REPORTS

Impact of an Integrated Adolescent Reproductive Health Program in Brazil

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An impact evaluation of an integrated school- and health-clinic-based adolescent reproductive health initiative was undertaken by the State Secretariats of Health and Education in Bahia, Brazil during 1997–99. The project was initiated in response to continued high pregnancy rates among adolescents and growing numbers of new HIV infections among young adults. It sought to promote responsible sexual and health-seeking behaviors among public secondary-school students, including the use of public health clinics. The study design included a matched control group used to measure project impact. The findings indicate that the project was successful in increasing the flow of sexual and reproductive health information to secondary-school students and that it had an impact on adolescents' intentions to use public health clinics in the future. No effects on sexual or contraceptive-use behaviors or on use of public clinics were observed, however. Client exit-interview data from a subset of project clinics indicate that adolescents who use clinic-based services are overwhelmingly female and considerably older on average and much more likely ever to have been pregnant than are adolescents in the target population for the project. (STUDIES IN FAMILY PLANNING 2001; 32[3]: 230–243)

Recent years have witnessed a marked increase in the level of attention being devoted to adolescent reproductive health issues in developing country settings. A number of factors have prompted the increased attention, including the demographic significance of the 10–19 age group in most developing countries; concern over the adverse health and social welfare consequences of adolescent pregnancies and sexually transmitted infections (STIs); a growing awareness of the pivotal role that adolescents and young adults will play in the HIV/AIDS pandemic, and the awareness that adolescence is an opportune time for intervention (Bongaarts 1998; Buvinić, 1998; Zabin and Kiragu 1998). This increased attention has led to marked growth in the number and variety of programs aimed at protecting the reproductive health of adolescents in developing country settings. The target of most interventions has been adolescents' knowledge, attitudes, perceptions, skills, and intentions with regard to sexual and reproductive health (Leffert et al. 1998; Adamchak et al. 2000). Other interventions have sought to influence the environment in which the young are reared in order to make it safer and more supportive of healthy development and to increase young people's use of reproductive health services (Adamchak et al. 2000).

Logically, interventions in the latter category have sought to take advantage of the clinic-based reproductive health services that exist in most settings, although these services vary widely in terms of accessibility, comprehensiveness, and quality. Recent research highlights some of the barriers that adolescents face in many places when seeking such services, barriers that serve to inhibit their wider use (Senderowitz 1999; Gutierrez et al. 2000; Nelson 2000). These include physical barriers (for example, limited geographic coverage and poor transportation systems); economic barriers (high transportation and service costs); administrative and process bar-

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riers; and psychosocial barriers (Nelson et al. 2000). Administrative and process barriers arise because existing services in most settings have been designed (implicitly or explicitly) for married adult women. As a result, features of the service-delivery system such as long waiting times, limited staff skills in communicating with adolescents, personal biases of service providers that result in adolescents' being denied services, and lack of privacy and confidentiality all serve to dissuade young people from making use of clinic services. Psychosocial barriers reflect social norms that define unmarried adolescents' use of clinic-based reproductive health services as inappropriate. Such psychosocial barriers, operating at the community level, include perceptions that clinics are for adults and that adolescents who go to clinics are either pregnant or have a sexually transmitted infection.

Awareness of these barriers has led to recent efforts to make health services more "youth friendly." Health services are said to be successful in these efforts if they "have policies and attributes that attract youth to the facility or program, provide a comfortable and appropriate setting for youth, meet the needs of young people, and are able to retain their youth clientele for follow-up and repeat visits" (Senderowitz 1999: 3). Typically, such efforts entail the training of health-service providers, the discontinuation of unjustified policies and practices that discourage young people from seeking services, and the improvement of the clinic environment to make it more comfortable for and acceptable to adolescents. Many initiatives also include an outreach component designed to reduce some of the psychosocial barriers affecting the young.

Despite the growing consensus that reproductive health services need to be more attractive to the young, to date relatively little empirical evidence has been found that demonstrates the connection between effecting such a change and substantial increases in adolescents' use of health services. Although relatively few rigorous evaluations of youth-friendly interventions or programs have been undertaken, the evidence from the studies that have been conducted, primarily in the United States, is mixed. Several US studies have reported associations between the introduction of services aimed at young people and reproductive health outcomes (Zabin et al. 1986; Anderson and Cope 1987; Koo et al. 1994; Moore et al. 1994); others have failed to observe any relationship (Singh 1986; Hughes et al. 1995), and one study found that the availability of youth-friendly services was associated with negative outcomes (Olsen and Weed, 1986). Several initiatives in Latin America led by nongovernmental organizations have reported success in attracting adolescents to health facilities (for example, PROFAMILIA in Colombia and MEXFAM in Mexico), but recent evaluation studies in Chile, Zambia, and Zimbabwe failed to demonstrate that the introduction of youth-friendly services had an effect on levels of service use (Moyo et al. 2000; Nelson et al. 2000; Murray et al. forthcoming).

This study presents the findings of an adolescent reproductive health project recently conducted in Salvador, Bahia, Brazil. The project was initiated by the state government of Bahia in response to continuing high levels of adolescent pregnancy and growing numbers of new HIV cases among young adults.

Setting and Project Design

Bahia is the fifth-largest state in Brazil. Of its population of 12.5 million, 17 percent live in Salvador, the state capital. Nearly half (47 percent) of the total population of the state is younger than 20, and 25 percent are between the ages of 10 and 19. Bahian adolescents and young adults are, however, knowledgeable about contraception. In 1996, for example, 99 percent of both females and males aged 15–24 knew at least one modern contraceptive method, and 96 percent knew of three methods (BEMFAM 1999). The typical age of sexual debut among Bahian youth is early. Data from the 1996 Brazil Demographic and Health Survey (DHS) indicate a median age at first intercourse in Northeast Brazil of 19.4 years among females and 16.2 years among males (BEMFAM 1999), ages that are likely to be lower in Bahia. These data also indicate a marked cohort trend toward earlier ages at sexual debut and increasing proportions of youth with premarital sexual experience. Nationally, 58 percent of married and 69 percent of unmarried sexually active 15–24-year-olds interviewed in the 1996 DHS reported current use of a modern contraceptive method. Reported contraceptive-use levels were, however, lower in the northeast than in any other region. That fertility rates among 15–19-year-olds have not fallen substantially (as they have for other age groups) suggests low levels of use-effectiveness. In 1997, Bahian girls aged 15–19 accounted for 22 percent of the 47,190 babies born in the state, and 27 percent and 30 percent, respectively, of all births in the interior cities of Santo Antonio de Jesus and Itabuna (Universidade Federal da Bahia 1998). Anecdotal evidence indicates rising HIV infection rates among women aged 20–29, most of whom were likely to have been infected during their teen years.

In response, the government of the State of Bahia began to focus attention on the reproductive health needs of adolescents in the 1990s. In 1997, the State Secretariats of Health (SESAB) and Education (SEC) initiated a pilot project, the *Projeto SESAB/SEC Para Atenção*

a Saude Sexual e Reprodutiva do Adolescente (hereinafter referred to as the "Integrated ARH Project"), which sought to integrate school-based sexual and reproductive health education with the provision in public clinics of reproductive health services appropriate to adolescents. The objectives of the project were to promote responsible sexual behavior, including the use of such clinics.

For the project, ten clinics were identified by SESAB to serve as reference clinics for the pilot project, and each was paired with a secondary-school "partner." The pilot clinics were chosen based upon the following criteria: (1) they were one of the 12 SESAB training centers for reproductive health; (2) health professionals posted to these clinics had demonstrated an interest in or a positive attitude toward adolescent reproductive health issues; (3) nurse/physician teams trained in reproductive health were posted at them; and (4) the clinics showed evidence of demand for adolescent reproductive health services. Training courses in reproductive health services for adolescents for providers who were already delivering family planning services within the SESAB network were carried out during 1995–97 in 19 training sessions. Three hundred service providers, including physicians, nurses, and social workers, attended these sessions. The training was subsequently expanded to include personnel who had not previously received such training.

The criteria used by SEC to select the partner schools were (1) proximity (within five kilometers) to a pilot clinic; (2) enrollment of at least 200 students in each targeted grade; and (3) a high level of cooperation of school staff and administrators. At the selected schools, a comprehensive sexual and reproductive health education curriculum developed by SEC was introduced. The following topics were covered in the curriculum: sex and sexuality; basic anatomy and physiology of human reproduction; biological, psychosocial, and cultural aspects of sexual behavior; myths, beliefs, and taboos related to sex and sexuality; gender identity and sexual roles; ways to avoid pregnancy and STIs, including contraception; and drug abuse and prevention. The intervention strategy called for trained teachers in four disciplines (Portuguese, biological sciences, art, and history) to integrate sex education into the regular curriculum for one or two hours per week. In light of the competing demands of the regular curriculum and of other education themes mandated by the national Ministry of Education, however, the strategy was changed to one of targeting a proportion of class sessions (30 percent) in each of the disciplines listed above for the inclusion of sexual and reproductive health themes. SEC provided guidelines to assist teachers in integrating sexual and reproductive health material into their curricula.

A key design feature of the pilot project was the integration of activities undertaken at partner schools and health facilities. Among the activities contributing to the effective linkage and integration of school- and clinic-based sexual and reproductive health efforts were: (1) referral of students in need of sexual and reproductive health services from project schools to reference clinics; (2) meetings between teachers and health-service providers from partner units; (3) visits by teachers (with their students, if feasible) to health facilities; (4) visits by health-service providers to schools; and (5) meetings between clinic directors and education and health-system district managers.

The referral of students to special reference clinics was envisioned as a means of overcoming some of the barriers to adolescents' use of clinic-based health services. By means of a referral card, teachers could refer to a clinic any student who (1) was already sexually active; (2) was interested in becoming sexually active; (3) suspected he or she had an STI; or (4) suspected she was pregnant.

Data and Methods

A matched quasi-experimental control-group panel design was used to measure project impact on knowledge, attitudes, and behavioral outcomes by comparing changes in indicators for students attending pilot-project schools with those for students attending comparable "control" schools. Service statistics from SESAB health facilities were also used in assessing project impact on adolescent health-service use. The observation period for the study was roughly three school years (from May 1997 to November 1999).

Ten pairs of schools and clinics participated in the pilot project, five in Salvador and five in the interior of Bahia. For the project evaluation, six pairs of project schools and clinics were chosen. Two of the ten participating schools, one in Salvador and one in the interior, were excluded from the study because one or more of the target grades for the sex and reproductive health education program were discontinued. Six schools were selected out of the remaining eight eligible schools for participation in the evaluation study—four from Salvador and two from the interior. The four schools from Salvador comprised all of the remaining schools from the capital. The two schools from the interior, one from Itabuna and one from San Antonio de Jesus, were randomly chosen from the four remaining schools.

The control group consisted of students attending other public schools in the same geographic area as the pilot schools. In addition to location, control schools

were matched with pilot-project schools on socioeconomic level of the student body and school size. In schools chosen for the project evaluation, two grades (sixth and eighth) were targeted as study cohorts. These grades were chosen in part because of SEC's desire to introduce sex and reproductive health education before students became sexually active and because another SEC project focusing on preventing drug use was targeting fifth- and seventh-grade students. Because of resource constraints, not all students in the target grades could be included in the panel study. Instead, in schools where approximately equal numbers of students attended morning and afternoon classes, either morning or afternoon classes were randomly chosen. In schools with unequal numbers of students attending morning and afternoon classes, the session with the larger number of students was chosen. All students present in the selected classes on the day of the initial survey (KAP I) who agreed to fill out a questionnaire were included in the study panel.

Data

Several sources of data supported the program-evaluation effort. The analyses and findings presented here are based upon three data sources described below. A local university-based research organization, the Instituto de Saude Coletiva of the Universidade Federal do Bahia (ISC/UFB), undertook all of the fieldwork for the study.

Knowledge, Attitudes, and Practice (KAP) Surveys

Self-administered surveys undertaken in project and control schools were used to measure changes in sexual and reproductive health-related knowledge, attitudes, and practices (KAP) among adolescents during the May 1997–November 1999 period. Three rounds of surveys were undertaken in project schools—the first (KAP I) at the beginning of the 1997 school year, the second (KAP II) at the end of the 1997 school year, and the third (KAP III) at the end of the 1999 school year. Two rounds of surveys were undertaken in the control schools—one at the beginning of the 1997 school year (KAP I) and a second at the end of the 1999 school year (KAP III). The KAP surveys included information on sociodemographic background, knowledge of sexual and reproductive health issues and contraception, level of sexual activity, past and current use of contraceptives, intention to use contraceptives, exposure to sexual health information from teachers involved in the project and other sources, awareness of school-affiliated clinics offering reproductive health services to adolescents, awareness of other sources of contraceptives, use of clinic-based reproductive health services and reasons for nonuse, and satisfaction with clinic services and service providers.

The target sample size for the KAP I survey was 4,800 students. Twelve facilitators were trained by senior ISC researchers to administer the survey. Students' participation in the survey was voluntary, and informed consent procedures approved by the State Secretariat of Education were followed. Students were instructed to stay in the classroom while completing the questionnaire, while teachers were asked to leave the classroom. The survey took a maximum of 50 minutes, the length of a class period, to complete. Parental information and consent procedures approved by the Secretariat of Education were followed.

The objective of the KAP II survey was to measure short-term (within one school year) changes in sex and reproductive health-related knowledge, attitudes, and behaviors among students attending project schools. Data from this survey round were not used in analyses undertaken for the present article.

The objective of the KAP III survey, conducted in October–November 1999, was to measure longer-term changes in sex and reproductive health-related knowledge, attitudes, and behaviors, including use of clinic-based reproductive health services, among students attending project and control schools. A modified version of the KAP I questionnaire was used in the survey. Given the panel design of the evaluation study, the intent was to interview as many of the students who had participated in the KAP I survey as possible. Because most students had advanced two grades and many had changed schools, an extensive tracking operation was required in order to identify the schools and classes where KAP I survey respondents could be found. Matriculation records maintained by SEC were used for this purpose. In cases where students who completed a KAP I questionnaire were attending the same school in 1999, all students in the classes in which these students were found were asked to complete a KAP III questionnaire. In cases where students who had completed KAP I had moved to other schools, all of the classes in those schools in which significant numbers (that is, 50 or more) of such students were enrolled were included in the KAP III sample. Resource constraints made tracking all students who had left or dropped out of the public school system or attended other schools impossible.

Table 1 provides background information on students interviewed in the KAP I survey. No statistically significant differences are shown between students attending project schools and those attending control schools with regard to key characteristics and behaviors. With the exception of the knowledge that a woman can

Table 1 Percentage of students attending project and control schools, by selected variables, State of Bahia, Brazil, 1997, KAP I survey

Variable	Project schools (N = 2,424)	Control schools (N = 2,353)
Sex		
Male	38.7	40.2
Female	61.3	59.8
Age		
11–14	46.2	48.9
15–19	53.8	51.1
Grade		
Sixth	56.8	58.8
Eighth	43.2	41.2
Skin color[a]		
White/light brown	72.9	73.6
Dark brown/black	27.1	26.4
Working		
Yes	11.9	13.4
No	88.1	86.6
Knowledge/attitudes		
Knows about the condom	92.4	92.5
Knows about the pill	80.6	77.8
Knows a woman can become pregnant at first intercourse	53.4	50.1
Knows correct use of condom	83.3	80.4
Knows both partners must be treated for an STI	55.6	53.6
Knows AIDS is transmitted by unprotected sex	94.7	93.2
Agrees there are different ways to show sexuality	76.6	74.5
Behaviors		
Has had sexual intercourse	35.3	35.8
Used a contraceptive method at first sex[a]	47.5	44.3
Used a condom at last sex[b]	56.5	53.8
Ever been pregnant or made someone pregnant[a]	9.1	9.4

[a] Skin color is a proxy indicator for family's socioeconomic status.
[b] Question was asked only of those who had had sex: project schools, n = 792; control schools, n = 803.
Note: None of the p-values was statistically significant.

become pregnant the first time she has intercourse and that both partners need to be treated for an STI, students generally had high levels of knowledge of most sexual and reproductive health issues. Thirty-five percent of students (67 percent of boys and 16 percent of girls) reported ever having had sex at the time of the baseline survey. Approximately 50 percent of sexually experienced students reported having used a contraceptive method at first sex and a condom at last sex. Nine percent of students reported having been pregnant or having made someone pregnant.

Service Statistics

Data on adolescents' use of clinic-based health services were obtained from SESAB's computerized SISMAC service statistics system. Two service-use indicators were used in the study: (1) the number of new adolescent contraceptive acceptors and (2) the proportion of contraceptive acceptors who were adolescents. Unfortunately, information on adolescents who visited clinics for other sorts of services is not maintained in the SISMAC system. Arrangements were made also to collect information on a temporary basis in pilot clinics about whether new adolescent method users attended the clinic's partner school, another school, or did not attend school. This arrangement was discontinued in 1998, but was revived for the August–November 1999 period (the last four months of the evaluation study period). The information was used to assess whether students in project schools were making use of reference clinics.

Clinic Survey

To augment the KAP survey and SISMAC data, a survey of adolescent clients and service providers in four reference clinics was undertaken in 1998. The purpose of the survey was to assess: (1) the extent to which service-quality standards were being met in pilot clinics and (2) the level of satisfaction of adolescent clients with the clinic services they received. The survey covered four of the five pilot clinics in Salvador, chosen on the basis of the previous year's service statistics to ensure a sufficient volume of adolescent clients. Clinics in the interior were not included in the exercise because of budget constraints. Accordingly, the findings of this survey can be generalized only to the four clinics included in the survey, which SESAB management thought to be typical of clinics in Salvador. Interviewers were trained by SESAB staff in the use of a standardized questionnaire, and teams of three to four interviewers were posted at each clinic for four weeks during November–December 1998. The field teams were supervised by senior SESAB staff. A total of 385 interviews with adolescent clients was obtained, representing 89 percent of the adolescents visiting the four clinics in the month during which data were collected. All service providers at the four clinics who provided sexual and reproductive health services to adolescents (N = 20) were interviewed.

Statistical Methods

Under the quasi-experimental study design, project impact was to be measured by comparing changes in relevant indicators among students attending project schools as compared with those attending control schools. A panel design, according to which the same students in both project and control schools would be followed over a 30-month period, was adopted in order to maximize

the precision with which changes in sexual and reproductive health knowledge, attitudes, and behaviors could be measured.

Two problems were encountered, however, that made modification of the study design necessary. First, despite strenuous efforts to track the students who had participated in the KAP I survey, the rate of loss to follow-up between the KAP I and KAP III surveys was high: Only 26 percent of students in project schools and 30 percent of control-school students who had completed a KAP I survey questionnaire completed a KAP III questionnaire. Several factors contributed to the high rate of sample attrition, including high dropout and absentee rates in public schools in Bahia, migration between schools, and grade repetition. Because of the resulting danger of attrition bias, the panel feature of the study design was abandoned. Instead, all students in classes that included students who had been interviewed in the KAP I survey were interviewed in the KAP III survey, and the survey data were analyzed as if they had been obtained from independent samples.

Second, although teachers at control schools were not trained in sexual and reproductive health instruction in connection with the Integrated ARH Project, educational activities were offered at all control schools at some point during the three-year evaluation period, and related information, education, and communication (IEC) materials were available at all of the schools. The Federal Ministry of Education sent materials on the national curriculum parameters to all secondary schools in Brazil in 1998. The introduction of sexual and reproductive health education activities in the control schools precludes the production of meaningful estimates of program impact on related knowledge, attitudes, and some behaviors included in the original study design. The recommended topics in the national guidelines were similar to those in the pilot-project curriculum, but no support was provided to help teachers integrate material into their curricula. Because the activities offered in the control schools did not entail linkages with health facilities or the promotion of health-facility use, the assessment of project impact on the use of health services among secondary-school students based upon the original study design remains valid.

Because the process of choosing pilot schools and clinics and the process through which students were exposed to the intervention were not random in nature, determinants of health-facility use other than exposure to the intervention had to be taken into account when changes in use indicators among project- and control-school students were considered. The comparison was, therefore, accomplished through the use of multivariate statistical methods. Logistic regression was used because of the binary nature of the outcomes of interest. The models were estimated in the following form:

$$\text{Indicator} = \text{constant} + \text{KAP III*project school} + \text{project school} + \text{KAP III} + \text{age} + \text{works} + \text{dark/black} + \text{teachers/student} + \text{unobserved factors},$$

where KAP III*project school = 1 if student attended a project school at the time of the KAP III survey; project school = 1 if student attended a project school; KAP III = 1 if the interview was from the KAP III survey; age = respondent's age at the time of the KAP I survey; works = 1 if student worked outside the home (a proxy measure for exposure to outside influences); dark/black = 1 if students identified themselves as having dark or black skin color (a proxy indicator for family's socioeconomic status); teachers/student = teacher-to-student ratio in the school attended; and unobserved factors = factors that were not measured in connection with the project evaluation and that could not be included as control variables.

The parameter of primary interest is the KAP III* project-school dummy variable. This parameter provides a measure of whether the KAP III effect was larger among students attending project as opposed to control schools, that is, whether changes that occurred between the KAP I and KAP III surveys were larger among students attending project schools than among those in control schools. The magnitude of project impact is indicated by the extent to which the odds ratio for a given health-facility-use indicator differs from one. An odds ratio greater (or less) than one that is statistically significant indicates that the KAP III effect was larger (or smaller) among students attending project schools than among those attending control schools.

The data in all surveys were treated as self-weighting. Estimated standard errors for the survey estimates were based upon first-order Taylor-series linearization procedures to compensate for the use of a clustered sampling design. For analytic purposes, each class within a school was treated as a separate cluster.

Three potential sources of bias in the estimates of impact should be noted. First, the schools and clinics participating in the pilot project were chosen in part because of their willingness to participate, and, therefore, comparable results might not have been observed at other schools and clinics. Second, because the findings are based upon the responses of adolescents who were attending school at the time of the KAP I and KAP III surveys, they might be biased to the extent that the comparison groups differ because participants or control-school students dropped out of school for reasons related to sexual or reproductive health (for example,

because of pregnancy). If, for example, students who were not exposed to the intervention had higher dropout rates for such reasons, the estimates would be biased toward overstating the impact. Unfortunately, the resources available to the evaluation study did not permit the tracking of students lost to follow-up between surveys to determine whether they had dropped out of school for such reasons.[1]

Finally, although the multivariate statistical procedures effectively control for differences in the groups being compared with regard to the factors used as control variables, the comparison groups might differ with regard to factors correlated with the outcomes of interest that were not measured in connection with the evaluation study. For example, if the students who were exposed to sexual and reproductive health education were also those who were predisposed to engage in healthier behaviors, this unobserved receptivity or predisposition would be reflected in larger estimates of project impact than are warranted. Although no evidence was found that the schools chosen for the pilot project differed from nonparticipating schools with regard to such receptivity or predisposition, nevertheless, students may have been self-selected in their receptivity to the information provided.

Results

Generally, project activities were carried out as planned by SESAB and SEC. By the end of 1997, an average of 3.2 service providers per SESAB clinic had been trained in reproductive health service provision appropriate for adolescents (the project target was two trained providers per clinic). Only one clinic failed to maintain the target of having two trained providers throughout the evaluation period.

Two anomalies in project implementation at SESAB health facilities should, however, be noted. First, two reference clinics had to be replaced for non-project-related reasons (one experienced organizational difficulties in 1997 that resulted in a prolonged shortage of trained service providers, while the other discontinued the provision of family planning services at the end of 1997). As a result, clinic substitutions were made during 1998. The extent to which information about clinic substitutions was widely disseminated to students is uncertain. Students who were told in 1997 which clinic to visit would, if they sought services in 1998, have ended up at a non-referral clinic. In addition, students who had already received reproductive health or family planning services in 1997 had to start over again as first-visit clients at a new referral clinic. In light of the existing social, psychological, and logistic barriers to adolescents' use of health clinics for reproductive health and family planning services, such disruption in the referral system would be expected to affect negatively their motivation to seek services.

Secondly, the administration of the public health system changed in 1998, as the State of Bahia moved to municipal control of health clinics. Consequently, five of the six reference clinics were transferred from SESAB to municipal management. The organization and quality of adolescent services may have stayed the same in some clinics as a result of the influence of trained providers posted there because the clinic and municipal authorities involved supported project objectives, but the extent of this influence and support is uncertain.

SEC also met its target for training teachers to integrate sexual and reproductive health information into the curriculum of key subjects taught throughout the school year. A total of 84 teachers in the six project schools were trained or retrained in this integration over the life of the project. Data gathered in 1999 (not shown) indicate that sexual and reproductive health topics had been included in 32 percent of class sessions during the 1999 school year, a result slightly in excess of the SEC target of 30 percent. Presumably, this finding indicates that these topics were covered in about one-third of classes in the four target disciplines.

Of special importance for the purposes of the present study is the implementation of the joint or linked SESAB/SEC activities intended to facilitate students' use of health clinics. Evaluation data (not shown) indicate that in four of the six project schools, teachers met with health-care service providers from the partner clinic and service providers from the partner clinics visited the schools to participate in the project's educational efforts. In three of the six schools, teachers visited the partner clinic accompanied by students, although the majority of teachers at project schools did not do so.

Data from the KAP III survey and the accompanying survey of school personnel provide some insights about the extent to which the referral mechanism was implemented as planned. In a 1999 survey of teachers in project schools (N = 34), 18 percent reported having referred at least one student to a reference clinic during the 1999 school year. In the KAP III survey, however, only about 2 percent of students attending project schools reported that they had been referred to a clinic by a teacher from their school. Only 19 percent of project-school students reported that their school had referred students to a specific clinic, whereas 31 percent said the school had no such policy, and 51 percent said that they did not know. Only 10 percent of project-school students

correctly identified the reference clinic for their school in the KAP III survey. Because the policy of referring students was undertaken only among students meeting certain criteria, however, the policies may not have been advertised widely, so that relatively few students may have learned of the existence of the linked health facilities.

Process evaluation revealed some problems in the use of referral cards, the means by which teachers were to refer students to clinics. These problems apparently contributed to the limited success of the project's referral strategy. Teachers were instructed during training to mention to their students the school's partnership with a clinic and to give a referral card to any student expressing a desire to seek health services who met the referral criteria outlined above. A student receiving such a card was to present it at the reception desk of the clinic so that the service providers could record the student's visit with a stamp on the card, which the student was to give back to his or her teacher. At the end of each month, all cards were to be collected by SEC so that they could monitor the flow of referrals. Teachers were instructed to follow up with referred students after their clinic visits to monitor the referral system's functioning. Few referrals were made using the cards during the early stages of the pilot project, however, and the practice of using the cards never gained momentum. During the period of less than six months in 1997 when the card system was in use, several problems were observed. First, teachers reported that the preprinted referral cards were often delivered late to the schools. Second, the participating clinics were unable to deliver services immediately to students who presented their cards because the clinics' daily agendas were set in advance. The service providers involved indicated, however, that they rearranged their daily agendas to accommodate the students from the referral schools. Finally, teachers reported that they had trouble retrieving cards from the students who had visited clinics. The card system was, therefore, discontinued in 1997. In 1999, the use of such cards was judged formally as unsuitable for facilitating student access to clinics. The referral policy remained in effect, however.

Effects of Receiving Information at School

Table 2 presents data derived from the KAP I and KAP III surveys showing the extent to which the Integrated ARH Project was successful in increasing the availability of sexual and reproductive health information at project schools. The increase in the proportion of students of both sexes at project schools who reported that they received such information from a health professional was significantly larger than that of students attending control schools. This finding is consistent with expectations. Despite the introduction of sexual and reproductive health education in control schools, the increase in the proportion of students of both sexes attending project schools who reported having received sexual and reproductive health information in class exceeded that observed in control schools by a considerable margin. These data confirm that the project was successful in increasing the flow of information to students at project schools offered by health professionals and as part of the regular curriculum.

Table 2 Percentage of students attending project and control schools who received sexual and reproductive health information, by source of information, according to sex and category of school, State of Bahia, Brazil, 1997–99

Source of information	Males		Females	
	Project school	Control school	Project school	Control school
	Percent (N)	Percent (N)	Percent (N)	Percent (N)
Health professional				
KAP I	9.9 (939)	14.8 (946)	8.6 (1,485)	13.0 (1,407)
KAP III	13.7 (588)	10.1 (686)*	15.3 (1,048)	12.5 (1,198)*
School classes				
KAP I	58.0 (939)	56.8 (946)	60.7 (1,485)	59.1 (1,407)
KAP III	82.2 (588)	46.3 (686)**	87.5 (1,048)	47.0 (1,198)**
Individual teacher				
KAP I	11.3 (939)	11.0 (946)	8.4 (1,485)	8.5 (1,407)
KAP III	4.6 (588)	8.2 (686)	3.9 (1,048)	7.2 (1,198)

* Significant at $p < 0.05$; ** $p < 0.001$.

Effects on Sexual Behavior and Contraceptive Use

Few significant differences were observed between the two samples of students in increased sexual and reproductive health-related knowledge or changes in attitudes or perceptions in this area (data not shown). This result may be due in part to the introduction in control schools of education on this subject unrelated to the Integrated ARH Project. As Table 3 shows, no effects of project efforts were found on levels of sexual activity or on contraceptive behavior. Two-thirds of boys and 15 percent of girls reported being sexually initiated at the time of the KAP I survey. These proportions increased to 76 percent and 29 percent, respectively, by the time of the KAP III survey, reflecting the two-year increase in students' age. These data for sexual initiation are consistent with recent DHS data for Northeast Brazil (BEMFAM 1999). Contraceptive-use rates generally and condom-use rates in particular at first and last sex were high in both survey rounds. Although project effects were not detected, the increased proportion of girls reporting having used a contraceptive method at first sex and the proportions of students of both sexes reporting having used a condom at last sex are encouraging. These data provide evi-

Table 3 Percentage of students attending project and control schools who had had sexual intercourse and who were using contraceptives, by sex and category of school, State of Bahia, Brazil, 1997–99

Source of information	Males		Females	
	Project school	Control school	Project school	Control school
	Percent (N)	Percent (N)	Percent (N)	Percent (N)
Ever had sexual intercourse				
KAP I	66.6 (939)	67.4 (946)	15.6 (1,485)	14.6 (1,407)
KAP III	76.3 (588)	76.1 (686)	31.2 (1,048)	27.3 (1,198)
Used a contraceptive method at first sex				
KAP I	45.0 (939)	43.3 (946)	53.2 (1,485)	46.9 (1,407)
KAP III	48.8 (588)	46.6 (686)	63.3 (1,048)	61.1 (1,198)
Used a contraceptive method at last sex				
KAP I	74.1 (939)	70.9 (946)	81.0 (1,485)	71.4 (1,407)
KAP III	83.9 (588)	80.9 (686)	89.4 (1,048)	82.1 (1,198)
Used a condom at last sex				
KAP I	62.6 (939)	58.3 (946)	42.2 (1,485)	40.8 (1,407)
KAP III	73.7 (588)	70.6 (686)	51.7 (1,048)	50.6 (1,198)

Note: None of the differences was statistically significant.

dence of at least a theoretical demand for reproductive health services in this population.

Multivariate analyses were undertaken on the behavior indicators considered in Table 4 to assess whether the observations described above were distorted by comparison-group differences in factors unrelated to sexual and reproductive health education. None of the differences between comparison groups was observed, however, after the introduction of control variables for age, work status, skin color, and the student–teacher ratio at the school the respondent attended. The failure to observe project effects does not, therefore, appear to have been the result of compositional differences between comparison groups.

Effects on Students' Use of Clinics

The initial evidence considered on the question of project impact on health-facility use is based upon service statistics obtained from SESAB's SISMAC system. The Integrated ARH Project was anticipated to increase the number of adolescent clients at project reference clinics over the 30-month evaluation study period. SISMAC data on the numbers of new adolescent pill, condom, and total contraceptive method users (that is, of all methods available) reported by the six pilot-project clinics during the 1995–99 period are displayed graphically in Figure 1. Comparable data for the 258 public clinics in the State of Bahia that were not included in the pilot project are displayed in Figure 2.

The data suggest an upward trend in the number of new adolescent pill users and in the total number of new adolescent method acceptors at the six reference clinics during the 1997–99 project period.[2] No clear trend is apparent with regard to numbers of new condom users.

Table 4 Odds ratios from logit regression for the effects of project-school attendance on sexual and reproductive health behaviors, by sex, State of Bahia, Brazil, 1997–99

Behavior	Male	Female
	Odds ratio (CI)	Odds ratio (CI)
Ever had sexual intercourse	0.96 (0.63–1.46)	0.80 (0.47–1.35)
Used a contraceptive method at first sex	1.06 (0.75–1.49)	0.79 (0.51–1.24)
Used a contraceptive method at last sex	1.03 (0.62–1.73)	1.14 (0.59–2.18)
Used a condom at last sex	1.00 (0.60–1.66)	0.95 (0.56–1.59)

Note: 95 percent confidence intervals are shown in parentheses. None of the differences was statistically significant.

Figure 1 Average annual number of new adolescent contraceptive users at pilot clinics, by method and year, Salvador, State of Bahia, Brazil, 1995–99

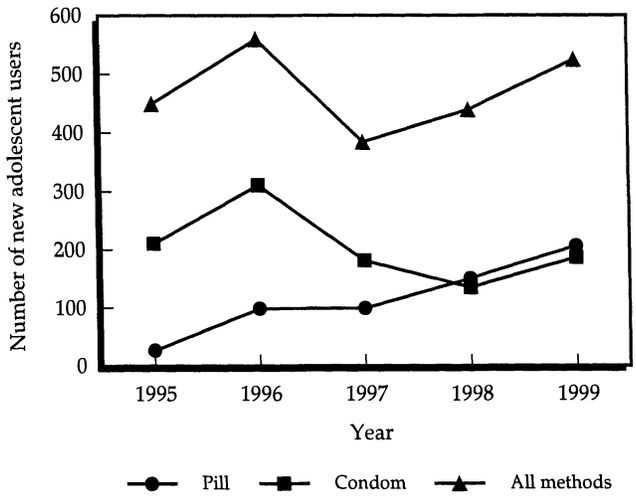
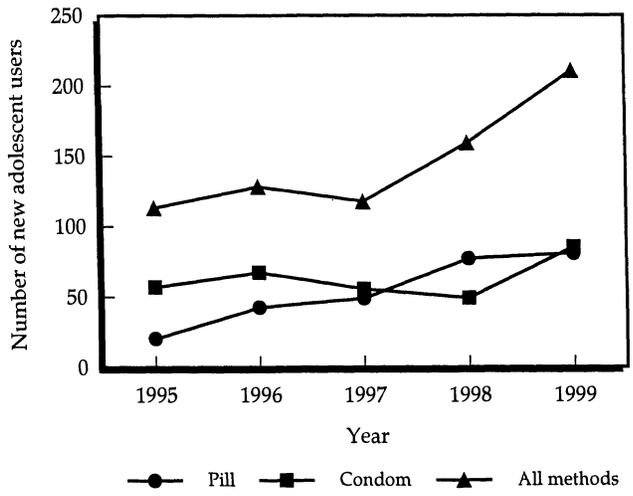


Figure 2 Average annual number of new adolescent contraceptive users at 258 nonproject clinics, by method and year, State of Bahia, Brazil, 1995–99



Although the levels of new adolescent contraceptive users was lower than that observed at project clinics, comparable trends are observed at nonproject clinics, and the proportional gain in numbers of new adolescent contraceptive users was, in fact, larger at nonproject than at project clinics during this period.

Figures 3 and 4 present SISMAC data on trends in the proportion of new contraceptive acceptors who were adolescents at project and nonproject clinics, respectively, during the 1997–99 period. Again, the trends at project and nonproject clinics appear to have been similar. The SISMAC data thus provide little evidence of a marked increase in adolescents' use of health facilities resulting from the Integrated ARH Project.

Figure 3 Proportion of new contraceptive users at pilot clinics who were adolescents, by method and year, Salvador, State of Bahia, Brazil, 1995–99

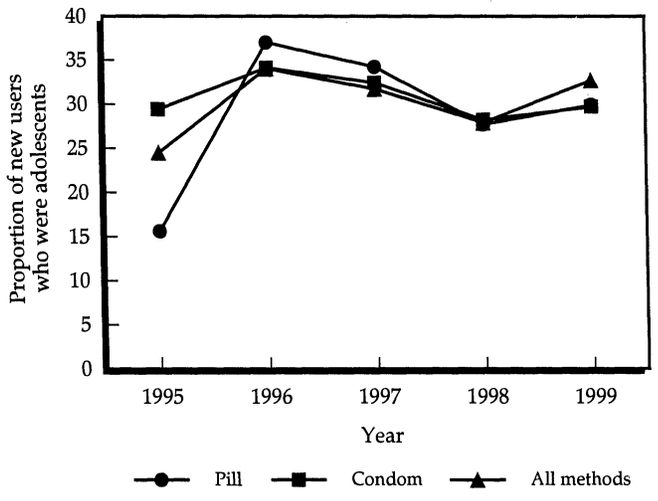
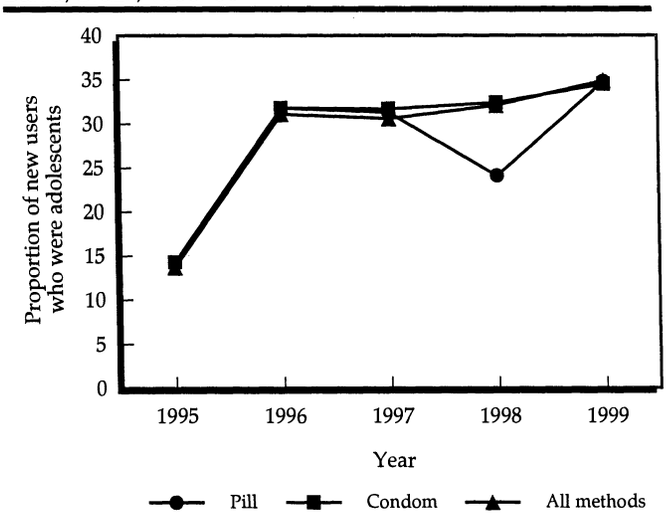


Figure 4 Proportion of new contraceptive users at nonproject clinics who were adolescents, by method and year, State of Bahia, Brazil, 1995–99



The school referral system implemented under the Integrated ARH Project was the basis of the expectation of an increase in numbers of adolescent clients at reference clinics. In order to track project-school students' clinic use, a special form was introduced as part of the SISMAC system at the six clinics included in the project evaluation during 1997. The data gathered using the form indicate that only 5 percent of all new adolescent clients came from the designated partner school in the calendar year 1997. Another 9 percent came from a pilot-project school, but not the clinic's designated partner school. (One clinic reported no adolescent clients coming from any project school.) The form was reintroduced during August–November, 1999. During this four-month period, only 6 percent of all new adolescent clients were recorded as coming from the designated partner school. The evidence suggests that the referral system implemented as an element of the project did not result in a significant increase in project-school students' use of reference clinics.

Further evidence of clinic service use is provided by comparisons of data from the KAP I and III surveys. Table 5 presents data on changes in indicators related to students' use of clinic-based services, their reasons for nonuse, and their comfort levels with service providers, by category of school. As the table shows, few of the comparisons were statistically significant. No significant comparison-group differences are observed with regard to students' use of clinics. The increase in the proportion of female students attending project schools who reported the opinion that "someone from this school could obtain a contraceptive method from a health post" was statistically significantly larger than that observed among girls attending the control schools. Marginally significant differences in favor of girls attending project schools were also observed with regard to increases in the proportions of students reporting that they would go to a clinic if they had a sexually transmitted infection ($p = 0.055$) and that they would feel comfortable discussing sex with a doctor at a clinic ($p = 0.079$). Thus, although no project effects on service use were detected, some evidence was found of effects on students' awareness that they can obtain reproductive health services.

Multivariate analyses were undertaken on the indicators of health-service use considered in Table 5 to rule out the possibility that the observations noted above were distorted by comparison-group differences in factors unrelated to sexual and reproductive health education (see Table 6). No additional differences between comparison groups were observed, however, after controlling for age, work status, skin color, and the student–teacher ratio at the respondent's school (results not shown).

Table 5 Percentage of students attending project and control schools who used clinic health services, their reasons for nonuse, and level of comfort with service providers, by sex and category of school, State of Bahia, Brazil, 1997–99

	Males		Females	
	Project school	Control school	Project school	Control school
Variable	Percent (N)	Percent (N)	Percent (N)	Percent (N)
Has visited a clinic				
KAP I	6.0 (939)	5.4 (946)	4.3 (1,485)	3.9 (1,407)
KAP III	10.7 (588)	8.4 (686)	2.6 (1,048)	2.3 (1,198)
Would go to a clinic if had an STD				
KAP I	64.4 (939)	68.0 (946)	61.7 (1,485)	64.8 (1,407)
KAP III	70.7 (588)	69.1 (686)	73.5 (1,048)	67.9 (1,198)
Did not go to clinic because:				
Ashamed or worried about knowing someone there				
KAP I	10.2 (939)	9.1 (946)	16.5 (1,485)	19.3 (1,407)
KAP III	2.9 (588)	2.5 (686)	6.7 (1,048)	6.2 (1,198)
Long wait or because the clinic does not have medicine				
KAP I	5.9 (939)	7.4 (946)	4.2 (1,485)	3.5 (1,407)
KAP III	0.5 (588)	2.2 (686)	0.9 (1,048)	1.0 (1,198)
Clinic does not serve adolescents				
KAP I	6.6 (939)	4.8 (946)	6.1 (1,485)	6.0 (1,407)
KAP III	1.4 (588)	0.7 (686)	1.0 (1,048)	0.8 (1,198)
Feels comfortable discussing sex with doctor at clinic				
KAP I	10.2 (939)	9.1 (946)	9.6 (1,485)	8.1 (1,407)
KAP III	8.1 (588)	6.3 (686)	16.7 (1,048)	10.9 (1,198)
Feels comfortable discussing sex with nurse at clinic				
KAP I	6.6 (939)	5.6 (946)	4.8 (1,485)	5.4 (1,407)
KAP III	4.0 (588)	2.8 (686)	4.3 (1,048)	3.0 (1,198)
Feels that someone from this school could obtain a contraceptive method from a clinic				
KAP I	14.1 (939)	13.8 (946)	18.0 (1,485)	16.1 (1,407)
KAP III	36.8 (588)	31.5 (686)	60.8 (1,048)	42.2 (1,198)

Note: The only significant difference between project and control schools was the proportion of females who feel that someone from their school could obtain a contraceptive from a clinic.

Table 6 Odds ratios from logit regression for the effects of project-school attendance on students' use of clinics' health services, their reasons for nonuse, and their level of comfort with service providers, by sex, State of Bahia, Brazil, 1997–99

	Males	Females
Variable	Odds ratio (CI)	Odds ratio (CI)
Has visited any clinic	1.23 (0.16–9.47)	1.05 (0.19–5.76)
Would go to a clinic if had an STD	1.23 (0.85–1.77)	1.43 (1.03–1.97)*
Did not go to clinic because:		
Ashamed or worried about knowing someone there	1.19 (0.61–2.31)	1.31 (0.78–2.21)
Long wait or because the clinic does not have medicine	0.34 (0.12–1.08)	0.56 (0.25–1.25)
Clinic does not serve adolescents	1.05 (0.28–3.90)	1.54 (0.52–4.57)
Feels comfortable discussing sex with doctor at clinic	1.20 (0.64–2.25)	1.15 (0.78–1.70)
Feels comfortable discussing sex with nurse at clinic	1.26 (0.60–2.66)	1.46 (0.74–2.87)
Feels that someone from this school could obtain a contraceptive method from a clinic	1.22 (0.75–1.97)	1.69 (1.01–2.81)*

* Significant at $p < 0.05$.
Note: 95 percent confidence intervals are shown in parentheses.

Further insight into young people's use of clinic-based services is provided by the profile of adolescent clients at the four clinics covered in the survey conducted in 1998, shown in Table 7. The overwhelming majority of young clients (97 percent) were female. The mean age of these clients (17.5 years) was higher than that of female students interviewed in the KAP III survey (16.7 years). The majority (57 percent) of respondents attended school, a finding confirming that students comprise a substantial portion of the total number of clients and justifying the linked school/clinic approach adopted by the Integrated ARH Project. Only 11 percent of adolescents seen at the four clinics attended one of the pilot-project schools, however. Clearly, planners' initial concerns that referrals from pilot schools would overwhelm the clinics were not warranted.

Nearly all adolescent clients were sexually initiated and had previously used a family planning method, and 67 percent had been pregnant (6 percent three or more times). This profile differs substantially from that of the female KAP III survey respondents, of whom only 29 percent had experienced a sexual relationship and 9 percent had been pregnant. The client exit-survey data suggest, therefore, that public clinics in Salvador are currently serving a clientele with substantially different characteristics from the secondary-school population that was the primary focus of the Integrated ARH Project.

The most frequent responses concerning choice of clinic given during client exit interviews were "closest to home" (50 percent) and "got better service/attention" (45 percent) (not shown). Only 3 percent of respondents indicated that a teacher had referred them to the clinic. Interestingly, only about 7 percent of respondents cited "closest to school" or "on the way to school" as a reason for choosing the clinic. Thus, neither reference-clinic status nor proximity to school appears to be a major factor in the choice of clinics among adolescent clients.

Unexpectedly, almost 80 percent of respondents to the clinic survey reported that their parent(s) knew that they had gone to the clinic that day, and 53 percent reported that their families had suggested they go to the

Table 7 Percentage of 385 adolescent clients at four reference clinics during a 30-day period in 1998, by selected characteristics, Salvador, State of Bahia, Brazil

Characteristic	Percent	(N)
Age		
12–17	43.6	(168)
18–19	56.4	(217)
Gender		
Male	3.1	(12)
Female	96.9	(373)
Marital status		
Single	56.8	(218)
Married/in union	41.6	(160)
Divorced/separated	1.8	(7)
Attending school		
Yes	56.6	(218)
No	43.4	(167)
Attends a pilot school (missing = 167)		
Yes	11.0	(24)
No	89.0	(194)
Has had sexual intercourse (missing = 57)		
Yes	95.8	(369)
No	4.2	(16)
Number of previous sexual relations (missing = 16)		
0–5	25.0	(82)
6–15	30.5	(100)
16–40	35.7	(117)
40+	8.8	(29)
Previous use of contraceptive		
Yes	96.2	(355)
No	3.8	(14)
Previously pregnant (or made someone pregnant)		
Yes	66.6	(241)
No	33.4	(121)

clinic for services. Family members appear to be a positive force in Bahia in terms of promoting adolescents' use of clinics' health services, at least among the subpopulation of young people interviewed at clinics for the present study (as noted above, these were primarily older female adolescents, of whom many had had a prior pregnancy). Whether such parental support exists for adolescents in Bahia in general cannot be assessed from the available data.

Finally, client satisfaction appears to have been high among the clinics' adolescent clients. More than 90 percent of respondents felt that the service providers they dealt with would maintain confidentiality, that they had paid attention to them and responded to their questions, that they gave explanations or clarifications and made them feel at ease, and that they were respectful and competent. Almost all (98 percent) of the respondents said that they planned to return to the clinic where they were interviewed for the survey at some time in the future, and 96 percent said that they would recommend the clinic to a friend.

Discussion

The evaluation findings, based upon several sources of data that suffer from a number of limitations, are consistent in indicating a lower-than-expected level of project impact. On the positive side, the findings indicate that the Integrated ARH Project resulted in an increased flow of sexual and reproductive health-related information from a school-based source, and in particular from a health professional. Having service providers from reference clinics visit schools is the most likely reason for the latter observation. (Whether visits from service providers from other clinics might have had the same effect is uncertain.) Students attending project schools were also statistically significantly more likely to have reported their intention to use clinic-based services when necessary (for example, if they had a sexually transmitted infection). Levels of sexual and reproductive health knowledge among students increased statistically significantly over the 30-month evaluation period, and a number of positive changes in attitudes, perceptions, and intentions were observed. Because the changes observed among students attending project schools did not differ significantly from those among students attending control schools, they cannot be attributed to the project, however.

Although secondary-school students in Bahia use public clinics, no evidence was found of increased contraceptive use among new adolescent acceptors at reference clinics. The evidence indicates that the referral system implemented in project schools was not effective, nor do teachers' referrals appear to have been an important factor in adolescents' decisions to make use of clinic services or to determine which clinic to use. Instead, the evidence suggests that, at least among young people who use clinics in Bahia, convenient location and perceptions of high-quality services were the primary factors influencing clinic choice among adolescent clients.

The characteristics of adolescent clients of reference clinics were observed to differ statistically significantly from the primary target audience for the project (students attending secondary schools in Bahia). Clinic clients were overwhelmingly female, somewhat older, more likely to have had sexual intercourse, and more likely to have ever been pregnant in comparison with secondary-school students as a whole. Male adolescents and younger, less sexually experienced female adolescents were underrepresented among clinic clientele. Young people seeking primary prevention services do not appear to be using the clinics in large numbers.

What factors might have contributed to the lower-than-expected level of project impact? With regard to

lack of impact on sexual and contraceptive behaviors, the project joins a sizable number of similar interventions that have been unable to demonstrate effects on behaviors (many were able to demonstrate impact on knowledge and attitudes, however) (Kirby 1997 and 1999a). Kirby (2001) has identified a series of features of relatively successful school-based programs in sexual and reproductive health education, in terms of behavioral impact. The curriculum used in Bahia's secondary schools in the pilot project incorporates many of these features, and larger impacts may be seen once the program has become better established. Because sexual and reproductive health knowledge is only one of many antecedents of risky behaviors (Kirby 1999b), other antecedents of such behaviors may have to be addressed in order to influence substantially the sexual and contraceptive behaviors of Bahian adolescents.

The low impact of the project on students' use of clinic-based health services reflects the problems encountered with the referral cards, the need to substitute two of the reference clinics, and the municipalization of public clinics in 1998. Moreover, although the project trained clinic staff to provide reproductive health services appropriate to adolescents, few of the features of clinics believed to make health facilities "youth friendly" were incorporated into the project (Senderowitz 1999; Nelson et al. 2000). For example, in 1999 none of the six clinics included in the evaluation study handed out educational material to adolescents or had a special day, a special patient flow, or a special entrance for adolescents, and only one clinic had a receptionist who had been specially trained to deal with adolescent clients. These are characteristics of facility-based services that are thought to be important in settings where, according to social norms, young people are stigmatized for being seen at health facilities (Senderowitz 1999; Gutierrez et al. 2000). Teachers may also fail to motivate students to use clinics.

Even if such measures as those listed above had been implemented, they might not have been adequate to overcome (1) the ready access to condoms and oral contraceptives that adolescents in urban Brazil have through pharmacies and (2) communities' refusal to accept that unmarried young people require sexual and reproductive health services. That alternative sources of contraceptives are available to the young in Salvador makes clinic-based services a less essential resource for adolescents seeking to practice responsible sex than for those who have no other recourse. These alternative sources of contraceptives typically do not provide adequate information on the proper use of methods, however. Therefore, finding ways to provide unmarried young people with information and counseling in nonstigmatizing settings is important even where a well-established commercial resource exists.

The findings of a recent evaluation of the impact of improvements in the youth friendliness of services in Lusaka, Zambia, are instructive. The study found that although the programs evaluated improved the adolescents' access to services, the observed changes in service-use levels were not related to the degree of the clinics' youth friendliness, but were associated with the level of the local community's acceptance of such services for young people (Nelson et al. 2000). These findings suggest that future programs in Bahia (and elsewhere) should target not only adolescents and health-service providers, but also communities' social norms, if significant and sustained increases in young people's use of clinic-based health services are to occur.

Notes

1 In settings such as Northeast Brazil that are characterized by sporadic school attendance and high levels of population mobility, the conduct of panel studies requires more rigorous follow-up procedures than were possible during the present study. Among the steps that might be taken are more rigorous tracking exercises prior to data collection, multiple visits to schools to obtain interviews from sporadic attendees, and home visits to young people from whom data cannot be obtained at school.

2 The erratic trends in the SISMAC data during the 1995–96 period are likely anomalies associated with the start-up of the service statistics system.

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