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Prevalence and associated factors of substance use disorders among people who use drugs: a population-based cross-sectional study in the Western Province of Sri Lanka

Sashiprabha Dulanjalee Nawaratne[1*], Janaki Vidanapathirana[2]

[1] University of Colombo - Postgraduate Institute of Medicine, Colombo, Sri Lanka.
[2] Director, National STD/AIDS Control Programme, Ministry of Health, 29 De Saram Place, Colombo 10, Sri Lanka.

*Corresponding author: Dr. Sashiprabha Dulanjalee Nawaratne,
MBBS, MSc in Community Medicine, MD in Community Medicine.
Visiting Research Fellow - Unit of Academic Primary Care, Warwick
Medical School, University of Warwick, Coventry, CV4 7AL, United
Kingdom. Phone: +44 7442097829.
E-mail: sdnawaratne@gmail.com

Abstract

Introduction: This study aimed to assess the prevalence of substance use disorders and associated factors among people who use drugs in the Western Province of Sri Lanka. **Methods:** A cross-sectional study was conducted in the Western Province of Sri Lanka, using a respondent-driven sampling technique. Sampling was initiated with 20 seeds and peers were recruited by peers through handing out coupons. The number of recruited participants was proportional to the estimated number of people who use drugs in each district of Western Province. A total of 870 people who use drugs participated in the study. A validated Sinhala version of the Drug Abuse Screening Test was used to assess the drug use severity among the participants and a pre-tested validated questionnaire was used to collect data to assess the associated factors. RDS Analyst software version 0.64 was used to assess frequency estimates. To assess factors associated with substance use disorders multiple logistic regression analysis was performed using SPSS software version 22. **Results:** The median age of the study sample was 39 years. The incidence of substance use disorder among the sample was 88.4%. Being employed, using heroin as a psychoactive drug, using drugs daily, using more than one drug, being a heavy alcohol user, buying drugs, stealing money or exchanging goods to get drugs, spending a substantial amount per month on drugs (Rs > 40,001), past or present medical history of tuberculosis and those who had disclosed their drug use behavior to their immediate family were found to be significantly associated with an increased risk of having a substance use disorder. **Conclusion:** A high prevalence of substance use disorder was found in the sample with multiple economic, behavioral, and health-related risk factors.

Keywords: Drug abuse screening. Substance use disorders. Prevalence. Risk factors. Sri Lanka.

Introduction

In the world, approximately 284 million individuals aged between 15 to 64 years use psychoactive drugs [1]. Psychoactive drugs are compounds that alter the mental functions of a person, such as perception, awareness, cognition, mood, and emotions when ingested or administered into the body [2]. Long-term or recurrent use of psychoactive substances at high dosages and/or frequencies may result in the development of a distinct, diagnosable condition known as a drug use disorder, that compromises function and health and requires specialized care [3]. According to the World Drug Report, over 35 million people worldwide suffer from substance use disorders [4]. In 2016, substance use disorders were attributed to 31·8 million DALYs (Disease Adjusted Life Years) (95% Uncertainty Interval 27·4–36·6), while 1·3% of all DALYs (95% Uncertainty Interval 1.2–1.5) were attributable to psychoactive drug use as a risk factor [5].
The literature reveals that psychoactive drug use

can affect all aspects of the health of an individual. Physical effects such as road traffic accidents [6] seizures, altered consciousness [7], and Bloodborne viral infections [8], have been reported in the literature. Mental health issues such as mood and anxiety disorders, suicidal thoughts, posttraumatic stress disorder, eating disorders, [9-11], depression, and schizophrenia [12] are associated with psychoactive drug use. Social well-being is also affected by drug use. Research suggests family burden [13], social isolation [11], crime [14], stigmatization, and discrimination are strongly associated with drug use [9,15,16]. Unemployment rates were exceptionally high among psychoactive drug users. Thus they face challenges in maintaining and sustaining financial security [9,12,16]. Furthermore, financial hardship can lead to crime and violence thereby building a vicious cycle.

People who use drugs constitute a hidden population in Sri Lanka [17]. Therefore, the true extent of the burden posed by psychoactive drug users in Sri Lanka remains unknown. According to estimates, there are 533,883 drug users in Sri Lanka [18]. Although the true magnitude of the psychoactive drug users is difficult to capture from direct measures, data demonstrate that the number of psychoactive drug users has been steadily increasing over the years [19]. Substance use disorders have large societal costs due to lost productivity, early death, higher healthcare expenditures, and costs linked with criminal justice, social welfare, and other social implications [20]. Therefore, it is important to understand the true extent of the disease burden brought on by psychoactive drugs.

This study focuses on people who use psychoactive drugs excluding alcohol and tobacco. Even though substance use disorder (SUD) contributes to the global disease burden, little attention is paid to this problem among drug users in particular. For example, in Sri Lanka, many studies have been conducted on institutionalized psychoactive drug users [21-24] but no study has examined the prevalence of substance use disorders among people who use drugs in the community. Therefore, this study aimed to assess the prevalence of substance use disorders and associated factors among people who use drugs in the Western Province of Sri Lanka.

Methods

Study Design and Setting

A cross-sectional study was carried out in Colombo, Gampaha and Kalutara districts in the Western Province. According to the National Prevalence Survey on Drug Use, 42% of people who use drugs in Sri Lanka reside in the Western Province [18].

Study Population

People who use drugs in the Western province, of Sri Lanka were taken as the study population. A person > 18 years of age, who has been using psychoactive drugs for non-medical purposes during the past 12 months preceding the study, in possession of a valid peer recruitment coupon, resided, or worked in the Western Province at least for three months before the time of the data collection was included for the study. Those who only use alcohol or tobacco as a psychoactive substance, show symptoms of psychosis, mania, or cognitive impairment and are unable to provide informed written consent were excluded from the study.

Sample Size

Two sample sizes were calculated. To assess the prevalence of substance use disorders, the formula for integrated biological-behavioral surveillance surveys was used $n = D \times (Z1-\alpha) 2 \times P (1-P) /d2$ [25]. The proportion of people who use drugs who had at least primary education (37%) was taken as the proportion of the population estimate[16]. With a 95% confidence interval (Z=1.96), an alpha error of 5%, a design effect (D) of 2.2, and a 10% non-response rate, the final sample size was calculated and rounded up (n=870). For assessing the associated factors, the sample size required to detect a given odds ratio in a cross-sectional or case-control design was used $n = Z21-\alpha \{1 / [P1 (1-P1)] + 1 / [P2 (1-P2)] \} / [\log e (1- \epsilon)]2$ [26]. As the calculated sample size should be able to detect even the smallest of associations, drug users with risky sexual behaviors with OR 1.23 (P=77.5%) were selected from a previous case-control study [23] to calculate the sample size. Using this information, a confidence level (Z) of 95%, a relative precision (ε) of 25%, a non-response rate of 10%, and assuming that 73.1% of opioid users have opioid dependence [16] the total sample size required was 765. However, to obtain the maximum sample, a previous sample size of 870 was used for both components.

Sampling Technique and Data Collection

Respondent Driven Sampling (RDS) was used to recruit the people who use drugs in the western province. RDS uses coupons (with information on the study, date of interview, place of interview, contact information, and a unique identification number) to recruit peers through peers [25]. Sampling was initiated with 20 seeds (Colombo district-9, Gampaha district-7, Kalutara district-4). Participants recruited from each district are shown in Figure 1. Each seed was handed with three coupons and the recruitment process continued till the expected sample size was achieved. The number of participants recruited from each district

was proportional to the estimated number of people who use drugs in each district [18]. Interviews were conducted in the language which was preferred by the participant (Sinhala or Tamil). A research assistant carried out the tasks of the coupon manager. The coupon manager screened the participants for eligibility, collected and discarded used coupons, and following the questionnaire handed out recruitment coupons to participants to pass to their peers. Four sociology graduates with prior experience in working with psychoactive drug users collected data from September 1st to November 30th, 2019.

Figure 1. Number of recruits recruited by each seed using respondent-driven sampling according to the district in the western province.
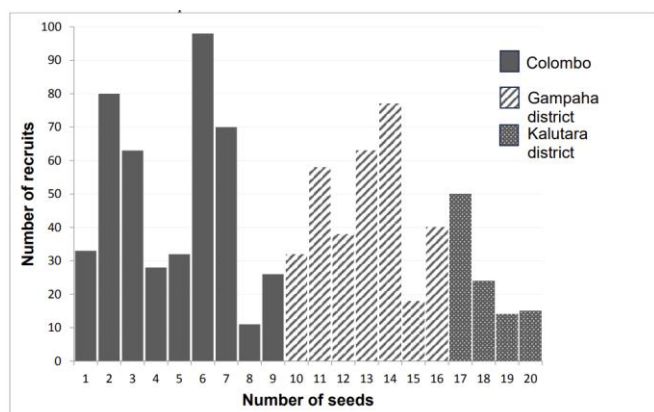
Source: Own Authorship.

Data Collection Instrument

A pretested validated questionnaire was used for data collection. The first component of the questionnaire contained a culturally adopted and validated Sinhala version of the modified Drug Abuse Screening Test (DAST-SL). The ten-item DAST questionnaire by Harvey Skinner [27] was culturally adopted and validated among community-based people who used drugs in Sri Lanka. The validated DAST-SL is a 9-item questionnaire that assesses the degree of psychoactive drug use severity validly and reliably. It was validated against the clinical diagnosis provided by a psychiatrist according to the DSM-V (Diagnostic and Statistical Manual of Mental Disorders fifth version) criteria for SUD. The total scores of DAST-SL ranged from 0 to 9. DAST-SL cut-off score of ≥2 demonstrated a presence of SUD. Details regarding the cultural adaptation and validation of the DAST-SL tool were published in a separate article. The second component of the questionnaire contained basic socio-demographic information, drug use patterns, means of obtaining drugs, the perceived health of the participant, health conditions or diseases, injuries, and information on the stigma associated with psychoactive drug use.

Data Analysis

Descriptive data was analyzed using RDS Analyst software version 0.64 [28]. Sample percentages and population percentages with 95% confidence intervals were calculated. The RDS Analyst software computes population estimates using weights derived from the self-reported network sizes of the participants. To assess the factors associated with SUD, the sample was categorized as people who use drugs with SUD and without SUD according to the DAST-SL scores (total score of ≥2). All variables were converted into binary variables and bivariate analysis was carried out the associations with SUD were assessed using the Chi-square test, degrees of freedom and p values, and unadjusted Odds Ratios with 95% confidence intervals. Backward Logistic Regression method was used to identify the independent risk factors for substance use disorders after adjusting for confounders. The binary logistic regression analysis was conducted using SPSS software version 22.

Ethical Considerations

Informed written consent was obtained from participants before administering the questionnaire. Any participant screening positive for an SUD by the DAST-SL tool was referred to an institution of the participant's choice (hospital clinic or a center run by the National Dangerous Drugs Control Board). Ethical approval for the study was obtained from the Ethical Review Committee of the Faculty of Medicine, University of Colombo, Sri Lanka (EC-19-055), and the study was performed according to the Declaration of Helsinki. Administrative approval was obtained from the Provincial Director of Health Services, Western Province, Sri Lanka.

Results

All participants who arrived at the data collection site were eligible to participate in the study. The coupon non-return rate was 65.2%. As the participants were not re-interviewed, the reason for non-responses could not be elicited. The median age of the study sample was 39 years with an interquartile range of 20 years. Participant's ages ranged from 19 - 70 years with the highest proportion (n=236; 27.1%) being between the ages of 30-39 years. The study sample was predominantly male (98.3%). Sinhalese comprised 86.3% (n=751) of the participants and 38 participants (4.4%) had never attended school. Only seven participants (0.8%) had a degree or a diploma. The majority (n=500; 57.5%) of the participants have had an education up to year 6-10. Out of all the participants,

51.8% (n=451) were married. A majority (n=742; 85.3%) were currently employed and 56.2% of them were engaged in elementary occupations and 385 participants (44.2%) had a monthly income between 20,000-40,000 rupees.

Prevalence of Substance Use Disorder Among Participants

The majority of participants were polydrug users (n=583, 67%) Cannabis was the most frequently used psychoactive drug (n=633, 72.8%) in the last 12 months followed by Heroin (n=604, 69.4%) and Methamphetamine (n=162, 18.6%) among the participants. Smoking or snorting was the most common way to take psychoactive drugs among the participants (n=841, 96.7%) Only 1.8% of the participants injected drugs. The responses to the DAST-SL questionnaire by the participants are shown in Table 1.

Table 1. Frequency distribution of the responses provided by the participants for the DAST-SL questionnaire in the Western Province.

DAST-SL Item	Yes No.	Yes %	No No.	No %
1. Do you abuse more than one drug at a time?	583	67.0	287	33.0
2. Are you always able to stop using drugs when you want to?	311	35.8	559	64.2
3. Have you had "blackouts" or "flashbacks" as a result of drug use?	333	38.3	537	61.7
4. Do you ever feel bad or guilty about your drug use?	709	81.5	161	18.5
5. Does your spouse (or parents) ever complain about your involvement with drugs?	711	81.7	159	18.3
6. Have you neglected your family because of your use of drugs?	434	49.9	436	50.1
7. Have you engaged in illegal activities in order to obtain drugs?	327	37.6	543	62.4
8. Have you ever experienced withdrawal symptoms (felt sick) when you stopped taking drugs?	650	74.7	220	25.3
9. Have you had medical problems as a result of your drug use (e.g., memory loss, hepatitis, convulsions, bleeding, etc.)?	231	26.5	639	73.4

Source: Own Authorship.

The distribution of participants having or not having an SUD screened by the validated DAST-SL questionnaire is shown in Table 2.

Table 2. The prevalence of substance use disorder among participants according to the DAST –SL questionnaire.

Substance use disorder	Frequency	Sample Percentage %	Population percentage % (95% CI)
No	101	11.6	14.7 (10.7-18.6)
Yes	769	88.4	85.3 (81.3-89.3)

Source: Own Authorship.

Factors Associated With Substance Use Disorder

Thirty-four independent variables that demonstrated a p-value <0.2 at the bivariate analysis were selected for the multivariate analysis. The model was tested using the backward LR (Likelihood Ratio) method. After multivariate analysis, 15 variables were retained. The significant predictors of SUD identified by binary logistic regression after the removal of confounding are described in Table 3. The final model demonstrated statistical significance at $\chi^2= 453.47$; df= 16; p<0.001. The operationalization of the variables retained after the backward LR method is described below.

Employment status was taken as currently employed and unemployed. For psychoactive drug use, multiple responses were recorded for psychoactive drugs taken during the past 12 months. For bivariate analysis, responses were amalgamated according to various drug types (e.g. Heroin use vs other). For Tramadol use all Tramadol products, capsules, or tablets: 50 mg; tablet (prolonged release) 100 mg; Tramadol 225 mg (street name - Apple) and Super Tramadol X 200 (street name - Strawberry) use were considered. A new variable was created as polydrug use. Those who used more than one type of drug were defined as a "poly-drug user". The frequency of current drug use was recorded with 10 options with varied frequency. For the bivariate analysis the answers "about once a day" "twice a day" and "three times a day" were amalgamated as "daily user" and all the others as "none daily user". Participants were inquired if they obtained drugs by paying money or by other means (exchanging goods, exchanging sex, stealing goods or money, influencing others). Those who are heavy alcohol users were taken as a positive response. "heavy alcohol user" was defined as those who had "five or more standard drinks on any day or 15 or more per week for men" or "four or more on any day or 8 or more standard drinks per week for women" [29].

Standard drink is defined differently in many literature [30]. In this study "quantity of any alcoholic beverage containing 10 grams of pure alcohol" was taken as the definition of standard drink. For clarity, pictures with examples of standard drinks were shown to participants. Participant's past medical history with every diagnosis of diseases and any symptoms developed after initiation of drugs were assessed. Loss of weight was assessed according to the perception of the participant and no anthropometric measurements were taken. Those who were currently on treatment or with a history of Tuberculosis after the initiation of drug use behavior were recorded. The history of injuries was dichotomized as "interpersonal violence" and other ("Road traffic accidents", "burns", "near drowning", "self-inflicted injuries", or "other"). Interpersonal violence was taken as the violence of a physical nature by one or more individuals with the participant, that

resulted in a physical injury/ injuries to the participant while under the influence of psychoactive drugs. Participants were asked if they had ever disclosed their psychoactive drug use to others. Immediate family was taken as the participant's parents, siblings, spouse, or children.

Table 3. Independent variables associated with substance use disorder among people who use drugs in the Western Province and their significance.

Independent variable		Substance use disorder		Adjusted Odds Ratio (AOR)	95% Confidence Interval for AOR		Significance
		Yes (%)	No (%)		Lower	Upper	
Employment	Currently employed	663 (89.4)	79 (10.6)	2.51	1.05	6.00	0.039
	Currently unemployed	106 (82.8)	22 (17.2)	Reference value			
Current psychoactive drug use	Heroin use	584 (96.5)	21 (3.5)	3.45	1.38	8.64	0.008
	Other drug use	42 (76.4)	13 (23.6)	Reference value			
Non-prescription Tramadol misuse *n=815; ** n=418	Yes	150 (96.8)	5 (3.2)	4.41	1.01	19.24	0.048
	No	619 (86.6)	96 (13.4)	Reference value			
Daily drug use	Yes	708 (97.4)	19 (2.6)	4.95	1.94	12.61	0.001
	No	61 (42.7)	82 (57.3)	Reference value			
Polydrug use	Yes	562 (96.4)	21 (3.6)	3.06	1.26	7.19	0.013
	No	207 (72.1)	80 (27.9)	Reference value			
Current heavy alcohol use	Yes	505 (92.5)	41 (7.5)	11.33	4.37	29.36	0.000
	No	264 (81.5)	60 (18.5)	Reference value			
Buy own drugs	Yes	765 (90.5)	80 (9.5)	3.36	1.41	8.04	0.006
	No	4 (16.0)	21 (84.0)	Reference value			
Monthly expenditure on drugs*	>Rs. 40,001	291 (99.0)	3 (1.0)	5.26	1.10	25.25	0.038
	< Rs. 40,000	474 (86.0)	77 (14.0)	Reference value			
Exchanged goods to obtain drugs	Yes	426 (99.2)	8 (0.8)	3.27	1.56	8.86	0.002
	No	337 (77.3)	99 (22.7)	Reference value			
Stolen goods or money to obtain drugs	Yes	348 (98.6)	5 (1.4)	1.76	1.24	2.29	0.025
	No	421 (81.4)	96 (18.6)	Reference value			
On treatment/ treated for Tuberculosis	Yes	48 (98.0)	1 (2.0)	5.71	2.27	14.35	0.003
	No	721 (87.8)	100 (12.2)	Reference value			
Loss of weight	Yes	92 (94.7)	1 (1.1)	1.67	0.94	2.41	0.055
	No	677 (87.1)	100 (12.9)	Reference value			
History of injuries under the influence**	Interpersonal violence	350 (98.6)	5 (1.4)	5.45	0.99	29.89	0.051
	Other	58 (92.1)	5 (7.9)	Reference value			
Disclosure of drug use behaviour to a family member	Yes	710 (89.9)	80 (10.1)	3.34	1.08	10.36	0.037
	No	59 (73.8)	21 (26.3)	Reference value			
Disclosure of drug use behaviour to a nurse	Yes	248 (91.9)	22 (8.1)	0.39	0.14	1.07	0.069
	No	521 (86.8)	79 (13.2)	Reference value 0.38			

Source: Own Authorship.

Discussion

Substance use disorders have serious consequences on a person's health, relationships, and general quality of life. This cross-sectional study assessed the prevalence and associated factors of substance use disorder among people who use drugs in the Western Province of Sri Lanka. The percentage of participants who met the DAST-SL criteria for substance use disorder was 88.4%. This demonstrated a population proportion of 85.3 (95% Confidence Interval 81.3-89.3). A recent study conducted in Sri Lanka revealed that among opioid users 73.1% had opioid dependence [16]. However, it used the WHO ASSIST tool to screen for opioid dependence. The DSM-V classification for SUD includes symptoms of both drug dependence and abuse [32].

Moreover, our study assessed SUD among various psychoactive drug users. This may be the reason for the difference in the findings. No recent global or regional studies have looked at the prevalence of substance use disorders among people who use drugs. This could be due to drug use research being known to be challenging for researchers, ethical boards as well as participants [31]. Nevertheless, a study by French et al revealed a similar high prevalence of substance use disorder (86.8%) among people who use drugs [32].

Among the socio-demographic and economic variables considered (age, gender, ethnicity, education, marital status, employment status, and monthly income) only the current employment status revealed a significant association with substance use disorder. People receive money when they work. The finding might be attributed to the acquisition of psychoactive drug purchasing power. Similarly, those who bought drugs for money and those who spent more than Rs. 40,001 per month on drugs were also found to be significantly associated with SUD. This revealed that those who spend more on drugs and those who spend a considerable amount on obtaining psychoactive drugs are at a higher risk of developing a SUD. This financial security could be a reason behind drug users who spend more on drugs having substance use disorder compared to those who spend less.

Our study also revealed that heroin use, daily drug use, and polydrug use were significantly associated with having an SUD. Heroin is known to be the most harmful psychoactive drug available [33]. The current study demonstrated that heroin users are 3.45 times more likely and polydrug users are 3.06 times more likely to have a SUD than others. This is similar to a Spanish study that demonstrated a significant association between SUD among heroin and polydrug users [34]. It was well understood that people who progress to daily use of drugs have a higher probability of developing SUD [4]. Similarly, our study demonstrated that daily drug users were 4.95 times more likely to have an SUD than non-daily users.

Drug users with SUD experience drug craving and withdrawal symptoms [7]. Therefore, they will go to any means necessary to obtain psychoactive drugs. This may be the reason why those who exchanged goods to obtain drugs and those who stole money or goods to

obtain drugs demonstrated a significant association with having an SUD. As polysubstance use is common among people who use drugs, many develop multiple comorbid substance use disorders [35]. According to a recent research report, 25% of heroin users and 60% of cocaine users have alcohol use disorder [35]. The study demonstrated a similar situation where heavy alcohol use demonstrated a statistically significant association with SUD.

The impacts of drug addiction on social structures have contributed to the widely held belief that drug addiction is largely a social problem, not a health problem [3]. The study demonstrated a significant association between tuberculosis and SUD. Tuberculosis has been known to be common among people who use drugs [36]. The detrimental impacts of psychoactive drugs on the immune system lead to increased vulnerability to tuberculosis [37]. Studies have shown that treatment adherence for tuberculosis is also poor among people who use drugs [38]. However, no study has looked at its association with SUD. This study showed that people who use drugs with SUD were more than five times more likely to have a history of Tuberculosis compared to those without SUD. Our study also demonstrated that people who use drugs with substance use disorder are 3.34 times more likely to disclose their drug use behavior to their immediate family. A person with substance use disorder experiences many physical mental and social changes. Hence, it may be difficult for them to hide it in a close environment with their families. This may be the reason for the above finding.

This study had several strengths including capturing the burden of SUD among a Community-based sample of people who use drugs. It has also demonstrated substantial clinical and social implications necessary for health services and policymakers working to improve services for people who use drugs with SUDs. However, this study may have few limitations. The study participants were recruited using respondent-driven sampling, a non-probability sampling approach. Even though all sample processes were properly planned and executed, respondent-driven sampling allowed peers to recruit peers from their networks. As a result, it may be possible to recruit individuals with similar characteristics creating recruitment bias. Furthermore, data from the previous twelve months were acquired through interviews, which carries the possibility of recall bias. Moreover, coupon refusal was high, which was common in studies using respondent-driven sampling [39]. Another possible limitation was that participants' claims of previous or current physical and mental disorders were not professionally validated. Despite these limitations, we feel that our study offers important information and an insightful understanding of substance use disorders among people who use drugs in Sri Lanka.

Conclusion

This study found a high prevalence of SUD and various economic, behavioral, and health-related factors that contribute to the development of SUD among people who use drugs in the Western province, of Sri Lanka. Among the participants being employed, using heroin as a psychoactive drug, using drugs daily, using more than one drug, being a heavy alcohol user, bringing drugs, stealing money or goods or exchanging goods to get drugs, spending a substantial amount per month on drugs (Rs > 40,001), medical history of tuberculosis and those who had disclosed their drug use behavior to their immediate family was found to be independently associated with having increased risk of SUD. Further studies on SUD in other regions of the country can greatly benefit in determining the burden of SUD as well as identifying the treatment, rehabilitation, and policy changes that may be required to minimize drug use disorders among this marginalized population.

Acknowledgement

Ethical Approval

All measures were taken to ensure that the Declaration of Helsinki was adequately addressed throughout the study and that all the methods were carried out in accordance with the relevant guidelines and regulations. The ethical approval for the study was obtained from the Ethical Review Committee of the Faculty of Medicine, University of Colombo (Reference no: EC-19-055).

Informed consent

It was applicable.

Funding

Data sharing statement

The datasets supporting the conclusions not included in the article are available upon reasonable request from the corresponding author through email.

Conflict of interest

The authors declare no conflict of interest.

Similarity check

It was applied by Ithenticate®.

Peer Review Process

It was performed.

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