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# Long-term stability in obsessive thoughts and compulsive behavior in the general population: a longitudinal study in Sweden

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**ABSTRACT**

**Objective:** Obsessive thoughts and compulsive behavior and their related disorder Obsessive-Compulsive Disorder (OCD) commonly occur in the general population. Clinical populations indicate a high level of stability, although there are few longitudinal studies in the general population. The recommended drug treatments are SSRIs/TCAs. However, there are few long-term follow up studies. The goal of this study was to 1) examine the occurrence and stability of obsessions, compulsions, and OCD in a longitudinal population-based survey, 2) investigate the use of SSRI and TCA and the potential effect on symptoms.

**Methods:** A ten-year longitudinal general population in Stockholm was used (2000 and 2010, $n = 5650$) Obsessional washing, checking, intrusive unpleasant thoughts and the level of suffering due to these symptoms were measured by self-report. Information on use of SSRIs and TCAs by these individuals was obtained from registers. Stability was examined using contingency tables and multinomial logistic regression.

**Results:** At baseline, 2.1, 11.7 and 11.9% reported obsessional washing, checking and intrusive thoughts. A total of 5% reported considerable suffering from these (i.e. OCD). Based on psychiatric interview only 0.4% had OCD. Ten years later a quarter of OCD cases were still classified as having OCD, one quarter reported any obsessive or compulsive symptom and half were classified as symptom-free. Treatment receipt was low and controlling for medication did not change the stability.

**Conclusion:** Obsessive thoughts and compulsive behavior are common and stable. While this group is potentially undertreated, there is no indication that those treated display a different pattern of recovery.

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Obsessions; compulsive behavior; obsessive-compulsive disorder; antidepressive agents

## Introduction

Obsessive thoughts and compulsive behaviour comprise by themselves or combined obsessive-compulsive disorder (OCD) [1,2]. Obsessional thoughts are unwanted ideas, images or impulses that repeatedly enter the individual's mind in a stereotyped form whereas compulsive acts or rituals are repeated stereotyped behaviour that are neither inherently enjoyable nor useful. Descriptive epidemiological studies indicate that OCD is relatively common in the general population, although there is considerable variation in prevalence estimates – ranging from 0.7% to 5.1% in, e.g [3–6], and several longitudinal studies indicate a high level of chronicity. There are however few population-based studies of obsessive thoughts and compulsive behavior, and the chronicity may be overestimated when studied only in treatment seeking populations [3]. While commonly placed together with other anxiety syndromes, the DSM-5 now has a separate chapter for OCD, as does ICD-11. This move out of the anxiety disorders section was mainly supported by that obsessions and compulsions are the fundamental feature, rather than the (although prevalent) anxiety. From a treatment perspective, the link to anxiety is retained, with a similar recommended psychological interventions, and pharmacotherapy treatment consisting of selective serotonin reuptake inhibitors (SSRIs) and tricyclic antidepressants (TCAs) [7].

DSM clearly states a high level of chronicity of untreated OCD: 'If OCD is untreated, the course is usually chronic, often with waxing and waning symptoms [DSM-5 p 239] [1]', referring to an older long-term study on patients conducted before the introduction of SSRIs [8]. In contrast, one of the few general population cohorts, a 20-year follow-up of the Zurich community cohort, showed a more favorable course for OCD and OCD syndromes. Long-term studies (10–20 years) among OCD patients conducted after the introduction of psychotherapeutic interventions with demonstrated efficacy have also concluded that most do not experience remission [9]. In a recent meta-analysis of men, follow-up for

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almost 5 years showed (contrary to expected) a high long-term remission rate [10].

Several RCTs have examined short-and long-term effects of SSRI and TCA on OCD patients [7], and the Swedish national guidelines state that there is solid evidence that antidepressants that potently inhibit presynaptic reuptake of serotonin, i.e. five specific SSRIs and clomipramine, ease obsessions and compulsion [11,12], and while treatment for more than a year recommended, there are few follow-ups longer than a year [11]. Similar recommendations are found in, e.g. the UK [13], US [14] and internationally [15].

Since there are few population-based studies on the occurrence of OCD and obsessive-compulsive symptoms (OCS), most of which are cross-sectional, we investigate the point prevalence and stability in a longitudinal population-based cohort. The natural course of OCD and OCS is affected by possible medication, so we also investigate the prevalence of recommended pharmacological treatment and the potential effect of medication on symptom stability.

## Material and methods

### Population

The PART study (a Swedish acronym for Mental health, Work, and Relations) is a longitudinal population-based of Swedish citizens originally sampled at age 20 to 65 residing in Stockholm, Sweden 1998–2000 [16]. A simple random sampling procedure was used, and the National Address Register (SPAR) was used for enumeration (sample frame). In total, 19,742 individuals were sent a questionnaire to which 10,441 responded (53% response rate). Non-participation was significantly more common among the young, male and low-educated [17]. A follow up questionnaire with similar symptom questions was sent out in 2010 (March through June), 10–12 years after the baseline (response $n = 5621$ of 9820 eligible, 57%). Through the individuals' identity number, which are maintained by the National Tax Board for all individuals ever residing in Sweden, the participants were linked to the Swedish Prescribed Drug Register with the National board of health and welfare [18]. Before 2009, the sole and exclusive right to retail medicine was held by the state-owned National Corporation of Swedish Pharmacy's, and data include information on all prescriptions dispensed at local pharmacies to individuals. Drugs are classified according to the WHO Anatomical Therapeutic Chemical (ATC) system. The PART study was also linked to the National Patient Register (under the auspice of the National board of health and welfare) containing register information on health care utilization (hospitalizations and specialized treatment in outpatient clinics) recorded according to the International Classification of Disease.

A two-stage subsample from the baseline ($n = 1091$) [16] was examined using SCAN 2.1 interview [19]. SCAN is a semi-structured interview conducted by trained health professionals, where one of the sections covers obsessive-compulsive disorder. Clinical judgments of present symptoms (4–6 weeks period) and level of interference were used for comparison with self-reported obsessive thoughts and compulsions.

### Obsessive thoughts and compulsions

The baseline and follow-up postal questionnaires contained four questions about obsessions and compulsions during the last 30 days: 'Do you think you wash excessively' and 'Do you think you engage in excessive checking, e.g. of taps, locks and doors' (compulsions) and 'do you have intrusive thoughts with distressing content that you can't control' (obsessions). An additional question on suffering due to these symptoms was also asked, to cover the DSM-IV and ICD-10 criteria of impairment. All questions had yes/no response alternatives. The symptom questions were constructed from recommendations by the Swedish Psychiatric Association and the Swedish Institute for Health Service Development (SPRI) [20]. We conceptualize OCD as having any symptom of obsession or compulsion and suffering. Those reporting any symptom of obsession or compulsion without suffering were defined as experiencing OCS. Those with baseline OCD but only OCS at follow-up were defined as in remission. Recovery was defined as having neither OCD nor OCS.

The SCAN examination for OCD contains an open-ended question on experiencing OCD with given examples. Those with potentially relevant symptoms were subsequently asked probing questions on six specific symptoms which were coded as clinically relevant or not. Thereafter the interviewer rated the level of interference from present symptoms, where $>$ 1 h/day for at least a week was used to operationalize impairment. Symptoms examined were: obsessional checking and repeating, obsessional actions associated with excessive orderliness, obsessional thoughts of harm or accidents, obsessional actions associated with cleanliness and obsessional doubts, obsessional doubts and ruminations and feelings of incompletion.

### Prescribed and dispensed drugs for anxiety

Information on prescription medication was obtained from the prescribed drug register for the drugs recommended for OCD by the Swedish Agency for Health Technology Assessment and Assessment of Social services (SBU) and Swedish Medical Products Agency. SBU is a government authority commissioned by the government to evaluate the scientific evidence ascribed having clinical evidence/effect (based on systematic reviews), and the Medical Products Agency is the government authority responsible for the regulation and surveillance of drugs and medicinal products. The drugs recommended for OCD by the two agencies are SSRIs and Clomipramine [21]. At least one year of treatment, dispensed across several months is recommended [11]. These are also the drugs in the United Kingdom National Institute for Health and Care Excellence (NICE) [13] recommendations for adults with OCD. We obtained the following ATC codes from the register: N06AA04, N06AB06, N06AB05, N06AB03, N06AB08 and N06AB04, from 2005 through 2010. Intermittent drug use was defined as positive if the drug was continuously dispensed more than 3 times during any of the years.

### Covariates

Age and sex were obtained from register information. Because the ICD (but not DSM) classification system does not allow OCD diagnosis in the presence of Schizophrenia, we included information on health care utilization (in and out-patient specialized care) for Schizophrenia using the National Patient Register between 1998 and 2010 (ICD-10 code range F20–F29). Information on income (self-reported continuous in thousand SEK at follow-up) was to adjust for financial differences.

Four measures covering anxiety and depression were used to adjust for common coexisting syndromes that would be treated with antidepressants. *Social anxiety* and *Agoraphobia* were measured with items modified from Marks and Mathews Fear Questionnaire [16,22] covering avoiding 1) transport by bus, train, or car, 2) going into shops, cinema or queuing 3) large open spaces (agoraphobia) and 1) eating, drinking or writing when others are watching 2) being watched or in the center of attention 3) being with others due to negative self-judgment. Response alternatives ranged from Never, to Always (coded 0–4) which was summated (range 0–12 for both Social anxiety and Agoraphobia). *Panic* was measured using nineteen items (covering DSM-IV panic attacks) from the Sheehan Panic Disorder Scale (previously SPRAS), scored as 0–3 and summated into score from 0–57 [16,23]. *Generalized anxiety* was measured with seven items from the Symptom Checklist (SCL) [24] on worrying too much, nervousness, easily annoyed, fearfulness, feeling tense, restlessness and feeling pushed to get things done, which were scored 0 through 4 and summarized (range 0–28).

*Depression* was measured with the Major Depression Inventory [25] with 10 items covering 10 DSM-IV depression symptoms. The items were coded as six-point likert alternatives (from 'at no time' to 'all the time', scored 0–5) and summated into a severity rating scale ranging from 0–50.

### Statistical analysis

The stability of OCD/OCS was examined using contingency tables and unconditional multinomial logistic regression [26]. Multinomial logistic regression is a generalization of logistic regression that allows predictions of the probabilities of the different possible outcomes of a categorically distributed dependent variable, in this case (a) OCD (b) OCS. We report 95% confidence intervals as measures of uncertainty. The multinomial logistic regression was conducted in ten steps. First: 1) crude longitudinal associations, 2) age-adjusted (in intervals) 3) age and income adjusted, and 4) adjusted for age, income, and intermittent SSRI/TCA medication. Thereafter, the age-adjusted model was completed with adjustments for 5) agoraphobia, 6) social anxiety, 7) panic attacks, 8) generalized anxiety 9) depression. The two last models were adjusted for 10) age and all measures of anxiety and depression, and 11) all measures of anxiety and depression and intermittent SSRI/TCA medication.

Non-participation was examined among those eligible for participation using bivariable chi-square and *t*-tests, and then multinomial logistic regression with participation in 2010 as an outcome and baseline OCD symptoms as a predictor in a multivariate logistic regression controlling for age. Comparisons of baseline anxiety and depression scores between those with OCD, OCS and those free from symptoms were made with Welch's analysis of variance (ANOVA).

Estimates for the prevalence of and impairment from OCD symptoms assessed from the SCAN interview in the baseline subsample were computed with weights to correct for the two-stage sample design (1,090 due to missing information on screening group). The weighted sensitivity and specificity of the self-reported OCD information (using interview information as criterion) was estimated on those 1078 subsample individuals that had non-missing self-reported OCD.

All analyses were performed with STATA version 12.

## Results

A total of 5,621 individuals participated in the last follow up. Participants were more often female, 58.9%. The mean age at follow-up was 54.8 years (SD = 12.3) and mean annual income was kSEK 369.8 (SD = 315.8). Different participation probability was found across sex ($\chi 2$ (1, $N = 10{,}345$) = 62.7 $p < 0.0001$), and baseline OCD symptoms (obsessional washing ($\chi 2$ (1, $N = 10323$) 3.3, $p = 0.07$), checking ($\chi 2$ (1, $N = 10{,}321$) 5.1 $p = 0.0244$), and intrusive unpleasant thoughts ($\chi 2$ (1, $N = 10{,}314$) 15.1 $p = p < 0.0001$) and suffering ($\chi 2$ (1, $N = 10{,}317$) 1.0 $p = 0.0016$). Age was significantly different between participants ($M = 43$, SD = 12.3) and non-participants ($M = 39$, SD = 12.3), t(10339) = −15.90, $p < 0.0001$. All OCD-participation associations remained significant after controlling for age in logistic regression. Eighteen individuals had a hospital/outpatient schizophrenia diagnosis during the follow-up period and were excluded.

The prevalence of obsessional washing, checking, and intrusive unpleasant thoughts in the population and among those reporting impairment showed that obsessions were the dominant symptom, affecting up to one in four and causing considerable suffering for 4.5 to 6.5% of the population (Table 1). The baseline prevalence of impairment due to obsessions or compulsions was similar across sex and age (Table 2), with a tendency of a u-shaped association with age.

The baseline examination of the validity of the self-report OCD items, using SCAN as criterion standard, showed low credibility (Supplementary Table 1). The sensitivity and specificity are generally both low, and prevalence estimates are much inflated.

Mean scores of anxiety and depression were dissimilar between baseline OCD and OCS (supplementary table 2).

The stability of OCD and OCS is shown in Tables 3 and 4. Approximately half of those with OCD or OCS at baseline were symptom-free ten to twelve years later (Table 3). Less than a quarter of those with OCD at baseline continued to have OCD at follow-up (23%), whereas a majority were either symptom-free (54%) or in remission (23%). The prevalence of antidepressant use was 8 and 16% among the baseline OCS and OCD cases respectively. Stratifying for the last five years antidepressant use was more consistent in those with OCD. Multinomial logistic regression was carried out on 5493

**Table 1.** OCD and OC symptom prevalence at baseline and follow-up in the cohort, with 95% confidence intervals.

| | Baseline ($n = 5611$) | | | | | | Follow up ($n = 5522$) | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Symptoms (OCS) | | | Symptoms and Suffering (OCD) | | | Symptoms (OCS) | | | Symptoms and Suffering (OCD) | | |
| | *n* | % | *95 % CI* | *n* | % | *95 % CI* | *N* | % | *95 % CI* | *N* | % | *95 % CI* |
| Washing | 118 | 2.1 | 1.7–2.5 | 26 | 0.5 | 0.3–0.6 | 66 | 1.2 | 0.9–1.5 | 18 | 0.3 | 0.2–0.5 |
| Control | 506 | 9.0 | 8.3–9.8 | 74 | 1.3 | 1.0–1.6 | 408 | 7.4 | 6.7–8.1 | 58 | 1.1 | 0.8–1.3 |
| Thoughts | 658 | 11.7 | 10.9–12.6 | 286 | 5.1 | 4.5–5.7 | 492 | 8.9 | 8.2–9.7 | 240 | 4.4 | 3.8–4.9 |
| Any Symptom | 1,060 | 18.9 | 17.9–19.9 | 293 | 5.2 | 4.6–5.8 | 827 | 15.0 | 14.0–15.9 | 249 | 4.5 | 4.0–5.1 |

**Table 2.** Prevalence of OC symptoms OCD and at baseline and at follow up.

| | Baseline | | | | | Follow-up | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | OCS | | OCD | | | OCS | | OCD | |
| | *n* | % | *95% CI* | % | *95 % CI* | *N* | % | *95 % CI* | % | *95 % CI* |
| *Sex* | | | | | | | | | | |
| Women | 3,307 | 13.7 | 12.6– 14.9 | 5.7 | 5.0–6.5 | 3260 | 10.1 | 9.0–11.1 | 5.4 | 4.6–6.1 |
| Men | 2,304 | 13.6 | 12.2–15.0 | 4.5 | 3.6–5.3 | 2262 | 11.1 | 9.8–12.3 | 3.7 | 2.9–4.5 |
| *Age* | | | | | | | | | | |
| 20–29 | 1,028 | 19.8 | 17.4–22.3 | 6.5 | 5.0– 8.0 | 1012 | 11.2 | 9.2–13.1 | 6.3 | 4.8–7.8 |
| 30–39 | 1,242 | 13.0 | 11.2–14.9 | 5.4 | 4.1–6.7 | 1228 | 9.8 | 8.1–11.4 | 4.9 | 3.7–6.1 |
| 40–49 | 1,248 | 11.1 | 9.4–12.9 | 6.0 | 4.7–7.3 | 1232 | 10.3 | 8.6–11.0 | 5.4 | 4.1–6.6 |
| 50–59 | 1,564 | 12.0 | 10.4 – 13.6 | 4.2 | 3.2–5.2 | 1534 | 9.8 | 8.4–11.3 | 3.5 | 2.6–4.4 |
| 60–65 | 529 | 14.0 | 11.0–16.9 | 3.4 | 1.9–4.9 | 516 | 13.0 | 10.1–15.9 | 2.9 | 1.5–4.4 |

**Table 3.** Prevalence of being symptom-free, having OCS symptoms and OCD at follow-up across baseline status (5522).

| | Follow-up status | | |
|---|---|---|---|
| Baseline status | Symptom-free % (95 % CI) | OCS % (95 % CI) | OCD % (95 % CI) |
| *Full Cohort* | | | |
| Symptom-free (n = 4471) | **91.4 (90.6–92.3)** | 5.7 (5.0–6.3) | 2.8 (2.4–3.4) |
| OCS (n = 759) | 57.8 (54.3–61.4) | **34.1 (30.8–37.5)** | 8.0 (6.0–10.0) |
| OCD (n = 292) | 54.1 (48.4–59.8) | 22.6 (17.8–27.4) | **23.3 (18.4–28.1)** |
| *Among medicated* | | | |
| Symptom-free (n = 257) | **84.8 (80.4–89.2)** | 7.8 (4.5–11.0) | 7.4 (4.2–10.6) |
| OCS (*n* = 62) | 51.6 (39.1–64.1) | **33.9 (22.0–45.7)** | 14.5 (5.7–23.3) |
| OCD (*n* = 48) | 35.4 (21.8–49.0) | 20.8 (9.3–32.4) | **43.8 (29.7–57.8)** |
| *Among non-medicated* | | | |
| Symptom-free (*n* = 4214) | **91.8 (91.0–92.7)** | 5.5 (4.8–6.2) | 2.6 (2.2–3.1) |
| OCS (*n* = 697) | 58.4 (54.7–62.1) | **34.1 (30.6–37.7)** | 7.5 (5.5–9.4) |
| OCD (*n* = 244) | 57.8 (51.6–64.0) | 23.0 (17.7–28.2) | **19.3 (14.3–24.2)** |

Note: Bold (main diagonal) indicates stable groups; above the main diagonal is deterioration, below main diagonal recovery and remission.

subjects with full information on all variables. Odds ratios from the crude and adjusted models are shown in Table 4. The odds of having OCD at follow-up were 3 and 12 times higher for those with OCS and OCD at baseline, compared with those without baseline symptoms. For individuals with baseline OCS and OCD the odds of having OCS at follow-up were 8 and 5 times higher. All associations were statistically significant and remained unchanged following adjustment for age, sex and income. Adjusting for intermediate drug use reduced the odds ratio for OCD but not OCS.

Adjusting for baseline levels of agoraphobia, panic attacks, social phobia, and depression (models 4 through 10) slightly reduced the associations, but all odds ratios remained significant.

## Discussion

This study indicates that obsessive thoughts and compulsions cause considerable suffering to more than 5% of the general population, mainly due to obsessive thoughts. Over a course of a decade a majority of these were in remission – no longer reporting symptoms of obsessive thoughts and compulsions. During follow up 8–16% of the baseline cases were on pharmacological treatment (SSRIs or Clomipramine). Individuals treated with SSRIs or TCAs did not have a reduction in the probability of experiencing OCD at follow-up compared to the untreated group.

### Comparison with previous studies

The prevalence of OCD in our study was approximately 5%, which is higher than those reported in general population mental health surveys using criteria-based psychiatric interviews, and also higher than the 0.4% fulfilling DSM-IV criteria in the interviewed subsample. The CIDI-DSM-III-R/DSM-IV 6 to 12-month OCD prevalence typically ranges between 0.5 and 2% [6,27] while the Munich DIS-DSM-III 6 months and lifetime and

**Table 4.** Longitudinal associations, Odds Ratio from multinomial logistic regression, with 95% confidence intervals.

| | OCS | | OCD | |
|---|---|---|---|---|
| Model | OR | 95 % CI | OR | 95 % CI |
| *Crude (n = 5493)* | | | | |
| OCS | 9.4 | 7.7–11.5 | 4.4 | 3.2–6.0 |
| OCD | 6.7 | 4.9–9.2 | 13.4 | 9.6–18.7 |
| *Model 1 (n = 5493)* | | | | |
| OCS | 9.6 | 7.8–11.6 | 4.3 | 3.1–6.0 |
| OCD | 6.8 | 5.0–9.4 | 12.9 | 9.2–18.0 |
| *Model 2 (n = 5493)* | | | | |
| OCS | 9.4 | 7.7–11.5 | 4.1 | 2.9–5.6 |
| OCD | 6.5 | 4.7–9.0 | 11.2 | 7.9–15.7 |
| *Model 3 (n = 5493)* | | | | |
| OCS | 9.3 | 7.7–11.5 | 4.0 | 2.9–5.6 |
| OCD | 6.4 | 4.7–8.8 | 10.2 | 7.2–14.4 |
| *Coexisting syndrome* | | | | |
| Model 4 *(n = 5493)* | | | | |
| OCS | 9.3 | 7.6–11.4 | 4.0 | 2.9–5.6 |
| OCD | 6.3 | 4.6–8.7 | 10.7 | 7.5–15.1 |
| Model 5 *(n = 5493)* | | | | |
| OCS | 9.2 | 7.5–11.3 | 3.9 | 2.8–5.4 |
| OCD | 5.9 | 4.3–8.2 | 8.1 | 5.7–11.7 |
| Model 6 *(n = 5493)* | | | | |
| OCS | 8.8 | 7.1–10.8 | 3.4 | 2.4–4.7 |
| OCD | 4.9 | 3.5–6.9 | 5.5 | 3.7–8.1 |
| Model 7 *(n = ,493)* | | | | |
| OCS | 8.4 | 6.8–10,.5 | 3.4 | 2.4–4.7 |
| OCD | 5.1 | 3.6–7.3 | 6.2 | 4.2–9.1 |
| Model 8 *(n = 5493)* | | | | |
| OCS | 9.1 | 7.4–11.1 | 3.3 | 2.4–4.6 |
| OCD | 5.3 | 3.7–7.5 | 4.3 | 2.9–6.4 |
| Model 9 (n = 5493) | | | | |
| OCS | 8.4 | 6.8–10.5 | 3.0 | 2.0–4.2 |
| OCD | 5.0 | 3.4–7.4 | 3.3 | 2.1–5.12 |
| Model 10 (n = 5493) | | | | |
| OCS | 8.4 | 6.8–10.5 | 3.0 | 2.1 4.2 |
| OCD | 5.1 | 3.4–7.5 | 3.4 | 2.2–5.4 |

Note:
Model 1 adjusted for age.
Model 2 adjusted for age and log-income.
Model 3 adjusted for age, income and SSRI/TCA.
Model 4 adjusted for age and agoraphobia.
Model 5 adjusted for age and social anxiety.
Model 6 adjusted for age and panic attacks.
Model 7 adjusted for age and generalized anxiety.
Model 8 adjusted for age and depression.
Model 9 adjusted for age, anxiety and depression.
Model 10 adjusted for age, anxiety and depression and SSRI/TCA.

were 1.8% and 2% and the British Survey of Psychiatric Morbidity 2000 CIS-R ICD-10 current disorder of 1.1%. Additionally, 10–16% reported OCS, (without clearly specifying suffering), which is similar to the 13% lifetime prevalence of OCS in the Epidemiology of Mental Disorders project [28]. Prevalence of 'clinically relevant' OCS in the longitudinal Zurich community cohort similar to our study showed large age differences, with 12-month prevalence ranging from 1.5% among 34-year-olds to 7.8% in 20 year-olds [3]. That OCD prevalence varies across studies is due not only due to a heterogeneous populations but likely due to methodological differences in ascertaining/measuring OCD [29,30]. In our study, the use of a screening tool, which is less accurate than diagnostic instruments, probably inflated the prevalence.

We found that about half of those with OCS were symptom-free ten years later. Similar recovery was found for those with OCD at baseline, although 25% of those were not in remission. This level of stability is similar to an older previous Swedish study of patients with OCD, conducted before the introduction of SSRIs, where 20% were fully recovered at follow-up 40 years later [8]. A higher level of recovery was also reported in the later Zurich study [31] where 86% of those with OCD and 85% of those with OCS were symptom-free at their last follow-up (11–15 years later). Clinical samples of OCD patients have often reported low levels of remission, although a meta-analysis on long-term outcomes found a more optimistic prognosis, with 53% remission rate [32]. In multivariate analysis baseline OCD and OCS both predicted these future states, but non-overlapping confidence intervals suggest that OCD was better predicted by OCD at baseline and OCS better predicted by OCS.

We found that among the baseline OCD cases about 16% received recommended antidepressant medication continuously during at least one year between 2005 and 2010. Similarly low levels of treatment have been reported in population-based surveys. The cross-sectional British Survey of Psychiatric Morbidity 2000 showed 12% use of TCAs and 3% SSRIs among those with OCD [33] and the US National Comorbidity Survey 20% of those with 12-month period OCD received any OCD-specific treatment during that period. In the Zurich study 33% in OCD and 6.2% in OCS group received antidepressant treatment [3].

A low level of remission was found among medicated OCD individuals. The high stability in this group most likely reflects a higher severity. Thus, our study shows that the high level of stability shown in clinical [34,35], cross-sectional [33] and older longitudinal studies is also apparent in this large population-based cohort. For comparison, in a small ($n = 66$) 2-year longitudinal study of patients where 77% received SSRIs, only 12% achieved remission [34,35]. Our findings that antidepressant treatment for OCD reduced the probability of OCD but not OCS is in line with reviews showing that treatment provides symptom relief, but that a large proportion experience residual impairing symptoms [7] Alternatively, our findings may be a result of a more severely unwell subgroup receiving treatment. Caution is that non-experimental studies are less able for quantifying the effects of therapy due to the effects of confounding by indication [36]. Notice however that the data on medication in our study is less than sufficient to permit a more emphatic conclusion on the effect of medication.

The level of stability was partly explained by concomitant depression and anxiety which just shows that these states, which are commonly overlapping with OCD also in general population surveys [6], may contribute to OCD persistence.

The implications of our findings is that OCD is a stable disorder where, given that our measures are sufficiently valid and reliable, few receive adequate drug treatment, and medication may only have a partial effect on symptom relief. Moreover, we have no information on non-pharmacological treatment, and Cognitive Behavioural Therapy has the highest priority in the Swedish national guidelines from the National Board of Health and Welfare, followed by SSRIs [37].

### *Methodological considerations*

One limitation of this study is that the baseline participation rate was relatively low (50%) although psychiatric surveys do

tend to render lower response rates. This may have caused bias if those with OCS were less or more prone to participate. Baseline examination of non-respondents has shown that while the prevalence may be biased, associations are less affected [17]. A considerable limitation also concerns the measurement of obsessions and compulsions. The questions used, obsessional checking and obsessional actions on cleanliness and recurrent meaningless and repugnant thoughts causing significant distress, cover the core aspects of obsessive-compulsive disorder in ICD and DSM, but have not been validated or tested for reliability or sensitivity to change. OCD research diagnosis from standardized psychiatric interviews such as CIDI, DIS or CIS-R, typically shows relatively high criterion validity and test-rest reliability, compared to other diagnoses, indicating that the disorder is easily defined and identified. OCD-like symptoms are common, with the exception that they need to cause significant distress or impairment to be clinically relevant. False positive responses to the criteria of suffering would dilute the longitudinal stability estimates in our study. The much higher prevalence of symptoms compared to prevalence of impairment in OCD may however also be due to poor insight [6].

The content of the PART OCD questionnaire overlaps with the first three items in the NICE OCD screening questionnaire, although does not include the following two symptoms on daily activities taking a long time to finish and orderliness/upset by mess. Not covering all OC affects the content validity, and it should be mentioned that ordering is a relatively common OCD symptom in general population surveys (9.1%) [6]. We acknowledge that the low agreement between our screening tool and the psychiatric interview indicates a less accurate screening tool but want to emphasize that there are (subclinical) states and symptoms outside the disorder criteria that are painful and of clinical relevance. Consequently, this hinders comparisons of our result with those from previous studies. Another limitation of this study is that we have no information on symptom occurrence in the period between baseline and follow-up. While accurate description of the natural history of any mental disorder is inherently difficult [38], the waxing and waning of symptoms (considerable fluctuations in diagnostic stability, symptom presence and severity) is said to be a marker of OCD [39]. The question of whether the obsessions or compulsions caused distress was not in reference to a specific symptom and hence did not allow a differentiation between obsessions and compulsions. OCD is a disorder defined by obsessions, compulsions or both, but some research findings have suggested that this is a lumping of quite heterogeneous symptoms [40]. The information on drugs was measured with register information with full national coverage, with reliable automatic coding from the pharmacies. A weakness is that this register did not exist before 2005, so a major limitation is this large gap in information during the study period.

As mentioned above our data on medication does not cover the entire period, and we have no information on CBT which is a high-priority treatment recommendation. Clinical trials have shown that combinations of drugs and CBT may be better than drugs alone [32], but this could not be tested in our data. Finally, data for this study was collected between 1998 and 2010 and may not necessarily be transferable to the situation today. The Covid pandemic appear to have both produced more OCD symptoms in the population and exacerbated symptoms in those with OCD [41].

## Conclusion

OCS and OCD were common in this Swedish General population, but the majority was either symptom-free or in remission over the course of a decade suggesting an overall favorable outcome. Only less than a quarter of those with OCD at baseline continued to have OCD. The medication seems to have less effect on the course of OCD, although the design of the study and the available data does not allow for an unequivocal conclusion.

## Disclosure statement

No potential conflict of interest was reported by the author(s).

## Data availability

Data for the current study can be accessed through The Swedish National Data Service (SND), a digital research data repository held at the University of Gothenburg and run by a consortium of Swedish universities (snd.gu.se).

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