

# Adolescent Maternal Lifecourse Outcomes: Implications from an Integrated Mental Health Services Approach

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*Family intervention literature on adolescent parenting describes the pathways between outcomes for adolescent mothers and their children and the contexts of the pregnancy itself (e.g., poverty, low or no prenatal care, lower educational attainment). The aim of these descriptions is often to inform intervention designs that promote adaptive functioning for the child, the mother, and the dyad. Mental health services are an important component of many of these interventions; these services may be delivered by a clinician within the organization providing the intervention, or the organization may connect mothers with external mental health services in their communities. Using in-house clinicians rather than external providers may be beneficial by decreasing the high attrition rates common to this population. Although this service delivery approach is theoretically appealing, it has not been subject to rigorous empirical evaluation. In the current randomized study, we examine outcomes for teenage mothers based on two service delivery methods: Integrated Mental Health Services (IMHS) and the Standard of Care (SoC) which outsources clients' mental health needs through community referrals. Information about the effectiveness of service delivery strategies can help program providers make decisions about how best to allocate limited funds to provide effective services.*

**Keywords:** adolescent mothers, maternal outcomes, intervention design, service delivery models

## Introduction

Historically, adolescent intervention science has emphasized preventing adolescent pregnancy; less attention has been devoted to what happens to young mothers after they give birth. Of this second literature, a central theme exists: describing the pathways between outcomes for adolescent mothers and their children and the contexts of the pregnancy itself (e.g., poverty or lack of prenatal care). Given that adolescent mothers and their children often have less adaptive and more problematic outcomes (e.g., Pogarsky, Thornberry, & Lizotte, 2006), it is with good cause that many interventions focus on this population with the goal to identify and bolster features of the adolescent parent's circumstances that promote adaptive functioning for the child, the mother, and the dyad.

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Mental health services are an important component of many of these interventions; these services may be delivered by a clinician within the organization providing the intervention, or the organization may connect mothers with external mental health services in their communities. Using an in-house clinician may have several benefits including taking advantage of the relationships that the mothers may build with staff members in the program (Chablani & Spinney, 2011), which may decrease the high attrition rates often found in evaluations of programs for adolescent mothers (e.g., Chablani & Spinney, 2011; Logsdon, Foltz, Stein, Usui, & Josephson, 2010). Although this service delivery approach is theoretically appealing, it has not been subject to rigorous empirical evaluation.

In the current study, we examine differences in positive mental health functioning, increased educational attainment, the prevention of closely spaced subsequent pregnancies, and decreased financial reliance on subsidy programs for teenage mothers based on two service delivery methods: Integrated Mental Health Services (IMHS) and the Standard of Care (SoC) which outsources clients' mental health needs through community referrals.

### **Implications for Integrated Services**

The integration of mental health services for teenage parents strikes many of the same themes as the current shift towards care coordination at the national level. For example, the lack of resource awareness for mental health services in a given community may inhibit primary care practitioners from including behavioral health components in care plans (Honigfeld, 2007). In this instance, the barrier to coordinated care between primary care services and mental health services – awareness of and access to available mental health services – is easily addressed through care coordination that provides linkages between service settings. Bringing multiple systems of care under one service agency and coordinating the care of each patient is another mechanism for coordinating the services for a patient. This method reduces the risk of patients “getting lost” navigating their care needs and services between multiple agencies (Honigfeld, 2007).

Federal programs, such as the Title V Maternal and Child Health Services Block Grant Program, require care coordination as one of the provisions included in creating Medical Homes for children with complex medical and developmental needs (American Academy of Pediatrics Council on Children with Disabilities, 2005). Similarly, under Part C of the Individuals with Disabilities Act, coordination of care services is required for children receiving early intervention services. In both cases, care coordination often is provided by impersonal agencies (e.g., health insurance providers) that are not located in the specific clients' community and do not have in-person relationships with either the service providers or the patients whose care they coordinate. In other instances, primary care providers (including clerical staff or nurses) can be helpful in arranging referrals for additional services as an informal type of practice-based service

coordination (Antonelli & Antonelli, 2004). Practice-based care coordination like this is inefficient, however, as it is an “unsystematic approach to care coordination [which] makes it difficult for insurance companies that pay for care to identify and recognize a set of services that can be documented and that require substantial time commitment to qualify for reimbursement” (Honigfeld, 2007, p. 10).

Significant gains in child outcomes have been accomplished when care coordination has been more personal than agency-based coordination and more organized than the varied forms of practice-based case management (Honigfeld & Nickel, 2010). Honigfeld and Nickel (2010) posit that these outcomes are likely the product of an organized and in-person process for linking patients to an array of services, following up with those care providers, and compiling feedback across service type back into a single integrated source of service utilization for the patient. In essence, integrating services reduces miscommunication, prevents patients from feeling overwhelmed when navigating service coordination on their own, and thereby promotes efficient service engagement. These conclusions, however, are based on data collected from families with younger children; whether these encouraging results also apply to mental health service coordination for adolescents remains unknown.

### **Mental Health and Lifecourse Outcomes for Adolescent Mothers**

**Mental health functioning.** Considerable research suggests that adolescent mothers are psychologically vulnerable (Oxford & Spieker, 2006) in that they may experience elevated symptoms of mental health difficulties, including both internalizing (e.g., depression and anxiety) and externalizing (e.g., anger and disruptive behavior) problems. Compared to older mothers, adolescent mothers are more likely to experience depression (Lanzi, Bert, & Jacobs, 2009). They also have higher rates of depressive symptoms compared to their same-age peers who are not parenting (Mollborn & Morningstar, 2009). In an effort to provide insight into the directional relationships between depressive symptomology and adolescent parenting, Mollborn and Morningstar (2009) examined 2 longitudinal study datasets and found that at least some of the difference in mental health outcomes between adolescent parents and their nonparenting peers may stem from differences in depressive symptoms that are pre-existing to pregnancy.

Regardless of the directional relationship (i.e., which came first – parenting or depression?), depression among adolescent mothers is a worthy focus for intervention, as depressed adolescent mothers show lower quality parenting compared to their nondepressed parenting peers (Reid & Meadows-Oliver, 2007) and their children are more likely to show developmental delays (Whitson, Martinez, Ayala, & Kaufman, 2011). A wealth of research has suggested that reducing symptoms of maternal depression may have significant benefits for children across multiple domains (Garber, Ciesla, McCauley, Diamond, & Schloedt, 2011). These include enduring effects on attachment security (Campbell et al., 2004; Martins & Gaffan, 2000;

National Institute of Child Health and Development Early Child Care Research Network, 1999), self-regulation (Cicchetti, Rogosch, & Toth, 1998; Feldman et al., 2009; Goodman & Gotlib, 1999; O'Hara, 2009), and cognitive and language development (Cicchetti & Toth, 1998; Hay, Pawlby, Waters, & Sharp, 2008; Kurstjens & Wolke, 2001; Petterson & Albers, 2001; Sohr-Preston & Scaramella, 2006).

Fewer studies have considered anxiety among adolescent mothers; further, these findings are mixed. Some research suggests that, on average, adolescent mothers may not experience elevated anxiety symptoms relative to older mothers (Schiefelbein, Susman, & Dorn, 2005). Other studies, however, point to subgroups of adolescent mothers who may be at higher risk; Oxford and Spieker (2006) identified a group of these higher risk adolescent mothers, comprising 42% of their sample of adolescent parents, who showed elevated symptoms of both depression and anxiety. Given the co-occurrence of anxiety and depression in more general populations of both adolescents (Brodbeck, Abbott, Goodyer, & Croudace, 2011) and adults (Kessler et al., 2008), it is likely that adolescent mothers face challenges in terms of both depression and anxiety.

In addition to internalizing problems, adolescent mothers may also experience difficulties with externalizing problems, such as anger and disruptive or antisocial behavior. Oxford and Spieker (2006) also identified a subgroup of problem-prone adolescent mothers, comprising about 15% of their sample. These mothers were much more likely to engage in criminal and antisocial behavior, as well as substance use. Subsequent data collection when the mothers were close to 30 years old showed that those in the problem-prone group were significantly less likely to be financially independent and to have completed their education.

**Educational attainment.** Adolescent mothers have significantly lower rates of educational attainment than their nonparenting peers (Boden, Fergusson, & Horwood, 2008). Several studies suggest that this may be because adolescent girls who drop out of school are more likely to become pregnant (Fergusson & Woodward, 2000; Haldre, Rahu, Rahu, & Karro, 2009). Regardless, pregnancy may represent an important opportunity to connect with girls who have already dropped out of school, as they may access additional services during this time. Promoting educational attainment has been suggested as a way to mitigate the negative outcomes that adolescent mothers and their children may experience over the course of their lives (Mersky, Topitzes, & Reynolds, 2011; Sullivan et al., 2011).

**Subsequent pregnancies.** In 2008, slightly less than one-fifth of births to adolescent mothers were second- or higher-order births (Child Trends, 2011). Among women who give birth as teens, those who are younger at their first birth (e.g., 13 as opposed to 17) may have an increased likelihood of a rapid repeat pregnancy (Pfitzner, Hoff, & McElligott, 2003). Crittenden, Boris, Rice, Taylor, and Olds (2009) found that past life experiences, including a history of abuse or

involvement in the foster care system, also increased adolescent mothers' risk for a rapid repeat pregnancy. Preventing closely spaced, subsequent pregnancies is an important goal of interventions, as closely spaced, subsequent births are associated with poorer outcomes for adolescent mothers (e.g., lower educational attainment; Manlove, Mariner, & Papillo, 2000) and their children (e.g., language delays; Oxford & Spieker, 2006).

**Financial resources.** There is evidence that contextual factors, such as living in impoverished communities, not only increase the risk of adolescent pregnancy (Crosby, & Holtgrave, 2006; Meade, Kershaw, & Ickovics, 2008), but also are related to outcomes for adolescent mothers and their children. Pregnancy during adolescence is related to lower levels of workforce participation, lower income, and higher levels of welfare participation or reliance on financial subsidy programs (Boden et al., 2008). Further, Mollborn and Morningstar (2009) found that lack of financial resources (e.g., income, housing, child care) contributed substantially to the “educational penalty” that adolescent parents experience.

**Linkages among outcomes.** Recent research has suggested that mental health, educational attainment, financial resources, and subsequent births are closely linked among adolescent mothers. Furthermore, mental health functioning may mediate the relationship between adolescent pregnancy and subsequent outcomes. For example, depression may increase the likelihood of a closely timed second birth (Barnet, Liu, DeVoe, Alperovitz-Bichell, & Duggan, 2007; Christensen, Stuart, Perry, & Le, 2011), especially among low-income adolescent mothers (Mollborn & Morningstar, 2009). Aggressive behavior also is associated with rapid repeat pregnancy for adolescents (Crittenden et al., 2009). Among general adolescent populations, depression and other mental health challenges are related to a higher risk of dropping out of school (Fletcher, 2010). This connection has not been examined among teenage mothers, but the findings suggest that addressing mental health issues may help adolescent mothers stay in school.

### **Theoretical Bases for Prevention and Intervention Programs**

Several different types of service provision have been shown to impact the above outcomes. The largest proportion of services is devoted to providing preventive health services for adolescent mothers and their children (i.e., wellness exams or those targeting particular health programs, such as child immunization, preventative dental care, auditory/vision screening), with relatively fewer programs directly addressing maternal outcomes, such as educational attainment and reliance on public subsidy programs for financial support. Results from studies published in the last decade indicate that this smaller set of programs can improve outcomes for mothers. Many programs target reducing rates of subsequent births and have seen success (e.g., Barnet et al., 2009; Black et al., 2006; Key, Gebregziabher, Marsh, & O'Rourke, 2008; McDonnell, Limber, & Connor-Godbey, 2007; Ownbey, Ownbey, & Cullen, 2011). A second area of focus on maternal outcomes is the study of postnatal depression – an intervention outcome that has

received the lion's share of scholarly attention, especially when one's review includes studies that promote positive mother-child interactions in the context of maternal depression among mothers of all ages. Results are mixed, however, in the ability of these programs to reduce depressive symptoms among adolescent mothers as a particular population of interest (Logsdon et al., 2010; Miller, Gur, Shanok, & Weissman, 2008). Published evaluations indicate that programs supporting educational goal attainment have seen success through a variety of delivery mechanisms including home-visit based services (Barnet et al., 2007) and programs offered within the school (Harris & Franklin, 2009). Finally, other programs take a comprehensive approach to providing services for adolescents who are pregnant or parenting by including multiple settings for service delivery across a range of physical/mental health outcomes (McDonnell et al., 2007).

The findings above are encouraging, but the intensive services needed to produce these effects in comprehensive interventions employing multiple outreach mechanisms to target multiple outcomes are often expensive, so programs must balance costs against the appeal of providing comprehensive services across a range of outcomes for mothers and their children. For programs that include a maternal mental health component, one way to reduce costs is to provide at least some mental health services in-house rather than referring clients to external providers in other community agencies. Using an in-house clinician also has the potential advantage of capitalizing on the relationships that adolescent mothers may build within service programs which could increase retention and engagement in the program (Chablani & Spinney, 2011). Although these advantages are promising from a theoretical perspective, they have not been tested using rigorous evaluation procedures. The current study is a step toward filling this gap in the literature. Using data from a randomized trial, we evaluate the impact of an integrated mental health services (IMHS) approach (through in-house clinicians) versus Standard of Care (SoC; referral to outsourced community mental health services) in improving mental health functioning, increasing educational attainment, preventing closely spaced subsequent births, and decreasing financial reliance on subsidy programs among adolescent mothers.

### **The Present Study**

The Village for Families and Children, Inc. (the Village) is a private non-profit behavioral health and social services agency serving Greater Hartford, CT. The Village began the evaluation of their Adolescent Family Life – Friends of the Family (AFL-FOF) program for teenage parents in 2007. The AFL-FOF program was designed to serve adolescent parents' needs on a case-by-case basis; therefore, the type, number, and length of service sessions per client varied by which level of need case managers deemed appropriate at intake. Case managers were responsible for facilitating participant enrollment into a wide range of services based on need: from parenting-skills training programs, to General Education Development (GED) or other adult-education classes, to health and mental health services and workshops.

A randomized trial was used to assess whether IMHS program participants, who received mental health services through the Village, had better outcomes than SoC participants, who were referred to other agencies in the community for mental health services. In this paper, we focus on maternal outcomes, including decreased subsequent pregnancies, increased educational goal attainment/retention, improved mental health status, and decreased financial dependence on subsidy programs. We hypothesized that participants in the IMHS group would have better outcomes in avoiding subsequent pregnancies, maintaining or increasing educational attainment, and reducing their financial dependence on subsidy programs. Further, we hypothesized that participants at the highest risk would experience greater effects, with a more pronounced effect for those in the IMHS group compared to SoC.

## **Methods**

### **Participants**

The AFL-FOF program recruited participants over the course of three and a half years through School-Based Health Centers in two of Hartford's public high schools, one of the city's Technical High Schools, and the city's alternative education school. Additionally, participants were referred from the state's child protection service agency (the Department of Children and Families; DCF), United Way's Infoline resource and crisis service, Hartford area hospitals and urban health care centers, and other local teenage parenting programs. Seventy-seven percent of adolescents approached agreed to participate in the program. Participants were excluded from the program evaluation (but not from service delivery) if the caseworker determined that they were an immediate risk to themselves or others, or if they failed to provide consent for participation in the program evaluation. The resulting final sample consists of 122 teenage mothers. Table 1 (on the next page) details baseline demographic characteristics.

### **Procedure**

Once clients were referred to the AFL-FOF program, program staff contacted them by telephone or mail to make initial intake appointments. At the time of enrollment, each participant was randomly assigned to one of two intervention conditions: IMHS or SoC. Integrated Mental Health Service (IMHS) participants received their mental health services through the Village, whereas participants in the SoC group were evaluated by AFL-FOF case managers and referred to community organizations and programs to meet their mental health needs. Hence, this design assigned participants to one of two active treatment conditions and is not a placebo control study because all participants received treatment. At the time of randomization, case managers conducted an assessment of the client's needs (categorized into three groups: low needs, medium needs, and high needs) and created a service plan. After baseline assessment, participants were contacted for 3 follow-up assessments (at 6-, 12-, and 18-months postpartum). All follow-up

assessments for the program evaluation were completed within a 2-month window of the time point with the exception of the final 18-month follow-up data collection when AFL-FOF staff completed the measures by home visit or phone interview, if necessary.

**Table 1. Participant Demographic and Background Characteristics at Baseline**

	Treatment Condition		
	SoC	IMHS	
Nonmarried	84.7% (50/59)	87.3% (55/63)	
Latina	69.5% (41/59)	66.7% (42/63)	
White/Caucasian	1.7% (1/59)	9.5% (6/63)	
Black/African American	44.1% (26/59)	39.7% (25/63)	
Biracial/Other	20.3% (12/59)	30.2% (19/63)	
Case Management Level	Low	49.2% (29/59)	53.2% (33/62)
	Moderate	27.1% (16/59)	29.0% (18/62)
	High	23.7% (14/59)	17.7% (11/62)
Has Health Insurance	89.3% (50/56)	90.5% (57/63)	
English as Primary Language	74.6% (44/59)	74.6% (47/63)	
Past or Present DCF Affiliation	28.8% (17/59)	30.2% (19/63)	
CAPI > 215 (Risk Threshold)*	31.9% (15/47)	45.3% (24/53)	
Participant Age	Range	14-19	14-19
	<i>M (SD)</i>	18.01 (1.402)	18.28 (1.20)
	Median	18.1	18.6
Currently Pregnant	55.9% (33/59)	58.7% (37/63)	
Number of Children	0	55.9% (33/59)	54.0% (34/63)
	1	39.0% (23/59)	41.3% (26/63)
	2	3.4% (2/59)	3.2% (2/63)
	3	1.7% (1/59)	1.6% (1/63)
	<i>M (SD)</i>	0.51 (0.65)	0.52 (0.64)
Employed	14.3% (7/49)	20.0% (11/55)	

*Note:* SoC = Standard of Care; IMHS = Integrated Mental Health Services; and CAPI = Child Abuse Potential Inventory (Milner, 1986).

## Measures

At the time of enrollment, baseline measures were collected on demographic characteristics (e.g., past involvement with child protection services, financial reliance on parents/subsidy programs, housing arrangements). Participants also completed the CORE assessment required and developed by the funding agency that included several dichotomous behavior change outcome measures (i.e., subsequent pregnancy, educational attainment, financial reliance on parents/subsidy programs) assessed through single question items. No information on the instrument's reliability and validity was provided to grantees by the funding agency.

Beyond these data, mental health functioning was assessed through the Beck Youth Inventories (BYI; Beck & Beck, 2002). The BYI subscales focus on children and adolescents' emotional and social functioning within five main areas: self-concept, depression, anxiety, anger, and disruptive behavior. Each area is assessed through 20 four-point, Likert-type items that form each subscale. This measure has demonstrated acceptable reliability, with Cronbach's alphas and test-retest correlations for the majority of the five scales above 0.80 (Bose-Deakins & Floyd, 2004; Steer, Kumar, Beck, & Beck, 2001; 2005). With approval and oversight from the publisher, the AFL-FOF staff translated the BYI into Spanish. In the current sample, Cronbach's alphas at all time points were above 0.80 (see Tables 2 and 3). Missing data at the item level were rare (< 5%), and we used mean imputation on these missing items.

The Child Abuse Potential Inventory (CAPI; Milner, 1986) is a 160-item screening instrument designed to assess the potential of parents to neglect and physically abuse their children. The CAPI items present participants with a forced choice format wherein they must either agree or disagree with a series of statements across six factors (three psychological characteristics of distress, rigid expectations, and unhappiness; three interactional characteristics of problems relating with one's child, family, and others). Scores on the overall CAPI range from 0 to 486; larger scores reflect higher child abuse potential with a well-accepted risk cut-off above 215. Test-retest correlations ranging from 0.75 to 0.91 were reported over 1-day, 1-week, 1-month, and 3-month intervals (Milner, 1986). Milner has demonstrated construct validity for the CAPI in that higher CAPI scores are related to a variety of factors associated with risk of child maltreatment, including a parental history of personal child maltreatment; reductions in family cohesion; and increases in family conflict, domestic violence, and social isolation (Milner, 2004). Missing data at the item level were also rare on the CAPI (< 5%), and we used mean imputation for those items.

## **Analysis**

Due to the low degree of heterogeneity in the dichotomous outcome variables (subsequent pregnancy, financial subsidy reliance, educational goal attainment/enrollment), we generated a composite outcome variable. The composite variable was scored by accumulating 1 point for each of the possible following positive outcomes: no subsequent pregnancy, employed (full- or part-time), achievement of academic goals (enrollment in or completion of an academic program), and having a primary source of financial support other than public aid. Composite outcome scores, therefore, ranged from 0 to 4.

Participants were also classified according to their level of risk at baseline by a similar process of aggregating risk indicators, most of which were also dichotomous; participants' baseline risk level accumulated 0 points for no involvement with the state's child protection service agency (DCF), 1 point for having a past DCF affiliation, or 2 points for current DCF involvement.

Participants also accumulated 0 points for low case management level (as assigned by the case manager at intake), 1 point for medium case management level, or 2 points for high case management, and 1 point for a CAPI score over 215. Therefore, total possible risk aggregate scores ranged from 0 to 5. The resulting distribution of risk scores had approximately half falling in a low risk score (0 or 1) and half in a higher risk score ( $\geq 2$ ) group; for subsequent analyses, we split risk levels into those low risk and high risk groups. The composite outcome variable was used in examining differential intervention effects to determine if participants with differing composite risk scores might be more or less receptive to either intervention.

## Results

### Baseline Results

First, we investigated similarities and differences between the two intervention groups at baseline. Table 2 shows baseline data for adolescents in both groups. As would be expected with a randomized design, there were no significant differences between the groups on the baseline outcome variables. There were, however, baseline differences in BYI scale scores for participants with high versus low risk aggregate scores on employment status and BYI Anger, Depression, and Anxiety, such that more high risk participants were not working ( $t_{(96)} = 2.49, p < .05$ ) and were more angry, depressed, and anxious ( $t_{(97)} = 2.56, p < .05$ ;  $t_{(97)} = 4.27, p < .01$ ;  $t_{(97)} = 2.96, p < .01$ , respectively). At baseline, rates of missing data on entire scales/items ranged from none (school enrollment status among both intervention groups) to 22% (primary source of financial support among SoC clients). One hundred adolescents completed the CAPI and BYI instruments. Absence of data on any of the items/scales was not related to intervention group.

**Table 2. Outcome Variables at Baseline**

	Treatment Group		
	Standard of Care	Integrated Mental Health Services	Total
Enrolled in School or Graduated	64.9% (37/57)	63.3% (38/60)	64.1% (75/117)
Primary Financial Support from Public Aid/Financial Subsidy	22.7% (10/44)	15.6% (7/45)	19.1% (17/89)
	<b><i>M (SD)</i></b> <b><i>N = 47</i></b>	<b><i>M (SD)</i></b> <b><i>N = 53</i></b>	<b><i>M (SD)</i></b> <b><i>N = 100</i></b>
BYI Self-Concept ( $\alpha = 0.87$ )	43.44 (7.32)	44.45 (9.21)	43.98 (8.35)
BYI Anxiety ( $\alpha = 0.92$ )	14.94 (9.29)	17.51 (10.82)	16.40 (10.16)
BYI Depression ( $\alpha = 0.94$ )	11.04 (8.82)	14.11 (11.18)	12.67 (10.21)
BYI Anger ( $\alpha = 0.94$ )	14.89 (8.36)	17.93 (11.27)	16.50 (10.10)
BYI Disruptive Behavior ( $\alpha = 0.88$ )	6.14 (5.10)	6.36 (5.46)	6.26 (5.27)

Note: BYI = Beck Youth Inventories.

## Attrition

Sixty-seven of the mothers (54.9%) completed at least one follow-up data collection point. Rates of completion did not differ between treatment conditions. Across both treatment groups, we investigated whether any baseline demographic or outcome variables predicted participants' completion of at least one follow-up. There were no significant differences based on demographic or background characteristics, or by whether clients were pregnant with no other children at baseline compared to those pregnant and already parenting other children. We also found no differential attrition based on current or prior child protective services affiliation, on CAPI scores above the threshold, or on initial case management level.

In terms of outcome variables at baseline, average BYI scores on all subscales did not differ across those who did or did not complete follow-up assessments. Furthermore, there was no differential attrition based on educational attainment (enrolled/graduated compared to not enrolled/not graduated). Participants receiving financial support from subsidy programs at baseline were significantly more likely to complete at least one follow-up assessment ( $t_{(120)} = 5.2$ ,  $p < .001$ ). Table 3 presents a summary of outcome variables at the 3 follow up points.

**Table 3. Outcome Variables at 6-, 12-, and 18-Month Follow-Up Data Collection**

	Integrated Mental Health Services			Standard of Care		
	6 mo.	12 mo.	18 mo.	6 mo.	12 mo.	18 mo.
Pregnant Since Baseline	89.7% (26/29)	60.0% (12/20)	72.7% (16/22)	85.7% (18/21)	66.7% (12/18)	52.2% (12/23)
Enrolled in School or Graduated	48.4% (15/31)	66.7% (14/21)	62.5% (15/24)	61.9% (13/21)	78.9% (15/19)	65.2% (15/23)
Receiving Public Assistance	91.2% (31/34)	90.0% (27/30)	86.7% (26/30)	92.3% (24/26)	92.0% (23/25)	87.5% (21/24)
<b>BYI scales</b>	<b><i>M (SD)</i></b> <b><i>N = 34</i></b>	<b><i>M (SD)</i></b> <b><i>N = 28</i></b>	<b><i>M (SD)</i></b> <b><i>N = 6</i></b>	<b><i>M (SD)</i></b> <b><i>N = 25</i></b>	<b><i>M (SD)</i></b> <b><i>N = 25</i></b>	<b><i>M (SD)</i></b> <b><i>N = 8</i></b>
Self-Concept ( $\alpha = .88, .88, .800$ )	41.5 (9.4)	43.4 (8.5)	41.33 (10.25)	42.1 (8.47)	43.93 (9.7)	43.2 (7.5)
Anxiety ( $\alpha = .91, .90, .93$ )	14.97 (7.89)	13.98 (7.89)	13.0 (9.44)	10.20 (5.25)	13.1 (7.17)	12.12 (10.2)
Depression ( $\alpha = .94, .94, .97$ )	11.99 (7.27)	10.99 (6.27)	15.5 (17.9)	7.53 (5.83)	8.55 (6.21)	8.50 (4.14)
Anger ( $\alpha = .94, .94, .96$ )	14.51 (8.90)	12.37 (8.06)	18.2 (13.8)	9.95 (5.21)	12.7 (6.27)	12.7 (8.83)
Disruptive Beh. ( $\alpha = .89, .85, .86$ )	4.58 (4.45)	4.66 (5.88)	3.04 (2.26)	4.28 (3.94)	5.40 (5.11)	5.00 (5.42)

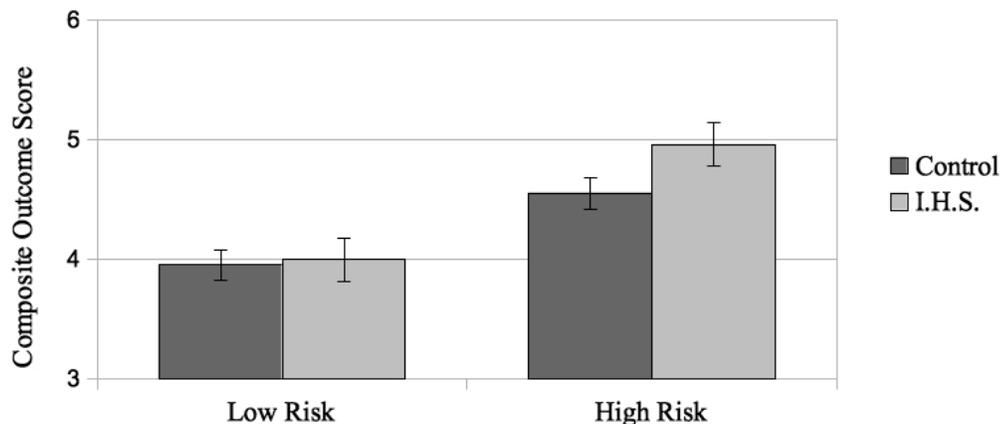
## Intervention Effects

Repeated measures ANOVAs (2x2 RM ANOVA with 2 levels of time, baseline and last report, and 2 levels of treatment, IMHS and SoC) showed no significant interactions between intervention group and time (all  $p > .05$ ), but regardless of intervention group assignment, follow-up  $t$ -tests showed that improvements from baseline on all but one BYI scale score: Self-Concept. Anxiety and Anger decreased significantly ( $t_{(61)} = 2.39, p < .05$ ;  $t_{(61)} = 2.85, p < .01$ , respectively). Depression and Disruptive Behavior scores decreased as well; although these changes were only marginally significant ( $t_{(62)} = 1.92, p = .06$  and  $t_{(60)} = 1.66, p = .10$ , respectively). There were no improvements in reliance on subsidy programs, as roughly the same number of participants reported relying on public aid income at baseline as at last follow-up. Significant improvements in education existed across groups ( $t_{(65)} = 5.36, p < .01$ ).

## Differential Intervention Effects

Although there were no significant effects based on intervention group, we proceeded with our hypothesis that effects might be differential – individuals at varying risk levels might be more amenable to intervention. No significant differences were found on outcomes between participants in the high and low aggregate risk groups regardless of intervention. However, a 2x2 ANOVA of composite risk (high vs. low) and intervention group on composite outcome showed a significant effect (Figure 1;  $F_{(1,62)} = 3.98, p < .05$ ). Participants with a greater number of risk indicators had significantly higher composite positive outcome scores when compared to those with lower composite risk scores. There was no main effect for intervention group, nor was there a significant interaction between risk and intervention.

**Figure 1. Interaction Between Aggregate Risk and Intervention Group on Composite Outcome**



## Discussion

The AFL-FOF program is akin to randomized control trials where participants are assigned to one of two active treatment conditions – but not comparable to nonintervention control or placebo control studies, as all participants received treatment. The evaluation of the program was conducted to determine whether one method of intervention was significantly more effective in impacting study outcomes than another service delivery method (i.e., whether IMHS promoted better maternal lifecourse outcomes than the SoC model) and whether there were differential outcomes for participants at varying risk levels.

Our main hypothesis was not supported, as there were no differential effects of service model on outcome; however, there were significant differences when participants were grouped by composite risk levels based on baseline data. Participants in both intervention groups experienced positive outcomes from the AFL-FOF program, but those at highest risk upon enrollment showed greater numbers of achievements (grade levels completed, positive changes in employment, improvements in BYI scale scores, and less reliance on financial subsidy programs). The lack of intervention group differences may be because services of either type were sufficient to support participants as they pursued lifecourse goals. This suggests that AFL-FOF impacts on mental health, for example, were sufficient to facilitate participants' achievements of lifecourse outcomes – particularly relative to education goal attainment.

Our findings are consistent with those of McDonnell et al. (2007) who showed that a comprehensive intervention can impact a variety of outcomes for adolescent mothers. Although their measure of educational attainment was somewhat different (meeting grade level expectations and graduation rates instead of enrollment or graduation), their intervention showed positive effects in this area (McDonnell et al., 2007). Similarly, rates of school enrollment or completion in our sample (65%) were similar to those found by Barnett et al. (2007) in their home-visiting treatment group (70%).

Retention of participants posed a significant challenge in the AFL-FOF program, and consequently, the evaluation. About fifty-five percent of participants completed at least one follow-up, situating the attrition rates in the middle of those found in other studies with adolescent mothers – higher than some (Barnett et al., 2009; Harris & Franklin, 2009), but lower than others (46.7% retention rate, Logsdon et al., 2010; 46.6% retention rate, Chablani & Spinney, 2011). Furthermore, within the AFL-FOF program, retention rates were similar across intervention groups, suggesting that providing in-house clinical services to capitalize on existing relationships did not improve retention. Although we found no evidence that participants who were retained in the study differed from those who were not, the small sample size limits our ability to generalize from these data or to test more complex models of change over time.

## Implications for Practice and Future Research

Results from this study contradict the assumption that participants at higher risk may benefit from mental health service provision models that maximize on existing relationships rather than putting participants in the position of forming new relationships with a new service provider for their mental health needs. The ability to facilitate service delivery with the aid of a known service professional does not generate significant improvements over outsourced service provision. Rather, higher risk participants see no beneficial effect from this additional social support and seem equally capable of engaging in and benefitting from offered mental health services regardless of whether they have a previous relationship with the program. For both levels of risk, individuals in both models of mental health service delivery were equally effective in promoting outcomes. In fact, those at highest risk were more likely to show better outcomes than their low risk counterparts – again, regardless of intervention group.

## Conclusions

Future intervention efforts with adolescent mothers should consider the varying costs of service delivery models and invest their resources judiciously. If providing mental health services through an in-house clinician results in cost savings, then plans for future programming can take some confidence from the AFL-FOF findings. Saving money here did not come at a cost to participant outcomes and may enable programs to reach more individuals or provide services for longer periods of time.

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