interventions in perinatal care for improving the outcome. Fig. 7, for example, shows a similar likelihood of stillbirths in institutions in Khartoum, Sudan, and Singapore for infants weighing 2000 gm or less; for infants weighing between 2501 and 4000 gm, however, there was a tenfold difference in risk of fetal death.

There is a logical sequence from intrauterine fetal conditions to type of presentation during labor to type of delivery and birth outcome. Along this chain, obstetric interventions are possible regarding presentation (manual external rotation before engagement into a small pelvis), type of delivery (decision on cesarean section) and birth outcome (neonatal care).

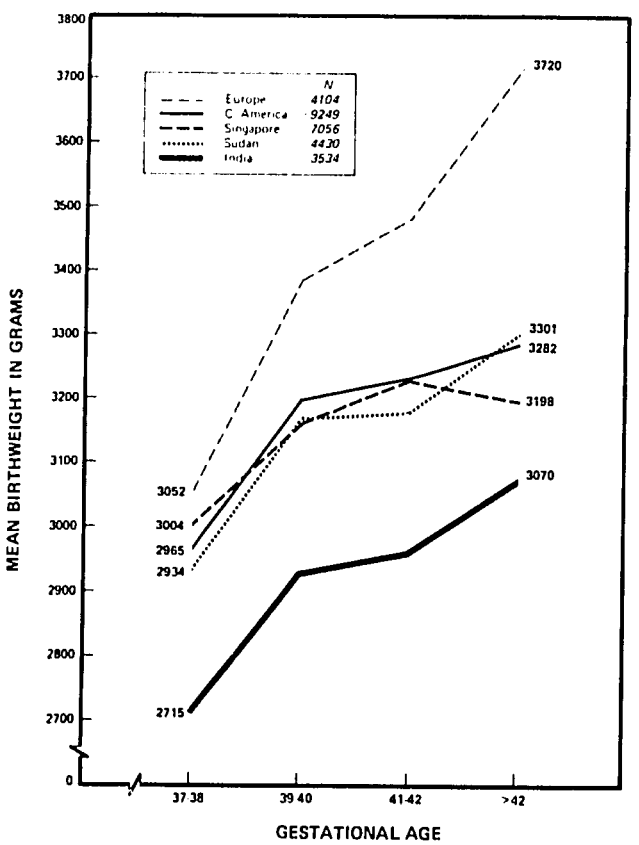

Fig. 5. Birth weight by gestational age.

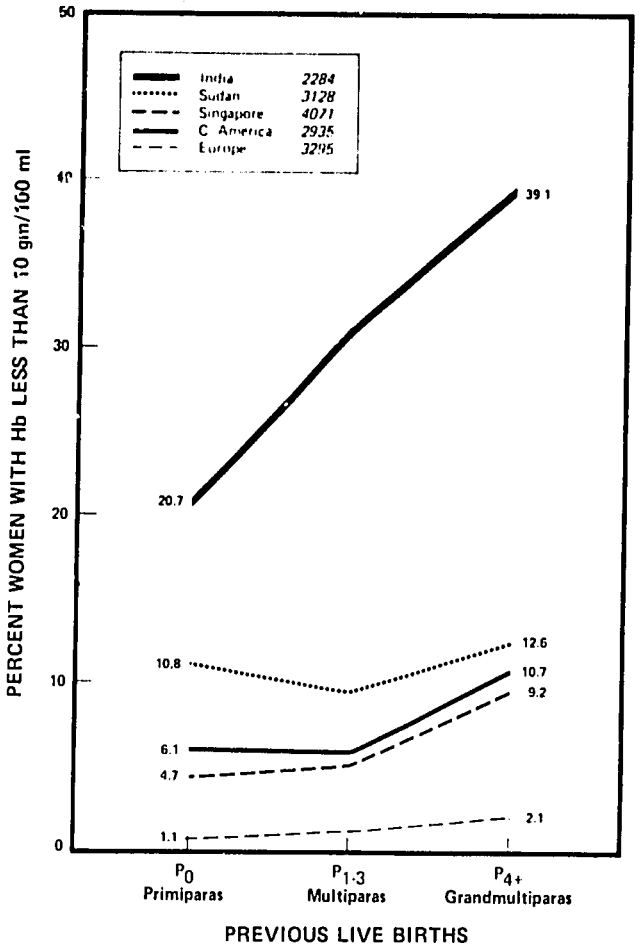

Fig. 6. Anemia by parity.

To date, the MCM experience shows great variation in the incidence of breech presentation, with a range between 1.99% (San Salvador-1) to 7.13% (Cairo). Obviously, high-risk referral centers will exhibit greater loads of breech presentations, pointing to a selection bias as generated by administrative necessity.

The causes of breech presentation during labor, as compared to vertex occiput anterior presentation, are many. Preliminary findings indicate that "low weight" (<2500 gm) babies have a decreased likelihood of rotating into the head-down position. Congenital malformations, multiple births and antepartum fetal death may also interfere with the usual rotation. The incidence of these abnormal fetal conditions for women with breech presentations during labor relative to vertex presentations is high. For four centers each of which had a sizable number of

breech presentations, the relative risks range from 2.6 in Tegucigalpa, Honduras, to 2.7 in Debrecen, Hungary, to 2.8 in Cairo, Egypt, to 2.9 in Singapore.

The most frequent abnormal fetal condition associated with breech presentation is low birth weight. The incidence of low birth weight (<2500 gm) for singleton births of breech presentation was found to be 2.2, 2.4, 2.6 and 2.9 times higher than for vertex presentations in Singapore, Tegucigalpa, Cairo and Debrecen, respectively.

Tables II and III give perinatal mortality rates by birth weight (low vs normal) and by type of delivery (vaginal vs cesarean section) for singleton deliveries of infants in breech and vertex presentations. In all four centers, the risk of perinatal mortality for low birth weight infants (<2500 gm) is many times that for normal birth weight infants. Within the two birth weight categories, infants of breech presentation show a much higher risk of perinatal mortality than do infants of vertex occiput anterior presentation. Within the normal birth weight category, two of the four studies (Singapore and Tegucigalpa) show lower perinatal mortality for breeches delivered by cesarean section as compared with vaginal delivery. In contrast, the perinatal mortality rate is higher for breeches delivered by cesarean section in the other two studies.

This preliminary observation points to factors other than birth weight and type of delivery that must play an important role in perinatal mortality, particularly in developing countries. Timing of cesarean intervention, local indications for cesarean section, availability of trained personnel and patterns of referral and transport for women in prolonged labor are the most obvious factors which may contribute to variation among the centers. Obviously, with an increased likelihood of women being in prolonged labor and the infant in distress,

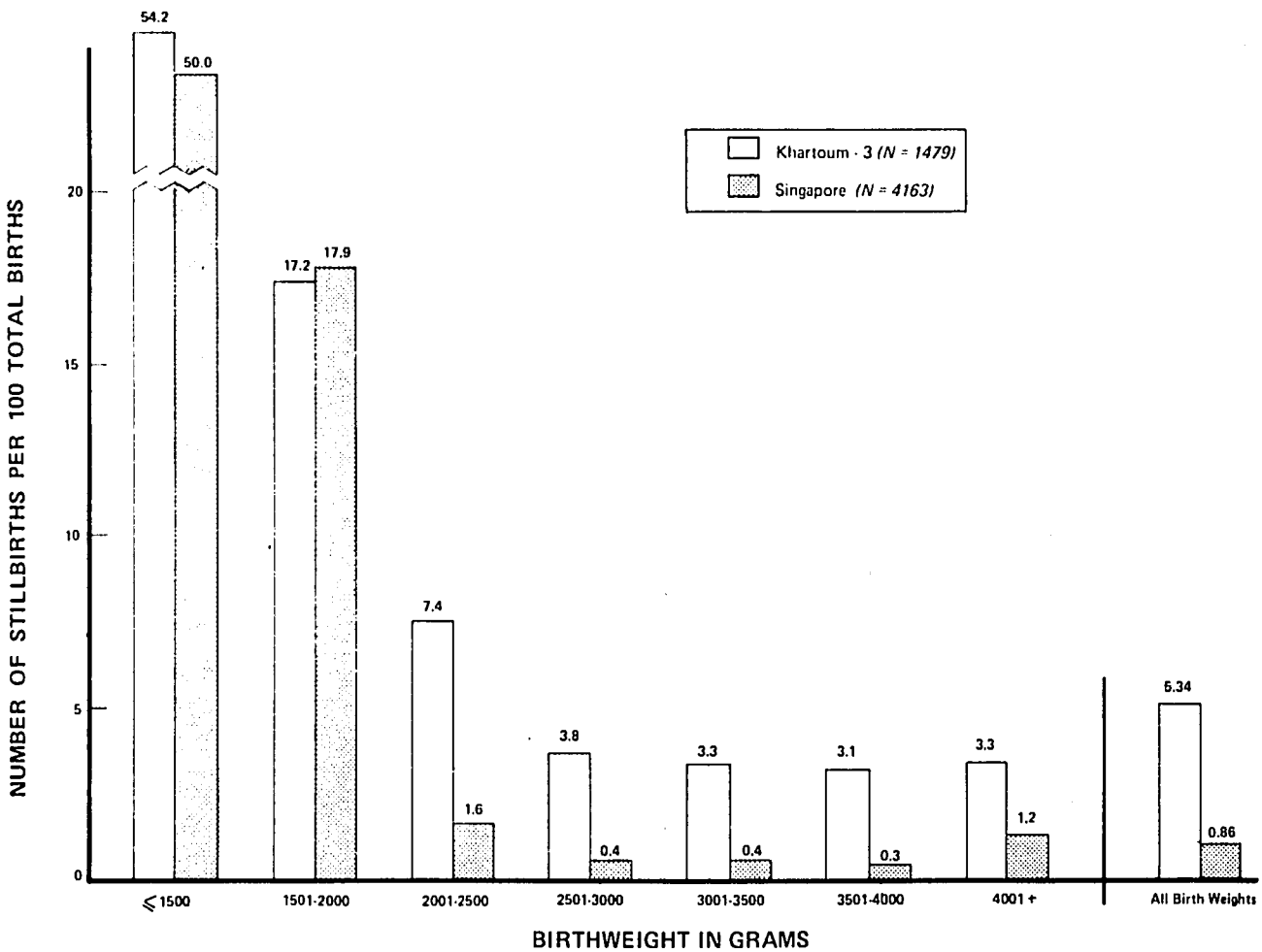

Fig. 7. Stillbirth by birth weight.

Table II. Perinatal mortality for infants of breech presentation, by birth weight and type of delivery (singleton births only).

	Vaginal Deliveries			Cesarean Sections			All Deliveries		
		Perinatal Deaths			Perinatal Deaths			Perinatal Deaths	
	N	No.	%	N	No.	%	N	No.	%
Low birth weight (<2500 gm)									
Tegucigalpa	24	5	20.8	5	3	60.0	29	8	27.6
Debrecen	23	6	26.1	6	2	33.3	29	8	27.6
Cairo	11	5	45.5	0	-	-	11	5	45.5
Singapore, 1977	17	7	41.2	3	0	0.0	20	7	35.0
Total	75	23	30.7	14	5	35.7	89	28	31.5
Normal birth weight (≥2500 gm)									
Tegucigalpa	57	5	8.8	52	0	0.0	109	5	4.6
Debrecen	35	0	0.0	32	1	3.1	67	1	1.5
Cairo	60	5	8.3	22	2	9.1	82	7	8.5
Singapore, 1977	69	2	2.9	17	0	0.0	86	2	2.3
Total	221	12	5.4	123	3	2.4	344	15	4.4

Table III. Perinatal mortality for infants of vertex presentation, by birth weight and type of delivery (singleton births only).

	Vaginal Deliveries			Cesarean Sections			All Deliveries		
		Perinatal Deaths			Perinatal Deaths			Perinatal Deaths	
	N	No.	%	N	No.	%	N	No.	%
Low birth weight (<2500 gm)									
Tegucigalpa	397	38	9.6	6	1	16.7	403	39	9.7
Debrecen	198	29	14.6	14	1	7.1	212	30	14.2
Cairo	53	11	20.8	7	6	85.7	60	17	28.3
Singapore, 1977	154	16	10.4	7	0	0.0	161	16	9.9
Total	802	94	11.7	34	8	23.5	836	102	12.2
Normal birth weight (≥2500 gm)									
Tegucigalpa	4071	32	0.8	46	3	6.5	4117	35	0.9
Debrecen	1495	9	0.6	93	0	0.0	1588	9	0.6
Cairo	1001	32	3.2	47	5	10.6	1048	37	3.5
Singapore, 1977	2170	6	0.3	125	0	0.0	2295	6	0.3
Total	8737	79	0.9	311	8	2.6	9048	87	1.0

cesarean section itself cannot possibly be the yardstick for predicting better outcome. In upgraded maternity hospitals with booking and antenatal care, appropriate timing of needed cesarean intervention is likely to generate mortality rates that are lower than if the intervention were delayed.

With the expansion of institutional baselines and the use of a complete death report, maternal death will be amenable to MCM study and the analysis will benefit from the classical work on maternal deaths in England and Wales over the last 20 years (28, 30).

Hospital administrators and health planners need current information on birth attendance (Fig. 8)

and hospital stay (Fig. 9) in order to allocate personnel and beds for optimal care of the mother and newborn at delivery and in the puerperium. The systematic review of attendant correlates, including the outcome of deliveries in various settings within a health region, may generate information that can be used to better allocate health resources.

Monitoring management at delivery and the outcome will help health professionals identify management techniques that will improve pregnancy outcome. In addition, study of attendance at delivery and length of hospital stay as they relate to maternal and infant well-being will enable administrators to make changes that will improve maternal and perinatal care in the national health services.

Desired family size and family planning practices. During the short postpartum hospital stay, the mother is especially receptive to educational efforts concerning reproductive health and puericulture. Ministries of health who have capitalized on this single most cost-effective opportunity to teach a woman the basics of infant care and child spacing are few. The opportunity to significantly improve maternal and child health and, by extension, the health of the family and community is greater during the immediate postpartum period than at any other time. Routine monitoring of this prime time for continuing education in family health is possible with MCM.

At the maternity care institution, the women's desired family size can be estimated for this clinic population on a continuous basis. The maternity record collects information on the contraceptive method, if any, used before this conception and the method planned or provided postpartum, including whether female sterilization was performed before the patient was discharged. It also contains an inquiry into the number of additional children wanted.

The present and earlier findings (7–9) indicate that postpartum family size expectations are not only quantifiable but can also be collapsed and abstracted into sensitive indices of desired family size. As shown in Fig. 10, the percentage of women wanting additional children by number of living children postpartum leads to center-specific, smooth curves that cut across the midpoint at which 50% of

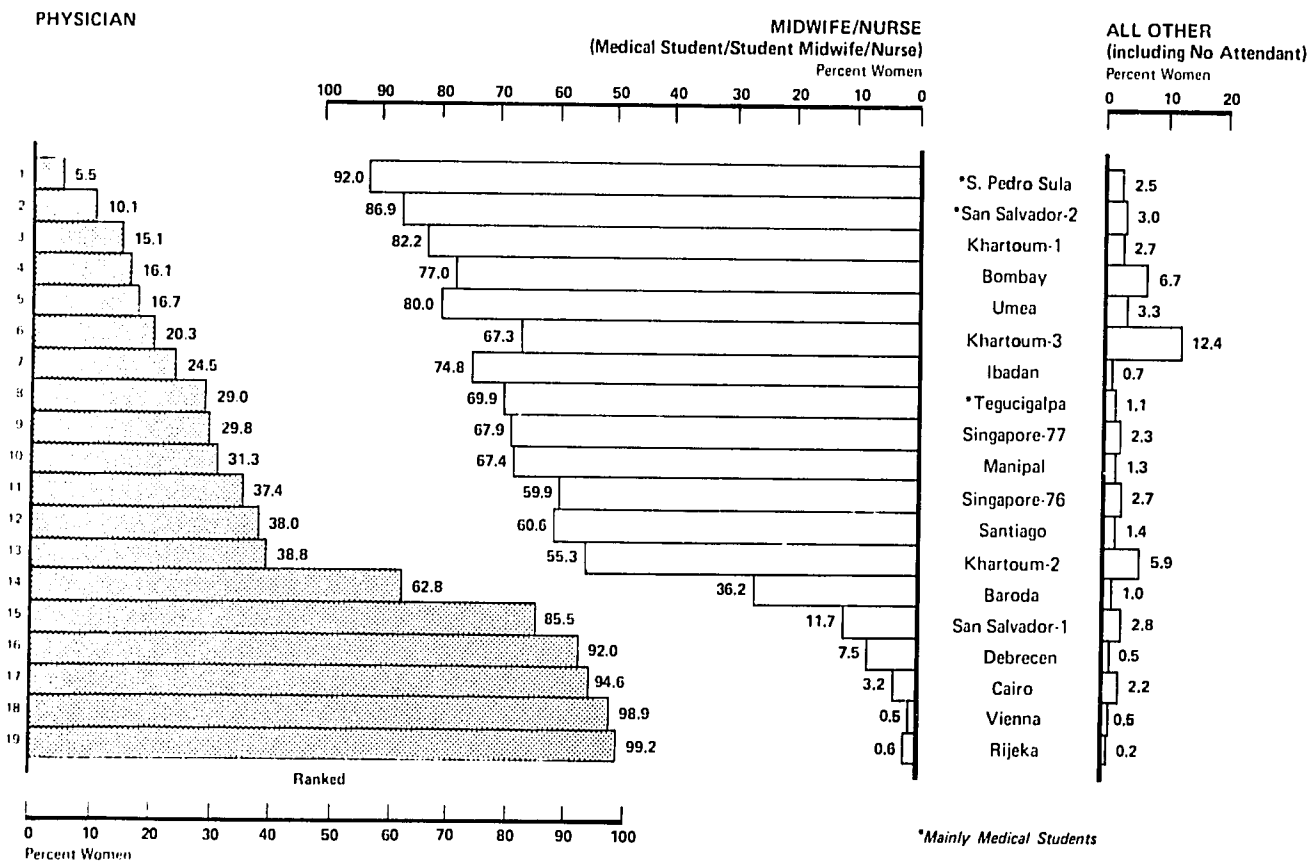

Fig. 8. Attendant at delivery.

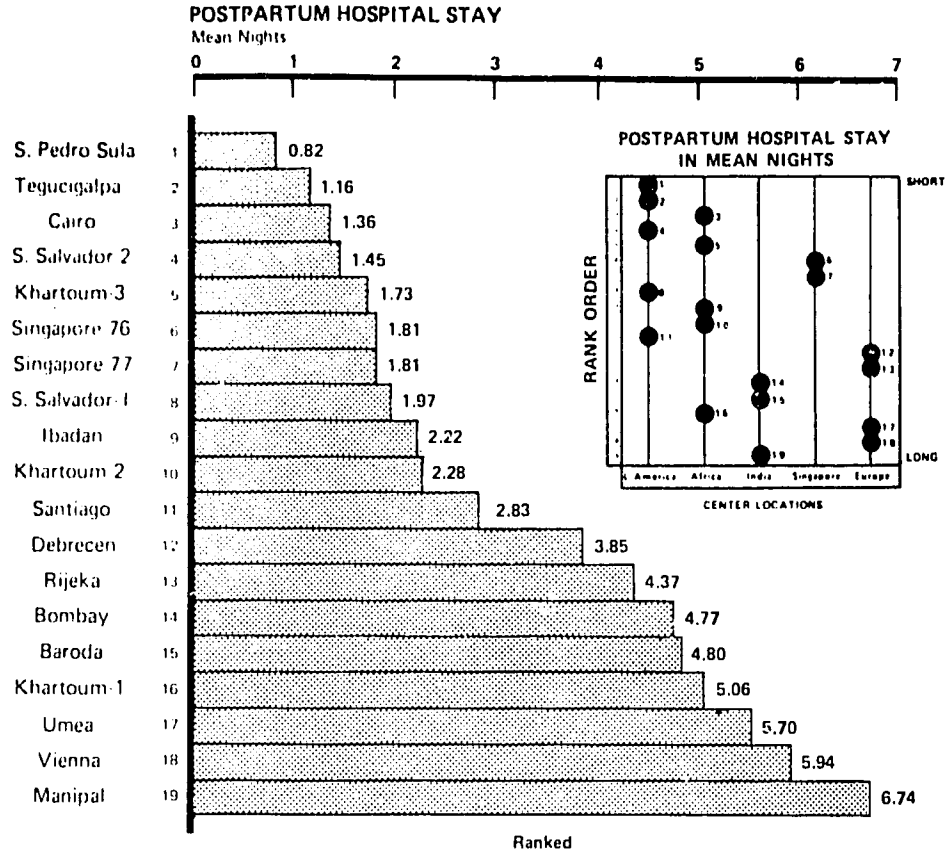

Fig. 9. Postpartum hospital stay in mean nights.

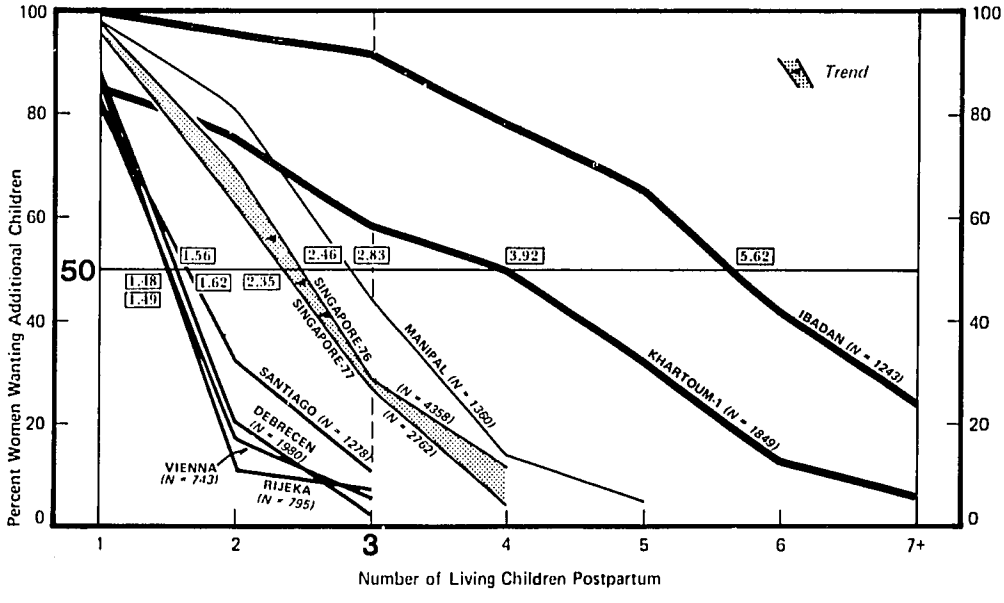

Fig. 10. Fertility desire by living children postpartum.

the women still want additional children and 50% do not. This value can be interpolated to the number of living children and may serve as a sensitive indicator and a cross-section of additional children desired postpartum. These midpoint values range from 5.62 (center in Ibadan, Nigeria) down to 1.48 (center in Rijeka, Yugoslavia). The index is referenced as "Additional Children Desired-Fifty"

(ADCza) and allows comparisons over time (trend) within an institution (Singapore: 7-12/1976 = 2.46; 1-6/1977 = 2.35) and among institutions at a given point in time (pattern), as shown in Fig. 10.

Planned and/or provided family planning methods can be evaluated by both method selection and number of living children postpartum. These contraceptive profiles become baselines for making informed decisions about how to change the mix of methods to optimize the benefits of contraceptives and minimize the risks of method-specific failure. The postpartum contraceptive profiles by method and number of living children are highly center-specific. Strong preference for intrauterine devices (IUDs) is noted in the center in Debrecen (Fig. 11), for pills in Khartoum (Fig. 12) and for tubal ligations in San Salvador, Bombay and Singapore (Fig. 13–15). Conventional methods are prevalent in the center in Singapore (Fig. 15). Nonprotection across a broad range of number of living children is sig-

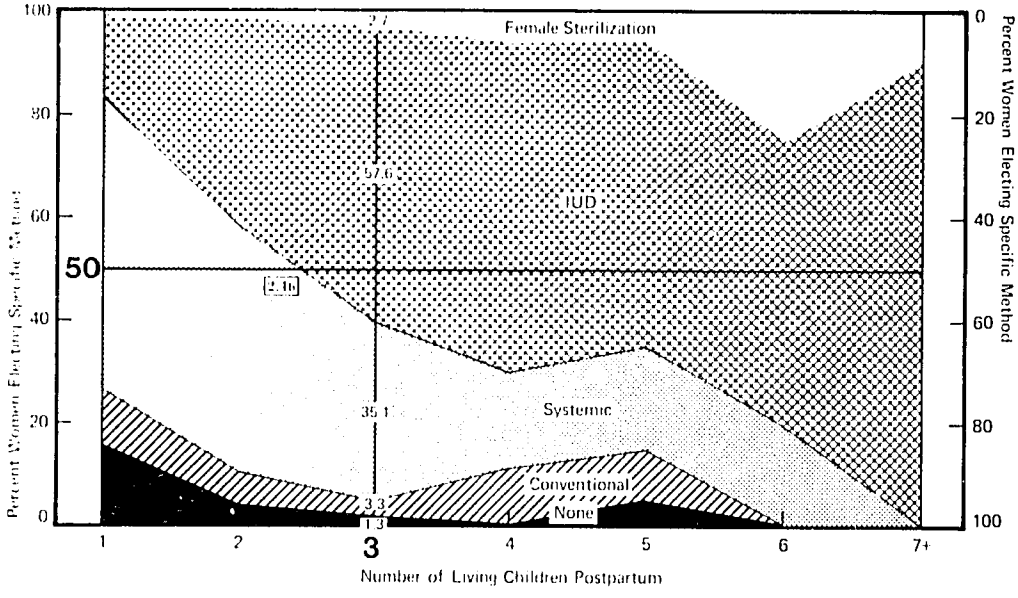

Fig. 11. Maternity center postpartum contraceptive profile by method and number of living children: Debrecen, Hungary.

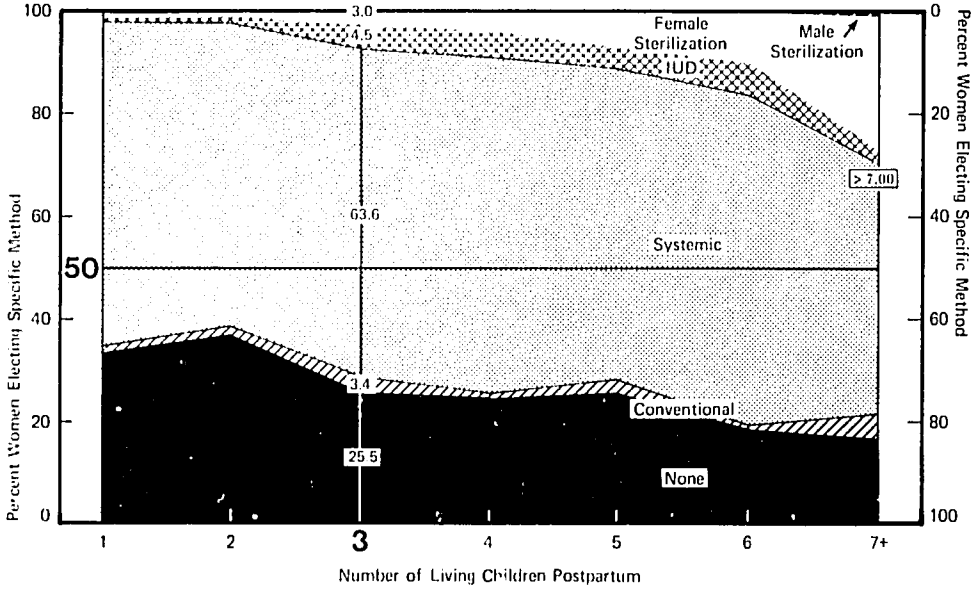

Fig. 12. Maternity center postpartum contraceptive profile by method and number of living children: Khartoum-1, Sudan.

nificant in centers in Ibadan and Khartoum (Fig. 13). The high frequencies of both female sterilization and nonprotection suggest an "all-or-none" type of approach to postpartum contraception in the three-center data set of Bombay (Fig. 14).

Elective use of female sterilization is inconsistent across the centers which suggests that availability of female sterilization would significantly increase its use in many centers where the desire for additional offspring is small. Serial cross-sectional analysis of MCM data will make it possible to follow the trend and detect any changes that might occur as a result of introducing an additional service or services.

As with additional children desired, one can interpolate the number of living children at which 50% of the women have accepted surgical methods of contraception, defined here as male and female sterilization and IUDs. "Family Planning Accept-

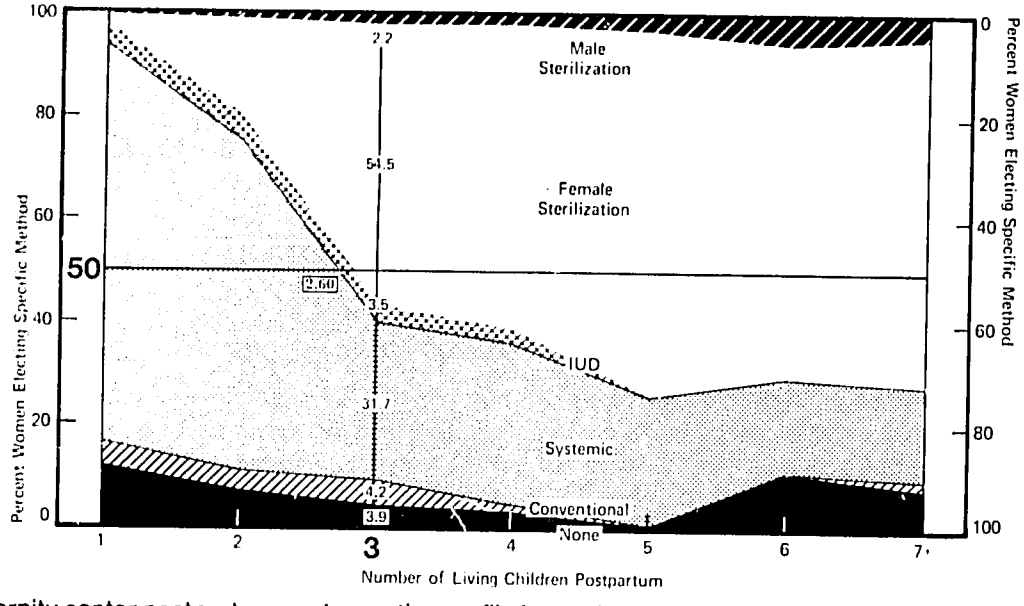

Fig. 13. Maternity center postpartum contraceptive profile by method and number of living children: San Salvador-1, El Salvador.

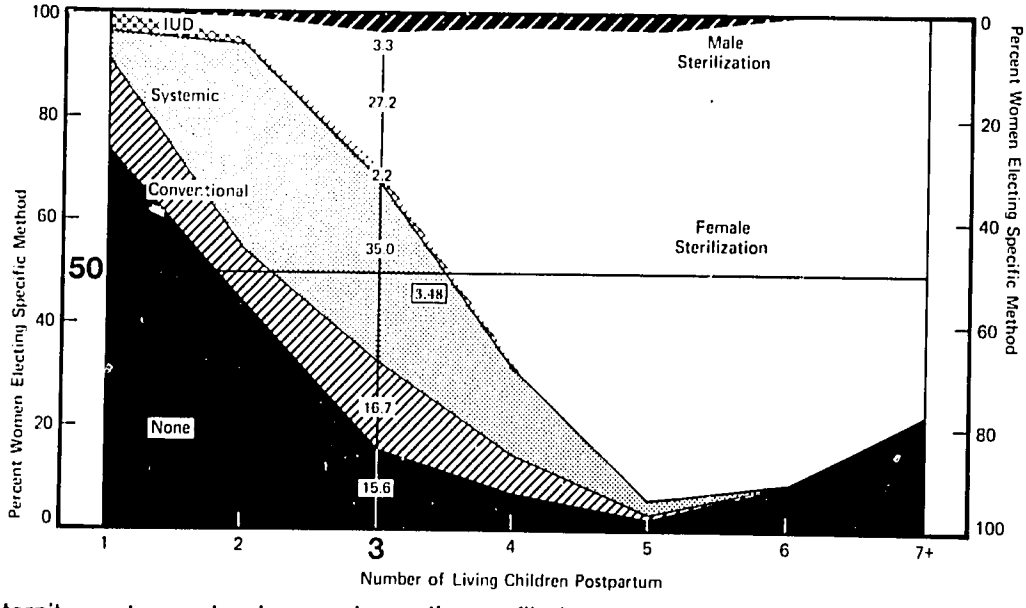

Fig. 14. Maternity center postpartum contraceptive profile by method and number of living children: Bombay, India.

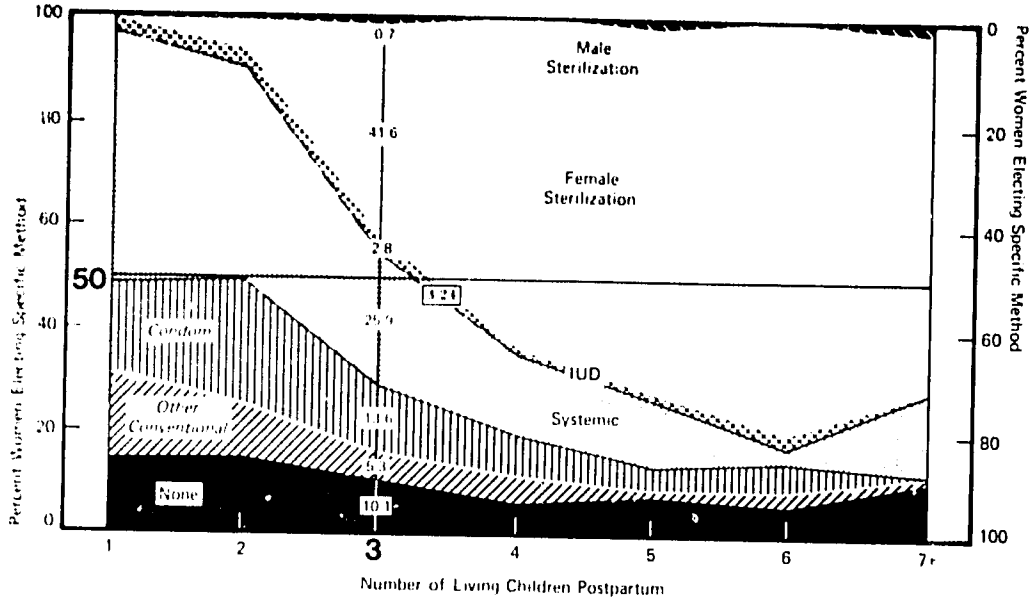

Fig. 15. Maternity center postpartum contraceptive profile by method and number of living children: Singapore, 1976

ance-Fifty for Surgical Methods" ($FPA_{50}SM$) for the various centers was calculated to be 3.48 in Bombay (Fig. 14), 3.24 in Singapore (Fig. 15), 2.60 in El Salvador (Fig. 13) and 2.46 in Debrecen (Fig. 11). At this interpolated number of living children, 50% of the women in that clinic had selected sterilization of either partner or an IUD. In the Singapore center, the $FPA_{50}SM$ moved downward from 3.24 in the second half of 1976 to 3.09 for the first six months in 1977 (6).

Monitoring family size expectations and contraceptive practices enables health care professionals to assess the perceived and real needs for contraceptive services by method and to institute changes calculated to increase the effectiveness of the contraceptive service. The maternity ward can and should have three major functions: (a) to provide a delivery that is safe and rewarding for mother and infant, (b) to teach patients the basics of reproductive health and infant care and (c) to provide the ministry of health with current information on family health, family size expectations and family planning practices.

DISCUSSION AND OUTLOOK

These preliminary findings indicate that MCM is a promising tool for health professionals interested in improving maternal and child health. The most important dimension of institutional maternity care monitoring is that it can provide the information needed to maximally improve the safety of the human reproductive process. Only if physicians and midwives can systematically learn from their own experience is there any prospect for accelerated improvement of pregnancy outcome. With MCM, physicians and midwives can continuously share current information with the national health authorities and thereby assume an important role in advising the health services on the priority needs in maternal and child health.

MCM can also provide valuable information for use in training health professionals. The medium of high-speed, high-quality feedback is becoming its own message (22). The as yet unmet challenge is the development of a maternity care monitoring system at the village level for rural areas. Such a monitoring system would provide health officials with information to help them determine the kinds of training that would be most beneficial and would allow them to monitor the success of training programs, including programmed learning packages, which economize on instructor time. Training health care personnel with learning packages has proved successful (3) and could be the most effective way to provide the training needed in some rural areas. Continuous monitoring and retraining should lead to a continuous upgrading of maternity care at the village level and, perhaps, to a better working relationship between urban and rural maternity care centers, which would accelerate improvements in maternal and child health at all levels.

Correlating risk factors with management factors among maternity centers will lead to an epidemiologic approach to risks in delivery management, including the quantification of outcome risks associated with suboptimal health (20). The proposed indices for measuring family size norm and contraceptive acceptance in maternity centers after the addition of a new family member may add to the growing methodologic armamentarium useful in evaluating service delivery performance. Through its accounting approach, MCM establishes institutional baselines needed for a systematic approach to research in maternal and child health (33). This in turn may lead to development of and experimentation with additional indices of family health (35, 37).

The identification and quantification of high-risk perinatal patients must be pursued and developed from within each country because the importance of each factor may be different in different geographic areas. For instance, the relative accessibility to health care services will affect the significance of socioeconomic risk factors. The kind of intervention will add further variation in importance of given risk factors (2). Within national health services, maternity care monitoring can provide continuous evaluation of the women's needs, the institutions' performance, the effects of specific types of intervention and the impact of selecting alternative decision options (34). Overall, the deployment of MCM over a network of sentinel maternity centers across urban and rural areas could provide routine evaluation of maternal and child health services to an important segment of the population.

In developing countries, the postpartum (pregnancy) risk assessment takes a particular meaning. The woman's information on the previous reproductive history, family health and the latest segment of the reproductive history should help to govern—by counsel and service—the subsequent reproductive behavior. In essence, the birth and growth of social obstetrics in many countries can progress optimally upon the art of objective risk assessment. In the process, the skill of medical professionals will be improved (19).

MCM may then be understood as the day-to-day professional surveillance of "total perinatal care" (1) that should guide preventive, promotive and curative intervention from early pregnancy to breastfeeding.

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