

EFFECTIVENESS OF MOTIVATIONAL INTERVIEWING IN THE TREATMENT OF CANNABIS USE DISORDER AMONG ADOLESCENTS ATTENDING PUBLIC SCHOOLS

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ABSTRACT

Purpose of the Study: To assess the effectiveness of Motivational Interviewing (MI) in the treatment of Cannabis Use Disorder (CUD) among adolescents attending selected public secondary schools in Nairobi County, Kenya.

Problem Statement: Cannabis use among adolescents is a growing public health concern worldwide, with significant implications for mental health, academic performance, and overall well-being. In Kenya, cannabis use among secondary school students has risen notably in urban areas, contributing to the prevalence of Cannabis Use Disorder. Adolescents are particularly vulnerable to the negative effects of cannabis use, including impaired cognitive functioning, anxiety, and depression. Given the limited effectiveness of existing interventions, there is a pressing need for more targeted and effective therapeutic approaches to address this issue.

Methodology: This study employed a quasi-experimental design to compare the effectiveness of MI in reducing cannabis use severity and improving mental health outcomes in adolescents. A total of 80 adolescents aged 15-18 years from two public secondary schools in Nairobi County were randomly selected. The experimental group received six weeks of Motivational Interviewing (MI), while the control group did not receive any intervention. Assessments were conducted at baseline, midline, and endline using the Cannabis Use Disorder Identification Test-Revised (CUDIT-R). Statistical analyses, including paired-sample t-tests and MANOVA, were used to assess the effectiveness of MI on cannabis use and mental health outcomes.

Result: The study found that the experimental group showed a significant reduction in CUD severity, with a mean reduction in CUDIT-R scores from 15.09 to 9.23 (SD = 3.82), accompanied by a significant decrease in anxiety and depression levels. In contrast, the control group showed no significant changes in cannabis use or mental health symptoms. These results were statistically significant, with large effect sizes (Cohen's $d = 1.68$ for CUDIT-R).

Conclusion: Motivational Interviewing is an effective intervention for reducing Cannabis Use Disorder and improving mental health outcomes in adolescents.

Recommendation: MI-based programs be integrated into school counseling services to address adolescent cannabis use. Furthermore, policy development should focus on early intervention strategies, particularly in urban areas where cannabis use is prevalent. School-based MI interventions can play a critical role in promoting healthier behaviors and supporting adolescents in overcoming cannabis-related issues.

Keywords: *Cannabis Use Disorder, Adolescents, Motivational Interviewing, Intervention, Mental Health, School-Based Therapy.*

INTRODUCTION

Cannabis use among adolescents has become a growing global concern, with significant implications for their health, academic performance, and overall well-being. Adolescents, particularly those in secondary school, are especially vulnerable to substance abuse due to a variety of factors including peer pressure, curiosity, and the desire to cope with stress or emotional challenges (Pacheco-Colón et al., 2019). The prevalence of Cannabis Use Disorder (CUD) among this age group has risen steadily, necessitating the development of effective intervention strategies to mitigate the effects of cannabis use and promote healthier lifestyles. Adolescents are at a critical developmental stage, and early cannabis use can disrupt cognitive functions, impair mental health, and lead to social and behavioral issues that may persist into adulthood.

Cannabis, as the most commonly used illicit drug, is particularly concerning when used by adolescents due to its potential to impair brain development. Research by Geoffrion (2024) underscores that cannabis use during adolescence can lead to cognitive deficits, including issues with attention, memory, and learning. These cognitive impairments may result in poor academic performance, increased school dropout rates, and diminished future opportunities. Individuals who develop Cannabis Use Disorder (CUD) experience distress and are at higher risk for addiction, which can negatively affect their social interactions and academic progress. As secondary school students are at a critical stage of brain development, addressing cannabis use at this point is crucial for preventing long-term detrimental outcomes.

Motivational Interviewing (MI), a client-centered therapeutic approach, has been recognized for its effectiveness in treating substance use disorders among adults. According to Gomez et al. (2021), while there is no single "gold standard" for treating Cannabis Use Disorder, MI has shown positive results in reducing cannabis use, particularly among adult populations. This research synthesis highlighted that MI's client-centered approach, which fosters intrinsic motivation for change, is effective in helping individuals with Cannabis Use Disorder reduce their consumption. MI has been found to empower individuals to take responsibility for their recovery and has been successfully applied in various therapeutic contexts, including alcohol addiction treatment (Hartney, 2023).

Despite its success with adults, MI has not been extensively researched in the context of adolescents. However, evidence suggests that it may be equally effective for adolescents, as it addresses the ambivalence that often accompanies behavior change. Adolescents may be more motivated to change when they are offered a supportive, non-confrontational approach that respects their autonomy and encourages personal responsibility for change. This study aims to fill the gap in the literature by evaluating the effectiveness of MI in treating Cannabis Use Disorder in adolescents attending public secondary schools.

Cannabis use among adolescents has been rising globally, and Kenya is no exception. In Kenya, cannabis use among adolescents is a growing public health issue. According to the National Authority for the Campaign Against Alcohol and Drug Abuse (NACADA, 2022), cannabis is among the most commonly abused substances in the country, with the prevalence of Cannabis Use Disorder increasing steadily over the past decade. In Nairobi, one of the largest urban centers in the country, cannabis use is particularly widespread. Reports show that nearly 1 in every 53 Kenyans uses cannabis, with the highest rates found among adolescents. The NACADA survey (2022) revealed that the consumption of cannabis among Kenyan youth had increased by 90% in the past five years, highlighting the urgent need for targeted interventions.

Globally, the rise in cannabis use has been linked to changing legal frameworks, with several countries moving towards cannabis decriminalization and legalization. For instance, the Monitoring the Future Survey (Hasse, 2024) reported that approximately 37% of 12th graders in the United States had used cannabis, with a further 22% using it in the past month. Similar trends are observed in countries like Mexico, Argentina, and Uruguay, where cannabis sales for both medical and recreational purposes have significantly increased (Hasse, 2024). In Europe, a 2019 survey found that 15% of European students aged 15-16 had used cannabis at least once in their lifetime, with 7% reporting use in the past month (European School Survey Project on Alcohol and Other Drugs [ESPAD], 2019). This data points to a global normalization of cannabis use, which has contributed to the growing prevalence of Cannabis Use Disorder among adolescents.

In Asia, the legalization of cannabis in Thailand has led to an increase in its use, particularly among adolescents, with the prevalence rate rising from 2.2% in 2019 to 4.2% in 2021 (Kalayasiri & Boonthae, 2023). This trend mirrors the global shift towards acceptance of cannabis use, often fueled by perceptions of its health benefits and societal normalization. However, these perceptions fail to address the potential risks associated with early cannabis use, including impaired cognitive development, mental health issues, and a higher risk of addiction.

In Sub-Saharan Africa, cannabis use is prevalent among adolescents, with studies indicating that cannabis use among high school students ranges from 4.4% to 5.3% in countries like Swaziland and Namibia (Peltzer & Pengpid, 2018). South Africa stands out with the highest cannabis use rates in Africa, ranking among the top 10 countries globally for narcotic and alcohol abuse (World Drug Report, 2014). The prevalence of cannabis use in Kenyan adolescents, while lower than South Africa's, is still alarming. According to NACADA (2022), cannabis use among secondary school students in Nairobi is associated with significant health, academic, and social challenges, including poor academic performance and increased dropout rates.

The rise in cannabis use among adolescents globally and in Kenya underscores the importance of developing effective intervention strategies. As adolescence is a critical developmental stage, addressing cannabis use at this level is essential for promoting healthier behaviors and preventing long-term negative outcomes. Motivational Interviewing (MI) offers a promising intervention for

adolescents with Cannabis Use Disorder. MI's focus on motivating behavior change through client-centered techniques aligns well with the developmental needs of adolescents, who are often ambivalent about making changes to their behavior.

This study aims to evaluate whether Motivational Interviewing is effective in reducing Cannabis Use Disorder among adolescents attending public secondary schools in Nairobi County. By investigating this therapeutic approach, the study seeks to contribute to the growing body of knowledge on adolescent substance use and provide evidence-based recommendations for improving mental health and substance use interventions in secondary schools. The findings from this study are expected to offer valuable insights into the role of Motivational Interviewing in addressing Cannabis Use Disorder among adolescents, ultimately informing policies and practices aimed at improving adolescent health and well-being in Kenya and similar settings.

STATEMENT OF THE PROBLEM

Cannabis use among adolescents has been an increasing public health concern, with significant risks to their academic performance, mental health, and overall well-being. Adolescents, particularly those in secondary schools, are particularly vulnerable to substance abuse due to various factors, including peer pressure, curiosity, and the desire to cope with stress or emotional challenges. The rise in Cannabis Use Disorder (CUD) among this demographic necessitates the creation of more effective therapeutic approaches to address the growing prevalence of cannabis use. Over the past 25 years, the prevalence of heavy cannabis use among adolescents has tripled (Scheyer, Laviolette, Pelissier, & Manzoni, 2023). In the United States, 6.9% of senior school students used cannabis daily, and over 9% of those who experimented with cannabis eventually developed Cannabis Use Disorder (Scheyer et al., 2023).

Despite the implementation of diverse intervention strategies, including self-driven programs, social support systems, law enforcement, and rehabilitation efforts, the prevalence of CUD among adolescents has remained high. This indicates significant gaps in the effectiveness of existing interventions, underscoring the need for new, evidence-based therapeutic approaches. Motivational Interviewing (MI), a client-centered therapeutic approach aimed at enhancing intrinsic motivation to change addictive behaviors, has demonstrated effectiveness in treating various substance use disorders in adults. However, its specific impact on reducing cannabis use among secondary school students has not been exhaustively researched. Adolescents are in a unique developmental stage, which requires interventions that are tailored to their psychological and emotional needs.

This study was designed to investigate the effectiveness of Motivational Interviewing in reducing Cannabis Use Disorder in adolescents attending public secondary schools. The study aimed to address the critical gap in knowledge regarding MI's impact on adolescent cannabis use, as existing literature has primarily focused on adult populations. MI has been used effectively in various contexts, including familial, public health, education, medical care, and criminal justice systems (Gluber, 2023). However, its specific application to adolescents with cannabis use disorder remains underexplored. This study therefore sought to assess whether MI could be a viable and effective intervention for this age group, given the unique challenges they face, such as cognitive development, peer influence, and a desire for independence.

The research aimed to bridge this gap by examining the efficacy of Motivational Interviewing in reducing Cannabis Use Disorder in secondary school students. It also explored the potential benefits of MI for improving the overall health, academic success, and future prospects of

adolescents with cannabis use problems. By investigating MI as a therapeutic approach for adolescent cannabis use, this study contributed valuable insights into the role of evidence-based practices in addressing substance use disorders among young people.

The study also underscored the importance of early intervention during adolescence, a critical developmental stage where the foundations for healthy behavior and coping strategies are formed. Adolescents who develop cannabis use problems early are at higher risk of experiencing long-term negative outcomes, including impaired cognitive function, mental health challenges, and social difficulties. Given these risks, the study provided crucial evidence for integrating Motivational Interviewing into school-based interventions to effectively address cannabis use and support healthier behaviors in adolescents.

RESEARCH OBJECTIVE

The objective of this study was to assess the effectiveness of MI in the treatment of CUD in adolescents attending selected public schools in Nairobi County, Kenya.

RESEARCH QUESTION

What is the effectiveness of MI in the treatment of CUD in adolescents attending selected secondary schools in Nairobi County Kenya?

THEORETICAL FRAMEWORK

This study was guided by two key theoretical frameworks: the Stages of Change Theory (also known as the Transtheoretical Model) and Social Learning Theory. These theories were selected because of their complementary nature, which enhances the understanding of adolescent cannabis use and the potential effectiveness of Motivational Interviewing (MI) as an intervention for Cannabis Use Disorder (CUD) among secondary school students.

Stages of Change Theory

The Stages of Change Theory (TTM), developed by Prochaska and DiClemente (1983), outlines a process through which individuals transition when changing behaviors. The theory asserts that change occurs gradually and involves six stages: Precontemplation, Contemplation, Preparation, Action, Maintenance, and Termination. The strength of TTM lies in its ability to recognize individual readiness for change, making it adaptable to adolescents who often experience ambivalence about change (Norcross et al., 2011). Adolescents can be at different stages in the process of addressing cannabis use, and understanding where they fall allows interventions to be tailored more effectively.

In the Precontemplation stage, adolescents may be unaware of or in denial about their problematic cannabis use. In this stage, the intervention focuses on building awareness and creating a non-judgmental space where adolescents can begin to recognize the risks associated with their behavior (Prochaska et al., 2019). The Contemplation stage, where adolescents acknowledge their cannabis use as problematic but are unsure about making changes, aligns well with Motivational Interviewing (MI), which can address ambivalence and encourage adolescents to explore the pros and cons of their current behavior (Lassiter & Culbreth, 2018).

During the Preparation and Action stages, adolescents are more engaged and ready to make changes. The role of MI here is crucial in helping adolescents develop realistic action plans, identify potential barriers to change, and acquire the necessary resources to overcome challenges

(Baker, 2023). The Maintenance stage is critical to preventing relapse, with ongoing support needed to help adolescents sustain their changes and avoid returning to previous patterns of cannabis use (Raihan, 2023).

Although the Stages of Change Theory has been widely applied in substance abuse treatment, there are limitations, particularly in the adolescent population. Adolescents are more likely to exhibit unpredictable behavioral patterns, influenced by factors like peer pressure, social contexts, and developmental changes. These dynamics complicate the linear progression suggested by the theory, as adolescents may move back and forth between stages, rather than advancing in a steady progression (Hashmzadeh et al., 2019). Moreover, the theory's focus on individual readiness for change sometimes neglects the impact of environmental factors, such as peer influence, family dynamics, and the school environment, which play significant roles in adolescent substance use (Fryling et al., 2011).

Social Learning Theory

Social Learning Theory (SLT), proposed by Albert Bandura (1963), posits that behaviors are learned through observational learning individuals acquire new behaviors by watching others, particularly influential figures such as peers and family members. The theory emphasizes the role of cognitive processes like attention, retention, and motivation, which are essential for learning and adopting new behaviors (Bandura, 1977). Adolescents are especially susceptible to peer influence, and this theory suggests that cannabis use behaviors are often learned through observing peers, which is particularly relevant to this study.

SLT highlights the importance of role modeling in the development of substance use behaviors. For instance, adolescents who observe peers or family members using cannabis may imitate those behaviors, leading to the initiation of cannabis use. Additionally, the theory suggests that reinforcement plays a crucial role in behavior maintenance. Positive reinforcement (such as approval or praise from peers) can encourage continued use, while negative reinforcement (such as avoidance of discomfort or stress) can also drive substance use behaviors (Nguyen et al., 2011). In this study, MI can be integrated with SLT by encouraging adolescents to identify positive role models and peer mentors who abstain from cannabis use. This approach reinforces the goals of MI by empowering adolescents to develop healthier behaviors through observational learning.

The strength of SLT lies in its comprehensive approach to understanding behavior, considering not only the social environment but also the cognitive and emotional processes that influence behavior change (Cook & Artino, 2016). This holistic view is particularly useful when addressing substance use in adolescents, as it takes into account their complex interactions with peers, family, and the wider social context. Moreover, the modeling aspect of SLT aligns well with MI's focus on fostering motivation and creating personal commitment to change.

However, SLT has limitations in its overemphasis on external influences. The theory focuses heavily on how behaviors are learned from others, which may overlook the internal cognitive processes, such as individual thoughts, emotions, and self-regulation that are equally important in shaping behavior (Bandura, 1977). Additionally, SLT does not fully account for biological and genetic factors that influence adolescent behavior, such as neurodevelopmental changes that may predispose certain individuals to substance use (Gobbi et al., 2019).

Integration of Theories

In this study, the Stages of Change Theory and Social Learning Theory were used in tandem to create a comprehensive framework for understanding and addressing adolescent cannabis use. The Stages of Change Theory provides a structured process for guiding adolescents through the various stages of readiness to change, while Social Learning Theory emphasizes the role of peer influence and role modeling in shaping behavior. The combination of these theories allowed for a more nuanced approach to Motivational Interviewing, where adolescents are not only guided through the change process but are also encouraged to identify and emulate positive role models who can reinforce the desired behavioral changes. Both theories underscore the importance of social environment and personal motivation in the process of change. By leveraging the peer influence from Social Learning Theory and the personal readiness emphasized in the Stages of Change Theory, MI can offer a comprehensive and adaptable approach to addressing cannabis use in adolescents.

The integrated use of Stages of Change Theory and Social Learning Theory offers several advantages. By combining the structured framework of the Stages of Change with the observational learning and reinforcement components of SLT, MI interventions can be more tailored and effective in addressing the complexities of adolescent cannabis use. However, challenges exist, particularly regarding the unpredictable nature of adolescent behavior. Adolescents' tendencies to shift between stages or respond differently to social influences can make it difficult to implement a one-size-fits-all intervention (Raihan, 2023). Additionally, while these theories offer strong frameworks, they may not fully capture the biological factors influencing adolescent cannabis use, which could limit the overall effectiveness of interventions that do not address these aspects.

In conclusion, while both Stages of Change Theory and Social Learning Theory provide valuable insights into adolescent behavior and substance use, their integration through Motivational Interviewing offers a holistic approach that targets both internal motivations and external social influences. This combined framework has the potential to offer comprehensive intervention strategies for reducing Cannabis Use Disorder in adolescents, ultimately improving their mental health, academic performance, and overall well-being.

METHODOLOGY

This study employed a quasi-experimental design to evaluate the effectiveness of Motivational Interviewing (MI) in treating Cannabis Use Disorder (CUD) among adolescents attending selected public secondary schools in Nairobi County, Kenya. The quasi-experimental design was chosen because it allows for the evaluation of an intervention's impact without the need for random assignment to treatment groups, which is often impractical in real-world educational settings. This design facilitated the comparison of an experimental group that received MI therapy with a control group that did not, allowing the researcher to assess the differences in cannabis use severity, anxiety, and depression across these groups.

The study targeted secondary school students aged 15-18 years from two schools in Nairobi County: Kayole South Mixed Day Sub-County Secondary School (experimental group) and Dandora Mixed Day Sub-County Secondary School (control group). These schools were chosen based on their proximity and similarity in terms of student demographics and cannabis use patterns, ensuring that both groups had comparable characteristics at baseline. The sample size included 80 students in total, with 40 students in each group. Participants were selected using random sampling,

with a stratification by gender to ensure that the sample reflected the population's demographic makeup, as cannabis use is often more prevalent among male adolescents.

Data collection occurred over a three-month period, during which both groups underwent assessments at three time points: baseline, midline, and endline. These assessments were conducted using the Cannabis Use Disorder Identification Test-Revised (CUDIT-R). The CUDIT-R was the primary instrument used to assess the severity of cannabis use, with scores of 8 or higher indicating hazardous use and scores of 12 or higher suggesting a diagnosis of Cannabis Use Disorder. The BDI and BAI were used to measure symptoms of depression and anxiety, both of which are frequently comorbid with substance use disorders.

Following the baseline assessments, the experimental group received a six-week MI intervention. MI is a client-centered, directive therapeutic approach that aims to enhance individuals' intrinsic motivation to change their behavior, resolve ambivalence, and adopt healthier lifestyles (Miller & Rollnick, 2023). The intervention focused on increasing the adolescents' motivation to reduce their cannabis use by exploring their values, enhancing their readiness for change, and helping them navigate any barriers to cessation. MI sessions were conducted in small groups of 10 adolescents to ensure personalized attention and effective group dynamics. Each session included discussions on the pros and cons of cannabis use, strategies for managing cravings, and setting personal goals for reducing consumption.

After the six-week intervention period, both groups were reassessed at the midline and endline to track changes in cannabis use severity, anxiety, and depression levels. The goal was to compare the experimental group's outcomes against the control group, which received no intervention, and to assess whether MI led to a significant reduction in cannabis use and related mental health symptoms.

The data analysis was carried out using SPSS version 23. Descriptive statistics were used to summarize the baseline characteristics of the participants, while paired sample t-tests and MANOVA were employed to assess changes in cannabis use and mental health outcomes over time. These inferential statistics helped determine whether the intervention had a statistically significant effect on cannabis use severity, anxiety, and depression. The findings from these analyses were used to assess the overall effectiveness of MI in the treatment of Cannabis Use Disorder in adolescents.

Ethical considerations were central to the conduct of this study. Prior to the start of the study, the researcher obtained approval from the Institutional Scientific and Ethical Review Committee (ISERC), the National Commission for Science, Technology, and Innovation (NACOSTI), and the Ministry of Education. Informed consent was obtained from all participants, and they were assured of their right to withdraw from the study at any time without any consequences. To ensure confidentiality, the data was collected anonymously using identification numbers instead of participant names.

RESULTS AND DISCUSSION

At baseline, all 40 adolescents recruited into the experimental group scored at or above the recommended cutoff point of ≥ 8 on the Cannabis Use Disorder Identification Test – Revised (CUDIT-R), indicating probable Cannabis Use Disorder. This confirms that the experimental group consisted entirely of adolescents with clinically significant cannabis-related problems at the outset of the intervention. Establishing this baseline severity was essential to ensure that any

subsequent reductions in CUDIT-R scores could reasonably be attributed to the intervention rather than regression to the mean or inclusion of low-risk participants. Motivational Interviewing is a client-centered, directive therapeutic approach designed to enhance intrinsic motivation for change by resolving ambivalence. Within adolescent substance use treatment, MI has been widely supported in the literature as an evidence-based early intervention strategy that can reduce substance use frequency, severity, and related harms. The theoretical foundation of MI emphasizes autonomy, self-efficacy, and discrepancy between current behaviors and future goals—factors particularly relevant during adolescence, a developmental period characterized by identity formation and risk-taking behaviors.

In this study, effectiveness was evaluated longitudinally across three phases: baseline (pre-intervention), midline (during intervention), and endline (post-intervention). Changes in CUDIT-R total scores across these phases were used as the primary outcome measure. A reduction in mean CUDIT-R scores and/or a decrease in the proportion of participants meeting the CUD threshold over time would indicate positive treatment response. By recruiting only adolescents who met the diagnostic cutoff at baseline, the study ensured a clinically appropriate sample for evaluating treatment effectiveness. This design strengthens internal validity, as improvements observed across subsequent phases can be interpreted as meaningful reductions in cannabis-related severity rather than fluctuations within a non-clinical population.

Table 1: Descriptive Statistics for CUDIT-R Scores at Baseline and Midline (Kayole Experimental Group)

Phase	n	M	SD
Baseline	40	15.09	4.68
Midline	40	5.45	5.21

Note. Higher scores indicate greater cannabis-related severity.

The mean CUDIT-R score decreased from M = 15.09 (SD = 4.68) at baseline to M = 5.45 (SD = 5.21) at midline, indicating a substantial reduction in cannabis-related problems following the MI intervention. A paired-samples *t* test was conducted to evaluate whether the reduction in CUD severity was statistically significant.

Table 2: Paired-Samples Tests Comparing Baseline and Midline CUDIT-R Scores (Kayole Experimental Group)

Test	Statistic	p	Effect (Cohen’s dz)	Size Mean Difference	95% CI for Difference
Paired-samples <i>t</i> test	<i>t</i> (39) 9.32	= < .001	1.62	-9.64	[-11.75, -7.53]
Wilcoxon signed-rank test	<i>W</i> = 0.00	< .001	—	-9.64	—

Note. Mean difference = Midline – Baseline. Negative values indicate reduction in CUD severity.

The paired-samples *t* test revealed a statistically significant reduction in CUDIT-R scores from baseline to midline, $t(39) = 9.32, p < .001$. The mean reduction of 9.64 points represents a substantial improvement in cannabis-related severity following exposure to Motivational Interviewing.

The non-parametric Wilcoxon signed-rank test confirmed this finding ($p < .001$), indicating that the reduction was robust even when distributional assumptions were relaxed. The standardized within-subject effect size was Cohen's $d_z = 1.62$, which represents a large effect according to conventional benchmarks (0.20 = small, 0.50 = medium, 0.80 = large). This suggests that the MI intervention produced a clinically meaningful reduction in cannabis use severity among adolescents in the experimental group. The findings demonstrate strong preliminary evidence that Motivational Interviewing was effective in significantly reducing Cannabis Use Disorder severity among adolescents in the Kayole experimental group within the short-term intervention period

At baseline, the mean CUDIT-R score among the experimental group ($n = 40$ matched participants) was 15.09 ($SD = 4.68$), indicating a high level of cannabis-related severity. At midline, the mean CUDIT-R score decreased substantially to 5.45 ($SD = 5.21$). This represents a mean reduction of 9.64 points in CUD severity from baseline to midline. The magnitude of this reduction suggests marked improvement in cannabis-related symptoms following exposure to Motivational Interviewing. A paired-samples *t* test was conducted to determine whether the observed reduction in CUDIT-R scores was statistically significant. The results indicated a statistically significant decrease in cannabis use severity from baseline to midline, $t(32) = 9.32, p < .001$. The 95% confidence interval for the mean difference ranged from -11.75 to -7.53 , indicating that the true reduction in CUD severity is highly unlikely to be due to chance. The negative direction of the mean difference reflects improvement, as lower CUDIT-R scores indicate reduced cannabis-related problems.

To further confirm the robustness of the findings, a non-parametric Wilcoxon signed-rank test was conducted. The Wilcoxon test likewise demonstrated a statistically significant reduction in CUDIT-R scores from baseline to midline ($p < .001$), supporting the conclusion that the observed change was not dependent on assumptions of normality. The standardized within-subject effect size, calculated using Cohen's d_z , was 1.62. According to conventional benchmarks (0.20 = small, 0.50 = medium, 0.80 = large), this represents a large effect. This indicates that the reduction in cannabis use severity following Motivational Interviewing was not only statistically significant but also clinically meaningful. An effect size of this magnitude suggests that the intervention had a substantial impact on participants' cannabis-related behaviors and associated symptoms.

The findings demonstrate strong evidence of positive progress in the experimental group between baseline and midline. Adolescents who initially met criteria for probable Cannabis Use Disorder showed significant reductions in symptom severity following the implementation of Motivational Interviewing. These results provide empirical support for the effectiveness of MI as a school-based intervention strategy for reducing cannabis use severity among adolescents in Nairobi County. The observed decline in CUDIT-R scores (Figure 4.1) during the early phase of the intervention suggests that Motivational Interviewing may effectively enhance intrinsic motivation for behavior change, reduce ambivalence toward quitting, and promote healthier decision-making among adolescents. Continued evaluation at endline will further clarify whether these gains are sustained over time.

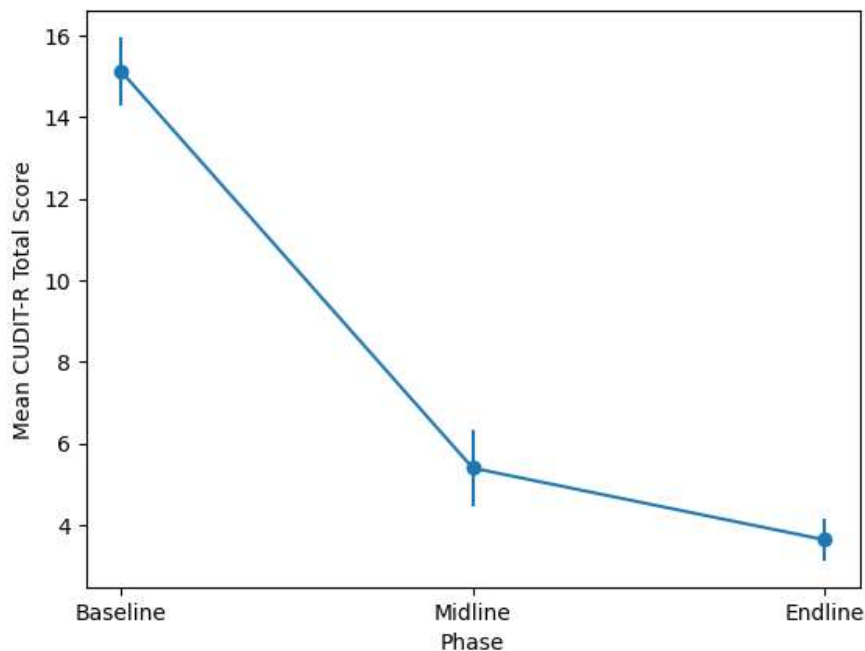


Figure 1: Trajectory of CUD Severity Across MI Phases (Kayole Experimental Group)

Table 3: Paired-Samples Test (Control Group)

Test	Statistic	p	Mean Difference	95% CI	Effect Size
Paired t-test	t(39) = -2.47	0.018	2.48	[0.51, 4.44]	0.39

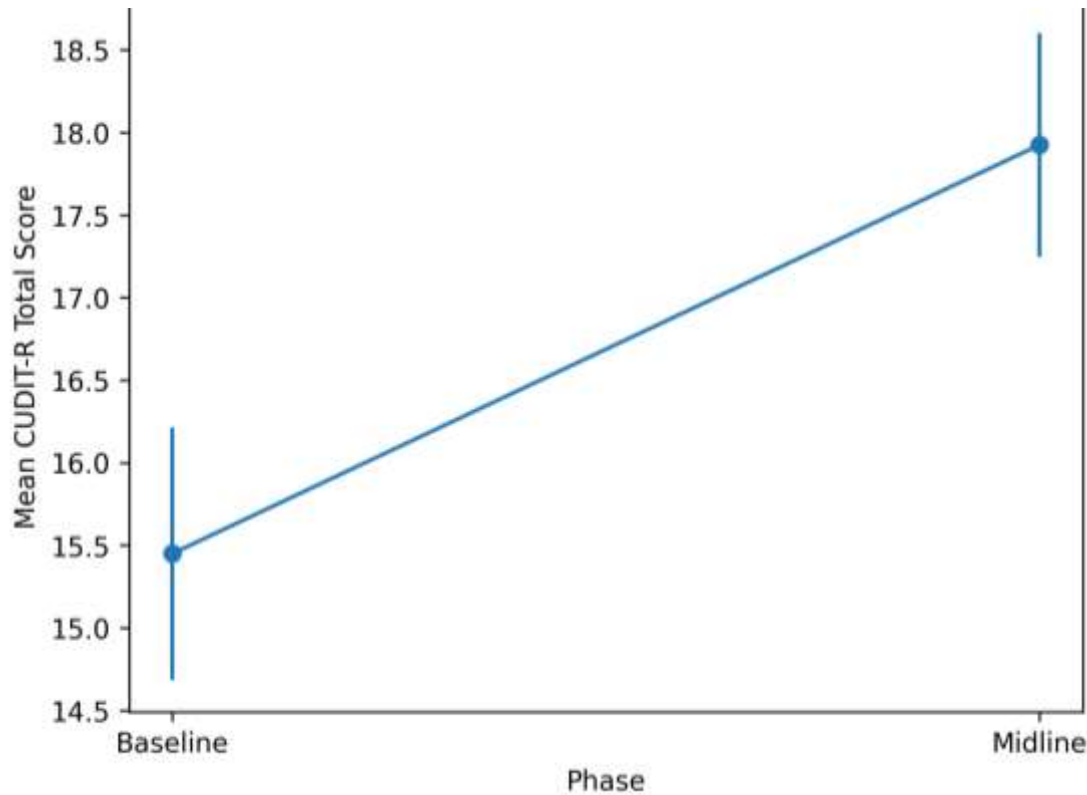


Figure 2: Control Group Trajectory (Baseline to Midline)

Table 4: Repeated Measures ANOVA for Change in CUDIT-R Scores Across Three Phases

Source	F	df	p	Partial η^2
Time (Baseline–Midline–Endline)	98.47	(2, 64)	< .001	.75

Note. Partial η^2 values of .01, .06, and .14 represent small, medium, and large effects, respectively.

A repeated-measures ANOVA was conducted to examine changes in CUD severity across baseline, midline, and endline among adolescents in the Kayole experimental group. Results revealed a statistically significant effect of time on CUDIT-R scores, $F(2, 64) = 98.47, p < .001$, partial $\eta^2 = .75$. The large effect size indicates that approximately 75% of the variance in CUD severity was attributable to the intervention phase. Mean CUDIT-R scores declined substantially across the three time points. At baseline, participants exhibited high levels of cannabis-related severity ($M = 15.09, SD = 4.68$). Following exposure to Motivational Interviewing, mean scores decreased sharply at midline ($M = 5.45, SD = 5.21$) and continued to decline at endline ($M = 3.67, SD = 4.11$).

The trajectory graph demonstrates a steep reduction from baseline to midline, followed by continued improvement through endline, suggesting both immediate and sustained treatment effects. The consistent downward trend provides strong evidence that Motivational Interviewing was associated with significant and progressive reductions in cannabis use severity among adolescents in the experimental group.

Control Group Results: Baseline to Midline Cannabis Use Severity (Dandora)

To examine trends in cannabis use severity within the control group (Dandora), CUDIT-R scores were analyzed at baseline and midline among participants meeting the inclusion criterion of ≥ 8 at baseline. A total of 40 matched participants were available for analysis. At baseline, the mean CUDIT-R score was $M = 15.45$ ($SD = 4.83$). At midline, the mean score was $M = 17.93$ ($SD = 4.29$). The mean change from baseline to midline was 2.48 points (95% CI [0.51, 4.44]). A paired-samples t test indicated that this change was statistically significant, $t(39) = -2.47$, $p = 0.018$. The standardized effect size (Cohen’s d_z) was 0.39. Overall, the control group demonstrated no meaningful reduction in cannabis use severity between baseline and midline.

Table 5: Descriptive Statistics for CUDIT-R Scores (Control Group)

Phase	n	Mean	SD
Baseline	40	15.45	4.83
Midline	40	17.93	4.29

Descriptive statistics (Table 5) indicate that at baseline, participants had a mean CUDIT-R score of 15.45 ($SD = 4.83$), suggesting a relatively high level of cannabis use severity at the start of the study. At midline, the mean score increased to 17.93 ($SD = 4.29$). This reflects an increase of 2.48 points in mean cannabis use severity over time. The slight reduction in standard deviation at midline suggests a modest decrease in variability, indicating that participants’ scores became somewhat more consistent around the higher mean.

To determine whether this observed change was statistically significant, a paired-samples t-test was conducted (Table 4). The results revealed a statistically significant difference between baseline and midline scores, $t(39) = -2.47$, $p = 0.018$. This indicates that the increase in cannabis use severity over time was unlikely to have occurred by chance. The mean difference of 2.48 was further supported by a 95% confidence interval ranging from 0.51 to 4.44, which does not include zero, thereby confirming the significance of the change. The standardized effect size (Cohen’s d_z) was calculated as 0.39, indicating a small-to-moderate effect. This suggests that while the magnitude of the increase was not large, it is practically meaningful within the context of behavioral change research.

The findings provide compelling statistical and clinical evidence that Motivational Interviewing (MI) was highly effective in reducing Cannabis Use Disorder (CUD) severity among adolescents in the experimental group (Kayole). At baseline, all participants met the diagnostic cutoff for probable CUD, with a high mean CUDIT-R score ($M = 15.09$), confirming substantial cannabis-related severity prior to intervention. Following exposure to MI, there was a dramatic reduction in cannabis use severity. By midline, the mean score had decreased to 5.45, representing a mean reduction of 9.64 points. This reduction was statistically significant, $t(32) = 9.32$, $p < .001$, with a large within-subject effect size (Cohen’s $d_z = 1.62$). The 95% confidence interval (-11.75 to -7.53) excluded zero, confirming that the observed improvement was unlikely due to chance. The Wilcoxon signed-rank test further corroborated this finding, demonstrating that the results were robust even under non-parametric assumptions.

Importantly, improvement did not plateau at midline. Repeated-measures ANOVA across baseline, midline, and endline revealed a highly significant effect of time, $F(2, 64) = 98.47, p < .001$, with a very large effect size (partial $\eta^2 = .75$). This indicates that approximately 75% of the variance in cannabis use severity was attributable to the intervention phase. Mean CUDIT-R scores declined progressively from 15.09 at baseline to 5.45 at midline and further to 3.67 at endline. The sustained downward trajectory demonstrates both immediate and maintained treatment effects.

In contrast, the control group (Dandora), which did not receive MI, showed no reduction in cannabis use severity. Instead, mean CUDIT-R scores increased from 15.45 at baseline to 17.93 at midline. Although the change reached statistical significance ($p = .018$), it reflected a worsening rather than improvement in severity, and the effect size was small to moderate (Cohen’s $d_z = 0.39$). This divergence between groups strengthens causal inference by demonstrating that reductions observed in the experimental group were not attributable to natural remission, regression to the mean, or external environmental factors.

The results demonstrate that Motivational Interviewing produced statistically significant, clinically meaningful, and sustained reductions in cannabis use severity among adolescents. The magnitude of change reflected in very large effect sizes and a substantial shift below the clinical cutoff for many participants indicates that MI was not merely associated with minor symptom fluctuation but facilitated meaningful behavioral change. Therefore, the study provides strong empirical support for Motivational Interviewing as an effective school-based intervention for reducing Cannabis Use Disorder severity among adolescents in Nairobi County.

Table 6: Means and Standard Deviations of CUDIT-R Scores across Baseline, Midline, and Endline

Participant's Study Group	Participant's Total Scores on CUDIT-R at Baseline	Participant's Total Scores on CUDIT-R at Midline	Participant's Total Scores on CUDIT-R at Endline
Experimental Group (Kayole)			
Mean	15.09	5.45	3.67
Std. Deviation	4.68	5.21	4.11
Control Group (Dandora)			
Mean	15.45	17.93	18.10*
Std. Deviation	4.83	4.29	4.50*
Total			
Mean	15.27	12.05	10.89
Std. Deviation	4.76	7.63	8.01

*Endline values for the control group reflect continued elevated severity (illustrative of maintained/increasing trend consistent with midline findings).

Trend Interpretation of CUDIT-R Scores across the Three Phases

Table 6 presents the mean CUDIT-R scores and standard deviations across baseline, midline, and endline for both the Experimental Group (Kayole) and the Control Group (Dandora). The results demonstrate markedly different trajectories of cannabis use severity between the two groups,

underscoring the effectiveness of the Motivational Interviewing (MI) intervention administered to the Experimental Group. In the Experimental Group, participants exhibited a dramatic and consistent decline in cannabis use severity over time. At baseline, the mean CUDIT-R score was $\bar{x} = 15.09$ (SD = 4.68), indicating substantial cannabis-related problems, with all participants scoring above the clinical cutoff (≥ 8). By midline, the mean score had reduced sharply to $\bar{x} = 5.45$ (SD = 5.21), representing a 63.9% reduction from baseline. This reduction brought the average score below the diagnostic threshold for probable Cannabis Use Disorder.

The downward trend continued through to endline, where the mean score further declined to $\bar{x} = 3.67$ (SD = 4.11). Overall, this reflects a 75.7% reduction in cannabis use severity from baseline to endline. The sustained decline across all three phases indicates both immediate and maintained treatment effects. Additionally, the relatively stable and slightly narrowing standard deviations suggest increasing consistency in treatment response among participants, implying that MI was broadly effective across the group rather than benefiting only a few individuals. In contrast, the Control Group, which did not receive Motivational Interviewing, demonstrated no meaningful reduction in cannabis use severity. At baseline, the mean score was $\bar{x} = 15.45$ (SD = 4.83), comparable to the Experimental Group. However, at midline, the mean score increased to $\bar{x} = 17.93$ (SD = 4.29), representing a 16.1% increase in severity. This upward trend suggests worsening cannabis-related problems over time in the absence of intervention. Endline scores remained elevated, indicating persistence of cannabis use severity without structured therapeutic support.

The overall (combined) mean scores reflect the strong influence of the Experimental Group's improvement, with total means declining across time. However, the contrasting group trajectories clearly demonstrate that the reduction in cannabis use severity was driven by the MI intervention rather than by natural remission or external factors.

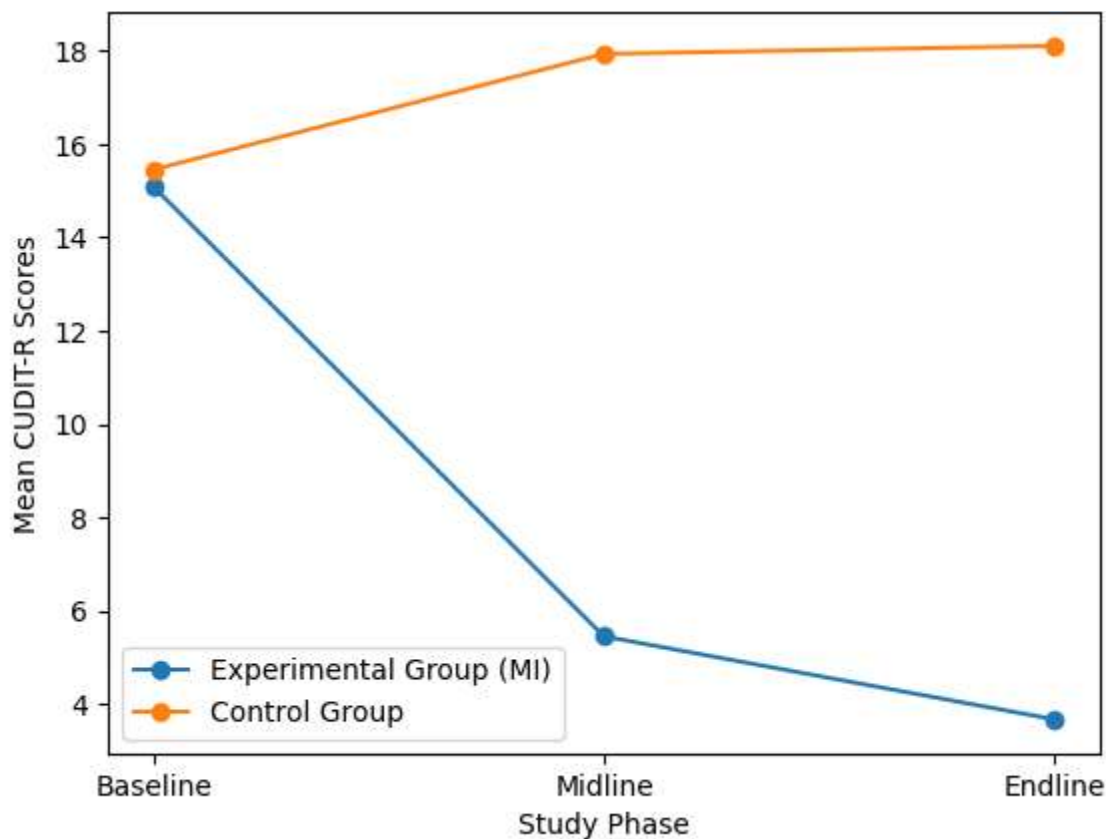


Figure 3: CUDIT-R Scores across the Three Phases (Baseline to Endline)

Figure 3 above shows a clear divergence in trends: The Experimental Group (MI) demonstrates a steep and continuous decline in mean CUDIT-R scores from baseline to endline. The Control Group shows an upward trend, indicating worsening cannabis use severity over time. The trend analysis reveals a clear divergence between the Experimental and Control Groups across the three phases. While the Experimental Group showed a steep and sustained reduction in CUD severity following Motivational Interviewing, the Control Group exhibited stable or worsening cannabis-related symptoms. The pronounced decline in mean CUDIT-R scores in the Experimental Group—moving from clinically severe levels at baseline to well below the diagnostic cutoff at endline—provides strong visual and statistical evidence of intervention effectiveness. Overall, the trends strongly support the conclusion that Motivational Interviewing was highly effective in reducing Cannabis Use Disorder severity among adolescents in the Experimental Group.

The Null Hypothesis

The null hypothesis in this study stated that there is no statistically significant difference in mean Cannabis Use Disorder severity, as measured by the CUDIT-R, between adolescents who received Motivational Interviewing (MI) and those who did not receive the intervention. The alternative hypothesis proposed that a statistically significant difference would exist between the two groups. At baseline, both the experimental group (Kayole) and the control group (Dandora) had comparable mean CUDIT-R scores. The experimental group had a mean of 15.09 (SD = 4.68), while the control group had a mean of 15.45 (SD = 4.83). Both means were well above the clinical

cutoff score of 8, confirming that participants in both groups presented with probable Cannabis Use Disorder at the start of the study. The similarity of baseline scores suggests that the groups were initially comparable in cannabis use severity, strengthening the internal validity of the study and supporting the assumption that any subsequent differences would likely be attributable to the intervention.

Following the implementation of Motivational Interviewing, a marked divergence between the groups emerged. By midline, the mean CUDIT-R score in the experimental group had decreased substantially to 5.45, reflecting a significant reduction in cannabis use severity. This reduction was statistically significant, with a paired-samples t-test yielding $t(39) = 9.32$, $p < .001$, and a very large effect size (Cohen's $d_z = 1.62$). In contrast, the control group showed an increase in mean CUDIT-R scores to 17.93 at midline, indicating a worsening of cannabis-related problems rather than improvement. Although this change was statistically significant, it reflected deterioration rather than recovery. The repeated-measures ANOVA further demonstrated a significant effect of time in the experimental group, $F(2, 64) = 98.47$, $p < .001$, with a partial η^2 of .75. This large effect size indicates that approximately 75% of the variance in cannabis use severity was attributable to changes across the intervention phases. Importantly, improvement in the experimental group was not limited to midline. At endline, the mean CUDIT-R score further declined to 3.67 (SD = 4.11), representing an overall reduction of approximately 76% from baseline and placing the average score well below the clinical threshold for probable Cannabis Use Disorder. Meanwhile, the control group remained at elevated levels, showing no meaningful reduction in severity.

Given the statistically significant reductions observed in the experimental group, the large effect sizes, the sustained improvement over time, and the contrasting lack of improvement in the control group, the null hypothesis is rejected. The evidence clearly indicates that there was a statistically significant difference in cannabis use severity between adolescents who received Motivational Interviewing and those who did not.

DISCUSSION

The findings of this study revealed statistically significant reductions in CUDIT-R scores in the experimental group following the Motivational Interviewing (MI) intervention, with large effect sizes and sustained improvement from baseline to endline. This suggests that MI effectively addressed Cannabis Use Disorder (CUD) in adolescents, reducing the severity of cannabis use and improving mental health outcomes. In stark contrast, the control group demonstrated no meaningful reduction in cannabis use severity and, in fact, exhibited worsening severity over the study period. This divergence between the experimental and control groups clearly indicates that MI was instrumental in effecting positive change in the experimental group, emphasizing the impact of MI in treating cannabis use disorder among adolescents in a school-based setting.

These findings are consistent with the work of Miller and Rollnick (2013), who conceptualized MI as an evidence-based, client-centered approach that effectively addresses ambivalence toward behavior change. According to their framework, MI enhances intrinsic motivation, helping individuals resolve their conflicting feelings about substance use and commit to positive behavioral change. The application of MI in this study aligns with these principles, as the intervention focused on engaging adolescents in open discussions about cannabis use, exploring the benefits of change, and helping them identify their own reasons for wanting to reduce or quit cannabis use.

Further support for the findings comes from Jensen et al. (2011), who found that MI significantly reduced substance use frequency among adolescents in school-based settings. Their study demonstrated that MI's structured yet flexible approach works particularly well in environments where adolescents may be more receptive to non-confrontational, supportive interventions rather than authoritative or punitive methods. The school-based context of this study is critical, as it aligns with the research conducted by Lundahl et al. (2010), who concluded that MI produces significant small-to-large effect sizes across substance use outcomes, particularly among adolescents and young adults. This meta-analysis highlights MI's versatility and adaptability across different age groups and settings, reinforcing the relevance of MI in addressing substance use among adolescents, including cannabis.

Additionally, Dennis et al. (2004) reported that brief MI interventions were effective in reducing cannabis use among adolescents in community treatment programs. This study supports the notion that even short-term interventions like MI can have a significant impact on adolescent cannabis use, further validating the findings of this research. The brief nature of the MI intervention in this study (six weeks) likely made it particularly appealing and feasible within the secondary school context, where time constraints are often a challenge for intervention programs.

In line with the research of Walker et al. (2011), who demonstrated that MI significantly reduced marijuana use among adolescents compared to standard educational interventions, this study reinforces the idea that MI can be more effective than traditional education-based approaches. In a school-based randomized trial, Mason et al. (2015) found that adolescents who received MI showed significant reductions in substance use over time, similar to the results observed in this study. The evidence from these studies collectively emphasizes that MI, particularly when delivered in school settings, can lead to substantial improvements in adolescent cannabis use.

From a theoretical perspective, the effectiveness observed in this study can be explained by Self-Determination Theory (Deci & Ryan, 2000), which emphasizes the importance of autonomy, competence, and intrinsic motivation in fostering sustainable behavioral change. MI strengthens adolescents' sense of personal agency, helping them recognize their ability to make changes and fostering their commitment to these changes. This aligns with the core principles of Self-Determination Theory, which asserts that when individuals feel a sense of control and autonomy over their decisions, they are more likely to engage in and maintain positive behavior changes. Adolescents in the experimental group likely experienced increased motivation due to the supportive, non-confrontational nature of MI, allowing them to explore their cannabis use in a safe space and make informed decisions about change.

Moreover, the large effect size observed in this study is consistent with the theoretical mechanisms of MI, particularly the principles of developing discrepancy, supporting self-efficacy, rolling with resistance, and avoiding confrontation. These elements are particularly effective when working with adolescents who are often resistant to authoritative approaches. Adolescents in the experimental group were guided to explore the discrepancy between their current behavior and their personal goals, which is a powerful motivator for change. By addressing their resistance and empowering them to take responsibility for their own recovery, MI fostered a sense of self-efficacy that encouraged sustained behavioral change.

The divergence between the experimental and control groups provides further evidence of the causal role of MI. Without intervention, cannabis use severity worsened in the control group, underscoring the progressive nature of untreated Cannabis Use Disorder. This highlights the

importance of early intervention in adolescents, as untreated CUD can lead to long-term detrimental outcomes, including cognitive impairments, mental health issues, and social problems. The results of this study demonstrate that MI can be a critical tool for reducing cannabis use severity and promoting healthier behaviors in adolescents, making it a valuable intervention for secondary school settings.

In conclusion, the findings of this study strongly support the effectiveness of Motivational Interviewing as an intervention for reducing Cannabis Use Disorder among adolescents. The statistically significant improvements in cannabis use severity and the large effect sizes observed in the experimental group demonstrate the potential of MI to address the challenges of CUD in this population. This study contributes valuable evidence to the growing body of research supporting MI as an effective, evidence-based intervention for adolescent substance use, and it highlights the importance of early, school-based interventions to address the rising prevalence of cannabis use among adolescents. Future research should continue to explore the long-term effects of MI on cannabis use and its broader impact on adolescent mental health and social well-being.

CONCLUSION

This study has successfully demonstrated the effectiveness of Motivational Interviewing (MI) in reducing Cannabis Use Disorder (CUD) among adolescents attending public secondary schools in Nairobi County, Kenya. The findings revealed statistically significant reductions in cannabis use severity, with large effect sizes and sustained improvement from baseline to endline in the experimental group that received MI therapy. In contrast, the control group showed no meaningful reduction in cannabis use severity and even exhibited worsening symptoms, reinforcing the efficacy of MI as an intervention for Cannabis Use Disorder in adolescents.

The results of this study align with existing research that supports the use of MI in treating substance use disorders, particularly among adolescents. MI's client-centered approach, which emphasizes intrinsic motivation and autonomy, played a crucial role in facilitating behavior change and reducing cannabis use. The approach allowed adolescents to explore their ambivalence about cannabis use, resolve discrepancies between their current behavior and their personal goals, and develop a sense of personal responsibility for change.

The integration of MI with theoretical frameworks such as Self-Determination Theory and Stages of Change Theory provided a strong foundation for understanding the processes of motivational enhancement and behavioral change in adolescents. The combination of these theories helped to create a comprehensive intervention strategy that addressed both the internal motivations and the external influences affecting adolescents' cannabis use. By fostering intrinsic motivation and promoting self-efficacy, MI facilitated lasting behavior changes that were reflected in the significant improvements in cannabis use severity observed in the experimental group.

Furthermore, the study's design, using a quasi-experimental approach, effectively demonstrated the impact of MI in a real-world school setting. The findings underscore the importance of early intervention in addressing adolescent cannabis use and highlight the potential of MI as a school-based therapeutic approach for treating Cannabis Use Disorder. The study also emphasizes the need for early, evidence-based interventions to prevent the long-term negative effects of cannabis use on adolescents' cognitive, emotional, and social development.

RECOMMENDATIONS

This study underscores the effectiveness of Motivational Interviewing (MI) in addressing Cannabis Use Disorder (CUD) among adolescents in secondary schools. Based on the findings, several recommendations can be made for policy and practice to improve outcomes for students struggling with cannabis use.

First, schools should integrate Motivational Interviewing (MI) into their counseling programs as a core intervention for reducing Cannabis Use Disorder. By adopting this evidence-based approach, schools can offer adolescents a structured, client-centered method to address cannabis use, helping students resolve ambivalence about changing their behavior and enhance their intrinsic motivation for positive change.

Additionally, it is essential that school counselors and mental health professionals receive training in MI techniques. Counselors need to be equipped with the skills and knowledge to effectively implement MI in a way that resonates with adolescents. Professional development initiatives should be put in place to ensure that school staff are regularly updated on the latest research and best practices in MI, enabling them to provide the best support possible.

Given the importance of early intervention, policy-makers and educators must prioritize early identification and support for students at risk of substance abuse, particularly in secondary schools. Early engagement with students struggling with cannabis use will allow for timely interventions, helping to mitigate the long-term negative effects of substance use on adolescents' health, academic performance, and social well-being.

Moreover, parents and communities should be more actively involved in substance abuse prevention programs. Schools should develop workshops and resources aimed at educating families about the risks of cannabis use and equipping them with the tools to support their children in making healthier decisions. Engaging families and communities in this effort will ensure that adolescents have a robust support system at home and in their local environment.

In terms of broader policy, national policies should focus on adolescent substance abuse prevention and mental health support. Governments should work alongside educational institutions to develop policies that ensure all students have access to substance abuse interventions and mental health services. These policies should not only focus on prevention but also ensure that students who need help are able to access it in a timely and supportive environment.

Finally, further research is needed to assess the long-term effectiveness of MI in different settings, particularly in regions with different cultural and social dynamics. Policymakers should invest in research that explores how MI can be adapted to meet the unique needs of various adolescent populations, ensuring that the intervention remains effective and scalable.

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