

Table 3 Logistic regression of the predictors of overdose among people who use drugs in Lebanon, 2014–2015

Predictor	OR (95% CI)	P-value
Age	1.008 (0.976–1.041)	0.6352
Sex		
Male	1	
Female	1.438 (0.431–4.803)	0.5552
Employment status		
Employed	1	
Unemployed	0.969 (0.593–1.585)	0.9296
Marital status		
Currently married	1	
Previously married	0.657 (0.261–1.658)	0.3748
Never married	0.955 (0.458–1.995)	0.9032
Education level		
Some/completed university or college	1	
No primary school	0.958 (0.415–2.212)	0.9194
Completed primary school	0.881 (0.416–1.865)	0.7402
Completed secondary school	0.861 (0.388–1.909)	0.7130
Injection frequency		
Less than once a week	1	
Everyday	2.21 (0.68–7.187)	0.1884
About every other day	1.915 (0.528–6.945)	0.3238
One to three times a week	1.14 (0.299–4.349)	0.8479
Incarcerated for drug injection or possession		
Never incarcerated	1	
Incarcerated	13.073 (1.972–86.654)	0.0081
<i>Prior engagement in substance dependence treatment</i>		
Never in treatment	1	
Treatment	3.064 (1.854–5.064)	< 0.0001
Arrested for drug injection or possession		
Never arrested	1	
Arrested	0.179 (0.028–1.13)	0.0681
No. of arrests for drug injection or possession	1.068 (1.01–1.129)	0.0209
No. of people who inject drugs you have seen in the past 4 weeks	1.012 (0.999–1.026)	0.0805
Age of first drug injection	0.955 (0.903–1.009)	0.1027

Missing values were imputed using a random forest imputation. P-values and confidence intervals (CI) have been adjusted for imputation. OR = odds ratio.

in our study is consistent with the proportion reported by a systematic review published in 2019, which reported that 20.5% and 41.5% of PWID had experienced non-fatal

overdose in the previous 12 months and in their lifetimes, respectively (29).

A majority of those who reported a history of drug overdose in our study had prior experience with substance use treatment programmes, and three-quarters had been incarcerated. Our findings are consistent with other studies that found similar associations (4–9). These institutional interactions could provide important opportunities for intervention, offering individuals overdose prevention education and training programmes and access to naloxone. This intervention is particularly important for those leaving prisons, as the likelihood of drug overdose is significantly higher after release (30–33).

Lebanon can consider modelling its overdose prevention programmes after those which already exist at drug treatment centres or in prison systems in other countries (34). We presented our study findings to a group of stakeholders, including treatment and criminal justice representatives, and we plan to use our contacts with these institutions as a springboard to further disseminate our research and to discuss developing and implementing overdose prevention efforts in their systems. We are also in the process of obtaining information about the availability of naloxone and its provision in emergency department ambulances. The strong social ties that exist between those experiencing overdose episodes suggest that overdose programmes that use word-of-mouth to offer overdose prevention and response training could reach the more vulnerable, especially if naloxone was available for community-based distribution.

Our study has several limitations. We relied on self-reporting to capture history of drug overdose, which may reflect inaccurately its prevalence. Also, our findings are not necessarily applicable to larger geographic areas or to other groups of PWID. The final limitation of our study is the 5-year lag time from the recruitment of study participants to the publication of the results. However, we are not aware of any publications on this research topic and with this study population during this time period.

Conclusion

In our sample of out-of-treatment PWID in the greater Beirut area, almost half reported a history of drug overdose and most had experienced incarceration and substance use treatment. This observed association suggests that overdose prevention programmes may be effective if targeted to recently incarcerated people and to those receiving drug treatment. Community-based interventions also have the potential to reach those at risk.