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Short Communication

Mortality in a cohort of young primary cocaine users: Controlling the effect of the riskiest drug-use behaviors

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HIGHLIGHTS

- Mortality in young cocaine users was 4.7 times higher than in the general population.
- Cocaine sniffers with no opioid use or drug injection had 3.1 times higher mortality.
- Short-term excess mortality in this cohort could largely be explained by opioid use.

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ABSTRACT

Background: Published studies indicate that primary cocaine users (PCUs) have a mortality rate 4–8 times higher than their age–sex peers in the general population. Most PCUs are primary intranasal cocaine users, never-injectors and never-opioid users (PICUNINOs) and are usually underrepresented in cohort mortality studies. The aim is to estimate excess mortality in all PCUs and in the subgroups of never-opioid users and PICUNINOs in Spain.

Methods: 714 PCUs aged 18–30 were street-recruited in 2004–2006 in Spain and followed until 2010 to ascertain vital status. Drug use was self-reported at baseline and 1–2 years later. Mortality was compared with that of the general population using standardized mortality ratios (SMRs).

Results: SMRs were 4.7 (95% CI: 2.4–9.0), 2.5 (95%CI: 0.8–7.8) and 3.1 (95% CI: 1.0–9.6), respectively, among all participants, never-opioid users and PICUNINOS when using only baseline data on drug use, and 1.2 (95% CI: 0.2–8.5) and 1.4 (95% CI: 0.2–9.9) among the latter two subgroups, when using baseline plus follow-up data.

Conclusion: Short-term mortality in young Spanish PCUs is 5 times higher than in the general population. This excess mortality may largely be explained by a history of opioid use or the risk of starting such use.

1. Introduction

Cocaine use has been associated with an increased risk of cardiovascular, neurological, and psychiatric disorders, as well as unintentional injuries, violent behaviors, and other health problems (EMCDDA, 2007; Kaye & Darke, 2004a; Kuhns, Wilson, Maguire, Ainsworth, & Clodfelter, 2009; Macdonald et al., 2003; Maraj, Figueredo, & Lynn, 2010; Marzuk et al., 1995; Qureshi, Suri, Guterman, & Hopkins, 2001; Ryb et al., 2009; Santos et al., 2012; Schnitzer et al., 2010). Therefore, primary cocaine users (PCUs) can be expected to have excess mortality compared to the general population, a risk estimated as 4–8 times greater (Degenhardt et al., 2011b). These estimates come from cohorts of PCUs who are either in drug treatment or which include a high or unknown proportion of participants with very risky drug use behaviors, such as heroin use, injecting drugs or smoking crack/cocaine (Kaye & Darke, 2004a, 2004b). However, most PCUs in developed countries had never used illicit opioids or injected drugs or smoked cocaine —

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hereinafter called "primary intranasal cocaine users never-injectors and never-opioid users" (PICUNINOs) (EMCDDA, 2007; EMCDDA, 2011; UNODC, 2011). As with non-fatal acute problems related to cocaine (Kaye & Darke, 2004a, 2004b), excess mortality is probably lower in PICUNINOs than in the previously studied PCU cohorts, so the available estimates cannot be generalized to PICUNINOs or all cocaine users.

The aim is to estimate excess mortality in a Spanish cohort of young PCUs, partially controlling the effect of the riskiest drug-use patterns, such as heroin use, drug injection and crack/cocaine smoking.

2. Methods

A cohort of 714 cocaine users was recruited in 2004–2006 from drug scenes and non-treatment settings using incentive-driven chain-referral methods in Madrid, Barcelona and Seville, Spain (Heckathorn, 1997; Heckathorn, 2011). Recruitment criteria were: regular cocaine use (≥52 days/last year), age 18–30, and no regular heroin use (≤12 days/last year). Two personal interviews were conducted, at baseline and 1–2 years later. Questions were included on socio-demographic variables, history and patterns of drug use, and other subjects. Most questions concerned the last year or the time between the two interviews. Determination of HIV and HCV (hepatitis C virus) antibodies in a dried blood spot was made by enzyme immunoanalysis (Pulido et al., 2009).

Both vital status and cause of death were obtained through record linkage with the National Mortality Register. Follow-up ended on July 2010. In the analysis, several subgroups of PCUs were considered according to risky drug-use patterns. PCUs were classified first using only drug use patterns from the baseline interview, and again after incorporating such patterns from the follow-up interview. Crude mortality rates (CMRs) per thousand person-years of follow-up (py) were determined for age–sex groups, using the dynamic method of allocation of person-years and deaths to the age group (Cleves, Gould, Gutiérrez, & Marchenko, 2010). Excess mortality compared to their age–sex peers in the general population was estimated with standardized mortality ratios (SMRs), using mortality rates of the Spanish population in 2008 (INE, 2011). Stratification methods were used to partially control the possible confounding effect of opioid use, drug injection or smoking cocaine. It was not possible to control for other variables. Causes of death were coded according to the International Classification of Diseases (ICD-10). Statistical analyses were conducted with STATA (Cleves et al., 2010).

3. Results

At baseline PCUs were young (mean age: 23.0), mostly men and had used cocaine for 6.2 years on average. In the year before baseline they had used cocaine 135 days on average, mainly by sniffing (91.6%). Some 62.5% (446) had never used illicit opioids, 94.3% had never injected drugs, 64.4% had never smoked cocaine, and 50.7% (362) were PICUNINOs. Lifetime opioid users were older, with higher probability of unemployment, imprisonment, arrests, or accommodation in precarious housing or institutions than never-opioid users. Moreover, they had used cocaine for longer, currently used it more often, were more likely to be drug injectors, cocaine smokers or polydrug users, and had a higher prevalence of HCV infection (Table 1).

The vast majority of lifetime opioid users had used these drugs very sporadically in the year before baseline. Only 1.1%, 0.7% and 4.3% of total participants, respectively, had used heroin, street methadone or other opioids monthly or more frequently, and only 1% had been treated for opioid abuse or dependence in that year.

PICUNINOs were very similar in their characteristics to never-opioid users, since they comprise a large percentage of the latter subgroup (Table 1).

Average follow-up time was 5.07 years per participant (SD: 0.86). Among all baseline PCUs there were 9 deaths in 3922 py, giving a CMR of 2.3/1000 py and a SMR of 4.7 (Table 2). The causes of death were: acute drug intoxication (3), HIV infection (2), suicide (1), pulmonary embolism (1), unspecified respiratory failure (1), and ill-defined and unspecified cause (1). The SMR tended to be higher in lifetime opioid users than never-opioid users (8.1 vs. 2.5), although the confidence intervals overlapped. Among PICUNINOs, the CMR (1.5/1000 py) and the SMR (3.1) were similar to never-opioid users. No relevant changes in CMR and SMR between the first and the second half of the follow-up period were found.

Of the baseline participants, 503 PCUs (70.4%), 333 (73.7%) never-opioid users, and 278 PICUNINOs (76.2%) could be interviewed 1–2 years after baseline. About 2.6% (95% CI: 1.1–4.1) of all PCUs, 3.6% (95% CI: 1.5–5.6) of never-opioid users, and 1.8% (95% CI: 0.5–4.6) of PICUNINOs ceased cocaine use, and among those who continued using cocaine the annual mean number of days of use decreased, respectively, from 131.0 days (95% CI: 125.4–136.6) to 69.3 (95% CI: 62.6–76.5), from 119.5 days (95% CI: 113.2–125.7) to 61.1 (95% CI: 53.8–68.3), and from 115.4 days (95% CI: 108.4–122.5) to 58.7 (50.8–66.5). The proportion of never-opioid users who started opioid use (9.0%; 95% CI: 5.8–12.2) was much lower than the proportion of last-year opioid users who ceased such use (31.3%; 21.7–41.0). Similarly, the proportion of "initiators" of any risky behaviors (opioid use, drug injection or cocaine smoking) (6.8%; 95% CI: 3.7–10.0) was much lower than the proportion of those who ceased all such behaviors (46.2%; 39.3–53.0). When including follow-up data on patterns of drug use, the SMRs were 1.2 among never-opioid users and 1.4 among PICUNINOs. However, the SMRs were 7.2 and 6.6, respectively, among lifetime opioid users and participants with opioid use or drug injection or cocaine smoking (Table 2).

4. Discussion

In this study we have explored the excess mortality compared to the general population in a Spanish street-recruited cohort of young primary cocaine users who at baseline had never used illicit opioids (62.5%) or did so only sporadically (≤12 days in the year before baseline). Participants had a mortality rate 4.7 times (95% CI: 2.4–9.0) higher than their age–sex peers in the general population during the 5 years following baseline (short term).

From this study it is very difficult to clearly identify explanatory factors for this excess mortality. However, mortality seems to be lower among never-opioid users at baseline than among lifetime opioid users (SMR = 2.5 vs. 8.1) and among those who at baseline neither used opioids nor injected drugs nor smoked cocaine (PICUNINOs) than among those with any of these risky behaviors (SMR = 3.1 vs. 6.2), although neither of the two differences reached statistical significance. The differences appear to be even larger after excluding those who started opioid use or other risky behaviors during follow-up. It might therefore be hypothesized that in Spain the excess mortality of young PCUs in the short term may largely be explained by a history of opioid use (or some strongly associated factor) or the risk of starting opioid use during follow-up, which was not negligible.

This study is perhaps the first to estimate excess mortality in young PCUs, controlling simultaneously for the effect of heroin use, drug injection and crack/cocaine smoking. This control is essential to obtain valid estimates because the mentioned behaviors are associated with a high risk of mortality (Degenhardt et al., 2011a; Dias et al., 2011; Muhuri & Gfroerer, 2011). To control the effect of opioid use, we excluded from the cohort those participants who had used such drugs more than 12 days in the year before baseline. Thus, during that year all participants had used cocaine much more frequently than heroin (≥52 days vs. ≤12 days), and it could be assumed that they were not primary opioid users. Moreover, stratification methods were also used to control the confounding, focusing on those subgroups that had never used opioids or other risky behaviors at baseline or follow-up interview. The results show that controlling for