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Developing Community Resilience through Grassroot Initiatives: Comparing Culturally Adapted Substance Use Prevention Programs Directed towards Indigenous Youth in Canada

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ABSTRACT

Considering the growing prevalence of substance use amongst young people, prevention programs targeting children and adolescents are needed to protect against related cognitive, psychological, and behavioral issues. Preventative programs that have been adapted to Canadian Indigenous cultures in school and family settings are discussed. The first and second phases of the Life Skills Training (LST) program and the Maskwacis Life Skills Training (MLST) program are reviewed, as well as Bii-Zin-Da-De-Da (BZDDD; "Listening to One Another") and a culturally sensitive smoking prevention program. Motivating factors, comorbid disorders, and at-risk personality types associated with substance use amongst Canadian children and adolescents, specifically Indigenous youth, are considered through the application of the biopsychosocial model. This paper aims to describe the requisite efforts being made in Canada towards Indigenous communities, compare substance use prevention programs targeting Indigenous children and adolescents, and provide suggestions for future research on preventative interventions directed towards substance use within minority groups.

1. Introduction

In the field of child and adolescent psychology, a variety of mental health disorders and risk factors are known to be predictive of substance use. Research shows that the effects of substance use during childhood and adolescence lead to abnormalities in brain functioning, such as poorer neurocognitive performance, diminished white matter quality, changes in brain volume, and abnormal neuronal activation patterns (Squeglia et al., 2009). Substance use has also been linked to the development of psychosis, with research linking early-onset cannabis consumption as a potential causal risk factor (Goerke et al., 2013). Despite the adverse consequences, many youths feel the need to "self-medicate" with

substances, demonstrated by the abuse of opioids and anxiety medications, such as benzodiazepines like Xanax, on the rise amongst young people (Young et al., 2012; Hockenull et al., 2019). This crisis of ever-younger substance use has spread through pop culture and social media with the overdose-related deaths of 21-year-old music idols Gustav Åhr and Jarad Higgins mirroring the previous generation's 27-club with icons like Kurt Cobain and Amy Winehouse.

In Canada, depending on the province, the legal age to purchase alcohol and marijuana is either 18 or 19 years old. However, 20-50% of children between the age of 8 and 10 report having consumed an alcoholic drink recently (Jackson et al., 2012) with alcohol being



the most common substance used by Canadian youth aged 11 to 18 (Canadian Center on Substance Use and Addiction, 2017; Health Canada, 2019). In addition, 33% of Canadian youth report trying cannabis before the age of fifteen (Curie et al., 2009), making cannabis the second most popular substance amongst elementary students. Inhalant use is also becoming a rising concern amongst Canadian youth aged 10 to 16 (Baydala et al., 2010), with 1-3% of children and youth undergoing addiction treatment reporting inhalant abuse as the cause (Alberta Health Services, 2018).

Indigenous children and adolescents in Canada make up a minority group of individuals particularly at risk of early substance use with 25% reporting substance use between the age of 10 and 12 years old (Maina et al., 2019). This is twice the rate compared to non-Indigenous children in Canada (Maina et al., 2019). Indigenous youth in Canada are also twice as likely to smoke tobacco (Reading et al., 2009) and appear to “begin experimenting with smoking earlier than their non-Aboriginal peers” (First Nations Information Governance Centre, 2012). Smoking marijuana and drinking alcohol appear to also be happening at an early age, with 96% of primarily Indigenous clients at a western Canadian opiate replacement therapy clinic reporting having started using alcohol at 6 years old and marijuana at 7 years old (Maina et al., 2019). Research identifies this early-onset and the subsequent compounding rate of substance use among Indigenous adolescents as a risk factor for substance-related disorders and associated problems like poorer educational outcomes and comorbid mental health problems in adulthood (Kunitz, 2008; Windle et al., 2008; Behrendt et al., 2009; Whitesell et al., 2009; Degenhardt et al., 2016).

In light of the dangers to developmental, mental, and physical health associated with substance use at a young age, the need for preventative programs is abundantly clear. The age in which these preventative interventions take place continues to be targeted towards a younger demographic, as the early onset of

substance use is demonstrated within minority and general populations (Health Canada, 2019). A variety of preventative programs have been widely implemented within school settings and curriculums throughout Canada, however, in the past decade, the need for culturally specific and traditionally sensitive programs has become evident for the effective prevention of substance use within minority communities (Snijder et al., 2020). The 1,673,785 Indigenous people in Canada make up 4.9% of the total population with 977,230 First Nations people, 587,545 Métis, and 65,025 Inuit (Statistics Canada, 2021). Of the total Canadian population under 14 years old, 7.7% are of Indigenous descent (Statistics Canada, 2021), resulting in a substantial demographic of young people who are underrepresented for targeted substance use prevention programs in Canada. This paper aims to describe the requisite efforts being made in Canada towards Indigenous communities, compare substance use prevention programs targeting Indigenous children and adolescents, and provide suggestions for future research of preventative interventions directed towards substance use within minority groups.

Theoretical background

As seen in Figure 1, the biopsychosocial model (Engel, 1977) can be implemented to explore the complex interplay of neurobiological (i.e., genetic) and psychosocial influences that contribute to substance use and addiction amongst Canadian Indigenous youth. This model has been widely accepted in the field of substance use and addiction, as consideration of biological, psychological, and social factors is required to accurately conceptualize relevant risk factors and addictive behaviors necessary in understanding the development and progression of substance use problems (Skewes et al., 2013).



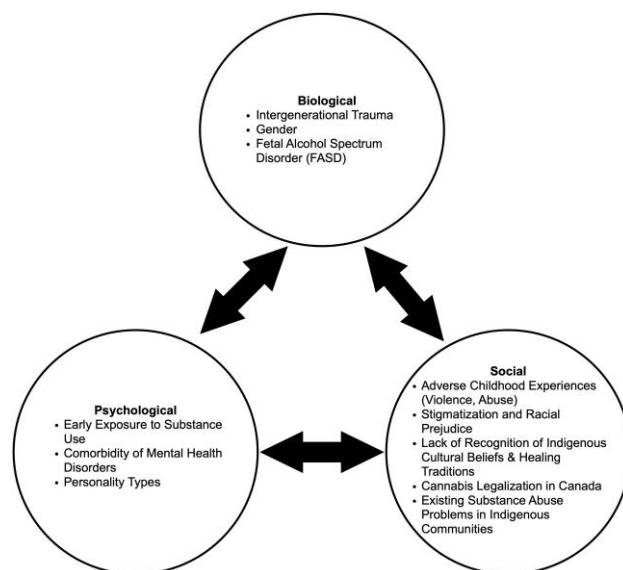


Figure 1. Biopsychosocial model

Biological factors

Under the domain of biological factors, we can explore genetic predispositions that influence substance use amongst Indigenous youth in Canada. Indigenous populations have historically faced adversity and traumatic experiences in Canada. During the country’s colonization, Indigenous peoples were enslaved (Lawrence, 2016), expropriated (Sharma et al., 2008), and genocided (Woolford et al., 2011). They suffered from the loss of their lands and resources, were the victims of forced religious conversion, and approximately 90% of all Indigenous people in Canada were systematically exterminated through successive smallpox and influenza epidemics of early colonization (Rowe, 2011). This racial abuse, targeted towards stripping the native people of Canada of their cultures, languages, and traditions continued until 1996 in the form of residential schools (Grant, 1996). These government-sponsored assimilation schools are well-documented to have forcefully taken children from their families and subjected them to physical, mental, and emotional abuse; often resulting in death, as evident by the May 2021 discovery of 215 children’s bodies found in an unmarked grave at a

former Kamloops residential school (Potenteau, 2021). Empirical evidence shows that the effects of such traumatic stress can be transmitted to subsequent generations through epigenetic changes in the germline (Jawaid et al., 2018). These trauma-induced epigenetic alterations may potentially render affected individuals “more susceptible to drug-induced neuroplastic changes that form the substrates of addictive diseases” with substances like alcohol, nicotine, methamphetamines, cocaine, and opiates (Cadet, 2016).

Gender appears to also play a role in the onset of substance use. In Canada, Indigenous female adolescents are more likely to begin smoking than males (First Nations Information Governance Centre, 2012). This could be the result of 80% of Canadian Indigenous women experiencing abuse (Larocque, 1994) and 25-50% experiencing sexual abuse as children (Collin-Vézina, et al., 2009), as sexual abuse has been shown to predict subsequent smoking trajectory in longitudinal studies (Amstadter et al., 2009).

Another biological factor contributing to substance use susceptibility involves predisposition from birth. It



is estimated that over 3,000 babies are born with Fetal Alcohol Spectrum Disorder (FASD) every year in Canada, with a significantly greater occurrence of the disorder in Indigenous populations (Government of Canada, 2017). In addition, self-report data from 2002/2003 First Nations Regional Health Survey shows that 1.8% of First Nations children aged 11 and under living on reserve suffer from Fetal Alcohol Effects (FAE) involving developmental deficits, life-long neurocognitive impairments, and deficits in daily-life functioning (First Nations Information Governance Committee, 2007; Dirks et al., 2019). Research shows an increased prevalence of substance use amongst FASD patients (Dirks et al., 2019), as well as clinical, neuropsychological, and neurochemical evidence of a link between FASD and attention-deficit-hyperactivity-disorder (ADHD) (O'Malley et al., 2002). This is concerning, as ADHD has high comorbidity with substance use disorders, implying that FASD may represent a direct and indirect risk factor for substance use. Although considered here as a biological factor, FASD-associated delays in development, intellectual problems, and social problems may also contribute to psychological and social factors of substance use development.

Psychological factors

Mental health disorders have been empirically proven as significant risk factors for comorbid substance use (Swendsen et al., 2010), especially amongst children and adolescents (Jones et al., 2019). Substance use as an adverse outcome of mental health disorders is a particularly prominent issue within minority groups as they are often less likely to receive treatment services (McKnight-Eily et al., 2021), resulting in the need for culturally adapted prevention programs. For example, Indigenous high school students in Canada are more likely to be diagnosed with depression or anxiety than their non-Indigenous peers, as well more likely of having a lifetime diagnosis of depression (Hop-Wo et al., 2020). Studies also show

that Indigenous youth are more likely to self-harm, seriously consider suicide, attempt suicide, binge drink alcohol, use marijuana and use recreational drugs (Hop-Wo et al., 2020). This higher prevalence of mental health and substance-related issues may be linked to the fact that suicide and self-inflicted injuries are the leading causes of death amongst Indigenous adolescents (Public Health Agency of Canada, 2016), with the suicide rate of Indigenous peoples being three times higher than that of non-Indigenous people (Kumar et al., 2016). The suicide rate doubles when living on-reserve compared to off-reserve and in northern communities, Inuit youth demonstrate one of the highest suicide rates in the world at eleven times the national average (43). The rate of anxiety is also higher amongst Indigenous youth, with 8.2% being diagnosed with an anxiety disorder compared to the 3% national average (Canadian Mental Health Association, 2018; Elflein, 2018).

The relationship between anxiety disorders and substance use can be demonstrated by psychological factors that serve as motivation for alcohol consumption. Conrod and Woicik present three personality types related to at-risk alcohol use patterns through their combined multi-method findings and the development of the Substance Use Risk Profile Scale (SURPS); anxiety sensitivity, sensation seeking, and hopelessness/negative thinking. Anxiety-sensitive youth exhibit an increased risk for anxiety disorders and tend to use alcohol as a coping, reduction, or avoidance strategy for negative emotions and social criticism (Maller et al., 1992; Stewart et al., 1997; Stewart et al., 2001; Conrod, 2007). Similarly, hopelessness/negative thinking personalities show a link to depressive disorders, with alcohol being used as a pain-reduction strategy to self-medicate, specifically amongst Indigenous youth (Stewart et al., 2005). Sensation seeking on the other hand refers to individuals that consume alcohol to experience euphoric and intoxicating effects (Stewart et al., 2000), which would require a completely



different preventative strategy compared to the previous two personality types that are orientated around self-soothing motivational factors. With 1 in 11 Canadian youth being dispensed a mood, anxiety, or antipsychotic medication between 2018 and 2019 (Canada Institute for Health Information, 2020), it is understandable why Indigenous youth may feel the need to self-medicate with substances. This is especially fathomable given the fact that, unlike other Canadian citizens, Indigenous peoples are required to have federal healthcare insurance in a predominately provincial healthcare system; a health inequality remaining from the Indian Act of 1876 (Richmond et al., 2016).

Social factors

In addition to the intergenerational trauma previously discussed, colonization has been associated with Indigenous children facing higher rates of adverse childhood experiences (Koss et al., 2003). Such experiences, in particular violence and abuse, are proven to be significant risk factors for substance use (Jacobs et al., 2001) and have been reported to be elevated within Indigenous households compared to in non-Indigenous households (Boyce, 2014). This may explain why Indigenous children and adolescents display an earlier onset of alcohol consumption with 28% of those aged 10 or younger living on-reserve and 42% aged 12 or younger living on or off-reserve reporting experimenting with alcohol (Tsuruda et al., 2012).

While non-commercial tobacco is considered a spiritual plant in many Indigenous communities (Gendron, 2018), alcohol was first introduced during colonization as a masked instrument of trade and diplomacy and has been historically used to suppress minority communities (Frank et al., 2000). After the stigmatization of Indigenous alcoholism was firmly established in Canadian society, a strict alcohol ban was enforced upon Canadian Indigenous communities from 1876 to 1985 through the federal Indian Act

(Moss et al., 1992), which harshly marginalized access to substances. The psychological effects of this racial segregation and discrimination in Canadian societies have led to stigmatization, racial prejudice, and a lack of recognition of Indigenous cultural beliefs and healing traditions (Logan et al., 2020). This emphasizes the need for culturally adapted and culture-based programs, as Indigenous peoples tend to underutilize mental health and addiction treatment services (Marrone, 2007).

The low engagement of resources and high prevalence of mental health and substance use problems in these minority communities results in Indigenous parents often also being affected by addiction, mental illness, homelessness, interpersonal and systemic violence, racism and trauma, and separation from their children (Caplan et al., 2020). This in turn can contribute to ambivalent or insecure attachment with their children (Howard et al., 2011; Feizi et al., 2019), which has been linked to anxiety and depressive disorders in adolescence (Lee et al., 2009). Such disorders seemingly increase the risk of comorbid substance use (Swendsen et al., 2010), as a bond to a substance may be used as a replacement for parental attachment (Schindler, 2019). This link between substance use disorders and insecure attachment appears to be stronger in adolescence compared to adulthood (Schindler, 2019), concurring the targeting of children and adolescents for preventative substance use programs. The ambivalent attachment also presents a difficulty in the field of child and adolescent psychology, as child therapy is recommended to integrate family involvement (Esser et al., 2011). This issue may be lessened in adolescents, as individual or group therapy is favored, however, lack of family and social support is also linked to substance use (Atadokht et al., 2015).

The societal influences of reserve communities and Indigenous traditions may also influence Indigenous youth's elevated smoking rates. One in three Indigenous youth aged 12 to 17 living on-reserve and



one in four living off-reserve reported smoking daily or occasionally (Atadokht et al., 2015). This is much higher than the approximate 8% of same-age youth in the general Canadian population (Health Canada, 2009). Children and adolescents that begin smoking at an early age demonstrate a higher risk of mental and physical health problems throughout their lifetime (Centers for Disease Control and Prevention, 1994), which highlights the need for preventative programs targeting Indigenous youth, as 57% of Indigenous adults living on-reserve report smoking daily or occasionally, compared to only 20% of the general Canadian adult population (Reid et al., 2019). It is also

worth noting that the 2018 federal legalization of cannabis in Canada may have influenced substance use, however, the use of cannabis for adolescents 15 to 17 decreased by 50% and remained relatively unchanged for young adults aged 18 to 24, with 6% of Canadians identifying as daily users both before and after legalization (Boudreau, 2020).

2. Methods

The studies were selected for eligibility by considering the inclusion and exclusion criteria listed in Table 1.

Table 1. Inclusion & exclusion criterion

Inclusion Criteria	Exclusion Criteria
Empirical Data	Non-Empirical Data
Substance Use Prevention Programs	Non-Substance Use Related Prevention Programs
Canadian Indigenous Youth	Youth of Non-Canadian Indigenous Origins

As the field of substance use prevention is very broad, the search terms were specifically selected to narrow the results for the specific population being reviewed. Therefore, the following search terms were entered into the EBSCOHost database: “Indigenous AND Youth AND Prevention Program”.

The complete representation of the search can be found in the Prisma Flow Chart (Figure 2). Entering the search terms resulted in 127 hits in the EBSCOHost database. An additional 4 peer-reviewed studies were also identified through other sources (i.e., in reviewing the reference lists of previous studies). The following filter functions were selected a) “full text”

for a complete assessment of the texts, b) “Academic Journals” to include only scientific journals, c) “Peer Reviewed” to include only peer-reviewed articles, and d) “PY ≥ 2011 PY ≤ 2021” to ensure that the research was up to date. This resulted in 30 articles whose abstracts were checked for compliance with the inclusion and exclusion criteria, as well as filtered for duplicate studies. After a comprehensive review of the abstracts, 20 articles had to be excluded because 3 did not meet the established criteria. The full texts of the selected 10 studies were reviewed and 5 studies were found to be relevant and were included in the literature review.



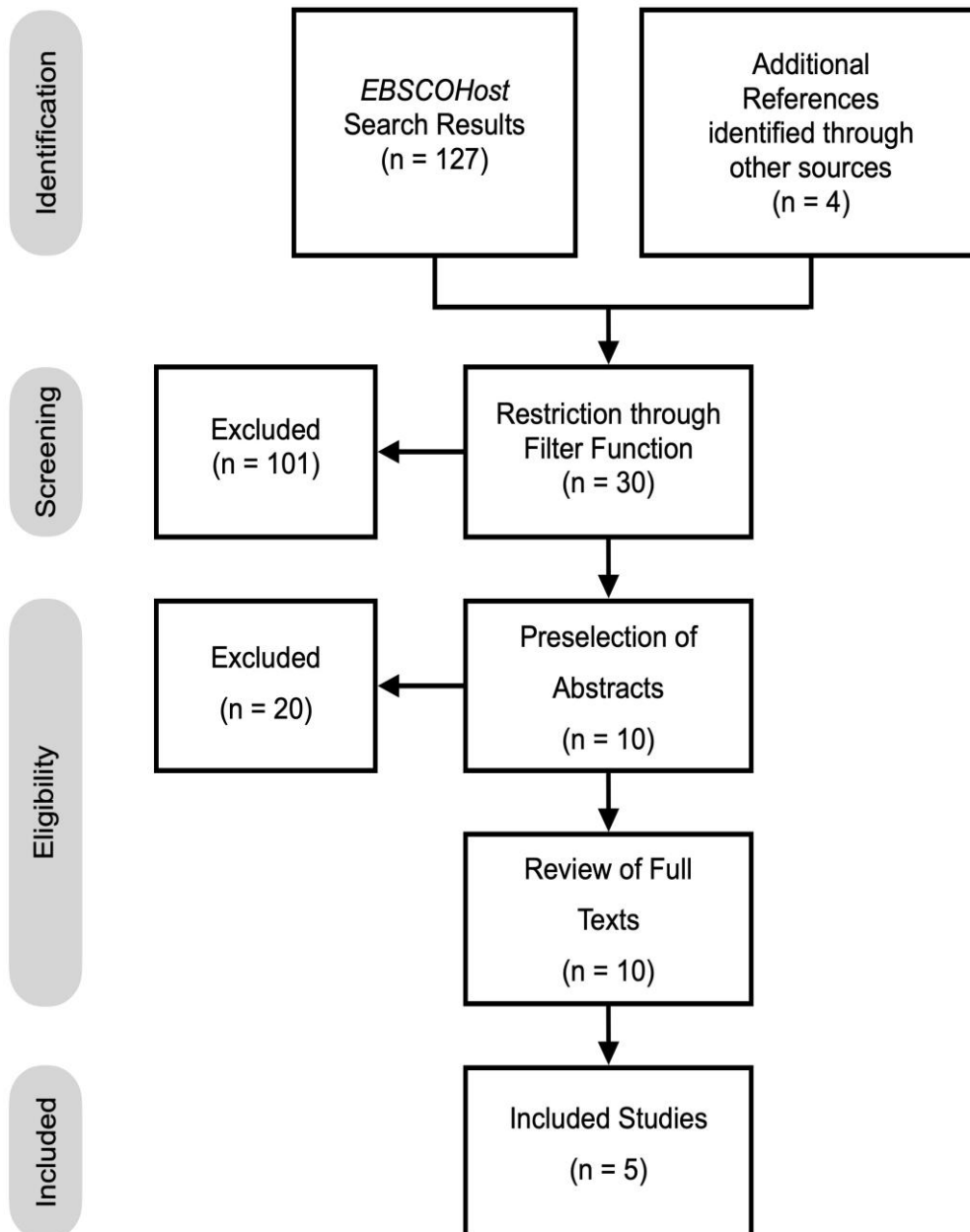


Figure 2. PRISMA flow chart

3. Results

Four prevention programs were chosen to be included in the review: LST, MLST, BZDDD, and an unnamed culturally sensitive smoking prevention program. As seen in Table 2, LST (i.e., MLST) is adapted and revised for different Indigenous Nations and reviewed in three studies, the culturally sensitive smoking prevention program is reviewed in a

comparison study, and the collective grassroots initiative of the BZDDD program is reviewed. The latter has been used since 1996 in various Indigenous populations throughout North America (Ivanich et al., 2020), however, there are no explicit empirical results that have been published to date and therefore only general reported findings can be discussed.



Table 2. Study overview

Authors	Journal	Title	N	Test Sample	Design	Results
Baydala, Sewlal, Rasmussen, Alexis, Fletcher, Letendre, ... & Kootenay (2009)	Progress in community health partnerships: research, education, and action	A Culturally Adapted Drug and Alcohol Abuse Prevention Program for Aboriginal Children and Youth	11	Indigenous elementary students (n = 17) of the Alexis Nakota Sioux Nation participated in the program from grade 3 to grade 5. a) 15 took the pre-test b) 11 took the post-test	Project Muse is a school-based drug and alcohol prevention program incorporating a culturally adapted 3-level Life Skills Training (LST). One level was delivered per year for three years and included 8 to 14 one-hour lessons/booster sessions. The Elementary School Program began in grade 3. The LST questionnaire was used to measure changes in students' knowledge of the negative effects of drug and alcohol use, attitudes toward drugs and alcohol, and drug and alcohol refusal and life skills. Focus Groups documented the community's experiences of and responses to the program adaptations and delivery.	Descriptive statistics showed most children demonstrated a positive effect from pre- to post-test with increasing overall scores of 55% for overall knowledge, 55% for drug knowledge, 64% for life skills knowledge, 46% for drug attitudes, and 73% for life skills summary. The LST questionnaire also documented positive changes in students' drug and alcohol refusal skills and self-belief. Focus groups requested increased communication with all community members about the program, including frequent updates.
Baydala, Fletcher, Worrell, Kajner, Letendre, Letendre & Rasmussen (2014)	Progress in community health partnerships: research, education, and action	Partnership, knowledge translation, and substance abuse prevention with a First Nations community	50	Indigenous elementary students (n = 25) of the Alexis Nakota Sioux Nation participated in the program from grade 3 to grade 5. a) Intervention Group: 12 took the pre-and post-tests and gave consent b) Comparison Group: 13 took the pre-and post-tests and gave consent Indigenous junior high students (n = 25) of the Alexis Nakota Sioux Nation participated in the program from grade 6 to grade 8. a) Intervention Group: 12 took the pre-and post-tests and gave consent b) Comparison Group: 13 took the pre-and post-tests and gave consent	Project Muse was further expanded to integrate junior high school students and comparison (i.e., control) groups. The LST program design remained the same, however, the PHCSCS-2 was added to the original LST questionnaire. The Elementary School Program began in grade 3 and the Junior High School Program began in grade 6. The focus was put on further adapting the program into the Isga language.	Elementary students showed no significant difference between the intervention and comparison cohorts on the LST or PHCSCS-2 questionnaires. Junior high students showed significant differences between the intervention and comparison cohorts on the LST questionnaire, with the intervention group showing increased knowledge of the negative effects of alcohol use, and increased knowledge/decreased behavior in terms of drug use or intent. No significant differences were found using the PHCSCS-2 questionnaire among junior high students, however, the comparison group showed higher mean scores compared to the intervention group.



Authors	Journal	Title	N	Test Sample	Design	Results
Baydala, Fletcher, Tremblay, Rabbit, Louis, Ksay-yin & Sinclair (2016)	Journal of Community Engagement and Scholarship	A Community-University Approach to Substance Abuse Prevention	67	Indigenous elementary and middle school students (n = 216) of the Maskwacis First Nations participated in the program from either grade 3 to grade 5 or grade 6 to grade 8. a) 216 took the pre-test in Year 1 b) 189 took the post-test in Year 1 c) 103 took the pre-test in Year 2 d) 96 took the post-test in Year 2 e) 79 took the pre-test in Year 3 f) 67 took the post-test in Year 3	The Maskwacis Life Skills Training (MLST) program adopted a culturally adapted 3-level LST, where one level was delivered per year for three years and included 8 to 14 one-hour lessons/booster sessions. The Elementary School Program began in grade 3 and the Junior High School Program began in grade 6. The MLST used an Overall Knowledge Scale, Cultural Knowledge Scale, Attitude Scale, an adapted LST questionnaire, and the PHCSCS-2 to measure overall knowledge, antismoking knowledge, life skills knowledge, cultural knowledge, attitude, antismoking attitudes, antidrinking attitudes, and life skills. Additionally, drug refusal skills, assertiveness skills, relaxation skills, and self-control skills were assessed under the life skills construct for junior high students. 25 Focus Groups were held to incorporate a community-based participatory research (CBPR) approach. Linear mixed model analysis was used to evaluate the collected questionnaire data.	Mean Year 1 pre- and Year 3 post-intervention percentage scores showed a positive effect with increases in all measured variables in both the elementary and junior high school cohorts. No statistically significant differences were found using the PHCSCS-2 in either the elementary or junior high students' results. Focus groups reported an increased sense of pride in identity, self-esteem, respectful attitudes, listening skills, and youth attendance at cultural events in the community. Elders' presence in the classroom was reported as beneficial by students, facilitators, and school personnel.
Ivanich, Mousseau, Walls, Whitbeck & Rumbaugh Whitesell (2020)	Prevention Science	Pathways of Adaptation: Two Case Studies with One Evidence-Based Substance Use Prevention Program Tailored for Indigenous Youth.	N/A	Grade 3 and 4 Indigenous elementary students. a) 5 U.S. Reservations b) 4 Canadian Reserves (Ojibwe Nation)	The Iowa Strengthening Families Program for Parents and Youth 10-14 (SFP 10-14; used for U.S. samples) was adapted into the Canadian Bii-Zin-DaDe-Da (BZDDD) family-orientated drug prevention program. It includes 7 weekly sessions each comprised of a group meal, separate 1-hour youth, and adult sessions and a 1hour family session. Videos, games, and activities were used as teaching and discussion methods. The BZDDD was culturally adapted to four distinct Ojibwe First Nations communities in Canada. Three key culturally adapted constructs (mental health promotion, substance use prevention, and group and advisory board focus) were	Publication of results was not possible due to the small sample size; however new randomized control trials are currently underway. The BZDDD is reported to be popular at the grassroots level, although it appears to only be effective for younger children. Family graduation rates for this program are reported to be higher than those of the original SFP 1014. The additional cultural program content was requested by the participating communities.



Authors	Journal	Title	N	Test Sample	Design	Results
McKennitt & Currie (2012)	American Indian and Alaska Native Mental Health Research	Does a culturally sensitive smoking prevention program reduce smoking intentions among aboriginal children? A pilot study.	18	Grade 4 Indigenous students (n = 18) from two western Canada elementary schools a) 11 in culturally sensitive prevention program (Elementary School 1) b) 7 in standard prevention program (Elementary School 2)	Comparison of groups regarding culturally sensitive prevention programs and standard prevention programs. A survey was administered a week before and a week after the administration of prevention programs to measure children's current smoking, intentions to smoke, knowledge of commercial tobacco, and knowledge about the cultural use of tobacco. A t-test was done to investigate the relationship between pre-and post-test impacts of each smoking prevention program on outcome variables.	In the pre-test, 16.7% reported experimenting with smoking and 55.6% believed many or most kids their age smoke regularly. The t-test showed a significant reduction of intention to smoke for the culturally sensitive prevention program compared to the standard prevention program.

4. Discussion

The following section is intended to evaluate the presented studies comparatively regarding various indicators, determine limitations, and provide suggestions for improvement that will contribute to the future outlook in the field of child and adolescent psychology. The aim is to discuss and critically examine scientific contributions to the question of effective substance use prevention programs that target Canadian children and adolescents of Indigenous descent.

The LST (i.e., MLST) shows promising results overall in both the Alexis Nakota Sioux Nation and the Maskwacis First Nations populations. In the first phase of Project Muse, which partnered with the Alexis Nakota Sioux Nation, researchers from the University of Alberta presented positive effects within all measured constructs for the elementary school program (Baydala et al., 2009). However, in the second phase, they integrated the Piers-Harris Children's Self-

Concept Scale-2 (PHSCS-2) and an additional cohort of junior high students, as well as focused on the further adaptation of the program into the Isga language, resulting in elementary students no longer showing significant preventative effects (Baydala et al., 2014). Despite the relapse in effectiveness observed in elementary-aged children, the program appeared to demonstrate partial preventative effects in the junior high-aged youth (Baydala et al., 2014). The University of Alberta team kept both age groups and questionnaires but extended the program further with extensive focus groups and three additional questionnaires while establishing the MLST program (Baydala et al., 2016). Although the PHSCS-2 still showed no significant results in either the elementary or junior high cohorts, all other measured variables showed a positive effect in both cohorts of the Maskwacis First Nations (Baydala et al., 2016). In all three studies where the LST (i.e., MLST) was utilized, focus groups emphasized the importance and



beneficial effects of integrating elders and cultural elements into the program's curriculum.

The BZDDD drug prevention program has been used in various Indigenous populations in North America and is said to be popular at the grassroots level, reportedly showing effectiveness in younger children (Ivanich et al., 2020). However, the lack of empirical data and vague published findings prevents a thorough analysis of its effectiveness and validity. Hopefully, in the future, this popular prevention program will be able to present evidence of its success in producing positive preventative effects within Indigenous youth populations, as many studies are reported to be underway at the time of this paper's conception (Good Clinical Practice Network, 2021; McGill University, 2021).

The comparative study design of McKennitt & Currie's study confirmed the need for culturally adapted prevention programs by highlighting the prevalence and mentality surrounding smoking amongst Indigenous youth and the increased effectiveness of a culturally sensitive prevention program (McKennitt, 2012). Both this school-based culturally sensitive smoking prevention program and the LST-based drug and alcohol prevention programs, as well as the family-orientated BZDDD drug prevention program, show promising results for Indigenous children and adolescents. The cultural inclusivity of such programs emphasizes the importance of specific adaptations for minority groups and should be considered when targeting substance use prevention in Indigenous and other minority populations.

The first phase of the LST-based Project Muse had a small sample size, resulting in the inability to perform statistical tests such as an ANOVA analysis (Baydala et al., 2009). The Alexis Nakota Sioux Nation Elders involved also reported difficulty in translating the program curriculum from English to their native Isga language (Baydala et al., 2009). These limitations were taken into consideration during the second phase

of the project and a larger sample size, as well as an ameliorated translation, was accomplished. However, the results of this study were impacted by the inconsistent and unpredictable school attendance of students, resulting in missed training lessons and booster sessions (Baydala et al., 2014). This limitation conforms with the known special challenge of high drop-out rates experienced when working with adolescents and young adults (Maur, 2017). Elementary students that attended more classes demonstrated better scores in drinking and personal management skills, however, the overall results for this age group were insignificant (Baydala et al., 2014). Contrarily, no significant differences were found between attendance and intervention outcomes for junior high students (Baydala et al., 2014). Therefore, whether the specific lessons or merely the enrolment in this program impacted the older age group could not be indisputably determined. The second phase of Project Muse, as well as the MLST, integrated the PHSCS-2 into their curriculum and it failed to yield any significant results (Baydala et al., 2009). This may be because this questionnaire was validated through primarily Caucasian children (Piers et al., 2002) and therefore may not be suited for Canadian Indigenous children. As there is no such social-emotional measurement instrument currently available for the reviewed minority group, the development of such an instrument in the future may assist in collecting significant data for LST-based preventative substance use programs. Overall, future substance use prevention programs implementing the LST would benefit from larger sample populations that include other Indigenous peoples. The results appear promising for mid-western First Nations groups in Canada, however, First Nations bands in other geographical locations and Indigenous peoples of Inuit and Métis descent must also be considered in future research.

Limitations for the BZDDD cannot be thoroughly assessed, as only very limited information has been



published. However, the program presents a risk of fidelity to the original key prevention constructs, as there has been a high fluctuation of adaptation made to the curriculum in each of the targeted sample populations as of yet (Ivanich et al., 2020). Researchers at McGill University resolved the solution to this issue by establishing the “Program Materials: Mental Health Promotion for Aboriginal Youth McGill University”; a training manual for the adaptation process in future Indigenous populations (McGill University, 2012)

The generalizability and application of the results of McKennitt & Currie’s study is limited due to the small sample size and uneven gender ratios between cohorts (McKennitt et al., 2012). The culturally sensitive prevention program cohort also had a slightly older sample population than the standard prevention program cohort (McKennitt et al., 2012). Therefore, future research should aim to include a larger sample population that is randomized more evenly in terms of gender and age. In addition, a study design with extended follow-up periods and the collection of more data on parental-smoking behaviors and acculturation would be beneficial.

5. Conclusion

Individual motivators, "self-medicating" behaviors, and personality types would be beneficial indicators to incorporate into future substance use prevention curriculums for both standard and culturally sensitive programs. It may also be beneficial to further specify drug prevention programs for individual substances, such as was done in the alcohol and smoking prevention programs. This may help to address and encourage preventative behaviors regarding the high prevalence of marijuana, opioid, and inhalant use amongst Canadian children and adolescents. Future research should also take into consideration the high comorbidity of mental health disorders and historical trauma experienced within Indigenous communities to better tailor a program to their needs. This

consideration should also be applied to substance use prevention programs curated for other minority groups like refugees and ethnic minorities. In addition to adapting prevention program curriculums to specific personality types and their unique motives for substance use, consideration should be given to sub-populations of marginalized communities, such as youth who also have comorbid disorders like Fetal Alcohol Spectrum Disorder (FASD), attention-deficit hyperactivity disorder (ADHD), anxiety, depression, first-hand trauma, and parents suffering from addiction and mental illness. Future studies may also aim to explore the relationship between substance use prevention and gender identity vs. assigned sex at birth, as transgender, non-binary, and Two-Spirit youth demonstrate a high risk for substance use (84), yet there has not been a specific substance use prevention program conceptualized for these individuals.

While cultural-based prevention programs can’t be directly applied and used with other minority populations or the general public, we can see the relevance and significant effect that a program adapted to a specific group’s culture has in substance use prevention amongst in-group children and adolescents. Therefore, a recommendation for the adaptation of such culturally sensitive prevention programs for specific groups within populations other than Indigenous peoples can be made on a global scale. The application of culturally sensitive substance use prevention programs should not reduce offerings of programs developed for the general population, as this may cause increased tensions between groups. Instead, at-risk populations should be targeted, while also offering prevention measures and substance abuse help to all. This would lead to a future society that prioritizes the increase of diversified care and the decrease of marginalization in the healthcare system.



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