JAOA

BRIEF REPORT

Reexamination of the paradigm of HIV risk reduction in adolescents

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Infection with the human immunodeficiency virus (HIV) in the adolescent/young adult population of the United States is a serious, growing problem. The current HIV risk-reduction strategies for adolescents have been less than effective in stemming the tide of infection. This ineffectiveness can be linked to failure of making developmentally appropriate risk-reduction informational material and reliance on condom-based interventions, which have an unacceptably high failure rate. A critical analysis of current models of HIV-risk reduction should be undertaken to create more developmentally appropriate and effective methods.

(Key words: Human immunodeficiency virus [HIV], adolescent sexual behavior, condoms)

The human immunodeficiency virus (HIV) infection in adolescents is a real, growing problem. Although the majority of cases of the acquired immunodeficiency syndrome (AIDS) in the United States are reported in persons aged 20 to 34 years, the time from infection with HIV to AIDS is approximately 8 to 10 years. This time frame implies that a significant number of persons were most likely infected during adolescence. The means by which adolescents contract HIV are similar to those for adults, with the most common route being sexual contact. Although efforts to address every mode of infection are necessary, particular emphasis must be concentrated in the area of sexual behavior to reduce the HIV infection rate among adolescents.

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Many programs and models have been proposed to reduce the HIV risk. Models actually implemented are based on the modification of high-risk behaviors and the identification of at-risk populations.[1-3] However, results from programs designed to decrease high-risk behaviors have been disappointing for the most part.

Behavioral changes—in particular, the use of condoms—brought on by education or interventions dominate these risk-reduction models. I propose that critical examination be given to these models for the following reasons: first, not all adolescents are developmentally mature enough to associate consequence with action. Second, the methods offered for "safe sex" (mostly condoms) are not particularly effective in the adolescent population.

Developmental issues

Adolescent cognitive development does not necessarily occur at the same pace as does chronologic development.[4] According to Jean Piaget,[5] early adolescent cognitive function is typified by concrete reasoning and difficulty in extrapolating consequence from action. The concrete-reasoning early teen does not typically respond to the same sort of interventions as do adults because references to long-term effects of current actions often go largely ignored. It is only with the transition to abstract reasoning that the realm of consequence comes into play. This transition occurs at different ages, much as the transitions that occur with younger children.

The clinical pertinence of this concept is seen with behavioral modifications aimed at destructive habits. For example, a smoking intervention plan to decrease smoking among 7th graders that includes a pathologic specimen of a cancerous lung may not be very effective. Why? A large percentage of 13- to 14-year-olds are unable to associate smoking with the possibility that cancer may ensue. Combined with the sense of "adolescent omnipotence," denial of potential risk presents a vexing dilemma.

Similarly, the perception of being "at risk" sexually varies greatly, and the ability to associate

long-term consequences from present actions may assist to "empower" the teen to take action to address the risk.

Just as an infant who has just begun to crawl cannot run, the early adolescent who is a concrete reasoner is faced with a number of interventions directed at consequence. Behavioral modification is usually associated with perceived risk, and those teens without the ability to perceive risk are "outside the loop" regarding these particular interventional strategies.

Other assumptions that the aforementioned models often make are that the adolescent decision-making process is rational; behavior is under volitional control; cognitive predispositions (beliefs attitudes, perceptions) drive behavior change; and value is assigned to good health. However, arguments could be made regarding these assumptions. Specifically, do adolescents value health—or even understand the concept of health? Are sexual choices always (or ever) rational? Can adverse health outcomes (such as sexually transmitted diseases [STDs]) sometimes be valued among peers as a rite of passage? Is adolescent behavior volitional, or can socioenvironmental factors influence behavior?

With these and other questions looming in the background, significant concern exists regarding the method of presenting interventions.

Does intervention produce any lasting behavioral change?

Risk-reduction education regarding HIV has been shown to increase adolescents' perception of the risk of contracting HIV[6] as well as increase their general knowledge of HIV and its transmission. Despite intensive efforts, these approaches have led to disappointing percentages of teens adopting a consistent behavioral change, such as regularly using condoms with intercourse. Lawrence D'Angelo, MD,[7] at the Children's National Hospital in Washington, DC, reported that in a 4-year study (1988 to 1992) of 500 high-risk young men, "adolescents frequently provided incorrect information regarding their sexual histories, incidence of STDs and frequency of condom use...condom use is, at best, sporadic and variable over time." Durbin and colleagues[8] studied 1899 students in Northern California. They found that the adolescents continued to have multiple sex partners despite having good factual knowledge about AIDS.

DiClemente and coworkers[9] studied more than 1000 adolescents. They found that school-based HIV-prevention programs primarily emphasizing AIDS information do not necessarily increase adolescents' use of HIV-preventive measures. Rickert and coauthors[10] found that although female adolescents are aware of AIDS, their behavior remains unchanged.

In a 1991 study of 3321 men, aged 20 to 39 years, 27% reported using a condom in the 4 weeks preceding the interview. In their discussion of the data, the authors note, "Our results show that the threat of AIDS has not stopped men from engaging in unprotected sex and that this continued risk-taking does not appear to result from a lack of awareness."[11] In another study,[12] sexually active teens in a Cleveland school who were knowledgeable about HIV infection were more likely than those who were not knowledgeable to have altered their sexual behavior to reduce their risk of infection. Specifically, 45% reported having had sex less often; 52% reported having had fewer partners; and 58% were using condoms more frequently. In this same study, female adolescents who knew more about AIDS were not likely to have reduced their frequency of intercourse, but they were more likely to have decreased the number of partners. In a study of male adolescents in Indiana, Orr and Langefeld,[13] found 23% of the teens reported using a condom in their last episode of intercourse.

Siegal and associates[14] detected an association between crack-cocaine use among 150 prostitutes in the Midwest and high-risk sexual behaviors. Less than 50% of these prostitutes reported using condoms *at least* once in the 3 months before the survey. Although 90% of the prostitutes believed that they had at least a moderate chance of being infected with the HIV, they still did not appreciably alter their behavior.

Stiffman and coauthors[15] painted a very bleak picture in their results of a study of 602 inner-city adolescents. The investigators examined the extent of change in these adolescents' AIDS risk level and the number of their AIDS-related risk behaviors as the adolescents entered young adulthood. The authors concluded, "It is apparent that neither information, nor the pertinency or relevancy of that information, nor various interventions are changing youths' behavior. Moreover, as young adults, they report that they dislike and have little confidence in the effective models." Rather, the youths in this study who did increase their risk behaviors were more likely to know about their risk and yet do nothing.

Therefore, it is apparent that despite factual knowledge, teens are unlikely to engage in lasting behavioral modification (practicing safer sex) to a sufficient extent.

Condoms

Condoms have been offered as a means of preventing STDs for many years. The proper, regular use of condoms with every sexual act is critical for success. For teens, however, the consistent and correct use of condoms proves somewhat problematic. Condom use is "operator-dependent," that is, it

requires a certain amount of manual dexterity and ability of the person(s) putting on the condom. Furthermore, adolescents need to have ready access to condoms and believe that the use of a condom is important enough to use during every sexual contact. Even with condoms made freely available, adolescents do not always wear them during sexual intercourse. In a 12-month investigation of 311 sexually active urban adolescent males, researchers found that distribution of free condoms had no effect on increased use despite simultaneous educational intervention.[16]

Some data do suggest that condoms are prone to a significant amount of failure, breakage, and slippage. The frequency of condom breakage is a matter of some debate. The Food and Drug Administration (FDA) currently tests batches of condoms by use of a water-stretch test. A condom is filled with 10 ounces of water, and any moisture detected on the outside is considered a failed test. A batch of condoms does not pass if more than 4 in 1000 condoms fail the test.[17] Foreign-made condoms tend to fail the test more often than domestically produced condoms. Approximately 21% of foreign-made condoms fail the test, whereas only 12% of domestically produced condoms fail.[18]

Nearly 50% of prostitutes in a study in the Netherlands had condoms break in the 6-month period prior to being interviewed.[19] One study by Trussell and colleagues[20] found that the average condom-breakage rate during 1 month per couple was 7.4%; during 1 year, 6.6%; and during the same couple's lifetime together, 5.2%. Trussell's group also noted that women attending a family planning clinic in 1988 revealed that the condom broke on an average of once per every 16 acts of intercourse. Other studies[21] place the incidence of condom breakage at about 1 per every 100 acts of intercourse.

Data from studies regarding failure rates (breakage) during anal intercourse have mixed results as well. Friction can damage condoms significantly, and anal intercourse tends to have higher friction than vaginal intercourse. The use of lubricants may decrease friction, but certain commonly used lubricants cause latex to disintegrate. "Correct use of latex condoms requires using only water-based lubricant [eg, K-Y jelly] (oil-based lubricants [petroleum jelly, shortening, mineral oil, massage oils, body lotions, or cooking oils] that can weaken latex should never be used.)"[22] Alarmingly, 9% of prostitutes in a study in the Netherlands used oil or petroleum jelly as lubricants during sexual intercourse, despite the fact that these substances weaken condoms.[19]

Even with consistent and correct use, a condom does not assure the user that transmission of HIV will not occur. The Centers for Disease Control and Prevention (CDC) in 1988 published an article, "Condoms for prevention of sexually transmitted disease."[23] The article cautioned that persons likely to become infected or known to be infected with HIV should be aware that condom use cannot completely eliminate the risk of transmission to themselves or to others.

Failure rates

"Failure rate" in condom use refers to the number of pregnancies that occur over a given period, with a condom as the sole means of contraception. First-year failure rates of condom use among typical users average about 12%.[24-26] Other studies indicate a failure rate of 18.4% in white girls younger than 18 years of age, [26] and 44.5% in unmarried Hispanic girls in the same age group.[27] The time in a month when a woman can become pregnant is relatively short (about 30 hours per month) (Sam Thatcher, MD, Dept of Obstetrics/Gynelcology, East Tennessee State University, James H. Quillen College of Medicine, Johnson City, Tenn, personal communication, February 1994), but the failure rate in regard to disease transmission (which is a constant threat) is probably much higher.

In serodiscordant couples where the man is HIV-positive and the woman is HIV-negative, several studies recognized that consistent and correct condom use met with very low failure rates, from 0% to 2%.[28] However, *inconsistent* condom use among serodiscordant couples met with seroconversion rates of 10% to 15%.[29] Yet, another study with serodiscordant couples found that seroconversion occurred in 17% of seronegative partners where condoms were used *consistently*.[30] Results from a longitudinal study by Vincenzi[31] of serodiscordant heterosexual subjects using condoms as sole means of protection against HIV suggest that condoms are very effective in preventing the transmission of the virus.

Comment

The CDC summarizes the point succinctly: "The most effective way to prevent sexual transmission of HIV infection and other STDs is to avoid sexual intercourse with an infected partner."[23] Condoms are better than nothing, but consistent, correct use is the caveat.

Therefore, we are faced with a conundrum. Current methods to reduce HIV risk that rely on condom use are woefully ineffective, as Ku and colleagues[32] note, "As males age, they tend to switch from reliance on condoms toward use of female contraception methods, especially oral contraceptives, and that, since their sexual activity increases at the same time, they have a much greater risk of HIV or other STDs. The trend toward safer [sexual] behavior has, at the very least, slowed. Indeed,

there is evidence that the movement has stopped or even reversed."

A critical evaluation of the materials used in the routine counseling of adolescents needs to be undertaken. Particular attention must be given to tailoring the materials to the cognitive developmental stage of the adolescent, avoiding age-specific materials. Clinicians need to scrutinize the "safer-sex" brochures and to provide their adolescent patients with factual, pertinent, and developmentally appropriate information.

Combining the cognitive developmental challenges of adolescence with the logistic difficulties of condoms regarding consistent, correct use leads to the conclusion that extreme care should be taken when considering and recommending risk-reduction strategies for adolescents.

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