

Sexuality Education and Young People's Sexual Behavior: A Review of Studies

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To assess the effects of HIV/AIDS and sexuality education on young people's sexual behavior, a comprehensive literature review was commissioned by the Office of Intervention Development and Support within the World Health Organization's Global Programme on AIDS. Fifty-two reports were reviewed. Of 47 studies that evaluated interventions, 25 reported that HIV/AIDS and sexuality education neither increased nor decreased sexual activity and attendant rates of pregnancy and STDs. Seventeen reported that HIV and/or sexuality education delayed the onset of sexual activity, reduced the number of sexual partners, or reduced unplanned pregnancy and STD rates. Only three studies found increases in sexual behavior associated with sexuality education. Hence, little evidence was found to support the contention that sex and/or HIV education promote promiscuity. The interpretative value of this research often was compromised, however, because of inadequacies in study design, analytic techniques, outcome indicators, and reporting of statistics.

Sexuality education for children and young adults is one of the most hotly debated and emotional issues facing policy makers, national AIDS program planners, and educators today. Arguments have raged over how explicit

This article extends and develops work initiated in two reviews earlier commissioned by the World Health Organization's Global Programme on AIDS: N. Ford, A. Fort-D'Auriol, A. Ankomah, E. Davies, and E. Mathie (1992), *Review of Literature on Health and Behavioural Outcomes of Population and Family Planning Education Programmes in School Settings in Developing Countries*, WHO/GPA, Geneva; and E. R. Allgeier (1993), *HIV/AIDS and Sex Education Strategies*, WHO/GPA, Geneva. The authors would also like to thank Dr. Paul van de Ven for his helpful comments and suggestions on the final draft of this article.

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education material should be, how much of it there should be, how often it should be given, and at what age to initiate instruction. Sexuality education for young people in developed countries has had a long and checkered history, its fortunes waxing and waning with the changing of governments and the tide of public opinion (Holmstedt, 1974; Mellanby, Phelps, & Tripp, 1992; Nazario, 1992; Scales, 1981; Siedlecky, 1979; Thomson, 1994; Wallace & Vienonen, 1989). Those changes are reflected in the content and ideologies that underpin school sexuality education curricula and the public controversy they engender. As a consequence, sexuality education is far from a homogeneous or unitary concept: It encompasses a wide range of curricula that differ in terms of aims, scope, implementation, and content (Jorgenson, Potts, & Camp, 1993; Nazario, 1992). The variety of approaches is reflected in the range of nomenclature used to describe what otherwise is broadly termed *sexuality education*. For example, programs have been labeled variously as family life education, sexual health, personal development, values clarification, "just say no," sex respect, and human sexuality. The descriptions of the interventions to be covered in this article also attest to the variety of approaches to sexuality education.

The degree of success this array has achieved also has varied. Kirby et al. (1994) investigated factors that contributed to the efficacy of school-based sexuality education programs in reducing any unwanted outcomes of adolescent sexual activity. The researchers found that effective instruction was grounded in social learning theory along with focused curricula giving clear statements about behavioral values and norms. More specifically, successful programs featured clear delineation of the risks of unprotected sex and methods to avoid those risks, focusing on activities that address social or media influences and modeling and practice in communication and negotiation skills. There is evidence also that providing clinical services, encouraging openness about sex, and initiating sexuality education prior to the onset of sexual activity may further enhance these outcomes of later initiation and safer practices (Jones et al., 1985; Nafstad, 1992; Wallace & Vienonen, 1989). Vincent, Geiger, and Willis (1994) flagged the limited effectiveness of isolated single interventions.

Attempts to refine program efficacy inevitably encounter the philosophical concern of legitimizing sexuality in adolescence (Thomson, 1994). The advent of the HIV/AIDS pandemic has inflamed the debate further. The necessarily frank treatment in education programs of historically taboo sexual practices (e.g., anal sex, homosexual sexual practice) has rekindled fears as to how young people will respond to the information presented to them. Whereas HIV education and sexuality education for young people clearly have fundamental points at which they diverge (Gillies, 1994), they

both have been subject to the same criticism: The discussion of sexuality for purposes other than the promotion of abstinence is an incitement and enticement to precocious sexual involvement (Allgeier & Allgeier, 1988; Nazario, 1992; Scales, 1981; Thomson, 1994; Vincent et al., 1994; Whatley & Trudell, 1993). It is clear that such criticism has had, and will continue to have, a significant effect on the extent and nature both of HIV and sexuality education (Scales, 1981; Udry, 1993; Vincent et al., 1994). For this reason, a thorough examination of the validity of this contention is essential. The aim of the current review is not to compare the relative merits of HIV and sexuality education programs, nor to theorize about why some approaches appear more successful than others in reducing the unintended consequences of adolescent sexual activity. Both of those issues have been addressed comprehensively elsewhere (Kirby, 1992; Kirby et al., 1994; Mellanby et al., 1992; Oakley, Fullerton, & Holland, 1995; Visser & van Bilsen, 1994). This article will complement and extend the previous work by bringing together data collected within and outside the United States. It also will go beyond previous reviews that are restricted to those interventions that are school-based (Kirby, 1992; Kirby et al., 1994; Stout & Rivara, 1989). The primary intention is to inform policy makers, program planners, and educators about the impact of HIV and/or sexuality education on the sexual behavior of youth as described in the published literature. Methodological considerations hampering the assessment of this body of literature also will be discussed. This article describes findings from a literature review commissioned by the World Health Organization's Global Programme on AIDS.

METHOD

Twelve literature databases were searched, and international experts in the field were consulted to obtain relevant material.¹ Where possible, articles were translated into English. The collection of articles cited in this review is representative rather than exhaustive.

The focus of the review is on research that studied the behavioral impact of HIV/AIDS and sexuality education on young people. Research that dealt solely with knowledge and attitudes about sex has been excluded because of the poor association between attitudes and knowledge, on one hand, and behavior, on the other (Kirby, 1985b). This also means that only the behavioral outcomes of multifaceted studies are reported. Similarly, studies that have described only policy and services with no behavioral impact analysis also have been excluded. Behavioral outcome most commonly is assessed by comparing people who did or did not receive HIV/AIDS and/or sexuality

education in terms of adolescent pregnancy, abortion and birth rates, infection rates with sexually transmitted disease (STD), and self-reported sexual activity.

Data dating from the mid-1970s were included in this report, even though some of the research was conducted before the advent of HIV/AIDS. Although the content of sexuality education has changed in the past 20 years, the basic findings from early studies still are relevant in terms of the relation of sexuality education to sexual behavior.

The studies considered in this review were classified into four types: controlled intervention studies, other intervention studies, cross-sectional surveys, and national and international comparison studies. The general findings arising from research under these headings will be described, with key studies being discussed in detail. Three studies will be considered outside those frameworks because the findings conflict with the general corpus of research.

FINDINGS

Controlled Intervention Studies

Experimental designs were employed in 11 studies, all of which were conducted in the United States. Those studies randomly assigned individual participants or groups (e.g., school classes) to treatment (e.g., sexuality education or HIV/AIDS education) or control conditions. The studies were conducted primarily with school-age or college students, most of them involving mixed gender groups, although some were single gender studies. Intervention impact was assessed by pretest and posttest measures of self-reported sexual activity and/or indicators of unprotected² sexual activity such as pregnancy, abortion, and birth rates.

The findings of those studies (see Table 1) were remarkably consistent despite variations in sample size, course composition, course duration, country of origin, and year of publication (1985 through 1995). Five of the sexuality education programs were associated with delayed initiation of intercourse (Jorgenson et al., 1993; Kirby, Barth, Leland, & Fetro, 1991; Zabin, Hirsch, Smith, Streett, & Hardy, 1986) and/or reduced pregnancy, abortion, or birthrates, for instruction recipients (Vincent, Clearie, & Schlucter, 1987; Williams, Achilles, & Norton, 1985). Following an AIDS prevention curriculum, one study found greater monogamy and consistent condom use (Walter & Vaughan, 1993), and another noted that instruction recipients had fewer sexual partners in the previous 2 months compared to controls (Main

et al., 1994). Three studies reported no relation of sexuality education to sexual activity (Bellingham & Gillies, 1993; Levy et al., 1995; Miller et al., 1993). However, changes or differences in rates of sexual activity in the Miller et al. study would have been difficult to detect, given the overall low rates of sexual participation (between 3% and 5%).

Despite varying success, 10 of the 11 studies did not indicate that sexuality education leads to earlier initiation or greater sexual activity. The exception to this trend was reported by Christopher and Roosa (1990), and that study will be described in a subsequent section.

Vincent et al. (1987), for example, demonstrated the potential for dramatic decrease in rates of adolescent pregnancy through the provision of sexuality education and family planning services. The program was instituted within a portion of a county in South Carolina, with the remainder of the county and three other counties serving as control areas. The intervention involved education for adult leaders, such as community agency professionals, religious leaders, and parents. There was school-based sexuality education for students from grades K through 12, broadcasting of program initiatives and messages through the media, and integration of sexual issues into mainstream health promotion. After 2 to 3 years of program implementation, the area that carried the intervention experienced a 35.5/1000 reduction in the estimated pregnancy rate for females 14 through 17 years of age, as compared with 14.4/1000 in the nonintervention area of the target county, and increases of 5.5 ($p < .002$), 16.4 ($p < .001$) and 13.9/1000 ($p < .0001$) in the control counties. The study demonstrated that the effects of sexuality education initiatives may be observed on a scale larger than that of a single school or college class or institution.

The randomized and controlled design of those intervention studies facilitate an accurate assessment of the impact of particular sexuality education programs. Tight control over program content and the study sample allows valid comparison with no intervention conditions, although one study, which reported comparative reductions in birth rates in the treatment group, failed to state the statistical significance of the findings (Williams et al., 1985). From those studies, it would appear that sexuality education does not lead to greater sexual activity but may lead to responsible and safer choices for young people.

Other Intervention Studies

The bulk of the studies of the relation of HIV and sexuality education to sexual activity were nonexperimental designs. A total of 27 studies (see

(text continues on p. 429)

TABLE 1: Summary of Study Design, Type of Intervention, and Key Findings of Controlled Intervention Studies

Study	Intervention	Sample	Key Findings for Impact on Sexual Behavior
School-based Bellingham & Gillies, 1993, USA	Discussion and role play based on a peer-produced comic dealing with HIV, safer sex, values, attitudes regarding people with HIV over 2 weeks	N = 164 control and 173 experimental male and female trainees at youth center ages 16 through 19 years	<ul style="list-style-type: none"> No differences between experimental and control groups at pretest or immediate posttest in percentage sexually active in the past year (no p value) or number of partners ($\chi^2 = .15$, $df = 2$, NS) No impact on condom use
Kirby et al., 1991, USA	15 × 1 period skills-based lessons focusing on contraception and postponing sexual intercourse	N = 329 control and 429 experimental males and females ages 15 through 18 years	<ul style="list-style-type: none"> For pretest virgins, 29% of treatment and 38% of control subjects became sexually active by 18 months follow-up ($p < .05$), and there was significant reduction in proportion initiating unprotected sex after 18 months (treatment 7% compared to controls 13%) ($p < .05$)
Levy et al., 1995, USA	15 × 1 period sessions on STD/HIV prevention, pregnancy, resistance, and negotiating skills by lecture, discussion, and videos from seventh to eighth grade	N = 124 control and 186 experimental males and females in seventh grade	<ul style="list-style-type: none"> No difference between newly sexually active students from treatment and control conditions on number of sexual partners in past 12 months ($p > .1$) Treatment group marginally more abstinent in past 30 days (73.7%) compared to controls (65.3%) ($p < .1$)
Main et al., 1994, USA	15-session HIV prevention using social cognitive theory on risk behavior norms, factual knowledge, and skills development over 1 semester	N = 419 control and 560 experimental males and females in 9th through 12th grade	<ul style="list-style-type: none"> At 6-month follow-up, no difference in initiation of coitus in experimental (16%) compared to controls (17%); $p = .98$ or frequency of intercourse in those active at pretest ($p = .533$) Of those sexually active at pretest, experimental group reported fewer sexual partners in past 2 months compared to controls at posttest ($p = .046$)

Walter & Vaughan, 1993, USA	6 × 1 period over 2 days AIDS prevention curriculum using health belief, social cognitive, and social influence models, including condom use negotiation and refusal of sex	N = 577 control and 739 experimental males and females in 9th and 11th grade	<ul style="list-style-type: none"> At 3-month follow-up, significant reduction in experimental group compared to controls in sexual intercourse with partners who used drugs intravenously ($p < .05$) Greater monogamy ($p < .05$) and consistent condom use ($p < .05$) in experimental group compared to controls No significant difference in changes to rates of abstinence from pretest to posttest ($p = .6$) Delayed initiation of intercourse for those who took part in the 3-year program (particularly for those < 16); for example, first coitus at age 15 at pretest approximately 57% compared to 3 years posttest, approximately 43% Pregnancy rate declined in instruction recipients by 30.1% but increased by 57.6% in controls from baseline to 28-month follow-up
Zabin et al., 1986, USA	3-year sex education and counseling program and contraceptives available at clinic nearby	N = 1,749 control & 1,201 experimental males and females ages 13 through 18 years	<ul style="list-style-type: none"> At immediate posttest, there was a significant increase in mean lifetime sexual interaction for those taking the program ($p < .02$) but not for controls No significant differences in coital behavior At 6-month follow-up, for preprogram virgins, there was a marginal difference in initiation of sexual activity in recipients of instruction (23%) compared to controls (50%) ($p = .051$)
Abstinence programs Christopher & Roosa, 1990, USA	Six abstinence-based sessions including sex refusal skills, self-esteem, consequences of sex, life goals, and family values	N = 129 control and 191 experimental males and females ages 12 through 13 years	
Jorgenson et al., 1993, USA	6-week abstinence-based pregnancy prevention program, including self-development, family values, pregnancy, and sexually transmitted diseases (STDs)	N = 52 control and 39 experimental males and females in seventh grade	

(continued)

TABLE 1: Continued

<i>Study</i>	<i>Intervention</i>	<i>Sample</i>	<i>Key Findings for Impact on Sexual Behavior</i>
Abstinence programs Miller et al., 1993, USA	Home-based 6 × 20 minute sex education videos discussing puberty, abstinence, gender equality, sexual anatomy, decision making, and refusal-of-sex skills	N = 290 control and 258 experimental males and females in seventh and eighth grade in culturally Mormon area	<ul style="list-style-type: none"> Follow-up measures taken at 3 and 12 months Low rates of sexual intercourse overall (3-5%) Significant increase in sexual interaction over time ($p < .001$) for both groups, but no group by time interaction ($p = .662$)
Public campaigns Vincent et al., 1987, USA	Public education (children, parents, teachers, community leaders) on reproduction, contraception, decision making, communication, sex education from K through 12	Estimated pregnancy rates for females ages 14 through 17 years	<ul style="list-style-type: none"> From baseline to between 2- and 3-year follow-up birthrate per 1,000 females in target area of intervention county dropped from 60.6 to 25.1 compared to control area (66.8/1000 to 52.4; $p < .01$) In three nonintervention counties, the comparable rates were 52.9 to 58.3 ($p < .01$), 34.8 to 51.2 ($p < .01$), and 38.7 to 52.6 ($p < .01$)
Williams et al., 1985, USA	At least 1 × 50-minute education including contraception, STDs, decision-making skills, and values; provision of contraceptive services	Birthrates of $N = 4,278$, females 11 through 18 years of age	<ul style="list-style-type: none"> At 2-year follow-up, birthrates declined from 24.3/1000 to 19.7/1000 in target counties, compared to an increase of 24.7 to 26.1/1000 in control counties (no p value given) Relative risk of a female becoming pregnant in control county compared to target county: 1.32

Table 2) are grouped into this category. Because of this large number, the text describing study outcomes has been divided into sections on sexual activity and the markers of pregnancy, abortion and births, contraceptive use, and condom use. The table summarizing the findings has been divided into program types.

Sexual Activity, Pregnancy, Abortion, and Births

Eight studies reported reductions in sexual activity, pregnancies, births, or abortions (Daures, Chaix-Durand, Maurin, Viala, & Gremy, 1989; Dycus & Costner, 1990; Edwards, Steinman, Arnold, & Hakanson, 1990; Howard & McCabe, 1990; Nafstad, 1992; National Swedish Board, 1978; Schinke, Blyth, Gilchrist, & Burt, 1981; Turner, Korpita, Mohn, & Hill, 1993). Fifteen showed no impact of sexuality education on levels of coital activity (Baldwin, Whitely, & Baldwin, 1990; Berger et al., 1987; Bernard & Schwartz, 1977; Blanchard, Narring, Michaud, & Dubois-Arber, 1993; Davidson & Darling, 1986; de Fine Olivarius, Worm, Petersen, Kroon, & Lynge, 1992; Dignan, Denson, Anspaugh, & C'mich, 1985; Eisen & Zellman, 1987; Herlitz, 1993; Kirby, 1985a; Rees & Zimmerman, 1974; Sakondhavat, Leungtonkum, Kanato, & Kuchaisit, 1988; Siegal, DiClemente, Dubin, Krasovsky, & Saliba, 1995; Weis, Ranbinowitz, & Ruckstuhl, 1992; Wielandt & Jeune, 1992; Yarber & Anno, 1981). One study of school-based clinics reported mixed effects on students' sexual and contraceptive practice across school sites and according to the priorities of the programs (Kirby, Waszak, & Ziegler, 1991). Marcotte and Logan (1977) described what seems to have been an increase in the percentage of medical students reporting regular sexual intercourse from 70.9% through 75.6% and frequency of intercourse 9.4 through 9.7 times per month pretest to posttest (see Table 2). The questions were about regular sexual intercourse and frequency in the past month, following a course of only 3 days duration, and therefore the increase may have reflected a greater rate of admission of sexual activity due to the intervention rather than an increase in activity per se. Moreover, interpretation was problematic as the statistical significance was not reported. Zuckerman, Tushup, and Finner (1976) reported statistically significant increases among male students attending a sexuality course in homosexual experiences and numbers of partners at posttest (see section on exceptions).

The Howard and McCabe (1990) study provided an example of the apparently successful use of the social inoculation theory³ of health education. That program targeted 13- and 14-year-old boys and girls and consisted

(text continues on p. 437)

TABLE 2: Summary of Study Design, Type of Intervention, and Key Findings of Other Intervention Studies

<i>Study</i>	<i>Intervention</i>	<i>Sample</i>	<i>Key Findings for Impact on Sexual Behavior</i>
Human sexuality courses Baldwin et al., 1990, USA	10-week human sexuality course on STDs/AIDS, contraception through lectures and readings	N = 107 control and 141 experimental male and female freshman to senior sexually active students	<ul style="list-style-type: none"> At immediate posttest, no significant differences in number of vaginal or oral partners for experimental or control groups since the course began ($p > .05$) No significant changes in condom use during vaginal or oral sex for experimental or control groups pre- to posttest ($p > .05$)
Dignan et al., 1985, USA	3 hours x 15-week human sexuality course (no course content details given)	N = 103 control and 101 experimental male and female sophomore students	<ul style="list-style-type: none"> Significant difference at pretest in levels of premarital intercourse for experimental (67%) compared to controls (43%; $p < .05$), but no significant changes by immediate posttest Increase in oral sex in experimental group ($p < .05$)
Dycus & Costner, 1990, USA	9-week human sexuality curriculum involving parents and school counselors on HIV, STDs, and decision making	N = 364 males and females ages 12 through 15 years	<ul style="list-style-type: none"> A drop in the pregnancy rate from 30 (at preprogram) to 8 for girls between 12 and 15 years of age in the first year of the pilot program (no p value given)
Rees & Zimmerman, 1974, USA	Human sexuality course on homosexuality, family planning, venereal disease, contraception, and abortion (course length unspecified)	N = 230 male and female college students	<ul style="list-style-type: none"> Since undertaking the course, attitudes changed, but there were no increases in percentage sexually active (males at pretest = 79%, at posttest 73%, no p value given; females at pretest 61%, at posttest 62%, no p value given)

Weis et al., 1992, USA	Human sexuality course (no details on course content given)	$N = 172$ males and females, mean age = 20.8 years	<ul style="list-style-type: none"> No significant change in the group's age at first coitus ($p = .67$), ever had coitus ($p = .95$), or number of pre-marital partners ($p = .62$) from pretest to immediate posttest
Yarber & Anno, 1981, USA	16-week human sexuality course with lectures on cognitive aspects of sexuality and small-group discussion, self-understanding through values and attitudes	$N = 80$ control and 70 experimental males and females, mainly between 18 and 23 years of age	<ul style="list-style-type: none"> No increase in coital sexual activity in past 4 weeks from pre- to immediate posttest Significant increase in masturbation in females (mean frequency in past month: control, .12 to .38, $p < .05$; experimental, 1.25 to 1.79 ($p < .05$)) More oral-genital contact in experimental males only (mean frequency in past month: 1.5 pretest, 2.41 posttest, $p < .05$)
Zuckerman et al., 1976, USA	15-week human sexuality course using explicit movies, slides, and small discussion group work on personal experiences	$N = 97$ control and 137 experimental males and females, mean age = 20.3 years	<ul style="list-style-type: none"> No significant behavioral changes for females from pretest to immediate posttest Significant increase among experimental males in homosexual experience ($p < .05$) and number of homosexual partners ($p < .05$) Marginal increase among experimental males in heterosexual experience ($p = .1$), but no increase in number of partners
Public campaigns Blanchard et al., 1993, Switzerland	Public "Stop AIDS" information campaign carried out in schools, youth centers, at social and sporting events over 5 years	$N = 2,911$ males and females 16 through 19 years of age	<ul style="list-style-type: none"> No significant trends in proportion sexually active over 5 years Of those sexually active, no increase in number of partners over 5 yrs (no p value)

(continued)

TABLE 2: Continued

Study	Intervention	Sample	Key Findings for Impact on Sexual Behavior
de Fine Olivarius et al., 1992, Denmark	Public campaign promoting barrier methods of contraception and limiting numbers of partners (1985) from 1984 to 1988	N = 2,365 females attending venereal disease clinic, mean age = 25.2 years	<ul style="list-style-type: none"> • Large increase in regular condom use from 1987 to 1992 (males, approximately 22% to 42%; females, approximately 10% to 32%; statistically significant but no <i>p</i> value specified) • No change in total numbers of sexual partners, frequency of intercourse, births, pregnancies, abortions, chlamydia, herpes, and cervical dysplasia ($p > .05$) • Over 4-year period, decrease in gonorrhea from 22% to 6% ($p < .01$) but increase in genital warts from 4% to 10% ($p < .05$)
Nafstad, 1992, Norway	Campaign in Stovner district 1988-1990, including free adolescent health service, education at school and youth clubs on contraception	Abortion rate of females between 15 and 19 years of age	<ul style="list-style-type: none"> • Abortion rate was significantly reduced from 35/1000 to 15/1000 females ages between 15 and 19 years ($p < .01$), whereas the rate for all of Norway remained constant (1988: 22/1000 and 1990: 20/1000; NS)
Herlitz, 1993, Sweden	Effect of nationwide campaign on AIDS (1987) from 1986 to 1989	N = 11,025 males and females ages between 16 and 44 years	<ul style="list-style-type: none"> • No statistically significant changes in percentage reporting coital activity or number of sexual partners (no <i>p</i> value) • Increase in use of condoms among singles with no regular partner (1986: 24% compared to 1989: 35%, no <i>p</i> value reported)
National Swedish Board, 1978, Sweden	3-year public information campaign	Pregnancy rate in females ages 14 through 19 years	<ul style="list-style-type: none"> • In third year of program, dramatic drop in youth abortions and number of adolescent pregnancies (104 in previous year to 78)

Wielandt & Jeune, 1992, Denmark	Pretest prior to public information of HIV/AIDS (1985) from 1984 to 1989	N = 1,381 males and females ages 16 through 20 years	<ul style="list-style-type: none"> • In third year of program, reduced rate of gonorrhea per 100,000 inhabitants in area receiving program (258 in previous year to 181), compared to national total (296 in previous year to 320, no <i>p</i> value reported) • No difference in age profiles for first coitus in 1984 and 1989 (median age, females: 1984 = 16.7 years, 1989 = 16.8 yrs; males = 16.9 years in both 1984 and 1989) • From 1984 to 1989, significantly more used condoms at first coitus: males = 36.5% to 61% ($p < .001$); females = 42.1% to 62% ($p < .001$)
Other education Berger et al., 1987, USA	At least one session at family planning clinic on abstinence, noncoital practices, refusal of sex, contraception, pregnancy, and STDs	N = 383 male and female clinic attendees ages 16 through 25 years	<ul style="list-style-type: none"> • After 12-month study period, no significant increase in number sexually active (pretest: 35%, posttest: 38%; NS, no <i>p</i> value given) • For those sexually active at pretest, contraception use at last intercourse was 27% at pretest, 76% at study close ($p < .001$)
Bernard & Schwartz, 1977, USA	One-semester sex education course on pregnancy, birth, abortion, contraception, and human sexuality	N = 141 control and 275 experimental male and female college students	<ul style="list-style-type: none"> • Students in the course did not show statistically significant increases or decreases in sexual activity from pretest to immediate posttest compared to controls
Davidson & Darling, 1986, USA	16-week functional marriage and family course, including premarital sex, sexual arousal, family planning, and autoeroticism	N = 88 control and 85 experimental male and female junior and senior college students	<ul style="list-style-type: none"> • Acquisition of knowledge of human sexuality did not result in statistically significant increased participation in sexual intercourse—ever had or frequency

(continued)

TABLE 2: Continued

Study	Intervention	Sample	Key Findings for Impact on Sexual Behavior
Other education Eisen & Zellman, 1987, USA	15-hour health-based education program, including reproductive biology, venereal disease (not HIV), and contraception	N = 120 males and females ages 13 through 18 years	<ul style="list-style-type: none"> • Adolescents who reported at least 1 hour of tuition prior to intervention were no more likely to be coitally active (36%) than those who reported none (31%) ($p = .44$) • Those in the program showed no greater coital participation at 3- and 6-month follow-up compared to pretest ($p = .598$)
Daures et al., 1989, France	Individualized information program on abortion, pregnancy, and STDs	N = 64 control and 190 experimental males and females ages 15 through 18 years	<ul style="list-style-type: none"> • At 3-year follow-up, a significant reduction in pregnancy in the informed group (2%) compared to controls (20%) ($p < .05$) • Reduced STDs among males in informed group (4.3%) compared to male controls (11.5%) ($p < .05$) • Girls who received information were 2.3 times less likely to have intercourse without contraception
Kirby, 1985a, USA	Meta-analysis of 14 courses ranging from 1 day to two semesters		<ul style="list-style-type: none"> • Meta-analysis of program outcomes grouped by course duration showed no statistically significant impact of education on having sex ever or in the past month, frequency of sex, or birth control use
Howard & McCabe, 1990, USA	10-period peer-led instruction on resistance, reproduction, STDs (no HIV), and family planning	N = 141 control and 395 experimental males and females ages 13 through 14 years	<ul style="list-style-type: none"> • At 2-year follow-up, delayed initiation of sexual intercourse for those in program (e.g., at end of eighth grade, experimental females = 4%, control females = 20%) ($p < .01$)

Marcotte & Logan, 1977, USA	3-day medical sex education course, including sex role socialization, physiology, cross-cultural comparison of sexuality, and sexual health	<i>N</i> = 41 male and female medical students, mean age = 24.9 years	<ul style="list-style-type: none"> • A potential one-third reduction in number of pregnancies for those in course compared to controls • 70.9% at pretest and 75.6% at immediate posttest had sexual intercourse regularly (no <i>p</i> value given) • Frequency of intercourse: 9.4/month at pretest and 9.7/month at posttest (no <i>p</i> value given)
Sakondhavit et al., 1988, Thailand	Sex education, including contraception instruction	<i>N</i> = 520 males and females attending vocational school, mean age = 20.6 years	<ul style="list-style-type: none"> • After 1 year, no increase in sexual activity (no <i>p</i> value given) • Increase in contraceptive use (no <i>p</i> value given)
Schinke et al., 1981, USA	Cognitive behavioral prevention with social worker on reproduction, contraception, problem solving, decision making, and interpersonal skills (no information on course length)	<i>N</i> = 49 control and 44 experimental male and female adolescents (no age specified)	<ul style="list-style-type: none"> • Reduction in intercourse without contraception in treatment compared to controls at 6-month follow-up (Group 1: 5% vs. 23%, Group 2: 7% vs. 31%), at 9-month follow-up (Group 1: 8% vs. 26%, Group 2: 11% vs. 42%), and at 12-month follow-up (Group 1: 6% vs. 30%, Group 2: 11% vs. 41%) (no <i>p</i> values reported)
Siegel et al., 1995, USA	12 sessions in 3 weeks on HIV, skills to refuse sex, decision making, sex education	<i>N</i> = 123 control and 434 experimental males and females, seventh through ninth grades	<ul style="list-style-type: none"> • From pretest to 3-month follow-up, no significant difference in changes in sexual risk-taking (i.e. number of partners, frequency of sex, and condom use) from pretest to posttest between experimental and control groups (no <i>p</i> value given)
Turner et al., 1993, USA	3- to 5-week college seminars on STDs, safer sex, values, decision making, and assertiveness skills	<i>N</i> = 227 control and 341 experimental males and females, mean age = 18.3 years	<ul style="list-style-type: none"> • At 3-month follow-up, greater abstinence in experimental males at posttest (42%) compared to pretest (25%; <i>p</i> < .05) and control group at posttest (29%; <i>p</i> < .05), but not for females

(continued)

TABLE 2: Continued

<i>Study</i>	<i>Intervention</i>	<i>Sample</i>	<i>Key Findings on Impact on Sexual Behavior</i>
Clinical services Edwards et al., 1980, USA	School family planning clinics giving counseling, education, and physical examinations	Birthrate for females 13 through 19 years of age at three schools over 6 years	<ul style="list-style-type: none"> No significant differences in number of partners between pretest and posttest, or between experimental and control groups Birthrate for school population fell from 79/1000 to 35/1000 in the junior-senior high school project and from 60/1000 to 40/1000 in the two senior high school projects after 3 years of program implementation (no <i>p</i> value given)
Kirby et al., 1991 USA	Analysis of six school-based clinics providing a range of general medical and counseling services with much variability in provision of sex education and contraception. Matched control schools with no-clinic	<i>N</i> ranged from 824 to 1,360 males and females in 9th through 12th grade	<ul style="list-style-type: none"> No difference between clinic and nonclinic schools in age of first intercourse in pretest virgins or frequency of sex in the sexually active Mixed findings in percentage sexually active when comparing clinic to nonclinic schools (no pretest measures) No association between presence of clinical services and pregnancy rates

of five periods of instruction (given by slightly older peers) in combination with a five-period program on reproduction, family planning, and sexually transmitted diseases. The curriculum focused on identifying and resisting social and peer pressures that might motivate early coital activity. In those schools in which the program had been implemented, there were lower proportions of male and female students initiating sex than in schools that did not take part in the program: In the eighth grade, 4% compared with 20% ($p < .01$), and in the ninth grade, 24% compared to 36% ($p < .01$) had become sexually active. Contraceptive use also was higher among those sexually active students who had been the recipients of sexuality education. Pregnancy rates for the female students in the program were lower also; a result both of greater use of effective contraception and of less sexual activity. This highlights the importance of resourcing both those young people who are, and those who are not, sexually active.

Contraceptive Use

A number of studies have demonstrated increased use of contraception following sexuality education (Berger et al., 1987; Blanchard et al., 1993; Eisen & Zellman, 1987; Herlitz, 1993; Howard & McCabe, 1990; Sakondhavit et al., 1988; Wielandt & Jeune, 1992). Other studies have indicated that although sexuality education generally does not produce an increase in coital activity, such instruction may lead to increases in alternative and safer practices (in terms of pregnancy or HIV transmission) such as masturbation or oral sex (Dignan et al., 1985; Yarber & Anno, 1981; Zuckerman et al., 1976).

Condom Use

Five recently published studies evaluated public education campaigns focused on HIV/AIDS issues and the promotion of condom use (Blanchard et al., 1993; Herlitz, 1993; Siegal et al., 1995; Turner et al., 1993; Wielandt & Jeune, 1992). Two reported no change in condom use posttest (Siegal et al., 1995; Turner et al., 1993), but three reported postintervention increases in condom use with no accompanying increase in sexual activity or lowering of age of first intercourse (Blanchard et al., 1993; Herlitz, 1993; Wielandt & Jeune, 1992). For example, in Switzerland, Blanchard et al. (1993) serially surveyed first- through fourth-year apprentices in the Swiss canton of Vaud in 1987, 1990, and 1992 regarding their sexual behavior, knowledge, and attitudes. Over that 5-year period, the young people had been exposed to the Swiss Stop-AIDS campaign, which promoted safer, rather than reduced,

sexual activity. From 1987 through 1992, there were dramatic increases in regular condom use and no lowering of age of first intercourse.

These findings from nonexperimental studies demonstrated that education can lead to increases in the extent to which safer sex is practiced but does not result necessarily in more sexual activity. Interpretation of the findings of six studies remains speculative, as details of statistical significance were not provided for observed differences (Dycus & Costner, 1990; Edwards et al., 1980; Marcotte & Logan, 1977; National Swedish Board, 1978; Sakhondavat et al., 1988; Schinke et al., 1981).

Cross-Sectional Surveys

In the cross-sectional surveys, study participants were not assigned randomly to treatment and control conditions nor were interventions manipulated by the investigators. Rather, respondents were surveyed as to whether they had, or had not, received sexuality and/or contraceptive education and then compared on subsequent sexual behavior. With one exception (Marsiglio & Mott, 1986; see section on exceptions), survey investigations did not report any increase in sexual behavior (either lower age of onset or greater number of partners) associated with receiving sexuality education (Anderson et al., 1990; Dawson, 1986; Furstenberg, Moore, & Peterson, 1985; Ku, Sonenstein, & Pleck, 1992; Philliber & Tatum, 1982; Pick-de-Weiss, Diaz-Loving, Andrade-Palos, & David, 1990; Spanier, 1978). Three studies reported greater contraceptive use among those respondents who had received sexuality education (Dawson, 1986; Ku et al., 1992; Marsiglio & Mott, 1986) (see Table 3).

A recent large-scale study by Ku et al. (1992) surveyed more than 1,800 males 15 through 19 years of age and found that most of them had received formal instruction on HIV/AIDS, birth control, and resisting sexual activity. The analysis revealed an association between education and decreased numbers of sexual partners, lower frequency of intercourse, and increased condom use. The effects were found to be significant, even after controlling for potential confounding variables such as age, ethnicity, and religion. Skills instruction for resisting intercourse was found to be important, particularly in reducing levels of sexual activity. The authors concluded, "In many communities, concerned parents or community members have feared that education about sex or AIDS may increase sexual activity by condoning contraception; this analysis does not indicate such an association" (Ku et al., 1992, p. 105).

Overall, the evidence from cross-sectional surveys has failed to find an association between sexuality education and greater sexual involvement, whether the recipient was, or was not, sexually experienced. A major draw-

back of this type of study design is that interpreting behavior change as an outcome of course participation is often limited by the self-selected nature of the groups to be compared. Perhaps, those students enrolling in a sexuality course are more predisposed to sexual behavior change than those not selecting such a course. Without randomization, such confounding factors remain uncontrolled.

International or National Comparison Studies

Another source of information examined was the cross-national and intranational comparative literature. Those studies (see Table 4) detail the impact of sexuality education on sexual activity and its outcomes, while taking into account reproductive and sexual health policy and services in differing countries, states, or cultures (Edelman & Pittman, 1986; Jones et al., 1985; Kroger & Wiesner, 1981; Siedlecky, 1987; Singh, 1986). Such reviews provide an interesting and valuable background against which the findings of more narrowly focused investigations can be interpreted.

The comparison studies indicated that when and where there was open and liberal policy as well as the provision of sexuality education and related services (e.g., family planning), there were lower pregnancy, birth, abortion, and STD rates (Edelman & Pittman, 1986; Jones et al., 1985; Kroger & Wiesner, 1981; Siedlecky, 1987; Singh, 1986). To illustrate, Jones et al. (1985) used a 37-country comparison of patterns of adolescent pregnancy to examine the impact of (inter alia) government education policy, financial support for abortion and single parents, religiosity, openness about sexuality, ethnicity, and marriage laws on adolescent pregnancy and sexual activity. Findings from that study indicated that those countries that rated higher on openness about sex were also those that experienced the lowest birthrates; teaching of birth control in schools was associated with low adolescent fertility; and low birthrates were associated with low abortion rates. In a detailed subanalysis comparing the United States with Canada, England and Wales, Sweden, the Netherlands, and France, the United States had by far the highest rates of adolescent pregnancy, birth, and abortion. Differences in amount of financial support for unmarried mothers, minority issues, or adolescent unemployment did not account for the discrepant birthrates. If discouraging the discussion of sex and access to family planning services in an effort to deter or shield adolescents from sex were effective policies, the United States would have been expected to have one of the lowest adolescent pregnancy rates. Instead, for 1980, 15- through 19-year-olds in the United States had a pregnancy rate of 96/1000 females, more than double that of the countries ranked second (England and Wales: 45/1000) and nearly seven

TABLE 3: Summary of Study Design, Type of Survey, and Key Findings of Survey Studies

Study	Intervention	Sample	Key Findings for Impact on Sexual Behavior
Anderson et al., 1990, USA	Survey about HIV/AIDS education in schools	N = 8,098 males and females between 9th and 12th grade	<ul style="list-style-type: none"> Once HIV/AIDS knowledge, gender, race, and age were taken into account, HIV/AIDS instruction had no effect on having ≥ 2 sexual partners over lifetime and/or in last year, or on always using condoms ($p < .05$)
Dawson, 1986, USA	Retrospective survey on receiving instruction on menstruation, venereal disease, birth control, reproduction, and sexual behavior	N = 1,888 females ages 15 through 19 years	<ul style="list-style-type: none"> No effect on probability of initiation of sexual activity (no p value given) Instruction recipients more likely to use contraception: ever ($p < .05$) and at first intercourse (if education is given prior to initiation) ($p < .05$)
Furstenberg et al., 1985, USA	Retrospective survey of sex education and sexual behavior	N = 469 males and females 15 through 16 years of age	<ul style="list-style-type: none"> Prevalence of intercourse significantly higher in those who did not have sex education (25.5%) compared to those who did (16.5%) ($p < .05$)
Ku et al., 1992, USA	Evaluated formal instruction in AIDS, birth control, STDs, and resisting sexual activity	N = 1,880 males 15 through 19 years of age	<ul style="list-style-type: none"> HIV/AIDS education was associated with a marginal increase in the number of those who had no partners in the last year (4%) ($p < .1$) and 9% increase in proportion using a condom 100% of the time ($p < .01$)
Marsiglio & Mott, 1986, USA	Retrospective 5-year longitudinal study of relationship between attending sex education course in school and subsequent sexual behavior	N = 12,069 males and females 14 through 22 years of age	<ul style="list-style-type: none"> Prior exposure to a sex education course was positively and significantly associated with initiation of sexual activity at 15 and 16 years of age ($p < .01$) but not at 17 and 18 years of age ($p > .05$) Those who had taken a sex education course were more likely to use effective contraception (73%) compared to controls (64%) ($p < .01$)

Pick-de-Weiss et al., 1990, Mexico	Retrospective survey on attendance at formal sex education course and sexual behavior	N = 392 females ages 16 through 17 years	<ul style="list-style-type: none"> • Having attended a sex education course did not affect initiation or continuation of sexual behavior ($\chi^2 = .1$; NS) or contraceptive behavior (no <i>p</i> value given)
Philliber & Tatum, 1982, USA	Retrospective survey of students who had and had not taken a life science course that included discussion on contraception, sexuality, genetics, and reproduction	N = 78 control and 190 experimental males and females, 10th through 12th grade	<ul style="list-style-type: none"> • At up to 3 years postcourse, no support for the notion that sex education encouraged or discouraged sexual activities once academic achievement and class level were taken into account (no <i>p</i> values given)
Siedlecky, 1979, Australia	Survey on sources of information for birth control	Unmarried males and females, 18 through 25 years of age	<ul style="list-style-type: none"> • No evidence that discussion of birth control increased levels of sexual activity
Spanier, 1978, USA	Retrospective survey on attendance at a sex education course at either junior or senior high school and sexual behavior	N = 1,177 male and female college students	<ul style="list-style-type: none"> • No relationship between attending a sex education course in junior or senior high and subsequent premarital sex behavior ($\chi^2 = 6.3$, <i>df</i> = 4, NS) • No relationship of birth control instruction to subsequent premarital sexual behavior (females: $\chi^2 = 2.2$, <i>df</i> = 4, NS; males: $\chi^2 = 4.4$, <i>df</i> = 4, NS)

times that of the sexually liberal Netherlands (14/1000). Countries that address young people's sexuality in a frank, open, and supportive manner experienced less of the negative consequences of sexual activity, yet this did not result in greater sexual involvement. Jones et al. (1985) conclude that "increasing the legitimacy and availability of contraception and sexuality education (in its broadest sense) is likely to result in declining adolescent pregnancy rates" (p. 61).

A complementary review by Singh (1986) examined, on a state-by-state basis within the United States, factors linked to variations in adolescent pregnancy. In terms of education about sex, state policy and its implementation were highly variable within and between states. Sexuality education was quantified by documenting the proportion of adolescents receiving sexuality education in junior and senior high schools, the amount of class time devoted to that instruction, whether parental consent was required, and the openness of each state's policy toward permitting sexuality education. The only statistically significant finding was an inverse relationship between the proportion of senior high school students receiving sexuality education and pregnancy rates. Unfortunately, this study did not gather direct measures of levels of sexual activity, only pregnancy rates. Therefore, it is not clear whether lower pregnancy rates were due to less sexual activity or more effective contraceptive use.

An interesting contrast can be made between the Singh (1986) analysis and the aforementioned analysis by Jones et al. (1985). Within the United States, a higher abortion rate was correlated inversely with birthrates. The international study, however, found a positive correlation between birth and abortion rates; that is, those countries with low birthrates also experienced low abortion rates and vice versa. By way of explanation, it is possible that in the United States, the pregnancy rate already was high, and birthrates were offset only by the number of young people deciding on abortion. In other countries, adolescent pregnancy rates were low overall, as were birth and abortion rates, because of effective contraception (given levels of sexual activity that were essentially comparable). This interpretation remains speculative.

International and national comparison studies of this type reinforce the findings noted in the previous sections, and indicate that sexuality education either does not have an adverse effect on unprotected sex and adolescent pregnancy or that it may promote more appropriate choices around sexual health. Furthermore, there is evidence that policy, service provision, and prevailing attitudes may interact differently from one sociocultural context to another.

TABLE 4: Summary of Study Design, Type of Article, and Key Findings of Summary Review Studies

<i>Study</i>	<i>Type of Article</i>	<i>Sample</i>	<i>Key Findings for Impact on Sexual Behavior</i>
Edelman & Pittman, 1986, International	Comparison of the United States with other Western industrialized nations on education, sexual behavior, adolescent pregnancy, and abortion		<ul style="list-style-type: none"> • Withholding sex education and family planning services has not led to less adolescent sex activity in the United States • The provision of information and services in Europe and Canada has not resulted in increased sexual activity; it has heightened sexual responsibility
Jones et al., 1985, International	37-country analysis of adolescent pregnancy	Females ≤ 19 years of age	<ul style="list-style-type: none"> • Adolescent pregnancy rates are lower in countries where there is a greater availability of contraceptive services and sex education • Levels of sexual activity in the United States are not very different from those in countries with much lower adolescent pregnancy rates
Kroger & Wiesner, 1981, USA	Review of STD literature		<ul style="list-style-type: none"> • STD rates soared following legislation that restricted classroom instruction on human sexuality and decreased following reintroduction of STD instruction
Siedlecky, 1987, Australia	Commentary on issues for young people's sexuality		<ul style="list-style-type: none"> • When there has been an increase in the number of school programs on sexuality education, there has not been a concomitant increase in adolescent pregnancies and births
Singh, 1986, USA	Interstate comparison in the United States of sex education, abortion, pregnancy, and birthrates	Females 15 through 19 years of age	<ul style="list-style-type: none"> • A higher proportion of White senior high school students receiving sex education was associated highly with lower pregnancy rates in White but not Black females (standardized $\beta = -.98, p < .01$) • No significant relationship between sex education and abortion rates ($p > .05$)

The Exceptions

Three studies appear as anomalies to the general trends described here. The first compared students taking psychology in college and those enrolled in a sexuality course (Zuckerman et al., 1976). There were no differences between experimental and control female students in sexual behavior from pretest to posttest. For male students, however, those in the experimental group reported greater masturbatory and orgasmic experiences than did controls at posttest (controlling for pretest measures). Although there were no increases in the number of heterosexual partners, there were significant increases among males in the experimental group, but not the control group, in number of homosexual partners and homosexual sexual experiences at posttest. The authors speculated that the increase may represent "coming out" behavior coincidental to the course or perhaps a greater willingness to admit to homosexual behavior stemming from the frank treatment of the subject during the course. Either way, the findings were confounded by the potential relation between treatment group sampling (i.e., self-selected enrollment) and study outcome measures.

Christopher and Roosa (1990) evaluated an abstinence-only program, through a quasi-experimental study design that included 320 male and female students. The program, as the name indicated, viewed abstinence as the most desirable way of preventing adolescent pregnancy, and educators and students were dissuaded from discussing birth control. An increase in mean level of noncoital sexual activity (such as breast touching) from pretest to posttest for male program recipients, but not controls, was the only statistically significant finding. Coital activity remained stable over time for both groups. A nonindependent replication of this study (Roosa & Christopher, 1990) revealed the same trends. The two other abstinence-based programs included in this review (Jorgenson et al., 1993; Miller et al., 1993) failed to confirm those findings. The Christopher and Roosa analyses challenge the assertion that only those approaches that advocate abstinence will achieve decreases in sexual involvement or guard against promiscuity. Whatley and Trudell (1993) questioned the validity of two abstinence programs as comprehensive sexuality education. Criticisms included insufficient and inaccurate information, reliance on scare tactics, avoidance of the realities of adolescents' lives, reinforcement of gender stereotypes, lack of respect for economic and cultural diversity, presentation of one side of controversial issues, and inadequate evaluation of program outcomes. An abstinence-only approach ignores the developmental diversity in young people's sexuality and marginalizes, and possibly alienates, those who, for whatever reason, do not adopt the "no sex" option. Furthermore, a program that precludes the discussion of prophyl-

lactic measures, so as not to undermine the abstinence message, misses the opportunity to resource students who will become sexually active in the future.

The third study that reported an association between sexuality education and increased sexual activity was by Marsiglio and Mott (1986). In their sample of 14- through 22-year-olds, followed over a 5-year period, prior exposure to a sexuality education course was associated positively and significantly with the initiation of sexual intercourse at 15 and 16 years of age, but not at 17 or 18 years of age. As with any other survey, correlation does not imply causality, but this result should not be overlooked. The effect of sexuality education, however, was less important (according to the statistical model proposed by the authors) than infrequent church attendance, parental education of less than 12 years, and ethnicity. The authors concluded that "it is unlikely that sexuality education courses will substantially alter teenage [sexual] behavior" (Marsiglio & Mott, 1986, p. 161).

DISCUSSION

The overwhelming majority of reports reviewed here, regardless of variations in methodology, countries under investigation, and year of publication, found little support for the contention that sexuality education encourages experimentation or increased sexual activity. The impact, if any, of education strategies, is in the direction of postponed initiation of sexual intercourse and/or safer practices, such as the effective use of contraceptives. Only 3 studies out of 52 reported a relation between sexuality education and increased sexual interaction. What light the three studies can shed on the debate is compromised variously, however, because of inadequate study design (nonrandomized allocation of subjects to experimental and control conditions; Zuckerman et al., 1976), marginal effect in the context of other variables (Marsiglio & Mott, 1986), and reliance on an abstinence-only approach (Christopher & Roosa, 1990).

However, there are a number of methodological problems that limit the findings of many of the studies reviewed here. First, a number of studies did not include levels of significance for reported increases and decreases in outcome measures (Blanchard et al., 1993; Dycus & Costner, 1990; Edwards et al., 1980; Herlitz, 1993; Marcotte & Logan, 1977; National Swedish Board, 1978; Rees & Zimmerman, 1974; Schinke et al., 1981; Williams et al., 1985). Significance levels are essential for differentiating those alterations in behavior expected by chance from those associated with an intervention. In addition, most studies failed to report exact *p* values associated with nonsig-

nificant results and whether a statistical test was one-tailed or two-tailed. A nonsignificant two-tailed result at the standard .05 level may become significant if submitted to a one-tailed test (see Yarber & Anno, 1981, and Zuckerman et al., 1976, for example). The risk of inflated Type II error cannot be evaluated if exact test statistic details are not given for nonsignificant results.

Second, 3 of the 19 intervention studies, using control groups and comparisons of pretest and posttest data, failed to assess the interactive effect of time and intervention (Bellingham & Gillies, 1993; Davidson & Darling, 1986; Yarber & Anno, 1981). One study made only between-group comparisons at pretest and posttest (Bellingham & Gillies, 1993). It is possible for a significant group-by-time interaction to occur without between-group differences at either pretest or posttest. The other two studies evaluated within-group pretest to posttest differences separately for experimental and control groups (Davidson & Darling, 1986; Yarber & Anno, 1981). Again, important information regarding the interactive effect of time and intervention is lost with such a design. The remaining 16 studies used repeated measures analysis, including a group-by-time interaction term, between-group differences in change scores from pretest to posttest, and/or analysis of covariance adjusted for pretest measurements.

Third, drawing conclusions from some studies was difficult because posttest measures were so close to program completion. This is particularly so for courses of short duration (Bellingham & Gillies, 1993; Christopher & Roosa, 1990; Marcotte & Logan, 1977). Posttest measures of behavior may overlap the time period in which baseline measures were taken, particularly if these measures are monthly or yearly averages. At best, this masks change and at worst, confounds results. Longer follow-up time allows for sufficient numbers to accumulate such that statistical analysis of change may be validly undertaken (Stout & Kirby, 1993). Delayed posttest will yield information also on the endurance of change and assist in the identification of correlates of sustained change.

Fourth, the nonrandomization of subjects to control and experimental conditions means that results always will be subject to self-selection bias. Yet, the largest group of studies in this review employed nonexperimental designs. Oakley et al. (1995), in a critical review of the HIV/AIDS prevention literature, questioned the ability of nonrandomized-controlled studies to address adequately the biases introduced in the sample selection process.

Finally, when comparing experimental and control groups, researchers should be mindful of the heterogeneity in sexual development of the students that compose these groups. Therefore, evaluation should include some assessment of interactive effects of sexual developmental stage and intervention. Differences between entire groups only reveal aggregate change, which

may veil important differential change in a developmentally diverse group. As far as numbers will allow, comparisons should be made between developmentally comparable subjects from the control and experimental conditions.

In summary, inadequate attention has been paid to evaluation of sexuality education and therefore programs have not benefited from lessons learned in the past. Rigorous evaluation should include valid sampling and methods of analysis, appropriate comparison groups, and sufficient follow-up periods. Intervention evaluation also should contain sufficient detail regarding the interplay between developmental stage and intervention strategy.

It would appear also that there are few accessible, peer-reviewed data from countries outside the United States. It would be instructive to compare the sexuality education policy, content, and practices within countries with low adolescent pregnancy rates (e.g., Sweden and Denmark) with those of North America. However, there is a comparative dearth of information available from Europe (Visser & van Bilsen, 1994).

From the educational, rather than the analytic, perspective, there are difficulties with promoting condoms for HIV prevention when sexuality education historically has been directed at reducing unintended pregnancy. The framing of education around contraception means that many of the studies cited here used unplanned pregnancy as the behavioral outcome for program evaluation. As it is possible to be protected against pregnancy while remaining vulnerable to STD transmission (e.g., in the use of oral contraceptives), unintended pregnancy is an incomplete evaluative tool for HIV/sexuality education. A major shift in the current focus of sexuality education and its evaluation will be required to address the attendant problem of HIV and other STD transmission.

At a broader level, there is much more to HIV and sexuality education than taking individuals and exposing them to information designed to protect and promote well-being. For example, individual teacher competence has been shown to interact with program content, influencing achievement of the aims of the program to an appreciable degree (de Gaston, Jensen, Weed, & Tanas, 1994). There is also a diversity of sources of information about sex to which young people either deliberately or inadvertently are exposed. It cannot be assumed that what is taught will be translated directly into behavior, hence the weak association between sexual knowledge, attitudes, and behaviors.

The question is not whether children will get sexuality education, but how and what kind they will receive. It is impossible to hide children from sexual influences. Adult role models, television, advertisements and parents bombard young children with them. . . . Silence and evasiveness are just as powerful teachers as a discussion of the facts. (McNab, 1981, p. 22)

Kirby (1985b) asserted that although the accusation that sexuality education incites sexual activity is unfounded, it is unrealistic and overly optimistic to construe sexuality education as the panacea for unacceptably high rates of adolescent STDs and unintended pregnancy. Sexuality education represents a valuable source of information about sex for young people, but often it is not the most influential. Hence, the potential of education for behavior modification must be assessed in the context of other information sources (Goldman & Goldman, 1981; Spanier, 1976; Stout & Rivara, 1989).

Only recently has the social context of human sexuality been receiving greater attention, particularly in the HIV/AIDS literature (Kippax, Crawford, Waldby, & Benton, 1990; Kirby et al., 1991; Moore & Rosenthal, 1990; Thomson, 1994). Choosing to have, or not to have, sex or to use condoms has social meanings, consequences, and implications for public and private identity (Hollway, 1984). In the British *Women Risk and AIDS Project* (Thomson & Scott, 1991), which studied 500 young women 16 through 21 years of age, the authors examined the perceived appropriateness of the sexuality education the women had received.

By far the most common criticism of sexuality education at school was that it had little or no relationship to the real choices and pressures around sexuality that affected the young women in question. . . . The concentration upon the biology of human reproduction was consistently criticised for taking no account of the context in which sexual behaviour takes place nor the personal and social consequences of such behaviour. (Thomson & Scott, 1991, p. 6)

Influences on young people's sexual lives are not restricted to explicit messages about sex. In pursuit of an appropriate and effective way to promote healthy, positive, sexual behavior, engagement with these influences is vital. It is important that policy makers, program managers, and teachers are aware that the evidence indicates that young people's sexual behavior can be modified through education. Failing to provide appropriate and timely information and services for fear of condoning and encouraging sexual activity cannot be supported.

NOTES

1. The databases were PSYCLIT, SOCIOFILE, APAIS, AUSTROM, MEDLINE, FAMILY RESOURCES, EMBASE, MENTAL HEALTH ABSTRACTS, PASCAL, SOCIAL SCISEARCH, PAIS INTERNATIONAL, and DISSERTATION ABSTRACTS ONLINE.

2. The term *unprotected* with reference to intercourse, as used here, means intercourse without the use of contraception; in contrast with HIV/AIDS discourse, unprotected intercourse generally refers to vaginal or anal intercourse without condoms.

3. This theory is based on the premise that it is possible to "immunize" people against the social and peer pressures that encourage negative health behaviors.

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