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## **A Systematic Review of Pregnancy Prevention Programs for Minority Youth in the U.S.: A Critical Analysis and Recommendations for Improvement**

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### **ABSTRACT**

African American and Latino youth experience disproportionate rates of both intended and unintended pregnancy in the United States. A public health priority to ameliorate the high rates among this population has been the creation and proposed expansion of pregnancy prevention programs designed specifically for minority youth. However, little is known about the role of incorporating cultural components into program curricula. To better understand the components and outcomes of existing programs for this population, this systematic review analyzed published outcome evaluations of adolescent pregnancy prevention programs for minority youth. This review of literature published from January 2002 to June 2012 and retrieved from databases CINAHL, PsycInfo and PubMed abstracted results from 10 outcome evaluations, meeting all inclusion criteria. These publications were assessed for intervention characteristics including use of theory, setting, and culturally specific aspects. In addition, aspects of the evaluation including design, outcome variables, and measures were assessed. Eight of the ten evaluations found statistically significant results for a main pregnancy prevention variable (e.g., ever had sex, contraceptive use, or previous birth). Programs with a primary goal of first or repeat pregnancy prevention demonstrated effectiveness, while programs with a focus to delay sexual initiation did not have a consistently clear effect. The review also indicated areas for improvement in methodological quality, and consistency in cultural components, variables and measures. Implications of this research indicate a positive impact from adolescent pregnancy prevention programs for minority youth, and a need to expand standardized measures and program components as well as increase rigor in research methodology.

**Keywords:** Review, Systematic; Minority Health; Pregnancy in Adolescence; Health Status Disparities; Program Evaluation

## **INTRODUCTION**

Reports indicate a continuing decline in adolescent pregnancy rates in the United States (Darroch & Singh, 1998; Hamilton & Ventura, 2012), but minorities remain disproportionately affected. Rates of teenage pregnancy among African American and Latino youth in the U.S. are two to three times higher than rates among white youth (CDC, 2011). In fact, more than half of all Latinas will experience a pregnancy before the age of 20 (CDC, 2011). Higher adolescent pregnancy rates among minority teenagers represent a continuing health disparity in the U.S. that demands public health attention.

Adolescent pregnancy is associated with adverse medical, economic, and social outcomes. Adolescents who become pregnant have increased risks for hypertension and anemia during pregnancy (Martin et al., 2010). Babies born to adolescents are also at increased risk for low birth weight, preterm birth, and death in infancy (Matthews & Macdorman, 2010). Teenage mothers are less likely to achieve in school or finish high school, and more likely to have children who become pregnant during adolescence (Manlove et al., 2010; Perper et al., 2010). In addition, nearly two-thirds of births to adolescents under the age of 18 years are unintended, which increases the likelihood that the mother is less emotionally and financially prepared for pregnancy and parenting (Chandra et al., 2005). Children of adolescent mothers are more likely to utilize public healthcare, and are more likely to be placed in foster care (Hoffman et al., 2008). The economic cost of teen pregnancy to society adds up to billions of dollars per year including increased healthcare costs, incarceration, foster care, and lost productivity (Hoffman et al., 2008; The National Campaign, 2011).

Recent proposed federal legislation intended to increase the number of adolescent pregnancy programs for minority populations has failed to pass (Thomas, 2011). The rationale for expanding access to these programs is to complement and support existing programs to decrease the adolescent pregnancy rate (Thomas, 2011). In order to support further development of adolescent pregnancy prevention among minority youth, it is important to survey the characteristics of existing programs in the U.S. To strengthen the efficacy and expansion of adolescent pregnancy prevention it is vital to understand the components, as well as the strengths and weaknesses of existing programs before developing more. The purpose of this systematic review was to analyze intervention characteristics of adolescent pregnancy prevention programs that are specifically focused on African American and Latino youth. Key characteristics of the analysis included an assessment of implementation setting, measures employed to evaluate interventions' effects, and culturally specific aspects, such as having staff of the same ethnic group as the youth, ensuring availability of materials in various languages, or targeting specific issues dealing with racial/ethnic identity (e.g.: music, experience with racism, cultural values). Results of this review allow us to see a larger picture of how adolescent pregnancy programs have been used with minority youth in order to promote successful programs and to suggest areas of improvement. In addition, this review supports further research to determine best practices in tailoring adolescent pregnancy prevention for minority populations.

## **METHODS**

### **Literature Search**

Three scholarly databases—PubMed, CINAHL, and PsycInfo—were utilized following the matrix method (Garrard, 2004) for this systematic literature review of evaluated adolescent pregnancy programs for minority youth. The articles were identified and abstracted by a single investigator. Additional searches of the references lists of included studies were conducted to identify related cited articles. Medical Subject Heading (MeSH) terms for selected ethnicity and

age were used in conjunction with search terms regarding programmatic features (U.S. National Library of Medicine, 2013). Search terms included varying combinations of the following words: *adolescent, African Americans, Hispanic Americans, pregnancy, pregnancy in adolescence, sexual risk, programs* and *evaluation* (Appendix A; Appendix B).

### **Inclusion and Exclusion Criteria**

Articles were included in this review if they were peer reviewed, were published in the U.S. between January 2002 and July 2012, and included outcome evaluation measures that specifically addressed adolescent pregnancy prevention among African American and/or Latino youth. The 10 year date range was selected in order to include programs recently implemented that may have potential for continued use and improvement. In order to be included, the program description must have explicitly mentioned pregnancy prevention. For this reason, several programs labeled as evidenced-based adolescent pregnancy programs by the Office of Adolescent Health were excluded due to the program description in the evaluation as an “HIV prevention program” with no mention of adolescent pregnancy (e.g., *Becoming a Responsible Teen, Respeto/Proteger*). Any measure used for the purpose of gauging pregnancy prevention could be included.

Due to a minimal amount of existing literature on programs implemented among minority youth, studies employing a range of evaluation designs were included (e.g., experimental, quasi-experimental and non-experimental study designs). Our intent was to be inclusive of published literature that does exist, using the matrix method for systematic reviews of the literature, and to be transparent about characterizing the rigor of the studies found (Garrard, 2004). As a result of a wide variation in outcome measures used to evaluate adolescent pregnancy programs (e.g., condom use, age of sexual initiation, live birth), studies with differing outcome measures of preventing pregnancy were included. As long as the article stated the population as “adolescent” there was not specific exclusion criteria for age range. The ages of adolescents were determined by the parameters of each individual evaluation. A number of evaluated programs specifically addressing African American and/or Latino adolescents were aimed to prevent repeat births and these studies were also included in the review. Studies with a main focus of HIV/sexually transmitted infection (STI), and not pregnancy prevention, articles that did not include primary data (i.e., review or editorial articles), and non-English language articles were excluded.

### **Data Extraction**

The literature search identified 123 abstracts, of which 10 articles met all inclusion criteria (Appendix C). The selected articles were assessed for both program components and methodological quality of the program evaluation. Specific program data were extracted regarding program type, such as school or home based; cultural components, including use of culturally tailored materials and activities; measures of pregnancy prevention, and findings. Each publication’s methodology was assessed by examining the selected evaluation study design, sample composition, outcome measures, and measurement tools, and use of reliability and validity reporting.

### **Quality Assessment**

Due to the various study designs and range in methodology between studies, a quality assessment was conducted based on JADAD criteria for systematic reviews to assess the quality of evidence among selected programs (Jadad et al., 1996). Upon identification of the 10 articles which met all inclusion criteria, each study was analyzed for methodological quality. Quality of evidence was characterized by reviewing the following items: study design, sample size, allocation concealment, participant withdrawal, follow-up procedures, and effect size (Table 1).

Table 1: Reported outcomes of adolescent pregnancy prevention programs.<sup>1</sup>

Author	Sexual Initiation	Sexual Intent	Frequency of Intercourse	Unprotected Sex	Number of Partners	First Births	Repeat Births
Akintobi et al., 2010	↓	-	-	-	-	-	-
Barnet et al., 2009	-	-	-	-	-	-	↓
Black et al., 2006	-	-	-	-	-	-	↓
Guilamo-Ramos et al., 2011	↓	-	↓	-	-	-	
Key et al., 2008	-	-	-	NS	-	-	↓
Kuperminc et al., 2011	NS	-	-	-	-	-	
Markham et al., 2012	↓	-	↓	↓	↑	-	
Murry et al., 2007	-	↓	-	-	-	-	-
Salihu et al., 2011	-	-	-	-	-	↓	↑
Tortolero et al., 2011	↓	-	↓	↓	NS	-	-

↑ Indicates significant increase in selected outcome  
 ↓ Indicates significant decrease in selected outcome  
 NS Non-significant finding  
 - Study did not assess outcome

<sup>1</sup>Guilamo-Ramos showed a within group decrease in sexual initiation, but no significant differences between groups. In addition, Markham showed a difference between Risk Reduction group and control in delay of sexual initiation, but no differences between Risk Avoidance group and control group.

## RESULTS

### Summary of Programs

Results of the literature review resulted in 10 articles which met all inclusion criteria. The studies reviewed were published in 7 different journals including disciplines of public health and medicine. An overview of the selected interventions indicated wide variation in program and evaluation design and results. Marked differences of interest in the programs were found in the areas of cultural components, outcome variables and outcome measures (Table 2).

Of the 10 reviewed studies, settings included school-based (n = 3), after-school (n = 2), community-based (n = 4), and in-home (n = 1). Six of the interventions specifically promoted the delay or avoidance of sexual activity, an additional four addressed repeat pregnancies, and the final intervention was a positive youth development program.

Table 2: Outcome evaluations of adolescent pregnancy prevention programs for minority youth: summary of programs, evaluation components, and results

Primary Outcome	Author	N	Program	Setting	Population	Cultural Components	Study Design	Length of Intervention	Post Intervention Follow-up	Measure For Primary Outcome	Results
Delayed sexual initiation	Akintobi et al., 2010	323	HYPE A Abstinence Club	Community or school	African American male and female teens 12-18	Culturally sensitive instructors, classes geared towards AA youth culture such as hip hop and rap	Non-experimental longitudinal	30 hours of curriculum	None	Sexual behavior question: Survey items NR	81% of youth reported not having sex since beginning of intervention
Delayed sexual initiation	Guilamo-Ramos et al., 2011	2016	Making a Difference! And Families Talking Together	After-school	African American and Latino mother/daughter dyads	Program materials included English tailored for Black and for Latinos, and in Spanish	Randomized Control Trial	30 minute session and two booster calls over 5 months	9 months	Sexual behavior question: Asked if ever engaged in vaginal intercourse	No between group differences in adolescent delaying of sexual initiation
Avoidance of sexual intercourse	Kuperminc et al., 2011	86	Cool Girls, Inc., positive youth development program	After-school	African American female youth 9-15 in 8 schools	None	Quasi-experimental non-equivalent comparison group design	9 months	None	Healthy behavior survey items adapted from YRBSS and Monitoring the Future Survey	No significant between group effects found regarding sexual intercourse.
Delayed sexual initiation (oral, vaginal and anal)	Markham et al., 2012	1742	It's Your Game Keep it Real- Risk Avoidance (Abstinence-only) and Risk Reduction (Abstinence-plus, inclusion of contraceptive information)	School-based	African American and Hispanic 7 <sup>th</sup> grade students male and female	Facilitators were predominately Latino and African American	Randomized Controlled Trial	2 academic years (7 <sup>th</sup> and 8 <sup>th</sup> grade)	Follow-up in 9 <sup>th</sup> grade (~12 months)	Students asked if they had ever had vaginal, anal, or oral sex- with a description of each	Risk Reduction students were 35% less likely to have initiated any type of sex than control (AOR=.65; CI: .54-.77; p<.01). No significant differences in delaying sexual initiation in Risk Avoidance

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											group with control.
Delayed sexual initiation	Tortolero et al., 2011	1445	It's Your Game: Keep it Real	School-based	African American and Hispanic 7 <sup>th</sup> and 8 <sup>th</sup> grade male and females	None	Randomized Control Trial	2 academic years (7 <sup>th</sup> and 8 <sup>th</sup> grade)	Follow-up in 9 <sup>th</sup> grade (~12 months)	Survey includes sexual activity and risk behavior	Students in control 30% more likely to have sex by 9 <sup>th</sup> grade than intervention (23.4% vs. 29.9%; ARR=1.29; CI: 1.02--1.64; p<.05).
Prevention of repeat birth	Barnet et al., 2009	235	Computer Assisted Motivational Intervention (CAMI) to prevent repeat pregnancy	In home and community	Predominant ly African American, female youth 12-18, 24 or more weeks gestation	Interventionists were African American women from community hired due to rapport with teenagers	Randomized Control Trial	24 months	None	Maryland birth certificate	CAMI+ group trended to be less likely than control to have repeat birth and hazard ratio was significantly lower. (13.8% vs. 25%, p=.08; HR=.45; 95% CI: .21-.98)
Prevention of repeat birth	Black et al., 2006	181	Home-Based Mentoring Program to delay second births	Home-based	Low income African American adolescent first time mothers	Mentors were also African American	Randomized Control Trial	12 months	6, 13, and 24 months post	Teens reported whether 2 <sup>nd</sup> live birth; Risk behaviors based on YRBSS	Control mothers 2.5x more likely to have a second infant (24% vs. 11%; OR: 2.45; 95% CI: 1.003-6.03; P=.05)
Prevention of repeat birth	Key et al., 2008	63	Comprehensive health care and social work based program for teen mothers	School-based	African American female youth in a low performing high school	Culturally matched social worker	Prospective cohort study	24 months or until age 20	None	State birth registry system; survey of contraceptive use	Subsequent births more common in comparison group than among subjects (33% vs. 17%; p=.001); No significant difference in overall use of contraceptives

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Prevention of primary and repeat births	Salihu et al., 2011	3115	REACHUP Program to Reduce Primary and Repeat Pregnancies	Community Based	Teenagers, males and females in select low income, predominately minority zip codes	Facilitators trained to work with minority communities	Ecological study	9 years	None	Vital Statistics Records of live births from DOH	Births in selected zip codes reduced 27% over 10 years, 60% greater reduction than at county level and 80% greater reduction than state level.
Reduction of intent to engage in sexual activity	Murry et al., 2007	284	The Strong African American Families Program: Longitudinal pathways to sexual risk reduction	Community-based	African American families with 11 year old children in 9 rural counties	Incorporates cultural competency, Racial socialization: teaching children how to cope with racism into program curriculum	Non-experimental longitudinal	7 week	29 months post	9 questions of sexual intent and risk behaviors	Participation associated with less intent to engage in sexual activity (B= -.28, p<.01)

## **Methodology**

Study designs included five randomized controlled trials (Barnet et al., 2009; Black et al., 2006; Guilamo-Ramos et al., 2011; Markham et al., 2012; Tortolero et al., 2011), one prospective cohort study (Key et al., 2008), one ecological study (Salihu et al., 2011), a quasi-experimental non-equivalent comparison group design (Kuperminc et al., 2011), and two non-experimental longitudinal studies (Akintobi et al., 2010; Murry et al., 2007). The number of participants ranged from 63 (Key et al., 2008) to 3115 (Salihu et al., 2011) over an intervention period of 12 months (Guilamo-Ramos et al., 2011) to 29 months (Murry et al., 2007), with the exception of one ecological study that evaluated 10 years of data (Salihu et al., 2011). Of the ten studies, five included post intervention follow-up with participants (Black et al., 2006; Guilamo-Ramos et al., 2011; Markham et al., 2012; Murry et al., 2007; Tortolero et al., 2011). The length of post intervention time to follow-up ranged from 9 months (Guilamo-Ramos et al., 2011) to 29 months (Murry et al. 2007). None of the 10 studies included psychometric properties (i.e., score reliability and validity) of the scales used to measure primary outcome variables.

## **Primary Outcome Variables**

Among programs seeking to prevent a first time adolescent pregnancy, the most common primary outcome variable was the delay of sexual initiation. Five studies specifically stated delay of sexual initiation as the primary outcome variable (Akintobi et al., 2010, Guilamo-Ramos et al., 2011; Kuperminc et al., 2011; Markham et al., 2012; Tortolero et al., 2009). Guilamo-Ramos et al. (2011) defined delay of sexual initiation specifically as avoiding vaginal sex while Markham et al. (2012) included vaginal, oral, or anal sex. The remaining studies did not operationalize sexual intercourse, when measuring this outcome (Akintobi et al., 2010, Kuperminc et al., 2011, Tortolero et al., 2009). An additional study measured the intent to engage in sexual activity, which differs in measurement from the previous variable (Murry et al., 2007). Of the four programs with intent of preventing repeat pregnancies, all reported a primary outcome variable of repeat live birth (Barnet et al., 2009; Black et al., 2006; Key et al., 2008; Salihu et al., 2011).

Of studies measuring live births, only Black et al. (2006) surveyed teens as to whether they experienced a live birth since the beginning of the evaluation. This survey additionally asked secondary, self-report outcome measure questions regarding sexual risk behavior that were adapted from the CDC Youth Risk Behavior Surveillance System (YRBSS; Black et al., 2006). The remaining three studies used state birth records and registry systems to confirm live births (Barnet et al., 2009; Key et al., 2008; Salihu et al., 2011). Among these studies, Barnet et al. (2009) and Key et al. (2008) tracked records of youth who participated in the study. Salihu et al. (2011) conducted an ecological study and, therefore, monitored rates of live birth as a whole in the zip codes where the intervention took place over ten years.

## **Outcome Measures**

Delay of sexual initiation and intent to engage in sexual activity were uniformly measured by self-report surveys across all evaluation studies with this outcome measure (Akintobi et al., 2010, Kuperminc et al., 2011, Markham et al., 2012; Tortolero et al., 2009; Murry et al., 2007). No two studies used the same scale or asked primary or secondary risk behavior outcome questions in a consistent way. Although several studies included examples or full charts describing the sexual behavior questions asked within the specific survey (Markham et al., 2010; Guilamo-Ramos et al., 2011; Kuperminc et al., 2011; Tortolero et al., 2009), no study fully indicated how scales were developed, adapted, or if they an existing scale was used. Kuperminc et al. (2011) indicated that sexual questions were adapted from the YRBSS as well as

the Monitoring the Future Survey, yet it was not stated which questions were used from each existing measure or how the adaptation may have affected score reliability or validity. Two additional studies stated that the scales used to assess sexual behavior were adapted from existing surveys or previously used with urban youth, but no scale details or psychometric properties were included (Markham et al, 2012; Tortolero et al. 2009).

### **Key Study Findings**

Eight of the 10 studies found statistically significant results indicating at least one positive program effect for a main pregnancy prevention outcome variable. Main outcome variables for pregnancy prevention among all studies included one or more of the following: sexual initiation, sexual intent, and frequency of intercourse, unprotected sex, number of partners, first birth, and repeat births (Table 3).

Of the five programs with a primary outcome variable of delay of sexual initiation, three programs did not show significant between group differences for delay (Guilamo-Ramos et al., 2011; Kuperminc et al., 2011; Markham et al., 2012). The Markham study involved two curriculums which were compared with a control group, titled Risk Avoidance and Risk Reduction curriculums. Only the Risk Reduction group was shown to have a significant within group difference in delay of sexual initiation (Markham et al., 2012). Two additional studies reported statistically significant results regarding a delay in sexual initiation among participating students. Akintobi et al. reported significant within group differences and Tortolero et al. reported significant between group differences (Akintobi et al., 2010; Tortolero et al., 2011).

One study reporting on reduction of first and second time births indicated significant results. This ecological study reported results indicating a reduction in first-time births, but an increase in second births in the population studied (Salihu et al., 2011). Three additional studies, two of which were RCTs, indicated that intervention group participants were statistically significantly less likely to have a repeat birth compared with comparison group participants (Key et al., 2008; Barnett et al., 2009; Black et al., 2006).

Only one study examined the outcome of intent to engage in sexual activity. This non-experimental study reported participation as having a statistically significant *negative* effect on intent to engage in sexual activity (Murry et al., 2007).

Based on JADAD criteria, studies reviewed to have low methodological quality included Akintobi et al., 2010, Key et al., 2008, Kuperminc et al., 2011, Murry et al., 2007, and Salihu et al., 2011. These determinations were made based on a range of factors including low sample size, non-randomization or allocation concealment, no follow up or short length of follow up, and/or no report of effect size (Table 3). The study which demonstrated the highest quality of evidence rating was Markham et al., 2012. This study was a Randomized Controlled Trial with a large sample size and 12 month follow up. The remaining studies included moderate quality of evidence (Barnett et al., 2005; Black et al., 2006; Guilamo-Ramos et al., 2011; Tortolero et al., 2007).

### **Cultural Components**

Among the 10 program evaluations that met the criteria for this review, 8 included at least one culturally competent aspect (Akintobi et al., 2010; Barnett et al., 2009; Black et al., 2006; Guilamo-Ramos et al., 2011; Key et al., 2008; Markham et al., 2012; Murry et al., 2007; Salihu et al., 2011). The remaining two programs made no statement about cultural aspects apart from participants being predominantly African-American and/or Latino (Kuperminc et al., 2011; Tortolero et al, 2011).

Table 3: Methodological Quality Assessment

Study	Study Design	Sample Size	Randomization Process	Allocation Concealment	Withdrawal	Post Intervention Follow-up in months	Effect Size
Akintobi et al., 2010	Non-experimental longitudinal	323	None	No	71	None	NR
Barnet et al., 2009	Randomized Control Trial	235	Randomization using computer generated permuted blocks of 6	NR	64	None	NR
Black et al., 2006	Randomized Control Trial	181	Randomization procedure stratified by maternal age and gender of child	NR	149	24	NR
Guilamo-Ramos et al., 2011	Randomized Control Trial	2016	Dyads assigned to conditions at clinic	NR	199	9	NR
Key et al., 2008	Prospective cohort study	63	None	No	Unclear	None	NR
Kuperminc et al., 2011	Quasi-experimental non-equivalent comparison group design	86	None	No	16	None	Avoidance of sexual intercourse $R^2=.19$
Markham et al., 2012	Randomized Controlled Trial	1742	Multi-attribute randomization protocol	NR	516	12	Single school undue influence: RA with control schools (.67-1.27); RR with control schools (.61-.68)
Murry et al., 2007	Non-experimental longitudinal	284	None	No	NR	29	NR
Salihu et al., 2011	Ecological study	3115	None	No	NR	None	NR
Tortolero et al., 2011	Randomized Control Trial	1445	Multi-attribute randomization protocol	NR	464	12	NR

In four of the evaluations, the only culturally related component was that the program mentor, facilitator, or social worker was intentionally of the same ethnicity or cultural background as the youth in the program (Barnet et al., 2009; Black et al., 2006; Key et al., 2008; Markham et al., 2012). One of these evaluations mentioned that facilitators, although not necessarily of the same cultural background as the youth, were trained to work with minority communities (Salihu et al., 2012).

The remaining three programs reviewed provided increased attention to cultural competency and described in more detail the cultural components included in programming to achieve that goal (Akintobi et al., 2010; Guilamo-Ramos et al., 2011; Murry et al., 2007).

The HYPE A Abstinence club evaluation indicated that the program was adapted to the needs of African American youth through the use of a 14 member planning session in which youth provided input on program setting and content. The results of this planning session indicated the desire for an incorporation of arts, relevant music, and culturally sensitive instructors. This included classes geared towards African American youth including hip hop and rap music to increase the effectiveness of the program among the selected population (Akintobi et al., 2010).

Another study reviewed which included attention to cultural components was the Strong African American Families Program. This program was designed to uniquely meet the needs of youth in rural African American communities through adaptive parenting (Murry et al., 2007). This family based intervention included the concept of racial socialization, in which African-American parents have an additional responsibility of teaching children how to cope with racism to develop the curriculum. The curriculum was culturally designed based upon researchers' previous research with rural African American families. In addition to self-esteem and racial identity, these messages of teaching children to prepare for encounters with racism while emphasizing pride in being African-American were incorporated (Murry et al., 2007).

The final program that included information about inclusion of cultural competency as was a comparative study of Making a Difference! Youth based abstinence program and Families Talking Together, a family based abstinence only program (Guilamo-Ramos et al., 2011). Guilamo-Ramos used three exploratory methods to gain information in order to cultural tailor program offerings. These methods included focus groups with Latino and black mothers and adolescents to obtain information about their preferences regarding interview content; interviews to obtain information about adolescent sexual behavior; as well as a pre-intervention survey. Intervention materials were culturally adapted based on variation with gender, grade, and race/ethnicity within these three formative research activities. Making a Difference! included the option for adolescents to receive an activity workbook in either English or Spanish. The Spanish version was back-translated to ensure similarity between versions. Families Talking Together included parental involvement and thus provided all program sessions and materials in English and Spanish. In addition, two English versions of the program manual were available, one tailored to Latino parents and one to black parents (Guilamo-Ramos et al., 2011).

## **DISCUSSION**

This systematic review of program outcome evaluations has revealed strengths and key areas that can be improved in the area of adolescent pregnancy prevention for minority populations. This review found that the majority of evaluated programs yielded at least one statistically significant result on an outcome variable intended to reduce adolescent pregnancy. However, among primary outcome variables, interventions used to prevent repeat pregnancy demonstrated effectiveness while not all interventions to delay sexual intercourse showed a significant positive effect. These findings are consistent with adolescent pregnancy prevention programs for a wider range population, which in a systematic review have also been found to have inconsistent results where similar programs produced differential results (Kirby, 2007). Our results give support to the utility of repeat pregnancy interventions as an effective method of reducing the rate of adolescent pregnancy among youth at high risk in the U.S., yet indicate a need for further study of the effectiveness of programs designed to delay sexual initiation.

Although these studies reported on statistically significant results, areas of improvement were also found in the areas of methodology outcomes, measures, and cultural components. The

methodological assessment indicated that the included articles had a range in quality of evidence from very low, to one rating of high. In addition to variation in rigor of study design, there were also issues related to sample size, participant withdrawal and lack of long term follow-up. None of the studies fully utilized effect size to demonstrate magnitude of the study results. The findings related to methodology in this study, mirror results of a systematic review of broad based adolescent pregnancy programs, which also found studies limited by design, small sample sizes, and low retention rates (Kirby, 2007).

In regards to outcomes, results indicated that programs varied widely in primary outcome variables, including condom use, delay of sexual initiation, reported birth, or repeat birth. In addition, each of the ten studies used different scales to measure primary and additional outcome variables and no study fully reported psychometric properties of the scales. The lack of consistency in use of scales contributes to the difficulty clearly understanding how these programs have impacted minority youth. Moreover, it is difficult to measure the true efficacy of adolescent pregnancy prevention in the U.S. when each program is measuring a different outcome.

The final variation in programs to be noted was related to cultural components. Though many of the programs included a cultural component, each varied in method and intensity. The evaluations could have been strengthened by a component to demonstrate whether and how the different cultural components added to these programs supported intervention effectiveness.

This review is unique in that it focuses on African American and Latino adolescents, priority populations that experience higher rates of adolescent pregnancy in the U.S. Previous systematic reviews of the adolescent pregnancy literature are of a broad nature and have not focused on one specific racial or ethnic population (Robin et al., 2004; DiCenso et al., 2002; Bennett et al., 2005; Buhi et al., 2007). Findings from this review has implications on research in the area of adolescent pregnancy prevention by highlighting an area of programs intended for a high-risk population of youth that have not previously been analyzed as a unit.

While systematic, this review is not devoid of limitations. First, the program evaluations reviewed here included programs that employed non-experimental and quasi-experimental designs as well as experimental designs. The variation in type of study design limits the ability to directly compare program outcomes. The methodological quality assessment highlights the need for the application of more rigorous research methods in the design, implementation and evaluation of adolescent pregnancy programs for minority youth. The lack of rigor in study design could be addressed in real world settings through the use of cluster randomized trials, early versus delayed intervention in order to have a comparison group, or the use of propensity score matched assessments. Additional limitations include the possibility of additional program evaluations that exist that were not present in the reviewed databases. Due to this, the issue of publication bias is possible. The current review also was limited to published outcome evaluations of programs; therefore information from existing adolescent pregnancy prevention programs that have not been evaluated or published evaluation findings (or cases in which the findings were not statistically significant [i.e., the file drawer effect]) was not included.

## **CONCLUSION**

Many public health researchers and program planners who wish to see a reduction in health disparities in the U.S. have supported legislation to increase funding for adolescent pregnancy prevention programs for minority youth. Thus far, this legislation has failed to pass in

both the U.S. House of Representatives and Senate over several years. By reviewing evaluations of existing pregnancy prevention programs for minority youth, we see that there have been marked successes within the past ten years. However, the lack of consistency in variables and measurement has made it more difficult to present a clear picture of these successes across the board. Strengthening the way these program outcomes are measured and reported can help support the case that pregnancy prevention programs are working in this country and deserve the increased funding that has been proposed in Congress.

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Appendix A: Search Strategy

Search Terms for Subjects	[AND]	Search Terms for Race/Ethnicity	[AND]	Search Terms for Adolescent Pregnancy	[AND]	*Search Terms for Programs
Adolescent		African Americans  [OR] Hispanic Americans		Pregnancy in adolescence  [OR] Pregnancy  [OR] Sexual Risk		Programs  [OR] Evaluation

\*The last facet was dropped from the final search strategy due to less optimal search results.

Appendix B: Final Search Terms

(Adolescent) AND (African Americans OR Hispanic Americans) AND (Pregnancy in adolescence OR Pregnancy OR Sexual Risk)

Appendix C: Adaptation of PRISMA Flow Diagram (Moher et al., 2009)

