

# Antidepressant use and violent crimes among young people: a longitudinal examination of the Finnish 1987 birth cohort

Elina Hemminki,<sup>1</sup> Marko Merikukka,<sup>2</sup> Mika Gissler,<sup>3</sup> Kristian Wahlbeck,<sup>4</sup> Jukka Savolainen,<sup>5</sup> Tiina Ristikari,<sup>2</sup> Mikko Aaltonen<sup>6</sup>

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<sup>1</sup>THL, Health and Social Care Systems, Helsinki, Finland

<sup>2</sup>Children, Adolescents and Families Unit, THL, Oulu, Finland

<sup>3</sup>Information Services, THL, Helsinki Finland

<sup>4</sup>Mental Health Unit, THL, Helsinki Finland

<sup>5</sup>Institute for Social Research, University of Michigan, Ann Arbor, Michigan, USA

<sup>6</sup>Institute of Criminology and Legal Policy, University of Helsinki, Helsinki Finland

## Correspondence to

Professor Elina Hemminki, THL, National Institute for Health and Welfare, P. O. Box 30, Helsinki 00271, Finland; [elina.hemminki@thl.fi](mailto:elina.hemminki@thl.fi)

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## ABSTRACT

**Background** The use of antidepressants, especially selective serotonin reuptake inhibitors (SSRIs), has been questioned due to poor efficacy and safety. We examined whether young violent offenders were more likely antidepressant users prior to their first violent offence than other young persons.

**Methods** The study is a follow-up of children born in Finland in 1987 (n=59 120), linking national registers to each other using personal identity codes. Data on psychotropic drug use came from a register of reimbursed drugs and data on crimes from a register on court convictions (after the age of 14 years). Participants were followed until the age of 18 years, and for some analyses until the end of the follow-up (mean 21 years). To adjust for differences in background characteristics, regression analyses for antidepressant use were made, using the no-conviction group as the reference.

**Results** Proportions of young people convicted by the age of 18 years were: 5% of boys (1.7% for violent crimes) and 1% (0.5%) of girls. Antidepressant use (both overall and for SSRIs) prior to violent crime was more common among those convicted than among those without convictions. Among boys with repeated violent crimes, it was also more common than among boys with non-violent crimes. Adjustment for differences in background characteristics decreased the associations between antidepressant use and violent crime, but did not eliminate them.

**Conclusions** The results add further evidence for caution in prescribing antidepressants among young persons. It also calls for a reanalysis of violence measures in the original trial data.

## INTRODUCTION

In North America and Europe, antidepressants, especially selective serotonin reuptake inhibitors (SSRIs), have been widely used to treat mood and anxiety disorders among people under 18 years.<sup>1–4</sup> However, their use is questioned due to poor efficacy and safety concerns, including the risk for suicidal thoughts and self-harm behaviour.<sup>5–15</sup> In Finland, the summaries of product characteristics (SPC) in drug compendiums rarely recommended antidepressants to young people, but a number of SPCs gave a loophole to allow doctors to individually decide on antidepressant use according to clinical need. The Finnish practice guidelines are more permissive in regard to treatment of young persons.<sup>16</sup>

Most studies and public discussion about the safety of antidepressants among young people have

focused on self-harm behaviour, not on violence towards others. However, current SPCs frequently contain a warning of increased hostility, including aggression and hate. We did not, however, locate any published trial that documented these. A meta-analysis of published trials in 2007 did not report a relation between fluoxetine and aggression.<sup>17</sup> Apparently these warnings are based on unpublished trials, on case descriptions, including widely publicised court cases or on spontaneous reporting in pharmacovigilance databases.<sup>18 19</sup>

Among adults, there are some epidemiological studies showing a positive association between antidepressant use and violent crimes.<sup>20–22</sup> In a Swedish nationwide study on violent crimes,<sup>23</sup> and in a Finnish nationwide study of all homicides in 2003–2011,<sup>24</sup> men were more likely to commit the crime while using antidepressants than when not using; in the Swedish study, the differences were not statistically significant. Among young persons (15–25 years), the Swedish nationwide cohort study showed an association between SSRIs and violent crime convictions,<sup>23</sup> and asked for other studies to confirm their findings.

Using nationwide register data from Finland, this study examines whether young people aged 15–18 years who are violent offenders are more likely to have used antidepressants prior to their first violent offence than young non-violent offenders or young people in the general population. Furthermore, we will inspect this by the number of violent crimes and adjust for background characteristics. Since manslaughters were rare, we additionally inspected antidepressant use until the end of the follow-up (mean age 21 years).

## METHODS

The study is a register-based follow-up in 1987–2008 of children born in 1987 and surviving the perinatal period.<sup>25</sup> The data were gathered from Finnish national registers using personal identity codes. Children who died before the age of 18 years and were not convicted for any crimes between 15 and 18 years were excluded from the analysis (n=356, 0.6%), leaving 59 120 children. A detailed description of data sources is given in an online supplementary material file. The ethics review board at the National Institute for Health and Welfare (THL) gave a positive statement for the whole study (26 March 2009, §28/2009), and register authorities gave permission for their data. For this study, anonymous subdata containing a restricted set of variables were used.



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Background data were obtained from the following registers: Medical Birth Register, the Central Population Register, Statistics Finland, the Care Register for Health Care Institutions, the Register of Social Assistance. Data on psychotropic drug use came from the Finnish Register on Reimbursed Medication, containing all reimbursed drugs.<sup>26 27</sup> During the study period, virtually all antidepressant drug purchases were covered. A high concordance has been reported between the prescription data and self-reported use of psychotropics.<sup>28</sup> The Criminal Records contain all convictions for crimes committed after turning 15 years. We classified assaults, homicides, attempted homicides, sexual assaults and robberies as violent crimes, whereas other types of crime are classified as non-violent crimes.

The study subjects were classified into five groups: (1) No conviction, (2) One conviction for non-violent crime only, (3) Two or more convictions for non-violent crimes only, (4) One conviction for violent crime; additional non-violent crimes possible, (5) Two or more convictions for violent crime; additional non-violent crimes possible. For most youth in groups 4 and 5 before age 18 years, violent crime was the reason for their first conviction: only 18% had been convicted for a non-violent offence before the first violent crime. The index crime refers to the first crime committed in each group 1–5 above.

The following background variables were used in the adjustment (for classification, see online supplementary file appendix table S1): socioeconomic class SES 2009, as based on occupation in 2009; education in 2008; community type in 1994; non-nuclear family in 2008: parents were not married by 1988, parents were divorced in the period 1987–2008, parent(s) died during 1987–2008; mother <20 years at the birth of the child; mother smoking any time during pregnancy; social assistance: social assistance given to the family before the child was 15 years; child protection before age 15 years: children placed in out-of-home care; psychiatric care before age 15 years: any inpatient care or visits to outpatient clinic for mental diseases recorded in the Care register.

All analyses were carried out separately by gender. In the analyses of antidepressant use prior to the crime, the follow-up of the non-conviction group was set to 16.8 years (the mean age at first crime among the convicted). Two logistic regression analyses for antidepressant purchases before the crime were made. In the first analysis, antidepressant use was adjusted for socioeconomic background characteristics and family having received social assistance or child protection measures. In the second analysis, psychiatric care before the age of 15 years was additionally adjusted for.

## RESULTS

The background characteristics for the boys and girls are given in the online supplementary file, appendix table S1. Crimes leading to a conviction were much more common among boys than girls: 5% of boys and 1% of girls had been convicted at least once by the age of 18 years (table 1). Most crimes were non-violent, but 1.7% of boys and 0.5% of girls had been convicted at least once for a violent crime. Most of the violent crimes were judged to be an assault or a petty assault. Among boys, there were 6 homicides or attempted homicides (none among girls) and 30 aggravated assaults (3 among girls).

About 2% of boys and 5% of girls had purchased antidepressants at least once between the ages 7 and 18 years (table 1). Purchases of other types of psychotropic drugs were less common, anxiolytics being the next most common type, online supplementary file, appendix table S2. Most users of antidepressants (76% of boys and 80% of girls) had bought

antidepressants two times or more (data not shown). SSRIs were the most commonly used (76% of all antidepressant prescriptions). Among boys, they represented 78% of the last antidepressant prescription prior to the crime (or equivalent time among controls) and among girls 82%. By generic names, the most common antidepressants were: citalopram (21% of all purchases), escitalopram (21%), fluoxetine (11%), sertraline (11%), mirtazapine (10%) and venlafaxine (10%).

Antidepressant use was more common among young people convicted for violent crimes than among non-convicted youth, both for any time and before the index crime (table 2). Likewise, antidepressant use was more common among young people convicted for non-violent crimes only than among those not convicted.

Among boys convicted for only one violent crime, antidepressant use was lower than among those convicted two or more times, both any time and prior to the index crime. Compared to boys convicted for non-violent crimes only, antidepressant use among boys convicted for one violent crime at any time was lower and prior to the index crime at the same level. If antidepressant purchases 6 months or closer to the crime are counted, among boys the proportion of users was higher among those with repeated violent crimes than others with convictions. Overall, however, the proportions of users were a minority among the convicts for violent crimes.

**Table 1** Distribution of boys and girls by convicted crimes committed between ages 15–18 years, distribution of violent crimes by type, and proportions having purchased psychotropic drugs between the ages of 7–18 years, 1987 Finnish birth cohort, numbers\* (%)

	Boys n (%)	Girls n (%)
Psychotropic drugs†		
Antidepressants N06A	645 (2.1)	1 441 (5.0)
Psychostimulants N06B	47 (0.2)	9 (0.0)
Antineurotics, tranquillisers N05B	369 (1.2)	381 (1.3)
Hypnotics N05C	43 (0.1)	108 (0.4)
Antipsychotics N05A	324 (1.1)	379 (1.3)
Crime‡		
Total	30 225 (100)	28 895 (100)
No conviction	28 618 (94.7)	28 583 (98.9)
1 non-violent	422 (1.4)	93 (0.3)
2+ non-violent	654 (2.2)	85 (0.3)
1 violent‡	377 (1.3)	112 (0.4)
2+ violent‡	154 (0.5)	22 (0.1)
Type of violent crime§		
Homicide	4 (0.5)	0 (0.0)
Attempted homicide	2 (0.2)	0 (0.0)
Aggravated assault	30 (3.7)	3 (1.9)
Assault, petty assault	682 (84.7)	142 (91.0)
Rape, other sex offence	15 (1.9)	0 (0.0)
Robbery	35 (4.3)	3 (1.9)
Other violent crime	37 (4.6)	8 (5.1)
Total	805 (100)	156 (100)

\*Children who died before the age of 18 years and were not convicted of any crimes between the ages of 15 and 18 years were excluded.

†One person can be in several drug classes.

‡Children are convicted and included in the register only from 15 years onwards. A person convicted of violent crimes could have additionally committed non-violent crimes.

§Percentage calculated from the total number of violent crimes.

**Table 2** Antidepressant purchase by crime classes up to the age of 18 years, by gender, 1987 Finnish birth cohort, percentages (%)\* of boys and girls having bought antidepressants

Crime class	(n)	Boys, % with antidepressant purchase				Girls, % with antidepressant purchase			
		Prior to 1st crime†		Six months previously†‡		Prior to 1st crime†		Six months previously†‡	
		Any time	1 time	2+ times†	0.5	1.1	1 time	2+ times†	1 time
Total	(30 225)	2.1	1.5	0.4	1.1	5.0	3.2	0.7	2.5
No conviction	(28 618)	1.9	1.4	0.3	1.0	4.9	3.2	0.7	2.5
1 non-violent	(422)	6.2	3.3	1.0	2.4	12.9	7.5	2.2	5.4
2+ non-violent	(654)	6.0	2.9	1.2	1.7	8.2	8.2	0.0	8.2
1 violent§	(377)	3.7	2.7	1.3	1.3	12.5	10.7	3.6	7.1
2+ violent§	(154)	11.0	8.4	2.0	6.5	13.6	4.6	0.0	4.6

\*Antidepressants (N06A) purchased before the age of 7 years are excluded; children are convicted and included in the register only from the age of 15 years onwards.

†Differences were statistically significant (&lt;0.001).

‡In the 'no conviction' group the age limit was 16.8 years (the mean age of the first crime in the crime groups).

§Children convicted of violent crimes could have additionally committed non-violent crimes.

Among girls, the proportions of antidepressant users were similar among all convicted girls and higher than among non-convicted girls (table 2), both overall, prior to the first crime and 6 months earlier. However, the numbers of girls convicted for violent crimes twice or more were low, making the numbers unreliable.

In the 37 cases of aggravated assaults, only one of the boys had bought antidepressants any time prior to the crime, and none had bought antidepressants 6 months earlier.

Since the number of violent crimes among girls was low, we also made the analysis up to the age of 22 years (table 3). The numbers of persons having been convicted for violent and non-violent crimes, as well as the proportions of those having bought antidepressants, were much higher than in the inspection up to the age of 18 years, both among girls and boys. When use at any time was inspected, the convicted persons had higher antidepressant use than those without convictions. Among girls, antidepressant use prior to the first crime was relatively similar in the four crime groups (from 15% to 19% had used them). Among boys, there was a gradient from violent crimes to non-violent crimes (from 9.4% to 5.4%). The anomaly of lower use of antidepressants in the follow-up to 18 years (table 2) among boys convicted of one violent crime disappeared.

The background characteristics of the boys convicted for two or more violent crimes by the age of 18 years differed from those of other boys (see online supplementary material file). Compared to those who had not been convicted, they came from lower social classes, parents had received social assistance much more often and the youth had more often received child protection measures. In 2008 (mean age 21 years), they less often had parents who were married to each other (nuclear family). The differences between non-convicted youth and those convicted for non-violent crimes were smaller. The boys with one violent crime and two or more non-violent crimes resembled each other.

Among girls with repeated violent crimes, the differences in background characteristics as compared to girls with no conviction showed similar trends as among boys (see online supplementary material file). Owing to the small number of repeated violent crimes, however, the numbers fluctuated. Unlike for boys, girls with one violent crime and two or more non-violent crimes did not resemble each other in regard to mothers' and fathers' occupation and education.

Adjusting for background characteristics lessened but did not eliminate differences in antidepressant use prior to the crime between the different crime groups (tables 4 and 5). The finding of more common antidepressant use for any time or in the 6 months prior to the index crime among boys convicted of two or more violent crimes remained (table 4). The differences in antidepressant use in other crime groups were smaller and statistically non-significant. Adjustment for psychiatric care before the age of 15 years further decreased the differences in the use of antidepressants.

Among girls, after adjustment for background characteristics, the use of antidepressants was still more common in the crime groups than among those without convictions, although the statistical significance disappeared (table 5). The number of girls who had committed two or more violent crimes was small, and the influence of adjustment could not be reliably studied.

We repeated the analysis of tables 2, 4 and 5 for SSRIs only (data not presented). The differences in SSRI use by crime groups for any time or prior to the crime were similar to those given in table 2; all differences were statistically significant

**Table 3** Antidepressant purchase by crime classes up to the age of 22 years, by gender, 1987 Finnish birth cohort, percentages (%)\* of boys and girls having bought antidepressants

Crime class	Boys, % with antidepressant purchase					Girls, % with antidepressant purchase						
	Prior to 1st crime†					Prior to 1st crime†						
	(n)	Any time	Total	1 time	2+ times	Six months previously	(n)	Any time	Total	1 time	2+ times	Six months previously
Total	(30 153)	7.0	2.9	0.7	2.2	1.3	(28 868)	13.6	6.5	1.3	5.2	3.1
No conviction‡	(25 714)	5.6	2.2	0.5	1.7	0.9	(27 910)	13.0	6.2	1.3	4.9	2.9
1 non-violent	(1 542)	9.7	5.4	1.3	4.1	2.3	(383)	27.9	15.1	3.9	11.2	8.6
2+ non-violent	(1 485)	16.5	6.3	2.1	4.2	3.2	(275)	38.6	19.3	2.9	16.4	9.8
1 violent§	(882)	15.9	8.4	2.5	5.9	3.7	(229)	28.4	17.0	3.5	13.5	9.6
2+ violent§	(530)	26.0	9.4	2.5	7.0	4.9	(71)	43.7	18.3	1.4	16.9	11.3

\*Antidepressants (N06A) purchased before the age of seven are excluded; children are convicted and in the register only from 15 years onwards.

†Differences were statistically significant (&lt;0.001).

‡In the 'no conviction' group, the age limit was 18.7 years (the mean age of the first crime in the crime groups).

§Children convicted of violent crimes could have additionally committed non-violent crimes.

(<0.001). In the adjusted analyses, the ORs of using SSRIs by crime group were similar to those given in tables 4 and 5.

We cross-tabulated the concomitant use of antidepressants and other psychotropic drugs 6 months prior to the index crime in the different crime groups and among those without convictions. The numbers of concomitant users were low among those convicted for crimes. Among non-convicts, the concomitant use of antipsychotics and antidepressants within 6 months before the end of follow-up (16.8 years) was higher. Adding the use of antipsychotics to the models did not greatly influence the ORs. If anything, they increased the differences between the crime classes and controls.

## DISCUSSION

In summary, boys were convicted for violent and non-violent crimes much more often than girls, but girls were prescribed antidepressants more often than boys. We found that antidepressant use prior to violent crime was more common among convicted young persons than among those without convictions. Among boys with repeated violent crimes, prior antidepressant use was more common than among boys convicted of non-violent crimes. Adjustment for differences in the background characteristics decreased the associations between antidepressant use and violent crime, but did not abolish them. When restricting the inspection to the subclass of SSRIs, the associations remained.

Even though the relative risks were notably increased, the actual numbers of antidepressant users, and thus the attributable risks, were low. None of the boys who had carried out manslaughter or attempted manslaughter had bought antidepressants in the previous 6 months. To commit a violent crime, factors other than antidepressant use are much more important. In our study, mental health problems (measured by psychiatric care before the age of 15 years), poverty (parents had received social assistance) and problems with parenting (child had received child protection measures) were important predictors for violent crimes.

At the time of starting this study, there were no large epidemiological studies among young people on the time sequence of antidepressant use and violent behaviour against others. Recently, a Swedish study on persons aged 15–25 years, comparing the same people while on drugs and while not, showed an association between SSRIs and violent crime convictions.<sup>23</sup> Our study, which looks at antidepressant use before the first violent crime and adjusts for background characteristics, adds further evidence that there is a relationship between these two.

In our study, SSRIs were the most commonly used antidepressants, and restricting the analysis to SSRIs gave similar results to those including all antidepressants. The previous focus on SSRIs, or even individual antidepressant drugs, may relate to the available data rather than real differences between different types of antidepressants.

Mental health problems and antidepressant use are closely connected to each other, and mental health problems are related to crimes.<sup>29–31</sup> People convicted for crimes or in jails frequently have mental health problems and use psychotropic drugs.<sup>32</sup> In our study, the strongest predictor for crime convictions was that the child had been in psychiatric care before the age of 15 years. Including psychiatric care in the models decreased the relationship between antidepressant use and violent crimes, but did not eliminate the relationship completely. We did not include mental health in the first model as it is likely to be a part of the causal pathway, and there is a causal relationship between mental

## Mental health

**Table 4** Comparison of antidepressant purchase prior to the index crime\* in different crime classes, raw and adjusted ORs and (95% CIs), 1987 Finnish birth cohort boys 15.0–17.9 years

Crime class	Number (purchased)†	Raw OR	CI	Adjusted 1‡ OR	CI	Adjusted 2§ OR	CI
Any time							
No conviction¶	388	1.00		1.00		1.00	
1 non-violent	14	2.49	1.45 to 4.29	1.93	1.11 to 3.36	1.89	1.06 to 3.38
2+ non-violent	19	2.18	1.36 to 3.47	1.41	0.87 to 2.29	1.04	0.63 to 1.72
1 violent**	10	1.98	1.05 to 3.74	1.42	0.74 to 2.72	0.90	0.46 to 1.75
2+ violent**	13	6.71	3.77 to 11.94	3.70	2.01 to 6.82	2.34	1.22 to 4.47
Six months previously							
No conviction¶	136	1.00		1.00		1.00	
1 non-violent	6	3.02	1.33 to 6.88	2.37	1.03 to 5.47	2.30	0.98 to 5.38
2+ non-violent	8	2.59	1.27 to 5.31	1.78	0.85 to 3.74	1.31	0.62 to 2.78
1 violent**	2	1.12	0.28 to 4.52	0.81	0.20 to 3.33	0.51	0.12 to 2.13
2+ violent**	6	8.49	3.69 to 19.53	4.85	2.01 to 11.68	3.08	1.26 to 7.57

\*Antidepressants (N06A) purchased before the age of 7 years are excluded; children are convicted and in the register only from 15 years onwards. In the 'no conviction' group, the age limit was 16.8 years (the mean age of the first crime in the crime groups). The children who died during the follow-up were excluded.

†For denominators, see [table 2](#).

‡Adjusted for confounders by logistic regression analysis: socioeconomic background characteristics (mother's and father's SES, mother's and father's education, community type, nuclear family, mother <20 years at birth, mother smoking during pregnancy) and family received social assistance <15 years of age or child protection measures <15 years, see online supplementary appendix table 1.

§Additionally adjusted for psychiatric care before the age of 15 years.

¶The reference group.

\*\*Children convicted of violent crimes may also have additionally committed non-violent crimes. SES, socioeconomic status.

**Table 5** Comparison of antidepressant purchase prior to the index crime\* in different crime classes, raw and adjusted ORs OR and (95% CIs), 1987 Finnish birth cohort girls 15.0–17.9 years

Crime class	Number (purchased)†	Raw OR	CI	Adjusted 1‡ OR	CI	Adjusted 2§ OR	CI
Any time							
No conviction¶	904	1.00		1.00		1.00	
1 non-violent	7	2.49	1.15 to 5.40	1.32	0.79 to 3.86	1.13	0.48 to 2.68
2+ non-violent	7	2.75	1.26 to 5.97	1.29	0.73 to 3.64	1.03	0.44 to 2.44
1 violent**	12	3.67	2.01 to 6.71	1.75	1.21 to 4.28	1.94	0.99 to 3.81
2+ violent**	1	1.46	0.20 to 10.85	1.22	0.16 to 9.22	0.84	0.09 to 7.23
Six months previously							
No conviction¶	471	1.00		1.00		1.00	
1 non-violent	5	3.39	1.37 to 8.39	2.58	1.03 to 6.47	1.88	0.72 to 4.90
2+ non-violent	5	3.73	1.51 to 9.25	2.62	1.03 to 6.63	1.86	0.71 to 4.86
1 violent**	6	3.38	1.48 to 7.73	2.39	1.03 to 5.56	1.97	0.83 to 4.69
2+ violent**	0	–	–	–	–	–	–

\*Antidepressants (N06A) purchased before the age of 7 years are excluded; children are convicted and in the register only from 15 years onwards. In the 'no conviction' group, the age limit was 16.8 years (the mean age of the first crime in the crime groups). The children who died during the follow-up were excluded.

†For denominators, see [table 2](#).

‡Adjusted for confounders by logistic regression analysis: socioeconomic background characteristics (mother's and father's SES, mother's and father's education, community type, nuclear family, mother <20 years at birth, mother smoking during pregnancy) and family received social assistance <15 years of age or child protection measures <15 years of age, see online supplementary appendix table S1.

§Additionally adjusted for psychiatric care before the age of 15 years.

¶The reference group.

\*\*Children convicted of violent crimes may also have committed non-violent crimes. SES, socioeconomic status.

health and antidepressant use, leading to potential over-adjustment of results. On the other hand, once mental health is included (model 2), it is likely to underestimate the occurrence of mental health problems as our data do not cover care in primary care or children not treated at all.

Involvement in the criminal justice system may itself increase the likelihood of using psychotropic drugs. Crimes are often repeated and the direction of causality and time sequence is not clear. Thus, in this study, only the first violent crime was

inspected. However, since there could have been other societal interferences before the age of 15 years, including juvenile custody, the time order in the association between psychotropic use and violent crimes is difficult to assess (see online supplementary material file).

Previous studies among adults suggest a negative correlation of violence to antipsychotic use,<sup>33</sup> and a positive correlation to analgesics (both opioid and non-opioid).<sup>24</sup> The concomitant use of other psychotropics 6 months prior to the conviction was

low, but among the controls there was some concomitant use of antidepressants and antipsychotics. The impact of concomitant use in the models was minimal.

The strengths of our study are the large size, the unselected total population, being able to identify the time order between antidepressant use and crimes and use of administrative data, which are complete and unbiased by attrition and/or survey non-response. Some social characteristics that were important confounders were controlled for. However, the data sources also included potential problems: purchase of antidepressants was used as a proxy for actual use, information about violent offending was limited to officially recorded crimes (eg, not including those committed prior to the age of 15 years), information on all important confounders was not available (see online supplementary material file), and the difficulty in parsing out the effects of mental health problems (see above).

### Further research

The rarity of violent crimes and the problems entailed in observational epidemiological studies in resolving causality call for other types of research designs. An approach could be to reanalyse existing trial data on antidepressants among young people using proxy measures on violence. It might be worth investigating whether the original trials of antidepressants included measures of aggression and violence. A reanalysis of one trial with two antidepressants among young people<sup>15</sup> suggests that having all trials might yield new information on the relation between antidepressants and violence. Such an analysis requires full access to the original individual-based data.<sup>15</sup> Another approach is careful case descriptions and analysis of events prior to the crime, with careful documentation of medicine use. Irrational violent crimes (ie, those without common motives), including school and other mass killings by young people, are a potential target group.

### Practical implications

Even though the official indications in SPCs for antidepressant use among young persons in Finland are now conservative, the practice guidelines have been liberal. The most recent clinical guidelines<sup>16</sup> recommend starting the treatment of severe depression in young persons with drugs, preferably jointly with psychotherapy. For other types of depression, it recommended starting treatment with psychotherapy, and if a good enough response is not achieved within a month, to add fluoxetine for 6 months. The possibility of self-harm is mentioned in the guidelines, but not violence.

The results of this study add further evidence for exercising caution in the use of antidepressants, particularly SSRIs, among children and youth, and to rely on other treatment methods. It also calls for studies and activities to prevent depression among young people.

### What is already known on this subject

- ▶ Among young people, the use of antidepressants, especially selective serotonin reuptake inhibitors (SSRIs), has been questioned due to poor efficacy and safety, including the risk for self-harm behaviour.
- ▶ Only one epidemiological study, using data from Sweden, has studied the relationship between antidepressant use and violence, suggesting a positive association.

### What this study adds

- ▶ Comparing young people convicted for violent crimes to non-convicted youth and those convicted for non-violent crimes, an increased likelihood for antidepressant purchases prior to the crime was found in a nationwide birth cohort in Finland.
- ▶ The results show a need to further study the impact of antidepressants, particularly SSRIs, on violent behaviour among children and youth.

**Contributors** EH developed the idea, participated in the study design and wrote the first draft. MM carried out the analysis and commented on the manuscript. MG participated in the study design, commented on the manuscript. KW participated in the study design and commented on the manuscript. JS participated in the study design and commented on the manuscript. TR commented on the manuscript. MA participated in the study design, analysed the data, commented on the manuscript. All authors have seen and accepted the final version.

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## Antidepressant use and violent crimes among young people: a longitudinal examination of the Finnish 1987 birth cohort

Elina Hemminki, Marko Merikukka, Mika Gissler, Kristian Wahlbeck, Jukka Savolainen, Tiina Ristikari and Mikko Aaltonen

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