Research article

A meta-analysis and meta-regression analysis of the global prevalence of obsessive-compulsive personality disorder

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HIGHLIGHTS

- OCPD rates do not vary significantly around the globe, with a prevalence of 6.5%.
- Higher rates were found in psychiatric and clinical patients' population.
- OCPD prevalence has been stable throughout the past 28 years.
- There was no genre-related effect but it may decrease with age increase.
- The current diagnostic instruments may detect OCPD but may not concisely and adequately evaluate its clinical impact.

ARTICLE INFO

ABSTRACT

There is a relative dearth of research on Obsessive-Compulsive Personality Disorder (OCPD), even if it has been recognized for over 100 years. Thus, the present study aims to review the worldwide prevalence of OCPD in different populations. The search was conducted employing the PubMed database of the US National Library of Medicine and *Biblioteca Virtual em Saúde* (BVS) to detect available studies showing OCPD prevalence rates. All the prevalence rates were extracted and aggregated through random-effects models. Meta-regression and sensitivity analyses were performed. The final sample was composed of 46 articles, including 89,264 individuals. We found that OCPD reports a high prevalence rate, with 6.5% (95%CI = 4.3–9.1%), and reaching even higher among psychiatric and clinical patient population. OCPD has presented stable prevalence rates worldwide throughout the past 28 years. There was no gender-related effect, but OCPD prevalence rates may decrease with age increase. There is a need to investigate personality disorders epidemiology based on the recently updated classification systems (i.e., DSM-5 and ICD-11). The present meta-analysis may suggest that the current diagnostic tools may detect OCPD in a cross-sectional assessment but not throughout the life of the person.

1. Introduction

According to the Diagnostic and Statistical Manual of Mental Disorders-fifth edition ("DSM-5"), personality traits may constitute personality disorders (PD) in case of a persistent and inflexible pattern of internal experience and behavior that markedly deviates from the

expectations of the individual culture that is present in at least two of the following domains: cognition, affectivity, interpersonal functioning, and impulse control. A PD causes clinically significant suffering and impairments to several areas of an individual's life (e.g., social, professional). It is a persistent disorder that shows a stable pattern, and its appearance usually occurs in adolescence or early adulthood (APA, 2013). PD

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prevalence data in the general population were widely unknown until the 90s (Lenzenweger, 2008). The third edition of the Diagnostic and Statistical Manual for Mental Disorders (DSM-III) in 1980 included diagnostic criteria and a multiaxial classification system. Also, new diagnostic instruments and structured and semi-structured clinical interviews were proposed. One of the most common PD in the general population is the Obsessive-Compulsive PD (OCPD) (Mancebo et al., 2005; Soeteman et al., 2008): it is associated with a reduction in quality of life, with at least a moderate effect on the psychosocial functioning (Mancebo et al., 2005) and a considerable economic burden (Soeteman et al., 2008). In addition, PDs are associated with high mortality rates and an increased number of comorbidities (Skodol, 2016, Santana et al., 2018), as well as with frequent interpersonal exchange difficulties and lower education (Moran et al., 2016). It has also been described an association between PD and higher alcohol and psychoactive substances consumption rate with elevated risks of self-aggression, suicidal attempts, and committed suicides (Hiroeh et al., 2001). PD may also lead to a significant impairment in the working capability with indirect costs due to the absence at work (Barrett and Byford, 2012). Coid et al. (2006) identified that people with PD were more likely to report unemployment or economic inactivity when compared to people without PD.

Despite the individual and social burden associated with PD, research in epidemiology is currently poor. Also, prevalence rates in different studies are heterogeneous, varying from 4% to 15% in the European and American cross-sectional studies (Coid et al., 2006). These differences can be attributed to different study populations, sampling methods, and diagnostic evaluation methods (Volkert et al., 2018). Ames and Molinari (1994) found 0.5% OCPD prevalence among elderly living in the community. Coid et al. (2006) found an 2.1% OCPD prevalence in a representative sample of individuals living in Great Britain. Jackson and Burgess (2000) found a slightly higher prevalence (3.1%) in a random sample of households in Australia. In other hand, a much higher prevalence of OCPD was found by Chamberlain et al. (2017) among internet users (71.5%). In a stratified sample in Turkey, there was 15.6% of individuals with OCPD (Dereboy et al., 2014).

OCPD is clinically characterized by an individual concern for order, perfectionism, and mental and interpersonal control at the expense of flexibility, openness, and efficiency (Chamberlain et al., 2017). Patients with OCPD strive to achieve perfectionism that interferes in their task completion: the primary goal of an activity or task may go unnoticed because of the great concern with details, rules, lists, order, or schedules (Costa et al., 2005). These individuals are usually reluctant to delegate tasks to team-workers and often focus on poor relevant details (APA, 2013). They may also be excessively dedicated to their working productivity up to the point of excluding their friendships and hobbies (Torres et al., 2006). Patients with OCPD usually show rigidity and stubbornness, possibly acting with an excess of awareness, scrupulousness, and inflexibility with regard to ethics, values, and moral issues (Mancebo et al., 2005). It is also described as having difficulty discarding objects even when patients do not report any sentimental bond with the object itself. They also usually save money, bearing the perspective of possible future catastrophes (APA, 2013). In the 10th edition of the International Classification of Diseases (ICD-10), it has been included the Anankastic PD (OCPD), characterized by the presence of feelings of doubt, perfectionism, over consciousness, excessive patterns of verification and concern with details, stubbornness, caution, and rigidity (World Health Organization, 1993).

This meta-analysis study aimed to determine the OCPD prevalence in different populations (general, clinical psychiatric, prison, and student), global regions (Americas, Asia, Europe, and Oceania), and based on different criteria (DSM-III, DSM-IV, DSM-5, and ICD-10).

2. Methodology

2.1. Review guidelines and registration

This study followed the PRISMA statement for the transparent report of systematic reviews and meta-analysis (Moher et al., 2009) and MOOSE guidelines for Meta-analysis Of Observational Studies in Epidemiology (Stroup et al., 2000). Figures 1 and 2 respectively present PRISMA and MOOSE checklists reporting the page of the manuscript in which we considered the item addressed. This study was registered at the Center for Open Science/Open Science Framework (https://osf.io/wnu8t/?view_only=d6433424400b4cf6858d6cc2b98b0ccf).

2.2. Information sources

We employed the PubMed of the US National Library of Medicine and *Biblioteca Virtual em Saúde* (BVS) databases. We identified all the relevant articles published in English, Portuguese, and Spanish. The last search was performed on November 17th, 2020.

The utilized search key words with Medical Subject Headings (MeSH) were: "((("Prevalence"[Mesh]) OR "Epidemiology"[Mesh]) AND "Personality Disorders"[Mesh]) OR "Compulsive Personality Disorder"[Mesh]", on PubMed and Descritores em Ciências da Saúde (DeCS): "(epidemiologia) OR (prevalência) AND (transtorno da personalidade) OR (transtorno da personalidade compulsiva)" on BVS. The selected articles were processed in two steps.

Step 1. All abstracts were reviewed by the first author and selected on the basis of aiming to describe OCPD prevalence.

Step 2. All abstracts were independently evaluated by two of the authors (first and second) and selected on the base of a consensual agreement on criteria used in Step 1. In case of disagreement, the abstract was evaluated by a third author (last author).

Step 3. The inclusion of the articles was based on a consensual agreement between the first and last authors: 1) original researches about OCPD prevalence were included; 2) studies based on OCPD diagnoses according to ICD (International Classification of Diseases) or DSM (Diagnostic and Statistical Manual of Mental Disorders); 3) studies based on samples from general population or students; 4) studies including individuals ≥16 years old; 5) studies in English, Portuguese or Spanish.

The main objective of this study was to analyze OCPD prevalence rates in the general population and students worldwide.

Review of Specialized books. Eight books were considered and reviewed: Diagnostic and Statistical Manual of Mental Disorders ("DSM-5") (American Psychiatric Association, 2013); Textbook of Psychiatry (Roberts, 2019); Synopsis of Psychiatry: Behavioral Sciences/Clinical Psychiatry (Sadock et al., 2015); Psychodynamic Psychiatry in Clinical Practice, Fifth Edition (Gabbard, 2014); *Clínica Psiquiátrica de Bolso* (Forlenza and Miguel, 2014); *Psiquiatria: Estudos Fundamentais* (Meleiro, 2018); *Manual de Psiquiatria Clínica* (Paraventi and Chaves, 2016); *Transtorno da Personalidade* (Neto and Cols, 2011).

Contact with experts. Sixteen specialists in the field of PDs from North America, South America, and Europe were contacted via e-mail to include potentially relevant articles that were not found by our search strategy.

Revision of reference list. The reference list of all selected articles in Step 3 was reviewed.

2.3. Data extraction

Data were extracted from the selected (full-text) articles by the first author and reviewed by the last author. All divergencies between the first and last authors were discussed with the second author.

PRISMA 2009 Checklist

Section/topic	#	Checklist item	Reported on page #
TITLE			
Title	1	Identify the report as a systematic review, meta-analysis, or both.	1
ABSTRACT			
Structured summary	2	Provide a structured summary including, as applicable: background; objectives; data sources; study eligibility criteria, participants, and interventions; study appraisal and synthesis methods; results; limitations; conclusions and implications of key findings; systematic review registration number.	1
INTRODUCTION			
Rationale	3	Describe the rationale for the review in the context of what is already known.	1-2
Objectives	4	Provide an explicit statement of questions being addressed with reference to participants, interventions, comparisons, outcomes, and study design (PICOS).	2
METHODS			
Protocol and registration	5	Indicate if a review protocol exists, if and where it can be accessed (e.g., Web address), and, if available, provide registration information including registration number.	2
Eligibility criteria	6	Specify study characteristics (e.g., PICOS, length of follow-up) and report characteristics (e.g., years considered, language, publication status) used as criteria for eligibility, giving rationale.	3
Information sources	7	Describe all information sources (e.g., databases with dates of coverage, contact with study authors to identify additional studies) in the search and date last searched.	2-4
Search	8	Present full electronic search strategy for at least one database, including any limits used, such that it could be repeated.	2-4
Study selection	9	State the process for selecting studies (i.e., screening, eligibility, included in systematic review, and, if applicable, included in the meta-analysis).	2-4
Data collection process	10	Describe method of data extraction from reports (e.g., piloted forms, independently, in duplicate) and any processes for obtaining and confirming data from investigators.	4
Data items	11	List and define all variables for which data were sought (e.g., PICOS, funding sources) and any assumptions and simplifications made.	Table 2
Risk of bias in individual studies	12	Describe methods used for assessing risk of bias of individual studies (including specification of whether this was done at the study or outcome level), and how this information is to be used in any data synthesis.	4
Summary measures	13	State the principal summary measures (e.g., risk ratio, difference in means).	4
Synthesis of results	14	Describe the methods of handling data and combining results of studies, if done, including measures of consistency (e.g., I^2) for each meta-analysis.	4

Page 1 of 2

Section/topic	#	Checklist item	Reported on page #
Risk of bias across studies	15	Specify any assessment of risk of bias that may affect the cumulative evidence (e.g., publication bias, selective reporting within studies).	Figure 3
Additional analyses	16	Describe methods of additional analyses (e.g., sensitivity or subgroup analyses, meta-regression), if done, indicating which were pre-specified.	4
RESULTS			
Study selection	17	Give numbers of studies screened, assessed for eligibility, and included in the review, with reasons for exclusions at each stage, ideally with a flow diagram.	Figure 4
Study characteristics	18	For each study, present characteristics for which data were extracted (e.g., study size, PICOS, follow-up period) and provide the citations.	Table 2
Risk of bias within studies	19	Present data on risk of bias of each study and, if available, any outcome level assessment (see item 12).	Table 1
Results of individual studies	20	For all outcomes considered (benefits or harms), present, for each study: (a) simple summary data for each intervention group (b) effect estimates and confidence intervals, ideally with a forest plot.	Table 2
Synthesis of results	21	Present results of each meta-analysis done, including confidence intervals and measures of consistency.	Figures 5-9
Risk of bias across studies	22	Present results of any assessment of risk of bias across studies (see Item 15).	Figure 3
Additional analysis	23	Give results of additional analyses, if done (e.g., sensitivity or subgroup analyses, meta-regression [see Item 16]).	Table 4; Figures 6-9
DISCUSSION			
Summary of evidence	24	Summarize the main findings including the strength of evidence for each main outcome; consider their relevance to key groups (e.g., healthcare providers, users, and policy makers).	10-11
Limitations	25	Discuss limitations at study and outcome level (e.g., risk of bias), and at review-level (e.g., incomplete retrieval of identified research, reporting bias).	10
Conclusions	26	Provide a general interpretation of the results in the context of other evidence, and implications for future research.	10-11
FUNDING			
Funding	27	Describe sources of funding for the systematic review and other support (e.g., supply of data); role of funders for the systematic review.	N.A.

From: Moher D, Liberati A, Tetzlaff J, Altman DG, The PRISMA Group (2009). Preferred Reporting Items for Systematic Reviews and Meta-Analyses: The PRISMA Statement. PLoS Med 6(7): e1000097. doi:10.1371/journal.pmed1000097

Figure 1. PRISMA checklist.

Item No	Recommendation	Reported on Page No
Reporting of background should include		
1	Problem definition	1
2	Hypothesis statement	2
3	Description of study outcome(s)	3
4	Type of exposure or intervention used	3
5	Type of study designs used	3
6	Study population	3
Reporting of search strategy should include		
7	Qualifications of searchers (eg, librarians and investigators)	1
8	Search strategy, including time period included in the synthesis and key words	2-4
9	Effort to include all available studies, including contact with authors	3-4
10	Databases and registries searched	2-4
11	Search software used, name and version, including special features used (eg, explosion)	3
12	Use of hand searching (eg, reference lists of obtained articles)	4
13	List of citations located and those excluded, including justification	Figure 4
14	Method of addressing articles published in languages other than English	3
15	Method of handling abstracts and unpublished studies	3-4
16	Description of any contact with authors	4
Reporting of methods should include		
17	Description of relevance or appropriateness of studies assembled for assessing the hypothesis to be tested	4
18	Rationale for the selection and coding of data (eg, sound clinical principles or convenience)	4
19	Documentation of how data were classified and coded (eg, multiple raters, blinding and interrater reliability)	4
20	Assessment of confounding (eg, comparability of cases and controls in studies where appropriate)	4
21	Assessment of study quality, including blinding of quality assessors, stratification or regression on possible predictors of study results	Table 1
22	Assessment of heterogeneity	Table 4
23	Description of statistical methods (eg, complete description of fixed or random effects models, justification of whether the chosen models account for predictors of study results, dose-response models, or cumulative meta-analysis) in sufficient detail to be replicated	4
24	Provision of appropriate tables and graphics	Tables 1-4; Figures 1-9
Reporting of results should include		
25	Graphic summarizing individual study estimates and overall estimate	Figures 5
26	Table giving descriptive information for each study included	Table 2
27	Results of sensitivity testing (eg, subgroup analysis)	Figures 6-9
28	Indication of statistical uncertainty of findings	Figures 5-9
Item No	**Recommendation**	**Reported on Page No**
Reporting of discussion should include		
29	Quantitative assessment of bias (eg, publication bias)	Figure 3
30	Justification for exclusion (eg, exclusion of non-English language citations)	Figure 4
31	Assessment of quality of included studies	Table 1
Reporting of conclusions should include		
32	Consideration of alternative explanations for observed results	5-6
33	Generalization of the conclusions (ie, appropriate for the data presented and within the domain of the literature review)	10-11
34	Guidelines for future research	10
35	Disclosure of funding source	N.A.

From: Stroup DF, Berlin JA, Morton SC, et al, for the Meta-analysis Of Observational Studies in Epidemiology (MOOSE) Group. Meta-analysis of Observational Studies in Epidemiology. A Proposal for Reporting. *JAMA*. 2000;283(15):2008-2012. doi: 10.1001/jama.283.15.2008.

Figure 2. MOOSE checklist.

Table 1. Results of the quality assessment.

Authors	Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	Q9	Total
Torgersen S et al.	1	1	1	1	1	1	1	1	1	9
Jackson JH et al.	1	1	1	1	1	1	1	1	1	9
Lenzenweger MF et al.	1	1	1	1	1	1	1	1	1	9
Coid J et al.	1	1	1	1	1	1	1	1	1	9
Samuels J et al.	1	1	1	1	1	1	1	1	1	9
Mike A et al.	1	1	1	1	1	1	1	1	0	8
Chamberlain SR et al.	1	0	0	1	1	1	1	1	0	6
Jalenques I et al.	1	1	0	1	1	1	1	1	1	8
Gawda B el at	1	1	1	1	1	1	1	1	1	9
Ansari Z et al.	1	1	0	1	1	1	1	1	0	7
Nicoletti et al.	1	1	0	1	1	1	1	1	0	7
Quirk SE et al.	1	1	1	1	1	1	1	1	1	9
Kayhan F el at	1	1	0	1	1	1	1	1	1	8
Black DW et al.	1	1	0	1	1	1	1	1	0	7
Yılmaz A et al.	1	1	0	1	1	1	1	1	0	7
Dereboy C et al.	1	1	1	1	1	1	1	1	1	9
Sahingöz M et al.	1	1	0	1	1	1	1	1	1	8
Uguz F et al.	1	1	0	1	1	1	1	1	0	7
Kempke S et al.	1	1	0	1	1	1	1	1	0	7
Samuel DB et al.	1	1	0	1	1	1	1	1	0	7
Moore EA et al.	1	1	1	1	1	1	1	1	0	8
Coolidge FL et al.	1	1	1	1	1	1	1	1	0	8
Sassoon SA et al.	1	1	0	1	1	1	1	1	1	8
Cheng H et al.	1	1	1	1	1	1	1	1	1	9
Crawford TN et al.	1	1	1	1	1	1	1	1	1	9
Moldin SO et al.	1	1	1	1	1	1	1	1	0	8
Maier W et al.	1	1	0	1	1	1	1	1	0	7
Black DW et al.	1	1	0	1	1	1	1	1	0	7
Aycicegi-Dinn A et al.	1	1	0	1	1	1	1	1	0	7
ECHEBURÚA E et al.	1	1	0	1	1	1	1	1	0	7
Yang M et al.	1	1	1	1	1	1	1	1	1	9
Torres AR et al.	1	1	1	1	1	1	1	1	1	9
Larsson JO et al.	1	1	0	1	1	1	1	1	0	7
Anderluh MB et al.	1	1	0	1	1	1	1	1	0	7
Sinha BK et al.	1	1	0	1	1	1	1	1	0	7
Maggini C et al.	1	1	0	1	1	1	1	1	0	7
Moran P et al.	1	1	0	1	1	1	1	1	1	8
Bodlund O et al.	1	1	0	1	1	1	1	1	0	7
Ames A et al.	1	1	0	1	1	1	1	1	1	8
Samuels JF et al.	1	1	1	1	1	1	1	1	1	9
Moran P et al.	1	1	1	1	1	1	1	1	1	9
Grant BF et al.	1	1	1	1	1	1	1	1	1	9
Wongpakaran N et al.	1	1	1	1	1	1	1	1	1	9
HYUN HA J et al.	1	1	0	1	1	1	1	1	1	8
Kulkarni RR et al.	1	1	0	1	1	1	1	1	0	7
Ekselius L. et al.	1	1	0	1	1	1	1	1	1	8
	1 = Yes		0 = No/Unclear							

JBI Critical Appraisal Checklist for studies reporting prevalence data

1. Was the sample frame appropriate to address the target population?

2. Were study participants sampled in an appropriate way?

3. Was the sample size adequate?

4. Were the study subjects and the setting described in detail?

5. Was the data analysis conducted with sufficient coverage of the identified sample?

6. Were valid methods used for the identification of the condition?

7. Was the condition measured in a standard, reliable way for all participants?

8. Was there appropriate statistical analysis?

9. Was the response rate adequate, and if not, was the low response rate managed appropriately?
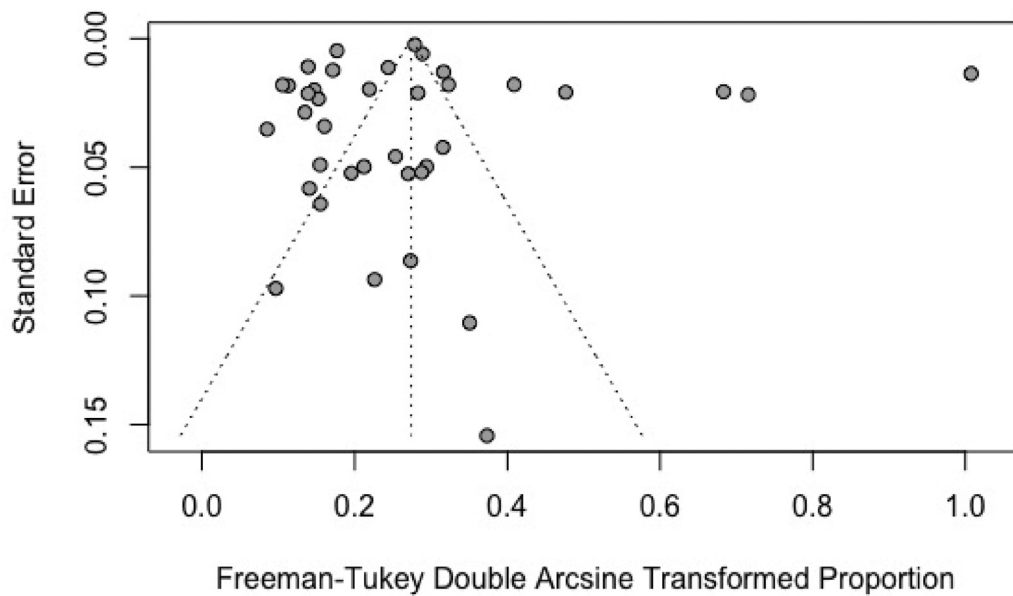
Figure 3. Publication Bias: Results of funnel plot and tests for all studies included in the meta-analysis for OCPD prevalence. Egger's regression test of funnel plot asymmetry: $t = 2.2603$, $df = 75$, p-value $= 0.02671$. Fail-safe N Calculation Using the Orwin Approach: 1 (Average Effect Size: 0.139; Target Effect Size: 0.0695).
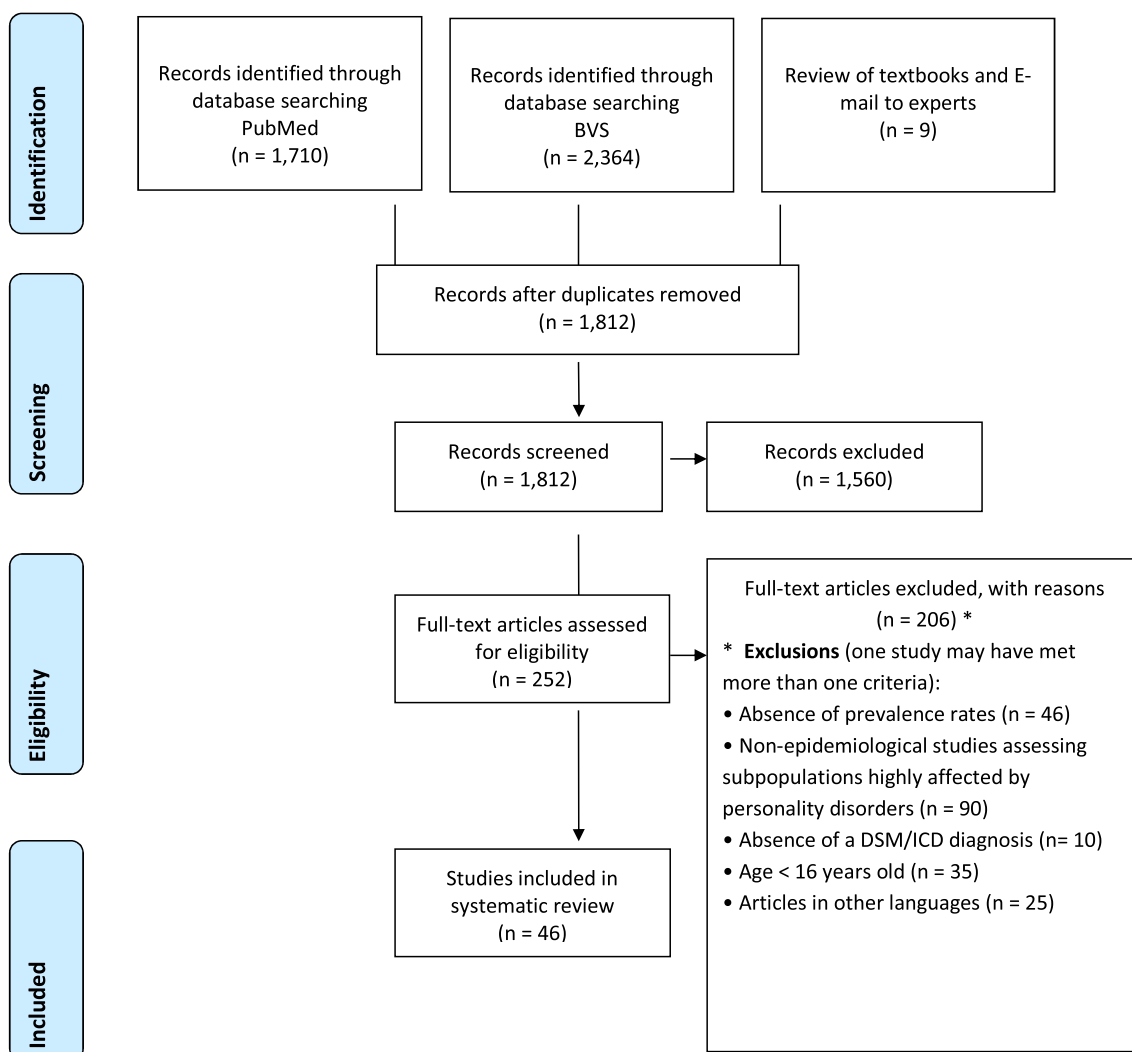
Figure 4. Study's selection flow chart.

Table 2. Main results of the included studies.

Author, year	Study population	Specific population assessed	Setting	Diagnostic criteria, Scale	Prevalence, N of the OCPD
Torgersen et al. (2001)	N: 2053 Female/Male (F/M): 0.556 Continent: Europe Mean age: 18-65	N: 2053 F/M: 0.556	Community	DSM III-R/SCID-II	2.00% 39
Jackson and Burgess (2000)	N: 10641 F/M: 0.557 Continent: Oceania Mean age: ≥ 18	N: 10641 F/M: 0.557	Community	CID-10/IPDE	3.09% 329
Lenzenweger et al. (2007)	N: 5692 F/M: - Continent: North America Mean age: ≥ 18	N: 214 F/M: -	Community	DSM-IV/IPDE	2.40% 5
Coid et al. (2006)	N: 626 F/M: 0.567 Continent: Europe Mean age: 16 - 74	N: 626 F/M: 0.567	Community	DSM-IV/SCID-II	1.90% 13
Samuels et al. (2002)	N: 742 F/M: 0.63 Continent: North America Mean age: 34 - 94	N: 742 F/M: 0.63	Community	DSM-IV and CID 10/ IPDE	DSM-IV: UP = 1,2 (0.4), WP = 0,9 (0,5)/CID-10: UP = 1,1 (0.4), WP = 0,8 (0,4) DSM-IV N = 9/CID-10 N = 8
Mike et al. (2017)	N: 1630 F/M: 0.55 Continent: North America Mean age: 59,53 ± 2,7	N: 1630 F/M: 0.55	Community	DSM-5/SIDP	2.90% 47
Chamberlain et al. (2017)	N: 1323 F/M: 0.616 Continent: North America/Africa Mean age: 28.5(13.0)	N: 1323 F/M: 0.616	Community	DSM-5/OPQ	71.50% 946
Jalenques et al. (2017)	N: 178 F/M: 0.786 Continent: Europe	N - Healthy Comparison Subjects (HCS): 118 Mean age: 46 ± 13.9 F/M: 0.788	Community	DSM-IV/PDQ-4+	6% 7
		N - Lupus patients: 60 Mean age: 47,5 ± 14 F/M: 0.783	Ambulatory	DSM-IV/PDQ-4+	13% 8
Gawda and Czubak (2017)	N: 1460 F/M: 0.52 Continent: Europe Mean age: 18 - 65	N: 1460 F/M: 0.52	Community	DSM-IV/SCID-II	9.66% 141
Ansari and Fadardi (2016)	N: 110 F/M: - Continent: Asia Mean age: 29.55	N: 110 F/M: -	Students	DSM-IV/SCID-II	16.36% 18
Nicoletti et al. (2016)	N: 65 F/M: 0.446 Continent: Europe	N - HCS: 20 Mean age: 65,5 ± 6,0 F/M: 0.5	Community	DSM-IV/SCID-II and SCID-II-PQ	10% 2
		N - Patients with Multiple Systems Atrophy: 15 Mean age: 62,9 ± 7,6 F/M: 0.466	Ambulatory	DSM-IV/SCID-II and SCID-II-PQ	13.3% 2
		N - Patients with Progressive Supranuclear Palsy: 14 Mean age: 69,8 ± 4,4 F/M: 0.428	Ambulatory	DSM-IV/SCID-II and SCID-II-PQ	35.7% 5
Quirk et al. (2017)	N: 768 F/M: 1 Continent: Oceania Mean age: > 25	N - Essential Tremor Patients: 16 Mean age: 70,4 ± 6,4 F/M: 0.375	Ambulatory	DSM-IV/SCID-II and SCID-II-PQ	12.5% 2
Kayhan and Ilik (2016)	N: 205 F/M: 0.502 Continent: Europe	N: 768 F/M: 1	Community	DSM-IV/SCID-II and SCID-II-PQ	10.30% 77
		N - HCS: 100 Mean age: 31.18 ± 8.98 F/M: 0.5	Community	DSM III-R/SCID-II	8% 8
Black et al. (2015)	N: 579 F/M: - Continent: North America	N - Chronic migraine patients: 105 Mean age: 35.63 ± 11.61 F/M: 0.505	Ambulatory	DSM III-R/SCID-II	50.50% 53

Table 2 (*continued*)

Author, year	Study population	Specific population assessed	Setting	Diagnostic criteria, Scale	Prevalence, N of the OCPD
		N - HCS: 91 Mean age: 49 ± 16 F/M: 0.63	Community	DSM-IV/SIDP	3% 3
		N - Patients diagnosed with pathological gambling: 93 Mean age: 49,9 ± 14 F/M: 0.55	Ambulatory	DSM-IV/SIDP	10% 9
Yılmaz et al. (2014)	N: 187 F/M: 0.732 Continent: Europe	N - 1st degree relatives of patients diagnosed with pathological gambling: 395 Mean age: ≥ 18 F/M: 0.63	Community?	DSM-IV/-	- -
		N - HCS: 90 Mean age: 44,1 ± 12,1 F/M: 0.7	Community	DSM-III-R SCID-II	6.60% 6
Dereboy et al. (2014)	N: 774 F/M: 0.59 Continent: Europe Mean age: 18-75	N - Asthmatic patients: 97 Mean age: 42.7 ± 11.7 F/M: 0.763	Ambulatory	DSM-III-R SCID-II	11.34% 11
Sahingöz et al. (2013)	N: 146 F/M: 1 Continent: Europe	N: 774 F/M: 0.59	Community	DSM-IV/CID-10 DIP-Q/TCI	DSM-IV = 14,1% CID-10 = 18,1% DSM-IV = 107 CID-10 = 137
		N - HCS: 73 Mean age: 24.59 ± 4.71 F/M: 1	Community	DSM-IV/SCID-II	1.40% 1
Uguz et al. (2013)	N: 105 F/M: 0.914 Continent: Europe	N - Polycystic Ovary Syndrome Patient: 73 Mean age: 23.82 ± 4.99 F/M: 1	Ambulatory	DSM-IV/SCID-II	8.20% 6
		N - HCS: 60 Mean age: 38.68 ± 7.54 F/M: 0.960	Community	DSM-III/SCID-II	1.70% 1
Kempke et al. (2013)	N: 276 F/M: 1 Continent: Europe	N - Lupus patients: 45 Mean age: 39.24 ± 9.91 F/M: 0.933	Ambulatory	DSM-III/SCID-II	20.00% 9
Samuel and Widiger (2011)	N: 536 F/M: 0.627 Continent: North America Mean age: 18.8	N - HCS: 92 Mean age: 42.4 ± 8.0 F/M: 1	Community	DSM-IV/ADP-IV	7.60% 7
Moore et al. (2012)	N: 1121 F/M: 0.444 Continent: Oceania	N - Patients with chronic fatigue syndrome: 92 Mean age: 42.5 ± 8.2 F/M: 1	Ambulatory	DSM-IV/ADP-IV	8.70% 8
		N - General psychiatric patients: 92 Mean age: 42.6 ± 8.2 F/M: 1	Ambulatory	DSM-IV/ADP-IV	25% 23
Coolidge et al. (2011)	N: 1569 F/M: 0.693 Continent: North America	N: 536 F/M: 0.627	Students	DSM-IV/PDQ-4+ and SCID-II PQ	50.40% 270
		N - HCS: 572 Mean age: 41.8 F/M: 0.554	Community	CID-10/IPDEQ	20.80% 120
		N - Schizophrenic/schizoaffective patients: 549 Mean age: 39.5 F/M: 0.329	Ambulatory	CID-10/IPDEQ	35.60% 195
Sassoon et al. (2011)	N: 59 F/M: 1 Continent: North America	N - Women not incarcerated: 523 Mean age: 32.6, SD = 19.5 F/M: 1	Community	DSM-IV/CCI	43% 225
		N - Incarcerated men: 523 Mean age: 33.6, SD = 9.6 F/M: 0	Prison	DSM-IV/CCI	21% 110
Cheng et al. (2010)	N: 7675 F/M: 0.57 Continent: Asia Mean age: ≥ 18	N - Incarcerated women: 523 Mean age: 35.0, SD = 8.7 F/M: 1	Prison	DSM-IV/CCI	25% 131
Crawford et al. (2005)	N: 1360 F/M: - Continent: North America Mean age: -	N - HCS: 26 Mean age: 28.9 ± 7.2 F/M: 1	Community	DSM-IV/SCID-II	0% 0

Table 2 (*continued*)

Author, year	Study population	Specific population assessed	Setting	Diagnostic criteria, Scale	Prevalence, N of the OCPD
Moldin et al. (1994)	N: 302 F/M: 0.473 Continent: North America Mean age: 18 - 77	N - Women with severe pre-mental disorder: 33 Mean age: 30.6 ± 6.9 F/M: 1	Ambulatory	DSM-IV/SCID-II	18% 6
Maier et al. (1992)	N: 452 F/M: 0.515 Continent: Europe Mean age: 38.1	N: 357 F/M: 0.57	Students	CID-10/PDQ-4+ and IPDE	21.84% 78
Black et al. (1993)	N: 65 F/M: 0.60 Continent: North America	N – AGE 33: 644 F/M: 0.53 Mean age: 33,1 (27,7–40,1)	Community	DSM-IV/CIC-SR and SCID-II	CIC-SR = 1,4% e SCID II = 4,7% CIC-SR = 9/SCID II = 30
		N: 302 F/M: 0.473	Community	DSM-III/IPDE	1.65% 5
Aycicegi-Dinn et al. (2009)	N: 117 F/M: 0.683 Continent: North America Mean age: 18.51 (SD = 0.9)	N: 452 F/M: 0.515	Community	DSM-III/SCID-II	2.20% 10
Echeburúa et al. (2007)	N: 381 F/M: 0.417 Continent: Europe	N - HCS: 33 Mean age: 38,1 (DP = 10,0) F/M: 0.601	Community	DSM-III/SCID-II	6.10% 2
		N - OCD patients: 32 Mean age: 38,3 (DP = 10,0) F/M: 0.594	Ambulatory	DSM-III/SCID-II	28.10% 9
		N: 117 F/M: 0.683	Students	DSM-IV/PDQ-4+	17.94% 21
		N - HCS: 103 Mean age: 40.73 (24–64) F/M: 0.466	Community	DSM-IV/IPDE and MCMI-II	1.9% 2
Yang et al. (2007)	N: 1014 F/M: 0.401 Continent: Europe	N - Alcohol-dependent patients: 158 Mean age: 43.42 (19–65) F/M: 0.348	Ambulatory	DSM-IV/IPDE and MCMI-II	12% 19
		N - Psychiatric patients without alcohol dependence: 120 Mean age: 40.58 (18–65) F/M: 0.467	Ambulatory	DSM-IV/IPDE and MCMI-II	9.20% 11
Torres et al. (2006)	N: 8399 F/M: - Continent: Europe	N - HCS: 544 Mean age: 42.4(11,9) F/M: 0.562	Community	DSM-IV/SCID-II	1.80% 10
		N - Incarcerated: 470 Mean age: 29,5(9,2) F/M: 0.215	Prison	DSM-IV/SCID-II	9.40% 44
		N - HCS: 6938 Mean age: 16 - 74 F/M: -	Community	DSM-IV/SCID-II	8.10% 562
Larsson and Hellzén (2004)	N: 29 F/M: 1 Continent: Europe	N - OCD patients: 108 Mean age: 16 - 74 F/M: -	Ambulatory	DSM-IV/SCID-II	28.60% 31
		N - Patients with other neuroses: 1353 Mean age: 16 - 74 F/M: -	Ambulatory	DSM-IV/SCID-II	20.30% 275
Anderluh et al. (2003)	N: 100 F/M: 1 Continent: Europe	N - HCS: 10 Mean age: 24.6 F/M: 1	Community	DSM-IV/DIP-Q	10% 1
		N - Women with Eating Disorders: 19 Mean age: 26.1 F/M: 1	Ambulatory	DSM-IV/DIP-Q	63.15% 12
		N - HCS: 28 Mean age: 25.1 F/M: 1	Community	CID-10/MOCI	4% 1
Sinha and Watson (2001)	N: 293 F/M: 0.662 Continent: North America Mean age: 21 (SD = 5.5)	N - Subjects With Anorexia Nervosa: 44 Mean age: 27.9 F/M: 1	Ambulatory	CID-10/MOCI	61% 27
		N - Subjects With Bulimia Nervosa: 28 Mean age: 26.7 F/M: 1	Ambulatory	CID-10/MOCI	46% 13
Maggini et al. (2000)	N: 2889 F/M: 0.489	N: 293 F/M: 0.662	Students	DSM-III-R/CATI and MCMI-II and MMPI-PD	Women: MCMI-II:0,51%/ MMPI-PD:0,51%/ CATI:0,51%/Men: MCMI-

Table 2 (*continued*)

Author, year	Study population	Specific population assessed	Setting	Diagnostic criteria, Scale	Prevalence, N of the OCPD
	Continent: Europe Mean age: 17 ± 0.4				II:0%/MMPI-PD:2,02%/ CATI:6,06% Women: MCMI-II:1/ MMPI-PD:0/CATI:1/ Men: MCMI-II:0/MMPI-PD:2/CATI:6
		N: 2889 F/M: 0.489	Students	DSM-III/SCID-II	30.50% 880
Moran et al. (2000)	N: 303 F/M: 0.660 Continent: Europe Mean age: 41.8 (range 18 ± 74)	N: 303 F/M: 0.660	Ambulatory	CID-10 and DSM-IV/ SAP and IPDE	CID-10 = 7,9%/DSM IV = 6,3% CID-10 = 24/DSM-IV = 19
Bodlund et al. (1998)	N: 587 F/M: 0.453 Continent: Europe	N - HCS: 139 Mean age: 28.0 (SD = 8.1) F/M: 0.690	Community	DSM-IV/DIP-Q	9% 13
		N - General psychiatric patients: 137 Mean age: 37.3 (SD = 12.0) F/M: 0.580	Ambulatory	DSM-IV/DIP-Q	38% 52
		N - Forensic psychiatric sample: 217 Mean age: 35.5 (SD = 10.3) F/M: 0.070	Forensic Psychiatric Unit	DSM-IV/DIP-Q	41% 90
		N - Sample of candidates for psychotherapy: 94 Mean age: 34.2 (SD = 8.1) F/M: 0.810	Ambulatory	DSM-IV/DIP-Q	62% 58
Ames and Molinari (1994)	N: 200 F/M: 0.500 Continent: Europe Mean age: 72.1	N: 200 F/M: 0.500	Community	DSM-III/SIDP-R	0.50% 1
Samuels et al. (1994)	N: 762 F/M: 0.652 Continent: North America Mean age: 18 - 64	N: 762 F/M: 0.652	Community	DSM-III/SPE	1.70% 8
Moran et al. (2006)	N: 2032 F/M: 0.510 Continent: Oceania Mean age: 24.1	N: 1943 F/M: 0.510	Community	CID-10/SAP	5.80% 113
Grant et al. (2004)	N: 43093 F/M: - Continent: North America Mean age: ≥ 18	N: 43093 F/M: -	Community	DSM-IV/AUDADIS-IV	7.90% 3261
Wongpakaran (2005)	N: 99 F/M: 0.495 Continent: Asia Mean age: 22.56 (range 21–25; SD = 1.53)	N: 99 F/M: 0.495	Students	CID-10/IPDE	2% 2
Ha et al. (2007)	N: 585 F/M: 0 Continent: Asia Mean age: 19,06 ± 0,26	N: 585 F/M: 0	Community	DSM-IV/PDQ-4+	39.80% 233
Kulkarni et al. (2013)	N: 200 F/M: 0.480 Continent: Asia	N - HCS: 100 Mean age: 27.7 ± 8.58 F/M: 0.480	Community	CID-10/IPDE	4% 4
Ekselius et al. (2001)	N: 557 F/M: 0.549 Continent: Europe Mean age: females 41.9 (SD 14.3)/ males 43.2 (SD 13.8)	N - Patients after first Suicide Attempt: 100 Mean age: 27.31 ± 8.68 F/M: 0.480	Hospital	CID-10/IPDE	11% 11
		N: 557 F/M: 0.549	Community	CID-10 and DSM-IV/ DIP-Q	DSM-IV = 7,7%/ICD-10 = 7,2% DSM-IV = 43/ICD-10 = 40

Note. (*) PD scale abbreviations are shown in Table 4. Additionally, the font size was reduced to fit the page.

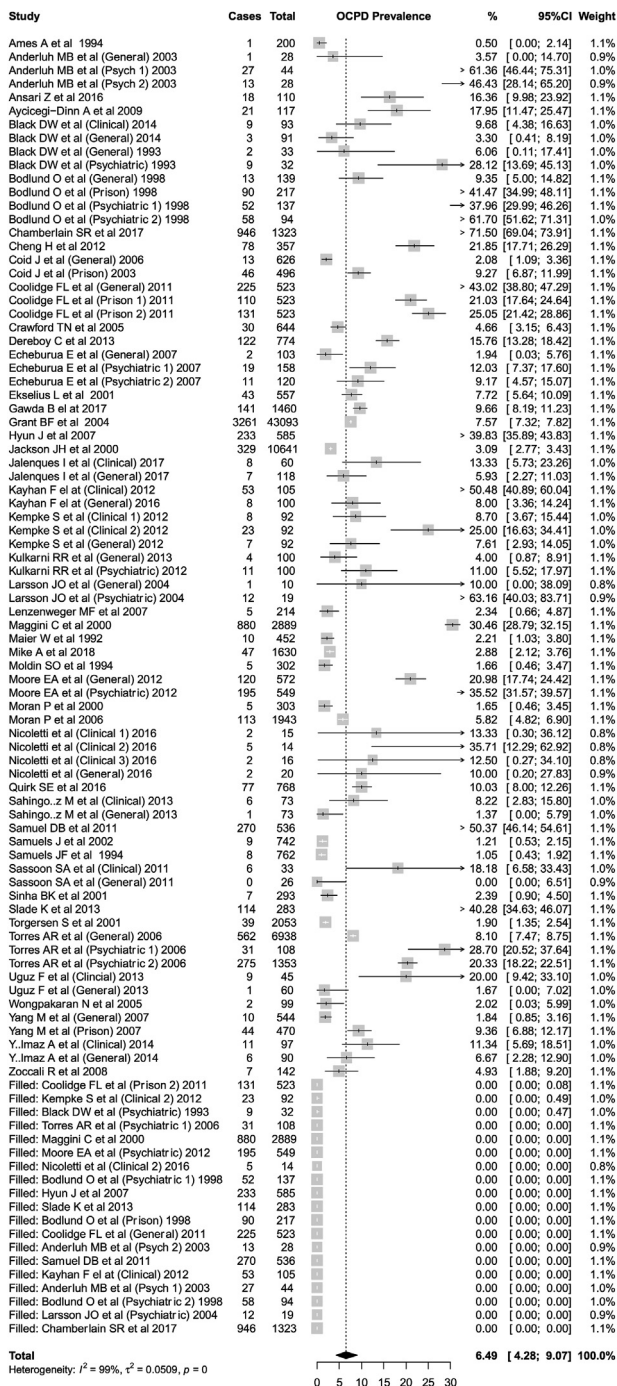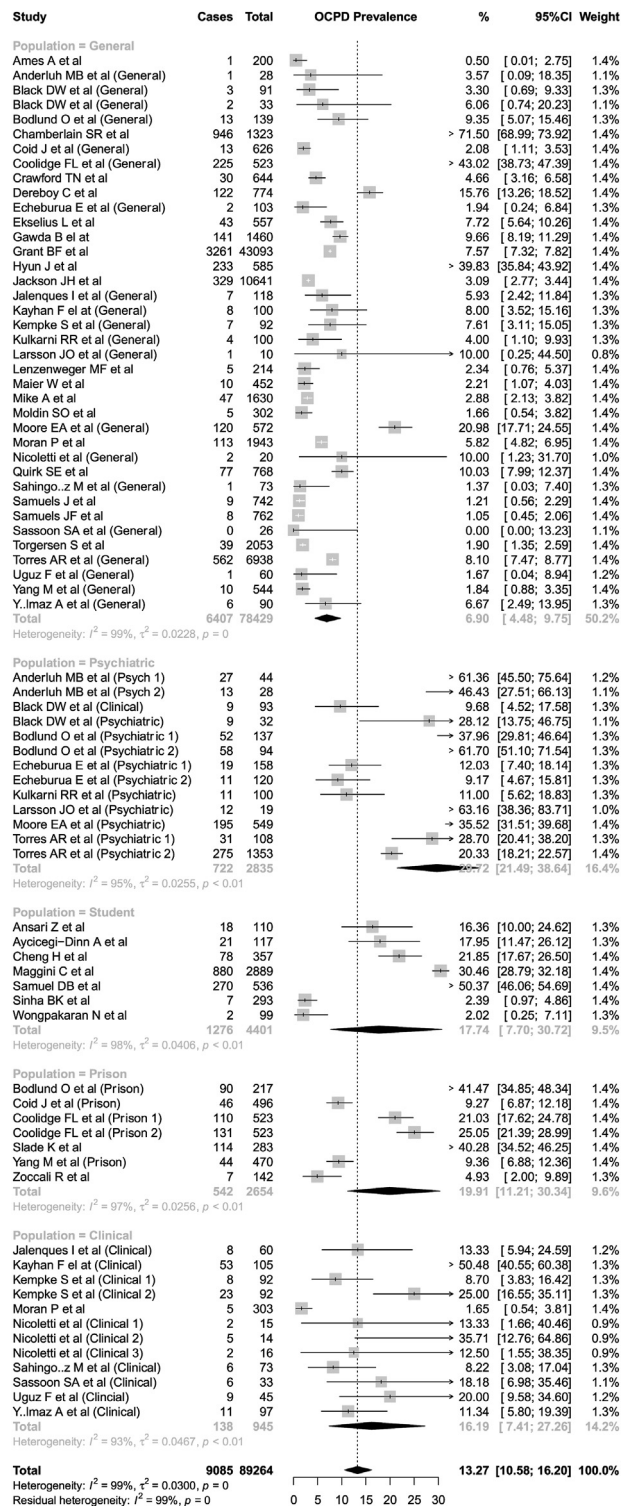| Study	Cases	Total	OCPD Prevalence	%	95%CI	Weight
Ames A et al 1994	1	200		0.50	[0.00, 2.14]	1.1%
Anderluh MB et al (General) 2003	1	28		3.57	[0.00, 14.70]	0.9%
Anderluh MB et al (Psych 1) 2003	27	44		61.36	[46.44, 75.31]	1.0%
Anderluh MB et al (Psych 2) 2003	13	28		46.43	[28.14, 65.20]	0.9%
Ansari Z et al 2016	18	110		16.36	[9.98, 23.92]	1.1%
Aycicegi−Dinn A et al 2009	21	117		17.95	[11.47, 25.47]	1.1%
Black DW et al (Clinical) 2014	9	93		9.68	[4.38, 16.63]	1.0%
Black DW et al (General) 2014	3	91		3.30	[0.41, 8.19]	1.0%
Black DW et al (General) 1993	2	33		6.06	[0.11, 17.41]	1.0%
Black DW et al (Psychiatric) 1993	9	32		28.12	[13.69, 45.13]	1.0%
Bodlund O et al (General) 1998	13	139		9.35	[5.00, 14.82]	1.1%
Bodlund O et al (Prison) 1998	90	217		41.47	[34.99, 48.11]	1.1%
Bodlund O et al (Psychiatric 1) 1998	52	137		37.96	[29.99, 46.26]	1.1%
Bodlund O et al (Psychiatric 2) 1998	58	94		61.70	[51.62, 71.31]	1.0%
Chamberlain SR et al 2017	946	1323		71.50	[69.04, 73.91]	1.1%
Cheng H et al 2012	78	357		21.85	[17.71, 26.29]	1.1%
Coid J et al (General) 2006	13	626		2.08	[1.09, 3.36]	1.1%
Coid J et al (Prison) 2003	46	496		9.27	[6.87, 11.99]	1.1%
Coolidge FL et al (General) 2011	225	523		43.02	[38.80, 47.29]	1.1%
Coolidge FL et al (Prison 1) 2011	110	523		21.03	[17.64, 24.64]	1.1%
Coolidge FL et al (Prison 2) 2011	131	523		25.05	[21.42, 28.86]	1.1%
Crawford TN et al 2005	30	644		4.66	[3.15, 6.43]	1.1%
Dereboy C et al 2013	122	774		15.76	[13.28, 18.42]	1.1%
Echeburua E et al (General) 2007	2	103		1.94	[0.03, 5.76]	1.1%
Echeburua E et al (Psychiatric 1) 2007	19	158		12.03	[7.37, 17.60]	1.1%
Echeburua E et al (Psychiatric 2) 2007	11	120		9.17	[4.57, 15.07]	1.1%
Ekselius L et al 2001	43	557		7.72	[5.64, 10.09]	1.1%
Gawda B et al 2017	141	1460		9.66	[8.19, 11.23]	1.1%
Grant BF et al 2004	3261	43093		7.57	[7.32, 7.82]	1.1%
Hyun J et al 2007	233	585		39.83	[35.89, 43.83]	1.1%
Jackson JH et al 2000	329	10641		3.09	[2.77, 3.43]	1.1%
Jalenques I et al (Clinical) 2017	8	60		13.33	[5.73, 23.26]	1.0%
Jalenques I et al (General) 2017	7	118		5.93	[2.27, 11.03]	1.1%
Kayhan F el at (Clinical) 2012	53	105		50.48	[40.89, 60.04]	1.1%
Kayhan F el at (General) 2016	8	100		8.00	[3.36, 14.24]	1.1%
Kempke S et al (Clinical 1) 2012	8	92		8.70	[3.87, 15.44]	1.0%
Kempke S et al (Clinical 2) 2012	23	92		25.00	[16.63, 34.41]	1.0%
Kempke S et al (General) 2012	7	92		7.61	[2.93, 14.05]	1.0%
Kulkarni RR et al (General) 2013	4	100		4.00	[0.87, 8.91]	1.1%
Kulkarni RR et al (Psychiatric) 2012	11	100		11.00	[5.52, 17.97]	1.1%
Larsson JO et al (General) 2004	1	10		10.00	[0.00, 38.09]	0.8%
Larsson JO et al (Psychiatric) 2004	12	19		63.16	[40.03, 83.71]	0.9%
Lenzenweger MF et al 2007	5	214		2.34	[0.66, 4.87]	1.1%
Maggini C et al 2000	880	2889		30.46	[28.79, 32.15]	1.1%
Maier W et al 1992	10	452		2.21	[1.03, 3.80]	1.1%
Mike A et al 2018	47	1630		2.88	[2.12, 3.76]	1.1%
Moldin SO et al 1994	5	302		1.66	[0.46, 3.47]	1.1%
Moore EA et al (General) 2012	120	572		20.98	[17.74, 24.42]	1.1%
Moore EA et al (Psychiatric) 2012	195	549		35.52	[31.57, 39.57]	1.1%
Moran P et al 2000	5	303		1.65	[0.46, 3.45]	1.1%
Moran P et al 2006	113	1943		5.82	[4.82, 6.90]	1.1%
Nicoletti et al (Clinical 1) 2016	2	15		13.33	[0.30, 36.12]	0.8%
Nicoletti et al (Clinical 2) 2016	5	14		35.71	[12.29, 62.92]	0.8%
Nicoletti et al (Clinical 3) 2016	2	16		12.50	[0.27, 34.10]	0.8%
Nicoletti et al (General) 2016	2	20		10.00	[0.20, 27.83]	0.9%
Quirk SE et al 2016	77	768		10.03	[8.00, 12.26]	1.1%
Sahingo..z M et al (Clinical) 2013	6	73		8.22	[2.83, 15.60]	1.0%
Sahingo..z M et al (General) 2013	1	73		1.37	[0.00, 5.79]	1.0%
Samuel D et al 2011	270	536		50.37	[46.14, 54.61]	1.1%
Samuels J et al 2002	9	742		1.21	[0.53, 2.15]	1.1%
Samuels JF et al 1994	8	762		1.05	[0.43, 1.92]	1.1%
Sassoon SA et al (Clinical) 2011	6	33		18.18	[6.58, 33.43]	1.0%
Sassoon SA et al (Clinical) 2011	0	26		0.00	[0.00, 6.51]	0.9%
Sinha BK et al 2001	7	293		2.39	[0.90, 4.50]	1.1%
Slade K et al 2013	114	283		40.28	[34.63, 46.07]	1.1%
Torgersen S et al 2001	39	2053		1.90	[1.35, 2.54]	1.1%
Torres AR et al (General) 2006	562	6938		8.10	[7.47, 8.75]	1.1%
Torres AR et al (Psychiatric 1) 2006	31	108		28.70	[20.52, 37.64]	1.1%
Torres AR et al (Psychiatric 2) 2006	275	1353		20.33	[18.22, 22.51]	1.1%
Uguz F et al (Clinicial) 2013	9	45		20.00	[9.42, 33.10]	1.0%
Uguz F et al (General) 2013	1	60		1.67	[0.00, 7.02]	1.0%
Wongpakaran N et al 2005	2	99		2.02	[0.03, 5.99]	1.0%
Yang M et al (General) 2007	10	544		1.84	[0.85, 3.16]	1.1%
Yang M et al (Prison) 2007	44	470		9.36	[6.88, 12.17]	1.1%
Y..lmaz A et al (Clinical) 2014	11	97		11.34	[5.69, 18.51]	1.1%
Y..lmaz A et al (General) 2014	6	90		6.67	[2.28, 12.90]	1.0%
Zoccali R et al 2008	7	142		4.93	[1.88, 9.20]	1.1%
Filled: Coolidge FL et al (Prison 2) 2011	131	523		0.00	[0.00, 0.08]	1.1%
Filled: Kempke S et al (Clinical 2) 2012	23	92		0.00	[0.00, 0.49]	1.0%
Filled: Black DW et al (Psychiatric) 1993	9	32		0.00	[0.00, 0.47]	1.0%
Filled: Torres AR et al (Psychiatric 2) 2006	31	108		0.00	[0.00, 0.00]	1.1%
Filled: Maggini C et al 2000	880	2889		0.00	[0.00, 0.00]	1.1%
Filled: Moore EA et al (Psychiatric) 2012	195	549		0.00	[0.00, 0.00]	1.1%
Filled: Nicoletti et al (Clinical 2) 2016	5	14		0.00	[0.00, 0.00]	0.8%
Filled: Bodlund O et al (Psychiatric 1) 1998	52	137		0.00	[0.00, 0.00]	1.1%
Filled: Hyun J et al 2007	233	585		0.00	[0.00, 0.00]	1.1%
Filled: Slade K et al 2013	114	283		0.00	[0.00, 0.00]	1.1%
Filled: Bodlund O et al (Prison) 1998	90	217		0.00	[0.00, 0.00]	1.1%
Filled: Coolidge FL et al (General) 2011	225	523		0.00	[0.00, 0.00]	1.1%
Filled: Anderluh MB et al (Psych 2) 2003	13	28		0.00	[0.00, 0.00]	0.9%
Filled: Samuel DB et al 2011	270	536		0.00	[0.00, 0.00]	1.1%
Filled: Kayhan F el at (Clinical) 2012	53	105		0.00	[0.00, 0.00]	1.1%
Filled: Anderluh MB et al (Psych 1) 2003	27	44		0.00	[0.00, 0.00]	1.0%
Filled: Bodlund O et al (Psychiatric 2) 1998	58	94		0.00	[0.00, 0.00]	1.0%
Filled: Larsson JO et al (Psychiatric) 2004	12	19		0.00	[0.00, 0.00]	0.9%
Filled: Chamberlain SR et al 2017	946	1323		0.00	[0.00, 0.00]	1.1%
Total				**6.49**	**[4.28, 9.07]**	**100.0%**
Heterogeneity: I^2 = 99%, τ^2 = 0.0509, p = 0			0 5 10 15 20 25 30			

Figure 5. Adjusted Forest Plot. P.S.: Different subpopulation numbers (e.g., Psychiatric 1 and 2; Prison 1 and 2) refer to different type of subpopulations assessed in the same study (i.e., case-control design).

Study	Cases	Total	OCPD Prevalence	%	95%CI	Weight
Population = General						
Ames A et al	1	200		0.50	[0.01, 2.75]	1.4%
Anderluh MB et al (General)	1	28		3.57	[0.09, 18.35]	1.1%
Black DW et al (General)	3	91		3.30	[0.69, 9.33]	1.3%
Black DW et al (General)	2	33		6.06	[0.74, 20.23]	1.1%
Bodlund O et al (General)	13	139		9.35	[5.07, 15.46]	1.3%
Chamberlain SR et al	946	1323		71.50	[68.99, 73.92]	1.4%
Coid J et al (General)	13	626		2.08	[1.11, 3.53]	1.4%
Coolidge FL et al (General)	225	523		43.02	[38.73, 47.39]	1.4%
Crawford TN et al	30	644		4.66	[3.16, 6.58]	1.4%
Dereboy C et al	122	774		15.76	[13.26, 18.52]	1.4%
Echeburua E et al (General)	2	103		1.94	[0.24, 6.84]	1.3%
Ekselius L et al	43	557		7.72	[5.64, 10.26]	1.4%
Gawda B el at	141	1460		9.66	[8.19, 11.29]	1.4%
Grant BF et al	3261	43093		7.57	[7.32, 7.82]	1.4%
Hyun J et al	233	585		39.83	[35.84, 43.92]	1.4%
Jackson JH et al	329	10641		3.09	[2.77, 3.44]	1.4%
Jalenques I et al (General)	7	118		5.93	[2.42, 11.84]	1.3%
Kayhan F el at (General)	8	100		8.00	[3.52, 15.16]	1.3%
Kempke S et al (General)	7	92		7.61	[3.11, 15.05]	1.3%
Kulkarni RR et al (General)	4	100		4.00	[1.10, 9.93]	1.3%
Larsson JO et al (General)	1	10		10.00	[0.25, 44.50]	0.8%
Lenzenweger MF et al	5	214		2.34	[0.76, 5.37]	1.4%
Maier W et al	10	452		2.21	[1.07, 4.03]	1.4%
Mike A et al	47	1630		2.88	[2.13, 3.82]	1.4%
Moldin SO et al	5	302		1.66	[0.54, 3.82]	1.4%
Moore EA et al (General)	120	572		20.98	[17.71, 24.55]	1.4%
Moran P et al	113	1943		5.82	[4.82, 6.95]	1.4%
Nicoletti et al (General)	2	20		10.00	[1.23, 31.70]	1.0%
Quirk SE et al	77	768		10.03	[7.99, 12.37]	1.4%
Sahingo..z M et al (General)	1	73		1.37	[0.03, 7.40]	1.3%
Samuels J et al	9	742		1.21	[0.56, 2.29]	1.4%
Samuels JF et al	8	762		1.05	[0.45, 2.06]	1.4%
Sassoon SA et al (General)	0	26		0.00	[0.00, 13.23]	1.1%
Torgersen S et al	39	2053		1.90	[1.35, 2.59]	1.4%
Torres AR et al (General)	562	6938		8.10	[7.47, 8.77]	1.4%
Uguz F et al (General)	1	60		1.67	[0.04, 8.94]	1.2%
Yang M et al (General)	10	544		1.84	[0.88, 3.35]	1.4%
Y..lmaz A et al (General)	6	90		6.67	[2.49, 13.95]	1.3%
Total	6407	78429		6.90	[4.48, 9.75]	50.2%
Heterogeneity: I^2 = 99%, τ^2 = 0.0228, p = 0						
Population = Psychiatric						
Anderluh MB et al (Psych 1)	27	44		61.36	[45.50, 75.64]	1.2%
Anderluh MB et al (Psych 2)	13	28		46.43	[27.51, 66.13]	1.1%
Black DW et al (Clinical)	9	93		9.68	[4.52, 17.58]	1.3%
Black DW et al (Psychiatric)	9	32		28.12	[13.75, 46.75]	1.1%
Bodlund O et al (Psychiatric 1)	52	137		37.96	[29.81, 46.64]	1.3%
Bodlund O et al (Psychiatric 2)	58	94		61.70	[51.10, 71.54]	1.3%
Echeburua E et al (Psychiatric 1)	19	158		12.03	[7.40, 18.14]	1.3%
Echeburua E et al (Psychiatric 2)	11	120		9.17	[4.67, 15.81]	1.3%
Kulkarni RR et al (Psychiatric)	11	100		11.00	[5.62, 18.83]	1.3%
Larsson JO et al (Psychiatric)	12	19		63.16	[38.36, 83.71]	1.0%
Moore EA et al (Psychiatric)	195	549		35.52	[31.51, 39.68]	1.4%
Torres AR et al (Psychiatric 1)	31	108		28.70	[20.41, 38.20]	1.3%
Torres AR et al (Psychiatric 2)	275	1353		20.33	[18.21, 22.57]	1.4%
Total	722	2835		28.72	[21.49, 38.64]	16.4%
Heterogeneity: I^2 = 95%, τ^2 = 0.0255, p < 0.01						
Population = Student						
Ansari Z et al	18	110		16.36	[10.00, 24.62]	1.3%
Aycicegi−Dinn A et al	21	117		17.95	[11.47, 26.12]	1.3%
Cheng H et al	78	357		21.85	[17.67, 26.50]	1.4%
Maggini C et al	880	2889		30.46	[28.79, 32.18]	1.4%
Samuel DB et al	270	536		50.37	[46.06, 54.69]	1.4%
Sinha BK et al	7	293		2.39	[0.97, 4.86]	1.4%
Wongpakaran N et al	2	99		2.02	[0.25, 7.11]	1.3%
Total	1276	4401		17.74	[7.70, 30.72]	9.5%
Heterogeneity: I^2 = 98%, τ^2 = 0.0406, p < 0.01						
Population = Prison						
Bodlund O et al (Prison)	90	217		41.47	[34.85, 48.34]	1.4%
Coid J et al (Prison)	46	496		9.27	[6.87, 12.18]	1.4%
Coolidge FL et al (Prison 1)	110	523		21.03	[17.62, 24.78]	1.4%
Coolidge FL et al (Prison 2)	131	523		25.05	[21.39, 28.99]	1.4%
Slade K et al	114	283		40.28	[34.52, 46.25]	1.4%
Yang M et al (Prison)	44	470		9.36	[6.88, 12.36]	1.4%
Zoccali R et al	7	142		4.93	[2.00, 9.89]	1.3%
Total	542	2654		19.91	[11.21, 30.34]	9.6%
Heterogeneity: I^2 = 97%, τ^2 = 0.0256, p < 0.01						
Population = Clinical						
Jalenques I et al (Clinical)	8	60		13.33	[5.94, 24.59]	1.2%
Kayhan F el at (Clinical)	53	105		50.48	[40.55, 60.38]	1.3%
Kempke S et al (Clinical 1)	8	92		8.70	[3.83, 16.42]	1.3%
Kempke S et al (Clinical 2)	23	92		25.00	[16.55, 35.11]	1.3%
Moran P et al	5	303		1.65	[0.54, 3.81]	1.4%
Nicoletti et al (Clinical 1)	2	15		13.33	[1.66, 40.46]	0.9%
Nicoletti et al (Clinical 2)	5	14		35.71	[12.76, 64.86]	0.9%
Nicoletti et al (Clinical 3)	2	16		12.50	[1.55, 38.35]	0.9%
Sahingo..z M et al (Clinical)	6	73		8.22	[3.08, 17.04]	1.3%
Sassoon SA et al (Clinical)	6	33		18.18	[6.98, 35.46]	1.1%
Uguz F et al (Clinicial)	9	45		20.00	[9.58, 34.60]	1.2%
Y..lmaz A et al (Clinical)	11	97		11.34	[5.80, 19.39]	1.3%
Total	138	945		16.19	[7.41, 27.26]	14.2%
Heterogeneity: I^2 = 93%, τ^2 = 0.0467, p < 0.01						
Total	**9085**	**89264**		**13.27**	**[10.58, 16.20]**	**100.0%**
Heterogeneity: I^2 = 99%, τ^2 = 0.0300, p = 0			0 5 10 15 20 25 30			
Residual heterogeneity: I^2 = 99%, p = 0						

Figure 6. Subgroup analysis - population

2.4. Quality assessment

The purpose of this evaluation was to analyze the methodological quality of the studies included. The Joanna Briggs Institute Checklist for Prevalence Studies (The Joanna Briggs Institute, 2017) was applied to all studies included in the current systematic review, which evaluates sample frame, process and size, setting description, data analysis coverage, valid and reliable evaluation methods, appropriate statistical analysis, and an adequate response rate (Table 1). As a result, all the 46 studies scored ≥6 on the scale (maximum = 9 points) and were included in the present meta-analysis.
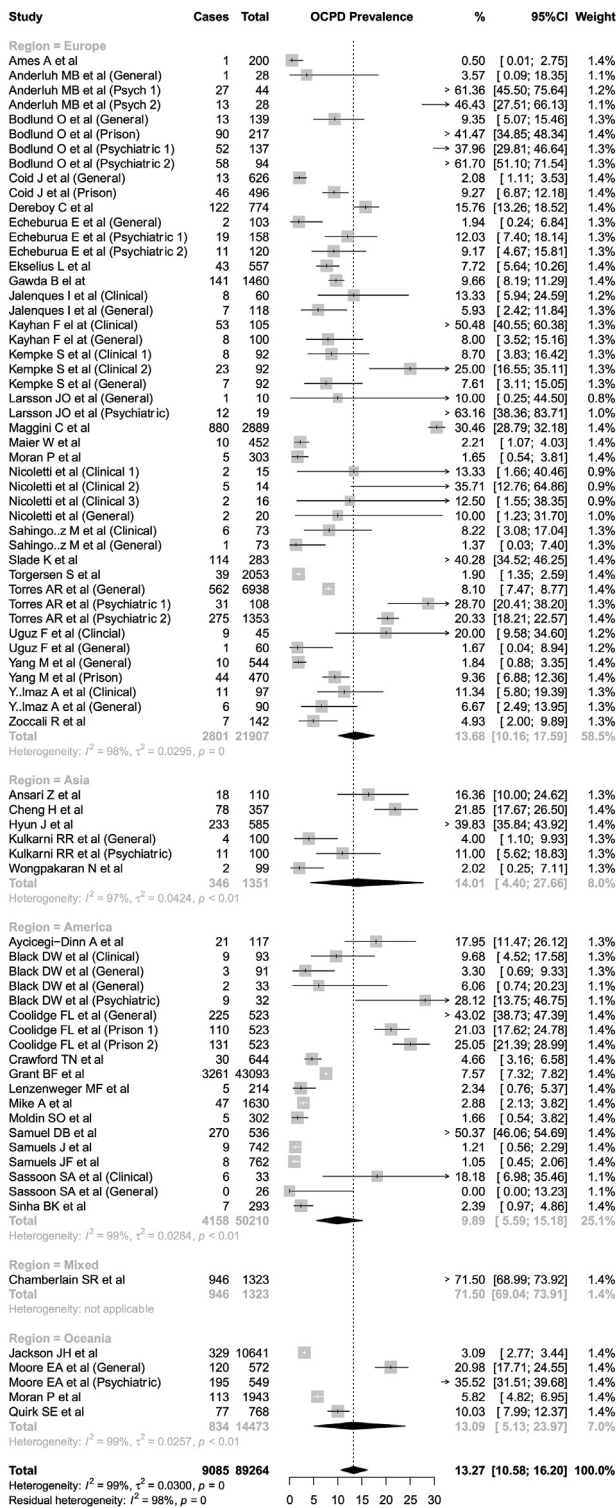
2.5. Data analysis

We used R software version 3.5.0 to run the analysis (Syntax reported in Supplementary File 1). The first step of our previously defined data analysis strategy was to determine the prevalence of OCPD in the general population and among students worldwide. As recommended by Barendregt et al. (2013), we used Freeman-Tukey double arcsine transformation because the prevalences found were close to 0 or 1 (i.e., as in the present study) to normalize its distribution and stabilize the

Figure 7 — Subgroup analysis by region

Study	Cases	Total	%	95%CI	Weight
Region = Europe					
Ames A et al	1	200	0.50	[0.01; 2.75]	1.4%
Anderluh MB et al (General)	1	28	3.57	[0.09; 18.35]	1.1%
Anderluh MB et al (Psych 1)	27	44	61.36	[45.50; 75.64]	1.2%
Anderluh MB et al (Psych 2)	13	28	46.43	[27.51; 66.13]	1.1%
Bodlund O et al (General)	13	139	9.35	[5.07; 15.46]	1.3%
Bodlund O et al (Prison)	90	217	41.47	[34.85; 48.34]	1.4%
Bodlund O et al (Psychiatric 1)	52	137	37.96	[29.81; 46.64]	1.3%
Bodlund O et al (Psychiatric 2)	58	94	61.70	[51.10; 71.54]	1.3%
Coid J et al (General)	13	626	2.08	[1.11; 3.53]	1.4%
Coid J et al (Prison)	46	496	9.27	[6.87; 12.18]	1.4%
Dereboy F et al	122	774	15.76	[13.26; 18.52]	1.4%
Echeburua E et al (General)	2	103	1.94	[0.24; 6.84]	1.3%
Echeburua E et al (Psychiatric 1)	19	158	12.03	[7.40; 18.14]	1.3%
Echeburua E et al (Psychiatric 2)	11	120	9.17	[4.67; 15.81]	1.3%
Ekselius L et al	43	557	7.72	[5.64; 10.26]	1.4%
Gawda B el al	141	1460	9.66	[8.19; 11.29]	1.4%
Jalenques I et al (Clinical)	8	60	13.33	[5.94; 24.59]	1.2%
Jalenques I et al (General)	7	118	5.93	[2.42; 11.84]	1.3%
Kayhan F et al (Clinical)	53	105	50.48	[40.55; 60.38]	1.3%
Kayhan F et al (General)	8	100	8.00	[3.52; 15.16]	1.3%
Kempke S et al (Clinical 1)	8	92	8.70	[3.83; 16.42]	1.3%
Kempke S et al (Clinical 2)	23	92	25.00	[16.55; 35.11]	1.3%
Kempke S et al (General)	7	92	7.61	[3.11; 15.05]	1.3%
Larsson JO et al (General)	1	10	10.00	[0.25; 44.50]	0.8%
Larsson JO et al (Psychiatric)	12	19	63.16	[38.36; 83.71]	1.0%
Maggini C et al	880	2889	30.46	[28.79; 32.18]	1.4%
Maier W et al	10	452	2.21	[1.07; 4.03]	1.4%
Moran P et al	5	303	1.65	[0.54; 3.81]	1.4%
Nicoletti et al (Clinical 1)	2	15	13.33	[1.66; 40.46]	0.9%
Nicoletti et al (Clinical 2)	5	14	35.71	[12.76; 64.86]	0.9%
Nicoletti et al (Clinical 3)	2	16	12.50	[1.55; 38.35]	0.9%
Nicoletti et al (General)	2	20	10.00	[1.23; 31.70]	1.0%
Sahingo..z M et al (Clinical)	6	73	8.22	[3.08; 17.04]	1.3%
Sahingo..z M et al (General)	1	73	1.37	[0.03; 7.40]	1.3%
Slade K et al	114	283	40.28	[34.52; 46.25]	1.4%
Torgersen S et al	39	2053	1.90	[1.35; 2.59]	1.4%
Torres AR et al (General)	562	6938	8.10	[7.47; 8.77]	1.4%
Torres AR et al (Psychiatric 1)	31	108	28.70	[20.41; 38.20]	1.3%
Torres AR et al (Psychiatric 2)	275	1353	20.33	[18.21; 22.57]	1.4%
Uguz F et al (Clincial)	9	45	20.00	[9.58; 34.60]	1.2%
Uguz F et al (General)	1	60	1.67	[0.04; 8.94]	1.2%
Yang M et al (General)	10	544	1.84	[0.88; 3.35]	1.4%
Yang M et al (Prison)	44	470	9.36	[6.88; 12.36]	1.4%
Y.lmaz A et al (Clinical)	11	97	11.34	[5.80; 19.39]	1.3%
Y.lmaz A et al (General)	6	90	6.67	[2.49; 13.95]	1.3%
Zoccali R et al	7	142	4.93	[2.00; 9.89]	1.3%
Total	2801	21907	13.68	[10.16; 17.59]	58.5%
Heterogeneity: $I^2 = 98\%$, $\tau^2 = 0.0295$, $p = 0$					
Region = Asia					
Ansari Z et al	18	110	16.36	[10.00; 24.62]	1.3%
Cheng H et al	78	357	21.85	[17.67; 26.50]	1.4%
Hyun J et al	233	585	39.83	[35.84; 43.92]	1.4%
Kulkarni RR et al (General)	4	100	4.00	[1.10; 9.93]	1.3%
Kulkarni RR et al (Psychiatric)	11	100	11.00	[5.62; 18.83]	1.3%
Wongpakaran N et al	2	99	2.02	[0.25; 7.11]	1.3%
Total	346	1351	14.01	[4.40; 27.66]	8.0%
Heterogeneity: $I^2 = 97\%$, $\tau^2 = 0.0424$, $p < 0.01$					
Region = America					
Aycicegi–Dinn A et al	21	117	17.95	[11.47; 26.12]	1.3%
Black DW et al (Clinical)	9	93	9.68	[4.52; 17.58]	1.3%
Black DW et al (General)	3	91	3.30	[0.69; 9.33]	1.3%
Black DW et al (General)	2	33	6.06	[0.74; 20.23]	1.1%
Black DW et al (Psychiatric)	9	32	28.12	[13.75; 46.75]	1.1%
Coolidge FL et al (General)	225	523	43.02	[38.73; 47.39]	1.4%
Coolidge FL et al (Prison 1)	110	523	21.03	[17.62; 24.78]	1.4%
Coolidge FL et al (Prison 2)	131	523	25.05	[21.39; 28.99]	1.4%
Crawford TN et al	30	644	4.66	[3.16; 6.58]	1.4%
Grant BF et al	3261	43093	7.57	[7.32; 7.82]	1.4%
Lenzenweger MF et al	5	214	2.34	[0.76; 5.37]	1.4%
Mike A et al	47	1630	2.88	[2.13; 3.82]	1.4%
Moldin SO et al	5	302	1.66	[0.54; 3.82]	1.4%
Samuel DB et al	270	536	50.37	[46.06; 54.69]	1.4%
Samuels J et al	9	742	1.21	[0.56; 2.29]	1.4%
Samuels JF et al	8	762	1.05	[0.45; 2.06]	1.4%
Sassoon SA et al (Clinical)	6	33	18.18	[6.98; 35.46]	1.1%
Sassoon SA et al (General)	0	26	0.00	[0.00; 13.23]	1.1%
Sinha BK et al	7	293	2.39	[0.97; 4.86]	1.4%
Total	4158	50210	9.89	[5.59; 15.18]	25.1%
Heterogeneity: $I^2 = 99\%$, $\tau^2 = 0.0284$, $p < 0.01$					
Region = Mixed					
Chamberlain SR et al	946	1323	71.50	[68.99; 73.92]	1.4%
Total	946	1323	71.50	[69.04; 73.91]	1.4%
Heterogeneity: not applicable					
Region = Oceania					
Jackson JH et al	329	10641	3.09	[2.77; 3.44]	1.4%
Moore EA et al (General)	120	572	20.98	[17.71; 24.55]	1.4%
Moore EA et al (Psychiatric)	195	549	35.52	[31.51; 39.68]	1.4%
Moran P et al	113	1943	5.82	[4.82; 6.95]	1.4%
Quirk SE et al	77	768	10.03	[7.99; 12.37]	1.4%
Total	834	14473	13.09	[5.13; 23.97]	7.0%
Heterogeneity: $I^2 = 99\%$, $\tau^2 = 0.0257$, $p < 0.01$					
Total	9085	89264	13.27	[10.58; 16.20]	100.0%
Heterogeneity: $I^2 = 99\%$, $\tau^2 = 0.0300$, $p = 0$					
Residual heterogeneity: $I^2 = 98\%$, $p = 0$					

Figure 7. Subgroup analysis - region

Figure 8 — Subgroup analysis by criterion

Study	Cases	Total	%	95%CI	Weight
Criterion = DSM-III					
Ames A et al	1	200	0.50	[0.01; 2.75]	1.4%
Black DW et al (General)	2	33	6.06	[0.74; 20.23]	1.1%
Black DW et al (Psychiatric)	9	32	28.12	[13.75; 46.75]	1.1%
Kayhan F et al (Clinical)	53	105	50.48	[40.55; 60.38]	1.3%
Kayhan F et al (General)	8	100	8.00	[3.52; 15.16]	1.3%
Maggini C et al	880	2889	30.46	[28.79; 32.18]	1.4%
Maier W et al	10	452	2.21	[1.07; 4.03]	1.4%
Moldin SO et al	5	302	1.66	[0.54; 3.82]	1.4%
Samuels JF et al	8	762	1.05	[0.45; 2.06]	1.4%
Sinha BK et al	7	293	2.39	[0.97; 4.86]	1.4%
Torgersen S et al	39	2053	1.90	[1.35; 2.59]	1.4%
Uguz F et al (Clincial)	9	45	20.00	[9.58; 34.60]	1.2%
Uguz F et al (General)	1	60	1.67	[0.04; 8.94]	1.2%
Y.lmaz A et al (Clinical)	11	97	11.34	[5.80; 19.39]	1.3%
Y.lmaz A et al (General)	6	90	6.67	[2.49; 13.95]	1.3%
Zoccali R et al	7	142	4.93	[2.00; 9.89]	1.3%
Total	1056	7655	8.05	[2.39; 16.35]	21.0%
Heterogeneity: $I^2 = 99\%$, $\tau^2 = 0.0632$, $p < 0.01$					
Criterion = ICD-10					
Anderluh MB et al (General)	1	28	3.57	[0.09; 18.35]	1.1%
Anderluh MB et al (Psych 1)	27	44	61.36	[45.50; 75.64]	1.2%
Anderluh MB et al (Psych 2)	13	28	46.43	[27.51; 66.13]	1.1%
Cheng H et al	78	357	21.85	[17.67; 26.50]	1.4%
Jackson JH et al	329	10641	3.09	[2.77; 3.44]	1.4%
Kulkarni RR et al (General)	4	100	4.00	[1.10; 9.93]	1.3%
Kulkarni RR et al (Psychiatric)	11	100	11.00	[5.62; 18.83]	1.3%
Moore EA et al (General)	120	572	20.98	[17.71; 24.55]	1.4%
Moore EA et al (Psychiatric)	195	549	35.52	[31.51; 39.68]	1.4%
Moran P et al	113	1943	5.82	[4.82; 6.95]	1.4%
Slade K et al	114	283	40.28	[34.52; 46.25]	1.4%
Wongpakaran N et al	2	99	2.02	[0.25; 7.11]	1.3%
Total	1007	14744	17.61	[9.56; 27.39]	15.7%
Heterogeneity: $I^2 = 99\%$, $\tau^2 = 0.0394$, $p < 0.01$					
Criterion = DSM-IV					
Ansari Z et al	18	110	16.36	[10.00; 24.62]	1.3%
Aycicegi–Dinn A et al	21	117	17.95	[11.47; 26.12]	1.3%
Black DW et al (Clinical)	9	93	9.68	[4.52; 17.58]	1.3%
Black DW et al (General)	3	91	3.30	[0.69; 9.33]	1.3%
Bodlund O et al (General)	13	139	9.35	[5.07; 15.46]	1.4%
Bodlund O et al (Prison)	90	217	41.47	[34.85; 48.34]	1.4%
Bodlund O et al (Psychiatric 1)	52	137	37.96	[29.81; 46.64]	1.3%
Bodlund O et al (Psychiatric 2)	58	94	61.70	[51.10; 71.54]	1.3%
Coid J et al (General)	13	626	2.08	[1.11; 3.53]	1.4%
Coid J et al (Prison)	46	496	9.27	[6.87; 12.18]	1.4%
Coolidge FL et al (General)	225	523	43.02	[38.73; 47.39]	1.4%
Coolidge FL et al (Prison 1)	110	523	21.03	[17.62; 24.78]	1.4%
Coolidge FL et al (Prison 2)	131	523	25.05	[21.39; 28.99]	1.4%
Crawford TN et al	30	644	4.66	[3.16; 6.58]	1.4%
Echeburua E et al (General)	2	103	1.94	[0.24; 6.84]	1.3%
Echeburua E et al (Psychiatric 1)	19	158	12.03	[7.40; 18.14]	1.3%
Echeburua E et al (Psychiatric 2)	11	120	9.17	[4.67; 15.81]	1.3%
Ekselius L et al	43	557	7.72	[5.64; 10.26]	1.4%
Gawda B el al	141	1460	9.66	[8.19; 11.29]	1.4%
Grant BF et al	3261	43093	7.57	[7.32; 7.82]	1.4%
Hyun J et al	233	585	39.83	[35.84; 43.92]	1.4%
Jalenques I et al (Clinical)	8	60	13.33	[5.94; 24.59]	1.2%
Jalenques I et al (General)	7	118	5.93	[2.42; 11.84]	1.3%
Kempke S et al (Clinical 1)	8	92	8.70	[3.83; 16.42]	1.3%
Kempke S et al (Clinical 2)	23	92	25.00	[16.55; 35.11]	1.3%
Kempke S et al (General)	7	92	7.61	[3.11; 15.05]	1.3%
Larsson JO et al (General)	1	10	10.00	[0.25; 44.50]	0.8%
Larsson JO et al (Psychiatric)	12	19	63.16	[38.36; 83.71]	1.0%
Lenzenweger MF et al	5	214	2.34	[0.76; 5.37]	1.4%
Nicoletti et al (Clinical 1)	2	15	13.33	[1.66; 40.46]	0.9%
Nicoletti et al (Clinical 2)	5	14	35.71	[12.76; 64.86]	0.9%
Nicoletti et al (Clinical 3)	2	16	12.50	[1.55; 38.35]	0.9%
Nicoletti et al (General)	2	20	10.00	[1.23; 31.70]	1.0%
Quirk SE et al	77	768	10.03	[7.99; 12.37]	1.4%
Sahingo..z M et al (Clinical)	6	73	8.22	[3.08; 17.04]	1.3%
Sahingo..z M et al (General)	1	73	1.37	[0.03; 7.40]	1.3%
Samuel DB et al	270	536	50.37	[46.06; 54.69]	1.4%
Sassoon SA et al (Clinical)	6	33	18.18	[6.98; 35.46]	1.1%
Sassoon SA et al (General)	0	26	0.00	[0.00; 13.23]	1.1%
Torres AR et al (General)	562	6938	8.10	[7.47; 8.77]	1.4%
Torres AR et al (Psychiatric 1)	31	108	28.70	[20.41; 38.20]	1.3%
Torres AR et al (Psychiatric 2)	275	1353	20.33	[18.21; 22.57]	1.4%
Yang M et al (General)	10	544	1.84	[0.88; 3.35]	1.4%
Yang M et al (Prison)	44	470	9.36	[6.88; 12.36]	1.4%
Total	5893	62093	14.37	[11.43; 17.56]	56.4%
Heterogeneity: $I^2 = 98\%$, $\tau^2 = 0.0177$, $p = 0$					
Criterion = DSM-5					
Chamberlain SR et al	946	1323	71.50	[68.99; 73.92]	1.4%
Mike A et al	47	1630	2.88	[2.13; 3.82]	1.4%
Total	993	2953	30.88	[0.00; 32.43]	2.8%
Heterogeneity: $I^2 = 100\%$, $\tau^2 = 0.3493$, $p = 0$					
Criterion = Mixed					
Dereboy C et al	122	774	15.76	[13.26; 18.52]	1.4%
Moran P et al	5	303	1.65	[0.54; 3.81]	1.4%
Samuels J et al	9	742	1.21	[0.56; 2.29]	1.4%
Total	136	1819	4.65	[0.00; 16.91]	4.2%
Heterogeneity: $I^2 = 99\%$, $\tau^2 = 0.0324$, $p = 0$					
Total	9085	89264	13.27	[10.58; 16.20]	100.0%
Heterogeneity: $I^2 = 99\%$, $\tau^2 = 0.0300$, $p = 0$					
Residual heterogeneity: $I^2 = 99\%$, $p = 0$					

Figure 8. Subgroup analysis - criterion

variances. A heterogeneity test (Q test) was used to determine if the differences between prevalence estimations in the studies were bigger than those expected by chance. Heterogeneity between the studies was measured using the I^2 statistic, which describes the percentage of variability among effect estimates beyond that expected by chance. If the value is below 25%, it implies there being low heterogeneity. A value of 50% implies moderate, and a value of 75% high levels of heterogeneity (Chiang et al., 2022). We used the DerSimonian-Laird estimator for tau^2. Significant heterogeneity was detected for the combined estimation.

Hereupon, we conducted leave-one-out meta-analysis. In addition, we conducted subgroup analysis by type of population, diagnostic criterion, and global region. The Egger's regression method (Figure 3) was used to assess publication bias (Lim et al., 2019). The presence of statistically significant publication bias was defined as p-values of 0.05 or less. The presence of publication bias was then investigated further using a fail-safe N test (Figure 3) to estimate the number of additional studies needed to make the eventual effect size insignificant (Lim et al., 2019). Then, we plotted an adjusted meta-analysis and forest plot for all the studies, using the 'trim-and-fill' technique (Idris, 2012). The trim-and-fill method works by trimming the studies that cause asymmetry in a funnel

Table 3. Methodological characteristics and geographic locations of the studies (N = 46).

Variable	No. of Studies
Geographic location	
North America	15*
Europe	22
Asia	5
South America	0
Oceania	4
Africa	1*
Origin of Sample	
Community	39
Students	7
Diagnostic criteria	
ICD-10	11*
DSM-5	2
DSM-IV	26*
DSM-III	11
Decades	
1900	6
2000	20
2010	20

Note. (*) indicates studies that included more than one geographic locality and studies that included more than one diagnostic criterion, as explained in methodology.

Table 4. Results of the meta-regression model for OCPD prevalence.

	Estimate	95%CI		z	p
Year	0.001	-0.007	0.009	0.225	0.822
Age	-0.005	-0.010	0.000	-2.105	0.035
Female	-0.028	-0.247	0.191	-0.253	0.800
Quality	-0.042	-0.115	0.032	-1.112	0.266
Population (Reference = General)					
Clinical	0.177	0.031	0.322	2.381	0.017
Prison	0.174	-0.022	0.369	1.743	0.081
Psychiatric	0.282	0.133	0.431	3.702	<0.001
Student	-0.005	-0.220	0.211	-0.041	0.967
Region (Reference = Americas)					
Asia	-0.055	-0.321	0.210	-0.409	0.683
Europe	0.019	-0.097	0.135	0.321	0.748
Oceania	0.107	-0.134	0.349	0.871	0.384
Mixed	0.581	0.055	1.106	2.166	0.030
Criterion (Reference = DSM-IV)					
DSM-5	0.018	-0.360	0.396	0.095	0.925
DSM-III	-0.039	-0.164	0.085	-0.621	0.535
ICD-10	-0.013	-0.183	0.158	-0.144	0.886
Mixed	-0.070	-0.293	0.153	-0.616	0.538

Figure 9. Leave-one-out

plot so that the overall effect estimate produced by the remaining studies is minimally influenced by publication bias, and then filling in imputed missing studies in the funnel plot using the bias-corrected overall estimate (Shi and Lin, 2019).

Once significant heterogeneity was found among all the studies, the second step was to conduct univariate analysis to test the individual association of each variable (methodological variables + geographic location of studies) to estimate OCPD combined prevalence by using a meta-regression analysis. In the third step, a random-effects regression model was used to evaluate the variability in estimating OCPD prevalence, following previous studies (Foo et al., 2018). By assuming that the selected studies are random samples from a larger population, the
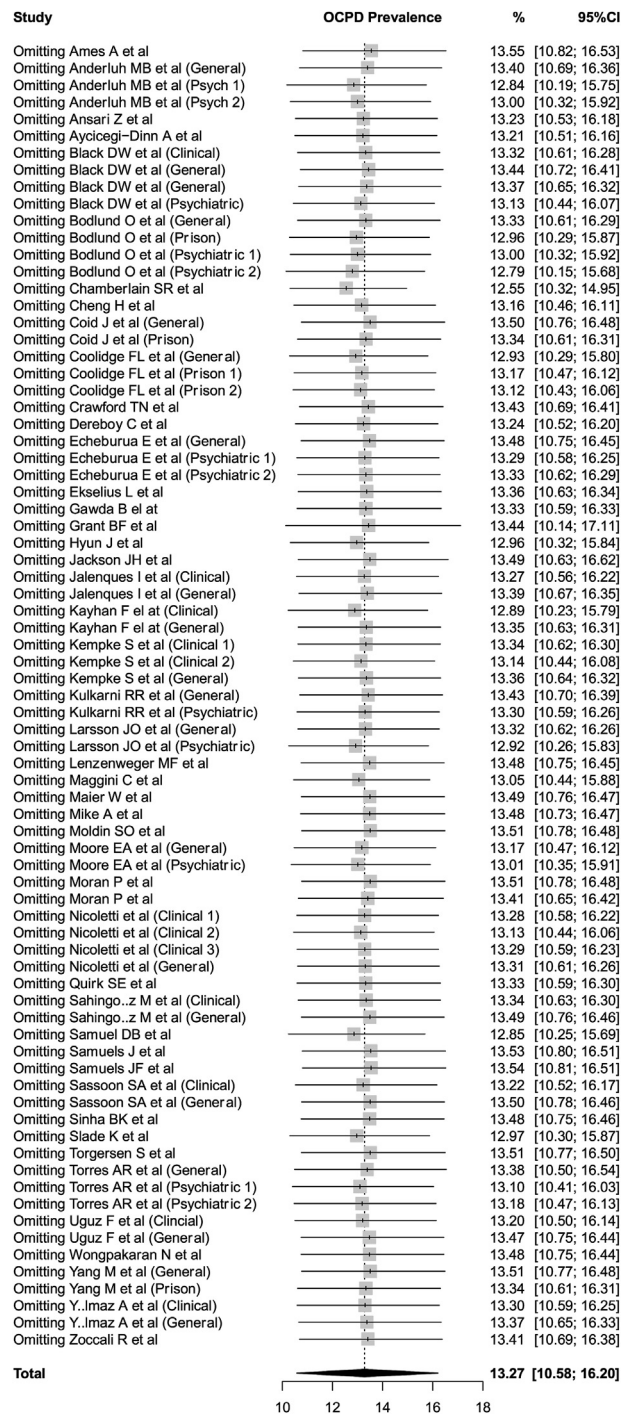
random-effects model attempted to generalize findings beyond the included studies. For these analyses, a significance level of 5% was established.

3. Results

Figure 4 (PRISMA) shows the study selection flow. In order to select the articles of this review, the first and the last authors read the titles and abstracts of all studies searched (n = 4,083). Duplicate studies were excluded, and 1,812 studies were evaluated by titles and abstracts. After that, 252 articles were selected for full-text reading. During this step, 206 articles were excluded: 46 did not report prevalence rates for OCPD; 90 of

them reported data of samples at risk for mental disorders or composed by prison population or mentally ill in psychiatric treatment; 10 of them reported any ICD/DSM 5-based diagnosis; 35 of them including individuals younger than 16 years old; and 25 of them were written in languages others than English, Portuguese or Spanish. Table 2 presents the main results of the included studies.

Eventually, 46 articles were included in this review (Figure 4). The meta-analytic sample included 89,264 individuals, with age ≥16 years old. The total sample is composed mainly of individuals from the general population (n = 78,429). There were also seven studies with students (n = 4,401), 13 studies with psychiatric patients (n = 2,835), seven with prisoners (n = 2,654) and 12 with clinical patients (n = 945). Figure 5 shows the adjusted forest plot in which we found an OCPD prevalence of 6.5% (95%CI = 4.3–9.1%). Non-adjusted meta-analysis models are presented in Figures 6, 7, and 8 (subgroup analysis by population type, global region, and diagnostic criteria).

Out of the 46 included articles, almost half were conducted in Europe, and a third of them in North America. One study included individuals from North America and Africa (Chamberlain et al., 2017). Diagnostic OCPD criteria in the studies were mostly based on DSM-IV (i.e., 26 studies were based on DSM-IV, 11 on ICD-10, 11 on DSM-III, and 2 on DSM-5). Four articles were based on two different criteria (i.e., DSM-IV and ICD-10). The Structured Clinical Interview for Axis II PD (SCID-II) was used in 15 studies; the International PD Examination (IPDE) was used in 9 studies, and the Personality Diagnostic Questionnaire 4+ (PDQ-4+) was used in 5 studies.

The selected articles have been published from 1992 to 2018, with 6 of them from the 90s, 20 of them from the first 2000's decade, and 20 of them from the 2010s, as described in Table 3. Figure 6 shows that 6.9% (CI 95% = 4.5–9.8%) of the general population was diagnosed with OCPD. Higher prevalences were found in clinical (16.2%), student (17.4%), prison (19.9%), and psychiatric (29.7%) samples. This lower prevalence in the general population was confirmed in the metaregression model (Table 4).

OCPD presented a stable prevalence throughout several countries of the world in the last 28 years; the geographic location was not associated with a significant difference in prevalence. The following prevalence rates were found in the subgroup analysis (Figure 7): 14.0% in Asia (five studies); 13.1% in Oceania (four studies); 13.7% in Europe (22 studies), and 9.9% in America (14 studies). These differences were not significant in the metaregression models (Table 4). Studies based on ICD-10 criteria (that showed an OCPD prevalence rate of 17.6%) or on DSM-IV (15.9%) reported higher OCPD prevalence rates than those based on DSM-III criteria (8.1%) (Figure 8). However, these differences were not significant in the metaregression model. The leave-one-out meta-analysis model (Figure 9) found no significant difference when each study was excluded.

No gender-related effect was found in the meta-regression model (Table 4), but it has been reported that the prevalence rates of OCPD decreased with the age increase of the subjects. As found in the subgroup analysis, studies with the general population had significantly lower prevalences of OCPD than those with clinical populations. No significant differences were found among specific regions.

4. Discussion

We conducted a comprehensive systematic review of studies reporting OCPD prevalence rates worldwide and a meta-regression analysis to evaluate its estimation variability. Our results showed a global OCPD prevalence rate of 6.5%. Significant higher levels were found in clinical and psychiatric populations. Younger age was also correlated with higher levels of OCPD.

Among the included studies, a study published in 2002 utilized data from the U.S. National Epidemiological Research about Alcohol and Correlated Conditions, which included over 43,000 individuals in a nationally representative sample. It was the largest study included in this

review: OCPD was the most prevalent PD among the general population, affecting 7.9% of the individuals during lifetime; prevalence rates of OCPD were practically the same in males and females but significantly less common in young adults (Grant et al., 2004). Our results corroborated this study since no gender-related effect has been found. However, we found that OCPD prevalence decreased with the age increase of studied subjects.

According to Tyrer et al. (2015), due to the complexity of PDs, their evaluation seems to be a difficult task in clinical practice. Diagnosis should be made out of a life-long disorder. PD affects the interaction with other people, and there are no biological markers or other independent markers for its identification. Considering the high prevalence rate for OCPD found in this review, we must conclude that the diagnostic instruments used to assess this disease are sensible to cross-sectionally assess OCPD signs and symptoms. However, they cannot properly assess OCPD throughout patients' lives (Tyrer et al., 2015). In addition, OCPD construct comprehension is debated between categorical and dimensional approaches (Rojas and Widiger, 2017). According to Matthews et al. (2009), there was a split between the categorical classification system and the dimensional one based on traces (Matthews et al., 2009), in which the pathological traits increase with the severity of the dimensions (Tyrer and Johnson, 1996).

Diagnostic features of OCPD have been changing over the last decades (Pfohl and Blum, 1995; Costa et al., 2005). Thus, it is not surprising that the current rating scales conceptualize and evaluate OCPD differently. Nowadays, several different self-report measures include a scale for OCPD (McDermutt and Zimmerman, 2005) with a questionable convergent validity (Widiger and Boyd, 2009). According to the American Psychiatric Association (1952), DSM-I described a compulsive personality featured by overconcern "with adherence to standards of conscience or of conformity," over inhibition, over conscientiousness, "an inordinate capacity for work," rigidity, chronic tension, and a "lack (of) a normal capacity for relaxation" (American Psychiatric Association, 1952). There were no major changes in criteria from the first to the second edition of the manual (Pfohl and Blum, 1995; Costa et al., 2005). However, according to Douglas B. Samuel, DSM-III criteria did not include overconcern with morality, over conscientiousness, lack of capacity for relaxation, or chronic tension. DSM-III changed OCPD core feature to include a restricted capacity of expressing warm and tender emotions. All diagnostic criteria went through another substantial review for DSM-III-R since additional criteria were added to represent the original thrift, order, and obstinacy as constructs of the syndrome (Widiger et al., 1988). A generalized perfectionism pattern and inflexibility became the main characteristics (American Psychiatric Association, 1987). In the DSM-IV (American Psychiatric Association, 1994), the restricted demonstration of emotions, a core feature in the DSM-III, was entirely removed from the diagnostic criteria alongside indecision (Pfohl and Blum, 1995). This would justify the results obtained in this study, as the lower prevalence rates based on DSM-III compared to those based on DSM-IV and ICD-10. Despite not finding significant differences in the meta-regression model, the present meta-analysis found higher prevalence rates in studies based on DSM-IV and ICD-10 when compared to those based on DSM-III. This may also suggest that the diagnostic threshold is lower with DSM-IV and ICD-10, leading to false-positive diagnoses.

As far as we know, this is the broadest systematic review about OCPD, including studies from far distant locations, the majority located in the Americas and Europe. The results showed that OCPD prevalence rates are stable worldwide. A few studies were conducted in Asia and Oceania (5 and 4, respectively), and no studies were found from Africa.

Our findings should be compared with the global prevalence data of other PD. According to DSM-5, the average prevalence rate of borderline PD (BPD) in the general population is around 1.6–5.9%, varying from primary care settings (6%), mental health outpatients centers (10%), and hospitalized psychiatric patients (20%) (American Psychiatric Association, 2013). According to Wagner et al. (2013), BPD is a highly prevalent PD in the clinical setting with annual costs visibly higher than other

mental and physical disorders: it has been estimated an average of approximately € 26.000 annually, when compared to depression (€2.900) and diabetes (€11.870), for example. Unfortunately, PD has not been included in the Global Burden of Disease Studies (Wagner et al., 2013; Global Burden of Disease Collaborative Network, 2017). We point out that it would be of great importance to estimate average costs generated by patients with OCPD, considering the impact on relational and work areas.

4.1. Limitations

Some limitations should be discussed. Firstly, our bibliographic research was limited to articles published in English, Spanish, and Portuguese. Secondly, characteristics of countries involved, other than geographic location, were not analyzed. However, the geographical location of a country has been conceptually relevant for this study.

4.2. Conclusions

There was no significant variability in OCPD prevalence rates worldwide, affecting almost one over 15 adult individuals. Also, results indicate that more standardized epidemiological data on OCPD are needed. Future studies should also focus on the epidemiology of PD through the different classification systems, such as DSM-5 and ICD-11, and, in particular, on the DSM-5 alternate model, since only two studies were based on DSM-5 criteria (Moran et al., 2016; Bach et al., 2017). In addition, an evaluation based on a dimensional approach (Sharp et al., 2015), taking into account personality functioning and personality traits in healthy and clinically ill individuals, might be of interest (Volkert et al., 2018). Also, analytical factor studies are necessary to clarify which diagnostic features are relevant and how the prevalence of OCPD could be measured in a trustworthy manner. Finally, the present meta-analysis may suggest that the current diagnostic tools may detect OCPD in a cross-sectional assessment but not throughout the life of the person.

Declarations

Author contribution statement

Marina Junqueira Clemente, Maria Olivia Pozzolo Pedro, Henrique Soares Paiva, Cintia de Azevedo Marques Périco, Julio Torales and Antonio Ventriglio: Conceived and designed the experiments; Contributed reagents, materials, analysis tools or data; Wrote the paper.

Anderson Sousa Martins Silva: Conceived and designed the experiments; Analyzed and interpreted the data; Contributed reagents, materials, analysis tools or data; Wrote the paper.

João Maurício Castaldelli-Maia: Conceived and designed the experiments; Performed the experiments; Analyzed and interpreted the data; Contributed reagents, materials, analysis tools or data; Wrote the paper.

Data availability statement

Data included in article/supp. material/referenced in article.

Declaration of interest's statement

The authors declare no conflict of interest.

Additional information

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References

American Psychiatric Association, 1952. Diagnostic and Statistical Manual of Mental Disorders. Washington DC.

American Psychiatric Association, 1987. Diagnostic and Statistical Manual of Mental Disorders. Washington DC.

American Psychiatric Association, 1994. Diagnostic and Statistical Manual of Mental Disorders. Washington DC.

American Psychiatric Association, 2013. Diagnostic and Statistical Manual of Mental Disorders (DSM-5®). American Psychiatric Pub.

Ames, A., Molinari, V., 1994. Prevalence of personality disorders in community-living elderly. J. Geriatr. Psychiatr. Neurol. 7 (3), 189–194.

Anderluh, M.B., Tchanturia, K., Rabe-Hesketh, S., Treasure, J., 2003. Childhood obsessive-compulsive personality traits in adult women with eating disorders: defining a broader eating disorder phenotype. Am. J. Psychiatr. 160 (2), 242–247.

Ansari, Z., Fadardi, J.S., 2016. Enhanced visual performance in obsessive compulsive personality disorder. Scand. J. Psychol. 57 (6), 542–546.

Aycicegi-Dinn, A., Dinn, W.M., Caldwell-Harris, C.L., 2009. Obsessive-compulsive personality traits: compensatory response to executive function deficit? Int. J. Neurosci. 119 (4), 600–608.

Bach, B., Sellbom, M., Kongerslev, M., Simonsen, E., Krueger, R.F., Mulder, R., 2017. Deriving ICD-11 personality disorder domains from dsm-5 traits: initial attempt to harmonize two diagnostic systems. Acta Psychiatr. Scand. 136 (1), 108–117.

Barrett, B., Byford, S., 2012. Costs and outcomes of an intervention programme for offenders with personality disorders. Br. J. Psychiatr. 200 (4), 336–341.

Barendregt, J.J., Doi, S.A., Lee, Y.Y., Norman, R.E., Vos, T., 2013. Meta-analysis of prevalence. J. Epidemiol. Community 67 (11), 974–978.

Black, D.W., Coryell, W.H., Crowe, R.R., 2015. Personality disorders, impulsiveness, and novelty seeking in persons with DSM-IV pathological gambling and their first-degree relatives. J. Gambl. Stud. 31 (4), 1201–1214.

Black Jr., D.W., R. N., Pfohl, B., Goldstein, R.B., Blum, N., 1993. Personality disorder in obsessive-compulsive volunteers, well comparison subjects, and their first-degree relatives. Am. J. Psychiatr. 150 (8), 1226–1232.

Bodlund, O., Grann, M., Ottosson, H., Svanborg, C., 1998. Validation of the self-report questionnaire DIP-Q in diagnosing DSM-IV personality disorders: a comparison of three psychiatric samples. Acta Psychiatr. Scand. 97 (6), 433–439.

Chamberlain, S.R., Leppink, E.W., Redden, S.A., Stein, D.J., Lochner, C., Grant, J.E., 2017. Impact of obsessive-compulsive personality disorder (OCPD) symptoms in Internet users. Ann. Clin. Psychiatr. 29 (3), 173–181.

Cheng, H., Huang, Y., Liu, B., Liu, Z., 2010. Familial aggregation of personality disorder: epidemiological evidence from high school students 18 years and older in Beijing, China. Compr. Psychiatr. 51 (5), 524–530.

Chiang, C., Zhang, M., Ho, R., 2022. Prevalence of internet gaming disorder in medical students: a meta-analysis. Front. Psychiatr. 12, 760911.

Coid, J., Yang, M., Tyrer, P., Roberts, A., Ullrich, S., 2006. Prevalence and correlates of personality disorder in Great Britain. Br. J. Psychiatr. 5 (188), 423–431.

Coolidge, F.L., Marle, P.D., Horn, S.A., Segal, D.L., 2011. Clinical syndromes, personality disorders, and neurocognitive differences in male and female inmates. Behav. Sci. Law 29 (5), 741–751.

Costa, P., Samuels, J., Bagby, R.M., Daffin, L., Norton, H., 2005. Obsessive–compulsive personality disorder: a review. In: Maj, M., Akiskal, H.S., Mezzich, J.E., Okasha, A. (Eds.), Personality Disorders. Wiley and Sons, New York.

Crawford, T.N., Cohen, P., Johnson, J.G., Kasen, S., First, M.B., Gordon, K., Brook, J.S., 2005. Self-reported personality disorder in the children in the community sample: convergent and prospective validity in late adolescence and adulthood. J. Pers. Disord. 19 (1), 30–52.

Dereboy, C., Güzel, H.S., Dereboy, F., Okyay, P., Eskin, M., 2014. Personality disorders in a community sample in Turkey: prevalence, associated risk factors, temperament and character dimensions. Int. J. Soc. Psychiatr. 60 (2), 139–147.

Echeburúa, E., Medina, R.B., Aizpiri, J., 2007. Comorbidity of alcohol dependence and personality disorders: a comparative study. Alcohol Alcohol 42 (6), 618–622.

Ekselius, L., Tillfors, M., Furmark, T., Fredrikson, M., 2001. Personality disorders in the general population: DSM-IV and ICD-10 defined prevalence as related to sociodemographic profile. Pers. Indiv. Differ. 30 (2), 311–320.

Foo, S.Q., Tam, W.W., Ho, C.S., Tran, B.X., Nguyen, L.H., McIntyre, R.S., Ho, R.C., 2018. Prevalence of depression among migrants: a systematic review and meta-analysis. Int. J. Environ. Res. Publ. Health 15 (9), 1986.

Forlenza, O.V., Miguel, E.C., 2014. Clínica Psiquiátrica de Bolso. Manoele Ltda, Barueri.

Gabbard, G.O., 2014. Psychodyanmic Psychiatry in Clinical Practice. American Psychiatric Publishing, Virginia.

Gawda, B., Czubak, K., 2017. Prevalence of personality disorders in a general population among men and women. Psychol. Rep. 120 (3), 503–519.

Global Burden of Disease Collaborative Network, 2017. Global Burden of Disease Study 2016 (GBD 2016): Incidence, Prevalence, and Years Lived with Disability 1990-2016. Institute for Health Metrics and Evaluation.

Grant, B.F., Stinson, F.S., Dawson, D.A., Chou, S.P., Ruan, W.J., Pickering, R.P., 2004. Co-Occurrence of 12-month alcohol and drug use disorders and personality disorders in the United States: results from the national epidemiologic survey on alcohol and related Conditions. Arch. Gen. Psychiatr. 61 (4), 361–368.

Ha, J.H., Kim, E.J., Abbey, S.E., Kim, T.-S., 2007. Relationship between personality disorder symptoms and temperament in the young male general population of South Korea. Psychiatr. Clin. Neurosci. 61 (1), 59–66.

Hiroeh, U., Appleby, L., Mortensen, P.B., Dunn, G., 2001. Death by homicide, suicide, and other unnatural causes in people with mental illness: a population-based study. Lancet 358 (9299), 2110–2112.

Idris, N.R.N., 2012. Performance of the trim and fill method in adjusting for the publication bias in meta-analysis of continuous data. Am. J. Appl. Sci. 9 (9), 1512.

Jackson, H.J., Burgess, P.M., 2000. Personality disorders in the community: a report from the Australian national survey of mental health and wellbeing. Soc. Psychiatr. Psychiatr. Epidemiol. 35 (12), 531–538.

Jalenques, I., Rondepierre, F., Massoubre, C., Bonnefond, S., Schwan, R., Labeille, B., Perrot, J.-L., Collange, M., Mulliez, A., D'Incan, M., 2017. High prevalence of personality disorders in skin-restricted lupus patients. Acta Derm. Venereol. 97 (8), 941–946.

Kayhan, F., Ilik, F., 2016. Prevalence of personality disorders in patients with chronic migraine. Compr. Psychiatr. 68, 60–64.

Kempke, S., Eede, F.V., Schotte, C., Claes, S., Wambeke, P.V., Houdenhove, B.V., Luyten, P., 2013. Prevalence of DSM-IV personality disorders in patients with Chronic Fatigue Syndrome: a controlled study. Int. J. Behav. Med. 20 (2), 219–228.

Kulkarni, R.R., Rao, K.N., Begum, S., 2013. Comorbidity of psychiatric and personality disorders in first suicide attempters: a case-control study. Asian J. Psychiatr. 6 (5), 410–416.

Larsson, J.O., Hellzén, M., 2004. Patterns of personality disorders in women with chronic eating disorders. Eat. Weight Disord. 9 (3), 200–205.

Lenzenweger, M.F., 2008. Epidemiology of personality disorders. Psychiatr. Clin. 31 (3), 395–403.

Lenzenweger, M.F., Lane, M.C., Loranger, A.W., Kessler, R.C., 2007. DSM-IV personality disorders in the national comorbidity survey replication. Biol. Psychiatr. 62 (6), 553–564.

Lim, K.S., Wong, C.H., McIntyre, R.S., Wang, J., Zhang, Z., Tran, B.X., Tan, W., Ho, C.S., Ho, R.C., 2019. Global lifetime and 12-month prevalence of suicidal behavior, deliberate self-harm and non-suicidal self-injury in children and adolescents between 1989 and 2018: a meta-analysis. Int. J. Environ. Res. Publ. Health 16 (22), 4581.

Maggini, C., Ampollini, P., Marchesi, C., Gariboldi, S., Cloninger, C.R., 2000. Relationships between tridimensional personality questionnaire dimensions and DSM-III-R personality traits in Italian adolescents. Compr. Psychiatr. 41 (6), 426–431.

Maier, W., Lichtermann, D., Klingler, T., Heun, R., Hallmayer, J., 1992. Prevalences of personality disorders (DSM-III-R) in the community. J. Pers. Disord. 6 (3), 187–196.

Mancebo, M.C., Eisen, J.L., Grant, J.E., Rasmussen, S.A., 2005. Obsessive compulsive personality disorder and obsessive compulsive disorder: clinical characteristics, diagnostic difficulties, and treatment. Ann. Clin. Psychiatr. 17 (4), 197–204.

Matthews, G., Deary, I.J., Whiteman, M., 2009. Personality Traits. Cambridge University Press, Cambridge.

McDermutt, W., Zimmerman, M., 2005. Assessment instruments and standardized evaluation. In: Bender, D., Oldham, J., Skodol, A. (Eds.), The American Psychiatric Publishing Textbook of Personality Disorders. American Psychiatric Publishing, Washington DC, pp. 89–101.

Meleiro, A.M., 2018. Psiquiatria Estudos Fundamentais. Guanabara Koogan Ltda, Rio de Janeiro.

Mike, A., King, H., Oltmanns, T.F., Jackson, J.J., 2017. Obsessive, compulsive, and conscientious? The relationship between OCPD and personality. J. Pers. 86 (6), 1–49.

Moher, D., Liberati, A., Tetzlaff, J., Altman, D.G., Group, P., 2009. Preferred reporting items for systematic reviews and meta-analyses: the PRISMA statement. PLoS Med. 6 (7), e1000097.

Moldin, S.O., Rice, J.P., Erlenmeyer-Kimling, L., Squires-Wheeler, E., 1994. Latent structure of DSM-III-R Axis II psychopathology in a normal sample. J. Abnorm. Psychol. 103 (2), 259–266.

Moore, E.A., Green, M.J., Carr, V.J., 2012. Comorbid personality traits in schizophrenia: prevalence and clinical characteristics. J. Psychiatr. Res. 46 (3), 353–359.

Moran, P., Coffey, C., Mann, A., Carlin, J.B., Patton, G.C., 2006. Personality and substance use disorders in young adults. Br. J. Psychiatry 188, 374–379.

Moran, P., Jenkins, R., Tylee, A., Blizard, R., Mann, A., 2000. The prevalence of personality disorder among UK primary care attenders. Acta Psychiatr. Scand. 102 (1), 52–57.

Moran, P., Romaniuk, H., Coffey, C., Chanen, A., Degenhardt, L., Borschmann, R., 2016. The influence of personality disorder on the future mental health and social adjustment of young adults: a population-based, longitudinal cohort study. Lancet 3 (7), 636–645.

Neto, M.R., Cols, T.A., 2011. *Transtorno da personalidade*. Porto Alegre. Artmed.

Nicoletti, A., Luca, A., Luca, M., Donzuso, G., Mostile, G., Raciti, L., Contrafatto, D., Dibilio, V., Sciacca, G., Cicero, C., Vasta, R., Petralia, A., Zappia, M., 2016. Obsessive compulsive personality disorder in progressive supranuclear palsy, multiple system Atrophy and essential tremor. Park. Relat. Disord. 30, 36–39.

Paraventi, F., Chaves, A.C., 2016. Manual de psiquiatria clínica. Rio de Janeiro: Roca.

Pfohl, B., Blum, N., 1995. Obsessive-compulsive personality disorder. In: Livesley, W.J. (Ed.), The DSM-IV Personality Disorders. Guilford, New York, pp. 261–276.

Quirk, S.E., Berk, M., Pasco, J.A., Brennan-Olsen, S.L., Chanen, A.M., Koivumaa-Honkanen, H., Burke, L.M., Jackson, H.J., Hulbert, C., Olsson, C.A., Moran, P.,

Stuart, A.L., W, L.J., 2017. The prevalence, age distribution and comorbidity of personality disorders in Australian women. Aust. N. Z. J. Psychiatr. 51 (2), 141–150.

Roberts, L.W., 2019. Textbook of Psychiatry. American Psychiatric Association Publishing.

Rojas, S.L., Widiger, T.A., 2017. Coverage of the DSM-IV-TR/DSM-5 section II personality disorders with the DSM-5 dimensional trait model. J. Pers. Disord. 31 (4), 462–482.

Sadock, B.J., Sadock, V.A., Ruiz, P., 2015. Synopsis of Psychiatry: Behavioral Sciences/clinical Psychiatry. Wolters Kluer, Philadelphia.

Sahingöz, M., Uguz, F., Gezginc, K., Korucu, D.G., 2013. Axis I and Axis II diagnoses in women with PCOS. Gen. Hosp. Psychiatr. 35 (5), 508–511.

Samuel, D.B., Widiger, T.A., 2011. Conscientiousness and obsessive-compulsive personality disorder. Personal. Disorders: Theory Res. Treat. 2 (3), 161–174.

Samuels, J.F., Nestadt, G., Romanoski, A.J., Folstein, M.F., McHugh, P.R., 1994. DSM-III personality disorders in the community. Am. J. Psychiatr. 151 (7), 1055–1062.

Samuels, J., Eaton, W.W., Bienvenu, O.J., Brown, C.H., Jr, P.T., Nestadt, G., 2002. Prevalence and correlates of personality disorders in a community sample. Br. J. Psychiatr. 180, 536–542.

Santana, G.L., Coelho, B.M., Wang, Y.-P., Filho, A.D., Viana, M.C., Andrade, L.H., 2018. The epidemiology of personality disorders in the Sao Paulo Megacity general population. PLoS One 13 (4), 1–20.

Sassoon, S.A., Colrain, I.M., Baker, F.C., 2011. Personality disorders in women with severe premenstrual syndrome. Arch. Wom. Ment. Health 14 (3), 257–264.

Sharp, C., Wright, A.G., Fowler, J.C., Frueh, B.C., Allen, J.G., Oldham, J., Clark, L.A., 2015. The structure of personality pathology: both general ('g') and specific ('s') factors? J. Abnorm. Psychol. 124 (2), 387–398.

Shi, L., Lin, L., 2019. The trim-and-fill method for publication bias: practical guidelines and recommendations based on a large database of meta-analyses. Medicine 98 (23), e15987.

Sinha, B.K., Watson, D.C., 2001. Personality disorder in university students: a multitrait-multimethod matrix study. J. Pers. Disord. 15 (3), 235–244.

Skodol, A.E., 2016. Personality pathology and population health. Lancet Psychiatr. 3 (7), 595–596.

Soeteman, D.I., Roijen, L.H.-v., Verheul, R., Busschbach, J.J., 2008. The economic burden of personality disorders in mental health care. J. Clin. Psychiatr. 59 (2), 259–265.

Stroup, D.F., Berlin, J.A., Morton, S.C., Olkin, I., Williamson, G.D., Rennie, D., Thacker, S.B., 2000. Meta-analysis of observational studies in epidemiology: a proposal for reporting. JAMA 283 (15), 2008–2012.

The Joanna Briggs Institute, 2017. Critical Appraisal Checklist for Analytical Cross Sectional Studies. Retrieved from. https://joannabriggs.org/sites/default/files/2019-05/JBI_Critical_Appraisal-Checklist_for_Analytical_Cross_Sectional_Studies2017_0.pdf.

Torgersen, S., Kringlen, E., Cramer, V., 2001. The prevalence of personality disorders in a community sample. Arch. Gen. Psychiatr. 58 (6), 590–596.

Torres, A.R., Moran, P., Bebbington, P., Brugha, T., Bhugra, D., Coid, J.W., Farrell, M., Jenkins, R., Lewis, G., Meltzer, H., Prince, M., 2006. Obsessive-compulsive disorder and personality disorder: evidence from the British national survey of psychiatric morbidity 2000. Soc. Psychiatr. Psychiatr. Epidemiol. 41 (11), 862–867.

Tyrer, P., Johnson, T., 1996. Establishing the severity of personality disorder. Am. J. Psychiatr. 153 (12), 1593–1597.

Tyrer, P., Reed, G.M., Crawford, M.J., 2015. Classification, assessment, prevalence, and effect of personality disorder. Lancet 385 (9969), 717–726.

Uguz, F., Kucuk, A., Cicek, E., Kayhan, F., Tunc, R., 2013. Mood, anxiety and personality disorders in patients with systemic lupus erythematosus. Compr. Psychiatr. 54 (4), 341–345.

Volkert, J., Gablonski, T.-C., Rabung, S., 2018. Prevalence of personality disorders in the general adult population in Western countries: systematic review and meta-analysis. Br. J. Psychiatr. 213 (6), 709–715.

Wagner, T., Roepke, S., Marschall, P., Stiglmayr, C., Renneberg, B., Gieb, D., Matthies, S., Salbach-Andrae, H., Flessa, S., Fydrich, T., 2013. Krankheitskosten der Borderline Persönlichkeitsstörung aus gesellschaftlicher Perspektive. Zeitschrift für Klinische Psychologie und Psychotherapie 42 (4), 242–255.

Widiger, T.A., Boyd, S., 2009. Assessing personality disorders. In: Butcher, J.N. (Ed.), Oxford Handbook of Personality Assessment. Oxford University Press, New York, pp. 336–363.

Widiger, T.A., Frances, A., Spitzer, R.L., Williams, J.B., 1988. The DSM-III-R personality disorders: an overview. Am. J. Psychiatr. 145 (7), 786–795.

Wongpakaran, N., Wongpakaran, T., 2005. Personality disorders in medical students: measuring by IPDE-10. J. Med. Assoc. Thail. 88 (9), 1278–1281.

World Health Organization, 1993. ICD-10 Classification of Mental and Behavioral Disorders: Clinical Descriptions and Diagnostic Guidelines. Medical Arts, Porto Alegre.

Yang, M., Ullrich, S., Roberts, A., Coid, J., 2007. Childhood institutional care and personality disorder traits in adulthood: findings from the British national surveys of psychiatric morbidity. Am. J. Orthopsychiatry 77 (1), 67–75.

Yılmaz, A., Cumurcu, B.E., Etikan, İ., Hasbek, E., Doruk, A., 2014. The effect of personality disorders on asthma severity and quality of life. Iran. J. Allergy, Asthma Immunol. 13 (1), 47–54.