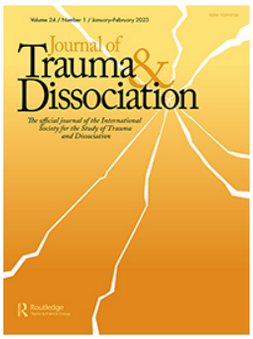

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The Prevalence of Depersonalization-Derealization Disorder: A Systematic Review

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ABSTRACT

Depersonalization-Derealization disorder (DDD) is a psychiatric condition characterized by persistent feelings of detachment from one's self and of unreality about the outside world. This review aims to examine the prevalence of DDD amongst different populations. A systematic review protocol was developed before literature searching. Original articles were drawn from three electronic databases and included only studies where prevalence rates of DDD were assessed by standardized diagnostic tools. A narrative synthesis was conducted. Twenty-three papers were identified and categorized into three groups of participants: general population, mixed in/outpatient samples, and patients with specific disorders. The prevalence rates ranged from 0% to 1.9% amongst the general population, 5–20% in outpatients and 17.5–41.9% in inpatients. In studies of patients with specific disorders, prevalence rates varied: 1.8–5.9% (substance abuse), 3.3–20.2% (anxiety), 3.7–20.4% (other dissociative disorders), 16.3% (schizophrenia), 17% (borderline personality disorder), ~50% (depression). The highest rates were found in people who experienced interpersonal abuse (25–53.8%). The prevalence rate of DDD is around 1% in the general population, consistent with previous findings. DDD is more prevalent amongst adolescents and young adults as well as in patients with mental disorders. There is also a possible relationship between interpersonal abuse and DDD, which merits further research.

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Dissociative disorders; epidemiology; systematic review

Introduction

Depersonalization (DP) and derealization (DR) are symptoms characterized by, respectively, feelings of unreality and detachment from one's self and one's surroundings (American Psychiatric Association, 2013). Depersonalization and derealization (DP/DR) symptoms can occur as transient experiences in otherwise healthy individuals at times of stress or physical exhaustion and have been used as terms to describe the phenomenon of "burnout" (Maslach & Jackson, 1981). On the other hand, Depersonalization-Derealization Disorder (DDD) occurs when this symptom cluster is persistent and distressing and is

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paired with functional impairment, rendering it a clinical diagnosis alongside other mental disorders or as a primary condition (American Psychiatric Association, 2013).

There is limited literature regarding the prevalence rate of DDD. A recent review focusing on the epidemiology of DP/DR both as a symptom and as a disorder was conducted by Hunter et al. (2004), which included relevant papers published between 1966 and October 2002. According to this review, the prevalence rate of DDD was 1–2% in community samples when using interviews as the diagnostic tool, while transient symptoms of DP/DR were more prevalent in the general population with lifetime rates of 26–74%.

Prevalence rates likely vary due to inconsistent definitions of DP/DR as a symptom or as a clinically significant disorder, paired with the use of a range of diagnostic tools. In order to evaluate as many studies as possible that contained some data on the prevalence of DP/DR, Hunter et al. (2004) did not set strict exclusion criteria for the quality of the studies under review. As a result, the previous review may include some studies of lower quality, potentially influencing the strength of the evidence. Therefore, this review aims to update the previous work, adopting a more systematic approach following PRISMA guidelines.

Two clinical interviews are commonly used when making a DDD diagnosis in clinical practice: the Structured Clinical Interview for DSM-IV Dissociative Disorders (SCID-D; Steinberg, 1994) and the Dissociative Disorders Interview Schedule (DDIS; Ross et al., 1989). The SCID-D is a semi-structured interview (Steinberg, 1994) and the DDIS is a clinician-administered structured interview (Ross et al., 1989). Both are used to identify dissociative disorders according to the DSM-IV (Ross et al., 1989; Steinberg, 1994). In order to capture all potentially useful data, studies using either one of these interviews were included, as well as studies that incorporated a standardized scale with a clinical cut-off score. The Cambridge Depersonalization Scale (CDS; Sierra & Berrios, 2000) and the depersonalization subscale of the Dissociative Experiences Scale (DES; Bernstein & Putnam, 1986) are two of the most frequently used standardized diagnostic scales of DDD that include a clinical cut-off score. Simeon et al. (1998) also suggest that the taxon version of the DES, consisting of 8 items regarding pathological dissociation in the DES (Waller et al., 1996), could be more useful than the mean DES score when detecting DDD (Simeon et al., 1998).

Our systematic review aims to describe the prevalence rates of DDD in a range of populations. To address this, we have reviewed quantitative studies published since October 2002 that provide relevant information about the prevalence rates of DDD and conducted a narrative synthesis to explore the findings from the selected studies.

Method

A systematic review protocol in PROSPERO format was developed and the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) guidelines were followed. The review protocol is shown in *Appendix*.

Search strategy

The search was limited to studies published in English after October 2002 but geographical locations were not limited. Three electronic databases were initially searched and screened in March 2020: PsycINFO, MEDLINE and Web of Science. Grey literature was also screened in Google Search. The results from these sources were combined with duplications removed. The search process was conducted by two independent reviewers to minimize error and repeated in February 2021 to include any eligible papers published since March 2020. The original search history is shown in *Appendix*.

Search terms

When defining the search terms, two main concepts were identified: 1, "depersonalization/derealization," and 2, "prevalence." For each concept, the Boolean operator "OR" was used to group all of the search terms. Both text words (free-text searches) and relevant subject terms (MeSH terms) were used as search terms and the results were combined within each concept. Concept 1 (depersonalization, derealization, depersonalization disorder, derealization disorder) and concept 2 (epidemiolog*, prevalen*, occurrence, frequency) were combined using the Boolean operator "AND." To cover all potential literature, we used truncation and searched both UK and US spellings.

Inclusion/ exclusion criteria

We only included quantitative studies that provided or allowed for the calculation of prevalence rates. Reviews were excluded although reference lists were manually screened to retrieve any other relevant studies.

Studies were excluded if: (a) they focused only on the relationship between DDD and its risk factors; (b) they only provided prevalence rates of other mental disorders or DP/DR symptoms; (c) they provided prevalence rates of DDD without use of a diagnostic interview or a standardized measure and clinical cut-off scores; (d) they focused on burnout or burnout syndrome rather than DDD.

The standardized clinical interviews for depersonalization include the SCID-D (Steinberg, 1994) and the DDIS (Ross et al., 1989). Clinically significant DDD can also be indicated by a cut-off score of ≥70 in the CDS (Sierra & Berrios, 2000) or by a sub-scale score of ≥30 in the Derealization/Depersonalization sub-scale of the DES (Bernstein & Putnam, 1986). Studies using the CDS-2, with a cut-off score of 3 (Michal, Zwerenz, et al., 2010; Sierra & Berrios, 2000), the CDS-9, with a cut-off score of 19 (Michal et al., 2004; Sierra & Berrios, 2000), or the taxon version of the DES, with a cut-off score of 13 (Bernstein & Putnam, 1986) were also eligible for inclusion. Any translated versions of the above interviews and scales that were validated and provided a cut-off score were also accepted. Studies using other scales were excluded.

Procedure

Two independent reviewers conducted study selection, quality assessment and data extraction process. In each phase, any discrepancies between the two reviewers were resolved through discussion with a third reviewer.

After removing duplicates in the initial database searches, the two independent reviewers screened titles and abstracts of the literature against inclusion criteria and then retrieved full texts of potential studies to assess their eligibility. Reasons for exclusion were recorded.

Then, two reviewers assessed the quality of eligible studies independently, using an adapted version of the Quality assessment checklist for prevalence studies (Nguyen et al., 2016). The adapted checklist consists of nine items that assess the risk of bias in nine domains with one summary item indicating the overall risk of bias (Nguyen et al., 2016). It was selected as it provides more specific criteria regarding the level of risk of bias than the original checklist (Hoy et al., 2012). A score of zero in each item indicated low risk and 1 indicated high risk. The overall risk of bias was indicated by the total score (Low risk: 0–3; Moderate risk: 4–6; High risk: 7–9). Before merging the results from the reviewers, the inter-rater reliability was calculated by an intraclass correlation coefficient.

Only papers at low or moderate risk of bias were included in the data extraction process, and a standardized form adapted from the Cochrane Data collection form template was used (Higgins, 2008). A narrative synthesis was conducted to explore the findings from the included studies.

Results

Study selection

In total, 1,786 papers were identified in the initial search, with 1151 remaining after removing duplicates. The PRISMA flow diagram for a summary of the selection process is shown in Figure 1. Sixty-seven potential papers were identified and the full texts were assessed for eligibility. In the study by Baker et al. (2003), all participants were DDD patients recruited from a specialist clinic, so this paper was excluded in our review. Additionally, three eligible papers, (Foote et al., 2008; Michal, Wiltink, et al., 2010; Tschan et al., 2013) were excluded as the same samples were used in three other included papers (Foote et al., 2006; Michal et al., 2009; Michal, Wiltink, Till, Wild, Blettner, et al., 2010). When screening full texts, we excluded one paper (Duffy, 2000) due to the discrepancy between the publication year of this paper presented in the database (2002) and presented in the paper (2000). When repeating the search process in February 2021, we found one eligible paper (Schlax et al., 2020) published since March 2020. Thus, 23 papers were identified and included in the following analysis.

Study characteristics

The range of publication dates was from 2006 to 2020. There was a good international distribution of the studies including Turkey (n = 5), Germany (n = 4) and the United States (n = 3). Other studies were from Canada (n = 1), Israel (n = 1), Mexico (n = 1), Northern Ireland (n = 1), Puerto Rico (n = 1), Serbia (n = 1), Spain (n = 2), Switzerland (n = 1), and the United Kingdom (n = 1). There was also one transcultural study (Sierra et al., 2006).

Most studies used structured or semi-structured interviews to obtain a diagnosis of DDD, such as the DDIS (n = 4) or the SCID-D (n = 8). Ten papers used the CDS (n = 6), the CDS-2 (n = 3) or the CDS-9 (n = 1). Only one study used the Derealization/Depersonalization sub-scale of the DES.

Sample characteristics

Sample sizes ranged from 20 to 13,182. In most of the studies, the mean age of participants ranged from 30 to 50 years (n = 17) and the proportion of female participants was above 50% (n = 18). Two studies did not report mean age of the sample (Gonzalez-Torres et al., 2010; Mueller-Pfeiffer et al., 2012) and two studies did not give the percentage of females (Gonzalez-Torres et al., 2010; Michal, Wiltink, Till, Wild, Blettner, et al., 2010).

Nine papers assessed the prevalence rate of DDD amongst the general population. Five studies were conducted amongst patients with mixed or non-specified disorders, with participants being outpatients (n = 2), inpatients

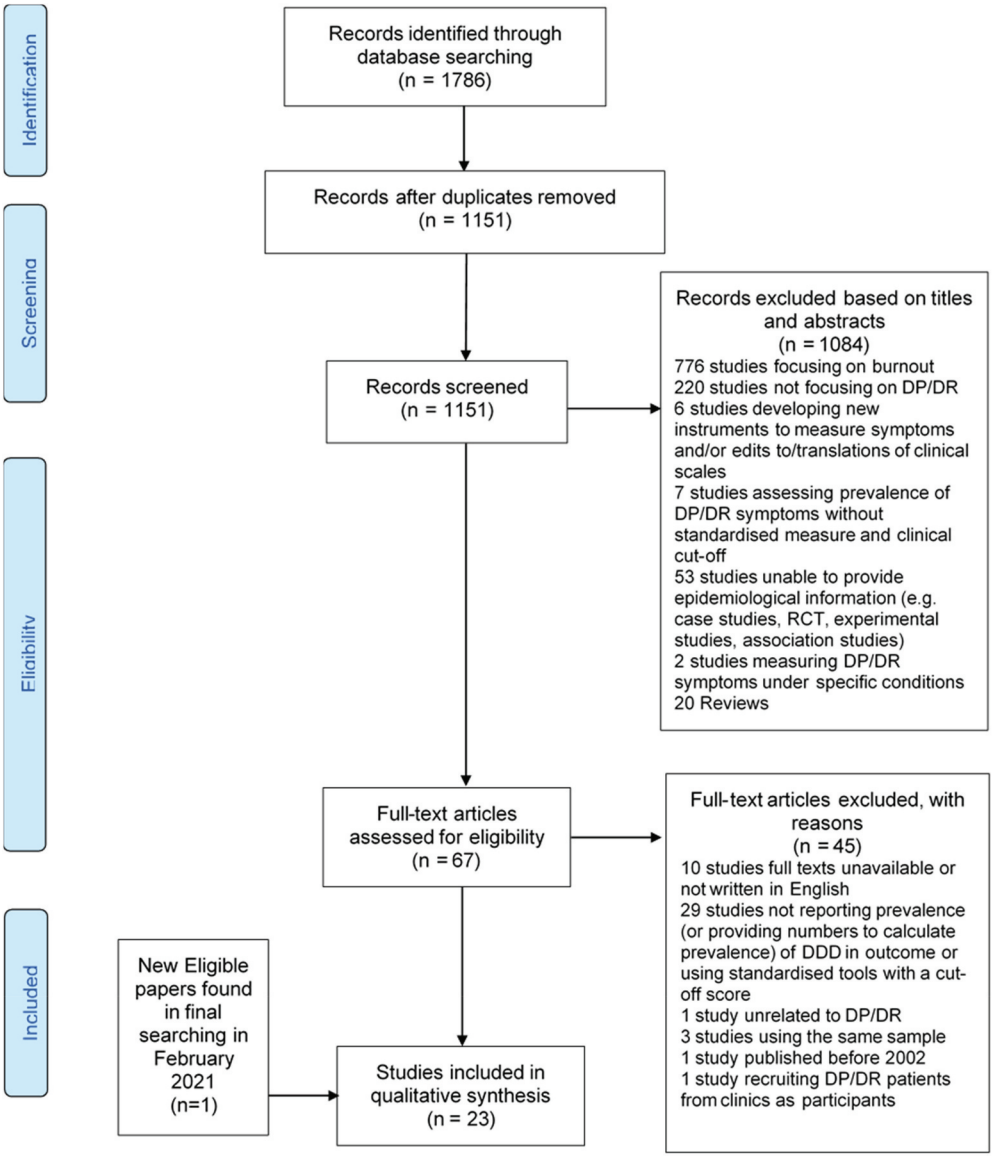

Figure 1. PRISMA flow diagram.

(n = 1) and mixed or unspecified patients (n = 2). Twelve papers evaluated the prevalence of DDD amongst patients with specific disorders or conditions, including anxiety disorders (n = 4), dissociative spectrum disorders (n = 2), substance use disorders (n = 2), interpersonal abuse (n = 2), borderline personality disorder (n = 1), schizophrenia or schizophrenia spectrum disorders (n = 1) and depression (n = 1). However, there are three studies that involved two or three specific groups (Aponte-Soto et al., 2019; Gonzalez-Torres et al., 2010; Somer et al., 2015).

Quality assessment

Most of the studies were at low risk (n = 15) and the remaining papers showed moderate risk (n = 8). We therefore included all 23 papers in our analysis. The intraclass correlation coefficient was 0.947, indicating excellent inter-rater reliability.

Results: general population

Table 1 presents the study characteristics and results of nine studies conducted amongst the general population.

The prevalence rates of DDD were similar across five studies (Gonzalez-Torres et al., 2010; Johnson et al., 2006; Michal et al., 2009; Michal, Wiltink, Till, Wild, Blettner, et al., 2010; Schlax et al., 2020), ranging from 0.76% (Schlax et al., 2020) to 1.9% (Michal et al., 2009), even with sample sizes varying from 172 (Gonzalez-Torres et al., 2010) to 13,182 (Schlax et al., 2020). There were a few outliers. Aponte-Soto et al. (2019) found that the prevalence rate was 0% among a sample of 40 adults. Beyond this, the prevalence rate was 9.7% amongst a community adult sample in Israel (Somer et al., 2015), inconsistent with the general trend of ~1% rates. Additionally, in two studies conducted in adolescents (Michal et al., 2015) and undergraduate students (Myers & Llera, 2020), the prevalence rates were 11.9% and 11%, respectively. It should be noticed that there are potential overlaps between the participants in the study by Michal, Wiltink, Till, Wild, Blettner, et al. (2010) and the study by Schlax et al. (2020), as they both investigated participants from the Gutenberg Health Study.

Results: patients with non-specific or mixed disorders

Table 2 presents the study characteristics and results of five studies conducted among patients with unspecified or mixed disorders.

Outpatients

Two studies reported DDD prevalence rates among adult outpatients with unspecified or mixed disorders, varying from 5% (Foote et al., 2006) to 20% (Dorahy et al., 2006). The difference between the prevalence rates could be due to the small sample size of 20 patients in the Dorahy et al. (2006) study and, although these were outpatients, they were described as complex in presentation.

Table 1. Study characteristics of studies involving the general population.

Authors & Year of publication	Country	Population	Sample size	Mean age (SD) / age range	% female (n)	Prevalence assessment method	Cut-off score	Results from original papers	Notes	DP/DR prevalence (%) among general population
Myers & Llera (2020)	United States	College psychology undergraduates	N = 198	M = 19.72; SD = 2.32	72% (1% gender variant/non-conforming, 27% male)	CDS	70	n = 22 participants (11%) reported experiencing clinical levels of dissociation.		11%
Michal et al. (2015)	Germany	Pupils aged 12–18 years	N = 3,809	- No DP: M = 15.6; SD = 1.7. - DP: M = 15.8; SD = 1.6	51.7% (n = 1971) - No DP: 51.1% (n = 1716) - DP: 56.4% (n = 255)	CDS-2	3 (≥ 3)	n = 452 (11.9%) pupils aged 12–18 years scored 3 or higher in CDS-2.		11.9%
Michal, Wiltink, Till, Wild, Blettner, et al. (2010)	Germany	Randomly selected community sample aged 35–74 enrolled in Gutenberg Health Study from April 2007 to October 2008	N = 4,912; **5,000 participants were enrolled but only 4912 completed the survey	- CDS-2 < 3 (n = 4859): M = 55.4; SD = 10.9. - CDS-2 >/ = 3 (n = 41): M = 53.3; SD = 10.0	Not given	CDS-2	≥ 3	n = 41 (0.8%) participants scored on or higher than 3 in CDS-2, indicating a clinically significant DDD		0.8%
Schlax et al. (2020)	Germany	German general population aged 35–74 enrolled in Gutenberg Health Study from April 2007 to April 2012	N = 13 182; **15 010 participants were enrolled but only 13182 included in the analysis	M = 54.8; SD = 10.9	49.5% (n = 6,526)	CDS-2	≥ 3	n = 100 (0.76%) participants scored on or higher than 3 in CDS-2		0.76%

(*Continued*)

Table 1. (Continued).

Authors & Year of publication	Country	Population	Sample size	Mean age (SD) / age range	% female (n)	Prevalence assessment method	Cut-off score	Results from original papers	Notes	DP/DR prevalence (%) among general population
Michal et al. (2009)	Germany	German general population	N = 1,287	Total sample: M = 48.9; SD = 18.3; range = 14–90. - DP-C (clinical DP): M = 50.4; SD = 17.7. - DP-I (impairment caused by DP): M = 55.2; SD = 17.8	54.5% - DP-C (clinical DP): 64% - DP-I (impairment caused by DP): 61.6%	CDS-9	19(≥19)	n = 25 (1.9%) participants scored in the range of clinically significant DDD/		1.9%
Gonzalez-Torres et al. (2010)	Spain	(1) Patients with schizophrenia or schizophrenia spectrum disorders (2) First-degree healthy relatives with no psychiatric history (3) healthy controls from the general population	N = 392: - patients: n = 147 - first-degree relatives: n = 73 - control subjects: n = 172	Overall: Median = 30.0, interquartile range = 24–42 - Patients: Median = 32, interquartile range = 25–40 - Relatives: Median = 35.5, interquartile range = 28–43.3 - Controls: Median = 27, interquartile range = 23–40.3	Not given	CDS (Spanish version)	71	(1) Among 141 patients, n = 24 (17%) had DDD according to the cut-off point of 71. (2) Among 71 relatives, n = 1 (1%) had DDD according to the cut-off point of 71. (3) Among 172 controls, n = 2 (3%) had DDD according to the cut-off point of 71.	** There were errors in calculation in original paper. Correct prevalence rates are listed as follow: (1) patients: 24/147 = 16.3% (3) controls: 2/172 = 1.16%.	1.16%

(*Continued*)

Table 1. (Continued).

Authors & Year of publication	Country	Population	Sample size	Mean age (SD) / age range	% female (n)	Prevalence assessment method	Cut-off score	Results from original papers	Notes	DP/DR prevalence (%) among general population
Aponte-Soto et al. (2019)	Puerto Rico	Hispanic adults with and without a history of interpersonal abuse: (1) participants with a history of interpersonal abuse (HIA); (2) control community group (CCG) without HIA	N = 80 - HIA: n = 40 - CCG: n = 40	M = 31.00; SD = 9.9; range = 21–65	65% (n = 52) - HIA: 65% (n = 26) - CCG: 65% (n = 26)	CDS (Spanish version)	70 (>70)	(1) 25% of HIA group scored > 70 on CDS. (2) No participants scored >70 on CDS in the CCG group.	**Original paper didn't report specific number of participants diagnosed with DDD	0%
Somer et al. (2015)	Israel	(1) Opiate use disorder patients (2) Arab women subjected to domestic violence (3) Non-clinical controls from a community sample (graduate students and their friends and family members)	N = 261 - Arab women: n = 80; - OUD patients: n = 68; - Nonclinical participants: n = 103	- Arab women: M = 33.29; - OUD patients: M = 32.44; - nonclinical: M = 34.80	59% (n = 154) - Arab women group: 100% (n = 80) - OUD patient group: 5.9% (n = 4) - nonclinical Israeli group: 68% (n = 70)	DDIS	Meets DDIS criteria for DDD diagnosis	(1) n = 43 (53.8%) Arab women subjected to violence had DDD. (2) n = 4 (5.9%) opiate use disorder patients had DDD. (3) n = 10 (9.7%) non-clinical controls had DDD		9.7%
Johnson et al. (2006)	United States	Adults in the community	N = 658	M = 33.1; SD = 2.9	53.0% (n = 349)	SCID-D	Meets DSM-IV criteria for DDD diagnosis	n = 5 (0.8%) participants had DDD, including 3 females and 2 males.		0.8%

[a]We recalculated the prevalence rates of DDD for all included papers. When the original papers had calculation errors in prevalence rates, we reported the correct prevalence rates in the results. We included patients with mixed DDD (i.e. dissociative amnesia+ Depersonalisation/ Derealisation) when calculating the prevalence rates. The median and interquartile range of age were reported if the original paper didn't provide mean age (SD) or age range of the sample.

[b]CDS = Cambridge Depersonalisation Scale; CDS-2 = 2-item version Cambridge Depersonalisation Scale; CDS-9 = 9-item version Cambridge Depersonalisation Scale; DDIS = Dissociative Disorders Interview Schedule; SCID-D = Structured Clinical Interview for DSM-IV Dissociative Disorders

Inpatients

In a transcultural study (Sierra et al., 2006), participants were psychiatric inpatients from three countries: United Kingdom (n = 31), Spain (n = 68), and Colombia (n = 41), assessed using the CDS. Reported prevalence rates were 41.9%, 35.8% and 17.5%, respectively.

Mixed or unspecified patients

Similar prevalence rates of DDD were found in mixed or unspecified patients: 6% in Mexico (García et al., 2006) and 4.4% in Switzerland (Mueller-Pfeiffer et al., 2012).

Results: patients with specific disorders

See Table 3. According to the nature of the disorders or conditions, similar studies were grouped together.

Anxiety disorders

Four studies provided DDD prevalence amongst patients with anxiety disorders: patients with panic disorder (Mendoza et al., 2011; Ural et al., 2015), patients with obsessive-compulsive disorder (Belli et al., 2012) and patients with social anxiety disorder (Belli et al., 2017).

Three studies were conducted in Turkey using the SCID-D (Belli et al., 2017, 2012; Ural et al., 2015) and one was conducted in Spain using the CDS (Mendoza et al., 2011). The prevalence rates ranged from 3.3% (Ural et al., 2015) to 20.2% (Mendoza et al., 2011). In those Turkish studies, the prevalence rates were 3.3% in panic disorder (Ural et al., 2015), 6.3% in social anxiety disorder (Belli et al., 2017), and 10.3% in obsessive-compulsive disorder (Belli et al., 2012). We included patients diagnosed with DDD as well as other dissociative disorders (i.e. dissociative amnesia + depersonalization) when calculating the prevalence in the two studies (Belli et al., 2017, 2012). Ural et al. (2015) reported the number of patients with DDD only, hence the prevalence rate was likely to be underestimated. However, the proportions of patients only diagnosed with DDD were relatively consistent across those three studies: 3.3% (Ural et al., 2015), 5.3% (Belli et al., 2017), and 3.84% (Belli et al., 2012). For panic disorders specifically, the prevalence rate is much higher in the Spanish population (20.2%; Mendoza et al., 2011) than the Turkish population (3.3%; Ural et al., 2015).

Dissociative spectrum disorders

There were two studies conducted among patients with dissociative spectrum disorders. However, there was a large discrepancy in the prevalence of DDD between these two populations, at 3.7% in patients with conversion disorder (Yayla et al., 2015) and 20.4% in patients with non-epileptic seizures (Mitchell et al., 2012).

Substance use disorders

Two studies explored the prevalence of DDD in patients with substance use disorders. The prevalence rates were 1.8% in the Turkish sample with alcohol dependency (Evren et al., 2007), and 5.9% in the Israeli sample with opiate use disorder (Somer et al., 2015). Most of the patients in these two studies were males, with only 5.9% females in both studies.

Interpersonal abuse

The prevalence of DDD assessed by the DDIS was 53.8% in women who had experienced domestic violence (Somer et al., 2015). Aponte-Soto et al. (2019) found a lower prevalence rate of 25% using the CDS among a sample of 40 adults with a history of interpersonal abuse.

Other specific disorders

Three studies examined the prevalence of DDD in other specific disorders. Gonzalez-Torres et al. (2010) found prevalence rates of DDD to be 16.3% in Spanish inpatients with schizophrenia or schizophrenia spectrum disorders, with 1.4% of their first-degree relatives also meeting diagnostic criteria for DDD. Another study in Serbia (Žikić et al., 2009) found the prevalence of DDD was 47.6% in people with depression, and a study of 21 Canadian outpatients with borderline personality disorder (Korzekwa et al., 2009) detected a prevalence rate of 19%, assessed by the SCID-D.

Results: prevalence assessment tools

We examined prevalence rates of DDD in each study according to the type of assessment tools used (self-reported scales versus diagnostic interviews). See Table 4

Discussion

A systematic review was conducted to examine the prevalence of DDD amongst different populations. Twenty-three studies dating from October 2002 to February 2021 were identified. The studies were mainly conducted amongst three types of populations (although some incorporated more than one type) including the general population, patients with non-specific or mixed disorders, and patients with specific disorders. The prevalence rate amongst the general population was relatively consistent across studies, with an estimate of around 1% (0.76–1.9%; Aponte-Soto et al., 2019; Schlax et al., 2020). The findings amongst patients with specific disorders or unspecified disorders were mixed; however, it is clear that DDD is more prevalent in patients with mental health conditions, as compared to the general population. For the studies conducted amongst the patients with

Table 2. Study characteristics of studies involving patients with mixed or unspecified disorders.

Patient type	Authors & Year of publication	Country	population	Sample size	Mean age (SD) /age range	% female (n)	Prevalence assessment method	Cut-off score	Results from original papers	Notes	Prevalence among patients (%)
Outpatients											
	Dorahy et al. (2006)	Northern Ireland	adult psychiatric patients aged 18–65	N = 20	M = 40.7; SD = 8.8; range = 26–57	95% (19)	DDIS	Meets DDIS criteria for DDD diagnosis	(1) n = 2 (10%) patients diagnosed with depersonalisation disorder, (2) n = 2 (10%) patients with depersonalisation disorder and dissociative amnesia	**new prevalence = (2 + 2)/20 = 20%	20%
	Foote et al. (2006)	United States	inner-city outpatient psychiatric population aged 18–65	N = 82 ** 231 eligible participants in original sample, but only 82 were interviewed with the DDIS	M = 37.4; SD = 11.4 (for entire sample of 231)	64% (147 of 231)	DDIS	Meets DDIS criteria for DDD diagnosis	Among 82 patients who were interviewed met the criteria for a DSM-IV dissociative disorder diagnosis, 4 (5%) patients had a diagnosis of depersonalisation disorder		5%
Inpatients											

(*Continued*)

Table 2. (Continued).

Patient type	Authors & Year of publication	Country	population	Sample size	Mean age (SD) /age range	% female (n)	Prevalence assessment method	Cut-off score	Results from original papers	Notes	Prevalence among patients (%)
Outpatients											
	Sierra et al. (2006)	United Kingdom, Spain, and Colombia	psychiatric inpatients aged 18–65	N = 140; - n = 31 from United Kingdom - n = 68 from Spain - n = 41 from Colombia	UK: M = 38.52; SD = 13 Spain: M = 35.13; SD = 9 Colombia: M = 33.78, SD = 13	47.9% (67) - UK: 45.2% (14) - Spain: 44.1% (30) - Colombia: 56.1% (23)	CDS (English version for UK group and Spanish version for Spanish and Colombian groups)	71 (>70)	(1)13 (41.9%) patients from UK scored above 70 in CDS (2)24 (35.8%) patients from Spain scored above 70 in CDS (3)7 (17.5%) patients from Colombia scored above 70 in CDS		41.9% in UK inpatients; 35.8% in Spain inpatients; 17.5% in Colombia inpatients
Mixed or unspecified patients											
Not mentioned	Garcia et al. (2006)	Mexico	Mexican psychiatric patients receiving treatment aged 18–63	N = 100	M = 32.4; SD = 12.5; range = 18–63	63% (63)	DDIS	Meets DDIS criteria for DDD diagnosis	n = 6 (6%) patients diagnosed with depersonalisation disorder		6%
Outpatients and day care patients	Mueller-Pfeiffer et al. (2012)	Switzerland	psychiatric outpatients and day care patients	N = 160	Median = 32.0	67.3% (107)	SCID-D	Meets DSM-IV criteria for DDD diagnosis	n = 7 (out of a possible 160) individuals diagnosed with depersonalisation disorder (4.4%), and all are female		4.4%

[a]We recalculated the prevalence rates of DDD for all included papers. When the original papers had calculation errors in prevalence rates, we reported the correct prevalence rates in the results. We included patients with mixed DDD (i.e. dissociative amnesia+ Depersonalisation/ Derealisation) when calculating the prevalence rates. The median and interquartile range of age were reported if the original paper didn't provide mean age (SD) or age range of the sample.

[b]CDS = Cambridge Depersonalisation Scale; DDIS = Dissociative Disorders Interview Schedule; SCID-D = Structured Clinical Interview for DSM-IV Dissociative Disorders

unspecified or mixed disorders, the prevalence rates ranged from 4.4% (Mueller-Pfeiffer et al., 2012) to 41.9% (Sierra et al., 2006). In those patients with specific disorders, prevalence rates varied from 1.8% (Evren et al., 2007) to 53.8% (Somer et al., 2015).

Compared with the review by Hunter et al. (2004), this review only included studies focusing on the prevalence rates of clinical DDD. One strength of the current study is that a review protocol was developed prior to beginning the literature search, and papers were screened based on the specific inclusion criteria. Additionally, only high or moderate quality papers using standardized assessment tools or scales with high reliability and validity were included.

Around half of the studies used structured clinical interviews (e.g. DDIS, SCID-D) to diagnose the participants. It is worth noting that the overall prevalence rates of DDD were higher in studies diagnosing participants by self-report scales, which may lead to overestimation of DDD prevalence.

The higher prevalence rate of 9.7% in Israel (Somer et al., 2015) could be due to some unique social causes in the Middle East, such as wars and conflicts (Pocock, 2017), which will cause traumatic experiences and stress that may increase the risk of DDD. Our findings show that DDD is more prevalent in the younger population, with a prevalence of around 11%, consistent with existing evidence that dissociative symptoms are more prevalent in adolescents (Carlson & Putnam, 1993). High levels of anxiety in the mid-teens (Abe & Suzuki, 1986) could be a potential factor when explaining the higher prevalence of DDD in the younger population, as existing literature suggests that depersonalization is associated with anxiety in the general population (Trueman, 1984).

The prevalence of DDD in outpatient and inpatient samples propose that DDD is more common in patients with more severe mental health conditions. The wide range of prevalence rate of DDD in patients with other dissociative spectrum disorders may be accounted for by the variations in diagnostic measures used; for example, Yayla et al. (2015) used the SCID-D while Mitchell et al. (2012) used the self-reported scale. In this case, the high prevalence of 20% in the study by Mitchell et al. (2012) could be caused by patient overestimation of their symptoms. The types of dissociation found in conversion disorder could be another possible factor for the low prevalence of DDD in patients with conversion disorder (Yayla et al., 2015). According to Holmes et al. (2005), detachment and compartmentalization (i.e. normally integrated cognitive or physical functions are disconnected) are two qualitatively different categories of dissociation. In this case, conversion disorder, which is characterized by compartmentalization, differs from DDD, which is characterized by detachment.

There is consistent evidence that DDD is prevalent in those who have experienced interpersonal abuse. As the interpersonal abuse experience is unlikely to be the consequence of the DDD, one can speculate that interpersonal abuse may be a risk factor for DDD.

Table 3. Study characteristics of the studies involving patients with specific disorders.

Specific Disorders	Authors & Year of publication	Country	Population	Patient type	Sample size	Mean age (SD) / age range	Gender (% female)	Prevalence assessment method	Cut-off score	Results from original papers	Notes	prevalence (%)
Anxiety Disorders												
Panic disorder	Mendoza et al. (2011)	Spain	Adult patients with panic disorders (with and without agoraphobia)	Outpatients	N = 104	M = 37.5; SD = 8.8	71.1% (75)	CDS (Spanish version)	70 (≥70)	n = 21 (20.2%) had a CDS score higher than 69 during the panic attack, including 2 males and 19 females		20.2%
Panic disorder	Ural et al. (2015)	Turkey	Psychotropic drug-naïve adult patients with panic disorder	Outpatients	N = 92	M = 31.98; SD = 7.32; range = 18–52	63.0% (58)	SCID-D (Turkish version)	Meets DSM-IV criteria for DDD diagnosis	n = 3 (3.3%) diagnosed with depersonalisation disorder according to the SCID-D.		3.3%
Social anxiety disorder	Belli et al. (2017)	Turkey	Psychotropic drug-naïve patients with social anxiety disorder (SAD)	Outpatients	N = 94 - low Dissociation Questionnaire score (< 2.5): n = 56 - high Dissociation Questionnaire score (>2.5): n = 38	Not given	55.32% (52)	SCID-D (Turkish version)	Meets DSM-IV criteria for DDD diagnosis	(1) n = 30 (31.91%) of the 94 patients were found to have dissociative disorder comorbidity (2) n = 5 (5.3%) patients had depersonalisation disorder; (3) One patient (1.0%) had dissociative amnesia and depersonalisation,	**new prevalence = (5 + 1)/94 = 6.3%	6.3%

(*Continued*)

Table 3. (Continued).

Specific Disorders	Authors & Year of publication	Country	Population	Patient type	Sample size	Mean age (SD) / age range	Gender (% female)	Prevalence assessment method	Cut-off score	Results from original papers	Notes	prevalence (%)
Anxiety Disorders												
Obsessive-compulsive disorder	Belli et al. (2012)	Turkey	Patients with obsessive-compulsive disorder (OCD)	Outpatients	N = 78	M = 31.22; SD = 8.83; range = 18–54	76.9% (60)	SCID-D (Turkish version)	Meets DSM-IV criteria for DDD diagnosis	(1) n = 3 patients (3.84%) were diagnosed as having with dissociative depersonalisation disorder (2) 3 patients (3.84%) were diagnosed as having dissociative amnesia disorder + dissociative depersonalisation disorder; 1 patient (1.28%) was diagnosed as having dissociative depersonalisation disorder + dissociative identity disorder, and 1 patient (1.28%) was diagnosed as having dissociative amnesia disorder + dissociative depersonalisation disorder + dissociative identity disorder	**new prevalence = (3 + 3 + 1 + 1)/78 = 10.26%	10.26%
Dissociative spectrum disorders												

(*Continued*)

Table 3. (Continued).

Specific Disorders	Authors & Year of publication	Country	Population	Patient type	Sample size	Mean age (SD) / age range	Gender (% female)	Prevalence assessment method	Cut-off score	Results from original papers	Notes	prevalence (%)
Anxiety Disorders												
Conversion disorder	Yalya et al. (2015)	Turkey	Patients with conversion disorder (CD) aged 18–65	Outpatients	N = 54: -people diagnosed with dissociative disorders (DD+): n = 20 - people without dissociative disorders (DD-): n = 34	- DD+: M = 28.05; SD = 7.54; - DD-: M = 29.21; SD = 8.05	90.7% (49)	SCID-D	Meets DSM-IV criteria for DDD diagnosis	n = 2 (3.7%) participants had DDD	**in original paper, the prevalence was 3.7% in abstract but 1.08% in result part. Correct prevalence = 2/54 = 3.7%	3.7%
Non-epileptic attack disorder	Mitchell et al. (2012)	United Kingdom	Adult patients with non-epileptic attack disorder (NEAD)	Not given	N = 50: - NEAD only: n = 39 - dual diagnosis: n = 11	Total sample: M = 42.0; SD = 14.5. - NEAD only: M = 41.6; SD = 15.1 - Dual diagnosis: M = 43.4; SD = 12.4	70% (35) - NEAD only:69.2% (27) - Dual diagnosis: 72.7% (8)	Derealisation/ Depersonalisation subscale of DES	sub-score ≥30	20.4% of the sample reported pathological levels of depersonalisation and derealisation symptoms (sub-score≥30).	**didn't report specific number	20.4%
Substance use disorders												
Alcohol dependence	Evren et al. (2007)	Turkey	Inpatients with alcohol dependency	Inpatients	N = 111	M = 43.6; SD = 9.9; range = 18–68	5.4% (6)	SCID-D (Turkish version)	Meets DSM-IV criteria for DDD diagnosis	(1) n = 1 (0.9%) patient diagnosed with a depersonalisation disorder. (2) 1 patient had amnesia and derealisation	**new prevalence = (1 + 1)/111 = 1.8%	1.8%

(*Continued*)

Table 3. (Continued).

Specific Disorders	Authors & Year of publication	Country	Population	Patient type	Sample size	Mean age (SD) / age range	Gender (% female)	Prevalence assessment method	Cut-off score	Results from original papers	Notes	prevalence (%)
Anxiety Disorders												
Opiate use disorder	Somer et al. (2015)	Israel	(1) patients with opiate use disorder (2) Arab women subjected to domestic violence (3) Non-clinical controls from a community sample (graduate students and their friends and family members)	Inpatients	N = 261 - Arab women: n = 80; - OUD patients: n = 68; - nonclinical: n = 103	- Arab women: M = 33.29; - OUD patients: M = 32.44; - Nonclinical: M = 34.80	59% (154) - Arab women group: 100% (80) - OUD patient group: 5.9% (4) - Nonclinical Israeli group: 68% (70)	DDIS	Meets DDIS criteria for DDD diagnosis	(1) n = 43 (53.8%) Arab women subjected to violence had DDD (2) n = 4 (5.9%) opiate use disorder patients had DDD (3) n = 10 (9.7%) non-clinical controls had DDD		5.9%
Interpersonal abuse												

(*Continued*)

Table 3. (Continued).

Specific Disorders	Authors & Year of publication	Country	Population	Patient type	Sample size	Mean age (SD) / age range	Gender (% female)	Prevalence assessment method	Cut-off score	Results from original papers	Notes	prevalence (%)
Anxiety Disorders												
Domestic violence	Somer et al. (2015)	Israel	(1) Opiate use disorder patients (2) Arab women subjected to domestic violence (3) Non-clinical controls from a community sample (graduate students and their friends and family members)	Inpatients	N = 261 - Arab women: n = 80; - OUD patients: n = 68; - nonclinical: n = 103	- Arab women: M = 33.29; - OUD patients: M = 32.44; - Nonclinical: M = 34.80	59% (154) - Arab women group: 100% (80) - OUD patient group: 5.9% (4) - nonclinical Israeli group: 68% (70)	DDIS	Meets DDIS criteria for DDD diagnosis	(1)n = 43 (53.8%) Arab women subjected to violence had DDD (2) n = 4 (5.9%) opiate use disorder patients had DDD (3) n = 10 (9.7%) non-clinical controls had DDD		53.8%
Interpersonal abuse	Aponte-Soto et al. (2019)	Puerto Rico	Hispanic adults with and without a history of interpersonal abuse - participants with a history of interpersonal abuse (HIA); - control community group (CCG) without HIA	participants from mental health clinics	80 - HIA: n = 40 - CCG: n = 40	M = 31.00; SD = 9.9; range = 21–65	65% (52) - HIA: 65% (26) - CCG: 65% (26)	CDS (Spanish version)	70 (>70)	(1)25% of HIA group scored > 70 on CDS (2) No participants scored >70 on CDS in the CCG group	**didn't report specific number	25%
Other specific disorders												

(*Continued*)

Table 3. (Continued).

Specific Disorders	Authors & Year of publication	Country	Population	Patient type	Sample size	Mean age (SD) / age range	Gender (% female)	Prevalence assessment method	Cut-off score	Results from original papers	Notes	prevalence (%)
Anxiety Disorders												
Depression	Zikic et al. (2009)	Serbia	Patients suffering from unipolar depression without psychotic features aged 18–65	inpatients and outpatients	N = 84	DP group: M = 44.5; low DP group (scored lower than 70): M = 45.7	76.2% (64)	CDS	70(≥70)	n = 40 (47.6%) subjects scored higher or equal to 70, including 8 males (20%) and 32 females (80%)		47.6%
Schizophrenia or schizophrenia spectrum disorders	Gonzalez-Torres et al. (2010)	Spain	(1) Patients with schizophrenia or schizophrenia spectrum disorders (2) First-degree healthy relatives with no psychiatric history (3) Healthy controls from the general population	inpatients	N = 392: - n = 147 patients; - n = 73 first-degree relatives; - n = 172 control subjects	Overall: Median = 30.0, interquartile range = 24–42 - Patients: Median = 32, interquartile range = 25–40 - Relatives: Median = 35.5, interquartile range = 28–43.3 - Controls: Median = 27, interquartile range = 23–40.3	Not given	CDS (Spanish version)	71	(1) Among 141 patients, n = 24 (17%) had DDD according to the cut-off point of 71. (2) Among 71 relatives, n = 1 (1%) had DDD according to the cut-off point of 71. (3) Among 172 controls, n = 2 (3%) had DDD according to the cut-off point of 71.	** errors in calculation in original paper. Correct prevalence were: (1) patients: 24/ 147 = 16.3% (3) controls: 2/ 172 = 1.16%.	16.3% in patients with schizophrenia or schizophrenia spectrum disorders; 1% in relatives of patients;
Borderline personality disorder	Korzekwa et al. (2009)	Canada	Adult patients with borderline personality disorder (BPD)	outpatients	N = 21 **54 eligible patients (BPD) but only 21 patients completed the SCID-D-R	M = 38; SD = 8 * for N = 21	76%	SCID-D	Meets DSM-IV criteria for DDD diagnosis	n = 4 (19%) patients with BPD had DDD according to SCID-D-R		19%

[a]We recalculated the prevalence rates of DDD for all included papers. When the original papers had calculation errors in prevalence rates, we reported the correct prevalence rates in the results. We included patients with mixed DDD (i.e. dissociative amnesia+ Depersonalisation/ Derealisation) when calculating the prevalence rates. The median and interquartile range of age were reported if the original paper didn't provide mean age (SD) or age range of the sample.

[b]CDS = Cambridge Depersonalisation Scale; DES = Dissociation Experiences Scale; DDIS = Dissociative Disorders Interview Schedule; SCID-D = Structured Clinical Interview for DSM-IV Dissociative Disorders.

The high prevalence of DDD in depressive patients should be interpreted carefully, as Žikić et al. (2009) assessed DDD prevalence using the CDS and some of these items overlap with depressive symptoms, which may lead to overestimation of DDD. Additionally, the findings amongst people with substance use should be treated with caution, as drug use could trigger experiences of depersonalization and derealization (Madden & Einhorn, 2018) and drug-induced depersonalization is similar to non-drug-induced depersonalization (Medford et al., 2003).

Clinical & empirical relevance

The finding that DDD is more prevalent in patients with other mental disorders and patients with more severe mental health conditions echo hypotheses by Mula et al. (2007) that depersonalization may represent an index of disease severity. However, DDD is severely neglected in clinical settings as clinicians are unfamiliar with its features and treatment and a misdiagnosis could be made due to the overlap between DDD and depression (Michal et al., 2016). Clinicians should be aware of the possibility of DDD when diagnosing patients and consider the influence of comorbidity when treating patients. For instance, depersonalization is related to treatment resistance in anxiety disorders and depression (Mula et al., 2007). Beyond this, there is a severe dearth of effective treatments for DDD as a primary or secondary diagnosis. Interventions specifically aimed at DDD and evidence of treatment effectiveness are needed. Moreover, although the existing literature indicates that DDD has a high comorbidity with anxiety disorders and depression (Michal et al., 2016), limited studies focus on the presence of DDD in patients already diagnosed with other mental disorders and how DDD may interact with these other disorders, affecting the severity of symptoms, response to treatment and prognosis.

Limitations & future directions

This review has some limitations. Firstly, we did not measure publication bias. As negative findings, (i.e. studies that did not detect participants diagnosed with DDD) are less likely to be published, the prevalence of DDD could be overestimated. Secondly, considering the high heterogeneity of included studies (i.e. the variability of the study population), we did not conduct a meta-analysis. The small number of included studies is another limitation. For instance, we only found one paper involving patients with depression, thus the results could be unrepresentative. Beyond this, although we have assessed the quality of the included papers, the potential selection bias and response bias still existed. Specifically, according to the quality assessment results, almost half of the included studies were at risk of response bias. In addition, all of the included

Table 4. The specific prevalence assessment tools and the results (prevalence rates) in studies using self-reported scales and diagnostic interviews.

Prevalence assessment tools	Authors (year of publication)	Prevalence (%)
Studies using self-reported scales		
Cambridge Depersonalisation Scale	Sierra et al. (2006)	41.9% in UK inpatients;35.8% in Spain inpatients; 17.5% in Colombia inpatients
	Zikic et al. (2009)	47.6%
	Myers & Llera (2020)	11%
	Aponte-Soto et al. (2019)	25% in participants with a history of interpersonal abuse; 0% in control group
Cambridge Depersonalisation Scale (Spanish version)	Gonzalez-Torres et al. (2010)	16.3% in patients with schizophrenia or schizophrenia spectrum disorders; 1% in relatives of patients; 1.16% in healthy control
	Mendoza et al. (2011)	20.2%
2-item Cambridge Depersonalisation Scale (CDS-2)	Michal, Wiltink, Till, Wild, Blettner, et al., 2010. (2010)	0.8%
	Michal et al. (2015)	11.9%
	Schlax et al. (2020)	0.76%
9-item Cambridge Depersonalisation Scale (CDS-9)	Michal et al. (2009)	1.9%
Derealisation/Depersonalisation subscale of Dissociation Experiences Scale (DES)	Mitchell et al. (2012)	20.4%
Studies using diagnostic interviews		
Dissociative Disorders Interview Schedule (DDIS)	Garcia et al. (2006)	6%
	Dorahy et al. (2006)	10%
	Foote et al. (2006)	5%
	Somer et al. (2015)	53.8% in Arab women 5.9% in OUD patients 9.7% in the nonclinical group
Structured Clinical Interview for DSM-IV Dissociative Disorders (SCID-D)	Mueller-Pfeiffer et al. (2012)	4.4%
	Korzekwa et al. (2009)	19%
	Belli et al. (2012)	3.84%
	Johnson et al. (2006)	0.8%
	Yalya et al. (2015)	3.7%
	Ural et al. (2015)	3.3%
SCID-D (Turkish version)	Evren et al. (2007)	0.9%
	Belli et al. (2017)	5.3%

studies were published in English and there was a lack of studies from Australia, Southeast Asia, Central America, and African countries. Future research could focus on the prevalence of DDD in those settings and explore whether different cultural backgrounds have an impact. It should be noted that our review only provided descriptive epidemiological information about the frequency of DDD. Therefore, although we establish an association between DDD and potential risk factors, we still cannot infer any causal relationships between them.

Conclusion

This review summarizes the results of epidemiological studies, providing an update to our knowledge of the prevalence of DDD amongst different populations. The included studies were from a range of countries, allowing for a broader understanding of the prevalence rate of DDD across the globe. Overall, results

indicate that the prevalence rate of DDD ranges from 1% to 2% in the general population, remaining consistent with previous findings (Hunter et al., 2004). We also find a trend that DDD is more prevalent amongst adolescents and young adults. Although the prevalence rates amongst patients with unspecified or specific disorders varies, it remains consistent that DDD is more prevalent in patients with mental health conditions than in the general population, suggesting that patients who already have other diagnoses are more vulnerable to DDD.

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Appendix

Appendix 1: Systematic review protocol in PROSPERO format

Review Title

The prevalence of depersonalization and derealization (DP/DR) disorders: a systematic review

Review question

What are the prevalence rates of DP/DR disorders in different population (e.g. non-clinical population, patients with mixed or unspecified disorders, and patients within specific disorders)?

Searches

Databases

The following databases will be searched and reviewed:

MEDLINE

PsycINFO

Web of science.

These databases will be combined and searched. Grey literature will also be searched in Google Search to ensure that other relevant literature not retrieved in electronic databases can be covered.

Before the final analysis, the search process will be repeated to include new published literature and avoid any potential mistakes in first search.

Search terms

Concept 1: depersonalization OR derealization OR depersonalisation OR derealisation OR Depersonalization/Derealization Disorder OR Depersonalisation disorder OR Depersonalization Disorder OR derealization disorder OR derealisation disorder

Concept 2: epidemiolog* OR prevalen* OR occurrence OR frequency

Both UK and US spellings will be searched. Within each concept, the Boolean operator "OR" will be used to group all the search terms within the corresponding concept, and the Boolean operator "AND" will be used to combine two concepts.

Limitation

All searches will be limited to humans and English language. The results will be limited to studies published after October 2002. The deduplication process will be conducted after finishing the search.

Types of study to be included

We will only include quantitative studies that provide prevalence rates of DP/DR disorders or provide information to calculate prevalence rates. Reviews will be excluded but the reference lists of reviews will be manually checked to retrieve relevant studies.

Condition or domain being studied

Inclusion: Eligible studies must focus on the prevalence rate of DP/DR disorders, which is defined by structured clinical interviews using DSM-IV, DSM-V or ICD-10 criteria, such as the Structured Clinical Interview for DSM-IV Dissociative Disorders (SCID-D; Steinberg, 1994) and the Dissociative Disorders Interview Schedule (DDIS; Ross et al., 1989). Additionally,

studies that used Cambridge Depersonalisation Scale (CDS; Sierra &Berrios, 2000) and taxon version of Dissociation Experiences Scale (DES; Bernstein and Putnam, 1986) and provided clinical cut-off scores (70 for CDS and 13 for taxon DES) will also be included. Studies using the 2-item version CDS (CDS-2; Sierra and Berrios, 2000; Michal, Wiltink, Till, Wild, Blettner, et al., 2010) with a cut-off of 3 and the 9-item version CDS with a cut-off of 19 (CDS-9; Sierra and Berrios, 2000; Michal et al., 2004) are also accepted. The outcome of eligible studies should include the prevalence rate of DP/DR disorders.

Exclusion: Studies that focus on the relationship between DP/DR disorders and risk factors will be excluded. Studies that only provide prevalence rates of other mental disorders will be excluded. Studies that only give prevalence of symptoms of DP/DR without a standardized measures and clinical cut-off will be excluded. Studies that focus on burnout or burnout syndrome will also be excluded.

Participants/population

Inclusion: Both clinical and non-clinical population will be included.

Exclusion: N/A

Intervention(s)

N/A

Comparator(s)/control

N/A

Context

Geographical locations are not limited.

Main outcome(s)

The main outcome is the prevalence rates of DP/DR disorders. Studies that do not provide prevalence or the information that can be used to calculate prevalence will be excluded. For studies that only provide information to calculate prevalence rates, prevalence will be calculated by dividing the number of people identified as having DP/DR disorders by the total sample size.

Secondary outcome(s)

None.

Data extraction (selection and coding)

The search results will be deduplicated, downloaded and imported to Endnote 7 for storing and screening. Two independent reviewers will screen the titles and abstracts of the identified papers against the pre-specified criteria. Reviewers will record the titles of the excluded studies and reasons of excluding them. Then, these reviewers will retrieve the full texts of the remained studies and assess their eligibility using the criteria. The disagreements about inclusion will be resolved by discussion with a third reviewer.

Data extraction will be conducted by the reviewers using a standardized form, which is adapted from Cochrane Data collection form template (Higgins et al., 2022). Extracted information included authors, year of publication, country, study population, sample size, mean age (SD) or age range of the study sample, prevalence assessment methods and cut-off score, and relevant results of the study (prevalence rates of DDD). Any discrepancies between two reviewers will be resolved through discussion with a third reviewer.

Risk of bias (quality) assessment

To assess the quality of prevalence studies, Quality assessment checklist for prevalence studies (adapted from Hoy et al.) will be used. The checklist includes nine domains (items 1 to 9) and the scores of these items will be combined to generate an overall score to provide an overall assessment of the study quality (item 10). In each domain, reviewer will provide information about whether the risk of bias is low or high. A score of zero in each item indicates low risk in corresponding domain, while a score of one indicates high risk. A low overall risk

will be indicated by an overall score between zero to three, while a high overall risk will be indicated by an overall score between seven to nine. An overall score between four to six indicates a moderate overall risk of the study.

An intraclass correlation coefficient will be calculated to indicate the inter-rater reliability of risk of bias assessment results. Any disagreement between reviewers will be resolved by a discussion with a third reviewer. The final result of risk of bias will be presented in an independent table.

Strategy for data synthesis

We will conduct a narrative analysis to provide findings from selected studies. The study population characteristics (e.g. age, sample size, gender), settings, prevalence assessment methods and prevalence rates will be synthesized.

Analysis of subgroups or subsets

Subgroup analysis will be conducted to explore the prevalence rates among non-clinical population, clinical population with unspecified or mixed disorders and clinical population within specific disorders.

Type and method of review

Systematic review

Anticipated or actual start date

15/03/2020

Anticipated completion date

01/08/2020

Funding sources/sponsors

University College London, Division of Psychiatry

Conflicts of interest

None known

Language

English

Country

England

Stage of review

Review completed

Appendix 2: Original search history

Database: APA PsycInfo <1806 to March Week 4 2020>

Search Strategy:

– –

1 (depersonalization or derealization or depersonalisation or derealisation or Depersonalisation disorder or Depersonalization Disorder or derealization disorder or derealisation disorder).mp. [mp = title, abstract, heading word, table of contents, key concepts, original title, tests & measures, mesh] (4368)

2 exp Depersonalization/ or exp "Depersonalization/Derealization Disorder"/ (933)

3 1 or 2 (4368)

4 (epidemiolog* or prevalen* or occurrence or frequency).mp. [mp = title, abstract, heading word, table of contents, key concepts, original title, tests & measures, mesh] (409,186)

5 3 and 4 (596)

6 limit 5 to (human and English language and yr = "2002 – Current") (348)

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Database: Ovid MEDLINE (R) <1946 to March Week 3 2020>

Search Strategy:

– –

1 (depersonalization or derealization or depersonalisation or derealisation or Depersonalisation disorder or Depersonalization Disorder or derealization disorder or derealisation disorder).mp. [mp = title, abstract, original title, name of substance word, subject heading word, floating sub-heading word, keyword heading word, organism supplementary concept word, protocol supplementary concept word, rare disease supplementary concept word, unique identifier, synonyms] (3020)

2 Depersonalization/ (1547)

3 1 or 2 (3020)

4 (epidemiolog* or prevalen* or occurrence or frequency).mp. [mp = title, abstract, original title, name of substance word, subject heading word, floating sub-heading word, keyword heading word, organism supplementary concept word, protocol supplementary concept word, rare disease supplementary concept word, unique identifier, synonyms] (2,912,240)

5 3 and 4 (971)

6 limit 5 to (English language and humans and yr = "2002–Current") (664)

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Web of Science core collection

Search History

Set	Results	Save History/Create AlertOpen Saved History	Edit Sets	Combine Sets AND OR Combine	Delete Sets Select AllDelete
# 3	774	#2 AND #1 *Indexes = SCI-EXPANDED, SSCI, A&HCI, CPCI-S, CPCI-SSH, BKCI-S, BKCI-SSH, ESCI, CCR-EXPANDED, IC Timespan = 2002–2020*	Edit		
# 2	3,769	TS = (depersonalization OR derealization OR depersonalisation OR derealisation OR Depersonalization/Derealization Disorder OR Depersonalisation disorder OR Depersonalization Disorder OR derealization disorder OR derealisation disorder) *Indexes = SCI-EXPANDED, SSCI, A&HCI, CPCI-S, CPCI-SSH, BKCI-S, BKCI-SSH, ESCI, CCR-EXPANDED, IC Timespan = All years*	Edit		
# 1	3,974,514	TS = (epidemiolog* OR prevalen* OR occurrence OR frequency) *Indexes = SCI-EXPANDED, SSCI, A&HCI, CPCI-S, CPCI-SSH, BKCI-S, BKCI-SSH, ESCI, CCR-EXPANDED, IC Timespan = All years*	Edit		

Appendix 3: Quality assessment tool (Hoy et al., 2012; Nguyen et al.,2016)

Name of author(s): Year of publication: Study title:		
Risk of bias items	**Risk of bias levels**	**Points scored**
1. Was the study's target population a close representation of the national population in relation to relevant variables, e.g. age, sex, occupation?	**Yes (LOW RISK)**: The study's target population was a close representation of the national population.	0
	No (HIGH RISK): The study's target population was clearly NOT representative of the national population.	1
2. Was the sampling frame a true or close representation of the target population?	**Yes (LOW RISK)**: The sampling frame was a true or close representation of the target population.	0
	No (HIGH RISK): The sampling frame was NOT a true or close representation of the target population.	1
3. Was some form of random selection used to select the sample, OR, was a census undertaken?	**Yes (LOW RISK)**: A census was undertaken, OR, some form of random selection was used to select the sample (e.g. simple random sampling, stratified random sampling, cluster sampling, systematic sampling).	0
	No (HIGH RISK): A census was NOT undertaken, AND some form of random selection was NOT used to select the sample.	1
4. Was the likelihood of non-response bias minimal?	**Yes (LOW RISK)**: The response rate for the study was ≥75%, OR, an analysis was performed that showed no significant difference in relevant demographic characteristics between responders and non- responders	0
	No (HIGH RISK): The response rate was <75%, and if any analysis comparing responders and non-responders was done, it showed a significant difference in relevant demographic characteristics between responders and non-responders	1
5. Were data collected directly from the subjects (as opposed to a proxy)?	**Yes (LOW RISK)**: All data were collected directly from the subjects.	0
	No (HIGH RISK): In some instances, data were collected from a proxy.	1
6. Was an acceptable case definition used in the study?	**Yes (LOW RISK)**: An acceptable case definition was used.	0
	No (HIGH RISK): An acceptable case definition was NOT used	1
7. Was the study instrument that measured the parameter of interest (e.g. prevalence of low back pain) shown to have reliability and validity (if necessary)?	**Yes (LOW RISK)**: The study instrument had been shown to have reliability and validity (if this was necessary), e.g. test-re- test, piloting, validation in a previous study, etc.	0
	No (HIGH RISK): The study instrument had NOT been shown to have reliability or validity (if this was necessary).	1
8. Was the same mode of data collection used for all subjects?	**Yes (LOW RISK)**: The same mode of data collection was used for all subjects.	0
	No (HIGH RISK): The same mode of data collection was NOT used for all subjects.	1
9. Were the numerator(s) and denominato r(s) for the parameter of interest appropriate	**Yes (LOW RISK)**: The paper presented appropriate numerator(s) AND denominator(s) for the parameter of interest (e.g. the prevalence of low back pain).	0
	No (HIGH RISK): The paper did present numerator(s) AND denominator(s) for the parameter of interest but one or more of these were inappropriate.	1
10. Summary on the overall risk of study bias	**LOW RISK**	0-3
	MODERATE RISK	4-6
	HIGH RISK	7-9

Appendix 4: Results of quality assessment

Table A1. Results of quality assessment (risk of bias) of 22 included papers.

Authors	Year of publication	1. Was the study's target population a close representation of the national population in relation to relevant variables, e.g. age, sex, occupation?	2. Was the sampling frame a true or close representation of the target population?	3. Was some form of random selection used to select the sample, OR, was a census undertaken?	4. Was the likelihood of non-response bias minimal?	5. Were data collected directly from the subjects (as opposed to a proxy)?	6. Was an acceptable case definition used in the study?	7. Was the study instrument that measured the parameter of interest (e.g. prevalence of low back pain) shown to have reliability and validity (if necessary)?	8. Was the same mode of data collection used for all subjects?	9. Were the numerator (s) and denominator(s) for the parameter of interest appropriate?	Summary score on the overall risk of study bias
Ural et al.	2015	1	0	0	0	0	1	0	0	0	2
Mendoza et al.	2011	1	0	1	1	0	0	0	0	0	3
Gonzalez-Torres et al.	2010	1	1	1	1	0	0	0	0	1	5
Sierra et al.	2006	1	0	1	1	0	0	0	0	0	3
Zikic et al.	2009	1	1	0	0	0	1	0	0	0	3
Garcia et al.	2006	1	1	1	0	0	1	0	0	0	4
Korzekwa et al.	2009	1	0	0	0	0	1	0	0	0	2
Johnson et al.	2006	1	0	0	1	0	1	0	0	1	4
Evren et al.	2007	1	0	0	0	0	1	0	0	0	2
Somer et al.	2015	1	0	1	1	0	1	0	0	1	5
Mitchell et al.	2012	1	0	0	0	0	1	0	0	1	3
Belli et al.	2012	1	0	0	0	0	1	0	0	0	2
Michal et al.	2010	1	0	0	1	0	1	0	0	0	3
Dorahy et al.	2006	1	1	1	0	0	1	0	0	0	4

(*Continued*)

Table A1. (Continued).

Authors	Year of publication	1. Was the study's target population a close representation of the national population in relation to relevant variables, e.g. age, sex, occupation?	2. Was the sampling frame a true or close representation of the target population?	3. Was some form of random selection used to select the sample, OR, was a census undertaken?	4. Was the likelihood of non-response bias minimal?	5. Were data collected directly from the subjects (as opposed to a proxy)?	6. Was an acceptable case definition used in the study?	7. Was the study instrument that measured the parameter of interest (e.g. prevalence of low back pain) shown to have reliability and validity (if necessary)?	8. Was the same mode of data collection used for all subjects?	9. Were the numerator (s) and denominator(s) for the parameter of interest appropriate?	Summary score on the overall risk of study bias
Mueller-Pfeiffer et al.	2012	1	0	0	0	0	0	0	0	0	1
Belli et al.	2017	1	0	0	0	0	1	0	0	0	2
Michal et al.	2015	1	0	0	0	0	0	0	0	0	1
Foote et al.	2006	1	0	0	0	0	1	0	0	0	2
Michal et al.	2009	0	0	0	1	0	0	0	0	0	1
Yalya et al.	2015	1	0	1	1	0	1	0	0	0	4
Aponte-Soto et al.	2019	1	0	1	1	0	0	0	0	1	4
Myers & Llera	2020	1	1	1	1	0	1	0	0	0	5
Schlax et al.	2020	1	0	0	0	0	0	0	0	0	1

[a] Low risk of bias: overall score of 0-3; Moderate risk of bias: overall score of 4-6; High risk of bias: overall score of 7-9
[a] Low risk of bias: overall score of 0–3; Moderate risk of bias: overall score of 4–6; High risk of bias: overall score of 7–9