

Fertility regulation during human lactation

**INTERACTIONS OF CONTRACEPTION AND
BREAST-FEEDING IN DEVELOPING COUNTRIES**

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Introduction

One of the major goals of health programmes in the developing world is to improve maternal and child health. Two important steps towards achieving this goal are the promotion of birth spacing and the promotion of breast-feeding. Since birth spacing requires some type of fertility control measures, modern contraceptive programmes are becoming an integral part of maternal and child health programmes. The next logical question would then appear to be, 'What are the appropriate contraceptives, particularly among the modern methods, for use during lactation?'

The purpose of this paper is to take one step back and re-examine some of the assumptions underlining the premise that the introduction of modern contraceptives will generally improve birth spacing and promote breast-feeding in traditional societies. One assumption is that modern contraceptives are more effective than traditional means of birth spacing in the developing countries. This is most explicitly stated in a recent review: 'Although prolonged lactation has an important fertility reducing effect, it is less adequate as a birth spacing method than modern contraceptives for two reasons. First, the effectiveness of lactation during (sic) amenorrhoea in preventing pregnancy is lower than that of oral contraceptives and the IUD. . . . Second, the period of protection against the risk of conception provided by lactation is shorter than that of oral contraceptives and the IUD' (Van Ginneken, 1974). The second assumption is that the use of modern contraceptives will, through prolonging birth spacing, naturally facilitate and support longer breast-feeding (WHO, 1970, 1971).

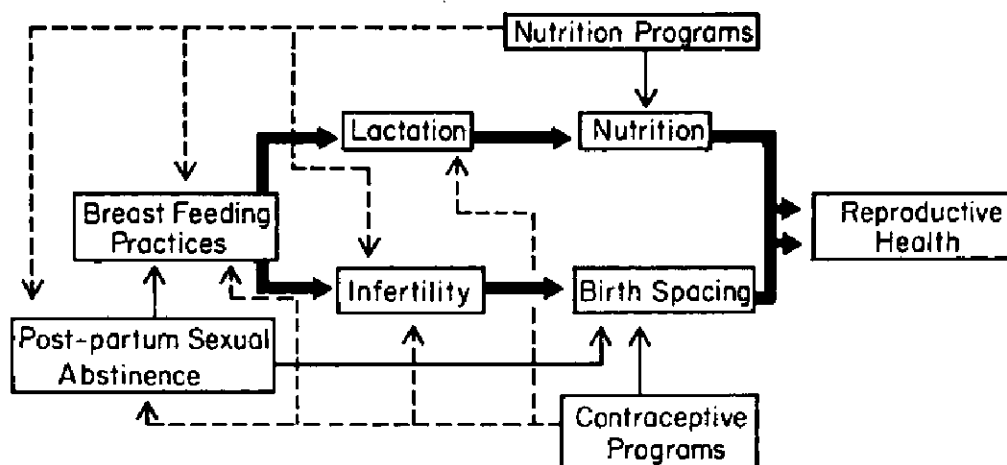
We will illustrate by examples from Bangladesh, the Philippines, Indonesia, and Nigeria that many societies in the developing world have been maintaining relatively prolonged birth spacing through the traditional fertility control measures of lactational amenorrhoea and abstinence in the post-partum period. In terms of relative efficacy in actual practice, the traditional methods in many societies are much more effective than modern methods since there is a cultural conditioning to their use which may not exist for modern methods. Additionally, because the

practice of modern contraception represents an innovation often associated with the changing roles of women, there is evidence in some countries that the introduction of modern contraceptive technologies, rather than supporting breast-feeding practices and child nutrition, can have the opposite effect.

Our purpose is not to deny the importance of the post-partum approach in family planning, or the utility of the modern contraceptive technologies in the developing world. Rather, we are identifying some issues which have been overlooked and which will require more research in a wide variety of societies if contraceptive programmes are going to meet the needs of the people concerned.

A conceptual framework

Text-figure 1 illustrates the conceptual framework that will be followed in this analysis and it indicates that there may be two relevant patterns of behaviour in the post-partum period. One is the practice of breast-feeding; the second is post-partum sexual abstinence. Breast-feeding has a dual physiological effect. First, is the support of lactation which promotes the nutrition of the infant. The second is the maintenance of infertility, which promotes birth spacing to the benefit of both the mother and the child.



Text-fig. 1. A model illustrating how breast-feeding practices influence reproductive health through biological effects on nutrition and birth spacing. Also shown is the role of post-partum sexual abstinence, and of modern intervention programmes in nutrition and contraception. The solid lines represent desired (beneficial) effects; the dotted lines represent undesired (adverse) effects.

In many societies there is the added practice of post-partum sexual abstinence (Saucier, 1972). While the rationales often reported relate to efforts to support breast-feeding and child nutrition (under the assumption that intercourse or semen may spoil the milk for the baby), a direct effect also recognized is on birth spacing.

The framework also illustrates two major public health interventions in this process. The first, with a longer history, is nutrition intervention. While the impact of nutrition programmes will not be detailed here, a few observations are relevant to our concern about the potentially adverse effects of contraception programmes.

The desired effect of nutrition intervention, particularly in the context of maternal and child health programmes, is to improve nutrition, particularly child nutrition and child survival. The simplest technological approach was to introduce milk supplementation and bottle feeding. As we now know, in many poor countries the introduction of bottle feeding has led to a marked reduction in breast-feeding with disastrous consequences to the infant (Berg, 1973). Less well documented is the effect of nutrition programmes on altering patterns of post-partum sexual abstinence since it would no longer be considered necessary to abstain to protect the mother's milk (Okediji *et al.*, 1976). This, in conjunction with a decline in breast-feeding, can lead to shorter birth spacing with its own set of adverse consequences.

Recently it has been proposed that nutrition programmes be directed to the lactating mother, to support lactation, instead of to the child. While this will undoubtedly be necessary in malnourished populations, there is concern that improved maternal nutrition may shorten the duration of lactational infertility and thus have the undesired effect of accelerating the pace of childbearing in the impoverished family if alternative contraceptive measures are not available and utilized (Vis *et al.*, 1975; Chen *et al.*, 1974).

The technological intervention of interest in this analysis is the contraceptive programme. The desired objective is to promote birth spacing and reproductive health. It is assumed that adequate birth spacing will indirectly support the maintenance of breast-feeding. The framework indicates, however, that there can be unintended consequences when modern contraceptive technologies are introduced into traditional breast-feeding populations. Two of these relate to the biological effects of steroidal contraceptives containing oestrogen: one is an effect on milk production (Chopra, 1972), the other on the maintenance of lactational infertility. Two additional problems relate to the social-cultural effects of modern contraceptive programmes on breast-feeding practices and on post-partum sexual abstinence with their potentially adverse effects on maternal and child health and birth spacing.

The issues being raised will be illustrated with data from field studies we are conducting in the Philippines and Bangladesh and investigations by other workers in Indonesia and Nigeria.

Philippines

There are limited data on trends in breast-feeding practices in the Philippines, although several studies point towards a decline. A survey of infants in Manila in 1958 reported that 64% were breast-fed, 23% bottle-fed, and 13% had mixed feedings (Del Mundo, 1959). A somewhat comparable survey of the urban areas of Luzon in 1974 revealed only 27% of infants were breast-fed, 29% were bottle-fed, and 44% had mixed feedings (Intengan, 1975). The latter survey relates the reduction in breast-feeding to changing roles and modes of life of urban mothers and their exposure to highly commercialized milk substitutes.

We have begun to examine the inter-relationships of breast-feeding practices, contraception, and birth spacing in the Philippines. The data summarized here have been obtained through a prospective study of 794 married women, residents of

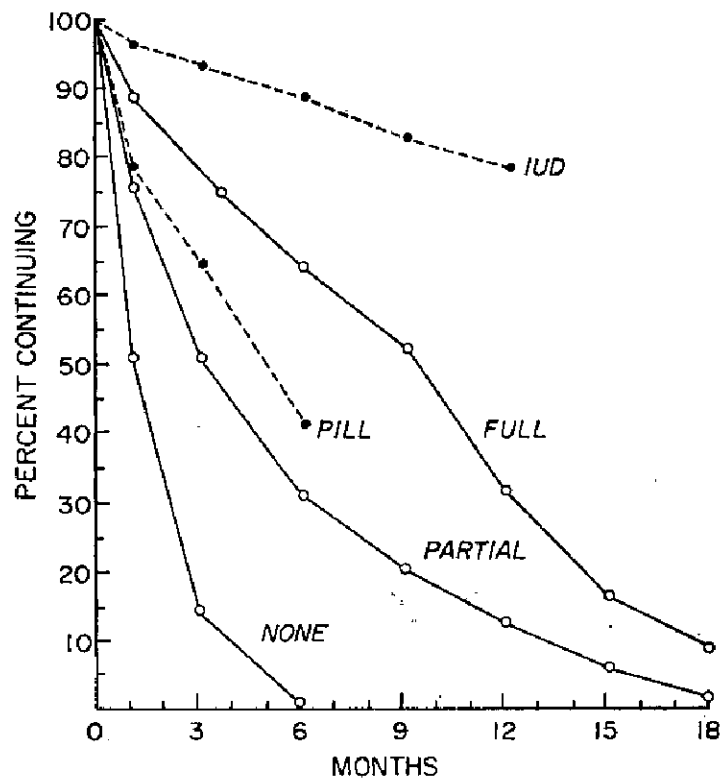
the City of Manila, who were delivered at the J. Fabella Maternity Hospital in June and July 1973 (Osteria, 1976). These women were followed for 24 months with detailed inquiry regarding breast-feeding and infant supplementation practices, amenorrhoea, contraceptive usage, and eventual pregnancy. During the course of follow-up, 566 (71.2%) of the women accepted contraception. Because the hospital had a post-partum programme, the majority (52%) of the acceptors had an IUD inserted, in most cases in the immediate post-partum period; 13% accepted oral contraceptives, and the remainder conventional contraceptives.

Table 1. Philippines: percentage distribution of women by breast-feeding status and selected characteristics, Manila, 1973

Characteristic	Total no. of women	Breast-feeding		
		No. of women	%	Median duration (months)
Age (years)				
<24	365	281	77.0	8.7
25-29	206	158	76.7	9.7
30-34	112	83	74.1	13.6
35-39	83	64	77.1	12.0
40+	28	18	64.3	12.0
Total	794	604	76.1	10.3
Education of wife				
Elementary or less	337	266	78.9	12.3
High school	314	241	76.8	8.1
College	143	97	67.8	4.3
Total	794	604	76.1	10.3
Wife's employment				
Full time	87	56	64.4	1.7
Part time	77	56	72.7	5.0
None	630	492	78.1	11.4
Total	794	604	76.1	10.3

Table 1 describes the breast-feeding patterns by age, education, and wife's employment. Overall, the proportion of women initiating breast-feeding did not vary strikingly between these categories, ranging from 64 to 78%. More striking is the variation in the duration of breast-feeding which declined sharply with the increasing education of the wife and, in particular, with wife's employment where the median duration drops from 11.4 months for the unemployed wives to 1.7 months for the wife working full time. An analysis of contraceptive acceptance by age and education indicates a small positive correlation with each of these factors indicative of a stronger desire to control fertility among older and higher educated women.

Because this study involves the urban sector where lactation is declining, it is of interest to determine how well modern contraceptive techniques are substituting for lactational amenorrhoea in promoting birth spacing. Two major questions must be examined in exploring this topic. First, what is the duration of fertility protection by the modern contraceptives in comparison with lactational infertility? (Related to this must be a consideration of the period of overlap between contraceptive acceptance and lactational amenorrhoea.) Second, what is the actual efficacy of the modern contraceptives in preventing pregnancy during the susceptible period—that is, after menstruation has resumed?



Text-fig. 2. Manila, Philippines. A comparison of the continuation rate of lactational amenorrhoea for post-partum women with full, partial, or no breast-feeding and of contraceptive use for post-partum acceptors of the pill or IUD.

The interval between childbirth and acceptance of contraception relates to the method. As noted above, most of the IUDs were inserted immediately post-partum. Pill acceptance occurred at a median of about 5 months following delivery, while conventional contraceptives were accepted at a median of about $3\frac{1}{2}$ months following delivery. There was thus some overlap between contraceptive use and lactational amenorrhoea. For the IUD this averaged 4.3 months while for conventional contraceptives it averaged slightly over 2 months. This overlap could not be calculated for oral contraceptives because the pills induced a cyclic pattern in most cases.

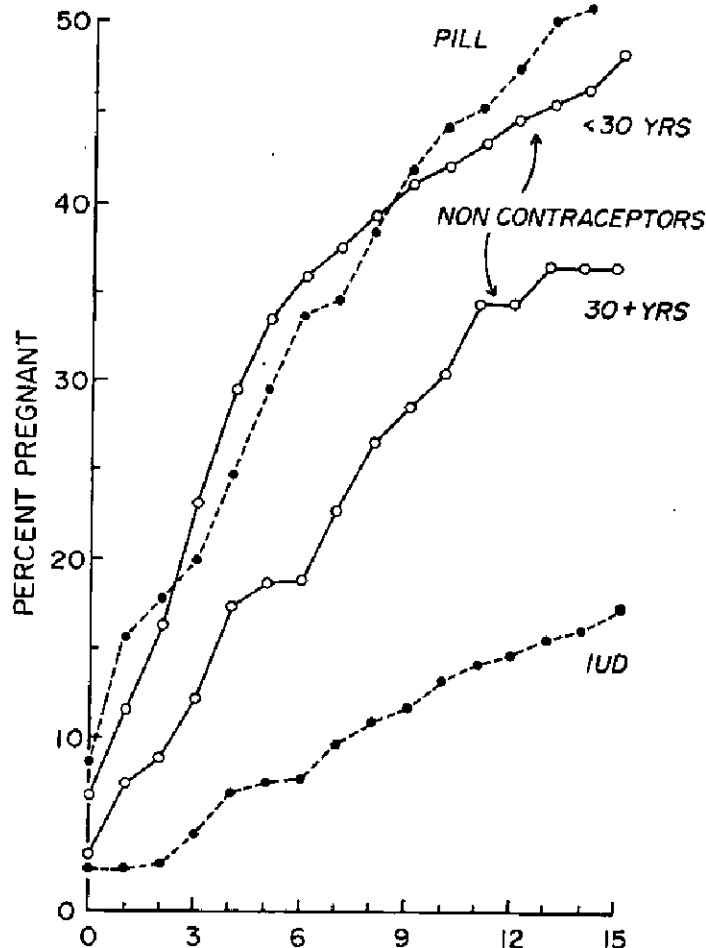
Text-figure 2 is a life table analysis showing the duration of lactational amenorrhoea according to breast-feeding practices. This is compared with the pattern of

continuation of pills and IUDs by month after acceptance. For full, partial, and no breast-feeding the median durations of post-partum amenorrhoea are approximately 9, 3, and 1 months. The continuation of pill use (median duration 4 months) is shorter than the duration of lactational amenorrhoea among women with full breast-feeding. The IUD is much better: the continuation rate is almost 80% at 1 year.

The crucial issue is: how effective are modern contraceptives in protecting against pregnancy during the fertile period? For this analysis, we looked at the cumulative probability of pregnancy for each successive month following the resumption of menstruation. The women were categorized into two groups—non-contraceptors and acceptors. They were non-contraceptors for as long as they did not accept any method of contraception. In the month they accepted contraception, they were classified as acceptors and were maintained in this acceptor classification for the remaining period of follow-up, whether or not they continued to use that contraceptive method. The underlying assumption of this analytical approach is that the contraceptive acceptors must be different from women who do not accept contraception in that they have taken some action to postpone or terminate childbearing. It is thus assumed that contraceptive acceptors would expect to have pregnancies at a slower pace than non-contraceptors. This analysis was handled by life table techniques.

Text-figure 3 illustrates the results in terms of the cumulative proportion pregnant by month since resumption of menstruation. The non-contraceptors are divided into two age groups—those under 30 years and those 30 years and over, since fecundity varies with age. For those under 30, pregnancies occurred rather rapidly; 22% were pregnant by 3 months, and 45% were pregnant by 12 months after resumption of menstruation. The pace is somewhat slower for older, non-contracepting women. Acceptors of IUDs, as anticipated, had a much slower pace of pregnancies as compared to non-contraceptors. Only 4% were pregnant by the third month and 15% by the end of 1 year. Most striking was the apparent inability of pill acceptors to retard the pace of conception. As Text-fig. 3 illustrates, the cumulative rate of pregnancy among pill acceptors parallels that of the more fecund age group of non-contraceptors. For all groups, 2–8% were pregnant at time zero; this represents conceptions that occurred in the various groups before the first menstruation, or, to express it differently, the failure rate of lactational amenorrhoea.

Several implications can be drawn from these limited observations in the Philippines. First, breast-feeding patterns are changing, particularly in the urban sector, as women's roles are changing. While contraception may not be able to take the blame (or credit) for these changes, it is apparent that women will be looking to modern contraceptives as a substitution for the birth-spacing effects of breast-feeding. This analysis indicates that, in proposing the introduction of new technologies to replace traditional practices, one must consider not only the theoretical effectiveness of the modern technology but the actual use effectiveness in a given social and cultural context. In this case, oral contraceptives appear inferior to the traditional means of birth spacing achieved by maintaining full breast-feeding.



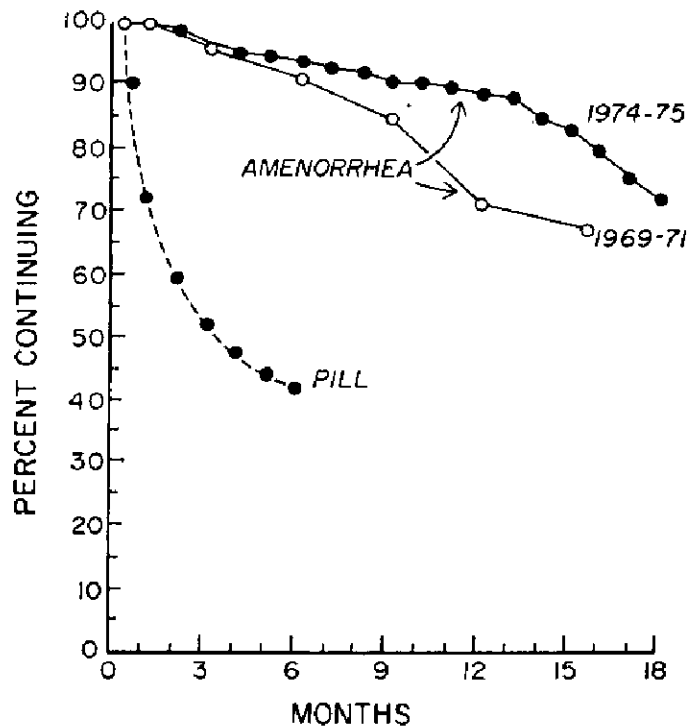
Text-fig. 3. Manila, Philippines. Cumulative rates of pregnancy for post-partum women by month following resumption of menstruation for non-contraceptors by age group, and for contraceptive acceptors by method first accepted.

Bangladesh

Breast-feeding in rural Bangladesh is universal and essentially continuous, extending from the birth of one child well into the subsequent pregnancy. Even fetal deaths or stillbirths generally will not interrupt lactation; the youngest child will simply be continued on the breast. In one prospective study of 200 women, only four women were observed to terminate lactation spontaneously in the absence of another pregnancy, when the children were 3½–4 years old (Chen *et al.*, 1974).

Under these circumstances, lactational amenorrhoea is also quite prolonged. Text-figure 4 shows, by life table analysis, the duration of lactational amenorrhoea among rural women with surviving children in Matlab thana who were observed during 1969–71 and 1974–75. In both periods the median duration of post-partum amenorrhoea extended beyond 18 months with birth intervals of approximately 3 years. The greater prolongation of amenorrhoea in 1974–75 may possibly be due to famine conditions at that time, although there were methodological differences in the studies that make this interpretation uncertain.

Text-figure 4 also shows, for comparison, the pattern of continuation for oral contraceptives by month after acceptance in the rural areas, based on data from an integrated health and family planning programme in Companiganj thana (Companiganj, 1975). There is a striking difference in the duration of effective protection provided by lactational amenorrhoea, as compared to oral contraceptives.



Text-fig. 4. Rural Bangladesh. A comparison of the continuation rates of lactational amenorrhoea for post-partum women observed in 1969-71 and 1974-75 and of contraceptive use for acceptors of the pill.

It should be noted that for Bangladesh the lack of recent data on continuation of IUD use is not accidental. Because of the reports of a high frequency of side effects with the IUD programme in the late 1960s, only a small fraction of women are willing to accept the IUD as a method of contraception in Bangladesh at the present time.

Two issues are of concern with reference to contraceptive programmes and lactation in Bangladesh. The first relates to the resources that are being expended to provide contraceptives to women who are already in an infertile state because of lactational amenorrhoea. The magnitude of this problem can be seen from Table 2 which summarizes the interval since last live birth and the lactational patterns of a sample of 165 oral contraceptive acceptors from the Matlab rural clinic in mid-1975. This reveals that 91% of the acceptors were breast-feeding and 70% were in a state of post-partum amenorrhoea. Considering the long duration of post-partum amenorrhoea in this area and the short duration of pill use, it is probable that there was very little demographic impact among the 44% of the acceptors who were less than 12 months post-partum.

Table 2. Rural Bangladesh: distribution of contraceptive acceptors in the Matlab family planning clinic by interval since last live birth, and breast-feeding and menstrual status (April–October 1975)

Interval since last live birth (months)	Acceptors (%)	% of acceptors	
		Breast-feeding	With amenorrhoea
0–6	23.6	87.2	71.8
7–12	21.8	88.9	80.6
13–18	23.0	100.0	86.8
19–24	15.1	96.0	56.0
25+	16.4	85.2	40.7
Total group (N = 165)	99.9	91.5	69.7

Source: Johns Hopkins Fertility Research Project, unpublished data.

A second issue relating to the overlap of hormonal contraception with lactational amenorrhoea in this population is much more disturbing; that is, the possibility that sporadic and temporary use of oral contraceptives by breast-feeding women in a state of post-partum amenorrhoea may actually lead to enhancement of fertility through inducing a resumption of ovulatory cycles. Only preliminary data are available from Bangladesh on this question; however, the results suggest that this is a matter of some concern. In a small pilot survey of pill acceptors in the Matlab area participating in a house-to-house pill distribution programme, 44 women were identified who had been 12–24 months post-partum and in a state of lactational amenorrhoea at the time of accepting oral contraceptives and who subsequently terminated pill use. A follow-up survey revealed that 24 (55%) had resumed normal menstrual cycles and an additional eight (18%) were pregnant. Only 27% returned to the state of lactational amenorrhoea. Although exact comparative data are not yet available, one would have expected at the time of follow-up that more than 70% of these women would have remained in a state of post-partum amenorrhoea if they had not initiated pill use.

These observations in Bangladesh indicate that, on the average, lactational amenorrhoea is a more effective means of birth spacing among rural women than the currently available modern contraceptive technologies. Averages do obscure the important fact that in each successive month a small fraction of women do become fecundable and will require contraceptive protection. A problem yet to be resolved is how to identify these women and initiate contraception before another pregnancy ensues. The early initiation of oral contraceptives would not seem appropriate, both because of the short duration of use and the possibility of enhancing fertility with sporadic use.

Indonesia

The other major traditional fertility control method in the post-partum period that is often discounted or not promoted by modern family planning programmes is post-partum abstinence. This attitude reflects the cultural bias of the Western-oriented family planning effort since it is rarely supported by an objective analysis of the available data from the developing world. Recent studies in parts of Indonesia and sub-Saharan Africa highlight the effectiveness and important role of post-partum sexual abstinence in birth spacing in these societies and address directly the implications for family planning programmes.

Table 3 summarizes the results of surveys among three different population groups in Central Java which specifically examine the inter-relationships between breast-feeding, amenorrhoea, and abstinence (Hull, 1975; Hull, Kodiran & Singarimbun, 1976; Singarimbun & Manning, 1976). Not unexpectedly, there is a dramatic decline in the practice of breast-feeding and post-partum abstinence as one moves from the poorer rural to the urban elite setting.

Table 3. Indonesia, South Central region: selected data on breast-feeding, amenorrhoea, and abstinence among urban elite and rural village women

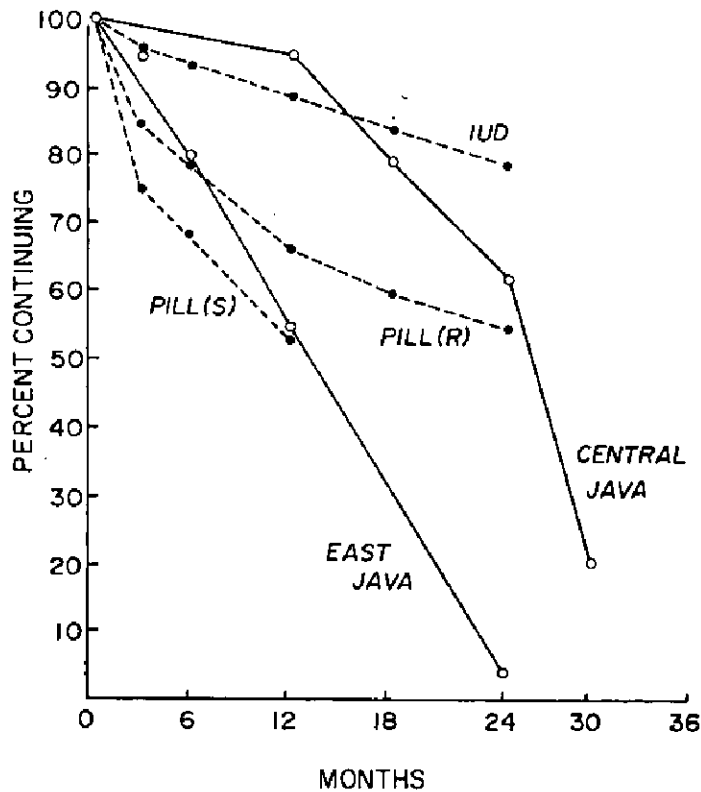
	Average duration (months) of			% resuming intercourse	
	Breast-feeding	Lactational amenorrhoea	Abstinence	Before menstruation	Before weaning
Urban elite	7.6	3.5	3.0	—	—
Magerwoharjo	16.3	12.9	13	43	51
Mojolama	25.6	18.7	24	12	38

Sources: Hull, 1975; Hull *et al.*, 1976; Singarimbun & Manning, 1976.

The inter-relationships of breast-feeding and abstinence are particularly noteworthy in the rural village. Singarimbun & Manning (1976) observed that 'the practice of abstinence is closely connected with the general belief that resumption of sexual intercourse prior to weaning has a detrimental effect on both the quality and quantity of the mother's milk. This detrimental effect is believed to be caused primarily by the entry of semen into the womb'. Based on this belief, as Table 3 indicates, the majority of women do not resume intercourse until after weaning.

It is interesting to note that the idea of abstinence was quite well accepted by both men and women. When husbands and wives were asked their 'ideal' duration of abstinence, over 50% of the husbands chose 12-23 months and 25% chose 24-35 months. Most of the husbands picked a specific number of months, whereas 62% of the wives simply indicated that abstinence should continue until after weaning.

There are some data which permit one to compare the continuation rates for post-partum sexual abstinence with the continuation rates for the IUD and the pill in Central and East Java (Singarimbun & Manning, 1976; Gille & Pardoko, 1966; Sullivan *et al.*, 1976). These comparisons are illustrated in Text-fig. 5. It is evident



Text-fig. 5. Java, Indonesia. A comparison of continuation rates for post-partum sexual abstinence in communities in Central and East Java, and for acceptors of IUDs and of the pill in the regular programme (R) and in special drives (S). (Sources: Sullivan *et al.*, 1976; Singarimbun & Manning, 1976; Gille & Pardoko, 1966.)

that for at least the first 2 years post-partum, the continuation of sexual abstinence compares favourably with pill use and, in Central Java, post-partum abstinence exceeds IUD continuation rates for over 1 year. The effectiveness of post-partum abstinence in conjunction with lactational amenorrhoea in these populations is attested by the fact that the average birth interval in Java has been reported to range from 34 to 38 months (Hull, 1975).

Singarimbun & Manning (1976) stress that the link between breast-feeding and sexual abstinence in Indonesia has important implications for family planning programmes. First, they note that, because abstinence is practised primarily to safeguard the mother's milk, it is likely that nutrition supplementation will reduce the practice of abstinence as well as breast-feeding and result in higher fertility. This, in fact, has been observed by Hull (1975) who noted that elite groups have shorter birth intervals due to declines in breast-feeding practice and abstinence. Singarimbun & Manning (1976) also note that beliefs about the effects of semen on the mother's milk in societies practising abstinence can have important implications for acceptability of specific contraceptive methods in breast-feeding mothers. For example, condoms and withdrawal which prevent semen entering the womb are likely to be more acceptable as a substitute for abstinence during breast-feeding than either the pill or the IUD.

Nigeria

The practice of post-partum sexual abstinence is probably most extensive in sub-Saharan Africa. Saucier (1972) in reviewing this practice notes that of 43 sub-Saharan African societies summarized in Murdock's *Ethnographic Atlas*, 25 (58%) were reported to practise post-partum sexual abstinence for more than 1 year.

Caldwell & Caldwell (1977) have recently conducted an extensive analysis of the role of sexual abstinence in determining fertility among the Yoruba in Nigeria. Table 4 summarizes the results of a survey of the urban population in Ibadan in 1973 regarding the practice of post-partum sexual abstinence. The results indicate that this is a very prevalent practice extending for a prolonged period; 86% of the women with children under 1 year old were abstaining, and almost 40% of women with children aged 2-3 years were abstaining. The authors note that sexual abstinence typically exceeds the duration of lactation. In surveys among both urban and rural areas, they found that almost half of the women abstained for 6 months after weaning, and an additional fifth for 12 months.

Table 4. Nigeria, Ibadan: frequency of sexual abstinence among Yoruba females 15-44 years old, by age of youngest surviving child, 1973

Age of youngest surviving child (months)	% abstaining from sexual relations
0-11	86
12-23	71
24-35	39
36-59	28
60+	33

Source: Caldwell & Caldwell, 1977.

The rationale for sexual abstinence, as reported by 82% of women, was to promote birth spacing for reasons of health, primarily the health of the child. Nearly all women believed that while the mother is still lactating a further pregnancy would diminish her supply of milk and endanger the child after birth. It is also the wide belief that the spermatozoa actually enter the body and poison the milk which is being fed to the baby. Thus, birth spacing is not designed to reduce fertility but to maximize the number of living children (Okediji *et al.*, 1976).

Not surprisingly, the practice of abstinence was inversely correlated with measures of modernization. This was reflected in rural, urban, and elite differentials. In the rural Yoruba areas, the average period of abstinence was 27 months. In the poorer urban areas it was 23 months, while in the suburbs where the new elite live it was only 8 months.

While indices of modernization were associated with a decline in abstinence, this was further enhanced by an independent effect of the practice of contraception. For example, among women aged 25–29 years who never used contraception, the average duration of sexual abstinence following the birth of the most recent child was 25, 20, 18 and 14 months for those with no schooling, primary, secondary and tertiary education respectively. Among contraceptors within these same educational categories, the average duration of abstinence was 15, 13, 10, and 8 months, respectively. Overall, at the same level of education, those who practise contraception averaged abstinence periods about 8 months shorter than those who do not.

In another report from this same study, Caldwell & Caldwell (1976) stress that 'in the urban areas there is a need for contraceptives that has little to do with limiting family size'. Rather, 'The contraceptive revolution is above all a . . . revolt against sexual relations within marriage being confined to a small fraction of the total marriage span because of prohibitions on relationships for long periods after each birth'.

It is inevitable that education and modernization will increase. The concern with the decline of abstinence is that there is a concomitant decline of breast-feeding which can have adverse effects on the child. More significantly, there is likely to be a rise in fertility, both because of a rise in fecundity due to a shortening of post-partum amenorrhoea as well as the trend towards substituting less effectively used (and more dangerous) contraceptive techniques (pill and IUD) for what had been a safe and foolproof method in this society (Caldwell & Caldwell, 1977).

Conclusions

Human biology has established the role of breast-feeding in infant nutrition and birth spacing. The purpose of this brief review has been to highlight how these biological functions have been reinforced by social and culturally dictated behavioural patterns in rural traditional societies to promote maternal and child health.

Too often we refer to traditional societies as 'non-contracepting' because they are not using the modern fertility control techniques. The fact is, most rural traditional societies in the developing world do practise a great deal of contraception. For example, Caldwell & Caldwell (1977) in examining the impact of sexual abstinence on fertility among Yoruba women estimated that 50% of the fecundable period (excluding the time spent in the pregnant state) for women aged 15–49 was spent in sexual abstinence with most of that being post-partum and terminal abstinence within marriage. Similarly, it has been estimated for some Asian societies that prolonged post-partum amenorrhoea reduces fertility by up to 40% of the reproductive potential (Chen *et al.*, 1974).

The issues of this Workshop relate to the use of contraception by lactating women. In traditional societies in the developing world, a large fraction of lactating women are already practising highly effective birth spacing methods. Generally, as we have shown, the use effectiveness of the traditional methods in some traditional societies in the post-partum period can equal or exceed the use effectiveness of the modern methods.

When it comes to the introduction of modern methods into these traditional societies, one problem often overlooked is that their performance may not only not equal traditional fertility control methods in the lactating women, but they can actually produce the opposite effects from those intended; that is, a shortening of the birth interval. As we have shown, this can result through behavioural mechanisms where poorly utilized modern contraception can replace abstinence or breast-feeding as a means of child spacing. It can also happen through biological mechanisms where the temporary use of oral contraceptives may initiate ovulatory cycles in women who would otherwise be maintained in a state of post-partum amenorrhoea.

The implications of this analysis seem obvious. In traditional societies, programmes for birth spacing in lactating women would do best to support the traditional practices for as long as possible. In societies practising abstinence, the timing of a switch to a modern contraceptive technique could be easily identified. Where lactational amenorrhoea is the controlling factor, the problem becomes more complex. One could wait until the first menstrual cycle appears; however, 5–10% of women will be pregnant before that event (Chen *et al.*, 1974). That could, of course, be managed by a programme making abortion available which, in fact, may well be acceptable in many societies already recognizing the adverse effects of short birth intervals. If a programme of contraceptive overlap is recommended, it clearly should be adapted to the social and cultural situations so that the method selected has a reasonable likelihood of extending beyond the period of post-partum amenorrhoea.

It should be recognized that promoting traditional methods of birth spacing binds women into traditional behavioural patterns. This is an issue where the rationale for the promotion of modern contraceptive practices comes into direct conflict with the promotion of traditional breast-feeding practices. It is inevitable that societies will move through a transitional state leading to the greater liberation of women for activities outside the home. It is likely, however, that in this transitional period breast-fed infants will suffer. A recent analysis by Popkin (1975) in the Philippines looking at the problems of the working mother and child nutrition concluded that 'the working status of the mother adversely affects the child, especially in the low income groups, by leading to declines in breast-feeding'.

We thus have a conflict in values—the liberation of the woman from the home which can be promoted by modern contraception versus maintaining the health and nutrition of the infant which can be promoted by maintaining traditional breast-feeding patterns. The relevant question is—how to achieve both of these goals in society.

Discussion

Thomson: Dr Mosley, when you say that the use of the pill may have an adverse effect, do you mean a direct pharmacological effect, or was the pill not being properly used? A problem about the pill is the discipline of using it properly.

Conceptually, we have to get away from the idea of just handing it out and being hopeful. In places like Bangladesh, I would not be very happy about relying on traditional methods, because of their inefficiency. Finally, was it difficult to obtain information on this sensitive subject from Bengali women?

Mosley: We do not ask the Bengali women about sexual practices. We can ask them directly about menstruation. Also, everybody knows when a woman is menstruating: she is considered unclean, she cannot bathe in certain places, she cannot cook meals, she cannot sleep with her husband nor say her prayers. Thus, any contraceptive method which adds a day or two to menstruation, or causes spotting, becomes a social disaster. This is one of the reasons, probably among others, why the IUD has been a problem in that society. Because the majority of the women are amenorrhoeic for much of their reproductive lives, something such as an injection which could maintain their infertility without causing bleeding might be more acceptable.

Turning to the use of modern methods in traditional societies, it cannot be over-stressed that they are not used well. Users drop out rapidly. In our studies we had to classify a woman as continuing on oral contraception if she herself thought she was continuing. A 'good' continuer in this circumstance did not miss more than two or three pills in a cycle. A 'poor' continuer took at least a few pills each cycle. An 'intermittent' continuer would miss entire cycles at a time, then reappear two or three months later, apparently not getting pregnant in the interim.

One reason why there do not seem to have been many pregnancies among intermittent users is because contraceptive use overlaps with lactation amenorrhoea, so that whether or not they continue may not be so important. However, there is suggestive evidence that the pill used intermittently will initiate resumption of cycles, and the people in the village seem to be becoming aware of it. I leave it to the physiologists to tell us whether a woman who is amenorrhoeic and who takes oral contraceptives could initiate cycling, even though she is breast-feeding.

Tyson: It would not be possible to initiate cycling, but gonadotrophins could be stored depending on the concentration of the oestrogen in the formulation. We know of many women who miss one pill, have a sudden peak in plasma gonadotrophin, ovulate and conceive very quickly. There is certainly break-through ovulation in women who miss one or two pills, which is presumed to be related to the storage of gonadotrophins due to a lack of LH-RH release. Perhaps these women are being set up for greater fecundity.

Gray: It has been demonstrated that the pill does not seem to be a satisfactory contraceptive in some societies, but I would be reluctant to dismiss contraception *per se* since reasonable results have been obtained with both IUDs and injectables.

Coming back to the 'cause and effect' argument, Dr Mosley is saying that contraceptive programmes can induce women to give up abstinence, etc. I should like to suggest that women who undertake contraception are those who wish to give up abstinence. In Nigeria, for example, many of the women who adopted contraception may have been those who were not in a polygamous marriage, who were being imposed upon by their husband and who had to break the post-partum sex taboos. They chose a method which may not be very satisfactory. This is not necessarily the fault of family planners *per se*.

Mosley: I think that I agree with everything you say. First, I am not against birth spacing; as I indicated most primitive societies have recognized its importance for thousands of years. It is only recently that modern institutions such as WHO have said that fertility control is appropriate. We are just catching up with the traditional world. Modern technologies however may not be the only approach. We should avoid a unifocal approach. I wonder whether oral contraception has not been overstressed—a single technology as a method of practice of contraception in the post-partum woman—whereas it may be the least appropriate.

Second, I am not sure whether family planners can take the blame or the credit. The purpose of contraception is to assist women to change their roles—but are we assisting them by the most effective and most appropriate means, given the social and cultural context to which the women are accustomed? Rather than simply saying that since oral contraceptives stop ovulation, they should be used by women all over the world, let us investigate what the various societies are actually using. The point is, that the women are choosing, and we are assisting them in their choice. They are choosing not to breast-feed, and we are assisting them in that choice too.

A theme among many family planners is that modern contraceptives will promote breast-feeding because they promote birth spacing. But what we may in fact be doing is promoting the decline of breast-feeding—in the same way better infant nutrition could promote birth spacing by lowering fertility by improving child survival.

Gray: Is it the method rather than the approach that you are criticizing? All the criticism seems to have been directed towards the pill.

Mosley: I am also criticizing the approach. We are telling people, as something new, as something we assume they do not know, that birth spacing is important for their health and that of their child. This may be a discovery we have just made, but it is something which they have known for a long time.

Gray: It has been in the European anthropological literature ever since Malinowsky.

Mosley: Fertility control has not been a part of modern medical practice until the last decade or so.

Gray: The various studies must be interpreted with caution. For example, Singarimbun & Manning (1976) point out that for individual women in Indonesia the stated duration of abstinence was longer than the pregnancy interval. This was a retrospective study and clearly there is an enormous bias in the duration of abstinence as stated by the respondents.

My own experience in Melanesia strongly suggests that in societies in which abstinence is considered to be a social norm, something to be aspired towards, people often exaggerate the duration of abstinence. I even had women coming in three or four months pregnant and declaring that they could not possibly be pregnant because they had abstained from intercourse.

Mosley: I agree that Singarimbun's data are retrospective and that there was a great deal of heaping of reported intervals. Valerie Hull is now doing a prospective study and is confirming that abstinence is extremely prolonged and that birth spacing averages about 33 months in the Indonesian society. That cannot be entirely attributed to lactation amenorrhoea. I admit we do not have adequate data.

Saxena: What sort of pill are you referring to?

Mosley: In Bangladesh, and for the most part in the Philippines, it is the combined oestrogen-progesterone pill, Norinyl-50.

Saxena: What was the major cause of discontinuation? Was it an effect on lactation?

Mosley: The women were asked if they had observed any difference in breast-feeding and whether this was the reason for discontinuation. Subjectively, they did not seem to notice an effect on breast-feeding. They discontinued use of the pill because of other effects. If they are sick for any reason after starting the pill, they stop taking it—a *post hoc propter hoc* type of reasoning. In Bangladesh, the most common reason is what they call *mata goro*, or dizziness, which is a vague symptom complex. A case control study is now under way to determine whether there is any set of symptoms that can definitely be attributed to the pill.

We carried out a comparative study of two pills, with and without oestrogen (a mini-pill) and, from subjective reports by the women, we were unable to show that they had noticed any difference in breast milk production, or infant feeding. There are no objective data from the Bangladesh studies.

Robyn: I think it is important to emphasize that traditional methods of birth spacing exist in developing countries. It is indeed inadequate to extrapolate from motivations existing in industrialized countries about modern methods of contraception, and to believe that these methods will achieve the same effects on birth spacing in all populations.

It has been said that adverse effects of semen on nursing is a common belief and, likely, motivates in some populations long periods of sexual abstinence after delivery. Is this due to semen itself or to the fact that an early pregnancy during lactation will stop milk production and endanger the life of the child, and thus lead to a lack of confidence in nursing infertility?

Mosley: I do not think that we can analyse these kinds of responses in much more detail. When they say that semen poisons the milk, that may be as far as their reasoning goes. Perhaps Dr Morley has some data.

Morley: There is a more fascinating and powerful belief in some societies that something goes from the baby into the mother and back to the man and that he loses his potency.

Gupta: It has been brought out from the Bangladesh study and others that prolonged lactation and abstinence are related to whether or not the mother is employed, her socio-economic class and so on. Traditional methods of contraception have proved to be ineffective. Prolonged lactation amenorrhoea and lactation have proved to be ineffective. Prolonged lactation amenorrhoea and lactation are helpful neither to the baby who cannot be sustained on only mother's milk for any length of time, nor to the mother on whose health it is a drain.

Van Ginneken: Dr Mosley quoted some conclusions from an article I wrote some years ago (1974). I can now see that some of these conclusions may have to be revised in the light of new data that have been published since that time.

The duration of amenorrhoea in studies which I summarized was about one year at the most. Dr Mosley quoted two studies (Mojolama, in Indonesia, and Matlab, in Bangladesh) where the period of amenorrhoea was much longer. I

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wonder whether that was partly due to malnutrition in the populations, which might have an effect on birth intervals in addition to lactation.

Mosley: I apologize for quoting something not fully in context. I wanted to quote the source, however, to say that we have to look at different societies because the situation is different in different societies.

Malnutrition probably does play a role, but even in the urban Filipino women breast-feeding is beginning to decline. Clearly, breast-feeding will decline as women change their patterns of behaviour, and we now have to substitute modern contraceptives for traditional methods. The question is whether they are as effective: are the women getting a fair deal, in terms of contraceptives? They may not be.

Van Ginneken: I agree. But I am still inclined to think that the maximum that can be expected from lactation is about 12 months on average. In the other investigations malnutrition may have been an important factor.

Mosley: The real question which I did not address is: what is the most appropriate duration of birth spacing for the health of both mother and child? In a well-nourished population, we cannot show much in the way of adverse effects until we come down to birth intervals of less than one year, which means an inter-pregnancy interval of less than three months. As the nutritional and health standards of the population go down, there has to be longer birth spacing in order to protect the health of the mother and child.

Are we approaching that problem backwards? We say that poor, malnourished countries should have fewer babies to protect the health of mothers and children. Perhaps we should say that there should be health services to protect the health of mothers and children, and that the women should have fewer babies in total. Perhaps birth spacing *per se* is not a crucial issue, and even traditional methods of spacing may be all right. If a woman is going to have only two children, almost no spacing might be all right. In a modern society, it might be best to have them together—one, two, then finish.

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