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ABSTRACT

Objectives: Besides medical needs, psychotropic medication use in adolescence might be conditioned by the cultural context of the family. This knowledge is relevant for both detecting inequities in healthcare, and identifying information bias in epidemiological studies using psychotropic medication as a proxy for impaired psychological health. Therefore, we investigated whether, independent of needs, the socioeconomic characteristics of the mother's country of birth are associated with psychotropic medication use in Swedish-born adolescents.

Design: Prospective cohort study.

Setting: The Swedish population.

Participants: By linking the Swedish Medical Birth Registry to other national registers, we identified all 324 510 singletons born between 1988 and 1990 and who were alive and residing in Sweden until the age of 18 years (2006–2008).

Primary and secondary outcome measures: The primary outcome was participants' use of psychotropic medication in the year they turned 18. In the analyses, applying a life-course approach, we included both the mother's and the children's characteristics throughout pregnancy, delivery, infancy, childhood and adolescence when calculating a risk score (RS) to adjust for needs. We classified the mother's country of birth according to the gross national income (GNI) per capita of each country.

Results: Overall, the lower the income of the mother's birth country, the lower the probability of psychotropic medication use among children. When adjusting for needs, the association became even stronger.

Conclusions: Besides medical needs, use of psychotropic medication by descendants of immigrants seems conditioned by the socioeconomic characteristics of the mothers' countries of birth. The threat of information bias must be considered if psychotropic medication is used a proxy for impaired psychological health in descendants of immigrants.

ARTICLE SUMMARY

Article focus

- We investigated whether, independent of needs, the socioeconomic characteristics of the mother's country of birth are associated with psychotropic medication use in Swedish-born adolescents.
- We evaluated if the use of psychotropic medication is potential proxy of psychiatric disorders in immigrants that could be used in epidemiological studies.

Key messages

- Swedish descendants—particularly girls—of immigrant women from low-income countries have a lower use of psychotropic medication than expected according to needs.
- The underuse of psychotropic medication in adolescent descendants of immigrants seems to contradict the principle of access to healthcare on equal terms and according to needs.
- Using psychotropic drugs as a proxy of psychiatric disorders in descendants of immigrants may give biased results in epidemiological studies.

Strengths and limitations of this study

- We analyse information from registries covering the entire Swedish population. These registries are regularly evaluated by the National Board of Health and Welfare and Statistics Sweden.
- We adopt a life-course approach and an innovative method for evaluating needs. However, needs are not directly evaluated.
- Because different psychiatric disorders can be treated with the same drug group, we cannot create a direct link between specific medications and diagnoses.

INTRODUCTION

There are many knowledge gaps concerning the determinants of psychotropic drug use in immigrants and, to the best of our knowledge, this information is almost absent for descendants of immigrants. In Sweden, the healthcare system aims to allocate resources on equal terms and according to needs rather than by gender, socioeconomic position or country of birth.[1 2] Therefore, from a public health perspective, it is

important to regularly examine the distribution of healthcare resources in relation to healthcare needs across different socioeconomic groups, gender and country of births.

Psychotropic medication are potent therapy for treating impaired psychological disorders in childhood and adolescence.[3] Despite the many uncertainties concerning their safety and efficacy,[4] the use of this medication in adolescents has increased considerably during recent decades.[5–7] In addition, psychotropic medication is used as a proxy for impaired psychological health in adolescents and young adults in register-based epidemiological studies.[8–14]

Psychotropic drug use in adolescents should be conditioned by needs. However, the concept of 'need' is ambiguous, and care-seeking and care-giving are influenced by other factors in addition to disease.[15 16] There are also complex relationships between symptoms, expectations, social factors and an individual's conception of disease.[17 18] Furthermore, the concepts of disease, illness and need are culturally defined to a great extent, and are influenced by societal and contextual factors acting over and above individual characteristics.[19] Therefore, psychotropic drug use may be conditioned by an individual's country of birth per se or in interaction with Swedish society.[20] Patterns of healthcare utilisation may also be transmitted across generations. This information is relevant not only for detecting inequities in healthcare but also for identifying information bias in epidemiological studies that use psychotropic medication as a proxy for impaired psychological health.

In this context, we investigated psychotropic medication use in 18-year-old adolescents born in Sweden. We aimed to compare adolescents born to immigrant women (ie, descendants of immigrants) with those born to native mothers. Our hypothesis was that any difference would disappear, or at least decrease, after adjusting for needs. We appraised needs using a risk score (RS)[21] for psychotropic drug use, including information on the health and socioeconomic status of the mothers and the children during pregnancy and delivery as well as throughout the children's infancy, childhood and adolescence.[22] We studied every 18-year-old adolescent in Sweden during the years 2006–2008.

POPULATION AND METHODS

Study population

The Swedish Medical Birth Registry is linked to several other national databases, including the National Inpatient Registry, the National Mortality Registry, the Swedish Drug Prescription Register, the Register of the Total Population and the Swedish 1990 population census, using a unique personal identification number (PIN). These registries are administered by the Swedish authorities (ie, The National Board of Health and Welfare and Statistics Sweden). To ensure the anonymity of the subjects, these authorities encrypted the original PINs of the individuals before delivering the data to us. The database was approved by the Regional Ethics Review Board in southern Sweden.

Using the Medical Birth Register, we identified all singleton children born in Sweden between 1988 and 1990 who were alive and residing in Sweden from birth until the year in which the child turned 18 (2006–2008) and whose mother's country of birth could be identified. The final study population represented 94% (324 510/347 148) of all children born in 1988, 1989 and 1990. Figure 1 shows a flow diagram of the selection criteria used to define the study population.

Assessment of the outcome variable

The outcome variable was the use of psychotropic medication (ie, dispensation at the pharmacy) according to the Drug Prescription Registry. We obtained this information in the calendar year that the child turned 18. Psychotropic medication was defined as all drugs with Anatomic Therapeutic Chemical (ATC) classification system[23] codes starting with N5 or N6 (see box 1). We dichotomised the outcome variable into use or non-use of psychotropic medication.

Assessment of child's characteristics

We categorised *birth year* into 1988, 1989 or 1990, using 1988 as the reference group. *Apgar score* was measured on a scale from 1 to 10 at the first, fifth and 10th minute after birth, where a score of 10 indicates a delivery without distress for the infant. We created dummy variables where an Apgar score ≤5 was classified as 'low', and an Apgar score >5 was classified as 'not low'. The latter was used as the referent. We recoded the missing values at 5 or 10 min as 'not low Apgar' because it can be assumed that the subsequent Apgar scores were high and therefore not measured if the Apgar score after 1 min was high.[24] This was the case for 37% of the children.

For every hospital discharge, a main diagnosis and up to seven secondary diagnoses are recorded in the Patient Register and coded according to the International Classification of Diseases (ICD). We defined a child admitted to a hospital with a diagnosis coded 290 to 319 or F00 to F90 (ICD V.9 and V.10, respectively) as *severe psychiatric morbidity*. Children never admitted to a hospital with any of these diagnoses were established as the reference group in the comparisons.

For every child, we calculated the total number of days spent in the hospital from birth until their 15th birthday. We distinguished between children with *extensive hospitalisation* (ie, children spending 30 days or more in the hospital) and children with less than 30 days in the hospital or who were never hospitalised, using the latter group as the referent. We combined *history of psychiatric diagnosis* and extensive hospitalisation of the children into four categories, as indicated in table 1.

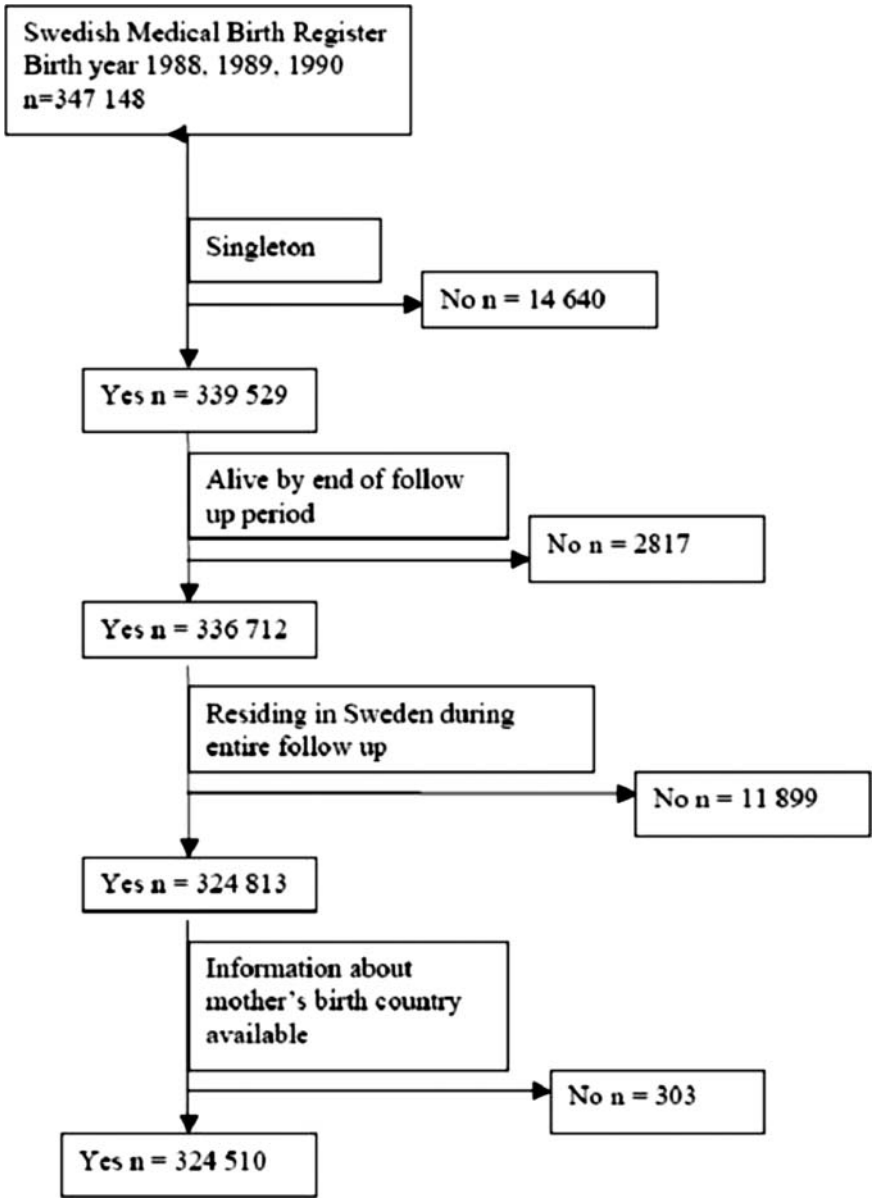

Figure 1 Flow diagram indicating the number of individuals remaining in the study sample after the application of the inclusion criteria.

Assessment of mother's characteristics

We categorised the mothers' *country of birth* by two different types of criteria: socioeconomic and geographic. Both categorisations are listed in table 1. In our analyses, we used the socioeconomic criterion, which categorises the mother's country of birth by means of the World Bank classification of country economies. Using this classification, we assume that countries in the same group resemble each other in access to material and welfare resources and medical resources in particular. This procedure seems less prone to stigmatise individuals than when using their demographic (eg, immigrant vs Swedish-born), or ethnic (eg, Caucasian, Asian and Black) characteristics or their geographic origin (eg, Northern European and African).

Countries were grouped according to their gross national income (GNI) per capita using the World Bank Atlas method into low-income, lower middle-income, upper middle-income and high-income countries. Sweden was included in the high-income category. However, we separated Sweden from the group of high-income countries and used Sweden as the referent in the comparisons because we conducted the study in the context of Swedish culture.

We classified *mother's age at delivery* into six groups (ie, <20 years, 20–24 years, 25–29, 29… >39 years). We considered mothers from the age group 25 to 29 the reference group in the comparisons.

We classified *maternal smoking during pregnancy* into four categories: 'no smoking', 'light smokers' (1–9 cigarettes/day), 'heavy smokers' (>9 cigarettes/day) and 'missing values'. The missing values ranged from 7.6% among the Swedes to 11.8% among mothers from low-income countries. We considered the non-smoking group, the reference category. The information on smoking was self-reported and recorded when the mother attended her first scheduled antenatal care visit.

Box 1 Equation for estimation of the risk score (RS) used in the analyses to approximate the need for psychotropic drugs. The equation was calculated in the population of children born to Swedish mothers and subsequently applied to all the children. The RS corresponds to the predicted probability of using psychotropic drugs as a function of the variables included in the model

Logit (use of psychotropic drugs) =
-3.467 = intercept
+0.180 × 'smoking 1–9 cigarettes/day'
+0.291 × 'smoking more than 9 cigarettes/day'
+0.057 × 'no information on smoking'
+0.126 × 'pre-eclampsia'
+1.742 × 'no information on age'
+0.219 × 'age under 20'
+0.071 × 'age 20–24'
+0.001 × 'age 30–34'
+0.094 × 'age 35–39'
+0.204 × 'age over 39'
+0.057 × 'low Apgar after 1 min'
+0.192 × 'low Apgar after 1 and 5 min'
+0.324 × 'low Apgar after 10 min'
+0.087 × 'no information on Apgar score'
+0.140 × 'no information on family situation'
+0.221 × 'not living together'
+0.152 × 'birth year 1989'
+0.238 × 'birth year 1990'
+0.164 × 'low educational level'
+0.028 × 'middle educational level'
+0.258 × 'no information on educational level'
+0.259 × 'mother extensive hospitalisation and no psychiatric diagnosis'
+0.530 × 'mother psychiatric diagnosis and no extensive hospitalisation'
+0.605 × 'mother extensive hospitalisation and psychiatric diagnoses'
+0.566 × 'child extensive hospitalisation and no psychiatric diagnosis'
+1.539 × 'child psychiatric diagnosis and no extensive hospitalisation'
+2.479 × 'child extensive hospitalisation and psychiatric diagnoses'

We identified all mothers with a diagnosis of *pre-eclampsia* (ICD-9 code 642) and considered mothers who did not suffer from pre-eclampsia the reference group in the comparisons.

We defined mother's *educational achievement* as the highest completed level of education in 1990. This variable was categorised into four groups: 'elementary school or lower' (9 years), 'lower secondary school' (12 years total), 'higher educational achievement' (>12 years) and 'missing information'. We used the 'higher educational achievement' category as the reference group in the comparisons.

Information regarding whether parents were *living together* was based on self-reported status when the mother was first seen for antenatal care. We considered mothers living together with the father of the child the reference group.

We identified mothers with *severe psychiatric morbidity* and with *extensive hospitalisation* in a manner similar to that used for children (see above). In addition, we combined a history of psychiatric diagnosis with extensive hospitalisation in the same way as we did for the children (see table 1).

Statistical analyses

To estimate needs, we applied a logistic regression and constructed an equation that predicted the probability (ie, the RS)[21] of using psychotropic medications around the age of 18 in the unexposed group (ie, children with mothers born in Sweden). This equation included the maternal and child's characteristics aforementioned.

These variables were chosen using both previous knowledge and an explorative approach. When two variables showed multicollinearity, we selected the variable that provided a better goodness of fit by means of a χ^2 test (eg, mother's education compared with household income).

Subsequently, we applied the RS equation to the entire population (ie, children with mothers born in Sweden *and* children with immigrant mothers).

The equation of the RS is presented in box 1. The individual value of the RS (ie, predicted probability) was obtained with the following formula:

$$RS = [e^{logit}/(1 + e^{logit})] \times 100.$$

In the analyses, we categorised the RS into four groups by quartiles and used the group with the lowest RS as the reference group in the comparisons.

Using logistic regression, we developed two consecutive models to estimate the relative differences (ie, OR) in the use of psychotropic medications. In the first model, we investigated the bare association between mother's country of birth and the use of psychotropic medication in adolescence. In the second model, we included the RS described above to adjust for possible dissimilarities in needs between the different maternal countries of birth. We analysed boys and girls separately in the models because there are cultural differences in gender roles, and gender may influence healthcare and psychotropic drug use.[25–27] We used SPSS V.18 for all analyses.

RESULTS

Box 1 indicates the regression coefficients of the variables used in the logistic regression to obtain the RS (ie, predicted probability) for psychotropic drug use.

Table 1 shows the characteristics of the adolescents at different life stages and classified according to the GNI categories of the mother's country of birth. This table indicates that adolescents born to mothers from low-income countries used less psychotropic medication than do adolescents with mothers born in Sweden. However, adolescents with mothers from low-income countries were more frequently hospitalised, and also more often hospitalised with a psychiatric diagnosis, than adolescents with Swedish mothers.

Table 1 Child's characteristics by maternal country of birth classified according to World Bank Gross National Income (GNI). Numbers are percentages unless otherwise indicated

	Sweden	HIC	UMIC	LMIC	LIC
Number of children	288 626	15 905	9572	7972	2435
Number of girls	140 235	7743	4656	3883	1174
Use of psychotropic medication at age 18 (ATC code)					
Psychotropic medication unspecified (N5 + N6)	4.7	5.0	3.9	3.4	2.2
Antipsychotics (N5A)	0.4	0.5	0.5	0.5	0.2
Anxiolytics (N5B)	1.5	1.6	1.4	1.3	0.7
Hypnotics and sedatives (N5C)	1.2	1.5	1.0	1.2	0.4
Antidepressants (N6A)	2.8	2.9	2.0	1.6	0.9
Psychostimulants (N6B)	0.8	0.7	0.5	0.4	0.3
Child's characteristics during perinatal period					
Birth year					
1988	32.1	33.2	31.2	28.7	28.1
1989	33.1	32.3	32.8	32.2	32.4
1990	34.8	34.5	35.9	39.1	39.4
Apgar score					
Low Apgar score	94.1	94.4	93.6	93.8	91.7
Low Apgar score (<6) after 1 min only	3.0	2.4	3.3	3.4	4.1
Low Apgar score (<6) after 1 and 5 min.	0.7	0.7	0.9	0.7	1.2
Low Apgar score (<6) after 10 min	0.4	0.5	0.4	0.5	0.8
Apgar scores missing	1.9	2.0	1.8	1.6	2.2
Child's characteristics until age 15					
Hospitalised >30 days	2.1	2.0	2.7	2.2	3.0
Psychiatric diagnosis according to Patient Registry	1.6	1.8	1.9	1.8	2.5
Hospitalised >30 days (A) and psychiatric diagnosis (B) combined					
(A) no and (B) no	96.7	96.5	95.9	96.3	94.9
(A) yes and (B) no	1.8	1.7	2.3	1.9	2.5
(A) no and (B) yes	1.2	1.4	1.4	1.5	2.1
(A) yes and (B) yes	0.4	0.4	0.5	0.3	0.5

HIC, high-income country; LIC, low-income country; LMIC, lower middle-income country; UMIC, upper middle-income country.

Table 2 is similar to box 1 but provides information on maternal characteristics. Low-income countries are those countries outside of Europe. Compared with Swedish mothers, mothers from low-income countries have lower income, lower educational achievement and are less likely to live with the father of their children. Furthermore, a higher percentage of mothers from low-income countries have been hospitalised for more than 30 days, and mothers from low-income countries have a much lower smoking prevalence.

Table 3 shows the OR and 95% CI for psychotropic medication use in adolescence as a function of the GNI categories of maternal country of birth stratified by gender. Overall, the lower the GNI of the mother's country of birth, the lower the probability of use of psychotropic medication among descendants of immigrants compared with adolescents born to Swedish-born mothers. In the unadjusted analysis (table 2, model 1), this association was more evident for girls than for boys. Nevertheless, after adjustment for the RS (table 2, model 2), the association was accentuated and evident in both sexes. The lowest risk for psychotropic drug use was found in girls born to mothers from low-income countries.

DISCUSSION

Our analyses indicate that Swedish adolescents born to immigrant women have a lower use of psychotropic medication in adolescence than do the offspring of native Swedish women. This observation was evident in both sexes but was especially pronounced in girls. Moreover, the relative use of psychotropic medication decreased linearly with the income (ie, GNI per capita) of the mother's country of birth and was lowest for girls with mothers born in low-income countries.

Several mechanisms could explain our findings. Adolescents born to immigrant women might have better psychological health and therefore lower needs for psychotropic drug treatment than the offspring of native Swedish women. If this were true, adjusting for needs would make any difference disappear or at least decrease. To create a RS, we adopted a life-course approach[28] and observed that a number of maternal and offspring characteristics during pregnancy, delivery, infancy, childhood and adolescence predicted psychotropic drug use during adolescence. Nevertheless, after adjusting for needs using the RS, the influence of mother's country of birth (ie, lower use of psychotropic medication among adolescents with mothers from low-

Table 2 Maternal characteristics by country of birth classified according to World Bank Gross National Income (GNI)

Maternal characteristics during perinatal period	Sweden	HIC	UMIC	LMIC	LIC
Geographical region of birth					
Sweden	100				
Nordic country outside Sweden		79.4			
Rest of Europe		14.6	63.4	27.6	
Rest of the world		6.0	36.6	72.4	100
Years spent in Sweden at delivery					
>18	98.9	49.8	9.5	13.2	7.6
6–18	0.6	32.5	35.3	20.7	30.9
0–5	0.4	15.9	38.1	46.5	44.4
No information	0.1	1.9	17.2	19.6	17.1
Age at delivery in years					
No information	0.0	0.2	8.3	8.4	8.3
<20	2.8	2.7	5.3	3.6	2.9
20–24	24.3	19.4	24.9	22.5	22.8
25–29	36.9	33.5	26.6	32	35.7
30–34	24.9	27.6	21.3	22.5	22.2
35–39	9.3	13.2	11.3	9.2	7.3
>39	1.8	3.3	2.4	1.8	0.9
Highest completed educational level in 1990					
Primary school (9 years) or less	17.2	25.2	41.2	36.8	46.9
Lower secondary (12 years)	54.9	47.7	32.2	33.6	24.6
Higher education (15 years)	25.1	22.1	14.6	13.4	9.9
No information	2.9	5.0	12.1	16.2	18.6
Living with child's father					
Yes	90.6	88.1	85.5	87	82.2
No	5.2	6.9	6.9	5.4	9.8
No information	4.2	5.0	7.6	7.6	8.0
Smoking during pregnancy					
No	68.0	62.4	69.3	75.5	83.1
1–9 cigarettes/day	15.0	16.3	12.5	8.6	4.1
>9 cigarettes/day	9.3	12.6	6.4	4.7	1.0
No information	7.6	8.7	11.8	11.2	11.8
Pre-eclampsia	2.1	2.0	1.5	1.2	2.4
Maternal characteristics until child aged 15					
Death	0.6	1.0	0.8	0.6	0.9
Hospitalised >30 days	7.0	8.1	7.2	6.9	11.0
Psychiatric diagnosis according to Patient Registry	1.4	2.1	1.5	1.4	1.3
Hospitalised >30 days (A) and psychiatric diagnosis (B) combined					
(A) no and (B) no	91.2	89.1	90.0	90.2	86.4
(A) yes and (B) no	4.9	5.1	5.2	4.9	8.4
(A) no and (B) yes	1.9	2.8	2.7	2.9	2.5
(A) yes and (B) yes	2.1	3.0	2.1	2.0	2.6

Numbers are percentages.
HIC, high-income country; LIC, low-income country; LMIC, lower middle-income country; UMIC, upper middle-income country.

income countries) remained independent and even increased. This finding suggests that differences in psychotropic drug use may reflect divergences in access to healthcare resources rather than lower needs. However, we cannot exclude the possibility that we missed other relevant factors that condition needs, such as childhood adversities, which affect psychological health later in life (eg, neglect and verbal or physical abuse).[29] Because we were restricted to the available information, our adjustment for needs is inherently incomplete.

Since the National Prescription Register contains only prescriptions that were handled by the pharmacies, information on medication prescribed but never picked up at the pharmacy is not available. Therefore, the observed differences in psychotropic drug use might reflect disparities in primary compliance rather than in prescription behaviour (ie, medication could be prescribed but the individual could never pick it up from the pharmacy). In Sweden, at the time of our study, the total yearly cost that a particular individual needed to

Table 3 Association between maternal country of birth and psychotropic medication use at age 18, unadjusted (model 1) and adjusted (model 2) for the risk score (RS) for psychotropic medication use*

	Boys				Girls			
	Model 1		Model 2		Model 1		Model 2	
	OR	95% CI	OR	95% CI	OR	95% CI	OR	95% CI
Maternal country of birth								
Sweden	Reference		Reference		Reference		Reference	
High-income country	1.08	(0.96 to 1.21)	1.01	(0.90 to 1.13)	1.08	(0.99 to 1.19)	1.03	(0.94 to 1.13)
Upper middle-income country	0.94	(0.80 to 1.10)	0.80	(0.69 to 0.94)	0.74	(0.64 to 0.85)	0.66	(0.57 to 0.76)
Lower middle-income country	0.90	(0.75 to 1.07)	0.78	(0.66 to 0.94)	0.59	(0.50 to 0.70)	0.53	(0.45 to 0.63)
Low-income country	0.69	(0.48 to 0.98)	0.57	(0.40 to 0.82)	0.32	(0.21 to 0.48)	0.28	(0.19 to 0.42)
Risk score (RS) for psychotropic drug use*								
First quartile			Reference				Reference	
Second quartile			1.17	(1.01 to 1.29)			1.10	(1.04 to 1.21)
Third quartile			1.45	(1.32to 1.59)			1.31	(1.13 to 1.31)
Fourth quartile			2.55	(2.34 to 2.77)			1.81	(1.81 to 2.01)

Values are OR and 95% CI.
*Variables included in the RS for psychotropic drug use: Perinatal period (Apgar score, child's birth year, maternal smoking during pregnancy, maternal age, maternal educational level, family situation); Infancy, Childhood and Adolescence (extensive hospitalisation child, psychiatric diagnosis child, extensive hospitalisation mother and psychiatric diagnosis mother).

pay for prescribed medications was 4300 SEK (ie, about 500 EU). Beyond this ceiling, medication was free of charge.[30] Therefore, individuals with a low socioeconomic position may be less prone to pick up prescribed medication. We adjusted for socioeconomic factors in the RS for psychotropic drug use but this procedure might be insufficient.

One explanation for the observed underutilisation of psychotropic medication by descendants of immigrants may be that the cultural context in which one grows up influences healthcare-seeking behaviour. Examples of these cultural influences are different conceptions of disease and taboos.[31] Another factor affecting the lower use of psychotropic medication by descendants of immigrants may be so-called health illiteracy (ie, unfamiliarity with the country's healthcare system).[32] These cultural and health illiteracy-related aspects may explain the underutilisation of healthcare by mothers. However, the children in our study grew up and attended school in Sweden. Thus, they had the opportunity to become familiar with the Swedish system. Nevertheless, it is likely that the effects of cultural influences and health illiteracy on mothers' healthcare-seeking behaviours are transmitted to the next generation because it is often mothers who regulate healthcare contacts for children.

Another circumstance behind the observed patterns of use of medication could be the communication between the patient and the healthcare provider. In this sense, insufficient intercultural competence among the healthcare staff might affect the interpretation of the patient's symptoms and hence, the prescription of medication.

The process of incorporating the host culture into an individual's behaviour, such as healthcare behaviour, is known as acculturation.[33] From this perspective, the number of years spent in Sweden might condition the degree of acculturation. Indeed, we found a high correlation between time spent in Sweden before delivery and mothers' country of birth, the lowest percentage of mothers with more than 18 years in Sweden being the group of mothers from low-income countries.

Interestingly, our results suggesting a relative underutilisation of psychotropic medication in 18-year-old descendants of immigrants contrast with previous findings that observed a higher rate of psychotropic drug use in first-generation immigrants.[34] In addition, a study in the Netherlands[35] found that in comparison with the native population, first- and descendants of Turkish and Moroccan immigrants had an increased rate of antidepressant and antipsychotic drug prescriptions and a decreased rate of attention-deficit/hyperactivity disorder (ADHD) medication and lithium prescriptions. However, in our earlier investigations in the county of Scania, we observed that overall utilisation of psychiatric healthcare resources in 18-year-old to 80-year-old immigrants was considerably less than expected according to self-reported needs.[32]

In this analysis, we only considered prescribed medication. Therefore, the results may be biased by the sale of over-the-counter (OTC) medication. In Sweden, the

only available OTC psychotropic drug is Propiomazine. Nevertheless, we believe it is improbable that our results would be affected by the inclusion of Propiomazine in the analyses because this assumption would imply that descendants of immigrants use this OTC drug as a substitute for all other psychotropic medication.

Strength of our study is that we had information from registries covering the entire Swedish population. Furthermore, 98.6% of all births are registered in the Swedish Medical Birth Registry. Therefore, we do not believe that giving birth at home is an important source of bias in our estimations. It could be possible that some mothers give birth at home because they are illegally residing in Sweden or because the Swedish healthcare is very different to their original traditions as is the case for Somali women.[36] However, we do not have information on the country of origin of the 1.4% of the women giving birth at home in Sweden. Furthermore, all women in Sweden with a PIN have the right to attend antenatal care and the majority of them do indeed use this service. However, a minor percentage do not attend all visits that they have the right to, and immigrated women tend to come later in the pregnancy then native Swedish women.[37] Also, even if information was quite complete overall, data on some variables were more frequently missing in children with an immigrant mother than in children with a native mother which may originate information bias. Besides, since smoking is a self-reported variable, there might be a bias due to linguistic barriers or cultural differences in the attitude towards reporting smoking.

The information recorded in the Medical Birth Register, the National Patient Register and the National Cause of Death Register is mandatorily reported by law, and the quality of the registries is regularly evaluated by the National Board of Health and Welfare and Statistics Sweden.

Measurement of psychotropic drug use using administrative registries reflects both access to healthcare and the presence of psychological disorders. From the perspective of community medicine, the identification of an imbalance between needs and utilisation of psychotropic medication raises questions about equity in access to healthcare resources. However, our findings also identify the existence of information bias when using a register-based measurement of psychotropic drug use as a proxy for impaired psychological health if descendants of immigrants are included in the analyses.

We performed analyses investigating specific groups of psychotropic medication (results available on request), but the results were similar to those found when analysing the entire medication group. Moreover, because the therapeutic profiles of the studied medication groups overlap each other (ie, different psychiatric disorders can be treated with the same drug group), we cannot create a direct link between specific medications and diagnoses.

The suitability of treating young people with psychotropic medication is polemic. Side effects can be severe and, certainly, there are risks when these medications are used in children and adolescents.[38 39] Also, it is not clear as to whether adolescents in Sweden and other high-income countries are prescribed these medication in excess (ie, overutilisation).[40] However, underuse may engender avoidable suffering[41] and therefore it is important to ensure that all people in need are granted access to medication.

If underutilisation of psychotropic medication by adolescent descendants of immigrants occurs, policy makers in the Swedish healthcare system should take this situation into account. Swedish healthcare policy is based on the principle of equity that supports the distribution of healthcare resources on equal terms and according to needs, regardless of any other determinants. This aspect is particularly relevant because one of the main goals stated by the Swedish National Institute of Public Health is to achieve 'secure and favourable conditions during childhood and adolescence' and, specifically, 'improved mental health among children and young people'.[39] Paraphrasing Wittkampf,[35] we need further research to clarify whether patients of different ethnic backgrounds with the same symptoms receive similar diagnoses and adequate treatment.

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Mother's country of birth and prescription of psychotropic medication in Swedish adolescents: a life course approach

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