PEER REVIEW HISTORY

ARTICLE DETAILS

TITLE (PROVISIONAL)	Investigating the associations of age of initiation and other psychosocial factors of singular alcohol, tobacco and marijuana usage on polysubstance use: analysis of a population-based survey in Jamaica
AUTHORS	Lalwani, Kunal; Whitehorne-Smith, Patrice; McLeary, Joni-Gaye; Albarus, Neena; Abel, Wendel

VERSION 1 – REVIEW

REVIEWER	Beaudoin, Mélissa University of Montreal, Psychiatry and addictology
REVIEW RETURNED	21-Jul-2023

GENERAL COMMENTS	This paper reports the finding of a cross-sectional study of 4,623 respondents from the Jamaica National Drug Prevalence Survey dataset. The authors investigated the association between polysubstance use and a few variables, including ease of access to marijuana, alcohol, and drug use among friends/relatives, risk perception, and each substance's initiation age. Multiple statistically significant associations supported the hypothesis that marijuana could act as a gateway drug toward polysubstance use. In the context of the recent decriminalization of marijuana in Jamaica as well as its recent legalization in multiple states and countries, it is relevant to investigate the impacts of this drug. Polysubstance use can lead to significant effects on physical and mental health, and therefore understanding the factors leading to it is crucial, especially in a population in which cannabis use is highly prevalent. Therefore, I believe this study is worthy of publication. Nevertheless, I have a few questions and comments, which you will find below (per section). General: 1. Some sentences could be shorter and/or easier to understand, particularly in the abstract section. For example, the first sentence ("Objectives" section") should be revised. 2. The authors could benefit from the help of correction software (e.g., Grammarly) or review by an English-proficient professional in order to ensure clarity. Abstract: 3. Reading only the abstract and key points makes it challenging to understand whether the entire dataset was included or whether a subsample of randomly selected respondents was analyzed. Although it becomes clear when reading the main text, this should be clarified in the "participants" section.

	4. Lines 22-23: It is difficult to understand what is meant by "reported low-risk perception to smoking marijuana sometimes and often" without having read the main text. Please clarify. Introduction: 5. The introduction is very well-written and easy to follow. The authors provided a relevant overview of the literature on the subject. Methods: 6. I have one primary concern regarding the methodology. The authors define polysubstance use as using two or more of the following substances: tobacco, alcohol, and marijuana (page 7, lines 25-28). However, it is later mentioned that illegal drugs were defined as any substance except tobacco or alcohol (page 7, lines 41-44). Therefore, it remains unclear whether illicit substances other than marijuana were considered. If not, the authors should provide an explanation, and this limitation should be acknowledged at the end of the discussion section. Results: 7. Table 1: I suspect there might be mistakes in risk perception statistics, as it looks pretty counterintuitive that more people would have high-risk perceptions about using marijuana and cigarettes sometimes than often. I am also surprised to see that little difference in risk perceptions between drinking alcohol sometimes vs. often. 8. Table 1: Accessibility to marijuana is the only psychosocial variable not included in this table; why? 9. Multiple sentences are formulated using double negations, which makes them challenging to interpret. For example, p.13, lines 28-31: "those participants who negatively indicated that […] were 1.736 and 1.792 times less likely to…". This problem could be solved by changing the formulation, for example: "having a relative who gets drunk or consumes drugs increased the risk of polysubstance use by 1.736…". 10. Table 3: Multiple odds ratios seem to be inverted. For example, an OR of 0.280 for easy access to marijuana could lead the readers to believe that easy access would decrease the likelihood of polysubstance use. The same is observed for friends/family who get drunk and take illegal drugs. These should be carefully reviewed in order to avoid false interpretations of the data. Discussion: 11. Page 14, lines 17-21, "95% of the population began using […] at age 25 or younger": this sentence is misleading, as a significant proportion of the sample never tried these substances. 95% of the individuals who used these substances at least once had done so before age 25. Please reformulate. 12. Page 14, lines 43-49, "The finding presented finds concordance with prior research that highlights the early age of marijuana use as being associated with other drug use and substance use disorders": the present study did not investigate this association, as other drugs were not considered. 13. Limitations: Please see point #5. In summary, this study is relevant and of interest in the context of the recent decriminalization of marijuana in Jamaica. Nevertheless, a few issues must be addressed in order to consider

	the manuscript for publication. If needed, I will be happy to receive the authors' answers as well as the corrected manuscript.

REVIEWER	Gallassi, Andrea Universidade de Brasilia, Programa de Pós-Graduação em Ciências e Tecnologias em Saúde (PPGCTS)
REVIEW RETURNED	01-Aug-2023

GENERAL COMMENTS	The article is interesting, with a good sample and good analysis, even if it is a data collection carried out 7 years ago. Some adjustments need to be made so that it can be considered an article with potential for publication. The objectives of the Abstract are confusing. It needs some adjustments in the writing. Contrary to what many people think, Jamaica has not legalized recreational/adult use of marijuana. This would be important to clarify in the introduction. In addition, it would be appropriate to detail the legal status of marijuana in the country (is the therapeutic use of cannabis allowed?), since the article treats all substances other than alcohol and tobacco as illegal (lines 42-44 page 8), as well as measuring the access only for marijuana. Lines 30 to 34 page 4. Considering that concurrent polysubstance use is the article's core, the authors should better define this concept. Polysubstance use "within a given period" is too vague. In the sub-item "Measures" (line 25 page 8) the authors still refer to this vague conceptualization to define concurrent polysubstance use. In the categorization of "low risk", please describe "no risk to low risk" to make it consistent (first line on page 9). Adjust it in the rest of the results/tables. Adopt a standard to define "cigarette" (or cigarette or tobacco). The authors' coding of risk perception (last paragraph of page 8) treats "I don't know the risk" as missing. In my opinion, this treatment is wrong, precisely because not knowing the risks should be used as a variable in the analysis, which can show that many people do not even know how to classify the risks of using a substance and still use substances. The authors tried to make this risk option a neutral variable, but in practice the option "I don't know the risk" was not neutral. In the variable about how easy it was to access marijuana, what does the variable "could not have access to" mean? How was this response option analyzed? In the Results (first paragraph), please adopt a standard for describing the numbers (with comma or without comma). Please insert in brackets the corresponding percentage of the number of people who reported concurrent polysubstance use in their lifetime, in the last year, and in the last month. Insert the "n" and the year of the data in the title of the tables. In Table 1, by adopting the option "I do not know the risk" as a variable to be analyzed, the results may modify and enable discussions regarding the lack of knowledge of risks as a risk. The same for Table 2. In the discussion, the authors make reference to the possible impact of increased marijuana use and access to medical marijuana due to the relaxation of laws, and therefore the need for prevention/treatment policies. I suggest that the authors provide an overview of the functioning of the drug use treatment and prevention network in Jamaica and how the present study's findings should inform prevention and treatment policies for substance use disorders in the country.

	Authors should include the possible reasons that led to so many missing in the results. They should also include this in the limitations of the study.

VERSION 1 – AUTHOR RESPONSE

Reviewer 1:
Dr. Mélissa Beaudoin, University of Montreal, Centre de recherche de l'Institut universitaire en santé mentale de Montréal
Comments to the Author:
General:
1. Some sentences could be shorter and/or easier to understand, particularly in the abstract section. For example, the first sentence (“Objectives” section”) should be revised.
Response:
The first sentence in the objectives has been revised and now states “To examine concurrent polysubstance use of alcohol, tobacco and marijuana and determine correlations with access to marijuana, friend and familial drug use habits, risk perception and the age of initiation associated with the singular use of these substances”. The rest of the abstract has been re-organized to facilitate easier understanding.
2. The authors could benefit from the help of correction software (e.g., Grammarly) or review by an English-proficient professional in order to ensure clarity.
Response:
Our team of authors agrees with the reviewer and has utilized the assistance of an English-proficient colleague to ensure clarity throughout the document.
Abstract:
3. Reading only the abstract and key points makes it challenging to understand whether the entire dataset was included or whether a subsample of randomly selected respondents was analyzed. Although it becomes clear when reading the main text, this should be clarified in the “participants” section.
Response:
The “Participants” section now reflects that the entire dataset was included in the analysis.
4. Lines 22-23: It is difficult to understand what is meant by “reported low-risk perception to smoking marijuana sometimes and often” without having read the main text. Please clarify.
Response:
The sentence now states “Respondents who did not believe smoking tobacco sometimes ($p=0.049$), and smoking marijuana sometimes and often was harmful, had increased odds of concurrent polysubstance use ($p=0.047$ and $p<0.001$, respectively).
Introduction:
5. The introduction is very well-written and easy to follow. The authors provided a relevant overview of the literature on the subject.
Response:
Thank you.
Methods:
6. I have one primary concern regarding the methodology. The authors define polysubstance use as using two or more of the following substances: tobacco, alcohol, and marijuana (page 7, lines 25-28). However, it is later mentioned that illegal drugs were defined as any substance except tobacco or alcohol (page 7, lines 41-44). Therefore, it remains unclear whether illicit substances other than marijuana were considered. If not the authors should provide an explanation, and this limitation should be acknowledged at the end of the discussion section.

Response:
Thank you. The study focused on alcohol, tobacco and marijuana primarily because these were the most commonly used substances among the population. The frequencies of illicit drugs other than marijuana were minimal. This was acknowledged in the limitations (please see final paragraph on page 22). The statement “Illegal drugs were defined as using any substance other than alcohol or tobacco” has been removed (please see the end of the first paragraph on page 9).
Results:
7. Table 1: I suspect there might be mistakes in risk perception statistics, as it looks pretty counterintuitive that more people would have high-risk perceptions about using marijuana and cigarettes sometimes than often. I am also surprised to see that little difference in risk perceptions between drinking alcohol sometimes vs. often.
Response:
Thank you for this assistance. In table 1, the frequencies of the risk perception have been corrected and the item re-categorized as per the second reviewer’s suggestion to include 3 categories, which are (1) no risk to low risk, (2) moderate to high risk and (3) don’t know the risk. Please see table one on page 12.
8. Table 1: Accessibility to marijuana is the only psychosocial variable not included in this table; why?
Response:
Accessibility to marijuana has now also been included in table 1 and has been re-categorized to include 4 categories, which are (1) easy, (2) difficult, (3) could not have access to and (4) don’t know. Please see table one on page 12.
9. Multiple sentences are formulated using double negations, which makes them challenging to interpret. For example, p.13, lines 28-31: “those participants who negatively indicated that […] were 1.736 and 1.792 times less likely to…”. This problem could be solved by changing the formulation, for example: “having a relative who gets drunk or consumes drugs increased the risk of polysubstance use by 1.736…”.
Response:
Thank you. The authors have taken this suggestion and the sentence now reads “In addition, those participants who indicated that friends or family members get drunk and take illegal drugs were associated with a 1.722 and 1.864 increased odds of reporting past month concurrent polysubstance use than those who reported that friends or family members did not get drunk and take illegal drugs (p=0.004 and p=0.017 respectively). Please see the end of paragraph one on page 16.
10. Table 3: Multiple odds ratios seem to be inverted. For example, an OR of 0.280 for easy access to marijuana could lead the readers to believe that easy access would decrease the likelihood of polysubstance use. The same is observed for friends/family who get drunk and take illegal drugs. These should be carefully reviewed in order to avoid false interpretations of the data.
Response:
Thank you. The authors have included all categories and indicated the reference category in table 3 for clarity in interpreting the odds ratios. Please see table 3 on pages 16-17.
Discussion:
11. Page 14, lines 17-21, “95% of the population began using […] at age 25 or younger”: this sentence is misleading, as a significant proportion of the sample never tried these substances. 95% of the individuals who used these substances at least once had done so before age 25. Please reformulate.
Response:
This sentence has been reformulated to state “This research suggests that the vast majority (95%) of individuals who used alcohol, tobacco or marijuana at least once, had done so before reaching the age of 25, predominantly in adolescence (49.9%, 54.6%, and 55.9% respectively) and childhood (7.7%, 11.1% and 7.3% respectively).” Please see the first paragraph of the discussion on page 17.
12. Page 14, lines 43-49, “The finding presented finds concordance with prior research that highlights the early age of marijuana use as being associated with other drug use and substance use disorders”: the present study did not investigate this association, as other drugs were not considered.

Response:
This sentence has been reformulated to state “The finding presented is in concordance with prior research that highlights the early age of marijuana use as being associated with alcohol and tobacco polysubstance use (67,68).” Please see the second paragraph of the discussion on page 17.
13. Limitations: Please see point #5.
Response:
Thank you. The point has been accordingly addressed.
In summary, this study is relevant and of interest in the context of the recent decriminalization of marijuana in Jamaica. Nevertheless, a few issues must be addressed in order to consider the manuscript for publication. If needed, I will be happy to receive the authors’ answers as well as the corrected manuscript.
Response:
The authors are grateful to Dr. Mélissa Beaudoin for the comments shared and appreciate the willingness to review the revised manuscript.
Reviewer 2:

Prof. Andrea Gallassi, Universidade de Brasilia, Universidade de Brasilia

Comments to the Author:

The article is interesting, with a good sample and good analysis, even if it is a data collection carried out 7 years ago. Some adjustments need to be made so that it can be considered an article with potential for publication. The objectives of the Abstract are confusing. It needs some adjustments in the writing.

Response:

Thank you. The authors have revised the objectives in the abstract to state “To examine concurrent polysubstance use of alcohol, tobacco and marijuana and determine correlations with access to marijuana, friend and familial drug use habits, risk perception and the age of initiation associated with the singular use of these substances”.

Comment:

Contrary to what many people think, Jamaica has not legalized recreational/adult use of marijuana. This would be important to clarify in the introduction. In addition, it would be appropriate to detail the legal status of marijuana in the country (is the therapeutic use of cannabis allowed?), since the article treats all substances other than alcohol and tobacco as illegal (lines 42-44 page 8), as well as measuring the access only for marijuana.

Response:

The current legal standing of marijuana use in Jamaica has been addressed in the following sentence, “In Jamaica, the most recent national survey indicated that 40-60 per cent of adolescents and 60-80 per cent of adults found marijuana easy to access (9). This finding is foreseeable, given Jamaica’s recent decriminalization of marijuana which allows for possession of small quantities (two ounces) for personal use and therapeutic treatment through the establishment of a legal medical marijuana industry (52)”. Please see penultimate paragraph of the introduction on page 7.
The statement “Illegal drugs were defined as using any substance other than alcohol or tobacco” has been removed (please see at the end of the first paragraph on page 9). The current study focused on alcohol, tobacco and marijuana use. Other than marijuana, no other illicit drug was studied.

Access only for marijuana was measured as the item on ease of access in the questionnaire utilized in the drug prevalence survey focused on access to illicit drugs.
Comment:
Lines 30 to 34 page 4. Considering that concurrent polysubstance use is the article's core, the authors should better define this concept. Polysubstance use “within a given period” is too vague.
Response:
This sentence in the introduction has been reformulated and now states “This is referred to as polysubstance use, as defined by the World Health Organization (13), and can either involve the use of two or more substances on a single occasion (simultaneous), or within a given period (concurrent) spanning days or months (14).” Please see second paragraph on page 4.
Comment:
In the sub-item "Measures" (line 25 page 8) the authors still refer to this vague conceptualization to define concurrent polysubstance use.
Response:
For the purpose of the study, “Lifetime, past year and past month concurrent polysubstance use (CPU) was defined as using two or more of alcohol, tobacco and marijuana over the lifetime, in the past 12 months and past 30 days respectively, measures described previously in the literature (58,59)”. Please see first paragraph on page 9.
Comment:
In the categorization of "low risk", please describe "no risk to low risk" to make it consistent (first line on page 9). Adjust it in the rest of the results/tables.
Response:
Thank you. “Low risk” has been re-categorized to “no risk to low risk” throughout the manuscript.
Comment:
Adopt a standard to define "cigarette" (or cigarette or tobacco).
Response:
Tobacco use has been adopted as the standard and used throughout the document.
Comment:

The authors' coding of risk perception (last paragraph of page 8) treats “I don't know the risk” as missing. In my opinion, this treatment is wrong, precisely because not knowing the risks should be used as a variable in the analysis, which can show that many people do not even know how to classify the risks of using a substance and still use substances. The authors tried to make this risk option a neutral variable, but in practice the option "I don't know the risk" was not neutral.

Comment:

Thank you. The authors agree with the reviewer’s viewpoint and have re-categorized the item to include 3 categories, which are (1) no risk to low risk, (2) moderate to high risk and (3) don’t know the risk (please see last paragraph on page 9) and utilized in the univariate and bivariate analysis as reflected in tables 1 and 2 of the results section. A regression model including the 3 categories of risk was done and demonstrated very high odd ratios for the variable “risk perception of smoking marijuana sometimes (don’t know the risk)” and absent 95% confidence intervals for the variable “risk perception of smoking marijuana often (don’t know the risk)” as seen below:

Psychosocial factors
Odds Ratio 95% C.I. p value
Lower Upper
Accessibility of marijuana (easy) reference
Accessibility of marijuana (difficult) 0.248 0.102 0.605 0.002**
Accessibility of marijuana (could not have access to) 0.271 0.039 1.865 0.185
Accessibility of marijuana (don’t know) 0.800 0.191 3.342 0.759

Risk perception of smoking tobacco sometimes (moderate to high) reference
Risk perception of smoking tobacco sometimes (no risk to low risk) 1.633 1.006 2.651 0.047*
Risk perception of smoking tobacco sometimes (don't know the risk) 1.068 0.217 5.266 0.935
Risk perception of smoking marijuana sometimes (moderate to high) reference
Risk perception of smoking marijuana sometimes (no risk to low risk) 1.500 1.023 2.198 0.038*
Risk perception of smoking marijuana sometimes (don't know the risk) 8023129999.1 0.000 - 0.999
Risk perception of smoking marijuana often (moderate to high) reference
Risk perception of smoking marijuana often (no risk to low risk) 2.749 1.704 4.435 <0.001***
Risk perception of smoking marijuana often (don't know the risk) 0.000 0.000 - 0.999
Age of initiation for alcohol: 11 years and under 1.507 0.410 5.541 0.537
Age of initiation for alcohol: 12-17 years 1.993 0.588 6.763 0.268
Age of initiation for alcohol: 18-25 years 1.094 0.318 3.760 0.887
Age of initiation for alcohol: 26 years and older reference
Age of initiation for tobacco: 11 years and under 0.535 0.185 1.546 0.248
Age of initiation for tobacco: 12-17 years 0.454 0.182 1.131 0.090
Age of initiation for tobacco: 18-25 years 0.691 0.276 1.734 0.431
Age of initiation for tobacco: 26 years and older reference
Age of initiation for marijuana: 11 years and under 3.095 1.046 9.156 0.041*
Age of initiation for marijuana: 12-17 years 4.319 1.784 10.461 <0.001***
Age of initiation for marijuana: 18-25 years 1.622 0.678 3.884 0.277
Age of initiation for marijuana: 26 years and older reference
Friends/family who get drunk (no) reference
Friends/family who get drunk (yes) 1.611 1.119 2.319 0.010**
Friends/family who take illegal drugs (no) reference
Friends/family who take illegal drugs (yes) 1.906 1.151 3.154 0.012*
* significant at the p <0.05, ** significant at the p= 0.01 level, ***significant at the p<0.001 level)

It is likely that the option "don't know the risk" was an underrepresented category with insufficient frequencies that may introduce variability and bias in the interpretation of the model above. As such, for the regression model in the manuscript, response options were re-categorized to examine respondents who had indicated some level of perceived risk (1=no risk to low risk, 2=moderate to high risk) and the option "don't know the risk" was excluded. Please see last paragraph on page extending onto page 10.

Comment:

In the variable about how easy it was to access marijuana, what does the variable "could not have access to" mean? How was this response option analyzed?

Response:

Accessibility to marijuana has now also been included in tables 1, 2 and 3 of the results, and has been re-categorized to include 4 categories, which are (1) easy, (2) difficult, (3) could not have access to and (4) don't know. Please second paragraph on page 10. The option "could not have access to" is synonymous with "no access".

Comment:

In the Results (first paragraph), please adopt a standard for describing the numbers (with comma or without comma).

Response:

Commas have been removed for describing numbers in the results (first paragraph).

Comment:

Please insert in brackets the corresponding percentage of the number of people who reported concurrent polysubstance use in their lifetime, in the last year, and in the last month.

Response:

The corresponding percentages have been included and the sentence reformulated to state “Lifetime concurrent polysubstance use was reported by 907 (19.6%) respondents. Among those who reported lifetime use, 623 (68.7%) and 561 (61.9%) respondents reported concurrent polysubstance use in the past year and past month respectively. Please see first paragraph on page 12.

Comment:

Insert the "n" and the year of the data in the title of the tables.

Response:

“n” and the year of the data in the title of the tables have been included.

Comment:

In Table 1, by adopting the option "I do not know the risk" as a variable to be analyzed, the results may modify and enable discussions regarding the lack of knowledge of risks as a risk. The same for Table 2.

Thank you for the suggestion. The authors agree and have re-categorized the item to include 3 categories, which are (1) no risk to low risk, (2) moderate to high risk and (3) don’t know the risk in tables 1 and 2 of the results. Please see pages 12-15.

Comment:

In the discussion, the authors make reference to the possible impact of increased marijuana use and access to medical marijuana due to the relaxation of laws, and therefore the need for prevention/treatment policies. I suggest that the authors provide an overview of the functioning of the drug use treatment and prevention network in Jamaica and how the present study's findings should inform prevention and treatment policies for substance use disorders in the country.
Response:

The authors agree with the suggestion and have included an overview of the prevention/treatment policies and highlighted recommendations. Please see pages 20-21.

Comment:

Authors should include the possible reasons that led to so many missing in the results. They should also include this in the limitations of the study.

Response:

Missing results were addressed as a result of correcting the univariate frequencies.

VERSION 2 – REVIEW

REVIEWER	Beaudoin, Mélissa University of Montreal, Psychiatry and addictology
REVIEW RETURNED	29-Oct-2023

GENERAL COMMENTS	The authors carefully and thoroughly reviewed the manuscript in concordance with the reviewers' comments, which is greatly appreciated. The paper is now much easier to understand and I have no further concerns. Therefore, I believe that the manuscript is now suitable for publication.

REVIEWER	Gallassi, Andrea Universidade de Brasilia, Programa de Pós-Graduação em Ciências e Tecnologias em Saúde (PPGCTS)
REVIEW RETURNED	24-Oct-2023

GENERAL COMMENTS	The authors have done an excellent job of proofreading and have addressed all of the issues raised in my initial review. As a result, I am satisfied with the work done and have no further comments.

VERSION 2 – AUTHOR RESPONSE