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Original article

Adolescent Age at Time of Receipt of One or More Sexual Risk Reduction Interventions

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A B S T R A C T

Purpose: Age of the target audience at time of intervention is thought to be a critical variable influencing the effectiveness of adolescent sexual risk reduction interventions. Despite this postulated importance, to date, studies have not been designed to enable a direct comparison of outcomes according to age at the time of intervention delivery.
Methods: We examined outcomes of 598 youth who were sequentially involved in two randomized controlled trials of sexual risk prevention interventions, the first one delivered in grade 6 (Focus on Youth in the Caribbean [FOYC]) and the second one in grade 10 (Bahamian Focus on Older Youth [BFOOY]). Four groups were examined, including those who received (1) both treatment conditions, FOYC and BFOOY; (2) FOYC in grade 6 and the control condition in grade 10; (3) the control condition in grade 6 and BFOOY in grade 10; and (4) both control conditions. Intentions, perceptions, condom-use skills, and HIV-related knowledge were assessed over 60 months.
Results: Data showed that those who received both interventions had the greatest increase in condom-use skills. Youth who received FOYC in grade 6 had greater scores in knowledge and intention.
Conclusion: These results suggest that youth receive the most protection with early and repeated exposure to interventions. These findings suggest that educators should consider implementing HIV prevention and risk reduction programs as a fixed component of education curriculum beginning in the preadolescent years and if possible also during the adolescent years.
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IMPLICATIONS AND CONTRIBUTION

This study examined the importance of timing and frequency of exposure to risk reduction programs. To our knowledge, this is the first study that has examined the effect of having been exposed to two randomized controlled trials of sexual risk prevention interventions at two different developmental periods during adolescence.

The prominence of adolescents and young adults in the context of the global HIV epidemic is uncontested. Adolescents and young adults between the ages of 13–29 years constitute over one third of all new HIV infections in the United States [1]. Focusing on those who are most vulnerable, such as youth, should be a primary aim of prevention programs [2]. A robust literature based on randomized controlled trials testifies to the effectiveness of a substantial number of HIV prevention interventions targeting adolescents and young adults [3,4].

Despite these successes, many basic questions regarding adolescent risk reduction interventions remain. A review of 66 group-based risk reduction interventions targeting adolescents observed that the reviewed studies did not provide “consistent evidence of differential effects on outcome for any of the 12 critical moderator variables (gender, virginity status, age, race/ethnicity,

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setting, dosage, focus, deliverer, multicomponent, targeting, study design and comparison group type" [3] (p. 288). The probable importance of each of these variables on outcomes is well recognized. Age and virginity status have received considerable attention in the literature for a variety of reasons. For several decades, concerns were raised that risk reduction interventions by describing safer sexual practices could accelerate the initiation of sex and/or increase sexual activity if they were delivered to youth prior to the initiation of sex [4,5]. This aspect of the variables' "age" and "virginal status" has been exhaustively studied, with an overwhelming preponderance of the literature indicating that sexual risk reduction interventions do not hasten the onset of sex or increase sexual activity [3,4,6].

However, the question as to the *best timing* for delivery of adolescent sexual risk reduction interventions in terms of age (which is confounded with sexual debut status) remains open. An extensive literature exists describing the myriad physical, cognitive, and emotional changes occurring over the course of adolescence, which could influence likelihood of being infected, of engaging in risk behavior, and/or of responding to a risk reduction intervention [7]. The adolescent's propensity to egocentric thinking and preoccupation with short-term over long-term consequences may negatively impact decision-making. The early adolescent's reliance on concrete rather than abstract reasoning as well as the older adolescent's tendency to revert to concrete thinking when confronted with an emotion-laden situations continues to allow them to wander into harm's way [8]. Evidence from imaging studies has revealed that a surge of neural proliferation occurs in the brain around preadolescence and a wave of neural pruning occurs over the first few years after puberty. This "remodeling" of the brain is important and consistent with the observation that neural connections appear to be strengthened, weakened, and/or revised during adolescence [9].

This question as to most propitious time(s) during a child's development for an intensive HIV prevention intervention remains unanswered. Currently, there are several risk reduction interventions targeting youth in mid-adolescence to late adolescence that have been demonstrated to be effective [10]. A much smaller number of interventions targeting preadolescents and early adolescents have been demonstrated to be effective [11–14]. However, direct statements about *relative* effectiveness of intervention delivery according to the age of the child—or the advantage of multiple intervention exposures [2]—remain speculative.

Several years ago (2008), we concluded follow-up through grade 9 of youth who had participated in a randomized controlled HIV prevention trial (Focus on Youth in the Caribbean [FOYC]) in grade 6. Also in 2008, we initiated a randomized controlled trial of a version of FOYC adapted for older adolescents—Bahamian Focus on Older Youth (BFOOY) among grade 10 students. Because a subset of the grade 10 students enrolled in the BFOOY evaluation had also participated in the grade 6 trial (FOYC), we are in a position to address some of the questions regarding timing of a skills-based group HIV prevention intervention. The data in this study are from the 12-month follow-up of the grade 10 study—and, therefore, a 5-year follow-up from the grade 6 study. Specifically, these intersecting data sets enable us to explore several questions. Does an additive or booster effect result if the grade 10 intervention (BFOOY) is given to youth who previously received the grade 6 intervention (FOYC), or have these youth already gained maximum benefit from its earlier receipt? Do youth who previously had received the control condition experience a sharper response to the grade 10 intervention than do their peers who had received the grade 6 intervention?

Methods

Data

The data utilized for these analyses are from youth who participated in two randomized controlled trials evaluating the effectiveness of the adolescent sexual risk reduction intervention FOYC. FOYC is a 10-session program (plus two booster sessions) targeting adolescents, which was adapted from Focus on Youth (FOY), an evidence-based risk reduction intervention targeting U.S. mid-adolescents that is part of the Centers for Disease Control and Prevention portfolio of evidence-based HIV prevention programs [15]. FOYC and FOY are based on a social cognitive model, Protection Motivation Theory [16], which posits that decision-making is a balance of the perceived benefits and risks associated with the risky or protective behavior. In brief, the model suggests that if the individual (1) believes that the protective maneuver is likely to work (response efficacy) and (2) that he or she is able to enact the protective maneuver (self-efficacy). He or she determines that (3) the disadvantages of employing the protective maneuver (response costs) are relatively small, while (4) the adverse consequences of the risky behavior are significant (severity) and (5) likely to happen to the individual (vunerability). Finally, he or she feels that the positive feedback that he or she will enjoy from engaging in the risky behavior both from an (6) external audience (extrinsic rewards) and (7) his or her own physical or emotional pleasure (intrinsic rewards) is small. Protection Motivation Theory would predict that this person is likely to intend to engage (intention) in the protective action rather than the risky action, a critical step in the pathway to "action." The intervention contains exercises designed to increase skills regarding risk avoidance, communication, negotiation, and condom-use as well as HIV-related knowledge. The intervention format includes lectures, interactive discussions, games, and exercises to reinforce main messages and a fictional family story to contextualize decision-making [12]. During its adaptation from FOY, subsequently, FOYC was modified to be developmentally appropriate for grade 10 students (see below). The grade 10 version of FOYC, called BFOOY, also contains 10 sessions (with the same order and general content of the grade 6 version, FOYC), but the discussions, exercises, and games reflect the older age of the participants. Youth and parents provided assent and consent to participate in each trial. Human Research Protection Boards for the Wayne State University and the Ministries of Health and Education in the Bahamas approved consenting procedures and study protocols.

Grade 6 intervention (Focus on Youth in the Caribbean) evaluation. The grade 6 effectiveness trial of FOYC involved 15 of the 26 government elementary schools located on the island of New Providence, the Bahamas, which were selected based on geographic distribution and willingness of the school administrators to accept randomization [12]. The control comparison for FOYC was a 10-session ecology curriculum, "The Wondrous Wetlands" (WW) [11–13]. The WW curriculum, which was developed for the Bahamas, emphasizes the preservation of the wetlands and provided applied knowledge and skills regarding water conservation. Approximately two thirds of the students in

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