Adolescent Substance Misuse Prevention Conceptual Framework (ASMPCF)

Soda Charity, Eniko Chenge, Geoffrey Takudzwa Msipa, Raymond Nyuke

Midlands State University, Zimbabwe

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ABSTRACT

Drug and substance misuse among adolescents is a critical public health challenge in Phakalane, Botswana, requiring contextual understanding for effective intervention. This qualitative phenomenological study aimed to explore the patterns and predictors of drug and substance misuse among urban adolescents, guided by the Social-Ecological Model (SEM). The purpose of the study was to use the findings to develop a preventive conceptual framework to curb adolescent substance misuse and reduce its impact. The study employed a descriptive phenomenological design to capture the lived experiences of 36 adolescents**.** A Colaizzi's descriptive phenomenological data analysis was used. The findings revealed three core patterns of misuse: early adolescent initiation, with boys starting earlier and using for longer durations; substance choice patterns, showing gender-differentiated repertoires (boys using cocaine, girls excluding it), and usage frequency patterns, involving high frequency use escalating during social events. Key predictors were identified across SEM levels: peer pressure, home availability, lack of parental attention, parental or sibling substance use, parental divorce, and excessive discretionary spending money. The study demonstrated how universal risk factors manifested in Botswana's specific socio-cultural context, where economic and familial dynamics created unique risk configurations. Findings highlighted the necessity for multi-level prevention strategies that address individual, interpersonal, and community-level factors.

Key words: Patterns, Predictors, Substance misuse, Adolescents, Phakalane, Botswana

INTRODUCTION AND LITERATURE REVIEW

Adolescent drug and substance misuse constitutes a serious global public health challenge, with profound implications for neurodevelopment, mental health, and long-term socioeconomic outcomes. According to the World Drug Report (2020) and Alho et al. (2020), an estimated 5.3% of the population aged 15 to 64 engaged in drug use in a single year, with initiation predominantly occurring during adolescence. In North America, Australia, and Europe, cannabis makes up the majority of illicit substance usage, although tobacco and alcohol are the most commonly used substances among young people (Hall et al., 2021). While global patterns provide a framework, the drivers and manifestations of this behaviour are profoundly shaped by local social, economic, and cultural contexts. In low- and middle-income countries, including those in sub-Saharan Africa, the rising burden of substance use disorders among adolescents coincides with often-limited resources for prevention and treatment, exacerbating its societal impact.

In Botswana, a nation with a youthful population, drug and substance misuse threatens to undermine the health and potential of a key demographic. Identifying patterns and recurring predictors is not merely an academic exercise; it is a prerequisite for developing targeted, evidence-based interventions. Effective strategies depend on moving beyond broad global models to understand the unique interplay of individual, familial, and community-level factors in specific settings. This study aimed to identify the patterns and predictors of substance misuse among adolescents in Phakalane, Botswana. The researchers sought to provide actionable evidence to guide the timely identification of at-risk youth and to develop a relevant prevention conceptual framework that contributes to the prevention and mitigation of this phenomenon.

Globally, patterns of substance misuse among adolescents follow developmental trends, with prevalence rising from early to late adolescence, peaking in young adulthood, and declining thereafter (Griffin & Botvin, 2010). The early adolescent window (10-14 years) is globally recognized as a critical risk period for substance misuse experimentation (Loke & Mak, 2013). Research indicates significant variability in individual use patterns and susceptibility to addiction. Studies from high-income countries reveal distinct user profiles. In the United States, gender differences in substance preference have been noted, with males reporting more illicit substance misuse and cigarette smoking. On the other hand, females reported higher rates of prescription opioid misuse and binge drinking (Bhatia et al., 2023). In Europe, for example, England identified four patterns: non-users, alcohol experimenters, occasional polysubstance users, and frequent polysubstance users (Connell et al., 2010).

Adolescent drug and substance misuse has not spared Asia. A meta-analysis by El Moubchiri et al. (2024) revealed tobacco as the most commonly used substance (16%), closely followed by alcohol (15%), with alcohol being the only substance showing an increasing trend in prevalence from before to after 2019. A study in Sub-Saharan Africa (SSA) found alcohol use problems to be the most prevalent (40%), followed by khat, stimulants, and cigarette smoking, with cannabis and other substances used by smaller proportions. The prevalence was highest in Southern Africa and among males (Ebrahim et al., 2024).

In Botswana, studies provided crucial data on the specific patterns and prevalence. An approximately 42.1% of secondary school students reported alcohol use and 16.7% acknowledged use of illicit drugs (Riva et al., 2018; Othalefile, 2022; Gasebonno, 2020). Alcohol was consistently the most prevalent substance, followed by tobacco and cannabis (Olashore et al., 2022). A significant portion 22.4% of students, met the criteria for risky alcohol use (Gasebonno, 2020). A study applying DSM-5 criteria found that 8.0% of adolescent learners met the diagnostic threshold for a substance use disorder, with cannabis use disorder being the most common 5.6% (OLADELE, 2021). The evidence on gender disparities in Botswana appears context dependent. While some studies with high school students suggested that boys were more prone to alcohol and drug-related problems, research among first-year university students found no significant gender disparity. This may indicate that gender differences are more pronounced in earlier adolescence (Olashore et al., 2020).

Predictors are best understood through a social-ecological lens, where risk and protective factors interact across individual, interpersonal, community, and societal levels (Gerra et al., 2020). At the individual level, key risk factors include genetic predispositions, neurodevelopmental vulnerability, personality traits like impulsivity and co-occurring mental health conditions, while resilience traits such as self-efficacy serve as protective factors (Nawi et al., 2021; Kanga, 2022). The interpersonal (microsystem) level is critically influenced by family and peers. Parental substance use, poor monitoring, and low family relationship quality increase risk, whereas effective parenting is protective. Affiliation with substance-using peers is one of the most powerful predictors, operating through social learning and pressure (Jose & Cherayi, 2020; Manyanda et al., 2021). The community and societal (exo/macrosystem) level encompasses factors such as the perceived availability of substances, exposure to community violence and poverty, and media influences, while positive school climates and restrictive policies are protective (Moradinazar et al., 2020). The negative impact of substance use disorders extends throughout the family system, affecting emotional and behavioural patterns (Lander et al., 2013).

Research across various contexts underscores this multi-level framework. A study in America highlighted the roles of parental substance abuse history, antisocial traits and perceived substance availability in early opioid misuse (Nichols et al., 2021). Similarly, work in Bangladesh found strong influences of peer relationships, family dynamics, and parental conflict on adolescent male substance use (Mahmud, 2024).

In Botswana, local studies align with this global evidence, identifying consistent predictors across all ecological levels. Research with secondary school students in Gaborone found significant associations between substance use disorder and having a substance-using friend or father, as well as higher levels of psychological distress (Olashore et al., 2022). A national survey of students confirmed that risk factors included alcohol availability, individual and social vulnerability, and poor peer modelling (Riva et al., 2018). Further Botswana-specific studies noted that a high density of community alcohol outlets fuels a drinking culture (Jeremiah et al., 2024), and that risk factors for alcohol use include male gender, older adolescent age, mental health challenges, psychosocial issues, with peer support and positive parenting as key protective factors (Kugbey et al., 2025).

This progression from global theory to Botswana-specific evidence establishes the contextual relevance of the multi-level framework for understanding substance use predictors in the study setting.

METHODOLOGY

The study adopted a constructivist philosophy, which underpins the qualitative research. Qualitative research is an approach for exploring and understanding the meaning individuals or groups ascribe to a social or human problem (Creswell & Creswell, 2018). The study used a qualitative study because it uncovers the social contexts, lived experiences, and cultural meanings behind substance misuse patterns that surveys alone cannot capture. The study allowed for in-depth exploration of the "why" and "how" from the adolescents' perspectives, which were essential for developing culturally relevant predictors and informing effective local interventions.

The study employed a descriptive phenomenological study design to explore substance misuse among adolescents from Phakalane, Gaborone, in Botswana. Phenomenological design aims at understanding individuals' lived experiences and the meanings they attribute to those experiences (Ahmad et al., 2022). Phenomenological research design, according to Wilson (2015), is valuable for exploring subjective experiences, gaining insights into individuals' perspectives, and understanding the meanings they attach to specific phenomena.

The study involved the adolescents of high socio-economic status in Phakalane who were indulging in drugs and substances. Phakalane is 22km from Gaborone, the capital city of Botswana. The researchers targeted the adolescents of this status because of the high prevalence of drug and substance misuse amongst this group (Gasebonno, 2020).

Table 1 Participants Demographic Details

		Gender	
No of Participants	Age	Female	Male
3	15	1	2
4	16	1	3
7	17	4	3
8	18	4	4
8	19	5	3
Total		18	18

The convenience sampling method was employed to select 36 participants, consisting of 18 boys and 18 girls. Qualitative research utilises very small sample sizes, which allow for in-depth analysis by engaging with each participant to understand their experiences concerning the research question (Hennink et al., 2011).

The research utilized a convenience sampling method. After receiving consent from the participants, the researchers proceeded to conduct interviews, which were mainly done in markets (Somaoso for Tswana), places of socialization, such as local parks and streets.

The data for the study were collected through in-depth interviews. The primary objective of in-depth interviews is to discover participants' perspectives, opinions, beliefs, and experiences in a thorough and nuanced manner (Osborne & Grant-Smith, 2021). These in-depth interviews were guided by open-ended questions. This approach, according to Voutsina (2018), offers participants the sovereignty to respond to open-ended questions at their own pace.

Before data collection, the researchers obtained an ethical clearance certificate from Midlands State University to ensure compliance with ethical guidelines. Additionally, a letter was obtained from the Councillor of the Phakalane area, granting permission to conduct the study in that specific location. The questions were designed to avoid causing emotional harm to the participants, following the guidance of Osborne and Grant-Smith (2021) on the appropriateness of semi-structured questions in removing biases and maintaining consistency. The researchers explained to the participants the goal and objectives of the study prior to the interviews. Participants gave their informed consent, both verbally and in writing, and permission was sought to audio record for later transcribing. Each participant was interviewed individually to create a comfortable environment for free expression of thoughts and experiences. As earlier alluded to, participants were interviewed in markets (Somaoso for Tswana), where they usually meet for smoking and drinking. In Botswana, 'somaosos' are the places where cigarettes and marijuana are sold; as such, the researchers made use of these places for the data collection.

The researchers employed Colaizzi's descriptive phenomenological method for data analysis. This method, as described by Praveena and Sasikumar (2021), is commonly used in qualitative research, particularly in phenomenological studies. The researchers religiously and chronologically followed Colaizzi's data analysis steps. Colaizzi's method is valuable as it emphasizes the active engagement of the researcher with the data and facilitates a thorough exploration of the participants' lived experiences.

The researchers enhanced dependability and conformability through ongoing audit in this study. The audit trail, along with extensive member checks and inputs from colleagues, were undertaken throughout the data collection, data analysis, and writing stages of the study. The researchers observed and were guided by all research ethical principles. The participants' privacy, confidentiality, and the safeguarding of personal information were protected.

RESULTS AND DISCUSSION

Table 2 Gender Differences in Substance Use

Dimension	Boys	Girls
Age of Initiation	Earlier initiation (as young as 14 years; Form 2)	Slightly later initiation (around 15–16 years; Form 4–5)
Duration of Use	Longer duration (3–5+ years; some up to 6 years)	Shorter duration (mostly 1–3 years)
Substance Types Used	Cigarettes, marijuana, alcohol, and cocaine (polysubstance use common)	Cigarettes, marijuana, alcohol (cocaine largely absent)
Cocaine Use	Present and relatively common among users	Not reported among participants
Polysubstance Use	Highly prevalent (simultaneous use of multiple substances)	Present but more selective (exclusion of certain drugs like cocaine)
Frequency of Use	Higher frequency, including daily use of multiple substances	Moderate frequency; daily cigarette use but less frequent hard drug use
Patterns of Escalation	More rapid escalation and stronger dependency patterns	Gradual escalation, often linked to social contexts
Social Context of Use	Peer-driven, includes both routine and social event use	Strongly tied to social events for example parties
Motivations for Use	Sensation-seeking, energy, coping, peer influence	Social belonging, peer influence, recreational purposes

The patterns of drug and substance misuse amongst adolescents in Phakalane, Botswana

Three questions guided the study;

1. When did you start, and how long have you been misusing drugs and substances?

2. What kind of drugs are you misusing?

3. How many times do you misuse drugs and substances per day?

Start and duration of drug and substance misuse

In response to the above question, all (36) participants from the research cited that they had started misusing drugs and substances in their early teenage years. The results from the participants indicated that the boys started misusing drugs and substances earlier than the girls did. Boys had more years of abusing drugs than girls. The majority of the boys (14) out of eighteen of them had abused drugs and substances for 3 to 5 years, whilst the minority had six years. On the other hand, 14 girls had abused drugs and substances for three years, whilst four of them had only a year of misuse. The following were verbatim quotes testified by the following participants.

"I started abusing drugs when I was 16. I was in form five, and now I have two years of drug misuse" (Female participant)

"I started drug and substance misuse when I was 14, I was in form 2, and I have 4 years of drug and substance misuse," said one male participant.

The findings of early adolescent initiation, tightly linked to the school phase (Forms 1-5), and the gendered trajectory where boys start earlier and accumulate more years of misuse, aligns robustly with global and regional epidemiological patterns. The early adolescent window (10-14 years) is globally recognized as a critical risk period for substance misuse experimentation (Loke & Mak, 2013). The findings that initiation is contextualised within specific school grades mirrors the predictable "developmental progression" noted in U.S. literature, where substance use increases rapidly from early to late adolescence (Griffin & Botvin, 2010). The pronounced male predominance in early initiation and sustained use is a cornerstone of substance misuse epidemiology. A recent systematic review of Sub-Saharan Africa (SSA) confirmed that the prevalence of substance use problems is consistently higher among males (Ebrahim et al., 2024). Similarly, a national U.S. study found males reported higher rates of illicit substance misuse (Bhatia et al., 2023). From an SEM perspective, these similarities underscore powerful universal forces at the individual and interpersonal levels (Connell et al., 2010). The gendered pattern often reflects broader societal-level norms that differentially socialize boys and girls regarding risk-taking and substance misuse. However, the prolonged and early onset of drug and substance misuse seen especially among boys implies severe detrimental effects on adolescent social interactions with peers and family, mental health, and academic performance. Therefore, the stark gendered trajectory in Phakalane sample may reflect more traditional socio-cultural norms in Botswana regarding masculinity, autonomy, and acceptable behaviour for boys versus girls. This highlights the societal level of the SEM, where cultural gender scripts powerfully shape risk behaviours.

Types of drugs and substances misused

The majority of the participants cited that they misused cigarettes, marijuana, alcohol, and cocaine. Most of the boys (13) took all the above-cited drugs and substances, while not all the girls (18) took cocaine. The results showed selectivity in terms of the uptake of drugs and substances. Some who smoked both cigarettes and marijuana and drank alcohol did not sniff cocaine, while others did the opposite. They gave different reasons for doing this. The following quotes from participants testified to the above-mentioned results.

"Personally, I am an outgoing person, so I smoke cigarettes, marijuana, and I also drink alcohol like all my peers. This is what it takes in this generation" (Female participant)

"I smoke cigarettes and sniff cocaine. I have never tried marijuana, and I drink occasionally" (Male participant)

The study revealed the gender-differentiated collection, selective poly-substance use and peer/familial modelling patterns that offer a nuanced view beyond mere prevalence, revealing the social logic behind substance choices. The hierarchy of drugs and substances, showed alcohol, cigarettes and marijuana being most common, and cocaine less so, which mirrors patterns found in Botswana and beyond. The findings were in tandem with Olashore et al. (2022), who also found alcohol to be the most used psychoactive substance in Botswana. The study identified peer and familial modelling as one of the most replicated findings in etiological research globally. This was similar to a New England study that identified peer substance use as having the largest effect on adolescent use patterns (Connell et al., 2010), while research in Hong Kong confirmed friends' use and invitations as dominant contributors (Loke & Mak, 2013). This strongly supports the interpersonal level of the SEM, where behaviours and attitudes are learned and reinforced within primary social networks.

The complete absence of cocaine use among girls in the sample, contrasted with its use by boys, is a stark gender difference. While global trends often show males using more illicit drugs, such a clear-cut gendered boundary around a specific hard drug is a significant contextual finding. This may be influenced by gendered perceptions of risk, differing social circles, or cultural stigmas associated with certain drugs for women. This study uniquely illuminated the cultural and economic ecosystem of substances in this urban Botswana setting.

Frequency of misuse of drugs and substances per day

The results showed that the adolescents abused drugs and substances differently. The majority of the participants (30) smoked cigarettes more than 5 times a day. Most of the boys (14) sniffed cocaine and smoked marijuana twice a day. The results showed that girls took between 5 and 10 cigarettes and smoked marijuana at least once a day. But the frequency increased during special occasions, such as drinking sprees and weekends. The following verbatim quotes were from the participants;

"I smoke 6 cigarettes a day and marijuana twice a day, and I drink alcohol occasionally, especially on weekends and parties" (Female participant)

"I smoke 10 cigarettes, and I sniff cocaine twice a day to the extent that I don't want to miss it, I make sure I take it because it makes me feel high and gives me energy and courage" (Male participant)

The findings revealed high-frequency routine use, gendered patterns in harder drug frequency, and context-dependent escalation demonstrate how drug and substance use become embedded in the daily and weekly fabric of adolescent life. The high daily frequency of cigarette use (5-10 times) aligns with patterns of nicotine dependence. The increased use during weekends and parties, or "drinking sprees," is a well-documented social phenomenon, reflecting the shift from experimental to recreational and social use (Griffin & Botvin, 2010). The higher frequency of cocaine and marijuana use among males continues the gendered pattern, consistent with findings that males often engage in more frequent use of illicit substances (Ebrahim et al., 2024). From an SEM lens, this highlights the interaction between the individual level (developing dependence, seeking specific effects like "energy" or to avoid feeling "low") and the community/organisational level (the structure of the school week, the presence of social venues for parties).

Synthesised through the SEM, the findings from Phakalane paint a coherent picture: adolescents, particularly boys, initiate use early during school transitions (Individual/Community Level). They enter a polysubstance environment where choices are shaped by peer norms and family examples (Interpersonal Level), and they progress to high-frequency, ritualised use patterns that are synchronised with their social and academic calendars (Community/Societal Level). This ecology is consistent with a recent socio-ecological study in rural Botswana, which found alcohol misuse "trickles down from the community, and family systems to an individual (Jeremiah et al., 2024)."

Predictors of drug and substance misuse

The predictors of drug and substance misuse were guided by one question that sought to find the influencing factors of drug and substance misuse.

Influencing factors towards drug and substance misuse

The majority of the participants (31) cited that peer pressure, home availability of drugs and substances, lack of attention from parents, family members who misused drugs and substances, parental divorce, and excessive money provided by parents were the predictors of drug and substance misuse. Whereas the minority of the participants (5) pointed out that the issues of the frequent absence of the parents, the influence of the media, and stress after the death of the parents, which were somehow related to the other predictors cited by the majority. This was testified by the following verbatim quotes;

"I misused drugs and substances because of peer pressure; my friends were into drugs and told me to try it. They gave me a cigarette for the first time, and I had a different feeling from that day. They continued to give me cigarettes, and in the end, I became addicted to smoking. I took more and more drugs and substances, but I started with a cigarette" (Female participant).

"At home, my parents have an in-house bar where they store their beer, so one day, when my parents were not around, I took one bottle of wine and started drinking. I wanted to taste as I always see them doing. I continued doing this habit until my parents saw me one day, but it was too late as I was habituated to this behaviour" (Male participant**)**

This study identified six primary predictors of drug and substance misuse among Botswana adolescents: peer pressure, home availability of drugs and substances, lack of parental attention, family members who abuse drugs and substances, parental divorce, and excessive discretionary spending money provided by parents. These predictors align strongly with risk factors documented globally, which reinforces the SEM's universal applicability.

In terms of the influence of peer pressure (which is at the interpersonal level) and a well-established global risk factor, this finding resonated well with Riva et al.'s (2018) quantitative study in Botswana, which showed that poor peer modelling was a strong predictor of substance use among secondary school students. This similarity mirrored findings from other African contexts, such as a multi-country study which confirmed peer substance use as a significant correlate of alcohol use in adolescents across eight sub-Saharan African nations (Kugbey et al., 2025).

The study further found that parental and family factors (interpersonal level) contributed to the predictors. It was revealed that the lack of parental attention, parental divorce and family substance use were predictors and these findings resonated with a study in Bangladesh which showed that parental alcohol problems and marital aggression are significant predictors of adolescent substance use (Mahmud, 2024). Similarly, a study on opioid misuse among high-risk adolescents in the U.S. found that a parent's history of substance abuse significantly increased the child's risk of use (Nichols et al., 2021). These findings are supported by theoretical frameworks like family systems theory, which detail how substance use disorders disrupt family attachment, roles, and stability, creating an environment conducive to intergenerational transmission of the behaviour (Lander et al., 2013).

It was revealed that the availability of substances (community level) in society was a predictor of drug and substance abuse. The availability of drugs and substances within homes is a powerful proximity-based risk factor. The findings corresponded with a U.S. study, which identified adolescents' perceived availability of substances as a significant predictor of lifetime opioid use (Nichols et al., 2021). Similarly, a quantitative study in Botswana confirmed that reported availability of alcohol was a key risk factor for its use among students (Riva et al., 2018). A recent qualitative study in rural Botswana also underscores this finding that alcohol trickles down through community and family systems to become easily accessible to individuals (Jeremiah et al., 2024).

The above-mentioned findings converge across diverse contexts and support the core premise of the SEM that adolescent behaviour is shaped by nested and interacting systems. Peer influence operates powerfully across cultures during this developmental stage, while familial dysfunctions (like inattention, conflict and modelling of use) represent a nearly universal pathway to risk. These similarities suggest that prevention frameworks with proven efficacy in other settings may have adaptable core components for Botswana.

CONCLUSION

In conclusion, the study found early initiation, gendered and polysubstance use, and socially embedded frequency as not merely individual choices but the product of dynamic transactions between the adolescent and their interpersonal, community, and societal environments. In terms of predictors of substance misuse among Botswana adolescents, the study found peer pressure, home availability of drugs and substances, lack of parental attention, family members who abuse drugs and substances, parental divorce, and excessive discretionary spending money provided by parents. The findings in this study demonstrated significant congruence with global research, while also revealing context-specific factors that highlight the unique socio-cultural and economic environment of Botswana. The study made a distinct contribution to the literature on adolescent substance use in sub-Saharan Africa. It was among the first to explicitly apply and support the Social-Ecological Model using rich qualitative data from adolescents in Botswana. The confluence of factors like "lack of parental attention" and "given lots of money" points to a potentially unique risk configuration, implying compensatory parenting in a modernising economy. This synthesis offers a deeper understanding rather than studying factors in isolation. The above-mentioned findings converge across diverse contexts and support the core premise of the SEM that adolescent behaviour is shaped by nested and interacting systems. Peer influence operates powerfully across cultures during this developmental stage, while familial dysfunctions (like inattention, conflict and modelling of use) represent a nearly universal pathway to risk. These similarities suggest that prevention frameworks with proven efficacy in other settings may have adaptable core components for Botswana. Effective strategies must simultaneously, strengthen individual coping skills, empower families with positive parenting and communication techniques work with schools to manage transition periods and peer dynamics; engage communities to provide alternative recreation and question norms around weekend use; and advocate for stronger policy enforcement regarding age-of-sale laws. By grounding these recommendations in the direct experiences of Phakalane adolescents, this study offers a powerful, context-specific blueprint for action with relevance across similar urban settings in Southern Africa.

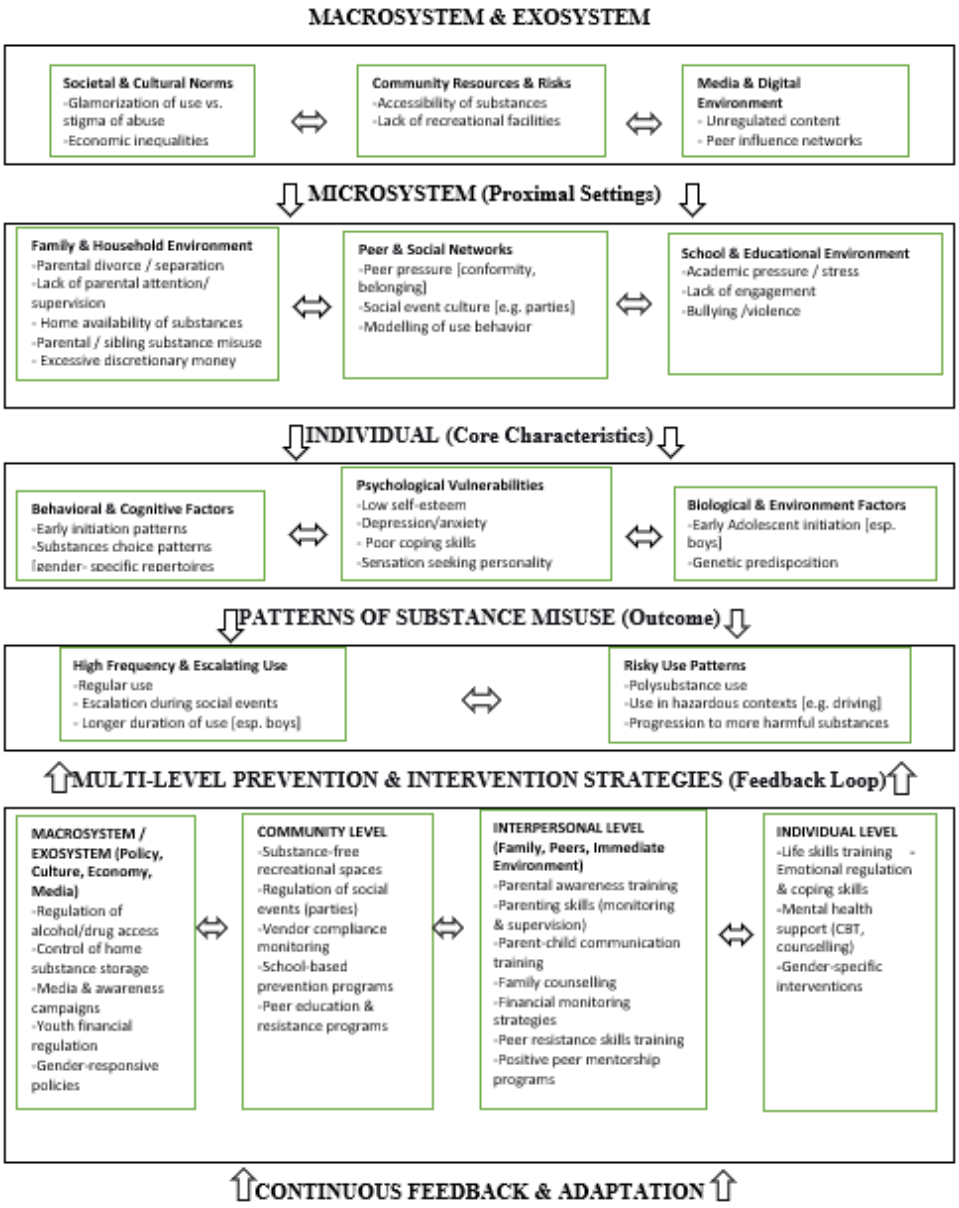
The Botswana Ministry of Education should adopt targeted, family-centred policy interventions by integrating Parental Awareness Training into school orientation programs at both primary and secondary levels. This initiative should focus on educating parents about the critical role of supervision, emotional availability, and responsible financial support, particularly considering findings that highlight lack of parental attention and excessive discretionary income as key drivers of adolescent substance misuse. Additionally, the Ministry could institutionalize periodic parent–school engagement workshops that equip caregivers with practical skills in monitoring, communication, and early identification of risky behaviours. Embedding such programs within the school system ensures consistent parental involvement and strengthens the home–school partnership, thereby addressing one of the most significant interpersonal-level risk factors identified in the study.

The study recommends that the government of Botswana and its development partners, including the anti-drug and substance activists, implement programs guided by SEM at the following levels. At the family level: The programs should enhance parental monitoring, communication and awareness of the risks of storing substances at home or using money as a substitute for attention. At the school/community-level: There should be promotion of peer-resistance programs and creation of substance-free recreational spaces. This recommendation is also societal/policy-level: There should be enforcement of regulations on alcohol and demerged from community-level research in Botswana (Jeremiah et al., 2024).

Adolescent Substance Misuse Prevention Conceptual Framework

The researchers developed the following framework [figure 1below] guided by the findings from the research above entitled, '**Patterns and predictors of drug and substance misuse amongst urban adolescents in Phakalane, Botswana'.** The Social Ecological Model (SEM) was adopted in the development of this framework, which translates the specific findings into a dynamic, multi-level model that can be adapted across different cultural and geographic contexts.

Figure 1. Adolescent Substance Misuse Prevention Conceptual Framework



Source: Researchers

The above diagram depicts the dynamic, multi-directional influences leading to adolescent substance misuse and the necessary points for intervention, based on the findings and SEM.

Macrosystem & Exosystem (Distal Influences)

It is the broader societal, cultural, economic, and digital landscape that shapes adolescent behaviour. These are factors the adolescent does not directly interact with on a daily basis, but which shape their environment.

Societal & Cultural Norms: The finding of gender-differentiated repertoires, such as cocaine use among boys but not girls, points to deep-seated gender norms. Likewise, a recent systematic review of Sub-Saharan Africa (SSA) confirmed that the prevalence of substance use problems is consistently higher among males (Ebrahim et al., 2024). The gendered pattern often reflects broader societal-level norms that differentially socialize boys and girls regarding risk-taking and substance misuse. Globally, norms can glamorize use, such as alcohol, which is seen as 'mature', while cannabis as 'cool'. These create stigma that prevents help-seeking behaviour. Economic inequalities, a macro-factor, can drive the "excessive discretionary spending money" from relative deprivation to affluence.

Community Resources & Risks: The accessibility of substances is a key community-level risk. This includes both physical availability in vendors and social availability from peers and homes. A recent qualitative study in rural Botswana found that alcohol trickles down through community and family systems to become easily accessible to individuals (Jeremiah et al., 2024). Conversely, a lack of pro-social recreational facilities, such as sports and arts, creates a vacuum filled by risky social events.

Media & Digital Environment: It is a critical modern exosystem. It is peer influence beyond physical networks that exposes youth to unregulated pro-use content, and algorithms that can promote subcultures centred on substance use. Similarly, Adindu et al. (2024) found that teenagers who spend more time on social media are more likely to participate in dangerous activities, such as using illegal substances and drinking. Adolescents who reported using social media frequently were more likely to experiment with drugs than their classmates who used social media less frequently.

Global Adaptability: This layer is where local context is paramount. Interventions, such as regulating advertising, investing in youth centres and digital literacy campaigns, should be culturally tailored. They must also be aimed at changing the structural environment.

Microsystem (Proximal Settings)

The adolescent directly and regularly interacts with the immediate settings.

Family & Household Environment: This is the epicentre of several of the key predictors. Parental divorce, lack of parental attention, and home availability create an environment of low monitoring, emotional neglect, and easy access. A study by Mahmud (2024) revealed that lack of parental attention also evidences this with a study, parental divorce and family substance use were predictors of drug and substance misuse among adolescents. Similarly, in Botswana, a quantitative study confirmed that reported availability of alcohol was a key risk factor for its use among students (Riva et al., 2018). Parental and/or sibling use provides direct modelling and normalizes behaviour. Excessive discretionary money, often a family-provided resource, facilitates purchase. A study on opioid misuse among high-risk adolescents in the U.S. found that a parent's history of substance abuse significantly increased the child's risk of use (Nichols et al., 2021).

Peer & Social Network: Peer pressure is a universal predictor, but the finding of 'escalating use during social events' highlights its situational intensity. Riva et al.'s (2018) quantitative study in Botswana showed that poor peer modelling was a strong predictor of substance use among secondary school students. This similarity mirrored findings from other African contexts, such as a multi-country study which confirmed peer substance use as a significant correlate of alcohol use in adolescents across eight sub-Saharan African nations (Kugbey et al., 2025). This is not just passive pressure but the active construction of a social identity where substance use is central to belonging and celebration.

School & Educational Environment: Academic stress, poor teacher-student relationships, or bullying can be push factors, while a positive, engaging school climate is a major protective factor globally. The school-environment may play an important role in the likelihood a student engages in high-risk substance use behaviours, including co-morbid use. It is high among adolescents; however, not all schools share the same prevalence (Bisset et al., 2007).

Global Adaptability: The mechanisms here, that is, modelling, bonding, monitoring and belonging are universal. The specific manifestations, which is, type of family conflict and nature of social events will vary, making family therapy, parenting programs, and peer mentorship universally applicable but locally adaptable strategies.

INDIVIDUAL (Core Characteristics)

It refers to the adolescent's own biological, psychological, and behavioural makeup. This level mediates how they experience and react to influences from the outer systems.

Biological & Developmental Factors: The finding of early adolescent initiation, especially in boys, points to the critical window of puberty and brain development, where risk-taking is high and executive function impulse control is still maturing. Similarly, from a systematic search of databases, Belfiore et al. (2024) Biological factors, including neurotransmitter systems like endocannabinoid and dopaminergic systems, play a significant role in addiction. Genetic and neurobiological factors contribute to cannabis addiction susceptibility Genetic predispositions can make some adolescents more vulnerable.

Psychological Vulnerabilities: Factors like low self-esteem, depression, anxiety, and poor coping skills, often stemming from microsystem failures, make substance use a more appealing form of self-medication or escape. Likewise, Psychological factors like personality traits and mental health conditions interact with SUD development. Temperament and personality traits represent crucial factors that contribute to the development and persistence of addiction-related behaviours (Belfiore et al., 2024)

Behavioural & Cognitive Factors: This is where the patterns identified in the study become individual traits: the decision to initiate early, the development of a substance-specific repertoire, and the cognitive biases that maintain use.

Global Adaptability: Developmental stages and core psychological needs are human constants. Prevention must equip adolescents with universal skills such as emotional regulation, critical thinking, refusal skills, and accurate knowledge about substance effects and addiction.

Patterns of Substance Misuse (Outcome)

It is the observable behavioural outcome resulting from the interaction of all previous layers.

High-Frequency & Escalating Use: The move from experimentation to regular, problematic use, often tied to rituals. Griffin et al. (2023) also found that increased use during weekends and parties, or “drinking sprees,” is a well-documented social phenomenon, reflecting the shift from experimental to recreational and social use. The higher frequency of cocaine and marijuana use among males continues the gendered pattern, consistent with findings that males often engage in more frequent use of illicit substances (Ebrahim et al., 2024).

Risky Use Patterns: This includes using multiple substances, using in dangerous situations, and showing signs of dependence. It represents the most harmful end of the spectrum. The sheer intensity of daily cigarette use and the explicit integration of substance use into routines to manage mood (“feel high,” “avoid feeling low”) point towards a pattern of self-medication that may be particularly acute in this context. While self-medication is a known risk factor globally (Griffin et al., 2023)

Global Adaptability: While the specific substances may change, for instance alcohol cannabis vs. prescription drugs, the progression from initiation to regular use to risky use is a common pathway worldwide that the framework seeks to interrupt.

Multi-Level Prevention & Intervention Strategies (Feedback Loop)

This is the action component of the framework. It shows that effective prevention must simultaneously target all SEM levels, creating a reinforcing feedback loop of protection. The arrows point both ways, indicating that change at one level such as a successful school program can influence others for instance improving family communication.

Policy & Enforcement: These target Macro/Exo levels. These are laws to restrict home availability of prescription drugs, regulate alcohol advertising, and use taxation to reduce the impact of excessive discretionary spending. These policies should deter availability, be monitored and evaluated periodically. El-Khatib et al. (2021) said that the value of safe, nurturing and supportive social institutions around the lives of adolescents is crucial in the prevention of risky behaviour. Schools are valuable social institutions to this effect and school safety and adolescent health outcomes can be threatened by drug use and violence.

Community & Environmental Strategies: These target Exo/Micro levels. They involve creating alternative, safe social spaces to compete with risky social events. They also concern community policing to reduce physical availability. Onyenwe (2024) found that public health strategies play a pivotal role in addressing adolescent's substance use due to their population-level impact and emphasis on preventive measures. Unlike individual-level interventions, which focus primarily on treatment and harm reduction, public health strategies prioritize upstream interventions aimed at reducing risk factors and promoting protective factors across entire communities. By leveraging evidence-based prevention programs and conceptual frameworks, public health efforts can target the multifaceted determinants of adolescent substance use, ranging from individual beliefs and behaviours to societal norms and environmental influences Community vendors can be monitored and capacitated to avoid selling to adolescents.

Family & School-Based Programs: These directly target the key Micro predictors. Parenting skills training to increase attention, monitoring, and healthy communication post-divorce. School-based peer resistance education to counter peer pressure. Life skills training to build individual resilience and confidence. School based support groups can create positive peer learning. Employing school psychologists as well as guidance and counselling teachers can promote early detection and mitigation of drug and substance misuse impact. Interventions in educational settings include curriculum interventions, physical activity interventions, peer interventions and family-school cooperation, and electronic interventions (Liu et al., 2023).

Individual-Centred Therapies: For those already showing misuse patterns, therapies like Cognitive Behavioural Therapy (CBT) or Motivational Enhancement Therapy (MET) address individual psychological vulnerabilities and cognitive factors to change behaviour.

Global Utility: This tiered approach ensures scalability. A country can start with school-based life skills education, often low-cost and high-reach, while building capacity for family and community programs and advocating for stronger policies. The framework provides a blueprint for a coordinated, comprehensive national or community strategy.

In summary, this conceptual framework integrates the specific findings from Phakalane in Botswana into a robust, dynamic model. It demonstrates that adolescent substance misuse is not a simple cause-effect issue but the result of a cascade of interacting factors across multiple levels of a young person's world. Effective prevention, therefore, requires a synergistic, multi-pronged approach that is informed by local data but grounded in these universal ecological principles.

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