In Mozambique, Social Diversity Within Church Congregations Encourages Contraceptive Use

Social interaction within religious congregations appears to have had a strong impact on the adoption of contraceptive use in Mozambique, particularly in large cities.[1] An analysis of 1997 Demographic and Health Survey data for large cities and rural areas indicates that city women who belong to less diverse and more socially isolated denominations or have no religious affiliation are less likely than mainstream Christian women to have ever practiced contraception or to have discussed it with friends or relatives. A similar but weaker association exists among women living in rural areas, probably because of the minimal social diversity within and among church congregations in rural Mozambique.

Contraceptive adoption and fertility change are probably affected by social interactions among women; church activities are among the situations in which such interactions may take place. The impact of religious involvement on an individual's attitudes toward and knowledge about contraception, however, is difficult to analyze, because religions have widely divergent views on contraception and fertility, and types of social interaction may differ among religious groups.

To explore this issue, a sociologist studied qualitative and quantitative data collected in Mozambique, a former Portuguese colony with relatively high fertility and a low level of contraceptive use. The investigator's hypothesis was that through shared church membership, individuals establish informational links that help transmit innovative reproductive practices, usually from women of higher social status to those of lower status. However, he expected the extent to which innovative practices are diffused to differ by type of religion: Some religions promote social isolation, in which members interact mostly with other members, and this may limit people's access to new ideas.

Census data from 1997 indicate that 24% of people in Mozambique are Roman Catholics, 8% are "mainstream" Protestants (such as Anglicans, Baptists, Methodists and Presbyterians), and 17% belong to churches that practice an indigenous type of Pentecostalism (often known as Zionist churches).* In addition, one in five are Muslims and one in four practice no religion. Muslims were excluded from the study, as women's participation in Islam and Christianity differs.

A research team collected qualitative data during 1998 and 1999 in the suburban area surrounding Maputo, the nation's capital. Church leaders and leaders of women's church groups were interviewed in three Catholic parishes, two mainstream Protestant churches, several Zionist congregations and two churches with practices similar to those of Zionism. In addition, focus groups were conducted among adherents of the various religious denominations, and religious services and weekly women's group meetings were observed.

The investigator notes that in every observed event, women outnumbered men; for urban African women, he comments, "church offers a vital form of association, social support, and identity that complements—and often replaces—the crumbling institutions of family and kinship." In particular, the Zionist churches focus on family issues and emphasize the important role that women play in maintaining a strong family. One result, the researcher observes, is that in weekly church group meetings women's conversations are "usually devoted to exchanges of ideas on how to keep their husbands satisfied, children fed, and houses clean."

In general, the Christian churches studied did not differ much in their official positions on the use of contraceptives: The mainstream Protestant denominations and the Zionist churches, for example, both took a neutral stance. Moreover, according to the investigator, while Catholicism officially rejects modern contraception, "the local clergy does not actively pursue the anti-contraceptive agenda" of the church. Thus, doctrinal differences per se might not have substantial direct effects on members' contraceptive practices.

On the other hand, contraception is generally not formally discussed in the Zionist churches, often because individuals perceive it as something in which church leaders have little interest. In addition, Zionist churches are often quite homogeneous, and members are warned to limit their social contact with the "impure" outside world. In contrast, the Catholic and mainstream Protestant congregations are generally more heterogeneous and are more open to outside influences. According to the researcher, it is not unusual for nurses or others with appropriate training to discuss family planning at church women's meetings. The Protestant and Catholic women also reported having received advice on preventing HIV infection that included information on family planning.

The researcher observes that "at first glance, Zionist women's interaction in and outside the congregations is very similar to that of mainstream church members." Yet whereas Zionist women are "more engaged in the life of their congregations," he comments, they also are more homogeneous in their educational attainment and social class (both most often quite low). In addition, because of the Zionist women's mostly self-imposed isolation from the larger society, they probably have less access than the other women to new ideas. Finally, although older women in Zionist congregations are expected to advise younger women on marital and reproductive matters, they are unlikely to have had much experience with modern contraceptives.

To further analyze the relationship between religious involvement and reproductive behavior, the researcher conducted special analyses of the 1997 Mozambique Demographic and Health Survey. From among the 8,779 women aged 15–49 who participated in the survey, the investigator identified three groups—women who were Roman Catholic or mainstream Protestant, women who were Zion-

*Zionism, a form of charismatic Protestantism, originated in South Africa but has become popular elsewhere in Sub-Saharan Africa. In most Zionist and similar churches, the small congregations are led by a male bishop or pastor but consist largely of women. The movement emphasizes faith-healing and advocates separation from worldly influences, to the extent that some denominations explicitly discourage members from socializing with non-Zionists.

ist (or belonged to "quasi-Zionist" congregations), and women who declared no religious affiliation—from which he selected women who lived in major cities and those who lived in rural areas in order to produce a starker contrast. The hypothesis to be tested was that fertility control would be greatest among women affiliated with mainstream churches, less among those in Zionist congregations and least among nonreligious women (who were assumed to be the most isolated socially), and that these differentials in contraceptive knowledge and use would be greater among city residents than among rural women.

Regardless of type of religion, rural women had slightly more children than did urban women, while urban women had attained more education than rural women. Women belonging to mainstream churches tended to have the most years of education (5.3 in cities and 1.6 in rural regions) and women with no formal religious affiliation the fewest (3.3 and 0.8, respectively).

Likewise, levels of contraceptive knowledge were much higher in urban areas, with some religious differentials as well. In cities, 93–96% of Christian women knew of at least one modern contraceptive method, compared with 80% of those with no religious affiliation, while in rural areas, 56–61% of Christian women and 42% of unaffiliated women knew of a method. In cities, the proportion who had ever used a modern method fell steadily, from 48% among members of mainstream congregations to 37% among Zionist women and 27% among unaffiliated women. The relative proportions in rural areas were very much lower and varied less by religion (6%, 9% and 5%, respectively). Finally, the proportion who said they had discussed family planning with a friend or neighbor was slightly higher among urban members of mainstream churches (24%) than among urban Zionist women (22%) or women with no affiliation (18%); similar differentials were seen among rural women (15%, 13% and 9%, respectively).

The investigator then conducted two multivariate logit analyses—one for cities and the other for rural regions—in which he controlled for the effects of cultural, social and demographic characteristics. In the cities, Zionist women and women with no formal religious affiliation were both significantly less likely than women belonging to mainstream churches to have ever used modern contraceptives (odds ratios of 0.66 and 0.63, respectively). In rural areas, women with no religious affiliation had significantly reduced odds of having used a modern method (odds ratio, 0.59), but the contraceptive use of mainstream Christians did not differ significantly from that of Zionists. The researcher comments that "these results conform to the hypothesis that in cities the cultural and informational milieu of mainstream churches would be more propitious for contraceptive experimentation than that of smaller, Zionist-like churches."

In comparable analyses of the likelihood that women had discussed family planning with a friend or neighbor, the researcher again found an impact of religious affiliation: Among city residents, women attending Zionist churches and those not following any formal religion had significantly lower odds of having discussed family planning than did women belonging to mainstream churches (odds ratios of 0.74 and 0.56, respectively). Having no religious affiliation was also linked with a significantly reduced likelihood of family planning discussions among rural women (odds ratio, 0.62).

An examination of educational attainment among the survey subgroups reveals that city women who attended mainstream Protestant churches were much more likely to have completed seven or more years of schooling than were Zionist women. The researcher comments that "the presence of so many women with relatively high levels of education in mainstream congregations helps create a certain innovation-prone cultural environment that may benefit other, less educated members." In rural areas, on the other hand, the proportion of more educated women is so small, he notes, that churches lack the "critical mass of educated innovators capable of influencing the rest of their congregations."

The investigator concludes that in Sub-Saharan Africa, churches are social venues in which women can share their concerns and experiences with other women, although "whether or not this sharing leads to adoption of sociocultural and technological innovations depends largely on the social environment in which it occurs." The researcher also notes that this effect is seen not necessarily in direct communication about contraception, but in individuals' perceptions, through others' examples, that family planning is a desirable and legitimate practice.–*M. Klitsch*

REFERENCE

1. Agadjanian V, Religion, social milieu, and the contraceptive revolution, *Population Studies,* 2001, 55(2): 135–148.

Use of Any Combined Pill Type Confers an Elevated Risk of a First Heart Attack

The use of any oral contraceptive significantly raises the likelihood of a first myocardial infarction, according to a nationwide study from the Netherlands.[1] The results of the study also suggest, although inconclusively, that women who use third-generation pills (those containing the progestogen gestodene or desogestrel) are less likely to have a heart attack than those using pills containing the second-generation drug levonorgestrel, and that the use of third-generation pills is not associated with the risk of heart attack.

The investigation aimed to address a flaw that existed in most similar published studies, by recruiting sufficient numbers of women using second- or third-generation pills so that effects on the risk of myocardial infarction could be compared. The researchers note that these two types of contraceptive are commonly used in the Netherlands, so the population of potential study subjects was large. The analysis also included the use of first-generation pills (those containing the progestogens lynestrenol or norethindrone).

The investigators conducted the population-based case-control study by sending a standardized questionnaire to women aged 18–49 who had been hospitalized for a first myocardial infarction between January 1990 and October 1995, and to a randomly selected group of controls who had not had a myocardial infarction. Controls were matched to women who had had a heart attack by five-year age-group and area of residence, and they were asked to respond to the questionnaire with reference to a specific year between 1990 and 1995.

In all, 248 women who had had a myocardial infarction and 925 controls completed the survey. Women in the study group were, on average, older than the controls (43 vs. 38). They were also more likely to be current smokers (84% vs. 43%); have a history of hypertension (24% vs. 6%), high cholesterol (11% vs. 3%) and diabetes (6% vs. 1%); and have a family history of cardiovascular disease (65% vs. 36%).

Women were more likely to be current users of second-generation pills than of any other type: 24% of the study group and 19% of controls, compared with 8% of the study group and 12% of controls who used third-generation

pills, and 4% of the study group and 3% of controls who used first-generation pills. After adjustment for confounding factors (age, area of residence, calendar year and risk factors for cardiovascular disease), logistic regression analyses showed that current users of any pill type and current users of first- and second-generation pills were significantly more likely than nonusers to have a heart attack (odds ratios, 2.1, 2.7 and 2.5, respectively). In contrast, users of third-generation pills seemed to be as likely as nonusers but less likely than users of second-generation pills to have a heart attack (1.3 and 0.5, respectively); the researchers concede, however, that the 95% confidence intervals for these results were too wide for a definite conclusion to be drawn.

The study also analyzed the effect of other cardiovascular risk factors. Logistic regression analyses showed that the likelihood of myocardial infarction was elevated among both pill users and nonusers if they had hypertension (6.1 and 5.1, respectively) or were obese (5.1 and 3.4, respectively). The likelihood was dramatically higher for pill users, but not nonusers, if they had high cholesterol (24.7 vs. 3.3) or diabetes (17.4 vs. 4.2), or if they were current smokers (13.6 vs. 7.9).

The researchers note that only one other investigation has recruited sufficient users of third-generation oral contraceptives to be able to compare the effect of using third- and second-generation drugs on the risk of myocardial infarction. They argue that although those results suggest that third-generation pills carry the higher risk of heart attack, the 95% confidence interval again was too wide to permit a definite conclusion. The author of an editorial accompanying the Dutch study adds that recall bias may have affected that finding.[2] Recall bias was minimized in this study by including in the questionnaire color photographs of all available oral contraceptives in the Netherlands. In addition, the researchers found no evidence of prescription bias, and they avoided selection bias by selecting patients nationwide and according to their hospital discharge diagnosis.

The researchers admit that the absolute risk of heart attack among pill users is small, but "because all combined oral contraceptives are equally effective means of birth control, the issue of safety is paramount." In practical terms, the authors advise that "before prescribing oral contraceptives, clinicians should screen women for conventional risk factors for cardiovascular events."–*T. Lane*

REFERENCES

1. Tanis BC et al., Oral contraceptives and the risk of myocardial infarction, *New England Journal of Medicine,* 2001, 345(25):1787–1793.

2. Chasan-Taber L and Stampfer M, Oral contraceptives and myocardial infarction—the search for the smoking gun, editorial, *New England Journal of Medicine,* 2001, 345(25):1841–1842.

Emergency Contraception Is Little Known and Rarely Used by South Africans

Only about one in four women attending public-sector health clinics in South Africa reported having heard of emergency contraception, according to a study conducted in three provinces; levels of knowledge were even lower in rural areas and among less-educated and older women.[1] Very few of the women who were interviewed had ever used the method, and the majority who knew of the method were uncertain whether it was offered at the facility where they were interviewed. Nevertheless, once interviewers explained emergency contraception to the study participants, about nine in 10 said they would be interested in using it in the future, would recommend it to friends and would be willing to pay for emergency contraception if they needed to use it.

Emergency contraception has been available for some time in South African public-sector health facilities. Clients may not always know when a service is available, however, and there is little information on how widespread knowledge about emergency contraception is among South African women.

To determine knowledge of and attitudes toward emergency contraception among a broad range of South African women, researchers conducted a survey of clients and providers at 89 public-sector health care facilities between November 1999 and August 2000. Fifty-eight of these facilities were in urban (30) or rural (28) areas of Western Cape Province, which were randomly sampled according to client load. In addition, surveys were conducted at all 14 primary health care facilities in KwaZulu-Natal, a rural province, and at 17 selected facilities in an urban section of Gauteng Province.

A team of interviewers visited each facility and interviewed at least 10 consecutive clients aged 15–49. The structured questionnaire asked about women's demographic characteristics, their sexual history and contraceptive use, how much they knew about emergency contraception and whether they had ever used emergency contraception. All clients were interviewed in their preferred language, by trained staff who were fluent both in that language and in English.

Overall, 1,068 health care clients were interviewed, nearly 87% of those who initially were approached. (Most of those who refused to participate said that they did not have time to complete the interview.) Twenty-seven percent of those interviewed were married, while 47% were unmarried but in a stable relationship. The proportion married was highest in the urban areas of Western Cape Province (37%) and lowest in KwaZulu-Natal (14%). Sixty-eight percent of the women had completed 8–12 years of schooling; few had no formal education (4%). The sample was fairly evenly divided among women who were currently employed (29%), those who were unemployed but seeking a job (30%) and other unemployed women (28%); the remainder (13%) were students.

Most survey respondents had ever had sexual intercourse (93%) and had had sex within the past year (87%). Eighty-seven percent had ever been pregnant, and there were sizable regional differences in pregnancy history: The proportion who had ever been pregnant ranged from 90–91% in the rural sections of Western Cape Province and KwaZulu-Natal to 77% in Gauteng Province. Similarly, 48% of those who were sexually experienced had become pregnant as teenagers, with this proportion ranging from 40% in Gauteng Province to 60% in KwaZulu-Natal. Sixty-five percent of the women said they had become pregnant at least once when they were not ready—varying from 59% in the rural parts of Western Cape Province to 78% of women in KwaZulu-Natal. Among the women who had been sexually active in the year preceding the survey, 68% were currently practicing contraception; most (71% of users) relied on an injectable contraceptive, while 15% used the pill and 12% condoms.

Twenty-three percent of the women had heard of emergency contraception; this proportion was highest in urban sections of Western Cape Province (34%) and was lowest in KwaZulu-Natal (11%). Knowledge of emergency contraception was about twice as great among 15–24-year-olds and 25–34-year-olds (25% each) as among older women (13%), and was more than twice as great among those with at least some secondary education (28%) as among the less-educated (11%).

A logistic regression analysis revealed that awareness of emergency contraception was related to three background characteristics. Compared with clients from KwaZulu-Natal, women from urban areas of Western Cape Province were substantially more likely to know about emergency contraception (odds ratio, 4.4) and those from the other two regions were somewhat more likely to know about it (2.1–2.3). Similarly, knowledge of emergency contraception was greater among women aged 15–34 than among 35–49-year-olds (2.0–2.1). Finally, compared with women with at least some secondary schooling, clients with none or with only a primary education had reduced odds of knowing about emergency contraception (odds ratio, 0.4).

Nearly all clinic managers interviewed knew that their facility offered emergency contraception, but 57% of women who knew of the method did not know if one could obtain it from the facility where they were interviewed. Moreover, even women who had heard of emergency contraception in general often were misinformed about its specific attributes. For example, 47% who knew of the method were uncertain about how soon after unprotected intercourse emergency contraception needs to be taken.

Just 9% of the women who knew about emergency contraception had ever used it (about 2% of all women interviewed), and none had used it more than once. However, after the method was explained to respondents, 90% of clients who were interviewed said that they would use it in the future if the need arose, 89% reported they would be willing to pay for it and 92% said they would recommend it to a friend.

Even with these low levels of knowledge about emergency contraception, the researchers note, the South African women who were interviewed may be more knowledgeable than the general population, as they were clients of primary health care facilities and were of reproductive age.

The researchers comment that it is encouraging that the women had generally positive attitudes toward emergency contraception and would be willing to pay for it, "suggesting that a major barrier to [emergency contraception] use in South Africa is a lack of awareness of the method." They also note that emergency contraceptive products have been offered at private-sector pharmacies without a prescription since November 2000, shortly after the survey was conducted. However, while public-sector clinics provide emergency contraception by cutting apart cycles of combined oral contraceptives, the several dedicated emergency contraception products available in South Africa are too expensive for most public-sector facilities to offer.–*M. Klitsch*

REFERENCE

1. Smit J et al., Emergency contraception in South Africa: Knowledge, attitudes, and use among public sector primary healthcare clients, *Contraception,* 2001, 64(6): 333–337.

Feeding Method Does Not Affect Mortality of Infants Of HIV-Infected Women

Of infants born to HIV-infected women participating in a study in Kenya, those assigned to be formula-fed were no more likely than those assigned to be breastfed to die before their second birthday, even when infection with HIV was taken into account. HIV-free survival at two years, however, was significantly more frequent among infants in the formula-fed group than among those in the breastfeeding group.[1] Diarrhea, pneumonia and malnutrition were the most common causes of death, but none occurred more often in one feeding group than in the other.

To compare the effects of breastfeeding and formula-feeding on mortality, morbidity and nutrition among infants of HIV-infected women in developing countries, researchers recruited a sample of HIV-infected women from antenatal clinics in Nairobi between 1992 and 1998. Half were randomly assigned to breastfeed their newborns, while the other half were instructed to use formula; participants were followed for two years after delivery. During clinic visits, doctors performed physical examinations of the children and obtained information on their health and development; infants were tested for HIV once a month during their first year and once every three months during their second year. Infants who were sick, dehydrated or malnourished received care from study physicians or from Kenyatta National Hospital.

Overall, 425 HIV-infected women participated in the study: 212 were assigned to breastfeed and 213 to formula-feed. All women had access to drinkable water, a reliable supply of formula, training on how to properly prepare formula and access to medical care for their infants. The women in the breastfeeding group delivered 197 liveborn singletons and firstborn twins, 185 of whom were followed up for two years; the women in the formula-feeding group delivered 204 infants, of whom 186 completed the full two years. Eighty-four infants died during the course of the study, 45 in the breastfeeding group and 39 in the formula-feeding group; nearly twice as many breastfed infants as formula-fed infants became infected with HIV (61 vs. 31).

The overall mortality rates of the breastfeeding group at 12 and 24 months (15% and 20%) did not differ significantly from those of infants in the formula-feeding group (17% and 24%). Among infants who did not acquire HIV during the study, the two-year mortality rate was 10% in the formula-feeding group and 8% in the breastfeeding group; among HIV-infected infants, however, these rates were 40% and 46%, respectively. In analyses that controlled for HIV status, the mortality rates of infants in the formula and breastfeeding groups were not significant different. The proportion of infants who died or were infected with HIV within the first two years of life was significantly higher among infants in the breastfeeding group than among those in the formula-feeding group (42% vs. 30%, respectively).

Pneumonia, diarrhea and malnutrition were the most common contributing causes of death, although none of the three was significantly associated with either feeding method. The proportions of infants in the formula-feeding group who died of sepsis or of neonatal noninfectious causes (20% and 11%, respectively) were significantly higher than the proportions among infants in the breastfeeding group (2% and 0%). Within the first six months of life, infants assigned to be breastfed were significantly better nourished overall than were infants assigned to be formula-fed; after adjusting for HIV status, breastfed infants were also significantly better nourished during the first two years.

The researchers note that the study had several limitations. Not all of the mothers complied with their designated feeding method: Thirty percent of infants in the formula-feeding group had some exposure to breastmilk. In addition, the rates of morbidity may have been underestimated because of the reliance on maternal reporting of illnesses between clinic visits.

The researchers comment that "two years of follow-up was sufficient to capture any potential adverse consequences of formula feeding but not all of the adverse consequences of breastfeeding with respect to HIV-1 related

mortality." They add that "Of children infected after two months of age, only 9% had died after two years but most of the remaining children would be expected to die sometime during childhood." The researchers conclude that "the use of formula to prevent HIV-1 transmission can be a safe and viable option even in resource poor settings, if maternal education, clean water, a supply of formula and access to health care are available."*–J.Rosenberg*

REFERENCE

1. Mbori-Ngacha D et al., Morbidity and mortality in breastfed and formula-fed infants of HIV-1–infected women, *Journal of the American Medical Association,* 2001, 286(19):2413–2420.

As Desired Fertility Falls, Contraceptive Services Help Women Avoid Abortions

In an area of Matlab, Bangladesh, where an intensive maternal and child health and family planning program has been delivering high-quality services since the late 1970s, about one in 10 unintended pregnancies end in abortion*—the same proportion as in a comparison area where women receive standard government services. However, unintended pregnancy is significantly less common in the program area; as a result, the proportion of all pregnancies that end in abortion is significantly lower there. Analysts who examined these trends observe that the high-quality longitudinal data from Matlab offer an unusual opportunity to study the effects of family planning services on abortion in the context of rapid fertility decline.[1]

The two areas are similar, but women in the program area have more contact with community health workers than women in the comparison area have with government workers; they also have a wider variety of contraceptive methods from which to choose. Contraceptive prevalence is rising in both areas, but use has been consistently higher and the unmet need for contraception consistently lower in the program area; moreover, women in the program area are more likely than those in the comparison area to use highly effective methods, such as the injectable. The birthrate per 1,000 women has fallen dramatically in both areas since 1979, but it has been consistently lower in the program area.

To assess trends in abortion, the analysts examined data on nearly 150,000 pregnancy outcomes, including 4,100 abortions, in the two areas between 1979 and 1998. (They note that abortion reporting in Matlab is likely to be complete because the health workers are trusted in the community and are likely to be aware of women's pregnancy status.) In addition, the researchers obtained information on women's pregnancy intentions and contraceptive use from 1984 and 1990 surveys of knowledge, attitudes and practice; by matching these data to pregnancy outcome data for about 10,000 women, they were able to examine separately intended and unintended pregnancies in the five years following each survey.

In 1979, the number of abortions per 1,000 women aged 15–49 was slightly but significantly higher in the program area than in the comparison area (probably, the analysts comment, because of the greater availability of menstrual regulation in the program area). Since 1983, however, the rate has fallen slightly in the program area and risen in the comparison area; the two rates have differed significantly every year. By the late 1990s, women in the program area averaged five fewer abortions per 1,000 annually than women in the comparison area.

In both areas in both survey years, about half of married women who were not pregnant and not relying on permanent contraception said that they wanted more children; about three-quarters of these women became pregnant within the five years following the survey. Among those reporting that they wanted no more children, the proportion who conceived within the next five years was significantly lower in the program area than in the comparison area—34% vs. 46% in 1984–1989 and 22% vs. 39% in 1990–1995. Within each area, the decline between periods was statistically significant. Similarly, unintended pregnancies made up a smaller proportion of all pregnancies in the program area than in the comparison area in the five years following both the 1984 survey (30% vs. 42%) and the 1990 survey (23% vs. 34%), and the declines between periods were statistically significant.

Few intended pregnancies ended in abortion, and the proportion did not change over time. However, in both periods, termination of an intended pregnancy was significantly less common in the program area (fewer than 1%) than in the comparison area (2%). By contrast, in each period, the proportions of unintended pregnancies ending in abortion were similar in the two areas (3–5% in 1984–1989 and 10–11% in 1990–1995), and the increase in each area between periods was statistically significant.

Between 1984–1989 and 1990–1995, the proportion of pregnancies ending in abortion rose in both areas. However, because unintended pregnancies and terminations of intended pregnancies were less common in the program area than in the comparison area, the proportion of pregnancies ending in abortion was likewise lower there (1% vs. 4% in the earlier period and 3% vs. 5% in the later period). Findings from the entire database are similar to those for survey respondents: Between 1984–1986 and 1996–1998, the abortion rate per 1,000 women increased minimally in the program area but substantially in the comparison area; in both periods, the rate was lower in the program area (2.2–2.3) than in the comparison area (5.2–6.8).

The analysts comment that as couples in developing countries increasingly wish to limit their family size, the incidence of abortion may rise. As illustrated in the Matlab program area, however, "widespread availability of quality family planning services...helps couples to space and limit their births and can result in much lower rates of abortion than would otherwise be the case." For countries undergoing fertility transition, the researchers conclude, keeping the number of abortions low will entail increasing contraceptive use and offering a variety of effective methods. By reducing the incidence of illegal abortion in particular, such strategies will have important public health benefits.*–D. Hollander*

REFERENCE

1. Rahman M, DaVanzo J and Razzaque A, Do better family planning services reduce abortion in Bangladesh? *Lancet,* 2001, 358(9287):1051–1056.

*Although abortion is illegal in Bangladesh, pregnancies may be terminated in the early weeks of gestation through menstrual regulation.

Early, Fast-Paced Growth Benefits Short-Term Health Of Underweight Infants

Rapid catch-up growth in the first 20 months of life appears to confer short-term health benefits on babies who are born small for their gestational age. According to data from a cohort of babies born in Brazil in 1982,[1] those who were born small but gained weight rapidly had a significantly lower rate of hospitalization in 1985 than did similar infants who did not gain weight as quickly (6% vs. 16%). These fast-

growing small babies had nearly the same rate of hospitalization as fast-growing infants whose birth weight was appropriate for their gestational age.

The data come from a population-based cohort study of babies born in 1982 in the southern Brazilian city of Pelotas. These infants were followed up twice—at age 20 months and at age 42 months. Complete records were available for 3,582 infants; these records included information on the infant's birth characteristics (length of gestation, weight, and size for gestational age) and on maternal characteristics (age, education and family income), 20-month follow-up data on infant hospital admissions and 42-month follow-up data on mortality.

For weight gain from birth to age 20 months, the investigators calculated z-scores, a measure that assesses the pace of growth (i.e., the mean value of the change in weight-for-age); for infants who are small for their gestational age, a z-score of .66 or higher signals that their weight is catching up with that of infants whose size at birth was appropriate for their gestational age. Logistic regression techniques were used to determine the odds of hospitalization for any cause in 1985, the odds of hospitalization for diarrhea and lower respiratory tract infections in 1985, and the odds of dying by 1987. These analyses controlled for family income and for maternal age and education. The investigators also conducted one-sided tests for linear trends in the proportions who experienced each outcome; these tests compared the fastest growing babies to those who were growing at a moderate or slow pace, both for babies whose birth weight was appropriate for their gestational age and for those whose birth weight was not.

Of the infants in the analysis, 6% were low-birth-weight and 14% were born small for their gestational age. By the first follow-up interview, however, 59% of small-for-gestational-age infants had gained enough weight (change in z-score above the mean) to catch up with babies whose birth size had been appropriate for their gestational age.

By 1985, the small-for-gestational-age infants who had gained weight rapidly in the first 20 months of life had significantly lower rates of hospitalization than similar infants who had gained weight less quickly (6% vs. 16%, $p<.001$). Moreover, infants whose weight at birth had been appropriate for their gestational age benefited from rapid weight gain as well: Only 5% of those with the most rapid weight gain were hospitalized in 1985, compared with 9% who had gained weight slowly or at a moderate pace.

There were significant linear trends by pace of growth in the proportions hospitalized; that is, the rate of hospitalization for any cause decreased linearly with increasing pace of weight gain among all infants. Linear trends in the proportions hospitalized for diarrhea and lower respiratory tract infections were also significant (i.e., rates for these specific causes decreased linearly with increasing pace of weight gain among all infants, regardless of birth weight). According to results of the logistic regression analyses, moderately paced weight gain (as opposed to rapid weight gain) was significantly associated with higher odds of hospitalization for any cause (adjusted odds ratio, 2.8).

Only 10 of the infants in the analysis had died before their fifth birthday. The mortality rate by 1987 was highest by far among small-for-gestational-age babies whose weight gain was below the mean (13 deaths per 1,000 live-born infants), while the rate among other small-for-gestational-age infants who caught up quickly was similar to that of infants whose birth weight was appropriate for their gestational age (three deaths per 1,000 vs. 1–2 per 1,000). Tests for linear trends by growth pace in the proportion of infants who died were significant—these proportions decreased linearly with increasingly fast-paced growth. Moreover, multivariate analyses suggest that compared with small infants who caught up in weight early in life, those who did not had significantly higher odds of dying (adjusted odds ratio, 8.1).

The investigators acknowledge that their study has several limitations, including an overall loss to follow-up of 15%, the determination of gestational age by the mother's recollection of her last menstrual period (with 20% of women unable to provide even that information) and the possibility that small infants with chronic diseases who could not catch up in weight were hospitalized at disproportionate rates. The researchers further note that their study did not consider whether fast catch-up growth might have negative health effects later in life (i.e., possible increased incidence of coronary disease and obesity), as has been suggested in studies conducted in industrialized countries. They assert that even if further research reveals that quick catch-up growth in infancy can have negative effects in adulthood, the country's level of development has to be taken into account. In their view, encouraging early catch-up growth for short-term health benefits appears to make sense in developing countries, where high child mortality rates make efforts to enhance child health crucial. The authors thus conclude that their results "support the efforts of the international pediatric community to promote fast growth among children who are born small."–*L. Remez*

REFERENCE

1. Victora CG et al., Short-term benefits of catch-up growth for small-for-gestational-age infants, *International Journal of Epidemiology,* 2001, 30(6)1325–1330.