

Regional variation in pediatric prescribing of ADHD medication: The impact of different prescribing behaviors as to children facing social adversity

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Background

The increasing utilization of medicine against Attention-deficit/hyperactivity disorder (ADHD) in children has raised concerns, partly due observed and unknown side effects.

While ADHD seems to be associated with social adversity, large cross-national and regional variations in pediatric ADHD prescribing may indicate that variations in ADHD prescribing not merely reflects variations in the demographic composition of social adversity but also variations in prescribing behavior.

Aim

To explore to what extent regional variations in incident pediatric prescribing of ADHD medication are explained by differences in

- demographic composition and/or
- ADHD prescribing for children facing social adversity as measured by low parental education and single parenthood

Materials and methods

A cohort of Danish children (5-17 years) without previous psychiatric condition (N=813,416) was followed during 2010-2011 for incident ADHD prescribing in the individual-level Danish registries. Register information was retrieved for both children and their parents.

By region we calculated the cumulative incident proportion (CIP) of ADHD dispensing according gender and age-groups. Bivariate correlations between CIP and parental education were calculated by all explanatory variables including region.

By means of Poisson regression (2 models), we estimated Incidence Rate Ratio (IRR with 95% CI) of ADHD prescribing across regions. A range of child and parent characteristics (e.g. parental educational level and cohabitation status) was included as additional explanatory variables.

We eliminated the differences in the demographic distribution by direct standardization of the distribution of social adversity indicators for each variable in the models.

Results

While region 5 and 1 had higher CIP than the national level, ADHD prescribing in region 3 was lower (*Figure 1*). CIP was independently of region highest in boys, with large age dependent differences.

For all regions CIP decreased with increasing length of parental education (*Figure 2*). The gap between those with lowest and next-lowest level was largest in Region 1 (15.5 vs. 7.2).

The result the multivariate analyses (Model 1) shows significantly higher incidence of ADHD prescribing in Region 1 (IRR: 1.23; CI:1.13-1.34) and Region 5 (1.21;1.13-1.30) compared to the national level (estimates for all variables not shown).

After inclusion of the interaction (region*parental education and education*cohabitation) in Model 2, the difference increased for region 1, whilst it for region 5 decreased. IRR in region 3 was significantly below 1 – more pronounced in model 2

Poisson regression analysis:

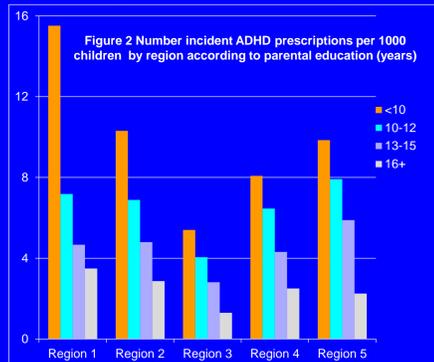
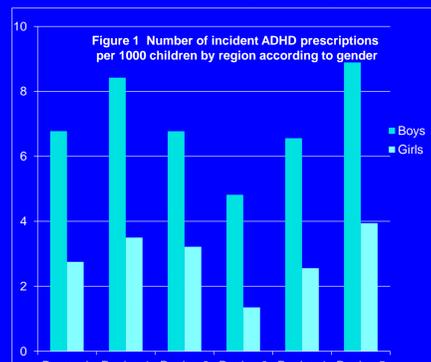
The impact of social adversity on regional ADHD prescribing patterns

Explanatory variables	Model 1		Model 2	
	IRR	95 % CI	IRR	95 % CI
Region				
- All/ National level	1.00	-	1.00	-
- Region 1	1.23	(1.13-1.34)	1.68	(1.40-2.02)
- Region 2	1.10	(1.03-1.17)	1.13	(0.96-1.33)
- Region 3	0.62	(0.57-0.67)	0.54	(0.44-0.66)
- Region 4	1.04	(0.97-1.10)	1.01	(0.86-1.18)
- Region 5	1.21	(1.13-1.30)	0.99	(0.83-1.19)
Gender				
- Boy	1.00	-	1.00	-
- Girl	0.40	(0.38-0.42)	0.40	(0.38-0.42)
Child age group (year)				
- 5-8	1.00	-	1.00	-
- 9-12	0.93	(0.88-0.98)	0.93	(0.88-0.98)
- 13-17	0.77	(0.74-0.81)	0.77	(0.74-0.81)
Parent's length of education				
- 0: <10 years	1.00	-	1.00	-
- 1: 10-12 years	0.86	(0.80-0.91)	0.93	(0.83-1.03)
- 2: 13-15 years	0.64	(0.59-0.68)	0.73	(0.64-0.83)
- 3: +15 years	0.39	(0.35-0.43)	0.43	(0.33-0.55)
Parental cohabitation status				
- 0: Single	1.00	-	1.00	-
- 1: Cohabiting	0.67	(0.64-0.70)	0.79	(0.71-0.88)
- Region 1-5*Education 1-3 (*)	Not in model 1		In model 2, not shown	
- Education 1-3* Cohabitation		"		"

Interaction terms – only included in model 2

Parent's age at child's birth, psychiatric condition and country of birth included in both models

Cumulative Incident Proportion (CIP) of pediatric prescribing ADHD medication during 2010-11



Conclusion

- This study demonstrates that regional variations in pediatric ADHD prescribing not merely are explained by demographic variations but also by different prescribing attitudes towards children facing social adversity
- The fuzzy and context-bound ADHD diagnostic criteria may result in medicating children for facing social adversity