

Self-reported health problems due to prescription drug use and non-medical use of prescription drugs – a population-based study

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Abstract

Objective

We examined the association between the non-medical use of prescription drugs (NMUPD) and self-reported health problems due to the use of prescription drugs (hypnotics, sedatives, or strong painkillers), and whether it differed by social background among the general Finnish population.

Methods

Population-based (aged 15–69) Drug Surveys conducted in Finland in 2014 and 2018 were used. NMUPD was measured by the past-year use and social background by the educational level and employment status. Self-reported health problems due to prescription drug use was used as an outcome. A multinomial logistic regression was used.

Results

NMUPD was associated with self-reported health problems due to prescription drug use. The effect was modified by the social background and hazardous alcohol use: NMUPD was associated with health problems among those who had a high education, were employed or outside the workforce, and who used alcohol hazardously.

Conclusions

Although the findings may partly be explained by the differences in health literacy, they indicate health problems with NMUPD despite the social background. Therefore, when prescribing psychoactive prescription drugs, it is important to monitor the non-medical use of these drugs and inform patients of their possible association with health problems, irrespective of the patient's social background.

Keywords

Non-medical use of prescription drugs, self-report, health problems, population-based survey, Finland

Introduction

The non-medical use of prescription drugs (NMUPD, referred as to the use of sedatives, tranquillizers or pain medication that influences the central nervous system (CNS) and is obtained without a prescription or at higher doses than prescribed or for different purposes than prescribed) has shown to be associated with several different health-related forms of harm and adverse effects. These include e.g. a poor quality of life (Abrahamsson et al., 2015), problematic substance use and substance use disorders (Arria & Compton, 2017; Schepis et al., 2020), mental health problems (Baggio et al., 2014; Goodwin & Hasin, 2002) and suicidality (Ford & Perna, 2015; Kuramoto et al., 2012). NMUPD has also been linked to health in general so that NMUPD is associated with poorer self-reported health (Havens et al., 2011).

Self-reported health harm or problems related to NMUPD is a relevant study topic, as self-ratings or self-evaluations may diverge from other methods of screening or evaluation (Geest et al., 2004; Goesling et al., 2018). Patients may be reluctant to reveal the possible harm caused by the use of prescription drugs to their prescribing physicians, especially if they wish to continue the medication. Therefore, additional information could be achieved by anonymous, self-administered methods, such as surveys (Johnson, 2014). As already mentioned, NMUPD has been linked to poorer self-reported health (Havens et al., 2011), but as far as the authors know, there are no studies examining the association between NMUPD and self-reported health problems assumed to be caused by prescription drug use specifically.

In addition to health and health-related harm, NMUPD has been linked to factors possibly indicating lower socio-economic status (SES) such as unemployment (Perlmutter et al., 2017), lower educational attainment (Martins et al., 2015; Schepis et al., 2018), as well as economic disadvantage (Han et al., 2017), thus indicating that NMUPD is more likely among socially disadvantaged groups compared to those better off. As socio-economic inequalities in health are widely recognized (World Health Organization, 2008) and there are socio-economic differences, for example, in mortality and morbidity (Mackenbach et al., 2008), it can also be presumed that NMUPD and the (health) harm associated with it accumulate for those with a lower SES. Indeed, the existing literature turns focuses on the underprivileged and less is known about those who are more privileged, although they also may encounter NMUPD and the associated harm. Due to its increase NMUPD has become a growing public health concern, and therefore, more information about the phenomenon is needed in all social groups.

The purpose of this study was to explore self-reported health problems among non-medical users of prescription drugs. More specifically, we aimed to examine 1) the association between the non-medical use of prescription drugs and self-reported health problems due to the use of prescription drugs (hypnotics,

sedatives, or painkillers) and 2) whether there are differences in these health problems according to the social background between non-medical users of prescription drugs and their references among the general Finnish population.

Materials and methods

Data

Data was drawn from a series of population-based Drug Surveys conducted in Finland. The Drug Surveys were collected by Statistics Finland following the same protocol: Representative stratified random samples of the population aged 15–69 excluding the institutionalized population, those without a permanent address, and residents of the Åland Islands were drawn from the Finnish Population Information System. Younger age groups (15–39 years) were oversampled in order to increase the analytic power in the age group most actively using drugs. Respondents were contacted by mail and data was collected by self-administered anonymous questionnaires with responses possible either via the Internet or by mail.

The data used in this study was collected in 2014 and 2018 and the two datasets were pooled together in order to increase the statistical power. The random samples included 7,000 persons in both data collection years and there were altogether 6,714 respondents, 3,485 in 2014 and 3,229 in 2018, reaching a response rate of 50% and 46%, respectively. The data and its collection are described more thoroughly elsewhere (Karjalainen et al., 2020).

Measures

Health problems due to prescription drug use (outcome)

The outcome measure was based on self-reporting. Respondents were asked “*Have you had health problems you think are due to your use of sedatives, hypnotics, or analgesics?*”, and the response categories were “*Yes, during the last 12 months*”, “*Yes previously, but not during the last 12 months*”, “*Never*”, and “*I do not use these substances*”. Those responding not using these substances (n=3,377) were excluded. In addition, there were n=139 missing responses to this question, so there were altogether 3,198 respondents in the analysis data.

Non-medical use of prescription drugs

The NMUPD was measured with the question “*Have you used prescription drugs for non-medical purposes during the last 12 months?*” (Yes/no). The question was further specified by explaining that prescription drugs refer to hypnotics, sedatives, or strong painkillers and that non-medical use refers to the use without a proper prescription or to larger doses or for different purposes than prescribed.

Other variables

Gender (men, women), age group (15–29, 30–59, 60–69 years), educational level (basic/intermediate, high), employment status (employed/student, unemployed, outside the workforce), the use of illicit drugs

during the last 12 months (no, yes), hazardous alcohol use (AUDIT-C points ≥ 5 for women, ≥ 6 for men; no, yes), past-year prescriptions of CNS drugs (yes, no), and the year of the survey (2014, 2018) were used as covariates.

Most (82%) of those outside the workforce were retired, including both old-age and disability pensioners. These two groups of pensioners could not be separated, but presumably more than half were old-age pensioners since 58% of them were aged 65 or over. Past-year prescriptions for CNS drugs were measured with the question *“Have you been prescribed by a physician for hypnotics/strong analgesics (opioids)/sedatives in order to treat a disease? The response categories were Yes, during the last 12 months; Yes, previously, but not during the last 12 months; No, never; of which the latter two were combined into one category.*

Statistical analysis

Cross-tabulations were used to describe the data. The association between NMUPD and health problems due to prescription drug use was estimated with a multinomial logistic regression while controlling for all the covariates, the results presented as odds ratios (OR) with 95% confidence intervals (CI). To study whether there were differences in health problems due to prescription drug use owing to social background, interactions between NMUPD and the educational level, as well as between NMUPD and the employment status were tested. The interactions between NMUPD and other covariates were also tested. Where statistically significant interactions were found, modelling was separately applied to each category (i.e., for different educational levels separately). These models were also further adjusted for all the covariates. In these analyses the age group was used as a dichotomized variable (15–29, 30–69), since there were no unemployed among those aged 60–69.

Analyses were computed using the survey procedures provided in the software package SAS Enterprise Guide 7.1. To compensate for the oversampling of the younger age groups and participant non-response, weighting coefficients calculated by Statistics Finland were used so that the data was representative of the Finnish adult population in terms of age, gender, education, and the level of urbanization. Stratified sampling was taken into account using the strata-option. With the interactions, a p-value < 0.10 was considered statistically significant, otherwise the limit was set to $p < 0.05$.

Research ethics

The study protocol has been approved by the Ethical Review Board of the Finnish Institute for Health and Welfare and the surveys are GDPR compliant.

Results

Table 1 shows the distributions of self-reported health problems due to prescription drug use according to the background variables. More than 10 per cent of those reporting NMUPD also reported health problems due to prescription drug use, either during the last 12 months (14.9%) or previously (12.2%). The respective proportions among those reporting no NMUPD were 1.6% and 4.4%. Health problems were reported very similarly by men and women. In 2018, there was also a third option for gender, but in the analysis data there were only n=5 respondents reporting that their gender was other than male/female and none of them reported health problems due to prescription drug use. Therefore, they were excluded from the further analyses. In addition to those reporting NMUPD, the highest proportions of health problems due to prescription use either during the last 12 months or previously were reported by those who were unemployed (5.3% and 6.9%, respectively), had used illicit drugs during the last 12 months (8.1% and 6.2%, respectively) and were prescribed for CNS drugs during the last 12 months (7.1% and 6.2%, respectively).

The results from the multinomial logistic regression are shown in Table 2. NMUPD was associated with both past-year (OR 11.96) and previous (OR 3.54 in bivariate model) health problems due to prescription drug use and the association remained also in the adjusted model (OR 3.49 and 3.46, respectively). Furthermore, unemployment and being outside the workforce were independently associated with both past-year or previous health problems, whereas past-year illicit drug use or being prescribed CNS drugs during the last 12 months were independently associated only with past-year health problems. No statistically significant association was found between gender, age, educational level or hazardous alcohol use and health problems.

To study whether there were differences in health problems according to the social background between NMUPD and their references, interactions were calculated. Statistically significant interaction terms confirmed that the effect of NMUPD on health problems was modified by the educational level ($p < 0.05$) as well as employment status ($p < 0.10$). In addition, there was a statistically significant interaction between NMUPD and hazardous alcohol use ($p < 0.10$). To examine effect modification more closely, ORs were calculated separately for the employed, unemployed and those outside the workforce; for those with a basic/intermediate and high level of education; as well as by hazardous alcohol use (Table 3). NMUPD was associated with self-reported health problems due to prescription drug use irrespective of the educational level. However, the association was notably stronger among those with a high level of education (OR 32.99 for past-year and 12.07 for previous health problems), especially concerning the past-year health problems as referred to by the non-overlapping confidence intervals. On the subject of employment status, NMUPD was not statistically significantly associated with health problems among the unemployed, whereas among

those outside the workforce there was a strong association with NMUPD and health problems. Also among the employed NMUPD was associated with past-year health problems. Furthermore, NMUPD was independently associated with health problems among those using alcohol hazardously.

Discussion

Main findings and their interpretation

The aim of the study was to examine the association between NMUPD and self-reported health problems due to prescription drug use and whether it differed by social background. We found that NMUPD was linked with self-reported health problems due to prescription drug use (both in the past-year and previously). The effect of NMUPD on health problems was modified by the social background and hazardous alcohol use so that among those who had a high education, were employed or outside the workforce, and who used alcohol hazardously NMUPD was associated with health problems. This association was not found among the unemployed or those not using alcohol hazardously.

The increased likelihood of health problems due to prescription drug use among those with NMUPD found in this study provides important information on a sensitive matter. Self-rated harm or adverse effects caused by prescription drug use may be understated by patients, especially when in direct contact with the prescribing physician due to the patient's fear of discontinuation of the prescription. This may be even more the case if non-medical use is also involved. Indeed, some evidence from clinical settings exists that there is a discrepancy between self-reported benefits and observed difficulties/harm among patients so that patients may continue to report that their opioids are helpful although clinical indicators question the benefit (Goesling et al., 2018). Similarly, older adults who chronically use benzodiazepines have been shown to minimize or to deny side effects although demonstrating a significant psychological dependence on this drug (Cook et al., 2007). Therefore, an anonymous self-administered survey provides additional information on the negative effects of CNS drug use since the discontinuation of the use of these drugs is not at stake when responding. In general, better reports on sensitive matters such as substance use have been obtained using survey modes that rely on self-administration compared to those requiring direct contact with interviewers (Johnson, 2014).

Socio-economic inequalities in health are widely acknowledged (World Health Organization, 2008) and they also seem to have an impact on the prevalence of medicine use (Maron et al., 2019). Some evidence also exists of the association of NMUPD and poorer self-reported health (Havens et al., 2011), as well as poor quality of life (Abrahamsson et al., 2015). Thus, the association between NMUPD and self-reported health problems among those outside the workforce was an expected finding. Quite surprisingly, however, NMUPD was not associated with health problems due to prescription drug use among the unemployed or those with a basic/intermediate level of education. Instead, a strong association was found among those with a high education or who were employed/students. One explanation for this finding may lie in health literacy which according to the World Health Organization (1998) refers to "cognitive and social skills which

determine the motivation and ability of individuals to gain access to, understand and use information in ways which promote and maintain good health". Thus, there may be differences in the health literacy of the educational groups so that those with a high level of education have a better recognition of their health and health problems or report about them more actively compared to those with a lower education.

Disparities in seeking and accessing health care services may also explain these findings. Rather permanent differences between social groups (not explained by differences in health) have been shown to exist in the access to and utilization of services in outpatient health care in Finland: Those with a higher SES utilize health services more than those with a lower SES when adjusted for the service need. These differences are mostly due to disparities in the utilization of private and occupational health services (Manderbacka et al., 2019). For example, occupational health services are provided to those who are employed, which may ease their access to medicines or medicinal treatment compared to those who are unemployed.

Alcohol use and NMUPD were intertwined so that NMUPD was associated with health problems due to prescription drug use especially among those using alcohol hazardously. Although the interaction between NMUPD and past-year illicit drug use did not reach statistical significance in this study ($p < 0.11$), the results concerning illicit drug use were similar to those for hazardous alcohol use: NMUPD was associated with health problems due to prescription drug use among those who had used illicit drugs in the past year. As a robust association between NMUPD and the use of other substances, problematic substance use, as well as substance use disorders overall has been found (Arria & Compton, 2017; Schepis et al., 2020), it is possible that self-reported health problems due to prescription drug use may reflect harm associated with or caused by polydrug use among those also using other substances. This occurs, for example, in the case of simultaneous exposure to alcohol and prescription medication, which is assumed to be rather common at the population level (Breslow et al., 2015; Ilomäki et al., 2013).

Methodological considerations

A self-administered postal/online survey mode was used for the data collection in this study. Although people may be reluctant to reveal their substance use patterns, confidential and anonymous surveys without personal contact have been shown to obtain greater reports (Johnson, 2014), and can be expected to reduce the response bias in this study, too. The sampling protocol excluding the institutionalized population and those without a permanent address from the sample may have an impact on the results, since those using drugs problematically or in a more disadvantaged social position probably are left underrepresented in the study population.

Following international trends, the response rate in the series of Finnish Drug Surveys carried out by Statistics Finland has also been declining. However, it has remained approximately at the same level (~50%) throughout the 2010s. The participant non-response was compensated for by using weighting coefficients in the analyses. The limited number of respondents in the data posed its own restrictions, and therefore, when studying interactions a p-value < 0.10 was considered statistically significant instead of the more conventional $p < 0.05$.

It should also be noted that health problems reported here are based on self-report only and they have not been observed or verified by a physician or other external evaluator. The past-year measure of NMUPD is rather rough, but the data did not allow the use of more refined measures. The results might have differed if those with NMUPD could have been further categorized based on their NMUPD status (such as initiators, persistent users, quitters), as differences in health-related quality of life have been found between these groups in longitudinal research (Schepis & Hakes, 2014). Similarly, motives for NMUPD vary (Drazdowski, 2016; McLarnon et al., 2014) and they also may change over the lifespan (Schepis et al., 2020) indicating that not all NMUPD may generate the same risk of negative health-related outcomes. Therefore, as the motives could not be taken into consideration, some nuances in the results may have been lost.

Conclusion

NMUPD was associated with self-reported health problems due to prescription drug use. This finding was anticipated among the underprivileged, but a strong association was also found among the more privileged, such as those with a high level of education or those in employment. Although this may partly be explained by differences in health literacy, the results of this study indicate that the health harm associated with NMUPD exist in all social groups. Thus, when prescribing CNS drugs it is important to monitor both the use and non-medical use of these drugs irrespective of the patient's social background. Similarly, irrespective of the social background patients should always be asked as well as advised about the possible harm of CNS drugs.

Declaration of Interest

The authors report no conflicts of interest.

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Tables

Table 1. The distributions of health problems due to prescription drug use according to the background variables among the general Finnish population.

	Health problems due to prescription drug use			
	N	During the last 12 months (n=70)	Previously (not during the last 12 months) (n=144)	Never (n=2984)
NMUPD during the last 12 months				
Yes	120	14.9	12.2	72.9
No	3074	1.6	4.4	94.0
Gender				
Men	1371	2.0	4.8	93.2
Women	1822	2.1	4.6	93.3
Other	5	0.0	0.0	100.0
Age group				
15–29	847	3.1	4.0	92.8
30–59	1733	2.0	5.2	92.8
60–69	618	1.2	3.9	94.9
Educational level				
Basic/intermediate	2053	2.4	4.6	93.0
High	1145	1.4	4.8	93.8
Employment status				
Employed/student	2247	1.5	3.7	94.8
Unemployed	208	5.3	6.9	87.7
Outside the workforce	711	2.6	6.8	90.7
Use of illicit drugs during the last 12 months				
Yes	305	8.1	6.2	85.7
No	2890	1.5	4.6	94.0
Hazardous alcohol use (AUDIT-C points ≥ 5 for women, ≥ 6 for men)				
Yes	1066	2.1	5.0	92.9
No	2058	2.1	4.6	93.3
Has been prescribed for hypnotics, opioids or sedatives during the 12 months				
Yes	720	7.1	6.2	86.8
No	2454	0.6	4.3	95.2
Year of the survey				
2014	1642	2.6	4.3	93.1
2018	1556	1.5	5.1	93.4

Table 2. The associations of NMUPD and other characteristics with self-reported health problems due to prescription drug use among the general Finnish population, multinomial logistic regression.

	Bivariate models						Adjusted model ^a					
	Health problems due to prescription drug use						Health problems due to prescription drug use					
	During the last 12 months vs. no health problems			Previously (not during the last 12 months) vs. no health problems			During the last 12 months vs. no health problems			Previously (not during the last 12 months) vs. no health problems		
	OR	95 % CI		OR	95 % CI		OR	95 % CI		OR	95 % CI	
NMUPD during the last 12												
Yes	11.96	6.56	21.81	3.54	1.88	6.65	3.49	1.54	7.92	3.46	1.50	7.94
No	1			1			1			1		
Gender												
Men	0.96	0.58	1.57	1.06	0.75	1.51	0.91	0.52	1.60	1.14	0.79	1.64
Women	1			1			1			1		
Age group												
15–29	1			1			1			1		
30–59	0.64	0.38	1.08	1.29	0.85	1.97	0.89	0.44	1.82	1.38	0.87	2.18
60–69	0.37	0.16	0.83	0.95	0.55	1.64	0.35	0.12	1.03	0.46	0.23	0.93
Educational level												
Basic/intermediate	1.72	0.96	3.09	0.97	0.68	1.41	1.21	0.62	2.36	0.95	0.64	1.42
High	1			1			1			1		
Employment status												
Employed/student	1			1			1			1		
Unemployed	3.87	1.94	7.73	2.06	1.10	3.85	2.79	1.27	6.14	2.01	1.07	3.80
Outside the workforce	1.78	1.01	3.17	1.91	1.30	2.81	2.48	1.26	4.91	3.54	2.21	5.68
Use of illicit drugs during the last 12 months												
Yes	6.02	3.52	10.30	1.48	0.87	2.55	3.36	1.47	7.70	0.96	0.42	2.18
No	1			1			1			1		
Hazardous alcohol use (AUDIT-C points ≥5 for women, ≥6 for men)												
Yes	1.03	0.61	1.75	1.08	0.75	1.56	0.59	0.31	1.11	0.97	0.65	1.45
No	1			1			1			1		
Has been prescribed for hypnotics, opioids or sedatives during the last 12 months												
Yes	13.53	7.44	24.62	1.59	1.07	2.35	10.90	5.79	20.53	1.23	0.82	1.84
No	1			1			1			1		
Year of the survey												
2014	1			1			1			1		
2018	0.58	0.35	0.97	1.19	0.84	1.68	0.43	0.24	0.75	1.16	0.80	1.67

OR shown in bold type, $p < 0.05$.

^aAll the variables shown are included in the model.

Table 3. The association between NMUPD and self-reported health problems due to prescription drug use according to the educational level, employment status and hazardous alcohol use among the general Finnish population, multinomial logistic regression.

	Bivariate models						Adjusted models					
	Health problems due to prescription drug use						Health problems due to prescription drug use					
	During the last 12 months vs.		Previously (not during the last				During the last 12 months vs.		Previously (not during the last			
	OR	95 % CI	OR	95 % CI	OR	95 % CI	OR	95 % CI	OR	95 % CI	OR	95 % CI
Basic/intermediate education^a												
NMUPD												
Yes	8.59	4.40	16.79	2.94	1.44	6.02	2.53	0.99	6.44	3.08	1.10	8.64
No	1			1			1			1		
High education^a												
NMUPD												
Yes	48.18	12.13	191.36	9.75	2.45	38.85	32.99	8.47	128.54	12.07	2.07	70.28
No	1			1			1			1		
Employed/student^a												
NMUPD												
Yes	13.09	6.02	28.49	2.41	0.98	5.89	4.02	1.39	11.60	1.90	0.63	5.68
No	1			1			1			1		
Unemployed^b												
NMUPD												
Yes	3.60	0.81	16.05	2.88	0.54	15.37	1.59	0.30	8.51	4.59	0.66	32.04
No	1			1			1			1		
Outside the workforce^b												
NMUPD												
Yes	37.58	8.79	160.68	14.51	3.92	53.81	18.10	2.04	160.37	24.35	4.04	146.66
No	1			1			1			1		
No hazardous alcohol use^c												
NMUPD												
Yes	7.47	2.92	19.11	1.23	0.27	5.71	1.10	0.28	4.33	0.65	0.09	4.65
No	1			1			1			1		
Hazardous alcohol use^c												
NMUPD												
Yes	20.27	8.18	50.27	5.43	2.55	11.53	10.93	2.85	41.91	12.52	3.62	43.31
No	1			1			1			1		

OR shown in bold type, p < 0.05.

^aThe models are adjusted for gender, age group, employment status, use of illicit drugs during the last year, hazardous alcohol use, past-year prescriptions, and the year of the survey.

^bThe models are adjusted for gender, age group, educational level, use of illicit drugs during the last year, hazardous alcohol use, past-year prescriptions, and the year of the survey.

^cThe models are adjusted for gender, age group, educational level, employment status, use of illicit drugs during the last year, past-year prescriptions, and the year of the survey.