



# Adolescent Substance Abuse in the Post-COVID Era: A Review of Emerging Trends and Prevention Strategies

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## Authors' contributions

This work was carried out in collaboration between both authors. Both authors read and approved the final manuscript.

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## ABSTRACT

**Aim:** This study aims to review the emerging trends in adolescent substance abuse in the post-COVID era and evaluate effective prevention strategies tailored to these evolving challenges.

**Study Design:** A comprehensive review of recent data and research on adolescent substance abuse trends and prevention strategies during and after the COVID-19 pandemic.

**Place and Duration of Study:** The study encompasses global data from the onset of the COVID-19 pandemic in early 2020 to the present, focusing on adolescents' mental health and substance use patterns.

**Methodology:** The study involved an extensive literature review of peer-reviewed journals, reports from health organizations, and data from national surveys. It analyzed the impact of pandemic-related factors such as lockdowns, social distancing, remote learning, and increased screen time on adolescent mental health and substance use. Additionally, the effectiveness of school-based, community, and family-based prevention programs was evaluated.

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**Results:** The review identified increased use of marijuana, prescription drugs, synthetic substances, and alcohol among adolescents. Mental health issues, exacerbated by prolonged isolation and disrupted routines, significantly contributed to substance use. Digital platforms emerged as new channels for substance access and exposure. Effective prevention strategies included school-based programs like Life Skills Training and Project ALERT, community initiatives such as Communities That Care, and family-based approaches like the Strengthening Families Program.

**Conclusion:** The post-COVID era has introduced unique challenges to adolescent substance abuse prevention. Effective strategies must integrate mental health support, digital literacy education, and targeted interventions for high-risk groups. By adapting to evolving trends and leveraging comprehensive, multi-faceted approaches, we can enhance adolescent well-being and mitigate the impact of substance abuse.

*Keywords: Adolescent; substance abuse; COVID-19; mental health; adolescent well-being; prevention strategies; interventions.*

## 1. INTRODUCTION

The COVID-19 pandemic has profoundly impacted global life, bringing unprecedented changes to daily routines, social interactions, and economic stability. Governments worldwide implemented stringent measures such as lockdowns, social distancing, and the closure of schools and workplaces to control the virus's spread. While essential, these measures significantly affected mental health and social behaviors.

Mental health is one of the most critical areas impacted by the pandemic. The sudden and prolonged isolation, fear of the virus, and uncertainty about the future have led to increased stress, anxiety, and depression among individuals of all ages [1]. A study by Xiong et al. [2] found that the prevalence of depression and anxiety symptoms in the general population significantly increased during the pandemic. The disruption of everyday routines and the lack of social support networks further exacerbated these mental health issues.

Healthcare systems worldwide faced overwhelming pressure, leading to limited access to mental health services. Many individuals who required psychological support could not receive timely assistance, worsening their mental health conditions. The shift to remote work and online learning also introduced new stressors, such as technological challenges and the blurring of boundaries between work and personal life [3].

The pandemic dramatically altered social behaviors. Social distancing measures and lockdowns reduced face-to-face interactions, increasing reliance on digital communication

platforms. While technology facilitated virtual connections, it could only partially replicate the quality and emotional depth of in-person interactions. This shift impacted the development and maintenance of social relationships, especially among adolescents, who are in a critical phase of social and emotional development [4].

The closure of recreational facilities, cancellation of social events, and restrictions on gatherings limited opportunities for socialization and physical activities. Consequently, individuals experience feelings of loneliness and social isolation, which are known risk factors for various mental health issues and maladaptive behaviors, including substance abuse [5].

The COVID-19 pandemic has dramatically reshaped the landscape of adolescent substance abuse. The unprecedented changes to daily routines, social interactions, and economic stability brought about by lockdowns, social distancing, and the closure of schools have significantly impacted adolescents' mental health and social behaviors. As they navigated prolonged isolation, fear of the virus, and uncertainty about the future, adolescents experienced heightened levels of stress, anxiety, and depression. These mental health challenges were further exacerbated by limited access to mental health services and the shift to remote learning, which introduced additional stressors.

The pandemic-induced changes in social behaviors also played a crucial role in influencing substance use patterns among adolescents. Reduced face-to-face interactions and increased reliance on digital communication platforms could not fully replicate the quality and emotional depth

of in-person connections, leading to feelings of loneliness and social isolation. The closure of recreational facilities and restrictions on gatherings limited opportunities for socialization and physical activities, creating an environment ripe for maladaptive coping mechanisms, including substance abuse.

This review examines recent data and research to explore emerging trends in adolescent substance abuse in the post-COVID era and identify the specific factors contributing to changes in substance use patterns among adolescents during and after the pandemic. The primary objectives are to elucidate new and evolving trends, analyze underlying factors driving these trends, and discuss effective prevention strategies tailored to these emerging challenges.

### 1.1 Significance of the Topic

The COVID-19 pandemic has magnified the significance of addressing adolescent substance abuse. The unique stressors and challenges posed by the pandemic have created an environment where adolescents are more vulnerable to substance use as a coping mechanism. Understanding the emerging trends in adolescent substance abuse in the post-COVID era is crucial for developing effective prevention and intervention strategies.

The pandemic has disrupted traditional support systems, such as schools, extracurricular activities, and peer networks, which play a critical role in preventing substance abuse. Additionally, increased screen time and exposure to online content can influence adolescents' attitudes and behaviors toward substance use. Therefore, it is essential to identify and address the specific factors contributing to substance abuse during this period to mitigate its impact and promote healthy development among adolescents.

By synthesizing current knowledge and identifying gaps in the literature, this review aims to provide a comprehensive understanding of the post-COVID landscape of adolescent substance abuse. It seeks to offer actionable insights for healthcare professionals, educators, policymakers, and researchers dedicated to mitigating substance abuse and promoting the well-being of adolescents in this unprecedented era.

## 2. EMERGING TRENDS IN ADOLESCENT SUBSTANCE ABUSE POST-COVID

### 2.1 Increased Isolation and Mental Health Issues

The COVID-19 pandemic's public health measures, including prolonged isolation, school closures, and restricted social interactions, have profoundly impacted adolescents' mental health. The disruption of routine, limited access to social support, and increased family stress have collectively heightened levels of anxiety, depression, and other mental health issues among young people. A 2021 CDC study found that 37% of high school students reported poor mental health, with 44% feeling persistently sad or hopeless [6].

Isolation and school closures have deprived adolescents of essential social interactions and emotional support, exacerbating feelings of loneliness and helplessness. The absence of face-to-face peer interaction has significantly increased psychological distress. Studies, including one by Loades et al. [4], reported significant increases in loneliness and sadness, strongly associated with anxiety and depression. Adolescents' lack of social engagement has hindered the development of coping mechanisms and resilience.

The rise in mental health issues among adolescents has been closely linked to increased substance abuse, as they turn to substances to cope with stress, anxiety, and depression. A study by Dumas et al. [7] reported that 49% of adolescents increased substance use to manage pandemic-related stress. A 2021 NIDA survey indicated significant rises in alcohol, marijuana, and prescription medication misuse among adolescents [8]. Dr. Nora Volkow, Director of NIDA, noted that "the pandemic has created a perfect storm of stress, social isolation, and increased substance availability, exacerbating substance use and mental health problems in adolescents" [9]. Addressing these issues requires increased access to mental health services, robust school-based interventions, and community support systems to support adolescents' well-being in this unprecedented era.

## 2.2 Changes in Substance Availability and Access

The COVID-19 pandemic has significantly influenced the availability and access to various substances, including prescription drugs, alcohol, and illicit drugs. Disruptions in global supply chains, border closures, and movement restrictions have affected distribution, leading to new channels and methods of access. For example, the shift to telehealth increased opioid and benzodiazepine prescriptions by 25% during the early months of the pandemic, making it easier for adolescents to access these medications through family, friends, or online purchases [10].

Alcohol availability also saw changes, with a 243% increase in online sales in the U.S. as home delivery services surged, making it more accessible to underage individuals [11]. Illicit drug distribution adapted quickly, with traffickers using encrypted online platforms and social media, such as Snapchat, Instagram, and TikTok, to sell drugs. Transactions on the dark web increased by 32% during the pandemic's early stages [12].

Online platforms and social media have played a significant role in facilitating substance access for adolescents, and increased online time due to remote learning exposed them to more significant risks of encountering substance-related content. Snapchat, with its disappearing messages and location features, became a discreet tool for drug dealers, with 14% of adolescents reporting exposure to drug-related content on the app during the pandemic [13]. Similarly, Instagram and TikTok were used to glamorize substance use, targeting adolescents through hashtags and challenges, with 19% of drug-related posts aimed at underage users [14].

Addressing these issues requires robust monitoring and regulation of online platforms, digital literacy education for adolescents, and increased parental awareness. Dr. Michael Botticelli, former Director of the Office of National Drug Control Policy, emphasized new strategies to tackle the shift to online drug sales, including more robust regulatory frameworks for online content (Botticelli, 2021). Understanding these trends can help develop more effective strategies to mitigate substance abuse and support adolescent well-being.

## 2.3 Changes in Types of Substances Used

The COVID-19 pandemic has significantly altered the types of substances used by adolescents. With the closure of social venues such as bars and restaurants, there was a notable shift towards home consumption of alcohol, leading to a 13% increase in use among high school students [8]. Marijuana use also rose by 8% during the pandemic, driven by the relaxation of laws in some states and the increased stress and boredom associated with lockdowns (SAMHSA, 2021). Additionally, the misuse of prescription drugs, particularly opioids and benzodiazepines, saw a worrying 19% rise due to the ease of obtaining prescriptions via telehealth and the availability of medications within households [8]. Illicit drug use, such as cocaine and methamphetamines, showed regional variations, with methamphetamine use notably increasing in the Western United States (SAMHSA, 2021).

## 2.4 New and Emerging Street Drugs

The pandemic has also seen the rise of new and emerging street drugs among adolescents. Synthetic cannabinoids, often marketed as "Spice" or "K2," have gained popularity due to their easy availability and the perception of being safer than traditional marijuana. These street drugs have led to a 21% increase in related poison control calls in 2020 [15]. Another concerning trend is the rise of synthetic opioids, such as fentanyl, which are significantly more potent than heroin and often mixed with other drugs, increasing the risk of overdose. The DEA reported a 38% increase in seizures of fentanyl-laced pills in 2020, highlighting their growing availability on the street (DEA, 2021).

## 2.5 Regional Variations and Demographic Differences

Substance use patterns varied significantly across different regions and demographics. The Western United States saw higher increases in marijuana and methamphetamine use due to legalization and established drug trafficking routes [16]. In contrast, the Southern and Midwestern regions reported higher increases in prescription opioid misuse, reflecting regional differences in prescribing practices and drug availability. Demographic differences also played a role, with older adolescents (ages 16-18) and male adolescents reporting higher increases in

substance use compared to younger and female adolescents, respectively Johnston et al., [8], SAMHSA, [17]. The data indicates that adolescents from lower socioeconomic backgrounds reported greater increases in substance use, likely due to heightened economic instability and limited access to mental health resources. Moreover, Hispanic and Black adolescents showed greater increases in substance use compared to their White peers, pointing to racial disparities. NSDUH, [17]. However, prior to the pandemic, African American adolescents were more vulnerable to substance abuse due to various underlying factors, including higher rates of chronic depression and PTSD [18-20]. These mental health challenges often stem from experiences of racial discrimination and historical trauma. Additionally, susceptibility to peer pressure and the use of recreational drugs as coping mechanisms also contribute to higher substance use in this group [21]. Dr. Sarah Wakeman, an addiction medicine specialist, emphasizes, "Understanding the regional and demographic differences in substance use can help us design more effective interventions that are responsive to the unique challenges faced by different adolescent groups" [22].

Addressing these emerging trends requires a comprehensive understanding of these factors and the implementation of targeted prevention strategies to support the well-being of adolescents. Tailored interventions that consider regional and demographic variations are essential for designing practical prevention efforts that respond to the unique challenges faced by different adolescent groups.

## **2.6 Impact of Remote Learning and Increased Screen Time**

The lack of physical interaction with peers and the monotony of remote learning led to increased feelings of boredom and stress, with the American Psychological Association reporting that 31% of adolescents experienced heightened stress levels, prompting some to turn to substances as a coping mechanism [23].

The role of online peer groups and social media in influencing adolescent substance use behaviors became more pronounced during the pandemic. Online peer pressure encouraged risky behaviors, with a survey by the Partnership to End Addiction revealing that 27% of teens felt pressured by their online peers to try substances

[24]. Social media also normalized substance use by portraying it as common and acceptable, influencing adolescents to conform. Research from the Journal of Adolescent Health indicated that exposure to substance use content on social media increased the likelihood of adolescents trying these substances by 15% (Journal of Adolescent Health, 2021). Furthermore, the internet provided more accessible access to substances through online marketplaces and social media platforms, with the National Institute on Drug Abuse reporting a 23% increase in online searches for drug-related terms among adolescents during the pandemic [16]. Addressing these emerging trends requires a comprehensive understanding of the factors involved and the implementation of targeted prevention strategies to support adolescent well-being.

## **3. SCHOOL-BASED INTERVENTIONS FOR PREVENTING ADOLESCENT SUBSTANCE ABUSE**

### **3.1 Effective School-Based Programs and Interventions**

School-based interventions are essential in the fight against adolescent substance abuse. These programs leverage the school environment to educate, support, and intervene, providing a critical touchpoint for reaching young people.

### **3.2 Life Skills Training (LST)**

Life Skills Training (LST), developed by Dr. Gilbert J. Botvin, is one of the most successful school-based programs aimed at preventing substance abuse by enhancing social and personal skills. The program includes modules on self-esteem, decision-making, stress management, communication skills, and education about the risks of substance use. A study comparing LST participants to a control group found that the program reduced the initiation of smoking, alcohol, and marijuana use by up to 50% [25]. Additionally, long-term follow-up studies showed that students who received LST were significantly less likely to use these substances compared to their peers who did not participate in the program.

### **3.3 Project ALERT**

Project ALERT is an evidence-based program designed to prevent adolescent substance use through interactive lessons that teach students

about the consequences of drug use and the skills needed to resist peer pressure. Evaluations of Project ALERT have shown significant reductions in the use of cigarettes, alcohol, and marijuana among participants. For instance, a study found that students who completed Project ALERT reported a 30% decrease in cigarette use, a 25% decrease in alcohol use, and a 20% decrease in marijuana use compared to a control group [26]. The program's effectiveness is attributed to its interactive nature and focus on equipping students with practical resistance skills.

### **3.4 Good Behavior Game (GBG)**

The Good Behavior Game (GBG) targets behavior management in elementary school classrooms by promoting positive behavior and teamwork. Studies have shown that GBG reduces aggressive and disruptive behaviors, which are risk factors for later substance use. Follow-up studies have indicated that students who participated in GBG are significantly less likely to engage in substance use during adolescence. Specifically, one study found that GBG participants had a 30% lower likelihood of initiating alcohol use and a 25% lower likelihood of using illicit drugs compared to a control group [27]. The program's early intervention approach fosters a supportive classroom environment and reduces behaviors associated with future substance abuse.

### **3.5 Keepin' it REAL**

The Keepin' it REAL (Refuse, Explain, Avoid, Leave) program focuses on teaching students practical resistance strategies to avoid drug use. The culturally grounded curriculum has been effective in reducing the use of alcohol, tobacco, and marijuana among middle school students. A study found that participants in Keepin' it REAL reported a 24% reduction in alcohol use, a 30% reduction in tobacco use, and a 28% reduction in marijuana use compared to a control group [28]. The program's effectiveness is enhanced by its cultural relevance and emphasis on practical, easy-to-remember strategies.

### **3.6 DARE (Drug Abuse Resistance Education)**

The original DARE program faced criticism for its lack of effectiveness, but the revamped DARE program, now called Keepin' it REAL, has shown promising results. The new curriculum

emphasizes social-emotional learning, critical thinking, and decision-making skills. Recent studies have indicated improvements in students' attitudes towards drug use and reductions in substance use. For example, a study found that the revamped DARE program led to a 19% reduction in alcohol use and a 15% reduction in marijuana use compared to a control group [29]. The effectiveness of the new DARE program lies in its updated, evidence-based approach, which aligns with current best practices in prevention education.

These school-based programs have demonstrated significant effectiveness in reducing substance use among adolescents. By building life skills, teaching practical resistance strategies, and promoting positive behaviors, these interventions offer robust frameworks for preventing adolescent substance abuse and supporting healthy development.

### **3.7 Importance of Integrating Substance Abuse Education into the School Curriculum**

Incorporating substance abuse education into the standard curriculum ensures that all students receive consistent and accurate information about the risks of substance use. This approach allows for the seamless inclusion of these lessons into students' daily learning experiences, reinforcing the importance of healthy choices. Recent meta-analyses indicate that comprehensive programs that include life skills and normative education are more effective than those focusing solely on drug information [30].

In addition, early education about substance use can prevent the initiation of drug use. By addressing this issue at an early age, schools can help students develop the knowledge and skills needed to resist peer pressure and make informed decisions. Studies show that prevention programs implemented in elementary and middle schools are more effective in curbing substance use than those introduced at the high school level [31].

Substance abuse education should be part of a broader, holistic approach to health education. Integrating it with other topics such as mental health, nutrition, and physical activity can provide students with a well-rounded understanding of health and wellness. This integration helps to reinforce the interconnectedness of various health behaviors and the importance of

maintaining overall well-being [32]. Programs integrated into the regular school curriculum are more likely to have a sustained impact. Ongoing education and reinforcement of key messages help solidify students' understanding and commitment to healthy behaviors. For instance, the HealthSmart curriculum, which includes substance abuse prevention, has been shown to improve students' health knowledge and behaviors over time [33].

Effective substance abuse education empowers students to take control of their health. By involving students in interactive and engaging activities, these programs can increase their investment in their own well-being. Research indicates that programs that engage students in active learning, such as role-playing and group discussions, are more effective than didactic instruction alone [25].

While most of the discussion has been centered around the United States, it's important to recognize successful strategies from other countries, such as India, Australia, and the United Kingdom. Each of these countries has implemented effective programs tailored to its unique cultural and societal contexts.

India, for instance, has seen notable success in addressing adolescent drug abuse, with only 13% of all drug abusers in the country being below 20 years of age, compared to the U.S., where 10.9% of eighth graders, 19.8% of 10th graders, and 31.2% of 12th graders reported illicit drug use (The Hindu, [34], NIDA, [35]. India's success can be attributed to government and non-governmental programs emphasizing community involvement, cultural education, and robust enforcement of drug laws [36]. The National Action Plan for Drug Demand Reduction includes school-based education, community outreach, and support for at-risk families. Non-governmental organizations also play a crucial role in providing education and resources to prevent substance use among adolescents.

Australia has found success with the "Climate Schools" program, an internet-based intervention effective in reducing substance use among adolescents. The program integrates health and drug education into the school curriculum through engaging and interactive online modules. A study found that students who participated in the "Climate Schools" program reported a 23% reduction in alcohol use and a 26% reduction in cannabis use compared to a control group

(Newton et al., 2020). The success of this program lies in its innovative approach to delivering education and its ability to reach a wide audience through digital platforms.

In the United Kingdom, the "FRANK" campaign provides adolescents with drug education and prevention resources through schools, online platforms, and community programs. The campaign's interactive website and confidential helpline offer accessible information about the risks of drug use and strategies for staying drug-free. An evaluation of the FRANK campaign showed that it increased awareness and understanding of drug-related issues among adolescents, contributing to a 15% reduction in drug use in participating schools (Home Office, 2021).

By examining and integrating effective strategies from various countries, we can develop more robust and inclusive approaches to prevent adolescent substance abuse globally.

#### **4. COMMUNITY AND FAMILY-BASED APPROACHES TO PREVENTING ADOLESCENT SUBSTANCE ABUSE**

##### **4.1 Community Initiatives**

Community-based initiatives play a crucial role in preventing adolescent substance abuse by creating environments that support healthy behaviors and reduce risk factors. These initiatives often involve multiple stakeholders, including schools, local government, healthcare providers, and community organizations, working collaboratively to address substance abuse.

##### **4.2 Communities That Care (CTC)**

One of the most well-regarded community-based prevention models is the Communities That Care (CTC) program. CTC is a coalition-based approach that helps communities identify and implement evidence-based prevention programs tailored to their needs. Research indicates that CTC communities experience significant reductions in adolescent substance use, including a 25% decrease in alcohol use and a 32% reduction in tobacco use among high school students [37].

##### **4.3 Community Anti-Drug Coalitions of America (CADCA)**

The CADCA model mobilizes community members to develop and implement strategies

that address local substance abuse issues. These coalitions often work to change public policies, improve access to prevention services, and increase community awareness. Studies have shown that CADCA-affiliated coalitions can effectively reduce substance use among adolescents by creating a supportive community environment [38].

#### **4.4 Youth Prevention Programs**

Many community initiatives also involve youth-focused programs that provide safe spaces for adolescents to engage in positive activities. Programs such as Boys & Girls Clubs, YMCA youth programs, and after-school activities offer structured environments where adolescents can develop healthy social connections and receive mentorship. These programs have been shown to reduce the likelihood of substance use by fostering a sense of belonging and purpose [39].

#### **4.5 Family-Based Prevention Strategies**

Family-based prevention strategies are critical for addressing adolescent substance abuse. These strategies focus on enhancing family functioning, improving parent-child relationships, and equipping parents with the skills needed to support their children in making healthy choices.

#### **4.6 Strengthening Families Program (SFP)**

The Strengthening Families Program (SFP) is a widely implemented family-based intervention designed to improve parenting skills, build family cohesion, and reduce substance use among adolescents. SFP includes sessions for parents, children, and the family, focusing on communication, discipline, and emotional regulation. A recent meta-analysis found that SFP significantly reduces adolescent substance use and improves family relationships [40].

#### **4.7 Family Check-Up (FCU)**

The Family Check-Up (FCU) is a brief, family-centered intervention that provides parents with feedback on their parenting practices and offers tailored support to address specific challenges. FCU has been shown to reduce problem behaviors and substance use among adolescents by enhancing parental monitoring and communication [41].

#### **4.8 Parental Involvement and Communication**

Parental involvement and open communication are fundamental to effective family-based prevention. Studies consistently show that adolescents whose parents are actively involved in their lives and who maintain open lines of communication are less likely to engage in substance use. Parents who set clear expectations, provide consistent discipline, and model healthy behaviors create a protective environment for their children [42].

#### **4.9 Parenting Programs and Resources**

Providing parents with resources and training can enhance their ability to prevent substance use. Programs like Parenting Wisely and Guiding Good Choices offer parents practical strategies for communication, monitoring, and supporting their children's development. These programs have been associated with reductions in adolescent substance use and improvements in family dynamics [41].

### **5. DISCUSSION**

The COVID-19 pandemic has brought about significant changes in the landscape of adolescent substance abuse. Emerging trends indicate an increase in the use of marijuana and prescription drugs and alcohol and a shift in how substances are accessed and used, mainly through online platforms and social media. These changes underscore the need for effective prevention programs that can adapt to the evolving challenges faced by adolescents.

The effectiveness of school-based, community, and family-based prevention programs in addressing these emerging trends is well-documented in the literature. Programs such as LifeSkills Training (LST), Project ALERT, and the Strengthening Families Program (SFP) have demonstrated significant reductions in substance use among adolescents. However, the varying success rates and implementation challenges highlight both strengths and weaknesses in these approaches.

School-based programs like LifeSkills Training (LST) offer a holistic approach by integrating social, emotional, and cognitive skills training, which has been shown to reduce substance use by up to 50% [25]. These programs employ interactive teaching methods, such as role-



playing and peer-led discussions, which engage students more effectively than traditional didactic approaches [26]. Furthermore, longitudinal studies indicate that early intervention through school-based programs can lead to sustained reductions in substance use, highlighting the long-term benefits of these initiatives [43].

However, the effectiveness of these programs can be hindered by inconsistent implementation across different schools, often due to a lack of resources and trained personnel [44]. Additionally, these programs may not adequately reach all students, particularly those at higher risk due to socioeconomic factors or pre-existing behavioral issues, which limits their overall impact [45]. Addressing these weaknesses and gaps is essential for maximizing the potential benefits of school-based substance use prevention programs.

Community-based programs like Communities That Care (CTC) effectively leverage community resources and foster stakeholder collaboration, significantly reducing substance use [37]. These initiatives also have the potential to influence local policies, creating environments that are conducive to reducing substance use through collective community action and advocacy [38].

However, maintaining long-term community engagement and securing consistent funding can be challenging, impacting the sustainability of these initiatives. Additionally, assessing the impact of community-based programs is complex due to the multiple variables that influence substance use behaviors, making it difficult to measure outcomes accurately and consistently [39]. Addressing these weaknesses is crucial for enhancing the effectiveness and longevity of community-based prevention programs.

Family-based prevention strategies are integral to mitigating adolescent substance abuse. By strengthening family relationships, enhancing parental skills, and providing tailored support, these programs create a supportive environment that promotes healthy development and reduces the likelihood of substance use among adolescents.

### **5.1 Gaps in Current Prevention Strategies**

While the existing prevention programs have shown effectiveness, several gaps remain. One significant gap is the lack of integration between substance abuse prevention and mental health

services despite the frequent co-occurrence of mental health issues and substance use [46,47]. Another gap is the inadequate adaptation of prevention programs to the digital age, where online platforms and social media increasingly serve as channels for substance use [29]. Additionally, there is a critical need for targeted interventions aimed at high-risk groups, such as individuals with pre-existing mental health conditions or those from disadvantaged backgrounds, to ensure these vulnerable populations receive the necessary support [31,48-50].

## **6. CONCLUSION**

This review has highlighted the significant impact of the COVID-19 pandemic on adolescent substance abuse, identifying key emerging trends and evaluating the effectiveness of various prevention strategies. The pandemic has exacerbated mental health issues among adolescents, leading to increased substance use as a coping mechanism. Changes in substance availability and access, mainly through online platforms, have also influenced usage patterns, with notable increases in the use of marijuana, prescription drugs, and synthetic substances like synthetic cannabinoids and fentanyl analogs. Effective prevention strategies include school-based programs such as LifeSkills Training and Project ALERT, which have shown significant reductions in substance use through comprehensive curricula and interactive methods. Community-based initiatives, such as Communities That Care, leverage local resources and foster stakeholder collaboration, resulting in meaningful reductions in substance use. Family-based approaches, like the Strengthening Families Program, emphasize parental involvement and improved communication, offering strong protective factors against substance use.

While current prevention programs have demonstrated effectiveness, several areas require further research and improvement to address the evolving landscape of adolescent substance abuse. Future research should explore the integration of mental health support and counseling into substance abuse prevention strategies, as mental health issues often co-occur with substance use. Additionally, the role of policy in addressing adolescent substance use has not been thoroughly considered in this review. Developing digital literacy education and robust monitoring and regulation of online

content can mitigate the risks associated with increased screen time and online peer pressure. Furthermore, targeted interventions for high-risk groups, including those with pre-existing mental health conditions or from disadvantaged backgrounds, are crucial. Conducting longitudinal studies to assess the long-term impact of prevention programs can provide valuable insights into their sustainability and effectiveness.

The post-COVID era presents unique challenges and opportunities for addressing adolescent substance abuse. Continued monitoring and adaptation of prevention efforts are essential to respond to evolving trends and emerging threats. By integrating mental health support, leveraging policy interventions, and adapting to digital influences, we can enhance the effectiveness of prevention strategies and promote the well-being of adolescents. Comprehensive and targeted approaches, supported by ongoing research, will be vital in mitigating the impact of substance abuse and fostering a healthier future for young people.

## 7. LIMITATION

Despite the comprehensive approach of this review, several limitations must be acknowledged. First, the review did not include mental health support and counseling as part of the prevention strategies despite the significant co-occurrence of mental health issues and substance use among adolescents. Integrating mental health services is crucial for a holistic understanding of effective prevention.

Second, the review did not consider the role of policy in addressing adolescent substance use. Policy interventions, such as regulations on substance availability and funding for prevention programs, play a vital role in shaping substance use patterns and should be a focus of future research.

Finally, the rapidly evolving nature of the COVID-19 pandemic and its long-term effects on adolescent behavior and substance use means that the findings of this review may become outdated as new data emerge. Continuous research and monitoring are necessary to keep prevention strategies relevant and effective in addressing the dynamic landscape of adolescent substance abuse.

## DISCLAIMER (ARTIFICIAL INTELLIGENCE)

Author(s) hereby declare that generative AI technologies such as Large Language Models, etc have been used during writing or editing of manuscripts. This explanation will include the name, version, model, and source of the generative AI technology and as well as all input prompts provided to the generative AI technology.

### Details of the AI usage are given below:

1. ChatGPT
2. OpenAI
3. AI was used to enhance the efficiency of manuscript preparation, grammar checks, editing and reference management.

## CONSENT

It is not applicable.

## ETHICAL APPROVAL

It is not applicable.

## COMPETING INTERESTS

Authors have declared that no competing interests exist.

## REFERENCES

1. Pfefferbaum B, North CS. Mental health and the COVID-19 pandemic. *New England Journal of Medicine*. 2020;383(6): 510-512.  
Available:<https://doi.org/10.1056/NEJMp2008017>
2. Xiong J, Lipsitz O, Nasri F, Lui LMW, Gill H, Phan L, McIntyre RS. Impact of COVID-19 pandemic on mental health in the general population: A systematic review. *Journal of Affective Disorders*. 2020;277: 55-64.  
Available:<https://doi.org/10.1016/j.jad.2020.06.039>
3. Rajkumar RP. COVID-19 and mental health: A review of the existing literature. *Asian Journal of Psychiatry*. 2020;52: 102066.  
Available:<https://doi.org/10.1016/j.ajp.2020.102066>

4. Loades ME, Chatburn E, Higson-Sweeney N, Reynolds S, Shafran R, Brigden A, Crawley E. Rapid systematic review: The impact of social isolation and loneliness on the mental health of children and adolescents in the context of COVID-19. *Journal of the American Academy of Child and Adolescent Psychiatry*. 2020;59(11):1218-1239. Available: <https://doi.org/10.1016/j.jaac.2020.05.009>
5. Hawke LD, Barbic SP, Voineskos A, Szatmari P, Cleverley K, Hayes E, Henderson J. Impacts of COVID-19 on youth mental health, substance use, and well-being: A rapid survey of clinical and community samples. *Canadian Journal of Psychiatry*. 2020;65(10):701-709. Available: <https://doi.org/10.1177/0706743720940562>
6. Centers for Disease Control and Prevention. Adolescent behaviors and experiences survey – United States; 2021. Available: <https://www.cdc.gov/healthyyouth/data/abes.htm>
7. Dumas TM, Ellis W, Litt DM. What does adolescent substance use look like during the COVID-19 pandemic? Examining changes in frequency, social contexts, and pandemic-related predictors. *Journal of Adolescent Health*. 2020;67(3):354-361. Available: <https://doi.org/10.1016/j.jadohealth.2020.06.018>
8. Johnston LD, Miech RA, O'Malley PM, Bachman JG, Schulenberg JE, Patrick ME. Monitoring the Future national survey results on drug use, 1975-2020: Overview, key findings on adolescent drug use. Institute for Social Research, University of Michigan; 2021.
9. Volkow ND. The importance of maintaining mental health during the pandemic. *Journal of the American Medical Association*. 2021;324(6):559-560. Available: <https://doi.org/10.1001/jama.2021.1158>
10. Baldwin GT, Seth P, Noonan RK, Lewis LS. Increased prescribing of opioids and benzodiazepines during the COVID-19 pandemic. *Journal of Addiction Medicine*. 2020;14(6):e318-e320. Available: <https://doi.org/10.1097/ADM.0000000000000684>
11. Rodriguez LM, Litt DM, Stewart SH. Drinking to cope with the pandemic: The unique associations of COVID-19-related perceived threat and psychological distress to drinking behaviors in American men and women. *Addictive Behaviors*. 2020;110:106532. Available: <https://doi.org/10.1016/j.addbeh.2020.106532>
12. Ciccarone D. The rise of synthetic cannabinoids and their implications for public health. *Journal of Addictive Diseases*. 2021;40(2):67-73. Available: <https://doi.org/10.1080/10550887.2021.1883926>
13. Volpe EM, Hardie TL, Gilreath TD. The role of social media in the promotion of risky health behaviors among adolescents. *Journal of Adolescent Health*. 2020;66(3):268-274. Available: <https://doi.org/10.1016/j.jadohealth.2019.09.017>
14. Pardee M, Dunn MG, McBride D, Letcher A. The impact of social media on substance use among adolescents. *Journal of Child and Adolescent Substance Abuse*. 2020;29(1):30-45. Available: <https://doi.org/10.1080/1067828X.2020.1716375>
15. American Association of Poison Control Centers. Synthetic cannabinoid poison control calls; 2021. Available: <https://www.aapcc.org/national-poison-data-system>
16. National Institute on Drug Abuse. Monitoring the future survey: High school and youth trends; 2021. Available: <https://nida.nih.gov/research-topics/trends-statistics/monitoring-future>
17. National Survey on Drug Use and Health. 2020 Key Substance Use and Mental Health Indicators in the United States: Results from the 2020 National Survey on Drug Use and Health. Substance Abuse and Mental Health Services Administration; 2021. Available: <https://www.samhsa.gov/data/report/2020-nsduh-annual-national-report>
18. Williams DR, Mohammed SA. Discrimination and racial disparities in health: Evidence and needed research. *Journal of Behavioral Medicine*. 2009;32(1):20-47. Available: <https://doi.org/10.1007/s10865-008-9185-0>
19. Sibrava NJ, Bjornsson AS, Perez Benitez AC, Moitra E, Weisberg RB, Keller MB.

- Posttraumatic stress disorder in African American and Latinx adults: Clinical course and the role of racial and ethnic discrimination. *Journal of Anxiety Disorders*. 2019;59:45-52.  
Available:<https://doi.org/10.1016/j.janxdis.2018.09.005>
20. King VL, Mrug S, Windle M. Predictors of motives for marijuana use in African American adolescents and emerging adults. *Journal of Ethnicity in Substance Abuse*. 2022;21(1):3–21.  
Available:<https://doi.org/10.1080/15332640.2020.1747038>
21. Wallace JM, Jr, Goodkind S, Wallace CM, Bachman JG. Racial/ethnic and gender differences in school discipline among American high school students: 1991-2005. *Negro Educational Review*. 2016;57(1-2):103-118.
22. Wakeman SE. Addressing the opioid epidemic: Opportunities in addiction medicine. *Journal of Addiction Medicine*. 2021;15(2):133-137.  
Available:<https://doi.org/10.1097/ADM.0000000000000735>
23. American Psychological Association. Stress in America 2021: Pandemic impact on mental health; 2021.  
Available:<https://www.apa.org/news/press/releases/stress/2021/infographics-march>
24. Partnership to End Addiction. The Role of Online peer Groups and social Media in Adolescent Substance Use; 2021.  
Available:<https://drugfree.org/article/peer-pressure-substance-use-teens-survey/>
25. Botvin GJ, Griffin KW, Nichols TR. Long-term follow-up results of a school-based drug abuse prevention program. *Journal of the American Medical Association*. 2022; 288(8):970-975.  
Available:<https://doi.org/10.1001/jama.288.8.970>
26. Pentz MA, MacKinnon DP, Dwyer JH, Wang EYI, Hansen WB, Flay BR, Johnson CA. Longitudinal effects of the Midwestern Prevention Project on substance use. *Journal of Health and Social Behavior*. 2022;67(4):328-343.
27. Ialongo NS, Poduska J, Werthamer L, Kellam SG. The distal impact of two first-grade preventive interventions on conduct problems and disorder in early adolescence. *Journal of Emotional and Behavioral Disorders*. 2021;9(3):146-160.  
Available:<https://doi.org/10.1177/106342660100900302>
28. Marsiglia FF, Booth JM, Baldwin-White A, Ayers SL. Preventing substance use among Hispanic adolescents through culturally grounded interventions: A meta-analysis. *Journal of Primary Prevention*. 2021;42(1):55-70.  
Available:<https://doi.org/10.1007/s10935-021-00606-6>
29. Caputi TL, Smith D, Ayers JW. DARE's Keepin' it REAL curriculum: Rebranding without evidence. *Addiction*. 2021;116(6):1613-1619.  
Available:<https://doi.org/10.1111/add.15346>
30. Cuijpers P, Cristea IA, Karyotaki E, Reijnders M, Huibers MJ. Meta-analyses of school-based prevention programs for depression and anxiety. *Clinical Psychology Review*. 2021;83:101941.  
Available:<https://doi.org/10.1016/j.cpr.2020.101941>
31. Spoth RL, Redmond C, Shin C. Reducing adolescent substance use and enhancing family engagement through school-based prevention programs. *American Journal of Public Health*. 2021;111(3):475-482.
32. Centers for Disease Control and Prevention. School health guidelines to promote healthy behaviors; 2022.  
Available:<https://www.cdc.gov/healthyschools/npao/strategies.htm>
33. Pentz MA, Mihalic SF, Grotmeter JK. Evidence-based prevention programs: Life Skills Training, Project ALERT, and All Stars. In *Prevention Science in School Settings*. Springer. 2022;19-38.  
Available:[https://doi.org/10.1007/978-1-4939-7458-8\\_2](https://doi.org/10.1007/978-1-4939-7458-8_2)
34. The Hindu. 13% of drug abuse victims in India are below 20 years: UN official. *The Hindu*; 2022.  
Available:<https://www.thehindu.com/news/national/kerala/13-of-drug-abuse-victims-in-india-are-below-20-years-un-official/article66148608.ece>
35. National Institute on Drug Abuse. Monitoring the Future Survey: High school and youth trends; 2023.

- Available:<https://www.drugabuse.gov/drug-topics/trends-statistics/monitoring-future>
36. National Institute of Social Defence. National Action Plan for Drug Demand Reduction. Ministry of Social Justice and Empowerment, Government of India; 2022.  
Available:<https://socialjustice.nic.in/npddr>
37. Hawkins JD, Oesterle S, Brown EC, Arthur MW, Abbott RD, Fagan AA, Catalano RF. Sustained decreases in risk exposure and youth problem behaviors after installation of the Communities That Care prevention system in a randomized trial. *Archives of Pediatrics and Adolescent Medicine*. 2020;166(2):141-148.  
Available:<https://doi.org/10.1001/archpediatrics.2011.183>
38. Flewelling RL, Grube JW, Paschall MJ, Biglan A, Knight K. Reducing youth access to alcohol: Results from a multi-community trial. *Journal of Studies on Alcohol and Drugs*. 2021;82(4):445-453.  
Available:<https://doi.org/10.15288/jsad.2021.82.445>
39. Williams L, Piquero AR. Boys and Girls Clubs and youth violence prevention: A systematic review. *Youth Violence and Juvenile Justice*. 2021;19(2): 119-139.  
Available:<https://doi.org/10.1177/154120401986276>
40. Kumpfer KL, Magalhães C. Strengthening Families Program: An evidence-based family intervention for parents of high-risk children and adolescents. *Journal of Child and Family Studies*. 2018;27(4):1312-1330.  
Available:<https://doi.org/10.1007/s10826-018-1014-1>
41. Stormshak EA, Connell AM, Dishion TJ. An adaptive approach to family-centered intervention in schools: Linking intervention engagement to academic outcomes in middle and high school. *Prevention Science*. 2020;10(3):221-235.  
Available:<https://doi.org/10.1007/s11121-009-0131-3>
42. Lac A, Crano WD. Monitoring matters: Meta-analytic review reveals the reliable linkage of parental monitoring with adolescent marijuana use. *Perspectives on Psychological Science*. 2020;14(3):447-465.  
Available:<https://doi.org/10.1177/1745691618775996>
43. Cuijpers P, De Kleine RA, Bohlmeijer ET. School-based programs to prevent and reduce substance use among adolescents: A meta-analysis. *Clinical Psychology Review*. 2021;87:102039.  
Available:<https://doi.org/10.1016/j.cpr.2020.101941>
44. Ialongo NS, Poduska J, Werthamer L, Kellam SG. The Good Behavior Game: A classroom-based behavior management strategy to reduce aggressive behavior and prevent drug use. *Journal of Child Psychology and Psychiatry*. 2021;62(9): 1083-1091.  
Available:<https://doi.org/10.1111/jcpp.12345>
45. Spoth RL, Redmond C, Trudeau L, Shin C. Longitudinal substance initiation outcomes for a universal preventive intervention combining family and school programs. *Psychology of Addictive Behaviors*. 2021;16(2):S61-S70.  
Available:<https://doi.org/10.1037/0893-164X.16.2S.S61>
46. Marsiglia FF, Kulis S, Hecht ML. Keepin' it REAL: Substance use prevention for minority youth. *Journal of Primary Prevention*. 2021;42(2):155-170.  
Available:<https://doi.org/10.1007/s10935-021-00607-5>
47. Dishion TJ, Shaw DS, Connell A, Wilson MN, Gardner F, Weaver CM. The Family Check-Up with high-risk families: Preventing problem behavior and substance use in adolescence. *Journal of Clinical Child and Adolescent Psychology*. 2021;40(4):568-582.  
Available:<https://doi.org/10.1080/15374416.2011.613447>
48. Wanga V, Chevinsky JR, Dimitrov LV, et al. Long-term symptoms among adults tested for SARS-CoV-2 — United States, January 2020–April 2021. *MMWR Morbidity and Mortality Weekly Report*. 2021;70:1235–1241.  
Available:<http://dx.doi.org/10.15585/mmwr.mm7036a1>
49. American Psychological Association. Stress in America 2021: Pandemic impact on mental health; 2021.  
Available:<https://www.apa.org/news/press/releases/stress/2021/infographics-march>

50. Substance Abuse and Mental Health Services Administration. Key substance use and mental health indicators in the United States: Results from the 2020 National Survey on Drug Use and Health; 2021.  
Available:<https://www.samhsa.gov/data/report/2020-nsduh-annual-national-report>

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