Journal of Affective Disorders 403 (2026) 121483

Contents lists available at ScienceDirect

Journal of Affective Disorders

journal homepage: www.elsevier.com/locate/jad

Research paper

Use of antidepressants before, during, and after pregnancy between 2015 and 2021 in Switzerland: a retrospective analysis of Swiss health care claims data

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ARTICLE INFO

Keywords:
Antidepressant drugs
SSRI
Switzerland
Claims database
Pregnancy
Drug utilization
Pharmacoepidemiology

ABSTRACT

Objective: Depression and anxiety are common during pregnancy, but the prevalence of antidepressant use during pregnancy in Switzerland is not well documented. We explored antidepressant use before, during, and after pregnancy in Switzerland.

Methods: We conducted a descriptive study using a Swiss health care insurance claims database (Helsana) between 2015 and 2021. We included pregnancies resulting in birth of women who were continuously insured during three 270-day periods: preconceptional, pregnancy, and postpartum. In these periods, we quantified the exposure prevalence to antidepressants overall and stratified by region and use of co-medication. Antidepressants of interest included selective serotonin reuptake inhibitors (SSRI), serotonin-norepinephrine reuptake inhibitors, Hyperici herba and others. Additionally, we assessed prevalence of antidepressant discontinuation during pregnancy.

Results: We included 34,584 pregnancies of whom 1386 (4.0%) were exposed (≥1 claim) to antidepressants preconceptionally, 788 (2.3%) during pregnancy, and 1273 (3.7%) postpartum. Of 1386 women with preconceptional use, 60% had no antidepressant claim during pregnancy. Antidepressant use decreased from 1.6% in trimester one to 1.1% in trimester three. The most frequently dispensed antidepressants during pregnancy were SSRIs (75.0%). Exposure to antidepressants was two-fold higher in the French-speaking region (2.6%) than in Central Switzerland (1.3%). About one-third of women continuing antidepressant treatment during pregnancy also used benzodiazepines (co-medication) at least once during this time.

Conclusion: 4 of 100 women in Switzerland took antidepressants before pregnancy, but 60% discontinued treatment when they became pregnant. Since untreated depression in pregnancy may lead to severe long-term consequences for mother and child, this might be of concern.

1. Introduction

Depression and anxiety are the most common mental health disorders during pregnancy, with a reported prevalence between 9% and 15% (NICE, 2020; Woody et al., 2017; Yin et al., 2021). Reportedly, between 1% and 8% of pregnant women claim at least one antidepressant (AD) during pregnancy in high- income countries. Among women with pre-existing AD therapy, between 25% and 70% of women discontinued

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https://doi.org/10.1016/j.jad.2026.121483
Received 12 October 2025; Received in revised form 17 February 2026; Accepted 21 February 2026
Available online 23 February 2026

treatment either before or during the early stages of pregnancy (Bénard-Laribière et al., 2018; Grandt et al., 2021; Hayes et al., 2012; Huybrechts et al., 2013; Zoega et al., 2015).

Benefits and risks of antidepressant AD treatment need to be balanced carefully, (NICE, 2020; Schenkel et al., 2018) but in many cases, risks are likely acceptable given that untreated or undertreated depression during pregnancy is not only a risk factor for worsening long-term maternal mental health, but also for several pregnancy and birth complications which may have long-term consequences for the mother and the child (Bayrampour et al., 2020; Cohen et al., 2006). On the other hand, risks associated with in utero exposure to ADs are likely much smaller than initially reported (Betcher and Wisner, 2020). An initially communicated risk of congenital cardiac malformations associated with in utero exposure to paroxetine was later refuted (Wisner et al., 2020). The main concerns with regard to AD use during pregnancy are an increased risk of pulmonary hypertension in the newborn, which is rare in absolute terms, (Raffel et al., 2007) as well as the occurrence of transient symptoms of postnatal adaptation syndrome (PNAS) which manifest in approximately 30% of exposed newborns with mild symptoms in most cases (Grigoriadis et al., 2013; Raffel et al., 2007).

Evidence on AD use during pregnancy in Switzerland is scarce (Gerbier et al., 2022; Marxer et al., 2024). In an analysis of women with chronic diseases, the 2022 drug report by the Swiss health insurance Helsana Group reported, that 2.4% of pregnant women had at least two separate claims for an AD recorded within nine months before pregnancy. Of these, over 40% had no recorded AD claims during pregnancy (Twerenbold et al., 2022). Additional epidemiological studies in Switzerland have shown that AD use tends to decline during the course of pregnancy (Gerbier et al., 2022).

We aimed to conduct a descriptive study using the Swiss Helsana claims database to further evaluate the use of ADs before, during, and after pregnancy in Switzerland, thereby focusing on different ADs, pregnancy trimesters, and regional variations.

2. Methods

2.1. Data source

We conducted a retrospective descriptive study using the Helsana claims database between 2015 and 2021. In Switzerland, basic health insurance is mandatory, and people could choose among 50 different private health care providers (as of 2021), with subsidies available for those who cannot afford premiums. Helsana is one of the largest Swiss health insurance companies and covered 1.4 million individuals in 2021 (14.6% of the Swiss population) with mandatory basic health insurance across all 26 cantons (*Statistik der obligatorischen Krankenversicherung (OKP) | opendata.swiss*, 2026). The database includes information on outpatient services (TARMED codes), including primary and secondary care contacts (fee-for-service billing), outpatient drug dispensations (Anatomical Therapeutic Chemical [ATC] classification), bundled inpatient diagnostic codes (Swiss Diagnosis Related Groups, SwissDRG), and demographic information such as age, sex, and place of residence (ATC/DDD Index, 2025).

2.2. Pregnancy cohort

The study population has been evaluated in previous studies and included pregnancies of women aged 13–49 years at delivery, who gave birth between 2016 and 2021 (Marxer et al., 2024, 2025). Women were eligible if they were continuously insured with Helsana's mandatory health insurance from 270 days before the start of pregnancy until 270 days after delivery (observation period), and if they were not pregnant during the preconceptional and/or postpartum period, as determined by delivery or abortion codes (non-medicated miscarriages could not be captured). We chose a period of 270 days before conception and after delivery in order to have three time intervals of the same length, which improves comparability of absolute numbers across time intervals. A women could contribute multiple pregnancies to the study population. A flow chart of cohort enrollment is shown in Fig. S1.

2.3. Identification of pregnancies and definition of the delivery date

We identified both inpatient and outpatient deliveries (live births and stillbirths, excluding abortions before gestational week 22) covered by Helsana's mandatory health insurance between 01.01.2015 and 31.12.2021. Inpatient (in hospitals or officially recognized birthing centers) deliveries were identified using SwissDRG codes, and outpatient (home birth or at hospital/birthing center without overnight stay) deliveries through TARMED codes or midwife billing codes (*SwissDRG System 9.0/2020*, 2020). Multiple delivery codes within 30 days were considered to pertain to the same pregnancy, with the first recorded SwissDRG code used as delivery date (the first of all codes in the absence of a SwissDRG code) (MacDonald et al., 2019). Delivery codes recorded more than 300 days apart were treated as separate pregnancies. Those separated by 30 to 300 days used an inpatient SwissDRG code as delivery date, whereas if only outpatient code(s) were reported, codes were excluded (Gerbier et al., 2021, 2022; Spoendlin et al., 2021). Twin deliveries were counted as a single pregnancy (Fig. S2).

2.4. Identification of the date of the last menstrual period and pregnancy trimesters

Gestational age and pregnancy start are not recorded in Swiss healthcare claims data during the study period. Therefore, the date of the last menstrual period (LMP; i.e., start of pregnancy) was estimated using a validated algorithm based on data from the United States (US) (Margulis et al., 2013). The LMP date was set at 245 days before delivery for preterm pregnancies (<37 weeks), and at 270 days before delivery for all other pregnancies (Fig. S3). This algorithm has been used in previous studies using the Helsana claims database (Gerbier et al., 2021, 2022; Marxer et al., 2024; Spoendlin et al., 2021).

2.5. Time windows of interest

The observation period was divided into three mutually exclusive time windows: a) preconception (270 days to 1 day before LMP), b) pregnancy (LMP until delivery), and c) postpartum (1 to 270 days after delivery). The pregnancy period was further divided into 90-day trimesters, with the third trimester shortened in case of preterm delivery (Fig. S3).

2.6. Antidepressant drugs of interest and covariates

For all pregnancies, we reported maternal age at delivery, calendar year of delivery, inpatient vs. outpatient delivery, mode of delivery (i.e. presence of Cesarean section based on SwissDRG codes) and greater region of residence. We identified all claims for an AD of interest during the observation period including SSRIs, serotonin and noradrenalin reuptake inhibitors (SNRIs; venlafaxine, duloxetine), and other ADs (opipramol, doxepin, bupropion, reboxetine, agomelatine, high-dose Hyperici herba, and vortioxetine). Many tricyclic ADs, trazodone, and mianserine were not considered, due to their frequent off-label use to treat other conditions such as pain, insomnia or migraine (up to 80% off-label use) but they were assessed as co-medications (Wong et al., 2017). Low-dose Hyperici herba products are over-the-counter products in Switzerland and are not recorded in our data. However, as we do not have any coded diagnoses for the patients in our population, we could not verify the indication for AD treatment.

2.7. Descriptive and statistical analysis

We quantified the exposure prevalence to ADs (≥1 claim per time

window) during the preconception, pregnancy, and postpartum period, overall (2015–2021) and by calendar year. We further quantified exposure prevalence to ≥2 claims per period, and to ≥2 different ADs (i.e. combination therapies). Additionally, we quantified the exposure prevalence of each specific AD of interest during preconception, pregnancy, and postpartum overall and for each trimester separately. We analyzed AD exposure prevalence during preconception and pregnancy, stratified by greater regions (*Analyseregionen - BFS*, 2025) within Switzerland (Lemanic region, Midland, Northwestern, Zurich, Eastern, Central, Ticino) (For geographical information: Appendix 2, Fig. S4).

We categorized AD use patterns on a patient level into three subgroups: 1) Preconceptional AD use: defined as pregnancies with ≥1 AD claim in the 9 months before conception. This subgroup was further divided into continuers (≥1 AD claim during pregnancy) and discontinuers (no AD claim during pregnancy). 2) New AD use during pregnancy: ≥1 AD claim during pregnancy but none during the preconception period. 3) New AD use postpartum: ≥1 AD claim in the 9-month postpartum period, but none during the preconception period or during pregnancy.

We assessed the exposure prevalence to specific ADs during pregnancy for all users (i.e., preconceptional users that continued the AD treatment and new users during pregnancy) and for new users separately.

Continuers, discontinuers, and new users were further stratified by maternal age at delivery. We also quantified the proportion of pregnancies with psychotropic co-medication (≥1 claim before and/or during pregnancy), including antipsychotics, and hypnotics subdivided into benzodiazepine hypnotics and benzodiazepine-like hypnotics (zolpidem, zopiclone), and ADs not classified as ADs of interest.

To evaluate the role of confounding due to regional variation, we recalculated the main results using an extrapolation factor to adjust for age, year, and regional distribution of Helsana-insured women in the Swiss population, as described in previous studies (Gerbier et al., 2022; Spoendlin et al., 2021) (Tables S1 and S5-S9).

All analyses were performed using SAS® statistical software (SAS Institute, version 9.4, Cary, NC, USA).

This retrospective observational study utilized anonymized data and therefore did not require ethics committee approval. Patient consent was waived as only anonymized data were used.

3. Results

We included 34,584 pregnancies of 30,098 women. The first birth was recorded on 06.06.2016, the last birth on 04.04.2021 (due to the requirement of a 9-month postpartum period). The median maternal age at delivery was 31 years (interquartile range [IQR] 28–35). Cesarean section accounted for 32.7% of all deliveries, aligning with Swiss federal statistical data (32.0–33.2%) (Anzahl Und Rate Der Kaiserschnitte Nach Kanton Und Wohnregion - *2007-2022*, 2023) and our previous study in the Swiss nationwide hospital dataset (Marxer et al., 2022). The population covered all greater Swiss regions (Table S1). Of all pregnant women, 788 (2.3%) were exposed to at least one AD at any time between conception and delivery. This proportion was robust across calendar years during the study period. After restricting to pregnant women with at least two claims for an AD during pregnancy, 443 women (1.3%) were exposed. During the preconceptional period, almost twice as many pregnant women (4.0%, $N = 1386$) claimed ≥1 AD ($N = 868$, 2.5% had ≥2 claims), whereby the proportion of AD claims dropped in the three months before LMP (Table 1 and Fig. 1). AD exposure prevalence declined further across trimesters: with 1.6% ($N = 560$) in the first, 1.3% ($N = 432$) in the second, and 1.1% ($N = 377$) in the third trimester (Table 2, Fig. 1). Postpartum, AD exposure increased again to 3.7% ($N = 1273$, with $N = 825$, 2.4% with ≥2 claims).

Stratification by greater region of Switzerland revealed the highest exposure prevalence to ADs of interest during the 9-months preconceptional period and during pregnancy in the Lemanic region (5.3% and 2.6%), followed by Midland (4.3% and 2.6%), and Zurich (3.7% and 2.2%). The lowest exposure prevalence was observed in Central Switzerland (2.4% and 1.3%) and in Northwestern Switzerland (3.4% and 1.8%) (Table 1).

Table 1
Number and proportion of pregnant women exposed to ADs during the 9-month preconception period, pregnancy, and 9-month postpartum in Switzerland between 2015 and 2021.

		9-month preconception period	Pregnancy	9-month Postpartum
		N (%)	N (%)	N (%)
Total pregnancies			34,584 (100.0)	
Pregnant women exposed to ≥ 1 AD of interest		1386 (4.0)	788 (2.3)	1273 (3.7)
≥2 claims for the same AD (claims on separate days)		868 (2.5)	443 (1.3)	825 (2.4)
≥2 claims for different ADs		155 (0.5)	47 (0.1)	156 (0.5)
Exposed to specific ADs, N (%)				
SSRI	Escitalopram	469 (1.4)	227 (0.7)	427 (1.2)
	Sertraline	214 (0.6)	174 (0.5)	310 (0.9)
	Fluoxetine	171 (0.5)	73 (0.2)	105 (0.3)
	Citalopram	115 (0.3)	87 (0.3)	95 (0.3)
	Paroxetine	45 (0.1)	24 (0.1)	51 (0.2)
	Fluvoxamine	<10 (<0.1)	<10 (<0.1)	<10 (<0.1)
SNRI	Venlafaxine	131 (0.4)	66 (0.2)	96 (0.3)
	Duloxetine	107 (0.3)	36 (0.1)	63 (0.2)
Hypericum	Hyperici herba	198 (0.6)	103 (0.3)	223 (0.7)
Other ADs	Bupropion	34 (0.1)	18 (0.1)	24 (0.1)
	Reboxetine	<10 (<0.1)	<10 (<0.1)	<10 (<0.1)
	Agomelatine	37 (0.1)	14 (<0.1)	25 (0.1)
	Vortioxetine	30 (0.1)	<10 (<0.1)	34 (0.1)
	Opipramol	<10 (<0.1)	<10 (<0.1)	<10 (<0.01)
	Doxepin	<10 (<0.1)	<10 (<0.1)	<10 (<0.1)
Greater regions[a]	Total pregnant women per region[b]	N (%) exposed to ≥1 AD per greater region		
Lemanic region	6′792	362 (5.3)	178 (2.6)	264 (3.9)
Midland	6′591	285 (4.3)	173 (2.6)	279 (4.2)
Northwestern	5′274	178 (3.4)	97 (1.8)	157 (3.0)
Zurich	9′525	350 (3.7)	210 (2.2)	335 (3.5)
Eastern	3′359	109 (3.3)	70 (2.1)	111 (3.3)
Central	2′787	68 (2.4)	37 (1.3)	81 (2.9)
Ticino	1′442	48 (3.3)	29 (2.0)	51 (3.5)

[a] Map of greater regions in Switzerland (Fig. S4).
[b] Some women moved to another canton during the observation period (132 missing values).

The most frequently dispensed ADs during pregnancy were SSRIs, accounting for around three quarters of all AD claims (Table 2). The most frequently dispensed AD was escitalopram (35.2% of all exposed pregnancies), followed by sertraline (22.1%), and Hyperici herba (13.1%).

3.1. Treatment patterns of AD medication

Of 1386 preconceptional AD users, 574 (41.4%) continued AD treatment ('continuers') during pregnancy, while 812 (58.6%) discontinued treatment (i.e. did not claim any AD during pregnancy (Table 3)). The median age of AD continuers was 34 years at delivery (IQR 30–37), which was higher than the median age of discontinuers (31 years, IQR 27–35). Two thirds of AD continuers had ≥2 AD claims during pregnancy. Further continuers were more likely to have an

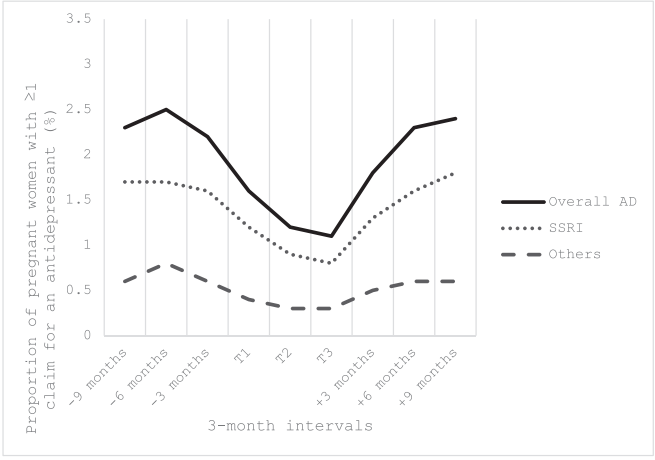

Fig. 1. Antidepressant exposure across pregnancy stages.
Proportion of pregnant women with ≥1 claim for an antidepressant during three-month intervals during the preconceptional period, pregnancy, and postpartum period.[a]
[a]Proportions differ to Table 1 due to differences in time intervals (i.e., 9-month vs. 3-month time intervals).
Abbreviations: AD, antidepressant; SSRI, selective serotonin reuptake inhibitor; T1, trimester 1; T2, trimester 2; T3, trimester 3.

Table 2
Number and proportion of pregnant women with a claim for an AD during pregnancy overall and stratified by AD substance and trimester in the Swiss Helsana claims database between 2015 and 2021.

	During pregnancy overall	1st trimester	2nd trimester	3rd trimester
	N (%) (% per substance during pregnancy)	N (%)	N (%)	N (%)
Total pregnancies	34,584			
Any AD	788 (2.3)	560 (1.6)	432 (1.3)	377 (1.1)
SSRI				
Escitalopram	277 (0.8)	154 (0.5)	122 (0.4)	108 (0.3)
Sertraline	174 (0.5)	115 (0.3)	112 (0.3)	106 (0.3)
Fluoxetine	73 (0.2)	67 (0.2)	23 (0.1)	19 (0.1)
Citalopram	87 (0.3)	61 (0.2)	55 (0.2)	45 (0.1)
Paroxetine	24 (0.1)	20 (0.1)	<10 (<0.1)	<10 (<0.1)
Fluvoxamine	<10 (<0.1)	<10 (<0.1)	<10 (<0.1)	<10 (<0.1)
SNRI				
Venlafaxine	66 (0.2)	50 (0.1)	49 (0.1)	36 (0.1)
Duloxetine	36 (0.1)	31 (0.1)	11 (<0.1)	11 (<0.1)
Hyperici herba	103 (0.3)	44 (0.1)	44 (0.1)	39 (0.1)
Other ADs				
Bupropion	18 (0.1)	14 (<0.1)	<10 (<0.1)	<10 (<0.1)
Reboxetine	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)
Agomelatine	14 (<0.1)	12 (<0.1)	0 (0.0)	<10 (<0.1)
Vortioxetine	<10 (<0.1)	<10 (<0.1)	<10 (<0.1)	0 (0.0)
Opipramol	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)
Doxepin	<10 (<0.1)	<10 (<0.1)	<10 (<0.1)	0 (0.0)

additional claim for a benzodiazepine hypnotic (28.7% vs 22.3%), antipsychotic (17.3% vs 9.1%), a benzodiazepine-like hypnotic (11.2% vs 8.7%), or trazodone (11.8% vs 7.3%) compared to discontinuers at some point before and/or during pregnancy (Table S3).

In addition to the 574 continuing AD users, 214 pregnancies (0.6% of all pregnancies) initiated AD treatment during pregnancy (34.1% Hyperici herba, 24.3% escitalopram, 16.8% sertraline) (Table S4). The majority (62.0%) of these new users discontinued the medication after delivery (Table 3).

In total, we observed a claim for at least one AD during the 9-month postpartum period in 1273 pregnancies (3.7% of all pregnancies). Of those, 48% (615 users) were new users who had not claimed an AD during preconception or during pregnancy (Table 3).

No meaningful discrepancies were observed when extrapolating data to the demographic distribution of the overall Swiss population with 4.0%, 2.3%, and 3.8% claiming an AD during preconception, pregnancy, and postpartum, respectively (Tables S1 and S5-S9).

4. Discussion

In this descriptive study, we used claims data to assess the exposure prevalence to and use patterns of ADs before, during, and after pregnancy in Switzerland between 2015 and 2021. Of 34,584 pregnancies (among 30,098 women), 4% of pregnant women claimed at least one AD during a nine-month preconceptional period, 2.3% during pregnancy, and 3.7% during the postpartum period. SSRIs accounted for around three quarters of AD claims during pregnancy. AD exposure prevalence during pregnancy varied by region with the highest exposure in the French speaking Lemanic region (2.6%), and the lowest in rural regions in the German speaking part of Switzerland (1.3%, Central Switzerland).

Switzerland's health care system is highly fragmented, and data on AD use during pregnancy is scarce (Gerbier et al., 2022; Twerenbold et al., 2022). Reassuringly, the 2.3% exposure prevalence observed in our study is consistent with findings from other high-income countries. A Dutch claims-based study reported that 2% of women claimed ADs during pregnancy (2000-2003), while observational studies from Scandinavia, Germany, France, Canada, and the US reported an exposure prevalence between 1% (Germany) and 8% (US) (Bénard-Laribière et al., 2018; Grandt et al., 2021; Hayes et al., 2012; Huybrechts et al., 2013; Ramos et al., 2007; Ververs et al., 2006; Zoega et al., 2015). Interestingly, a 2025 study based on claims data from a different Swiss health insurance (CSS), observed that only 1.6% of pregnant women claimed at least one AD during pregnancy, which is likely explained by differential regional coverage of the different health insurances in Switzerland (see later in the Discussion) (Dupuis et al., 2026).

In our study, 0.6% of pregnant women initiated some AD treatment during pregnancy, which was similar to a French study (0.4%), but lower than in a US study (4%). The most prescribed ADs were SSRIs, accounting for 75% of all AD claims before and during pregnancy, consistent with a population-based study in six European regions and a Swiss study (Charlton et al., 2015; Dupuis et al., 2026).

Almost two-thirds of women who claimed ADs preconceptionally discontinued treatment during pregnancy, consistent with Dutch and French claims-based studies which reported 60% and 68% discontinuation (Bénard-Laribière et al., 2018; Ververs et al., 2006). Due to the lack of clinical data in our data source, we cannot determine if discontinuation was medically indicated or reflected undertreatment. Benefits and risks of antidepressant treatment have to be balanced carefully, and treatment decisions during pregnancy are highly individual, with guidelines (NICE, 2020; Schenkel et al., 2018; Vickery, 2023) remaining relatively unspecific and generally advising to either continue the medication, combine different treatment options, or consider alternative approaches such as psychotherapy (Grote et al., 2009). However, discontinuation of AD treatment during pregnancy is associated with an up to five times higher risk of recurrent major depression and increases the risk of postpartum depression (Bayrampour et al., 2020; Cohen et al., 2006). Furthermore, untreated or inadequately treated depression and anxiety during pregnancy are associated with preterm birth, intrauterine growth restriction, lower birth weight, poorer neonatal outcome, such as NICU admission, and intergenerational transmission of risk for children's behavioral and psychological symptoms (Ghimire et al., 2020;

Table 3
Subgroups of AD users with different use patterns.

		N (%) of all pregnancies	9-month preconception[a]	Pregnancy[b]	9-month postpartum[c]	N (%) of all pregnancies
Total pregnancies: N= **34,584**						
Preconceptional AD use	Continuers	574 (1.7)	●	●	●	411 (1.2)
			●	●	○	163 (0.5)
	Discontinuers	812 (2.3)	●	○	○	646 (1.9)
			●	○	●	166 (0.5)
New AD use (during pregnancy)	Continuers	214 (0.6)	○	●	●	81 (0.2)
	Discontinuers		○	●	○	133 (0.4)
New AD use (postpartum)		615 (1.8)	○	○	●	615 (1.8)

Height of the cells is proportional to the subgroup prevalence.
[a]N = 1386.
[b]N = 788.
[c]N = 1273.
No claim ○.
≥1 claim ●.

Gimbel et al., 2021; Jeličić et al., 2022). Furthermore, suicide is recognized as one of the leading causes of death during and shortly after pregnancy in high-income countries (Khalifeh et al., 2016).

Despite these known risks, women and healthcare providers often worry more about potential teratogenic effects of drugs, than about risks imposed by omitting necessary drug treatment during or in anticipation of pregnancy (Mulder et al., 2018). This concern has been heightened by historical events, such as the thalidomide scandal (Rajkumar, 2004). Risks associated with AD use during pregnancy are present but are smaller than originally communicated. In 2005 the US Food and Drug Association (FDA) and the German Federal Institute for Drugs and Medical devices (*BfArM*) issued a warning regarding an increased risk of cardiac malformations in association with paroxetine (BfArM - Risikoinformationen -Paroxetine, 2006; *Public Health Advisory: Paroxetine*, 2005). However, two decades of post-marketing observational evidence suggest that this association was most likely spurious due to detection bias (Eleftheriou et al., 2023; Fischer Fumeaux et al., 2019; Huybrechts et al., 2014; Myles et al., 2013; Reefhuis et al., 2015; Reis and Kllén, 2010; Wisner et al., 2020). Nevertheless, AD use in pregnancy remains associated with a small excess risk of persistent pulmonary hypertension in the newborn (PPHN) of 1–2 excess cases per 1000 live births (mainly due to SSRI exposure) (Raffel et al., 2007). Moreover, approximately 30% of newborns exposed to ADs during pregnancy (mainly SSRIs and selective serotonin and norepinephrine reuptake inhibitors (SNRI) (Petersen et al., 2011)) exhibit postnatal adaptation syndrome (PNAS), which manifests in with mild symptoms in most cases (Grigoriadis et al., 2013; Raffel et al., 2007).

Two thirds of women who continued AD treatment during pregnancy claimed at least two packages, suggesting long-term treatment. Continuers were also more likely to use co-medications, such as benzodiazepine hypnotics, antipsychotics, and benzodiazepine-like hypnotics, compared with individuals who discontinued antidepressant treatment, consistent with findings from another Swiss study (Dupuis et al., 2026). This probably reflects more severe or concomitant mental health conditions, since comorbidity between mental disorders is common (McGrath et al., 2020). The proportion of women with at least two separate claims for ADs was lower and varied across the observation period (between 1.3% during pregnancy and 2.5% preconceptionally). Since a single package is unlikely to cover the entire nine-month period, it is likely that not all women continued treatment for a longer duration. Thus, our primary analysis, which focuses on women with at least one claim per observation period, may overestimate the number of women receiving continuous treatment. Furthermore, it is important to highlight that this study evaluated AD utilization in the peri-pregnancy period but does not provide insight into the prevalence of depression and/or anxiety in the Swiss population. Swiss claims data do not record outpatient diagnoses, preventing us from assessing the proportion of women with untreated diagnosed or undiagnosed depression or anxiety. In the 2022 Swiss health survey (a 5-yearly telephone-interview based survey), (*Schweizerische Gesundheitsbefragung 2022 - BFS*, 2022) 9.8% of the adult Swiss population indicated that they experienced strong or moderate depressive symptoms within the past two weeks. While the population of pregnant women differs from the overall Swiss population, it is likely that the proportion of depression and anxiety during pregnancy is higher and that the women with AD use in our study represent those with more severe symptoms.

The same health survey reported regional differences in depressive symptom prevalence, with the French speaking part of Switzerland showing an almost 1.5 times higher proportion (12.9%) compared to the German speaking part (8.7%). We observed the highest AD exposure during pregnancy of 2.6% in the Lemanic region and Midland (mostly French speaking), followed by the canton of Zurich (2.2%). This may reflect the higher prevalence of depression and anxiety in these areas. The Swiss health survey also revealed higher overall medication use in the French speaking regions, which might be reflected in our results. The lowest prevalence of AD exposure was observed in Central Switzerland (1.3%), consistent with the survey's findings of the lowest depressive symptoms prevalence (8%) and lowest medication use in Central Switzerland. However, we did not observe a higher AD exposure in the Italian speaking part of Switzerland (2%), despite the higher rate of

strong and moderate depressive symptoms in the Swiss health survey (10.5%). We cannot speculate on the exact reasons for these regional differences, but cultural factors such as differences in stigma around mental health conditions and availability of outpatient psychiatric and psychological services may play a role (Schuler et al., 2020). However, overall health care cost and health care premiums in the French speaking part of Switzerland surpass those in the German speaking part by 20% on average (Schleiniger, 2014). Thus, overall differences in health-care seeking behaviour may be key drivers behind this finding.

It is important to consider that our study included only 5.6% of all pregnancies in Switzerland between 2015 and 2021, i.e. of women insured with Helsana and continuous insurance coverage during the observation period (Marxer et al., 2024). Basic mandatory health insurance is required in Switzerland, but individuals can choose their insurance provider. Helsana is most strongly represented in the regions of Zurich, Ticino, Lemanic region, and Midland (*Statistik der obligatorischen Krankenversicherung (OKP) |opendata.swiss*, 2026). The above mentioned Swiss study, which observed lower AD utilization rates than we did used data from the health insurance CSS, which is strongly represented in Central Switzerland, showing the great role regional differences may play. However, extrapolation of our results to the overall Swiss population did not meaningfully change our results (Supplementary Tables S1, S5–9), suggesting that differences in regional coverage are non-differential in this study.

Although we cannot entirely exclude the possibility of differences in socioeconomic status across women insured with different health insurance provider, the comparable distribution of income classes does not suggest significant disparities (Felder et al., 2024).

Postpartum depression (PPD) affects approximately 10–14% of women in high-income countries (Bai et al., 2023). In our study population, 3.7% claimed ADs postpartum, which is higher than in Danish (1.5–2%) and Dutch (2.9%) observational studies (Munk-Olsen et al., 2012; Ververs et al., 2006). However, this reported AD use likely reflects monitoring intensity rather than the actual PPD prevalence. Remarkably, 50% of the postpartum AD users (1.9% of all pregnancies) were new users. On the other hand, in our study 40% of all AD users during pregnancy did not have any claims recorded during the postpartum period, despite the fact that depression during pregnancy is associated with a higher risk for PPD (Stewart and Vigod, 2016). Further studies are required to investigate the reasons and consequences of this high treatment discontinuation rate. Swiss claims data do not capture symptom onset, but a PPD screening program in Pittsburgh (US) reported that 24.9% of women with depression had symptoms before pregnancy, 36.7% during, and 38.4% between delivery and four to six weeks postpartum (Fisher et al., 2016).

4.1. Limitations

In addition to the strengths discussed above, several limitations should be considered. First, our study only included pregnancies resulting in live or stillbirths after gestational week 22, as spontaneous abortions and terminations are not reliably recorded in Swiss billing data. Spontaneous abortions - due to various reasons - are common. In our data, we cannot draw conclusions about the mental health prodromes or mental health consequences of these events during early pregnancy. Second, the date of LMP was not recorded in the data and had to be estimated, potentially leading to discrepancies between the true and the estimated start of pregnancy for some women. However, we do not expect a major impact on the results. Further, from 2021 onward, ultrasound-based pregnancy start dates will be recorded, improving accuracy for future studies. Third, we cannot confirm whether and how many ADs were taken by patients claiming ADs, as we did not have information on patient adherence. Finally, while we describe AD use before, during, and after pregnancy, we cannot assess whether the medication was clinically indicated, nor its impact on a woman's condition due to the lack of clinical information.

5. Conclusion

In conclusion, 4 out of 100 women in Switzerland were exposed to ADs within 9 months before pregnancy and 2.3 per 100 during pregnancy (ongoing or new users). Of all preconceptional AD users, 60% discontinued treatment before pregnancy or when they became pregnant. Those users who maintained treatment during pregnancy are likely those with more severe mental health conditions. Nevertheless, in view of the fact that untreated depression in pregnancy may lead to severe long-term consequences for mother and child, this high discontinuation rate might be of concern. Our findings highlight the continued importance of addressing mental health during pregnancy as a key public health issue in Switzerland.

CRediT authorship contribution statement

Alessia Danelli: Writing – review & editing, Writing – original draft, Visualization, Software, Project administration, Methodology, Investigation, Formal analysis, Data curation, Conceptualization. **Carole A. Marxer:** Writing – review & editing, Validation, Methodology, Investigation, Formal analysis, Data curation, Conceptualization. **Sereina M. Graber:** Writing – review & editing, Validation, Methodology, Investigation, Conceptualization. **Carola Huber:** Writing – review & editing, Validation, Methodology, Investigation, Conceptualization. **Simeon J. Zürcher:** Writing – review & editing, Validation, Methodology, Investigation, Formal analysis, Data curation, Conceptualization. **Alice Panchaud:** Writing – review & editing, Validation, Methodology, Investigation, Conceptualization. **Daniel Surbek:** Writing – review & editing, Validation, Methodology, Investigation, Conceptualization. **Christoph R. Meier:** Writing – review & editing, Validation, Supervision, Resources, Project administration, Funding acquisition, Conceptualization. **Julia Spoendlin:** Writing – review & editing, Writing – original draft, Visualization, Validation, Supervision, Software, Project administration, Methodology, Investigation, Funding acquisition, Formal analysis, Data curation, Conceptualization.

Details of ethics approval

This retrospective observational study utilized anonymized data and therefore did not require ethics committee approval. Patient consent was waived as only anonymized data were used.

Declaration of Generative AI and AI-assisted technologies in the writing process

During the preparation of this work the authors used chatgpt and open evidence in order to improve the readability and language of the manuscript. After using this tool/service, the authors reviewed and edited the content as needed and take full responsibility for the content of the published article.

Funding

This study was funded by internal funds of the Basel Pharmacoepidemiology Unit and did not receive any specific grant from funding agencies in the public, commercial, or not-for-profit sectors.

Declaration of competing interest

The authors have no competing interests to declare.

Acknowledgements

We thank Pascal Egger for data extraction and technical support.

Appendix A. Supplementary data

Supplementary data to this article can be found online at https://doi.org/10.1016/j.jad.2026.121483.

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