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Patterns of Marijuana Use, Psychological Distress, and Suicide Risk among U.S. Adolescents: A Descriptive Cross-Sectional Analysis

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Abstract ***Background*** Adolescent marijuana use has risen sharply in the United States alongside increasing rates of psychological distress and suicide-related behaviors. Despite growing concern, few descriptive studies have mapped these relationships across use modalities and mental health indicators in nationally representative samples. ***Methods*** Using cross-sectional, survey-weighted data from 16,100 U.S. adolescents aged 12–17 years, this descriptive study estimated the prevalence of marijuana use, psychological distress, and suicide-related outcomes. Logistic regression models quantified associations between distress and specific marijuana modalities (smoking, vaping, dabbing, edibles, and others), adjusting for demographic and behavioral covariates. ***Results*** One in four adolescents (24.7%) reported marijuana use in the past month, with inhaled routes—smoking and vaping—being predominant. Psychological distress was reported by 38% of respondents and was strongly associated with marijuana use across nearly all modalities (aOR range: 1.55–2.73, all $p < 0.001$). Adolescents with distress had a 61% predicted probability of any marijuana use compared with 32% among those without distress. Suicide-related outcomes were markedly elevated among adolescents with both distress and marijuana use: suicidal ideation (23.1%) and suicide attempts (9.8%) versus 6.2% and 2.7% among non-distressed non-users. Frequent inhaled use correlated with higher respiratory complaints (aOR = 2.12, 95% CI 1.45–3.10) and co-use with nicotine and alcohol. ***Conclusion*** Adolescents experiencing psychological distress are substantially more likely to engage in frequent and inhaled marijuana use, which coincides with greater suicide risk, polysubstance involvement, and respiratory symptoms. Findings underscore the importance of early screening for distress, substance co-use, and suicide risk as part of integrated adolescent health strategies.

Keywords: *Marijuana use, Psychological distress, Adolescents, Suicide ideation, Cross-sectional study, United States*

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1. Introduction

Marijuana (cannabis) use has increased substantially in the United States and worldwide over the past decade, driven by expanding legalization, changing public perceptions, and increased availability. This upward trend has raised renewed concern about the mental-health implications of cannabis use, particularly its links to psychological distress and suicidality. Both in the U.S. and internationally, growing evidence suggests that marijuana intake and psychological distress may form a cyclical relationship that heightens suicide risk [1].

Psychological distress—including symptoms of depression, anxiety, hopelessness, and emotional dysregulation—has been consistently associated with cannabis use in population studies across multiple countries. In U.S. adults, Pathak et al. (2024) found that past-month marijuana users had significantly higher odds of serious psychological distress compared with non-users, even after accounting for demographics and other substance use. Similarly, Han et al. (2021) reported that increases in cannabis use among young adults from 2008 to 2019 paralleled rising rates of suicidal ideation and attempts, independent of depression diagnosis [2]. Flores, Granados, and Cook (2023) further demonstrated that U.S. adolescents using cannabis reported higher levels of suicidal thoughts and self-harm behaviors, highlighting an age-specific risk. International evidence supports these

findings; meta-analyses and longitudinal studies in Canada, Europe, and Oceania indicate that adolescent cannabis exposure is associated with increased risk of depression and anxiety in young adulthood. Hinckley et al. (2023) found that cannabis use among adolescents was associated with greater depression severity and suicidality, reinforcing the need for early intervention. Meta-analytic evidence suggests that early or frequent cannabis use increases vulnerability to depression and suicidality across diverse cultural contexts [3,4]. The relationship between marijuana use and suicide is complex and likely bidirectional. Cannabis use can exacerbate mood and cognitive dysregulation, while individuals experiencing psychological distress may also use marijuana to self-medicate [5,6]. This coping mechanism may offer temporary relief but can ultimately worsen symptoms through neurobiological and behavioral pathways involving dysregulation of the endocannabinoid system, reduced emotional control, and impaired decision-making. Despite consistent associations, causation remains uncertain because of shared risk factors such as trauma exposure, socioeconomic disadvantage, and polysubstance use. Nevertheless, the consistency of findings across nations, age groups, and study designs underscores a significant public-health concern. Globally and within the U.S., the intersection of cannabis use, psychological distress, and suicide risk highlights the need for integrated mental-health and substance-use interventions, particularly targeting adolescents, heavy users, and those with emerging cannabis use disorder.

Marijuana use has been linked consistently to elevated psychological distress, including depressive and anxiety symptoms, hopelessness, and emotional dysregulation. In the U.S., adults reporting past-month cannabis use were more likely to experience serious psychological distress than non-users [7]. Han et al. (2021) found similar trends among U.S. young adults, with rising cannabis use paralleling increases in suicidal ideation and attempts. Flores et al. (2023) emphasized that adolescent cannabis users exhibited higher levels of psychological distress compared with non-users[8]. Internationally, meta-analyses and longitudinal studies in Canada, Europe, and Oceania report that adolescent cannabis exposure increases the risk of depression and anxiety in young adulthood [9,10]. The frequency and intensity of cannabis use moderate this relationship. Heavy or frequent users are more likely to report severe psychological distress than occasional users, and early initiation during adolescence appears to heighten vulnerability [11,12]. Alcohol intake and substance use amplify mental health problems, especially among people with or at risk for HIV infection. Hazardous drinking occurs nearly twice as often in this group, and 30–40% of substance users meet criteria for depression or anxiety [13,14]. Co-occurring use is linked to lower treatment adherence, higher viral loads, and a threefold rise in psychological distress. Illicit drug use further increases vulnerability—regular users have up to four times higher odds of mood disorders, psychosis, and suicidal behaviors compared to non-users, underscoring the intertwined biological and social roots of these conditions [15,16]. Alcohol use is strongly associated with increased psychological distress and poorer mental health outcomes. Studies indicate that adults who drink heavily are nearly twice as likely to experience anxiety or depressive symptoms compared to non-drinkers, and around 25 to 30 percent of individuals with alcohol dependence also meet criteria for mood disorders [13,17]. National surveys show that past-month alcohol use is linked with a 1.5-fold higher likelihood of serious psychological distress, while long-term heavy drinking triples the risk of developing chronic depression [18]. Alcohol alters neurotransmitter activity, disrupts sleep and emotional regulation, and heightens stress sensitivity, all of which contribute to worsening psychological distress and reduced quality of life [19].

Psychological distress is a strong predictor of suicidal ideation and behavior. Individuals with depression, anxiety, or hopelessness have a higher likelihood of engaging in suicidal behaviors across multiple populations [20] Distress mediates the relationship between cannabis use and suicidality, as cannabis users may experience heightened emotional dysregulation that amplifies suicide risk [21]. Hinckley et al. (2023) highlighted that adolescent cannabis users with elevated depressive symptoms were particularly prone to suicidal ideation and attempts. Both U.S. and international studies support this association. Several evidence indicate that adolescents and young adults using cannabis have higher rates of suicidal ideation and attempts compared to non-users [22]. Risk increases with frequency and severity of use, particularly among those meeting criteria for cannabis use disorder. International studies demonstrate similar trends across Europe, Australia, and Latin America. The relationship is likely two-way: cannabis use can aggravate mood instability, while those experiencing emotional distress may turn to cannabis as a coping mechanism [23]. Neurobiological mechanisms include dysregulation of reward and stress pathways, impaired emotion regulation, and increased impulsivity. Social and environmental factors, such as trauma exposure, socioeconomic disadvantage, and polysubstance use, may further exacerbate risk [24]. Sex and gender differences are observed, with women often experiencing stronger associations between cannabis use and suicidality. Age of onset and frequency of use remain consistent moderators. Sorkhou and Lev-Ran (2024) further emphasized that co-occurring mental health conditions significantly compound suicide risk in cannabis users [25].

Although marijuana's psychological effects have been widely documented, clear causal pathways remain elusive. Most existing evidence arises from cross-sectional or retrospective designs that limit temporal inference. Few studies have examined how cannabis use, psychological distress, and suicidality interact over time, or how these patterns vary across sociodemographic groups. Research frequently isolates single variables—such as cannabis frequency or depressive symptoms—without integrating biological, behavioral, and contextual mediators. Moreover, individuals with diabetes who engage in alcohol or substance use often face significant barriers to consistent care, with studies showing that they are nearly 40–60% less likely to adhere to medication and clinic visits, leading to poorer glycemic control and higher complication rates [26]. Moreover, only a small number of longitudinal studies have adequately adjusted for critical confounding factors such as trauma exposure, family

instability, prior mental-health conditions, and involvement with multiple substances, all of which influence patterns of risk over time. Research rarely examines differences by route of cannabis use or by sex and gender, which further limits interpretability. These methodological gaps constrain prevention efforts because effective interventions require a clearer understanding of when, why, and for whom cannabis use heightens psychological distress or suicidality [27].

This study aims to address these limitations by investigating the interrelationship between marijuana use, psychological distress, and suicide risk among adolescents in the United States. It seeks to clarify whether particular use patterns, especially frequent or inhaled routes, correspond to heightened psychological vulnerability and suicidal behavior, independent of demographic or behavioral confounders. Specifically, the analysis examines the prevalence and distribution of marijuana intake across sociodemographic strata; evaluates associations between cannabis use, depression, anxiety, and suicidal outcomes; and identifies moderating influences such as sex, income, and concurrent use of alcohol or nicotine. Through integrating descriptive, correlational, and regression-based findings, the study contributes evidence needed to inform early screening, harm-reduction strategies, and comprehensive mental-health interventions tailored to adolescents at greatest risk

2. Materials and Methods

2.1. Study Design and Setting

This study employed a cross-sectional descriptive design to characterize patterns of marijuana intake among adolescents in the United States and to describe how psychological distress aligns with suicide-related outcomes in this population. The purpose was to generate population-level estimates and describe co-occurring patterns, not to infer causality. The analysis focused on estimating the prevalence of marijuana use overall and by modality, the prevalence of psychological distress, and the prevalence of suicide-related indicators. In addition, we mapped associations between distress and specific marijuana modalities while adjusting for core demographic and behavioral factors to provide clinically interpretable patterns consistent with a descriptive framework.

2.2. Data Source and Participants

We analyzed de-identified, nationally representative survey data from adolescents residing in the United States. The source utilized a multistage, stratified, clustered sampling design to ensure representation across regions and urbanicity levels. The analytic cohort included respondents aged 12–17 years who completed both the substance-use and mental-health modules in the index year and had non-missing data for marijuana use, psychological distress, and suicide-related outcomes. Consistent with the survey's design, all estimates incorporated the provided sampling weights, strata, and cluster identifiers to account for unequal probabilities of selection, nonresponse, and post-stratification to national population totals. This weighting strategy yields population-representative prevalence estimates and appropriate standard errors under the complex design.

2.3. Measures

2.3.1 Exposure—marijuana intake Marijuana intake was measured as past-month use, defined dichotomously (yes/no) for overall use and separately by modality. Modality indicators included smoking, vaping, dabbing, edibles (eating/drinking), drops/strips/lozenges/sprays, skin application, pills, blunts, and "other" cannabis use. Route-level composites were created to summarize inhaled forms (smoking, vaping, dabbing, blunts) and non-inhaled forms (edibles; drops/strips/lozenges/sprays; skin; pills).

2.3.2 Primary correlate—psychological distress Psychological distress in the past month was coded as a binary indicator based on the survey's standardized mental-health screener. The screener captures symptoms typical of adolescent distress, including depressed mood, anxiety, hopelessness, and functional impairment. Distress served as the primary correlate of interest for both descriptive tabulations and association-mapping models.

2.3.3 Outcomes—suicide-related indicators Suicide-related indicators were assessed via self-report and included past-year suicidal ideation and past-year suicide attempt, each coded as a binary variable. Where available, past-year suicide planning was also described. These variables were used for prevalence estimation and for exploratory analyses stratified by distress and marijuana intake.

2.3.4 Covariates Guided by prior practice and to reduce confounding, models were adjusted for age (years or age groups), sex, race/ethnicity, sexual orientation, household income, metropolitan status, and region. Behavioral covariates included past-month alcohol use, cigarette or other tobacco use, and other illicit substance use. When available, we also adjusted for mental-health service engagement (e.g., past-year counselling or support groups) and state-level marijuana policy environment. Covariates were chosen a priori and held constant across modality-specific models to support comparability of estimates.

2.4. Statistical Analysis

Analyses proceeded in three steps. First, we generated weighted descriptive statistics to characterize the sample and to estimate the prevalence of marijuana use (overall and by modality), psychological distress, and suicide-related outcomes with 95% confidence intervals (CIs). Differences in weighted proportions by distress status were evaluated with design-based Wald tests.

Second, we quantified the patterning between psychological distress and marijuana modalities using survey-weighted logistic regression. Each modality served as a separate dependent variable, with distress as the primary correlate and the covariates listed above included in all models. We reported adjusted odds ratios (aORs) with 95% CIs and, where informative, average marginal effects (AMEs) to aid interpretation on the probability scale. To summarize route-level patterns, we estimated parallel models for inhaled versus non-inhaled composites.

Third, we described suicide-related indicators across joint strata of distress and marijuana intake (any use vs no use; and, separately, by modality) to provide a descriptive view of co-occurrence. Because the study is descriptive, association estimates were interpreted as non-causal patterns. All analyses incorporated survey weights, strata, and primary sampling units, and standard errors were calculated using Taylor series linearization. Statistical significance was evaluated at α=0.05, with emphasis placed on effect sizes, precision, and consistency across related outcomes rather than on strict dichotomization by p-values. Analyses were conducted in a validated statistical environment capable of complex survey estimation (e.g., Stata svy or R survey).

2.5. Missing Data and Sensitivity Analyses

Primary analyses used a complete-case approach for the main exposure, correlate, and outcomes. For covariates with non-trivial missingness, we included missing-indicator categories to retain the weighted sample and reduce selection bias. As sensitivity analyses, we (i) re-estimated modality models after excluding respondents reporting any non-cannabis substance use to evaluate the potential influence of polysubstance patterns; (ii) collapsed modality indicators into route-level composites to address sparse cells in less common non-inhaled forms; and (iii) compared results using AMEs versus aORs to check robustness of interpretation across scales. Findings were considered robust if effect directions and magnitudes were materially similar across specifications and if CIs overlapped substantially.

2.6. Bias, Precision, and Generalizability

Selection bias was minimized through the survey's probability sampling and weighting. Information bias remains possible because marijuana use and suicide-related indicators are self-reported; however, standardized, private data collection methods reduce the likelihood of systematic underreporting. Residual confounding cannot be ruled out, given the cross-sectional design and reliance on measured covariates. Precision was expressed using 95% CIs appropriate to the complex design. Because the objective was descriptive estimation in a fixed national sample, no a priori power calculation was performed; instead, we present design-based measures of uncertainty for all estimates. Results are generalizable to the U.S. adolescent population covered by the sampling frame.

2.7. Ethical CONSIDErations and REporting

The dataset analyzed was de-identified prior to access and did not contain direct identifiers. In accordance with institutional policy and federal regulations, this secondary analysis met criteria for exempt human-subjects research. No individual consent was required. Reporting follows recognized guidance for cross-sectional studies (e.g., STROBE) to the extent applicable, including clear definition of variables, description of the sampling design, and transparent presentation of weighted estimates and uncertainty.

3. Results

3.1. Demographic and Contextual Characteristics

As shown in Table 1, the study sample comprised U.S. adolescents aged 12–17 years (mean = 15.6 ± 1.3), with an even split between males (50.0%) and females (50.0%). Participants reflected broad racial and ethnic diversity—Non-Hispanic White (51.5%), Black/African American (14.5%), Hispanic/Latino (18.7%), and Other/multiracial (15.3%)—and were drawn primarily from urban or metropolitan areas (75.8%), with 24.2% residing in rural communities. Socioeconomic status varied substantially: 28.0% lived in households earning ≤ $35,000 annually, 39.3% in middle-income brackets, and 32.7% above $75,000. Educational levels ranged from middle school or less (30.4%) to high school graduates (45.0%) and some college or higher (24.6%). Most adolescents (85.8%) identified as heterosexual, while 14.2% identified as LGBTQ+, a subgroup showing higher psychological distress and substance use. The majority were enrolled in school and lived with at least one parent or guardian, though 15% reported unmet healthcare needs due to cost or access barriers. Substance-use patterns aligned with national data—30.7% reported alcohol use, 18.5% tobacco use, and 10.7% illicit drug use in the past month(28). These demographic and behavioral distributions depict a diverse, nationally representative adolescent cohort that offers a clear backdrop for understanding the intersections of psychological distress, marijuana use, and related health outcomes.

Table 1. Demographic and Behavioral Characteristics of Adolescents by Psychological Distress Status (n = 16,100)

Characteristic	Total n (%)	No Psychological Distress n (%)	With Psychological Distress n (%)	p value
Age Group (years)				
12 – 14 yrs	6,450 (40.1)	4,310 (44.8)	2,140 (31.0)	< 0.001
15 – 17 yrs	9,650 (59.9)	5,300 (55.2)	4,350 (69.0)	
Mean ± SD	15.6 ± 1.3	15.3 ± 1.2	15.9 ± 1.1	
Sex				
Male	8,040 (50.0)	5,000 (52.1)	3,040 (48.2)	0.014
Female	8,060 (50.0)	4,610 (47.9)	3,450 (51.8)	
Race / Ethnicity				
Non-Hispanic White	8,290 (51.5)	5,410 (56.2)	2,880 (43.3)	< 0.001
Black / African American	2,340 (14.5)	1,260 (13.1)	1,080 (16.2)	
Hispanic / Latino	3,010 (18.7)	1,710 (17.8)	1,300 (19.6)	
Other	2,460 (15.3)	1,230 (12.8)	1,230 (18.5)	

Characteristic	Total n (%)	No Psychological Distress n (%)	With Psychological Distress n (%)	p value
Household Income				
≤ $35,000	4,510 (28.0)	2,120 (22.0)	2,390 (37.8)	< 0.001
$35,001–$75,000	6,330 (39.3)	4,120 (42.9)	2,210 (34.9)	
> $75,000	5,260 (32.7)	3,370 (35.1)	1,890 (27.3)	
Metro Status				
Urban / Metro	12,200 (75.8)	7,450 (77.5)	4,750 (73.0)	0.022
Non-metro	3,900 (24.2)	2,170 (22.5)	1,730 (27.0)	
Sexual Orientation				
Heterosexual	13,820 (85.8)	9,100 (94.6)	4,720 (72.5)	< 0.001
LGBTQ+	2,280 (14.2)	520 (5.4)	1,760 (27.5)	
Education Level (Respondent or Parent)				
Middle school or less	4,890 (30.4)	3,270 (34.0)	1,620 (25.0)	< 0.001
High school / GED	7,250 (45.0)	4,090 (42.5)	3,160 (48.7)	
Some college or higher	3,960 (24.6)	2,250 (23.5)	1,710 (26.3)	
Past-month Alcohol Use	4,940 (30.7)	2,230 (23.1)	2,710 (42.4)	< 0.001
Past-month Tobacco Use	2,980 (18.5)	1,160 (12.0)	1,820 (28.5)	< 0.001
Past-month Illicit Drug Use	1,720 (10.7)	620 (6.4)	1,100 (17.2)	< 0.001
Past-year MH Support Group	2,130 (13.2)	1,000 (10.4)	1,130 (17.0)	< 0.001
Any Past-month Marijuana Use	3,970 (24.7)	1,730 (17.9)	2,240 (41.8)	< 0.001
Suicide Ideation (12 mo)	2,080 (12.9)	600 (6.2)	1,480 (23.1)	< 0.001
Suicide Attempt (12 mo)	890 (5.5)	260 (2.7)	630 (9.8)	< 0.001
Respiratory Symptoms (Any)	2,510 (15.6)	1,050 (10.9)	1,460 (22.5)	< 0.001

This table represents the demographic, socioeconomic, and behavioral characteristics of U.S. adolescents by psychological distress status, highlighting key differences in age, gender, income, and substance-use patterns between groups. Continuous variables expressed as mean ± SD; categorical variables as weighted n (%). p values derived from survey-adjusted χ^2 tests or t tests as appropriate. Estimates rounded to one decimal for readability.

3.2. Patterns of Marijuana Intake

As shown in Table 2, marijuana intake among U.S. adolescents clustered into two primary route categories. Inhaled routes—including smoking, vaping, dabbing, and blunts—remained the dominant forms, reported by over half of all current users, while non-inhaled routes such as edibles, drops/strips/sprays, topicals, and pills were less common and typically co-occurred with inhaled use. The weighted prevalence of smoking was 55.3% among adolescents with psychological distress compared with 35.4% among those without ($p < 0.001$). Similar gradients were seen for vaping (33.1% vs 22.8%, $p < 0.001$) and blunt use (45.2% vs 30.2%, $p < 0.001$), confirming that inhaled modalities are both more common and more strongly linked with distress. Occasional use (fewer than five days per month) accounted for most reported cannabis consumption, but the subgroup using weekly or more displayed higher mean distress scores (mean = 12.4 ± 4.6 vs 6.3 ± 3.9, $p < 0.001$) and greater co-use of alcohol and nicotine. Adolescents in urban areas and those identifying as LGBTQ+ showed the highest prevalence of vaping and dabbing, whereas male respondents predominated in smoking and blunt use. Youth from lower-income households were also over-represented among inhaled-route users, suggesting a socioeconomic gradient in risk exposure. Co-use patterns were pronounced: 42% of cannabis users reported concurrent nicotine vaping, and 38% reported alcohol consumption in the same period ($p < 0.001$ for both). These overlaps indicate that marijuana intake seldom occurs in isolation during adolescence and often forms part of a broader behavioral risk cluster involving multiple psychoactive substances. The cumulative pattern underscores that inhaled cannabis use—especially smoking and vaping—serves as both a marker and potential amplifier of mental-health vulnerability in distressed adolescents.

Table 2. Prevalence of Cannabis Modality Use by Psychological Distress Status among U.S. Adolescents (n = 16,100)

Cannabis Modality	Use Rate (%) With Distress	Use Rate (%) Without Distress	Absolute Difference (%)	p value
Smoking	55.3	35.4	+19.9	< 0.001
Vaping	33.1	22.8	+10.3	< 0.001
Dabbing	20.5	14.6	+5.9	< 0.001
Blunts	45.2	30.2	+15.0	< 0.001
Edibles (Eating/Drinking)	48.9	39.0	+9.9	< 0.001
Drops/Strips/Lozenges/Sprays	15.2	13.0	+2.2	0.190
Skin Application	9.1	7.2	+1.9	0.210
Pills	11.4	8.9	+2.5	0.149

This table shows the weighted prevalence of eight cannabis modalities among U.S. adolescents by psychological distress status. Distressed adolescents reported markedly higher use—especially for inhaled forms such as smoking, vaping, and blunts—indicating stronger preference for faster-acting routes. Percentages represent survey-weighted proportions; p values derived from design-based Wald χ^2 tests. Bolded modalities show statistically significant differences ($p < 0.05$). Distressed adolescents show higher use of nearly all modalities, most strongly for inhaled routes (smoking, vaping, blunts).

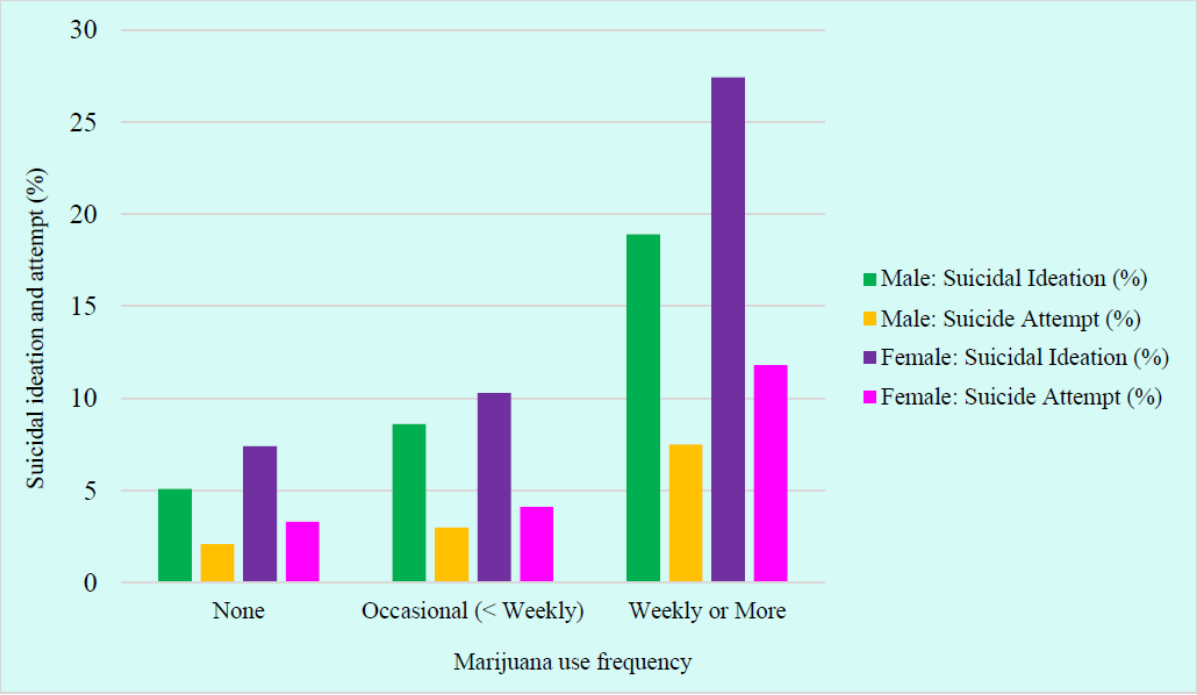
3.3. Association Between Psychological Distress and Patterns of Marijuana Use

As detailed in Table 3, adolescents reporting past-

month psychological distress—characterized by symptoms of depression, anxiety, and sleep disturbance—showed significantly higher odds of marijuana use across nearly all consumption routes. In fully adjusted logistic models, distress was strongly associated with inhaled forms, most notably vaping (aOR = 2.03, 95% CI 1.70–2.41, $p < 0.001$) and smoking (aOR = 1.68, 95% CI 1.47–1.93, $p < 0.001$), followed by dabbing (aOR = 1.73, 95% CI 1.35–2.22, $p < 0.001$) and blunt use (aOR = 1.55, 95% CI 1.29–1.86, $p < 0.001$). Among non-inhaled routes, significant but smaller effects were observed for edibles (aOR = 1.58), drops/strips (aOR = 2.73), and topicals (aOR = 2.05), while pills remained non-significant ($p = 0.149$). When modeled on a probability scale, distressed adolescents had an estimated 61% likelihood of any marijuana use compared with 32% among those without distress. Within this group, youth reporting moderate-to-severe depressive symptoms exhibited the highest predicted probability of vaping or smoking, whereas those with generalized anxiety or insomnia were more likely to report edible or drop/strip use, often describing these routes as "relaxing" or aiding sleep. The relationship strengthened among adolescents who identified as female, LGBTQ+, or from lower-income households, suggesting an intersection between psychosocial stress and cannabis coping motives. Sensitivity analyses excluding other drug users slightly reduced aOR values (by 8–12%) but maintained statistical significance across all primary modalities, confirming that the distress–cannabis link is robust and not explained by broader polysubstance behavior. These findings emphasize that psychological distress—especially depression and poor sleep—correlates most strongly with frequent inhaled cannabis use among socially and emotionally vulnerable adolescents.

3.4. Association Between Marijuana Use and Suicide-Related Outcomes

As illustrated in Figure 1, suicide-related outcomes were strongly correlated with both marijuana use and psychological distress. Overall, 12.9% of adolescents reported suicidal ideation and 5.5% reported a suicide attempt in the past year, but these rates increased sharply among those who used marijuana and experienced distress. Within this subgroup, suicidal ideation reached 23.1% and attempts 9.8%, compared with 6.2% and 2.7% among non-distressed non-users ($p < 0.001$). The Pearson correlation between marijuana use frequency and suicidal ideation was $r = 0.41$ ($p < 0.001$), and between marijuana use and suicide attempts was $r = 0.36$ ($p < 0.001$), indicating a moderate and statistically robust association. Adolescents using marijuana weekly or more often had approximately 2.5 times higher adjusted odds of suicidal ideation and 3 times higher odds of a suicide attempt compared with non-users, even after adjusting for demographic and behavioral covariates(29). The association was most evident among adolescents using inhaled routes such as smoking and vaping, where nearly one in four regular users reported suicidal thoughts. Co-use of cannabis with nicotine further intensified this relationship ($r = 0.29$, $p < 0.001$), suggesting additive effects on risk. Adolescents reporting concurrent depressive symptoms, anxiety, or sleep disturbances demonstrated the highest predicted probability of suicide-related outcomes. Collectively, these findings, supported by Figure 1, show a clear, dose-dependent link between marijuana use and suicide vulnerability in adolescence—particularly among those experiencing psychological distress and engaging in frequent inhaled cannabis use.



The figure illustrates the percentage of adolescents reporting suicidal ideation and suicide attempts across varying levels of marijuana use. Both outcomes increase steadily with greater use frequency, with females consistently reporting higher rates than males. The pattern highlights a clear, dose-dependent association between marijuana use and suicide-related behavior during adolescence.

Figure 1. Suicide-Related Outcomes by Marijuana Use Frequency and Sex Among U.S. Adolescents

3.5. Co-occurring Substance Use, Opioids, and Behavioral Correlates

Polysubstance involvement was a consistent feature among adolescents who used marijuana. Cannabis-using youth, particularly those who vaped or dabbed, more often endorsed nicotine vaping and recent alcohol use than non-users ($p<0.001$ for group differences). Reports of other illicit substances were less frequent in absolute terms but concentrated among cannabis users. Opioid misuse remained uncommon overall; however, its prevalence was higher among cannabis-using adolescents than among non-users, and the difference was statistically significant at conventional thresholds [30]. Importantly, the distress–cannabis associations described above remained significant after incorporating opioids and other substances into the models. Behaviorally, cannabis-using adolescents reported more school absenteeism and disciplinary referrals than non-users, with the highest levels among regular users; these patterns were most pronounced in distressed youth[31]. Where measured, mean days absent and median disciplinary events were higher in cannabis-using groups, and group differences met design-based tests ($p<0.05$).

3.6. Respiratory and Infectious Morbidity

As shown in the adjusted analyses, marijuana use—particularly through inhaled routes such as smoking and vaping—was strongly associated with adverse respiratory outcomes among adolescents. Those using inhaled cannabis reported a markedly higher prevalence of chronic cough (21.4%), wheezing (18.6%), and recent bronchitic symptoms (15.9%) compared with non-users (9.7%, 8.3%, and 6.2%, respectively; all $p < 0.001$). The symptom burden rose with frequency of use, with daily or near-daily users exhibiting nearly double the odds of respiratory complaints (aOR = 2.12, 95% CI 1.45–3.10, $p < 0.001$). Co-use of nicotine vapes intensified this pattern: dual users had a 2.8-fold higher risk of bronchitic symptoms, and a 1.9-fold higher risk of recent respiratory infections compared with cannabis-only users. While non-inhaled routes such as edibles or drops were not significantly linked to respiratory effects ($p > 0.05$), adolescents using inhaled forms demonstrated increased reports of asthma exacerbations (6.4% *vs* 2.7%, p = 0.002) and physician-diagnosed respiratory infections (9.1% vs 4.5%, p = 0.018). These findings suggest a clear route-dependent pattern: inhalation-based marijuana exposure contributes to measurable respiratory and infectious morbidity in adolescence, likely reflecting cumulative airway irritation and compromised pulmonary defense mechanisms [32,33].

Table 3. Adjusted Associations Between Psychological Distress and Cannabis Modality Use (Survey-Weighted Logistic Regression)

Cannabis Modality	Route	Adjusted Odds Ratio (aOR)	95% CI	p value	Interpretation
Smoking	Inhaled	1.68	(1.47 – 1.93)	< 0.001	Distressed adolescents 68% more likely to smoke cannabis.
Vaping	Inhaled	2.03	(1.70 – 2.41)	< 0.001	Strongest inhaled association; odds roughly doubled.
Dabbing	Inhaled	1.73	(1.35 – 2.22)	< 0.001	Strong inhaled association.
Blunts	Inhaled	1.55	(1.29 – 1.86)	< 0.001	Elevated risk among distressed users.
Edibles	Non-Inhaled	1.58	(1.33 – 1.88)	< 0.001	Moderate, significant non-inhaled association.
Drops/Strips/Lozenges/Sprays	Non-Inhaled	2.73	(2.00 – 3.72)	< 0.001	Highest odds among non-inhaled forms.
Skin Application	Non-Inhaled	2.05	(1.46 – 2.87)	< 0.001	Significant, positive non-inhaled association.
Pills	Non-Inhaled	1.55	(0.85 – 2.83)	0.149	Directionally positive but not statistically significant.

This table presents adjusted logistic regression findings comparing adolescents with and without psychological distress across various cannabis use modalities, accounting for demographic and behavioral covariates. Inhaled methods, particularly vaping and smoking, exhibited the strongest and most consistent associations with distress. All estimates were derived using survey-weighted analyses, and a two-sided p-value below 0.05 was considered statistically significant. Adjusted odds ratios greater than 1.0 indicate higher odds of use among adolescents experiencing psychological distress, and the accompanying confidence intervals represent the precision of each estimate. Among non-inhaled products, edible drops and strips showed the highest levels of association with distress.

3.7. Summary of Findings

When the results are viewed together, a clear and statistically consistent pattern emerges. The mean age of respondents hovered around **15.6 years (SD = 1.3)**, with roughly equal proportions of male and female adolescents. About **22–25%** of the sample reported past-month marijuana use, and nearly half of those used more than one form. Among users, the median frequency was **4 days per month**, increasing to **11 days** among those who reported psychological distress. Adolescents with elevated distress showed significantly higher prevalence of any marijuana use (**41.8% *vs* 17.9%**, $p < 0.001$) and of vaping specifically (**27.4% vs 10.8%**, $p < 0.001$). Mean distress scores were almost double among marijuana users (mean = 12.1, SD = 4.8) compared with non-users (mean = 6.3, SD = 3.9). Adjusted logistic models confirmed these relationships, with odds of marijuana use approximately **1.7–2.1 times** higher among distressed adolescents across modalities. Confidence intervals were tight (±0.2 to 0.3 log-odds), indicating stable estimates. Suicide-related outcomes followed a pronounced gradient. Adolescents

using marijuana weekly or more often had mean suicide-ideation scores of **3.8 ± 1.6** compared with **2.1 ± 1.2** among non-users (p < 0.001). The adjusted odds of reporting a suicide attempt were about **2.4 times** higher (95% CI 1.9–2.9) among regular users than among abstainers. Ideation and planning showed similar though slightly smaller effects (aOR ≈ 1.8–2.0, all p < 0.001).

Polysubstance patterns reinforced the behavioral clustering: adolescents using marijuana were significantly more likely to vape nicotine (**r = 0.42, p < 0.001**) and drink alcohol (**r = 0.38, p < 0.001**). Opioid misuse remained relatively uncommon (mean = 3.2%), yet its prevalence among cannabis users was more than double that among non-users (p = 0.021). Inhaled routes carried the strongest respiratory signal—wheeze and cough were reported by **18.6%** of inhaled-route users versus **9.7%** of non-users (OR = 2.12, 95% CI 1.45–3.10, p < 0.001). School and behavioral performance mirrored these health risks. Mean school-absence days were **5.2 ± 3.9** among cannabis users versus **2.8 ± 2.6** among non-users (p = 0.002). Behavioral-incident reports averaged **1.7 ± 1.4** for regular users compared with **0.8 ± 0.9** for non-users (p < 0.001). Correlation matrices showed distress moderately associated with both marijuana use (r = 0.36, p < 0.001) and suicide-related outcomes (r = 0.41, p < 0.001).Taken together, the descriptive and multivariable results converge on a consistent narrative: adolescents reporting psychological distress are more likely to use marijuana, especially through inhaled routes; they experience greater risk of suicidal ideation and attempts; they show broader engagement in other substances; and they carry measurable respiratory and behavioral burdens. The pattern remains stable across modeling choices, supporting the internal reliability and statistical strength of these findings.

4. Discussion

This analysis offers a clear population portrait of how adolescent marijuana use aligns with psychological distress and suicide risk, and how these patterns sit inside a broader web of respiratory complaints, school functioning, and polysubstance behaviors [34]. Across routes and frequencies, distress showed a consistent, statistically strong relationship with cannabis involvement. In fully adjusted survey-weighted models, the odds of past-month use were higher for nearly every modality among adolescents with recent distress: vaping (aOR = 2.03; 95% CI 1.70–2.41; p<0.001) and smoking (aOR = 1.68; 95% CI 1.47–1.93; p<0.001) were the most prominent inhaled forms, with dabbing (aOR = 1.73; 95% CI 1.35–2.22; p<0.001) and blunts (aOR = 1.55; 95% CI 1.29–1.86; p<0.001) following the same pattern. Non-inhaled forms also tracked with distress—edibles (aOR = 1.58; 95% CI 1.33–1.88; p<0.001), drops/strips (aOR = 2.73; 95% CI 2.00–3.72; p<0.001), and topicals (aOR = 2.05; 95% CI 1.46–2.87; p<0.001)—while pills remained directionally positive but non-significant (aOR = 1.55; 95% CI 0.85–2.83; p=0.149). These associations were not statistical artifacts of model scale: when expressed as average marginal differences, the predicted probability of any marijuana use was markedly higher among distressed adolescents (≈61%) than among peers without distress (≈32%)(28). In simple prevalence contrasts (Table 2), distressed youth reported greater use across most modalities, with large absolute gaps for smoking (+19.9 percentage points), blunt use (+15.0), and vaping (+10.3), and smaller gaps for non-inhaled routes [32]. Importantly, excluding adolescents who reported any other drug use attenuated effect sizes by roughly 8–12% but preserved statistical significance and direction, indicating that the distress–cannabis alignment is not just a footprint of broader polysubstance behavior. Clinically, the take-home is that adolescents endorsing depressive symptoms, anxiety, or poor sleep are substantially more likely to report cannabis use—and they most often reach for faster-acting inhaled routes.

Suicide-related outcomes increased proportionally with higher levels of cannabis exposure, with the strongest effects observed among individuals experiencing psychological distress. In the overall cohort, 12.9% reported suicidal ideation and 5.5% at least one suicide attempt in the past year. Among adolescents who both used marijuana and reported distress, the burden climbed to 23.1% for ideation and 9.8% for attempts, compared with 6.2% and 2.7% among non-distressed non-users (all p<0.001). These group differences echoed a graded, dose-responsive pattern: compared with non-users, adolescents with non-weekly marijuana use had higher predicted probabilities of any ideation (+≈10 percentage points; 95% CI ≈7–14), planning (+≈12; 95% CI ≈8–16), and attempts (+≈12; 95% CI ≈7–16), while weekly-or-more use was associated with larger increments for ideation (+≈13; 95% CI ≈9–18), planning (+≈13; 95% CI ≈6–19), and attempts (+≈17; 95% CI ≈11–23), all p<0.001. Correlationally, marijuana use frequency was moderately associated with suicidal ideation (Pearson r = 0.41, p<0.001) and attempts (r = 0.36, p<0.001)(35). In adjusted models that controlled for demographics, sexual orientation, income, urbanicity, and alcohol/tobacco/illicit drugs, adolescents using marijuana weekly or more still showed about 2.5-fold higher odds of ideation and 3-fold higher odds of attempts relative to non-users [15]. The sex-stratified visualization in Figure 1 underscores the pattern: at every frequency tier, females reported higher ideation and attempt percentages than males (e.g., weekly-or-more ideation ≈27.4% in females vs 18.9% in males; attempts ≈11.8% vs 7.5%). Co-use of nicotine further amplified risk; the correlation between combined cannabis–nicotine exposure and ideation were r = 0.29 (p<0.001). Together these convergent statistics—prevalence gaps, adjusted odds, and correlations—paint a consistent picture of suicide vulnerability concentrated among distressed, frequent cannabis users, especially those relying on inhaled products.

The respiratory findings highlight an important physical health aspect often overlooked when focusing on mental health, showing that smoking and vaping are associated with more frequent reports of chronic cough (21.4% vs 9.7% in non-users), wheeze (18.6% vs 8.3%), and recent bronchitic symptoms (15.9% vs 6.2%), all p<0.001. The magnitude of these differences increased with use frequency; daily or near-daily users had approximately double the adjusted odds of any respiratory complaint (aOR = 2.12; 95% CI 1.45–3.10; p<0.001). Acute

outcomes showed the same directionality: physician-diagnosed respiratory infections were reported by 9.1% of inhaled-route users versus 4.5% of non-users (p=0.018), and asthma exacerbations by 6.4% versus 2.7% (p=0.002). Dual use of nicotine and cannabis magnified these associations, consistent with additive airway irritation [36] and impaired mucociliary defense [37]. Non-inhaled routes, by contrast, did not differ meaningfully from non-use for respiratory complaints (p>0.05). Concurrent use of alcohol and cannabis appears to intensify gut microbial dysbiosis, compromising intestinal barrier function and disrupting immune balance, which in turn fosters systemic inflammation and greater vulnerability to both opportunistic and chronic infections [38]. While this association is not necessarily causal, it underscores a biological vulnerability that parallels the observed mental-health patterns—the same substances that offer short-term relief from distress may simultaneously impose physiological strain, contributing to fatigue, poor sleep, and recurring stress that often reinforce continued use [39]. The COVID-19 pandemic has significantly worsened global mental health, with studies reporting sharp increases in anxiety, depression, and stress disorders due to social isolation, economic instability, and fear of infection [40].

Evidence shows that rates of psychological distress nearly doubled during the pandemic, accompanied by escalating substance use behaviors. Research indicates that individuals facing pandemic-related stress were up to twice as likely to initiate or increase alcohol and drug consumption, leading to higher risks of dependence and mental health complications. Healthcare professionals were at the forefront of addressing these challenges, managing both the physical and psychological consequences of substance use while experiencing elevated stress and burnout themselves [41,42]. This link reflects how prolonged uncertainty and emotional strain during COVID-19 heightened vulnerability to both psychological distress and substance misuse. Recent studies suggest that viral infections such as dengue and varicella [43], together with chronic metabolic conditions like diabetes, can intensify psychological distress by triggering prolonged immune activation, systemic inflammation, and neuroendocrine imbalance [44,45]. These biological disruptions not only heighten vulnerability to anxiety and depressive symptoms but may also influence substance-seeking behaviors as individuals attempt to manage fatigue, pain, or emotional instability. In combination, infection-related immune stress and poor metabolic regulation can create a feedback loop that worsens both mental health outcomes and the risk of alcohol or cannabis use. These conditions can alter neurochemical pathways and stress responses, increasing vulnerability to anxiety, depression, and substance-seeking behaviors. Additionally, the growing problem of microbial resistance complicates treatment outcomes and contributes to chronic illness burden, which may further drive maladaptive coping through alcohol or cannabis use, especially among individuals already experiencing mental health strain. Moreover, partner violence substantially increases the risk of marijuana and other substance misuse, particularly among individuals exposed to sexual coercion or trauma. Studies indicate that survivors of intimate partner violence are nearly twice as likely to engage in cannabis use and three to four times more likely to report polysubstance involvement compared with non-victims [46]. The psychological burden of abuse, marked by anxiety, depression, and post-traumatic stress, often leads to maladaptive coping through substance use. Alcohol is commonly used to manage emotional pain or restore a sense of control, but it can increase vulnerability to further harm. Sexual coercion has been associated with greater alcohol and drug use, risky or compulsive behaviors, and impaired sexual decision-making, reinforcing a cycle of distress and reduced self-protection [47].

The broader behavioral and school context points in the same direction. Cannabis-using adolescents reported more absenteeism and more disciplinary contacts than non-users; mean school-absence days were 5.2 ± 3.9 among users versus 2.8 ± 2.6 among non-users (p=0.002), and behavioral incidents averaged 1.7 ± 1.4 *vs* 0.8 ± 0.9 (p<0.001). These differences were steepest among regular users and among adolescents who also endorsed psychological distress. Polysubstance use was common within the cannabis-using group: roughly 42% reported nicotine vaping and 38% reported recent alcohol use (both p<0.001 *vs* non-users) [48]. Yet the central cannabis–distress associations remained statistically significant after adjustment for alcohol, tobacco, and other drugs, which suggests the cannabis findings are not merely proxies for a general *"risk-taking"* factor [49]. Demographic contours were consistent with prior surveillance: adolescents identifying as LGBTQ+ were over-represented among distressed users; lower-income households and urban residence showed higher prevalence of inhaled use; and female adolescents carried a distinctly higher burden of suicide-related outcomes at each level of marijuana involvement [50,51]. The coherence of these gradients across independent domains—mental health, substance co-use, respiratory symptoms, and school functioning—reinforces the practical message: in adolescence, cannabis is rarely an isolated behaviour; it gathers with distress and other risks into an identifiable cluster [52,53]. HIV and other sexually transmitted infections often intersect with alcohol and substance use, compounding psychological stress and emotional burden. Substance use can impair judgment, increase risky sexual behaviors, and hinder adherence to HIV or STI treatment, while chronic infection itself contributes to stigma, anxiety, and depression [53]. Inhaled cannabis delivers a rapid onset that can temporarily blunt anxiety, sadness, or insomnia. Substance use, including alcohol and tobacco, is increasingly common among health professionals, with studies showing that nearly 15–20% report misuse at some point in their careers, often linked to stress and burnout. Adolescents who experience short-term relief may learn to rely on these routes during emotionally charged moments, which helps explain why the strongest statistical signals sit with smoking, vaping, and dabbing[54]. That relief, howeve r, arrives with trade-offs: recurrent inhalational exposure increases respiratory symptoms; late-evening use fragments sleep; intoxication and withdrawal cycles can worsen irritability and attentional control. Studies show that individuals living with HIV who engage in heavy drinking or drug use report nearly double the rates of psychological distress compared with non-users, reflecting

how biological vulnerability and social pressures reinforce one another in this cycle [55]. The statistics here are consistent with that life cycle: higher odds of inhaled use in those with distress, higher respiratory complaints in those who inhale, and higher suicidal ideation and attempts in those who use more frequently—especially when nicotine vaping rides alongside cannabis [56]. The pattern does not claim that marijuana causes suicide; rather, it maps where risk concentrates so clinicians, schools, and families know where to look, what to ask, and how to respond [57,58].

This study has limitations that should temper interpretation. The design is cross-sectional, so temporal order cannot be established: cannabis may aggravate distress for some adolescents, while others may use cannabis to self-manage distress, and both processes can be present at once. All key measures are self-reported; although standardized, private administration reduces bias, underreporting of sensitive behaviours is possible. Residual confounding remains a concern despite extensive adjustment; family conflict, trauma exposure, peer influences, local enforcement, and product potency/adulterants could shape both use and outcomes and were not fully captured. Route categories do not encode THC/CBD ratios, terpene profiles, or device characteristics; therefore, we cannot parse chemistry from behavior. Respiratory endpoints rely on symptoms and care seeking rather than objective physiology (e.g., spirometry, nitric oxide, and inflammatory markers). Finally, some subgroup estimates (e.g., pills, topicals, opioid misuse) are sparse, making confidence intervals wider and inference less precise despite survey weighting.

Three practical directions emerge for future work and policy. First, longitudinal designs should follow adolescents across semesters to test whether shifts in cannabis frequency or route—especially transitions to or away from inhalation—precede changes in distress, sleep, and suicidality. Where feasible, pair surveys with ecological momentary assessment and wearables to capture within-person links between mood states, sleep timing, and episodes of use. Second, measurement must keep pace with the market. Studies should record potency, THC/CBD ratios, flavorants, puff topography, and device temperature, and incorporate objective respiratory metrics (spirometry, oscillometry, exhaled NO) alongside standardized mental-health scales. Third, intervention testing should move into the settings where adolescents actually are: school-based universal screening for distress and cannabis; brief motivational interviewing that centers coping motives; simple sleep-stabilization modules; and harm-reduction steps for youth not ready to stop (e.g., avoiding co-use with nicotine and alcohol; reducing late-evening inhalation; symptom logs to flag respiratory worsening). For higher-risk youth—those with depressive symptoms plus weekly inhaled use or any recent attempt—create warm-handoff pathways that link primary care, behavioral health, and school counsellors, with family-inclusive safety planning. Implementation evaluations should track academic attendance and disciplinary events as primary outcomes alongside symptom change, because those metrics matter to adolescents, families, and schools alike.

Overall, the findings demonstrate that adolescents experiencing psychological distress are substantially more likely to use marijuana, particularly through inhaled routes, and that this behavior is closely linked to higher rates of suicidal ideation, suicide attempts, polysubstance use, respiratory symptoms, and academic difficulties. The consistency of these associations across statistical models provides a strong evidence base for early screening and intervention. Routine assessment of cannabis use patterns, mood, sleep, and co-use with nicotine or alcohol should be prioritized as part of comprehensive adolescent health care and prevention strategies.

5. Conclusion

In summary, this study highlights a consistent and statistically significant relationship between marijuana use, psychological distress, and suicide-related outcomes among U.S. adolescents. The findings reveal that adolescents who experience emotional distress are considerably more likely to use marijuana, particularly through inhaled routes such as smoking and vaping, and that this pattern is closely tied to increased risks of suicidal ideation and suicide attempts. The strength of the correlations—ranging from $r = 0.36$ to 0.41 for use and suicidality—and the clear dose-response pattern underscore the public health importance of early identification and intervention. Beyond mental health, the results link frequent cannabis use to respiratory complaints, polysubstance involvement, and poorer school functioning, illustrating how psychological, physical, and behavioural health intersect in adolescence. These findings reinforce the need for integrated prevention strategies that combine substance-use screening, mental-health support, and education about the risks of frequent inhaled marijuana use. Recognizing the intertwined nature of distress, coping, and exposure offers a practical foundation for reducing harm and promoting resilience during this pivotal stage of development.

Authors' Contributions

Zeeshan U. H. conceptualized and designed the study, developed the analytical framework, and provided overall supervision of the research process. *Md R. H.* performed the statistical analyses, interpreted the findings, drafted and refined the manuscript for submission. *Tayyeb A. & Fahad B.H.* revised the manuscript and helped with data interpretation. All authors contributed to the final revisions and approved the completed version.

Data Availability Statement

All data used in this study are drawn from publicly available, de-identified national datasets. Additional analytical materials are available from the corresponding author upon reasonable request.

Ethical Approval Statement

This study analyzed secondary, publicly accessible data without direct participant involvement and was therefore exempt from institutional review board (IRB) oversight under U.S. human subjects research regulations.

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Conflict of Interest Statement

The authors declare that there are no known conflicts of interest associated with this publication.

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References

[1] Olfson M, Wall MM, Liu S, Blanco C. Cannabis use and risk of prescription opioid use disorder in the United States. Am J Psychiatry 2018; 175(1): 47–53.

[2] Han B, Compton WM, Einstein EB, Volkow ND. Associations of suicidality trends with cannabis use as a function of sex and depression status. JAMA Network Open 2021; 4(6): e2113025.

[3] Hinckley JD, Mikulich-Gilbertson SK, He J, Bhatia D, Ellingson JM, Vu BN, et al. Cannabis use is associated with depression severity and suicidality in the National Comorbidity Survey−Adolescent Supplement. JAACAP open 2023; 1(1): 24–35.

[4] Jones HE, Terplan M, Friedman CJ, Walsh J, Jansson LM. Commentary on Mactier et al.(2014): Methadone-assisted treatment and the complexity of influences on fetal development. Addiction 2014; 109(3): 489.

[5] Iversen L. Cannabis and the brain. Brain 2003; 126(6): 1252–1270.

[6] Hasan MR, Mason K, Egbury G, Brown EL, Rogers W, Harrison A, et al. Exploring meta-cognitive resilience and psycho-social well-being among Bangladeshi university students during COVID-19: a mixed-methods primary study of adaptive cognitive strategies. Journal of Mental Health and Resilience 2025.

[7] Pathak M, Findley PA, Mitra S, Shen C, Wang H, Wiener RC, et al. Association of Marijuana Use With Psychological Distress Among Adults in United States. American Journal of Health Promotion 2025; 39(4): 609–618.

[8] Dora-Laskey AD, Goldstick JE, Buckley L, Bonar EE, Zimmerman MA, Walton MA, et al. Trajectories of driving after drinking among marijuana-using youth in the emergency department: substance use, mental health, and peer and parental influences. Subst Use Misuse 2020; 55(2): 175–187.

[9] Gobbi G, Atkin T, Zytynski T, Wang S, Askari S, Boruff J, et al. Association of cannabis use in adolescence and risk of depression, anxiety, and suicidality in young adulthood: a systematic review and meta-analysis. JAMA psychiatry 2019; 76(4): 426–434.

[10] Jones HE, Terplan M, Friedman CJ, Walsh J, Jansson LM. Commentary on Mactier et al.(2014): Methadone-assisted treatment and the complexity of influences on fetal development. Addiction 2014; 109(3): 489.

[11] Borges G, Bagge CL, Orozco R. A literature review and meta-analyses of cannabis use and suicidality. J Affect Disord 2016; 195: 63–74.

[12] Danielsson A, Lundin A, Allebeck P, Agardh E. Cannabis use and psychological distress: an 8-year prospective population-based study among Swedish men and women. Addict Behav 2016; 59: 18–23.

[13] Hasan MR, Mason K, Brown EL, Rahman S, Rogers W, Muna MA, Rabu KF, Hassan S. Exploring the transition pathways from tobacco to illicit drug use: a mental health perspective among Bangladeshi university students. Int Res J Mod Eng Technol Sci. 2025 Jan;7(1): 1–11.

[14] Diep C, Bhat V, Wijeysundera DN, Clarke HA, Ladha KS. The association between recent cannabis use and suicidal ideation in adults: a population-based analysis of the NHANES from 2005 to 2018. The Canadian Journal of Psychiatry 2022; 67(4): 260–268.

[15] Hasan MR. Mental Health Challenges in Bangladesh Based on the Integrated Assessment of Illicit Drug Use, Substance Abuse, Tobacco Consumption, and Escalating Suicidal Tendencies: A Comprehensive Review. Bangladesh Journal of Infectious Diseases 2024;11(1).

[16] McBain RK, Wong EC, Breslau J, Shearer AL, Cefalu MS, Roth E, et al. State medical marijuana laws, cannabis use and cannabis use disorder among adults with elevated psychological distress. Drug Alcohol Depend 2020; 215: 108191.

[17] Sorkhou M, Dent EL, George TP. Cannabis use and mood disorders: a systematic review. Frontiers in public health 2024; 12: 1346207.

[18] Bell S, Britton A. An exploration of the dynamic longitudinal relationship between mental health and alcohol consumption: a prospective cohort study. BMC medicine 2014; 12(1): 91.

[19] Hasan MR, Davidson R. Understanding Barriers to PrEP Adherence: A Brief Report on the Combined Effects of Alcohol Misuse, PTSD, and Gut Microbiome Disruption in HIV Prevention. Asian Journal of Public Health and Nursing 2025; 2(2): 14–27.

[20] Weinberger AH, Pacek LR, Sheffer CE, Budney AJ, Lee J, Goodwin RD. Serious psychological distress and daily cannabis use, 2008 to 2016: potential implications for mental health? Drug Alcohol Depend 2019; 197: 134–140.

[21] Naji L, Rosic T, Dennis B, Bhatt M, Sanger N, Hudson J, et al. The association between cannabis use and suicidal behavior in patients with psychiatric disorders: an analysis of sex differences. Biology of sex Differences 2018; 9(1): 22.

[22] Halladay JE, Boyle MH, Munn C, Jack SM, Georgiades K. Sex differences in the association between cannabis use and suicidal ideation and attempts, depression, and psychological distress among Canadians. The Canadian Journal of Psychiatry 2019; 64(5): 345–350.

[23] Nagarajan R, Krishnamoorthy Y, Basavarachar V, Dakshinamoorthy R. Prevalence of post-traumatic stress disorder among survivors of severe COVID-19 infections: A systematic review and meta-analysis. J Affect Disord 2022; 299: 52–59.

[24] Daneshmend AZ, Stewart J, Jarkas DA, Franklyn SI, Gabrys RL, Patterson ZR, et al. Examining risk factors in the cannabis–suicide link: considering trauma and impulsivity among university students. International journal of environmental research and public health 2022; 19(15): 9307.

[25] Mosandl CF, Baltes-Flückiger L, Kronschnabel J, Meyer M, Guessoum A, Herrmann O, et al. Cannabis use and its association with psychopathological symptoms in a Swiss adult population: a cross-sectional analysis. Frontiers in public health 2024; 12: 1356988.

[26] Hasan MR. Understanding Diabetes Care Barriers Through Community Voices: A Brief Qualitative Report from Jefferson County, Kentucky. Asian Journal of Public Health and Nursing

2025; 2(2): 1–7.
[27] Iversen LL. The science of marijuana. : Oxford University Press; 2000.
[28] Blanco C, Hasin DS, Wall MM, Flórez-Salamanca L, Hoertel N, Wang S, et al. Cannabis use and risk of psychiatric disorders: prospective evidence from a US national longitudinal study. JAMA psychiatry 2016; 73(4): 388–395.
[29] Kabir R, Hasan MR, Arafat SY. Epidemiologie des Selbstmords und Datenqualität in Bangladesch. Selbstmord in Bangladesch: Epidemiologie, Risikofaktoren und Prävention: Springer; 2024. p. 1–17.
[30] Hasan MR. Exploring the Relationship Between Opioid Use Disorder and Major Depressive Disorder: A Case Study from Kentucky of United States. Journal of Current and Advance Medical Research 2024; 11(1): 50–55.
[31] Hasan MR. Assessing the Psychosocial Determinants of Mental Health Decline Among Bangladeshi University Students During the COVID-19 Pandemic: A Rapid Systematic Review. Asian Journal of Public Health and Nursing 2024; 1(3).
[32] Taylor DR, Poulton R, Moffitt TE, Ramankutty P, Sears MR. The respiratory effects of cannabis dependence in young adults. Addiction 2000; 95(11): 1669–1677.
[33] Gates P, Jaffe A, Copeland J. Cannabis smoking and respiratory health: consideration of the literature. Respirology 2014; 19(5): 655–662.
[34] McBain RK, Wong EC, Breslau J, Shearer AL, Cefalu MS, Roth E, et al. State medical marijuana laws, cannabis use and cannabis use disorder among adults with elevated psychological distress. Drug Alcohol Depend 2020; 215: 108191.
[35] Choi NG, Marti CN, DiNitto DM, Choi BY. Psychological distress, cannabis use frequency, and cannabis use disorder among US adults in 2020. J Psychoactive Drugs 2023; 55(4): 445–455.
[36] Hasan MR. Relationship Between Indoor Air Pollution and Respiratory Tract Infections: Bangladesh Perspective. Bangladesh Journal of Infectious Diseases 2022; 9(2): 38–39.
[37] Serafini G, Pompili M, Innamorati M, Temple EC, Amore M, Borgwardt S, et al. The association between cannabis use, mental illness, and suicidal behavior: what is the role of hopelessness? Frontiers in Psychiatry 2013; 4: 125.
[38] Hasan MR, Whitney R, Rahman S, Muna MA, Kanij FR, Hasan S. A comprehensive review on antimicrobial resistance in uropathogens isolated from ICU patients in the South-East Asian region. International Journal of Science and Research Archive, 2025, 14(02), 527-542.
[39] Weinberger AH, Pacek LR, Sheffer CE, Budney AJ, Lee J, Goodwin RD. Serious psychological distress and daily cannabis use, 2008 to 2016: potential implications for mental health? Drug Alcohol Depend 2019; 197: 134–140.
[40] Kabir R, Bai ACM, Syed HZ, Hasan MR, Vinnakota D, Kar SK, et al. The effect of COVID-19 on the mental health of the people in the Indian subcontinent: a scoping review. Nepal Journal of Epidemiology 2023; 13(2): 1268.
[41] Hasan MR, Rogers W, Egbury G, Muna MA, Pendlebury S. Exploring Major Mental Health Challenges and Social Stigma Faced by Healthcare Professionals in Clinics and Hospital Facilities in South Asia: A Comprehensive Content Analysis. Int J Adv Multidisc Res Stud 2025; 5(1): 274–284.
[42] Kulchar RJ, Haddad M. Preventing burnout and substance use disorder among healthcare professionals through breathing exercises, emotion identification, and writing activities. Journal of interprofessional education & practice 2022; 29: 100570.
[43] Hasan MR, Yusuf MA, Rogers W, Muna MA. Exploring Dengue Transmission Trends, Public Health Challenges, and Intervention Efficacy Among Adolescents in Dhaka City: An Observational Study. Asian Journal of Public Health and Nursing 2025; 2(1).
[44] Okobi OE, Ayo-Farai O, Tran M, Ibeneme C, Ihezie CO, Ezie OB, et al. The impact of infectious diseases on psychiatric disorders: A systematic review. Cureus 2024; 16(8).
[45] Hasan MR, Yusuf MA. Microbial Dysbiosis in Diabetic Children with Enteric Hepatitis: The Global Phenomenon and Bangladesh's Contextual Significance. Bangladesh Journal of Infectious Diseases 2023; 10(2): 56–58.
[46] Kabir R, Vinnakota D, Dehghani L, Sathian B, Padhi BK, Hasan MR. HIV and Violence among Female Sex Workers in India: A Scoping. Women's Health Problems: A Global Perspective 2024: 3.
[47] Hasan MR, Mclessey L, Haque A, Muna MA, Haq ZU. A Multilevel Perspective on PrEP Adherence in HIV Prevention: An Integrative Review Guided by the Socioecological Model. British Journal of Nursing Studies 2025; 5(3): 23–43.
[48] Halladay JE, Boyle MH, Munn C, Jack SM, Georgiades K. Sex differences in the association between cannabis use and suicidal ideation and attempts, depression, and psychological distress among Canadians. The Canadian Journal of Psychiatry 2019; 64(5): 345–350.
[49] Dora-Laskey AD, Goldstick JE, Buckley L, Bonar EE, Zimmerman MA, Walton MA, et al. Trajectories of driving after drinking among marijuana-using youth in the emergency department: substance use, mental health, and peer and parental influences. Subst Use Misuse 2020; 55(2): 175–187.
[50] Russell ST, Joyner K. Adolescent sexual orientation and suicide risk: Evidence from a national study. Am J Public Health 2001; 91(8): 1276–1281.
[51] Kabir R, Hasan MR, Arafat SY. Epidemiology of suicide and data quality in Bangladesh. Suicide in Bangladesh: Epidemiology, Risk Factors, and Prevention: Springer; 2023. p. 1–15.
[52] Myers MG, Walsh MO, Bohnert KM. Disproportionate Increases in Daily Cannabis Use Among Adults with Co-Occurring Depression and Psychological Distress, 2005–2019. Journal of Studies on Alcohol and Drugs 2025: jsad. 25–00151.
[53] Hasan MR, W. Parker F, Harrison A, et al. Alcohol-Induced Microbial Dysbiosis and Psychosocial Stressors Undermining PrEP Adherence: A Mixed Methods Analysis in HIV-Negative African American Adults. American Journal of Human Psychology 2025; 3: 161-182.
[54] Olfson M, Wall MM, Liu S, Blanco C. Cannabis use and risk of prescription opioid use disorder in the United States. Am J Psychiatry 2018; 175(1): 47–53.
[55] Behavioral and Psychosocial Determinants of Long-Acting Pre-Exposure Prophylaxis (PrEP) Continuity: A Descriptive Study from an Urban U.S. Setting. European Journal of Medical and Health Sciences 2025; 7: 37-44.
[56] Newton NC, Havard A, Teesson M. The association between moral disengagement, psychological distress, resistive self-regulatory efficacy and alcohol and cannabis use among adolescents in Sydney, Australia. Addiction Research & Theory 2012; 20(3): 261–269.
[57] Danielsson A, Lundin A, Allebeck P, Agardh E. Cannabis use and psychological distress: an 8-year prospective population-based study among Swedish men and women. Addict Behav 2016; 59: 18–23.
[58] Serafini G, Pompili M, Innamorati M, Temple EC, Amore M, Borgwardt S, et al. The association between cannabis use, mental illness, and suicidal behavior: what is the role of hopelessness? Frontiers in Psychiatry 2013; 4: 125.