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# Preventing Post - Treatment Relapse among African American Adolescents and Young Adult Marijuana Users through Effective Treatment Interventions: A Proposed Intervention for Metro-Atlanta

Charlotte E. Robinson Ms

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Preventing Post - Treatment Relapse among African American Adolescents and Young Adult Marijuana Users through Effective Treatment Interventions: A Proposed Intervention for Metro-Atlanta

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**Preventing Post -Treatment Relapse among African American Adolescents and Young  
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Intervention for Metro-Atlanta**

by

Charlotte Robinson

MPH GEORGIA STATE UNIVERSITY  
B.S. LOUISIANA STATE UNIVERSITY

A Capstone Submitted to the Graduate Faculty  
of Georgia State University in Partial Fulfillment of  
the  
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MASTER OF PUBLIC HEALTH

ATLANTA, GEORGIA  
20045

APPROVAL PAGE

Preventing Post-Treatment Relapse among African American Adolescents and Young Adult  
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Metro-Atlanta

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Author's  
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### EDUCATION

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- Manage the design of audit and review parameters, delegate work assignments for review areas to team members, and led Entrance and Exit Conferences.
- Direct team member work activities and address issues that arise.
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- Address unique situations pertaining to funding, MIS and other programmatic issues with state and local agency level department heads, program beneficiaries, state and national Congressional staff, and the general public.

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- Acted as project manager and coordinated all logistical activities for site sampling investigations.
- Met with Chief Executive, Chief Financial and Health and Safety Officers, company managers, supervisors, legal staff present an overview of site sampling strategies, and, upon completion, investigative findings during Entrance and Exit Conferences.



## ABSTRACT

**INTRODUCTION:** Marijuana use, although illegal in the majority of states, is increasingly becoming acceptable for use in the United States. There are dangerous public health consequences associated with marijuana use—including: impaired driving, loss of productivity in workplaces and school settings, as well as mental health impacts. In Atlanta, the majority of residents (54.0%) are African American. Emergency room use is double for African American Fulton County residents compared to their Caucasian counterparts and approximately 1/5 of the total population receiving public health treatment identify marijuana as the primary drug of use, with 57% of those being African Americans. Despite these statistics, the availability of treatment and prevention programs targeting African Americans using marijuana is negligible.

**AIM:** The purpose of this study is to synthesize evidence-based approaches to substance use treatment so that effective components of previous research can be incorporated into an innovative marijuana prevention program to increase post-treatment abstinence targeting a segment of the population that has not been a significant focus in intervention research.

**METHODS:** A review of scientific literature was conducted to identify and appraise evidence based approaches to substance use among young adults. First, the student researcher examined programs targeting marijuana use. Second, the search was expanded to substance use in general. The student researcher identified the population, intervention, control arm, and outcomes of various studies focusing on substance use prevention in a variety of settings. With this appraisal, the most effective components are suggested for a marijuana specific program which could be offered to African-American young adults, as no current programs in Georgia were found.

**RESULTS:** Substance abuse intervention approaches targeting young adult populations were identified. Programs are delivered in a variety of settings: family, school, and community. Evidence supports that cognitive behavioral training, motivational enhancement training, and contingency management are the most effective approaches targeting substance use among young adults. A program that integrates components of each approach would be ideal for targeting African American young adults using marijuana in Metro-Atlanta and assisting them to maintain abstinence post-treatment.

**DISCUSSION:** The results from this study emphasize key program elements that can address marijuana addiction among African American young adults in Metro-Atlanta. As marijuana acceptance increases, the need for prevention programs becomes more urgent. This study's results can assist program planners in understanding the most strategic interventions that would optimize return on investment when addressing a largely silent public health threat: marijuana use among African American young adults in Metro-Atlanta.

## Table of Contents

ACKNOWLEDGEMENTS .....	iii
LIST OF TABLES .....	ix
LIST OF FIGURES .....	x
CHAPTER I INTRODUCTION.....	1
1.1 Background.....	1
1.2 Prevalence and Impact of Marijuana Use in Georgia .....	3
1.3 Marijuana Use in Atlanta.....	5
1.4 Purpose.....	7
CHAPTER II LITERATURE REVIEW .....	9
2.1 Theoretical Context of Youth and Young Adult Substance Abuse .....	9
2.2 Marijuana Treatment and Post-Treatment Relapse Data .....	11
CHAPTER III METHODS AND PROCEDURES .....	13
3.1 Data Collection .....	13
3.2 Consideration Criteria for Studies Included in Review .....	13
CHAPTER IV RESULTS .....	16
4.1 Overall Results of Literature Review .....	17
4.2 Quality Assessment.....	18
4.3 Examination and Discussion of Successful Programs .....	19
CHAPTER V CONCLUSION.....	34
5.1 Program Model Design for African American Adolescents and Young Adults in Metro- Atlanta.....	34
5.2 Program Policy and Funding Implications .....	40
5.3 Study Limitations.....	43
5.4 Recommendations for Future Research.....	44
5.5 Conclusion .....	45
REFERENCES .....	46

## **List of Tables**

Table 1.1 Penalties for Marijuana Possession in Georgia .....	4
Table 4.1 Comparative Assessment of Quality among Eligible Intervention Articles.....	18
Table 4.2 Findings of Individual Reported Studies .....	19
Table 4.3 Effective Interventions for Marijuana Treatment and Relapse Abstinence for Adolescents and Young Adults.....	33
Table 5.1 Adolescent and Young Adult Cannabis Treatment Manuals.....	40

**List of Figures**

Figure 3.1 Flowchart of Literature Search Process through Review ..... 15

Figure 4.1 Overall Results of Literature Review ..... 17

## **Chapter I**

### **INTRODUCTION**

#### **1.1 Background**

In its 2012 World Drug Report, the United Nations estimated that in 2010 between 153 million and 300 million people aged 15-64 (approximately 3.4-6.6 percent of the world's population) had used an illicit substance at least once in the previous year (United Nations Office on Drug and Crime, 2012). Marijuana, which is used as an illicit drug, consists of the dried leaves, stems, seed and flowers from the *Cannabis sativa* plant (hemp) and is the world's most widely used illicit substance with an estimated 119-224 million users worldwide. Within the United States (U.S.), marijuana is the most popular illicitly used and abused drug, particularly among persons aged 12-24 (Substance Abuse and Mental Health Services Administration (SAMHA), 2013). Additionally, research has indicated that marijuana use may cause dependence and addiction (Hall & Degenhardt, 2009). These factors combined contribute to the large prevalence and incidence of marijuana use. The proven dependence and addictive behaviors associated with marijuana use act in tangent with these factors to increase its use incidence and prevalence.

The impact of marijuana use is twofold as it affects both the individual and collective community's health and well-being. Although, the symptoms associated with marijuana use are not as harmful as with other addictive drugs, they do have negative effects on both the psychological and physical health of users. Numerous studies have demonstrated that marijuana causes dependency and/or addiction. There are over 400 chemical compounds in marijuana most of which are cannabinoids. The most psychoactive chemical present in marijuana is delta-9-tetrahydrocannabinol, commonly referred to as THC. Since the human body also produces cannabinoid compounds, when an individual smokes or ingests marijuana, the normal function of the body is interrupted which can result in permanent changes in the brain (Fusar-Poli, Crippa, Bhattacharyya, 2009; Hall & Degenhardt, 2009; Macleod, Oakes, Copello, Crome, Egger, Hickman, Oppenkowski, Stokes-Lampard & Smith, 2004). Marijuana impairs an individual's ability to think and interpret data and disrupts coordination and balance (Richer & Bergeron, 2009). Large doses of marijuana, ingested through food or drink, may cause both short- and long-term hallucinations, delusions, and a loss of personal identity.

Further, individuals who are long-term marijuana users may experience permanent deterioration of cognitive functioning (Fergusson & Boden, 2008; Trezza, Campolongo, Cassano, Macheda, Dipasquale, Carratu, Gaetani & Commo, 2008). Individuals who smoke marijuana regularly may have many of the same respiratory problems that tobacco smokers do, such as daily cough and phlegm production, acute chest illnesses, and a greater risk of lung infections. Finally, marijuana smoke can potentially cause lung and other respiratory tract cancers since it contains up to 70 percent more irritants and carcinogens than tobacco smoke (Polen, Sidney, Tekawa,

Sadler & Friedman, 1993).

Due to its increased harmful effects, use prevalence, and resulting increase in dependent/addictive behavior, marijuana abuse also poses an enormous physical, social and economic burden on American society. The National Drug Intelligence Center reported that approximately \$193 billion was expended on illicit drug use in the U.S. for health care provision, productivity loss and crime prevention in 2007 (U. S. Department of Justice, 2011). The annual burden on national health care has been more than \$11 billion since 2007 (U. S. Department of Justice, 2011). Costs associated with the loss in productivity were estimated at more than \$120 billion per year since 2007. These costs are related to preventive and treatment interventions including emergency room visits, in- and out-patient treatment and rehab, preventable injuries and deaths, etc. More than \$61 billion was expended in the U. S. in 2011 on judicial system costs crimes related to illicit drug production, transportation, distribution and use. Although crack cocaine and ice methamphetamine are the drugs which most often contribute to crime, research has demonstrated that marijuana may act as a gateway to the use of these more detrimental drugs (Ramo, Liu, & Prochaska, 2012; Golub, Johnson, & Dunlap, 2005; O'Brien, Comment, Liang, & Anthony, 2012).

## **1.2 Prevalence and Impact of Marijuana Use in Georgia**

According to the National Survey on Drug Use & Health (NSDUH) Georgia ranks fifteenth with respect to early age of onset for marijuana use and has the 11<sup>th</sup> highest prevalence rate among individuals aged 12 to 25 years in the nation. (SAMHA, 2011). Georgia is also one of the top 4 states overall in the union to have harsh laws

governing the severity of the maximum sentences for marijuana possession and for first offense penalties. Penalties for marijuana use, distribution and sale for less than one ounce of marijuana are so stringent in Georgia that the state is ranked number 12 in the nation in this arena. Some of the penalties for marijuana offenses in Georgia include (Dangerous Drug Act, 1967; Gettman, 2009; The Norml Almanac of Marijuana Arrest Statistics, 2002):

**Table 1.1 – Penalties for Marijuana Possession in Georgia**

<b>Amount (Oz)</b>	<b>Maximum Sentence</b>	<b>Maximum Fine*</b>
1 (one)	Probation	Variable
2 (two)	10 years	Variable
3 (three)	10 years	Variable
4 (four)	10 years	Variable

\*\$1,000 is the minimum fine amount.

In 2007, 33,512 arrests for marijuana offenses were made in Georgia, representing an approximate arrest rate of 351 per 100,000, persons. The arrest rate for possession was 295 per 100,000 persons and for marijuana sales was 56 per 100,000 persons. Total arrests for marijuana use, possession and distribution accounted for 54% of all drug arrests in Georgia during 2007 (Gettman, 2009). Data indicates that national arrest rates for minorities, particularly African Americans, and individual’s age 12-25 years are disproportionately higher than Caucasian Americans (Gettman, 2009). This is mirrored in arrest rates for African Americans in Georgia within this age group. Younger convicted felons in Georgia have indicated that they are 3 times more likely to have used marijuana



than older inmates as indicated in a study conducted by Stephens, Warner & Braithwaite (2007). Of the inmates studied, a larger percentage of African Americans reported using marijuana than their fellow Caucasian American inmates.

### **1.3 Marijuana Use in Atlanta**

The Atlanta Metropolitan Statistical Area (MSA), referred to as Atlanta in this study, is the eighth largest MSA in the U.S. The population number lends itself to drug use and trafficking. Atlanta is comprised of 5,457,831 persons and spans across twenty-eight counties. The largest county in Atlanta is Fulton County with a total population of 920,581 persons (U. S. Census Bureau, 2011). However, more recent data approximates the total population to be 949,599 persons (U. S. Census Bureau, 2012). The racial composition of Fulton County is 47.0% Caucasian American, 44.6% African American, 0.3% Native American, 6.0% Asian/Pacific Islander American, and 2.7% other races and/or multi-racial. There are 193,836 (20.4%) persons residing in Fulton County ages 10-24 years. The largest city in the Atlanta MSA is Atlanta proper with a total of 43,775 residents - 54.0% African American, 38.4% White, 3.1% Asian, 0.2% Native American and 4.3% other races and/or multi-racial (U. S. Census Bureau, 2013).

The health and well-being of individuals within Fulton County are subject to the stressors which exist within its boundaries, i.e., economic deprivation, income inequality, social disorder, crime, drug use, etc. (Adler & Matthews, 1994; Sampson, Morenoff & Gannon-Rowley, 2002; Warr & Ellison, 2000). Perceived neighborhood fear and drug use among young adults was examined by Theall, Sterk & Elifson (2009) in a study conducted in Atlanta. The sample population (n = 210) was comprised of inner city young adults ages 18-24 and consisted primarily of drug users (81%) and was

predominantly African American (81.4%). Nearly three-fourths (67.1%) of the African American respondents also lived with drug abusers. Theall and colleagues determined that there was a correlation between perceived fear and drug use. Subsequently, the potential preeminent impact of illicit drug use, including marijuana, is harmful to the health and well-being of the inner-city residents (mostly African Americans) of Fulton County.

Within Georgia, Atlanta is considered a “high intensity drug trafficking area” because of the large amounts of illicit drugs (which includes marijuana) as well as prescription drugs that are being manufactured/grown, transported, distributed and used within its borders (U. S. Department of Justice, 2011). In 2008, more than 1,550 calls were made to the Fulton County Helpline Call Center to report drug-related incidents (HODAC, Inc., 2008). In 2011, Fulton County law enforcement agencies reported that there were approximately 2,387 arrests made of juveniles (age 18 and under) for the possession of marijuana and 336 arrests of juveniles for the sale/manufacturing of marijuana (Georgia Bureau of Investigation, 2011). A recent investigation conducted in the city of Atlanta in Fulton County determined that 93% of all arrests for marijuana possession were of African Americans (Moore, 2012).

According to data obtained from the 2003 *National Institute on Drug Abuse Epidemiologic Trends in Drug Abuse Report* the number of individuals in Atlanta who sought emergency department (ED) treatment and mentioned that they were marijuana users totaled 3,602 individuals in 2002, a rate of 96 persons per 100,000. The number of marijuana ED mentions made by African Americans was double the number made by Caucasians and was an increase of 46% from 2000-2002 among African Americans. The

number of ED mentions for marijuana use for individual aged 18-25 years were 186. Approximately one-fifth of the total population who received public treatment admissions in Atlanta considered marijuana their primary drug with about 57% being of African American descent (Wilson, Boers, Claire, Sterk & Elifson, 2003).

Incarceration and treatment programs have been used to address marijuana abuse in the African American population age 12-25 years in Atlanta. However, these are ineffective solutions as evidenced by the marijuana incarceration rates and by the marijuana incarceration rates and current prevalence of marijuana use. To create a more effective intervention to this problem, focus should be placed upon marijuana treatment and cessation interventions that have high relapse prevention rates.

#### **1.4 Purpose**

As described, marijuana use among Atlanta's African American adolescent and young adult populations is serious and warrants public health attention. The purpose of this capstone is to propose various interventional strategies that offer promise in curbing marijuana use in the target populations. The objectives of this project are threefold. The first objective is to present a review of scientific literature that examines various marijuana treatment and cessation programs for their overall effectiveness and post-treatment relapse prevention potential. The second objective is to identify elements from the programs showcased in the literature review to develop a model treatment, cessation and post-treatment relapse prevention intervention program targeting African American individuals aged 12-25, that integrates evidence-based strategies. The third objective is to consider current and suggested policies, resources, and evaluation methodologies that

would catalyze the implementation and sustainability of the proposed intervention program.

## **Chapter II**

### **LITERATURE REVIEW**

#### **2.1 Theoretical Context of Youth & Young Adult Substance Abuse**

The most recent results from the 2010 National Survey on Drug Use and Health revealed that approximately 22.6 million individuals (8.9%) of all individuals living in the U.S., aged 12 or older, were current illicit drug users and of these individuals 17.4% were current marijuana users. A current drug user is defined by NSDUH as an individual who used drugs within the last month prior to the month data was collected. Further, approximately 22.1 million persons (8.7%) of the total U.S. population aged 12 or older were substance dependent or abusers. Of this number, 2.9 million used both alcohol and illicit drugs and 4.2 million used illicit drugs only. Marijuana is the most frequently used illicit drug of all illicit drugs used and/or abused in the U.S. for individuals aged 12-49 years totaling 4.5 million in number. Approximately three million individuals aged 12 and older in the U.S. used an illicit drug for the first time in 2010, and of this population 2.4 million (80%) individuals aged 12 years and older initiated marijuana use - the largest initiation rate for all illicit drug users. Among individuals aged 12-24, the average reported age for marijuana use initiation was 18.4 years. The rate of marijuana use

among those aged 12 years and older was slightly higher for males (9.1%) than females (4.7%) (SAMHA, 2012).

Enabling factors for increases in marijuana abuse in adolescents and young adults include: the low cost of marijuana in comparison to other illicit drugs and alcohol; peer pressure; low self-esteem and lack of parental guidance (Lee, Neighbors, & Woods, 2007). Adolescents and young adult marijuana abusers are at greater risk of negative health outcomes, including pregnancy, sexually transmitted diseases, early age school non-attendance and dropout, depression, unintentional injuries and death (Gonzales, Anglin, Beattie, Ong, & Glik, 2012). Additional enabling factors have been proposed for the increase in the numbers of African American adolescents and young adults who abuse marijuana including the increase in the numbers who are attending college, where there is greater exposure, and the perceived acceptability of marijuana use by peers (Wagner, Liles, Broadnax, & Nuriddin-Little, 2006). Long-term use has been associated with negative outcomes in adulthood including unemployment, judicial issues, divorce, lack of education and negative health status (Andrews, Foster, Capaldi, & Hops, 2000; Chassin, Presson, Sherman, & Edwards, 1992; Ellickson, Bell, & McGuigan, 1998; Ellickson, Tucker, & Klein, 2000; Kirk, Lewis, Lee, & Stowell, 2011). Further, more than 30 percent of all college students in the U.S. have used marijuana in the past twelve months (SAMHA, 2012).

Researchers have determined that youth who use marijuana are more likely to continue using in adulthood. One theoretical perspective on marijuana use (Newcomb and Bentler, 1988 as cited in Bogart, Collins, Ellickson, & Klein, 2007) among adolescents describes accelerated adult behavior adoption. Newcomb and Bentler

proposed that adolescents who are substance abusers have circumvented the natural order of their human developmental stages during puberty and, as a result, are unable to function in adulthood. Further, Newcomb and Bentler conjecture that the substance abuse is continued later in life due to dissatisfaction experienced in adulthood and the lost opportunity to mature gradually during adolescence. Because the prevalence of marijuana abuse and dependence has increased among African American youth and young adults, early intervention to delay the onset of use and increase post-treatment abstinence is extremely important in this population (Compton, Grant, Collier, Glantz & Stinson, 2004).

## **2.2 Marijuana Treatment & Post-treatment Relapse Data**

Approximately half of the individuals who seek treatment for marijuana abuse in the U.S. are 25 years of age and younger (Tims, Dennis, Hamilton, Buchan, Diamond, Funk, & Brantley, 2002). Adults who average more than 10 years of daily use have repeatedly entered treatment programs upwards of six times (Budney, 2006; Copeland, Swift, Roffman, & Stephens, 2001; Stephens, Babor, Kadden, & Miller, 2002). Treatment outcomes for adolescents and young adults also demonstrate a lack of treatment effectiveness. Post-treatment marijuana abstinence rates among participants of the Cannabis Youth Treatment (CYT) Study only ranged from between 11% to 15% 12 months post-treatment (Dennis, Godley, Diamond, Tims, Babor, Donaldson, Liddle, Titus, Kaminer, Webb, Hamilton and Funk, 2004). Other research has been conducted to examine potential contributing factors for failure to maintain marijuana abstinence post-treatment among individuals aged 12 to 24 years. Factors identified include: stress,

environmental triggers, easy accessibility, cravings, low self-esteem and peer pressure (Gonzales et al, 2012); perceived difficulty in abstaining (King, Chung, & Maisto, 2009); socio-economic status (Copersino, Boyd, Tashkin, Huestis, Heishman, Dermand, Simmons & Gorelick, 2010) and unfair treatment based on race (Brody, Kogan & Chen, 2012).

Compton and colleagues (2004) found that dependence and addiction rates in male and female African Americans were larger than the overall increases in marijuana abuse and dependence for all young adults. Compton and colleagues determined that dependence and abuse rates among 18-29 year old African American males increased from 21.8% to 43.0%, and among 18-29 year old African American females from 19.1% to 47.2% from 1991-2002. Consequentially, African American adolescents and young adults are entering into marijuana treatment at higher rates. However, data indicate that African American adolescents and young adults are less likely to complete treatment and post-treatment activities which lead to higher levels of marijuana abuse relapse in this population (Montgomery, Petry & Carroll, 2012). The risk factors which are associated with marijuana cessation and abstinence relapse in African American adolescents and young adults are similar to those of other adolescents and young adults (Buckner, Ecker, & Cohen, 2010; Montgomery, Petry & Carroll, 2012); however, research focusing specifically on intervention strategies for marijuana treatment and relapse prevention among African American adolescents and young adults is limited.



## **Chapter III**

### **METHODS AND PROCEDURES**

#### **3.1 Data Collection**

##### **Literature Search Strategy**

A literature search was conducted via PUBMED, EBSCO, ELVISER, LEXUSNEXUS and MEDLINE databases using the primary key words Adolescent, Young Adult, Substance Abuse Intervention, Marijuana, Intervention, African American, Therapy, Treatment, Relapse, Georgia, and Atlanta. No restrictions were placed on study date or design of the publication. The abstracts were examined and any abstract which indicated that study participants were from countries other than the U.S. were excluded from further review. Full-text articles for all remaining abstracts were retrieved. Only publications written in English were included in the review. The flowchart below illustrates the key word search and the results retrieved from each search.

#### **3.2 Consideration Criteria for Studies Included in Review**

##### **Inclusion Criteria**

Eligibility criteria included peer-reviewed articles evaluating the relationship of

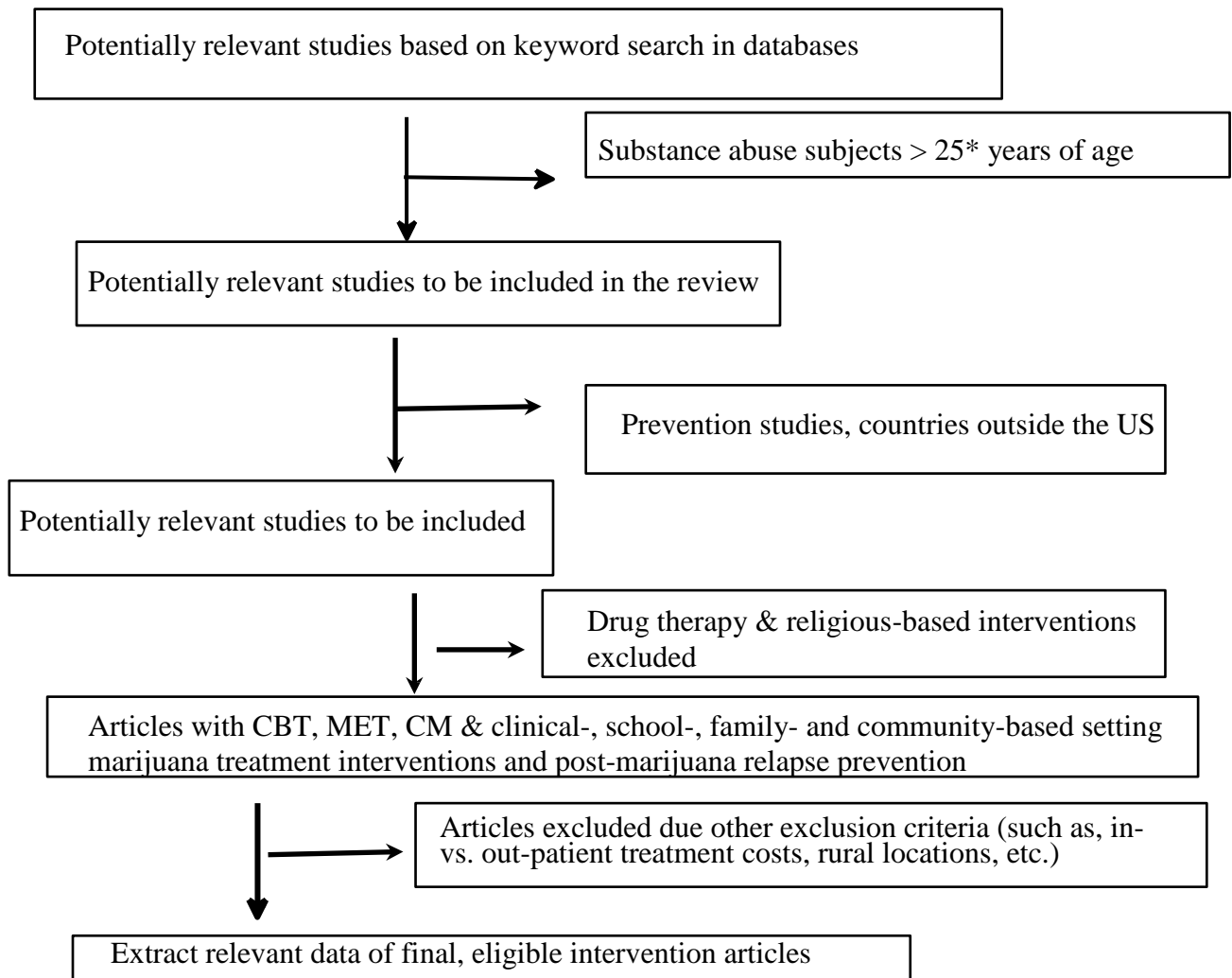
marijuana use prevention, treatment and post-treatment relapse prevention in adolescents and young adults in urban areas aged 12-25 years, particularly of African American descent in the Metro-Atlanta area. Studies which assessed various forms of marijuana treatment intervention in this population were reviewed initially to determine which treatment therapies were the most successful, i.e., outcomes consisted of marijuana abstinence for an extended time period. During the article review, it was determined that the treatment setting also impacted adherence, length of marijuana cessation post-treatment and other factors associated with marijuana initiation and use in the study population. Subsequently, searches were conducted in the above listed data bases as well as the Cochrane Library on the secondary search terms clinical-, school-, family-, and community-based settings in major urban areas. All articles included in the study focused on marijuana use and cessation intervention (i.e., treatment) and post-treatment relapse prevention techniques.

### **Exclusion Criteria**

Studies involving substance abusers older than age 25 years were excluded from this review. Other excluded articles were those that focused solely on marijuana use prevention and on marijuana relapse prevention techniques that involved drug therapy and religion-based interventions. Studies involving drug therapy interventions dealt with co-morbidities, psychosis, and drug substitution therapies. Many adolescent and young adult marijuana users suffer with co-morbid conditions, express psychosis and/or in need of drug substitution therapies as are marijuana substance abusers. Faith-based interventions were excluded due to the small number of studies found which included youth and young

adult participants and due to the potential lack of receptiveness for this age group to engage in modifying behaviors in response religious constructs. Studies involving youth in rural areas in the U.S. were excluded due to the differences in characteristics of study participants including: socio-economic status, cultural and environmental influences, and education levels. International studies were also excluded.

**Figure 3.1 Flowchart of Literature Search Progress through Review**



\* Note one study consisted of some participants that possibly were between 25-29 years of age, but this was not fully specified in the study design.

## **Chapter IV**

### **RESULTS**

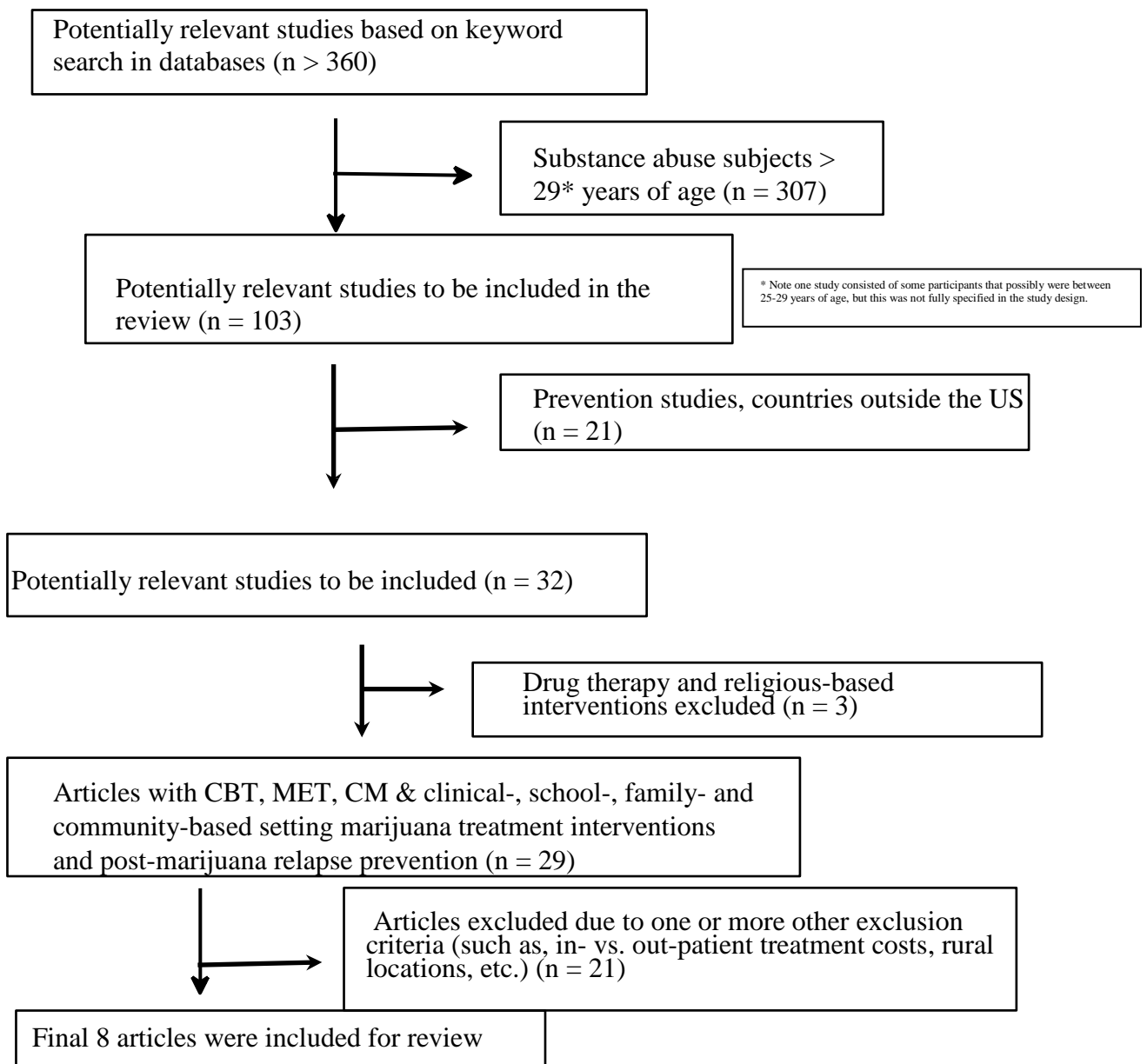
#### **4.1 Overall Results of Literature Review**

The researcher conducted the comprehensive review and more than 360 abstracts were identified using the terms: substance abuse, marijuana, adolescent, young adult, prevention, treatment, relapse, intervention. Of these, 53 met the criteria for further evaluation. All 53 of the full-text articles were collected and reviewed, 8 presented results of an intervention program for post marijuana treatment relapse and only 2 were conducted on African American study participants in the Metro-Atlanta area. Figure 4.1 presents the overall studies that met the review criteria.

Specific data within the studies and articles retrieved were used to determine the success of the treatment intervention in terms of length of post-treatment marijuana relapse abstinence and/or cessation. The student researcher summarized the results of each study by describing the population, intervention (in terms of therapeutic approach and intensity of sessions), as well as reported outcomes. Of the treatment therapies reviewed cognitive behavioral training (CBT), motivational enhancement training (MET), and contingency

management (CM) proved the most successful in obtaining research driven outcomes for the specific study investigators and for the primary outcome desired for this study. Once the focus of the study was narrowed, relevant information were retrieved from the full-text articles and synthesized to summarize the relationship between CBT, MET & CM and marijuana use post-treatment relapse abstinence. Eight articles were retrieved in full-text; all relevant information was placed in a standard data extraction format.

**Figure 4.1 Overall Results of Systematic Search**



## 4.2 Quality Assessment

It is essential to establish a study design in order to provide quality evidence. Table 4.1 was used to assess the quality of the studies analyzed in this paper.

**Table 4.1 – Comparative Assessment of Quality among Eligible Intervention Articles**

Assessment Criteria	Study 1 (Faggiano et al)	Study 2 (Walker et al)	Study 3 (Dios et al)	Study 4 (Stanger et al)	Study 5 (Kamon et al)	Study 6 (Dennis et al)	Study 7 (Griffin et al)	Study 8 (Talpade et al)
Was the purpose stated clearly?	Y	Y	Y	Y	Y	Y	Y	Y
Does the study apply to the research question?	Y	Y	Y	Y	Y	Y	Y	Y
Was relevant background literature reviewed?	Y	Y	Y	Y	Y	Y	Y	Y
Was the type of study design clearly identified/met acceptable design requirements?	29 RCT 3 PC	RCT	RCT	RCT	Pilot from larger RCT	RT	RCT	CT
Was the sample described in detail?	Y	Y	Y*	Y	Y	Y	Y	Y
Results were reported as statistically significant?	Y	Y	Y	Y	Y	Y	Y	Y
Conclusions were appropriate given study methods & results?	Y	Y	Y	Y	Y	Y	Y	Y

Key: Y=yes; N=no, RCT-Randomized Control Trial; PC-Prospective Cohort; CT-Control Trial

The 8 studies included in the review met the quality assessment questions in the

table above, although Dios and colleagues did not fully identify if the final study group contained study subjects older than age 25.

#### 4.3 Examination and Discussion of Successful Programs

The table below lists the design, intervention and outcomes for each of the individual studies reviewed.

**Table 4.2 Findings of Individual Reported Studies**

Investigators	Design	Population	Intervention	Setting	Outcomes
Faggiano et al	SR - 29 RCT	46,539 Participants 6 <sup>th</sup> &7 <sup>th</sup> Graders	CBT Enhanced curricula: <ul style="list-style-type: none"> <li>• Increase drug knowledge</li> <li>• Skill building</li> <li>• Skill usage vs. emotions</li> </ul>	S-B (28 US Schools)	<ol style="list-style-type: none"> <li>1. Drug Knowledge Improved (SMD .91; 95% CI: .42-1.39)</li> <li>2. Decision Making Skills (SMD 0.78; 95% CI: 0.46-1.09)</li> <li>3. Levels of Self-esteem (SMD 0.22; 95% CI: 0.03-0.04)</li> <li>4. Peer Pressure Resistance (RR 2.05; 95% CI: 1.24-3.42)</li> <li>5. Decreased Marijuana Use (RR 2.05; 95% CI: 1.24-3.2)</li> <li>6. Decrease Hardcore Drug Use (RR 0.45%; 95% CI: 0.24-0.85)</li> </ol>

**Table 4.2 Findings of Individual Reported Studies**

Investigators	Design	Population	Intervention	Setting	Outcomes
Walker et al	RCT (Delayed Tx Control)	97 Participants Age 14-19 9 <sup>th</sup> -12 <sup>th</sup> Graders	MET 2 Sessions involving: <ul style="list-style-type: none"> <li>• Motivational interviewing</li> <li>• Feedback of marijuana use comparisons,</li> <li>• Positive &amp; negative aspects of marijuana use</li> <li>• Problems related to use</li> <li>• Social support</li> <li>• Life goal &amp; relationship with marijuana use</li> <li>• Self-efficacy for resisting marijuana use</li> </ul>	S-B (4 HS)	<ol style="list-style-type: none"> <li>1. Decreased Marijuana Use in 9<sup>th</sup>-10<sup>th</sup> Graders (p&lt;.05)</li> <li>2. MET Therapy Effective for All Grade Levels at Initiation</li> <li>3. Meaningful Change in No. of Days of Marijuana Use – 16% (6 days)</li> </ol>
Dios et al	RCT	34 Participants Age 18-25* Years	MET (MM) 2 Sessions: <ul style="list-style-type: none"> <li>• Meditation</li> <li>• Mindfulness concepts discussion, i.e., non-judgmental, emotional awareness, environmental stressors</li> <li>• Daily practice coping meditation CD</li> </ul>	Clinical	<p>Decreased Marijuana Use (p =.031) than Control at:</p> <ol style="list-style-type: none"> <li>1. One month 6.15 fewer days (95% CI: -11.00 to -1.09)</li> <li>2. Two months 7.81 fewer days (95% CI: -13.48 to -1.98)</li> <li>3. Three months 6.83 fewer days (95% CI: -12.94 to-1.98)</li> </ol>



**Table 4.2 Findings of Individual Reported Studies**

Investigators	Design	Population	Intervention	Setting	Outcomes
Karmon et al	RCT	69 adolescent participants =14-18 years & 52 two-parent and 17 mother-only participant families from the Greater Burlington Vermont area	<p>CM</p> <ul style="list-style-type: none"> <li>• Abstinence-based incentive to motivate treatment engagement to participant &amp; families</li> <li>• Post-treatment incentives to maintain marijuana use abstinence</li> <li>• Urine tests</li> </ul> <p>Incentives:</p> <ol style="list-style-type: none"> <li>1. Weekly participant monetary vouchers with escalating value based on # of weeks marijuana free</li> <li>2. Weekly family vouchers with escalating value based upon # of weeks off-spring remained marijuana free</li> </ol>	Clinical	<p>Greater Marijuana Abstinence than Control at 3,6 &amp; 9 during treatment:</p> <ol style="list-style-type: none"> <li>1. 7.6 (MSD =5.6) vs 5.1 (MSD = 4.5)</li> <li>2. 50% vs 18 achieved <math>\geq 10</math> weeks of continuous abstinence</li> </ol>
Kamon et al	Pilot from Larger RCT	19 adolescents and young adults age 15-18 years, 12 families two-parent, 5 mother-only and 2 father-only from a small metropolitan area	<p>Combination-CBT/MET and/or CM</p> <ul style="list-style-type: none"> <li>• 14 weekly 90-minute therapy CBT/MET sessions</li> <li>• twice weekly urine tests. CBT/MET therapy was provided.</li> <li>• Participants CM monetary-based voucher up to \$590</li> <li>• Parents received incentives</li> </ul>	Clinical & Family-based	<p>Marijuana abstinence increased:</p> <ol style="list-style-type: none"> <li>1. From 37% at intake to 74% at treatment end (<math>z = 2.28, p = .02</math>)</li> <li>2. 53% 30 days post-treatment</li> </ol>

**Table 4.2 Findings of Individual Reported Studies**

Investigators	Design	Population	Intervention	Setting	Outcomes
Dennis et al	RT – 2 Trials	600 participants ages 15-16 years & families	Combination-CBT/MET and/or CM <ul style="list-style-type: none"> <li>• Trial I - five sessions CBT/MET therapy with 12 session of family therapy Family Support Network (FSN)</li> <li>• Trial II compared five sessions of CBT/MET with the Adolescent Community Reinforcement Approach (ACRA) and Multidimensional Family Therapy (MDFT)</li> <li>• Both counseling sessions to identify risk factors, goal-setting, therapy satisfaction &amp; improving parenting skills</li> </ul>	Clinical, Community & Family-based – 4 sites	1. Marijuana Abstinence -Trial I, significantly different by treatment type combination, MET/CBT5 27%, FSN 22%, MET/CBT 12 at 17% (overall – Cohen’s $F = 0.12, p < .05$ ); Trial II, small trend indicating that ACRA (34%) was slightly higher than MET/CBT5 (23%) and MDFT (19%) (Cohen’s $F = 0.16, p < .05$ ) post-treatment. . 2. Cost Benefit involved family therapies – FSN & MDFT
Griffin et al	RCT	178 AA participants ages 10-13 years	CBT/MET: Curriculum-based 1. Enhance life skills & practice skills in overall social contexts	School-based in Metro-Atlanta	Decreased marijuana use pre- vs post-treatment - no. of occasions using marijuana in within a 30 day timeframe Study participants ave 1.35 vs control 1.12 ( $p < .05$ )
Talpade et al	CT	407 AA participants ages 13-18 years	CBT/MET: Eight 1-hour sessions 1. Enhance decision making skills 2. Goal building 3. Positive vs negative influences	School-based in Metro-Atlanta	Readiness to Change: • 94% Significantly healthier decisions ( $M = 85.172, n = 92$ ) • Higher confidence to a. Find jobs ( $M = 20.176, n = 103, p = .001$ ) b. Increase education level – ( $M = 20.176, n = 103, p = .0011$ )

A myriad of treatment strategies have been developed and implemented to combat

adolescent and young adult marijuana abuse. The most effective of these strategies are cognitive behavioral training (CBT), motivational enhancement training (MET), and contingency management (CM). CBT uses social cognition and coping skills to modify behavior and involves teaching marijuana users: (1) the functional aspects of why marijuana use and cravings occur; (2) self-management avoidance skills for marijuana use triggers; (3) marijuana use refusal and problem solving skills; and (4) life style management. CBT sessions typically are conducted weekly for 6-14 sessions via group or individual counseling formats in various settings, clinical, school. Sessions ranged from 45-60 minutes in length depending upon the curriculum format. Session participants discuss recent marijuana cravings and/or use, role play and use other interactive exercises to reveal the thought processes which motivate marijuana use.

## **CBT**

Exemplar evidenced-based data supporting the efficacy of CBT can be found in the systematic review conducted by Faggiano, Vigna-Taglianti, Versino, Zambon, Borraccino and Lemma (2008). The reviewers analyzed data from 32 studies, 29 random control trials and 3 prospective control studies, with a total of 46,539 participants. Twenty-eight of the studies were conducted in the U.S. primarily with 6<sup>th</sup> and 7<sup>th</sup> graders. The studies examined school-based CBT training programs in the U.S. aimed at early stage prevention of both marijuana and hardcore drug use, i.e., heroin. Faggiano and colleagues found that behavior modification through skills-based training programs was successful in providing participants with the ability to resist marijuana use in all of the studies reviewed. They determined that students who were enrolled in these CBT school-

based interventions increased drug knowledge (standardized mean difference (SMD) 0.91; 95% CI: 1.17 to 4.03), decision making skills (SMD 0.78; 95% CI: 0.46 to 1.09); levels of self-esteem (SMD 0.22; 95% CI: 0.03-0.04), peer pressure resistance (relative risk (RR) 2.05; 95% CI: 1.24-3.42) while decreasing the levels of marijuana use (RR 0.81%; 95% CI: 0.73-0.92) and hardcore drug use (RR 0.45%; 95% CI: 0.24-0.85).

## **MET**

MET addresses the inconsistencies that marijuana users experience in deciding to abstain from use and strengthens their motivation to change negative outcome behavior patterns. MET therapy consists of 1-4 counseling sessions which are loosely scheduled and range from 45-90 minutes per session. Patients are guided to commit to change marijuana use behaviors through the application of empathy, reflection, summarization, affirmation, self-efficacy reinforcement, usage cost versus benefit resistance management and goal creation as defined by Budney, Roffman, Stephens & Walker, 2007.

Walker, Roffman, Stephens, Wakana & Berghuis (2006) conducted a randomized controlled trial of MET therapy on adolescent heavy marijuana abusers in a school-based setting in Seattle, Washington. Study participants were recruited voluntarily using classroom presentations, advertisements and self-referrals from four area high schools. Ninety-seven students aged 14-19 years in grades 9-12, who used marijuana on at least 9 of the last 30 days prior to the study, were randomly selected to participate in the intervention and control groups. The intervention and control groups were then both separated into two additional groups based upon grade level, i.e., 9<sup>th</sup>/10<sup>th</sup> vs. 11<sup>th</sup>/12<sup>th</sup>. Intervention group participants received two sessions of MET training lasting 30-60

minutes. Follow-up was conducted on both groups 3 months post-treatment. Walker and colleagues determined that the only significant decrease in marijuana use occurred in the 9<sup>th</sup>/10<sup>th</sup> intervention group ( $p < .05$ ). They also concluded that MET treatment for adolescents was effective in younger age groups and that the MET treatment model was conducive for treatment initiation for all age groups of adolescents.

Other researchers have tested alternate forms of MET therapy for efficacy. Dios, Herman, Britton, Hagerty, Anderson and Stein (n.d.) tested a brief form of MET therapy known as mindfulness mediation (MM) to reduce marijuana use in thirty-four females aged 18-29 years. MM is derived from Buddhist meditation practices in which non-judgmental self-awareness, openness and acceptance is cultivated to elicit changes in patients to modify negative marijuana use behaviors. The study participants were selected via telephone interview from females who responded to radio and newspaper advertisements in Providence, Rhode Island. Participants were randomized into the intervention and control groups via a 2:1 ratio. Approximately 50% ( $n = 17$ ) intervention group participants were Caucasian, 32.4% ( $n = 11$ ) African American 5.9% ( $n = 2$ ) Hispanic and 11.8% ( $n = 4$ ) other races. Intervention group participants were subjected to two sessions of (MM) in which MET was provided via a 5 minute MM session guided by an audio CD, followed by a discussion session. Participants were provided a CD to take home to use on a daily basis and record feelings and experiences after its use in a diary. Intervention group participants were determined to use marijuana significantly less frequently on average at follow-up ( $p = .031$ ) than the control group, i.e., 6.15 fewer days at 1 month (95% CI: -11.00 to -1.09); 7.81 fewer days at 2 months (95% CI: -13.48 to -1.98); and 6.83 fewer days at 3 months (95% CI: -12.94 to -1.98). Thus, intervention

group participants positively responded to MET therapy by substituting meditation as a coping mechanism for stress rather than marijuana.

### **CM /Systematic Reinforcement**

CM or Systematic Reinforcement involves developing a plan of action to ensure that post-treatment patients maintain marijuana abstinence. Individuals are rewarded (or, less often, punished) as a reward to adherence to their treatment plan. CM emerged from the behavior therapy and applied behavior analysis as an approach to treatment for mental health and substance abuse patients. One form of CM, the token economy, utilizes tokens or symbols as rewards for program treatment adherence. In the early stages of treatment adherence, patients are provided with lesser value tokens that are exchanged for more valuable tokens as the level of treatment adherence and use abstinence increases within the therapy timeframe (Zlomke & Zlomke, 2003). Another form of CM involves voucher programs in which individuals earn vouchers by adhering to program treatment regimens. The vouchers can be exchange for retail items. The value of the vouchers are also graduated based upon the amount of time that patients have adhered to treatment regimens and/or maintained marijuana use abstinence.

While CM has not been a high priority for marijuana research on adolescents and young adults, several investigators have conducted studies that demonstrate the efficacy of CM in reducing marijuana use among adolescents and young adults. One group of researchers, Stranger, Budney, Kamon & Thostensen (2009), conducted a pilot study that consisted of a mixed intervention therapy strategy employing CBT and MET in conjunction with a voucher CM. The CBT-MET therapy was provided to both the

adolescent marijuana abusers and their parents while the CM component consisted of vouchers that parents received if they ensured that their children adhered to treatment regimes. Study participants were recruited from the greater Burlington, Vermont area via referrals from schools, the juvenile justice system, community therapists, and physicians or through self-referral as a result of multi-media advertisements. Sixty-nine adolescents, aged 14-18 years, who were designated as either, marijuana users, abusers or dependents, were randomly assigned to the intervention group ( $n = 36$ ) and the control group ( $n = 33$ ). Fifty-two of the study participants were from two parent families and 17 participants were raised by their mothers alone.

The intervention and control adolescents groups were provided individualized weekly 90 minute CBT-MET sessions for 14 consecutive weeks and bi-weekly urine tests. However, only the parents of the intervention group received the weekly family counseling sessions and monetary vouchers for off-spring adherence to the treatment regimen (attendance at CBT-MET sessions and negative urine tests for ALL substance use) and their own adherence to the program's parental criteria. Both the intervention and control groups were offered an additional 12 weeks of urine testing post-pilot. Follow-up marijuana use assessments and urine testing was conducted at 3, 6, 9 months post-treatment. The intervention group had an average of 7.6 weeks of continuous marijuana abstinence ( $SD = 5.6$ ) as compared to an average of 5.1 weeks ( $SD = 4.5$ ) of continuous marijuana abstinence among the control group. However, there was no significant difference in post-treatment abstinence between groups. Stranger and colleagues concluded that integrating CM with other empirically proven interventions is effective in reaching positive marijuana absence outcomes for marijuana substance abuse

treatments for adolescents (Stranger et al, 2009).

Another study conducted by Kamon, Budney and Stanger in 2005, sought to provide additional information on CM effectiveness in adolescents and young adults. Kamon and colleagues obtained participants during the pilot phase of an on-going randomized clinical trial in a small metropolitan area who were referred by schools, the juvenile justice system, community therapists, physicians or who were self-referred between the ages of 12-18 years. Nineteen adolescents, ages 15-18 years, who reported marijuana use during the 30-days prior to the study were chosen to participate in the pilot study along with their parents. Twelve families were two-parent, five were mother-only and two were father-only households. Males comprised 89% ( $n = 17$ ) of the study subjects. Ninety-five percent of the study subjects were Caucasian and 5% were Hispanic.

The study intervention consisted of fourteen consecutive 90-minute weekly therapy sessions and twice weekly urine tests. The sessions were segmented into 3 components: one 40 minute participant meeting, one 40 minute parent meeting and one 10 minute family meeting in which a combination of CBT/MET therapy was provided. Study participants were rewarded with a monetary-based voucher each time that they tested negative for marijuana use, which increased incrementally based upon continued abstinence up to \$590. Parents received prizes such as restaurant gift certificates, movie theater tickets and grocery store vouchers depending upon their draw from a fishbowl and therapy adherence. On average, subjects provided an average of 13.3 ( $SD = 10.6$ ) marijuana negative specimens during treatment. Urine testing indicated that abstinence increased from 37% at intake to 74% post treatment ( $z = 2.28, p = .02$ ). Thirty days post-



treatment, 53% of all 19 study participants were marijuana abstinent.

### **Combination of Approaches**

Several researchers have also studied the efficacy of using a mixture of CBT, MET and/or CM as demonstrated by Stranger and colleagues, in an effort to obtain and sustain extended levels of marijuana therapy adherence and post-treatment abstinence in adolescent and young adult marijuana users. The most well-known is the CYT Study conducted by Dennis and colleagues (2004) at four sites: the University of Connecticut Health Center, Operation Parental Awareness and Responsibility (PAR), Incorporated, Chestnut Health Systems and Children's Hospital of Philadelphia. The study took place over a two-year time period and included 600 adolescents aged 15-16 years and their families. Study subjects were recruited and randomized based upon sequential admissions to the four treatment sites and separated into one of two trial groups in which family members were included or excluded. Study participants were then provided one of five short-term out-patient treatments that consisted of combinations of CBT and MET therapy. Adolescent study participants were predominately Caucasian males.

Trial I compared five sessions of CBT/MET therapy with a 12-session therapy regimen of MET and CBT (MET/CBT12) with another 12 sessions that included family therapy components (Family Support Network – FSN). Trial II compared five sessions of CBT/MET with the Adolescent Community Reinforcement Approach (ACRA) and Multidimensional Family Therapy (MDFT), both of which involve a more extensive battery of counseling sessions to identify risk factors, goal-setting, therapy satisfaction tracking and guidelines for improving parenting skills for substance abuse offspring.

The investigators' strategies involved determining: 1) the most beneficial of the combined intervention techniques (based on days of marijuana abstinence) and 2) the most cost beneficial.

In Trial I, the total days of abstinence across the four groups was not significantly different by site or condition. However, the percent of participants abstaining post-treatment was significantly different by treatment type combination: MET/CBT5 having the highest 27%, followed by FSN at 22% and MET/CBT12 at 17% (overall – Cohen's  $f = 0.12$ ,  $p < .05$ ). In Trial II, the total number of days of abstinence was not significantly different by site or intervention, although there was a small trend indicating that ACRA was slightly higher (34%) than MET/CBT5 (23%) and MDFT (19%) (Cohen's  $f = 0.16$ ,  $p < .05$ ) post-treatment.

Both trials demonstrated significant post-treatment improvements i.e., increased days of abstinence and percent of adolescents in treatment. The number of days of abstinence over 2 years post-treatment increased 24% from 52 days to 62 days on average within a quarter. The therapies that proved to be the most cost effective were those that involved family participation in both trials, i.e., Trial I – FSN and Trial II - MDFT.

### **African American Adolescent and Young Adult Studies in Metro-Atlanta**

None of the intervention studies for marijuana treatment and post-treatment abstinence described above targeted African American adolescent or young adults. Neither do they address the target location, i.e., Metro-Atlanta, which is the basis for this capstone. However, two studies addressing the target population and locations have been conducted – Building Resiliency and Vocational Excellence (BRAVE) and the Juvenile

and Adolescent Substance Abuse Prevention (JASAP) Programs. The BRAVE Program employed both CBT and MET therapies using a school-based strategy to achieve marijuana abstinence. The BRAVE Program was conducted by Griffin, Holiday, Frazier and Braithwaite in 2009, as a randomized controlled trial in an Atlanta inner city school system with 178 African American middle-school students (ages 10-13) as participants. Students were recruited at a middle school located in a working-poor to middle-class neighborhood in Metro-Atlanta where there were high rates of alcohol, tobacco and other drugs usage (ATOD) and violence. The middle school student population was 99% African American. Researchers worked with school administrators to select four homeroom classes (two intervention and two controls) over a 3 year time period to participate in the study. Students were randomly assigned to homeroom classes during the course of the study at the beginning of their sixth grade year and moved as a cohort to the eighth grade when they were then chosen to participate in the study in the 8<sup>th</sup> grade. The study to place over a 3-year time frame and consisted of three cohorts, 01, 02, and 03. Students who were in classes selected to participate in the study were similar in academic ability, adaptive behavior and functional level.

Students whose parents consented to their participation in the study and who completed a survey that assess ATOD use, socio-economic status and frequency of violence in their neighborhoods were chosen to participate. Griffin and colleagues chose three dependent variables, alcohol, marijuana and tobacco use to complete the selection of study participants. The researchers used baseline, post-test and follow measurements for ATOD use and neighborhood violence to compare the intervention and control groups. The primary goal of study was to address economic disadvantages while

working to prevent involvement with alcohol, marijuana and other drugs.

Students were motivated to change behaviors through the employment of curriculum-driven classroom exercises which enhanced life skills and encouraged to practice learned life-skills across all social contexts, i.e., school, family and community for an entire school year. BRAVE included a one year follow-up evaluation component that reviewed substance abuse behaviors or abstinence after program completion. BRAVE researchers found that students who received the school-based motivational intervention had significantly fewer occasions of marijuana use 30-days post-treatment ( $M = 1.12$ ,  $SD = 0.08$ ,  $n = 92$ ) than those in the control group ( $M = 1.35$ ,  $SD = 0.09$ ,  $n = 86$ ), ( $p < .05$ ) (Griffin, Holiday, Frazier, Braithwaite, 2009).

The JASAP Program (Talpade, Lynch, Lattimore & Graham, 2008) also consisted of a mixture of CBT and MET therapies and was implemented in a Fulton County, Georgia public school system in 2007. A total of 407 African American students (57% male and 43% female) ages 13-18 years identified by the juvenile court system, schools, churches, community and other youth organizations were recruited to participate in the study. Metrics for JASAP were based on the staging construct “readiness or intent to change” from the Trans-theoretical Model of Change (Prochaska and DiClemente, 1982, as cited in Talpade et al, 2008). Students’ readiness to stop smoking marijuana or intent to never use marijuana was assessed via a survey at the beginning and completion of the program. The study lasted over the school year and consisted of 8 one-hour sessions of instruction in which JASAP participants were provided instruction on such things as decision making and communication skills, long- and short-term goal building and positive vs. negative influences. Telephone follow-ups were conducted with 88 of the

students one year after program completion. Talpade and colleagues determined that study participants demonstrated a readiness to change by making significantly more healthy decisions ( $M = 85.172$ ,  $n = 92$ ) and increased their knowledge concerning substance abuse significantly after participating in JASAP ( $M = 11.32$  vs.  $M = 12.68$ ,  $t(205) = -3.03$ ,  $p = .001$ ). They also determined that participants felt more confident about finding jobs ( $M = 20.176$ ,  $n = 103$ ,  $p < .001$ ) and increasing their level of education ( $M = 20.176$ ,  $n = 102$ ,  $p < .001$ ).

**Table 4.3 Effective Interventions for Marijuana Treatment and Relapse Abstinence for Adolescents and Young Adults**

<b>Intervention Strategy</b>	<b># of Eligible Studies With Significant Results</b>
<b>CBT</b>	<b>1</b>
<b>MET</b>	<b>2</b>
<b>CM</b>	<b>2</b>
<b>Combination</b>	<b>5</b>

~Note: both the CM and Combination studies listed in the above table consisted of therapy interventions that included CBT & MET, resulting in a total of 10 studies appearing within this table. Please review **Table 4.2** to understand the combinations of interventions involved in each individual study.

## **CHAPTER V**

### **CONCLUSION**

#### **5.1 Program Model Design for African American Adolescents and Young Adults in Metro-Atlanta**

Based on the strength of the various interventions examined in this systematic review, a program model design to increase marijuana post-treatment abstinence for African American adolescents and young adults in Metro-Atlanta would best be served by a program that is comprised of the following components:

- Multi-level location settings consisting of all of the venues identified in the literature, i.e., clinical-, school-, family and community-based venues;
- Mixed combination of strategies, CBT, MET and CM with successful demonstrable results as describe in the studies outlined in Chapter 4 above;
- A longitudinal design with specific periodic tests;
- An evaluation module that includes a cost benefit analysis; and,
- A staff/board comprised of and led by African Americans (i.e., community stakeholders).

As evidenced in the studies describe in Chapter 4, CBT, MET and CM all have demonstrated that they are effective for the prevention and treatment of marijuana use among adolescents and young adults. However, the extent of the positive intervention outcomes outlined in this literature review indicate that a combination of each of the strategies described, CBT, MET and CM (i.e., a mixed-intervention), in various settings would provide a more holistic intervention approach that encompasses all aspects of the environment/living situations in which African American adolescents and young adult marijuana users ages 12-25 years old reside in the Metro-Atlanta area.

The model program would consist of the following. During the treatment phase of the program, combination therapy involving bi-weekly intensive CBT and MET therapeutic regimens consisting of 90 minute individual sessions conducted over a 6-12 month timeframe using either a monetary or voucher reward incentive would be provided to program participants. The incentives would be provided as a result of therapy adherence and negative marijuana use test results (urine sampling) conducted biweekly. Incentives should increase incrementally with therapy compliance and days of continuous abstinence. Once this regimen of treatment has been completed, CM should begin and consist of a monthly reinforcement meeting involving CBT & MET individual therapy sessions for a total of 90 minutes and a monthly urine sampling. Monetary or voucher reward incentives should be provided monthly with incremental increases based upon attendance at monthly reinforcement meetings and continuous days of marijuana abstinence for a 6-month time-period. Following the CM period, therapy sessions would be discontinued. Program participants would be followed-up at 6, 12, 18 and 24 months after the CM period. Program practitioners would contact participants to schedule

individual face-to-face interviews to discuss abstinence rates. At the time each interview is conducted, participants would be tested via hair sampling to determine continued length of marijuana use abstinence.

As outlined in the study limitation section below, study settings impact the success of marijuana treatment, prevention and post-treatment abstinence interventions. Also, not all African American adolescents and young adults are a part of any given setting, for instance, not all are attending school and not all have family members or familial support systems. Consequentially, setting venues are key components in the design of a model intervention and must be taken into consideration. The student investigator recommends that a model program for African Americans in the Metro-Atlanta area would include:

- 1) A school-based component that would serve African American participants age 12-25 years who are attending middle and high school *and college*. At least one of the 90 minute bi-weekly sessions per month would be provided via a curriculum-based program in an educational facility, i.e., one session per month would be held in an educational facility and be purely curriculum- based and the other would be held in a community or local health department or other facility and be clinical.
- 2) A two-pronged family-based component, one for African American adolescents age 12-17 years and/or those who are older up to age 25 that still reside with their parents/guardians and another that would serve African American young adults between the ages of 18-25 years who no longer reside with parental figures, but who have a familial support



system. During the treatment phase, family/parental figures would also receive three 90 minute CBT/MET sessions every six months that would involve skills to assist them in developing the following with adolescent and young adult program participants: building alliances and identifying goals learning to communicate, managing conversations, dealing with conflict, developing positive experiences/interactions, reviewing therapy to ensure continue adherence to positive therapeutic instructions and stated goals, preparing for future challenges once the program has terminated and program termination. They would also participate in three of the bi-weekly sessions that the program participant receives during this time period so that the therapist can facilitate conversation and the development of the skill-sets listed above. Family/parental figures should be provided incentives to ensure participant adherence as well as their own participation in the program. Incentives should be provided monthly and increase incrementally based upon their participation and participant program adherence. During the CM and post treatment phases, family/parental figures would continue to receive incentives based upon participant program therapy adherence. Program therapists should be available should family/parental figures need additional counseling or other assistance.

- 3) A community-based program for those African American marijuana users ages 12-25 years in Metro-Atlanta who do not attend school and/or have familial support. Local level public health departments and or community

centers would provide the bi-weekly 90 minute CBT/MET therapy sessions and conduct the urine and hair sampling tests during the treatment and post-treatment phases.

- 4) As cited in the community-based programs discussed in Chapter 4 above, urine and hair sampling testing and the combined CBT/MET therapy sessions and CM during the treatment and post-treatment phases could be provided at local level health departments for both family- and school-based program components.

To fully evaluate the effectiveness of the model program it must be longitudinal in nature. Commitment to participate in the study long-term should be obtained from study participants during the initial recruitment phase of the pilot for the program. Additional follow-up should be conducted at 3, 6 and 9 years post-treatment to determine if study participants have remained abstinent. Follow-up could be either via telephone interview or through on-line or paper mailed surveys to defray costs.

Listed in the table below are several manuals that were developed by Dennis and colleagues (2004) in the CYT Study which could be used to fully design the CBT, MET and CM components of a model program for adolescents and young adults in the Metro-Atlanta area. The components can be scaled to the number of participants in the study and structured to meet participant needs. These manuals should be used to assist in developing the specific content of the counseling sessions and therapists should be providing training on how counsel program participants based upon the structure chosen. However, the therapy provided should include components of the mindful meditation form of MET therapy describe in this capstone and all of the social cognition and coping

skills to modify behavior that are used in CBT, i.e.: (1) the functional aspects of why marijuana use and cravings occur; (2) self-management avoidance skills for marijuana use triggers; (3) marijuana use refusal and problem solving skills; and (4) life style management.

Trained therapists would provide all counseling sessions. Since there are multiple methodologies that can be used to determine the content of the counseling sessions, therapists should have an educational background in the public health field such as social workers with no less than a bachelors and have at least 10 years of counseling experience with adolescent and young adults. Since there is a multitude of ways that MET/CBT therapy can be structured, therapist should be trained in clinical counseling techniques that are specific to the type of MET/CBT therapy that will be used to provide counseling. Finally, the student researcher recommends that these therapists be similar to program participants in gender, culture and racial/ethnic make-up since studies have indicated that individuals are more prone to adhere to program regimens when providers have similar demographic characteristics (Braithwaite & Taylor, 2001; Wilkins, Elliott, Richardson, Lozano, & Mangione-Smith, 2011).

Finally, the model program should be pilot tested in specific neighborhoods in the Metro-Atlanta area to evaluate the effectiveness of each component and to revise program structure and delivery as needed to address program participant needs as well as cost considerations. In its initial stages, the model program would be implemented as a pilot project in select Metro-Atlanta neighborhoods comprised predominantly of adolescent and young adult African Americans and that have high rates of marijuana use.

**Table 5.1 Adolescent and Young Adult Cannabis Treatment Manuals**

<b>Reference</b>	<b>Manual Title</b>	<b>Location</b>
CYT Study	<i>The Motivational Enhancement Therapy and Cognitive Behavioral Therapy for Adolescent Cannabis Users: 5 Sessions, Vol. 1</i>	NCADI number BKD384
	<i>The Motivational Enhancement Therapy and Cognitive Behavioral Therapy for Adolescent Cannabis Users: 7 Sessions of Cognitive Behavioral Therapy for Adolescent Cannabis Users, Vol. 2</i>	
	<i>Family Support Network for Adolescent Cannabis Users, Vol. 3</i>	
	<i>The Adolescent Community Reinforcement Approach for Adolescent Cannabis Users, Vol. 4</i>	
	<i>Multidimensional Family Therapy for Adolescent Cannabis Users, Vol. 5</i>	Ncadistore.samhsa.gov/catalog/ProductDetails.aspx?ProductID=15868
	<i>Multi-systemic Therapy for Adolescents</i>	www.mstservices.com

The Metro-Atlanta neighborhoods Program participants should be recruited through the county educational systems from specific schools within the selected area and from colleges whose student make-up is predominately African American (Note: The Atlanta University Center in Atlanta, Georgia resides in a predominately African American neighborhood whose student population is predominately African American). Requests for referrals can be made to the juvenile court systems in Metro-Atlanta, community assistance centers and local and community health departments. Finally, outreach via local news media, television stations and other forms of electronic media may be used to generate interest so that self-referrals can also be accepted.

**5.2 Program Policy and Funding Implications**

As stated in the program model design, the program should be led by African

Americans who are stakeholders in Metro-Atlanta since evidenced-based research has shown that study participants: 1) tend to identify with persons of their own race and ethnicity, and, 2) better adhere to therapy regime coordination and direction, if delivered by health care workers of their own race and ethnicity (Braithwaite, & Taylor, 2001; Wilkins, Elliott, Richardson, Lozano, & Mangione-Smith, 2011). The key stakeholders involved in this collaboration would consist of district public health directors in the Metro-Atlanta area and their designated staff, mid- and upper-level managers from Georgia's Department of Public Health (DPH); local political leaders, including Metro-Atlanta mayors and commissioners, in the locales/neighborhoods selected for the study; Metro-Atlanta public school administrators, i.e., board members, principals, teachers, and so forth in the selected study area; managers, directors and staff of community organizations who would sponsor and/or or deliver services; and parents and families of study participants.

As with any profitable venture, the proposed marijuana relapse prevention model program must be economically sound in the eyes of the stakeholders. To combat the idea of "the cost of solving the problem as high" as described by Anthony Downs (1972) in stage three of his description of the "issue-attention cycle" and to ensure that the program will not "take a great deal of money and require major sacrifices from the population" and suffer a "gradual decline in interest" (Downs, 1972, pp. 138-139). A pilot budget must be developed that captures all potential costs for pre- and post-pilot implementation. Funding for the pilot should be obtained from various sources, such as local public political structures (i.e., local boards of health, Metro-Atlanta police departments, etc.), state and federal public health and welfare programs/grants, and local and national

private organizations and foundations should be used to pilot the proposed program model.

Buy-in from all potential stakeholders, including neighborhood residents, would need to be obtained in order to implement the model program pilot. The neighborhoods of choice must be those with the highest numbers of African American adolescent and young adult who use marijuana and are willing to participate in the study so that transportation costs are minimal to and from schools and/or community centers/public health departments that would provide services. This would potentially involve a great deal of pre-pilot program outreach within the neighborhoods of choice that comprise the Metro-Atlanta area. Outreach must also be conducted with other potential stakeholders which may involve meetings/conferences, letters and or fliers and other materials that would describe the programs goals and objectives and outline the sought-after positive outcomes. Consequentially, consideration should be given to outreach costs as well in the model program's pilot budget development.

To ensure that the program remains a foremost agenda issue for the key stakeholders, periodic meetings should be conducted to provide feedback and debrief the stakeholders and program implementation decision makers (i.e., upper level management of organizations implementing the pilot, such as the staff at local participating public health centers and Georgia DPH) and obtain their input. Care should be taken to continue neighborhood sanction of the program so meetings with neighborhood organizations and/or periodic updates via community boards, hardcopy mailings, emails, and other methods, should be performed. Critical evaluation stages must be benchmarked and measured throughout the pilot project. As outcomes are successfully attained, they must be elevated within the implementing organizational structure and local neighborhoods to

obtain continued buy-in. Once the pilot phase of the model program has been completed and is deemed successful, pilot findings should be reported to the various local stakeholders for full-fledge program implementation in the Metro-Atlanta area and the public health research community at large for future research opportunities.

### **5.3 Study Limitations**

Each of the aforementioned intervention strategies, CBT, MET and CM takes into account the risk and protective factors associated with drug abuse among adolescents and young adults, and qualifies how the various types of intervention strategies should be designed and implemented to achieve the most positive health outcomes. Researchers have examined the efficacy and effectiveness of each type of treatment based upon its setting, i.e., clinical-, family-, school- and community-based. Some of the positive factors associated with each of these settings have already been denoted in the studies described above. However, in the majority of the studies reviewed, study participants were not of African American descent as few studies regarding prevention, treatment and post-treatment relapse interventions have been conducted in this population. Further, Faggiano and colleagues' study consisted of a systematic review of 29 RCT and 3 prospective cohort studies which summarize findings of other studies rather than presenting findings specific to its own study design.

Researchers have also discussed limiting factors associated with each type of setting, including: 1) Costs for both out- and in-patient treatment in clinical settings (French, Roebuck, Dennis, Godley, Liddle, & Tims, 2003; Olmstead, Sindelar, Easton, & Carroll, 2007 ); 2) Exclusion of minorities in family-based treatments, particularly for

African Americans (Williams, Chang, & Addiction Center Adolescent Research Group, 2000 as cited in Collins, Ready, Griffin, Walker, & Mascaro, 2007); 3) Lack of knowledge regarding school-based interventions in college age students since very little research has been conducted on marijuana interventions in this population; 4) Practitioner barriers to community-based interventions (Godley, White, Diamond, Passetti, & Titus, 2001; Killeen, McRae-Clark, Waldrop, Upadhyaya, & Brady, 2012; Sheehan, Walrath, & Holden, 2007; Riley, Rieckmann, & McCarty, 2008).

Since various articles were reviewed in this capstone, publication bias is also a limiting factor. Research articles cited in this document may be slanted towards findings that were beneficial to the various investigators sought after outcomes rather than a complete description of all the findings. The research question in this capstone was self-developed and presents the findings that the student investigator determined addressed the question posed. Finally, the most inherent weakness of this study is that the proposed intervention plan could not be piloted tested for feasibility.

#### **5.4 Recommendations for Future Research**

As previously described, this model program would require pilot-testing for feasibility and refinement. Formative evaluation would help planners build a program that would be shaped by participant and stakeholder feedback and insight. Summative evaluation would demonstrate whether or not participants had any changes in their knowledge, attitudes, beliefs and behaviors in terms of marijuana use. Long-term evaluation would provide support on whether or not the program minimized recidivism and other consequences, such as arrests and marijuana induced emergency room visits.



Further, testing at different sites within Metro-Atlanta and other major metropolitan areas would help public health researchers and practitioners understand if the program was valid for diverse, urban, African American adolescent and young adult populations.

## **5.5 Conclusion**

Marijuana use and its consequences are a serious public health threat in Metro-Atlanta. A glaring disparity exists for adjudication and treatment for adolescent and young African Americans marijuana users. There is an urgent need to develop meaningful, effective programs to address marijuana use treatment and relapse prevention interventions among adolescent and young adult African Americans in this population. This capstone study introduces a model program that could potentially fill an unmet need that exists in Metro-Atlanta; but also, offers promise as a means for replication with other adolescent and young African Americans in urban cities provided further attention is garnered towards continued research.

## REFERENCES

- Adler, N. E., & Matthews, K. (1994). Health psychology: Why do some people get sick and some stay well?. *Annual Review of Psychology*, *45*, 229-59.
- Andrews, J. A., Foster, S. L., Capaldi, D. & Hops, H. 2000. Adolescent and family predictors of physical aggression, communication, and satisfaction in young adult couples: A prospective analysis, *Journal of Consulting Clinical Psychology* *68*, 195–208.
- Bogart, L. M., Collins, R. L., Ellickson, P. L., & Klein, D. J. (2007). Are adolescent substance users less satisfied with life as young adults and if so, why? *Social Indicators Research*, *81*(1), 149-169.
- Braithwaite, R. L., & Taylor, S. E. (2001). Health Issues in the Black Community. John Wiley & Sons, Inc. (US).
- Brody, G. H., Kogan, S. M., & Chen, Y. (2012). Perceived discrimination and longitudinal increases in adolescent substance use: Gender differences and mediational pathways. *American Journal Of Public Health*, *102*(5), 1006-1011.
- Buckner, J. D., Ecker, A. H., & Cohen, A. S. (2010). Mental health problems and interest in marijuana treatment among marijuana-using college students. *Addictive Behaviors*, *35*, 826-833.
- Budney, A. J. (2006). Are specific dependence criteria necessary for different substances: How can research on cannabis inform this issue?. *Addiction*, *101*, 125-133.

- Budney, A. J., Roffman, R., Stephens, R. S. & Walker, D. (2007). Research review: Marijuana dependence and its treatment. *Addiction Science & Clinical Practice*, 4(1) 4-16.
- Chassin, L., Presson, C., Sherman, S., & Edwards, D. (1992). The natural history of cigarette smoking and young adult social roles. *Journal of Health And Social Behavior*, 33(4), 328-347.
- Collins, M. H., Ready, J., Griffin, J. B., Walker, K. G., & Mascaro, N. (2007). The challenge of transporting family-based interventions for adolescent substance abuse from research to urban community settings. *American Journal Of Family Therapy*, 35(5), 429-445.
- Compton, W. M., Grant, B. F., Colliver, J. D., Glantz, M. D., & Stinson, F. S. (2004). Prevalence of marijuana use disorders in the United States: 1991-1992 and 2001-2002. *JAMA, Journal Of The American Medical Association*, 291(17), 2114-2121.
- Copersino, M., Boyd, S., Tashkin, D., Huestis, M., Heishman, S., Dermand, J. C, Simmons, M. S., & Gorelick, D. (2010). Socio-demographic characteristics of cannabis smokers and the experience of cannabis withdrawal. *The American Journal of Drug and Alcohol Abuse*, 36(6), 311-319.
- Copeland, J., Swift, W., Roffman, R., & Stephens, R. (2001). A randomized controlled trial of brief cognitive-behavioral interventions for cannabis use disorder. *Journal of Substance Abuse Treatment*, 21, 55-6.
- Dangerous Drug Act, 1933 GA Official Code Ann. Code § 79A-701, (1967).
- Dennis, M., Godley, S., Diamond, G., Tims, F., Babor, T., Donaldson, J., Liddle, H., Titus, J. C., Kaminer, Y., Webb, C., Hamilton, N., & Funk, R. (2004). The

- cannabis youth treatment (cyt) study: Main findings from two randomized trials. *Journal of Substance Abuse Treatment*, 27(3), 197-213.
- Dios, M. A. de, Herman, D. S., Britton, W. B., Hagerty, C. E., Anderson, B. J., and Stein, M. D. (n.d.). Motivational and mindfulness intervention for young adult female marijuana users. *Journal of Substance Abuse Treatment*, 42, 56-64.
- Downs, A. (1972). Up and down with ecology: The issue-attention cycle. In J. M. Shafritz, K. S. Layne, & C.P. Borick (Ed.), *Classics of public policy* (pp. 137-147). New York, NY: Pearson Longman.
- Ellickson, P., Bui, K., Bell, R., & McGuigan, K. A. (1998). Does early drug use increase the risk of dropping out of high school?. *Journal of Drug Issues*, 28(2), 357-380.
- Ellickson, P. L., Tucker, J. S., & Klein, D. J. (n.d.). Original article: High-risk behaviors associated with early smoking: Results from a 5-year follow-up. *Journal of Adolescent Health*, 28, 465-473.
- Faggiano, F., Vigna-Taglianti, F. D., Versino, E., Zambon, A., Borraccino, A. & Lemma, P. (2008). School-based prevention for illicit drugs use: A systematic review. *Preventive Medicine*. 46(5), 385-396. Retrieved August 27, 2012 from <http://dx.doi.org.ezproxy.gsu.edu/10.1016/j.ypmed.2007.11.012>.
- Fergusson, D. M., and Boden, J. M. (2008). Cannabis use and later life outcomes. *Addiction*, 103(6), 969-976.
- French, M. T., Roebuck, M., Dennis, M. L., Godley, S. H., Liddle, H. A., & Tims, F. M. (2003). Outpatient marijuana treatment for adolescents: Economic evaluation of a multisite field experiment. *Evaluation Review*, 27(4), 421-459.

- Georgia Bureau of Investigation. (2011). *2011 summary report uniform crime reporting (ucr) program*. Georgia Bureau of Investigation Crime Information Center. Retrieved August 10, 2012, from [http://gbi.georgia.gov/sites/gbi.georgia.gov/files/related\\_files/site\\_page/2011UCRSummaryReport1.pdf](http://gbi.georgia.gov/sites/gbi.georgia.gov/files/related_files/site_page/2011UCRSummaryReport1.pdf)
- Gettman, Jon. (November 2009). Marijuana in Georgia: Arrests, usage and related data. *The Bulletin of Cannabis Reform*. Retrieved August 6, 2012, from <http://www.drugscience.org/States/GA/GA.pdf>.
- Godley, S. H., White, W. L., Diamond, G., Passetti, L., & Titus, J. C. (2001). Therapist reactions to manual-guided therapies for the treatment of adolescent marijuana users. *Clinical Psychology: Science & Practice*, 8(4),405–417.
- Golub, A., Johnson, B. D., & Dunlap, E. (2005). Subcultural evolution and illicit drug use. *Addiction Research & Theory*, 13(3), 217-229.
- Gonzales, R., Anglin, M., Beattie, R., Ong, C., & Glik, D. C. (2012). Understanding recovery barriers: Youth perceptions about substance use relapse. *American Journal of Health Behavior*, 36(5), 302-314.
- Griffin Jr., J. P., Holliday, R. C., Frazier, E., & Braithwaite, R. L. (2009). The BRAVE (building resiliency and vocational excellence) program: Evaluation findings for a career-oriented substance abuse and violence preventive intervention. *Journal of Health Care For The Poor & Underserved*, 20(3), 798.
- Hall, W., & Degenhardt, L. (2009). Adverse health effects of non-medical cannabis use. *Lancet*, 374(9698), 1383-1391.

- HODAC, Inc. (2008). *FY2008 hodac annual helpline call report* (Georgia Department of Public) ANOVA Business Analysts. Retrieved August 10, 2012, from <http://health.state.ga.us/pdfs/prevention/2008%20HODAC%20Reports/District%203-2%20Report.pdf>.
- Kamon, J. L., Budney, A. J., & Stanger, C. (2005). A contingency management intervention for adolescent marijuana abuse and conduct problems. *Journal of the American Academy of Child & Adolescent Psychiatry, 44*, 513-521.
- Killeen, T. K., McRae-Clark, A. L., Waldrop, A. E., Upadhyaya, H., & Brady, K. T. (2012). Contingency management in community programs treating adolescent substance abuse: A feasibility study. *Journal of Child & Adolescent Psychiatric Nursing, 25*(1), 33-41.
- King, K. M., Chung, T., & Maisto, S. A. (2009). Adolescents' thoughts about abstinence curb the return of marijuana use during and after treatment. *Journal of Consulting and Clinical Psychology, 77*(3), 554-56.
- Kirk, C. M., Lewis, R. K., Lee, F. A., & Stowell, D. (2011). The power of aspirations and expectations: the connection between educational goals and risk behaviors among African American adolescents. *Journal of Prevention & Intervention in the Community, 39*(4), 320.
- Lee, C. M., Neighbors, C. & Woods, B. A. (2007). Marijuana motives: Young adults' reasons for using marijuana. *Addictive Behaviors, 32*(7), 1384-1394.
- Macleod, J., Oakes, R., Copello, A., Crome, I., Egger, M., Hickman, M., Oppenkowski, T., Stokes-Lampard, H., & Smith, D. G. (2004). Psychological and social sequelae of cannabis and other illicit drug use by young people: A systematic

review of longitudinal, general population studies. *Lancet*, 363(9421), 1579-1588.

Moore, Juanita (reporter). (2012, February: 544 EST). Channel 2 investigation highlights racial discrepancies in marijuana arrests. 5:00 News (television newscast). Atlanta, GA: WSTB-Channel 2. Retrieved May <http://www.wsbtv.com/news/news/local/channel-2-investigation-highlights-racial-discrepa/nK8Gd/>.

Montgomery, L., Petry, N. M., & Carroll, K. M. (2012). Moderating effects of race in clinical trial participation and outcomes among marijuana-dependent young adults. *Drug and Alcohol Dependence*, 126, 333-339.

Newcomb, M. D. & Bentler, P. M. (1988) *Consequences of adolescent drug use: Impact on the lives of young adults* (Sage, Beverly Hills, CA).

O'Brien, M., Comment, L., Liang, K., & Anthony, J. (2012). Does cannabis onset trigger cocaine onset? A case-crossover approach. *International Journal of Methods In Psychiatric Research*, 21(1), 66-75.

Olmstead, T. A., Sindelar, J. L., Easton, C. J., & Carroll, K. M. (2007). The cost-effectiveness of four treatments for marijuana dependence. *Addiction*, 102(9), 1443-1453.

Polen, M. R., Sidney, S., Tekawa, I. S., Sadler, M., & Friedman, G. D. (1993). Health care use by frequent marijuana smokers who do not smoke tobacco. *West J Med*, 158(6), 596-601.

- Prochaska, J. O., & DiClemente, C. C. (1982). Transtheoretical therapy: Toward a more integrative model of change. *Psychotherapy: Theory, Research & Practice, 19*(3), 276-288.
- Ramo, D. E., Liu, H., & Prochaska, J. J. (2012). Reliability and validity of young adults' anonymous online reports of marijuana use and thoughts about use. *Psychology of Addictive Behaviors, 26*(4), 801-811.
- Riley, K. J., Rieckmann, T., & McCarty, D. (2008). Implementation of MET/CBT 5 for adolescents. *Journal of Behavioral Health Services & Research, 35*(3), 304-314.
- Sampson, R. J., Morenoff, J. D., & Gannon-Rowley, T. (2002). Assessing neighborhood effects: Social processes and new directions in research. *Annual Review of Sociology, 28*(1), 443-478.
- Sheehan, A., Walrath, C., & Holden, E. E. (2007). Evidence-based practice use, training and implementation in the community-based service setting: A survey of children's mental health service providers. *Journal of Child & Family Studies, 16*(2), 169-182.
- Stephens, R. S., Babor, T. F., Kadden, R., & Miller, M. (2002). The marijuana treatment project: Rationale, design and participant characteristics. *Addiction, 97*, 109-124.
- Stephens, T., Warner, M., & Braithwaite, R. L. (2007). Age-based correlates of substance misuse among convicted felons in Georgia. *The American Journal of Drug & Alcohol Abuse, 33*(6), 885-892.
- Stranger, C., Budney, A. J., Kamon, J. L., & Thostensen. (2009). A randomized trial of contingency management for adolescent marijuana abuse and dependence. *Drug and Alcohol Dependence, 105*, 240-247.



Substance Abuse and Mental Health Services Administration. (2011). *Results from the 2010 national survey on drug use and health: Summary of national findings.*

NSDUH Series H-41, DHHS Publication No. (SMA) 11-4658. Rockville, MD: Substance Abuse and Mental Health Services Administration.

Substance Abuse and Mental Health Services Administration. (2013). *The national survey of drug use and health report: Trends in adolescent substance use and perception of risk.* NSDUH-099a, Rockville, MD: Center for Behavioral Health Statistics and Quality Substance Abuse and Mental Health Services Administration.

Talpade, M., Lynch, D., Lattimore, B., & Graham, A. (2008). The juvenile and adolescent substance abuse prevention program: An evaluation. *International Journal of Behavioral Consultation & Therapy*, 4(4), 304-310.

The Norml Almanac of Marijuana Arrest Statistics (2002). Georgia marijuana arrests.

Retrieved August 7, 2012, from

[http://norml.org/pdf\\_files/state\\_arrests\\_2004/NORML\\_GA\\_Marijuana\\_Arrests.pdf](http://norml.org/pdf_files/state_arrests_2004/NORML_GA_Marijuana_Arrests.pdf).

Theall, K. P., Sterk, C. E., & Elifson, K. W. (2009). Perceived neighborhood fear and drug use among young adults. *American Journal Of Health Behavior*, 33(4), 353.

Tims, F., Dennis, M., Hamilton, N., Buchan, B. J., Diamond, G., Funk, R., & Brantley, L. (2002). Characteristics and problems of 600 adolescent cannabis abusers in outpatient treatment. *Addiction (Abingdon, England)*, 97 (Suppl. 1), 46-57.

Trezza, V.; Campolongo, P.; Cassano, T.; Macheda, T.; Dipasquale, P.; Carratu, M.R.; Gaetani, S.; Cuomo, V. (2008). Effects of perinatal exposure to delta-9-

- tetrahydrocannabinol on the emotional reactivity of the offspring: A longitudinal behavioral study in wistar rats. *Psychopharmacology* (Berl) 198(4):529-537.
- United Nations Office on Drug and Crime. (2012). *World Drug Report 2012* (United Nations publication, Sales No. E.12.XI.1). Retrieved August 10, 2012, from [http://www.unodc.org/documents/data-and-analysis/WDR2012/WDR\\_2012\\_web\\_small.pdf](http://www.unodc.org/documents/data-and-analysis/WDR2012/WDR_2012_web_small.pdf).
- U. S. Department of Justice. (2011). *Atlanta High Intensity Drug Trafficking Area: Drug market analysis 2011* (DOJ National Drug Intelligence Center Office of National Drug Control Policy). Johnston, PA: Author.
- U. S. Census Bureau. (2011). *U. S. census bureau: American factfinder* [Data file]. Available from the U. S. Census Bureau Web site, Retrieved July 21, 2013, from [http://factfinder2.census.gov/faces/nav/jsf/pages/community\\_facts.xhtml](http://factfinder2.census.gov/faces/nav/jsf/pages/community_facts.xhtml).
- U. S. Census Bureau. (2012). *U. S. census bureau: American factfinder 2011 population estimate as of July 1, 2011* [Data file]. Available from the U. S. Census Bureau Web site, Retrieved July 21, 2013, from [http://factfinder2.census.gov/faces/nav/jsf/pages/community\\_facts.xhtml](http://factfinder2.census.gov/faces/nav/jsf/pages/community_facts.xhtml).
- U. S. Census Bureau. (2013). *U. S. census bureau: State and county quickfacts* [Data file]. Available from the U. S. Census Bureau Web site, Retrieved July 21, 2013, from <http://quickfacts.census.gov/qfd/states/13/1304000.html>.
- Walker, D. D., Roffman, R. A., Stephens, R. S., Wakana, K., & Berghuis, J. (2006). Motivational enhancement therapy for adolescent marijuana users: A preliminary randomized controlled trial. *Journal of Consulting and Clinical Psychology*, 74(3), 628-632.

- Wagner, M. L., Liles, R., Broadnax, R. L., & Nuriddin-Little, A. (2006). Use of alcohol and other drugs: Undergraduate hbcu students. *Negro Educational Review*, 57(3/4), 229-241.
- Warr, M., & Ellison, C. G. (2000). Rethinking social reactions to crime: personal and altruistic fear in family households. *American Journal of Sociology*, 106(3), 551-578.
- Wilkins, V., Elliott, M. N., Richardson, A., Lozano, P., & Mangione-Smith, R. (2011). The association between care experiences and parent ratings of care for different racial, ethnic, and language groups in a Medicaid population. *Health Services Research*, 46(3), 821-839.
- Williams, R. J., Chang, S. Y., & Addiction Center Adolescent Research Group. (2000). A comprehensive and comparative review of adolescent substance abuse treatment outcome. *Clinical Psychology: Science & Practice*, 7, 138-166.
- Wilson, K. J., Boers, J. H., Sterk, C. E., Elifson, K. W. (2003). Metropolitan Atlanta drug use trends. In *National Institute on Drug Abuse Epidemiologic Trends in Drug Abuse Volume II Proceedings of the Community Epidemiology Work Group* (NIH Publication No. 04-5365, pp. 7-16) Bethesda, MD: U. S. Department of Health and Human Services.
- Zlomke, K., & Zlomke, L. (2003). Token economy plus self - monitoring to reduce disruptive classroom behaviors. *Behavior Analyst Today*, 4(2), 177-182.