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Illicit drug use is increasing among non-medical users of prescription drugs—Results from population-based surveys 2002–2014



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ABSTRACT

Background: Non-medical use of prescription drugs (NMUPD) is known to be associated with illicit drug use, but less is known about how illicit drug use has changed in NMUPD. We examined (1) the changes in illicit drug use among Finnish non-medical users of prescription drugs during the 2000s and (2) whether the trends of illicit drug use differ by non-medical use of prescription drugs in the general population.

Methods: Data were derived from population-based (aged 15–69) Drug Surveys conducted in Finland in 2002, 2006, 2010 and 2014. The response rates varied between 63% and 48%. NMUPD during the last year was measured ($n = 252$). Past-year illicit drug use among non-medical users of prescription drugs and the reference population not reporting NMUPD ($n = 10,967$) was compared. Logistic regression was used to estimate the p -values for trends.

Results: Illicit drug use has increased notably among Finnish non-medical users of prescription drugs (from 21% to 70%, p for trend < 0.001). This was not explained by the respondents' gender, age, employment status or alcohol use. Among the reference population, illicit drug use also increased statistically significantly, but much more moderately (from 2.5% to 5.4%). The difference between the trends was confirmed by an interaction test ($p = 0.022$).

Conclusions: NMUPD seems to be increasingly merging with illicit drug use. This indicates an increasing prevalence of polydrug use among non-medical users of prescription drugs, which may bring about more severe harms and worse health outcomes for users and more challenges in regard to treatment.

1. Introduction

Medicinal drugs influencing the central nervous system, for example, sedatives, tranquillizers (e.g., benzodiazepines) or opioid analgesics are often the focus when it comes to the non-medical use or misuse of prescription drugs. These drugs are widely prescribed and used for medical purposes, but, for example, with opioids, increasing therapeutic use has also brought about adverse consequences, such as non-medical use, abuse and addiction (Manchikanti and Singh, 2008). As for benzodiazepines, their dependence and abuse potential are also seen as serious problems (Lader, 2011). Irrespective of the recommendations that benzodiazepines should only be used short-term to decrease the risk of, for example, dependence, it is still common or even the norm to see long-term use (Donoghue and Lader, 2010).

Non-medical use of prescription drugs (NMUPD) is a broad term with several different operationalizations (Barrett et al., 2008). In this paper, NMUPD refers to the use of sedatives, tranquillizers or pain medication that influences the central nervous system and is obtained

without a prescription or at higher doses than prescribed or for different purposes than prescribed. According to the World Drug Report (United Nations Office on Drugs and Crime, 2010), non-medical use of prescription drugs is 'a growing health problem in a number of developed and developing countries', and the phenomenon has also been referred to as 'a global health concern' (United Nations Office on Drugs and Crime, 2011). The use of prescription drugs has also been strongly connected with polydrug use, in particular in the EU Drugs Strategy 2013–2020 (Council of the European Union, 2012; United Nations Office on Drugs and Crime, 2016).

NMUPD has raised concerns and research has been conducted especially in the USA, where in 2014 the lifetime prevalence of NMUPD was 20.5%, prevalence in the last year 5.6%, and in the last month 2.5% among the population aged 12 and older (Center for Behavioral Health Statistics and Quality, 2015). As for Europe, although the phenomenon is increasing, less attention has been paid to it, which may be partly explained by the lack of a comprehensive monitoring system, as noted in the literature, too (Clark, 2015; Novak et al., 2016). Therefore,

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no estimates of the prevalence of non-medical use of prescription drugs among the general population exist at the European level (Casati et al., 2012).

In Finland, NMUPD among the general population has been surveyed using the same methodology (representative random sample, mail questionnaire) since the 1990s. In the period 1992–2002 NMUPD was found to be increasing (lifetime prevalence increasing from 3% to 7%), but since then the trend has been slightly decreasing: lifetime prevalence has decreased from 7% to 5%, prevalence in the last year from 3% to 2%, and in the last month from 1% to 0.5% in the period 2002 to 2014 (Karjalainen et al., 2016). Irrespective of this ostensibly positive trend, it is noteworthy that cannabis is the only illicit drug that is more prevalent than NMUPD (lifetime prevalence of cannabis use has increased from 6% in 1992 to 19% in 2014, with last-year prevalence increasing from 1% to 6%, last-month prevalence from 0% to 2%), and that the trends of NMUPD run in opposite directions in different gender and age groups (Karjalainen et al., 2016). In addition, in a Delphi-study conducted among Finnish drug experts, experts have foreseen a marked growth in the misuse of medicinal drugs in Finland (Lintonen et al., 2014). Therefore, NMUPD deserves to be studied further.

On the one hand, it has been suggested that among non-medical users of prescription drugs, a rather large group are ‘pure’ prescription drug misusers, i.e., they do not use illicit drugs in addition to NMUPD (Karjalainen and Hakkarainen, 2013; United Nations Office on Drugs and Crime, 2011). On the other hand, prescription drug use as an essential part of polydrug use is a matter of concern, as highlighted in the EU Drugs Strategy 2013–2020 (Council of the European Union, 2012). Illicit drug use has been shown to be associated with NMUPD both among adults (Abrahamsson and Hakansson, 2015; Becker et al., 2007; Novak et al., 2016) as well as adolescents (Nargiso et al., 2015), although the limitation of cross-sectional studies is that they do not permit an assessment of changes over time. Indeed, as far as the Authors know, there is no research evidence dealing with changes in the prevalence of illicit drug use among non-medical users of prescription drugs or in the ratio between ‘pure’ non-medical users of prescription drugs and those using also illicit drugs. Possible heterogeneity among non-medical users of prescription drugs based on what different subgroups may encounter e.g., different kinds of social or health problems is an important area of research that needs wider acknowledgement. Widening in the repertoire of different drugs used, in particular, may bring about more harms as well as more severe harms (Baggio et al., 2014; Karjalainen et al., 2010b), especially if different drugs are used simultaneously (Coffin et al., 2003). Since the research considering changes over time is very limited, we chose not to present any hypotheses.

The purpose of this study was to examine NMUPD in Finland based on a series of cross-sectional, population-based survey data, with special attention given to the association of NMUPD with illicit drug use. We set out to examine (1) possible changes in illicit drug use among Finnish non-medical users of prescription drugs during the 2000s and (2) whether the trends in illicit drug use differ between non-medical users of prescription drugs and the reference population (i.e., those who do not use prescription drugs non-medically).

2. Material and methods

2.1. Data

The data consist of population-based Drug Surveys conducted in Finland in 2002, 2006, 2010 and 2014. The data collection by Statistics Finland followed the same protocol each time: Representative random samples of population-based Drug Surveys conducted in Finland in 2002, 2006, 2010 and 2014. The data collection by Statistics Finland followed the same protocol each time: Representative random samples of the population were drawn from the Finnish Population Information System, and respondents were contacted by mail. The institutionalized

Table 1
Descriptive information for the Finnish Drug Surveys conducted in 2002–2014.

	2002	2006	2010	2014
Age of target population (yrs)	15–69	15–69	15–69	15–69
Age group that was oversampled (yrs)	15–34	15–34	15–39	15–39
Sample size (N)	4053	5500	4250	7000
Response rate (%)	63	55	48	50
Number of respondents (N)	2541	3029	2023	3485
Number of non-medical users of prescription drugs (N)	73	74	47	58

population, those without a permanent address, as well as residents of the Åland Islands were excluded. In each survey, data were collected by self-administered anonymous postal questionnaires, and in 2010 and 2014, responding via the Internet was also possible.

The target population were those aged 15–69 years. Younger age groups were oversampled in order to increase the analytic power in the age group most actively using drugs. The size of the random samples varied between 4053 (in 2002) and 7000 (in 2014) persons. In keeping with an international trend (de Leeuw and de Heer, 2002) also seen in other similar Finnish surveys (Virtanen and Sarén, 2016), the response rate for the Drug Surveys decreased from 63% in 2002 to around 50% in 2010 and 2014. However, it should be noted that in 2014 the decreasing trend stalled. More detailed information on the surveys is presented in Table 1.

Due to concern raised by the decreasing response rates, a non-respondent study was conducted in 2014. A random sample ($n = 353$) was drawn from the non-respondents and a short telephone interview was conducted. The response rate of this non-respondent study was 38%. It was found that prevalence of illicit drug use was very similar both among non-respondents and respondents to the original survey. Furthermore, the most common reason (50%) for non-response in the original survey was lack of time, while only 7% did not respond due to the theme of the survey (Karjalainen et al., 2016).

2.2. Measurements

In this study, NMUPD was defined as non-medical use of prescription drugs during the last 12 months ($n = 252$). In each survey, the same question was asked: *Have you during the last 12 months tried or used sedatives, anxiolytics or painkillers non-medically (e.g., without a prescription or at a higher dose than prescribed)?* However, in 2014 it was further underlined that these medications do not refer to drugs prescribed that are also available ‘over the counter’. Those who did not report NMUPD during the last 12 months were taken as a reference population ($n = 10,697$).

Illicit drug use was assessed using the same question in each survey year: *Have you during the last 12 months used illicit drugs (such as hashish, marijuana, amphetamine, heroin, or other similar substances)?* However, due to new emerging drugs, the list of illicit drugs has been updated in each survey questionnaire, and it was notably longer in 2014 compared to 2002. In 2002, the list of illicit drugs included hashish/marijuana, amphetamine, heroin/morphine, cocaine/crack, LSD, ecstasy and magic mushrooms, whereas in 2014 it covered in addition methamphetamine, buprenorphine or methadone (other than in substitution treatment), other opioids illegally, GHB/GBL, synthetic cathinones, synthetic cannabinoids and mephedrone.

Gender, age group (15–29, 30–59, 60–69 years), employment status (employed, unemployed, retired, student, other), and the use of alcohol (at least weekly) were also measured and controlled for due to the differences in illicit drug use by these indicators. Descriptive statistics of non-medical users of prescription drugs and the reference population are presented in a Supplementary file. Since the proportion of missing data in the variables used was very low (0–1.8%), multiple imputation

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