

Patient-reported outcomes in obsessive-compulsive disorder

Mythily Subramaniam, MHSM; Pauline Soh, BA; Clarissa Ong, BA; Lee Seng Esmond Seow, BA; Louisa Picco, MPH; Janhavi Ajit Vaingankar, MSc; Siow Ann Chong, MMed



The purpose of the article was to provide an overview of patient-reported outcomes (PROs) and related measures that have been examined in the context of obsessive-compulsive disorder (OCD). The current review focused on patient-reported outcome measures (PROMs) that evaluated three broad outcome domains: functioning, health-related quality of life (HRQoL), and OCD-related symptoms. The present review ultimately included a total of 155 unique articles and 22 PROMs. An examination of the PROs revealed that OCD patients tend to suffer from significant functional disability, and report lower HRQoL than controls. OCD patients report greater symptom severity than patients with other mental disorders and evidence indicates that PROMs are sensitive to change and may be even better than clinician-rated measures at predicting treatment outcomes. Nonetheless, it should be noted that the measures reviewed lacked patient input in their development. Future research on PROMs must involve patient perspectives and include rigorous psychometric evaluation of these measures.

© 2014, AICH – Servier Research Group

Dialogues Clin Neurosci. 2014;16:239-254.

Introduction

Obsessive-compulsive disorder (OCD) is a debilitating disorder characterized by two distinct phenomena: obsessions, which are recurrent and persistent intrusive thoughts, images, or urges (eg, pertaining to contamination, order/symmetry etc) that in most individuals cause marked anxiety or distress; and/or compulsions, which are repetitive covert or overt actions that are carried out to suppress or neutralize these distressing thoughts, images or urges (eg, checking, washing, or counting etc). More than 90% of patients with OCD have both obsessions and compulsions, although 30% suffer predominantly from obsessions and 20% predominantly with compulsions.¹ OCD has been moved from the anxiety disorders category to the obsessive-compulsive and related disorders group in the most recent edition of the *Diagnostic and Statistical Manual of Mental Disorders (DSM-5)*.² A diagnosis of OCD implies that the obsessions and compulsions are time-consuming, eg, take more than an hour a day and interfere significantly with daily, occupational, or social functioning.²

Keywords: *patient-reported outcome; obsessive-compulsive disorder; functioning; health-related quality of life; symptom*

Author affiliations: Research Division, Institute of Mental Health, Singapore

Address for correspondence: Mythily Subramaniam, Director, Research Division, Institute of Mental Health, Buangkok Green Medical Park, 10 Buangkok View, Singapore 539747 (e-mail: mythily@imh.com.sg)

Clinical research

Epidemiological studies have estimated the lifetime prevalence of OCD as ranging from 2.3% to 3.8% in the general population,³⁻⁵ with the average age of onset of the disorder to be around 20 years³⁻⁵ and a treatment gap of about 60%.⁶ Although symptoms typically wax and wane, a chronic course is the norm in the absence of adequate treatment. Comorbidity with OCD is common and associated conditions include affective disorders and anxiety disorders.⁵

OCD also causes considerable disability. While the 1990 and 2000 Global Burden of Disease (GBD) studies included three specific anxiety disorders: post-traumatic stress disorder (PTSD), panic disorder (PD), and OCD, due to the high degree of comorbidity across anxiety disorders, the 2010 GBD assessed the burden of all anxiety disorders but chose not to provide estimates for specific anxiety disorders.⁷ In the GBD 2010 study, anxiety disorders were a major global cause of years lost to disability (YLD), contributing 3.5% of all YLD. The World Health Organization estimated OCD to be the 11th leading cause of nonfatal burden in the world in 1990, accounting for 2.2% of total YLD.⁸

A patient-reported outcome (PRO) is any report of the status of a patient's health condition that comes directly from the patient, without interpretation of the patient's response by a clinician or anyone else. The outcome can be measured in absolute terms (eg, severity of a symptom, sign, or state of a disease) or as a change from a previous state.⁹ A patient-reported outcome measure (PROM), eg, a questionnaire, log, or diary is a means to capture PRO data and can be used to measure symptom severity, functioning, treatment benefits, or side effects.

PROMs are important because objective measures of disease outcome are not always available, and they reflect what is most salient to patients about their condition and its treatment. PROMs are unique indicators of the impact of disease on patients, and can empower patients by giving them a voice and decision-making capacity in evaluating the efficacy of treatment, its side effects, and affordability. PROMs are especially important in the context of mental illnesses such as OCD because their symptoms may not always be perceptible to others. Indeed, the time taken up by obsessions or compulsions as well as the extent of distress experienced can only be reported by patients themselves. Similarly, treatment effectiveness is best reported by patients as improvements on clinician-rated measures may not

correspond to how the patient functions or feels. Clinicians may overlook the negative side effects of treatment, which are often the reason for noncompliance.

A number of PROs have been reported among OCD patients. While some of the PROMs are generic and include questions designed to summarize perceived health in relation to broad life domains, others are condition-specific. Examples of generic instruments include the Medical Outcomes Study 36-Item Short-Form Health Survey (SF-36)¹⁰ and the World Health Organization Quality of Life BREF (WHOQOL-BREF).¹¹ On the other hand, condition-specific instruments such as the Obsessive-Compulsive Inventory (OCI)¹² mainly evaluate symptom domains directly associated with OCD.

The aim of this systematic review was to present an overview of PROs in the context of OCD. It includes the constructs, corresponding scales, and key findings related to PROs in OCD patients.

Methodology

Index terms for PROs differ between the major bibliographic databases. It has been suggested that review authors should not rely on a single index or subheading search term to identify studies addressing PROs.¹³ Multiple search terms are usually necessary. Furthermore, the search needs to combine index terms and free-text terms, and is likely to require several iterations.¹³ The present review was guided by the PRISMA statement and conducted in two phases. In the first phase, the authors (MS, CO, PS, and ES) identified various PROMs that were used in patients with OCD. They then conducted a systematic review using a search strategy using two keywords: (i) obsessive-compulsive disorder; AND (ii) specific instrument, and limited the search to abstract, title, and keywords. The databases used for the systematic review were PubMed, Science Direct, Medline, and PsycInfo. In addition, reference lists of all included studies were hand searched. To ensure recency of articles, the search was restricted to the period between and inclusive of January 1995 to October 2013. Potentially relevant papers were examined by at least two authors who worked independently, with discrepancies of opinion resolved by meeting together as a group. Inclusion criteria included: (i) the study cohort comprised OCD patients where OCD was the primary diagnosis, diagnosed clinically or using *DSM* criteria;

(ii) the study described outcomes among OCD patients using PROMs; (iii) the study was among adult populations; and (iv) the study focused on at least one of the three broad groups of outcomes—symptoms primarily related to OCD, functioning, and health-related quality of life (HRQoL). Exclusion criteria included studies not reported in English, studies in the general population (ie, not a patient population), case reports, case series, studies conducted only for validation purposes and studies that did not report on outcomes per se.

Results

Search results

The searches returned a total of 1368 articles. This included 945 unique articles after the removal of 423 duplicates. Screening by abstracts removed a further 725 articles. Full texts of the remaining 220 manuscripts were then retrieved and a further 65 studies were excluded. A total of 155 studies met all criteria and were included in the paper.

A total of 22 PROMs were used across the included studies. An overview of each instrument's measurement properties and how it assesses and scores outcomes is shown in *Table I*. Details of the sample and the outcome measures used in each of the 155 studies are outlined in *Table II* (available in the online version of this article).

Patient-reported outcomes related to functioning

Patients with OCD suffer from considerable disability as obsessive-compulsive (OC) symptoms can disrupt social relationships and impair occupational functioning. Knowing the predictors of functional impairment in OCD can facilitate treatment of the disorder by directing clinicians to those aspects of the problem. Storch et al¹⁴ suggested that patients who do not respond to first-line interventions could instead be offered therapies aimed at reducing factors associated with disability, thereby reducing burden of illness. There is also an increasing focus on patient-reported functional outcomes in clinical trials where they are often used to supplement traditional clinician-assessed outcomes. Scales that have been used to assess functioning in OCD include Sheehan Disability Scale (SDS),¹⁵ Social Adjustment Scale–Self Report (SAS-SR)¹⁶ and the Work and Social Adjustment Scale (WSAS),¹⁷ *Table I*.

Social functioning in OCD patients was found to be worse than community norms/controls.¹⁸⁻²⁰ Comparing across mental illnesses, Kennedy et al²⁰ reported that those with OCD had the highest work disability scores among six common mental disorders. Social functioning of OCD patients was comparable to that of patients with depression and alcoholism.¹⁹ Those with OCD were less impaired in terms of social functioning compared to those with social anxiety disorder (SAD),²¹ but were significantly more impaired in extended family functioning than patients with PD. Starcevic et al²² found no difference in disability scores between OCD patients with and without obsessive-compulsive personality disorder.

A younger age of onset of OCD was found to have a negative impact on social functioning in the domains of work and family unit role.¹⁹ This could be because an early onset of illness is specifically burdensome for patients' academic and professional development.¹⁹ Depressive and anxiety symptoms have also been found to be significantly related to disability^{14,19,23} and depression was found to mediate the relationship between OCD-related distress and functional disability.¹⁴

Functional disability has been associated with OCD symptom severity.^{14,19,23-27} Yale-Brown Obsessive-Compulsive Scale (Y-BOCS) compulsion scores were significantly related to social functioning.²³ Storch et al¹⁴ found that the extent to which an individual attempts to resist and is able to control his or her OCD symptoms mediates the relationship between OC symptoms and functional disability. Severity of sexual/religious obsessions and hoarding symptoms were associated with overall social adjustment.¹⁹ Disability was correlated with insight with regards to OCD,²⁸ as was the degree of avoidance and pathological doubting.²⁹ Occupational disability was also associated with poorer social functioning.³⁰ The Social Adjustment Scale (SAS)-non family score (excludes marital and family functioning score) was significantly associated with hostility expressed by patient's relatives.³¹

Fontenelle et al³² found that among OCD patients, brain-derived neurotrophic factor plasma levels correlated negatively on a trend level with total score on the SDS. The severity of disability was associated with the use of psychotropic agents³³ as well as refusal of pharmacotherapy among OCD patients.³⁴

Studies have found improved patient-reported functioning following treatment of OCD with pharmaco-

Clinical research

therapy and/or psychotherapy. Statistically significant improvements in the SDS subscales were reported in the active treatment arm compared with the placebo

arm in two studies.^{24,35} A prospective observational study conducted in a naturalistic primary care setting reported significant improvement in all three dimen-

Name of instrument (ref)	Main domain of assessment/ Number of subscales	Number of items	Time for administration	Scoring
Functioning				
Sheehan's Disability Scale (SDS) ¹⁵	Measure of functional impairment in three domains – work, social life, and family/home responsibilities.	3-item	1-2 minutes	A 0-10 visual analogue scale for each item. The three items may be summed into a single measure of global functional impairment that ranges from 0 (unimpaired) to 30 (highly impaired).
Social Adjustment Scale –Self Report (SAS-SR) ¹⁶	Measures role performance in 6 major areas of functioning – work, social/leisure activities, relationships with extended family, marital role as a spouse, parental role and role within the family unit.	54-item	15-20 minutes	0-5 for each domain and for the total score (all items are summed and divided by the number of items completed). Higher scores indicate poorer social functioning.
Work and Social Adjustment Scale (WSAS) ¹⁷	Assesses level of functional impairment due to an identified problem across 5 domains: 1) ability to work, 2) home management, 3) social leisure activities, 4) private leisure activities and 5) ability to form and maintain close relationships with others.	5-item	1.5 minutes	A 9-point Likert scale from 0 = no impairment at all to 8 = very severe impairment. Item scores are summed to calculate total score. Higher scores indicate greater functional impairment.
Health-related quality of life				
Illness Intrusiveness Rating Scale (IIRS) ⁴⁶	Measures three domains "Relationship and Personal Development," "Intimacy," and "Instrumental Life"	13-item	10 minutes	Each domain is rated for level of intrusiveness on a scale ranging from 1 (not very much) to 7 (very much).
Medical Outcomes Study 36-Item Short Form (SF-36) ¹⁰	Measures well-being across 8 domains: physical functioning, limitations due to physical health problem, bodily pain, general health, vitality, social functioning, limitations due to emotional problems and mental health.	36-item	5-10 minutes	The number of response choices per item ranges from two to six. The SF-36 yields an eight-dimensional profile, with each scale having a range from 0 to 100. Higher scores indicate better quality of life status.
Quality of Life Enjoyment and Satisfaction Questionnaire (Q-LES-Q) ⁴⁴	Measures quality of life across 8 summary scales: general activities, physical health, emotional well-being, household duties, leisure time activities, social relations, work, and school/course work.	93-item	40-45 minutes	Each domain is assessed on a 5-point scale from very poor to very good, and the domains are aggregated to produce an overall score.
Quality of Life Inventory (QOLI) ⁴⁵	Measures overall life satisfaction and importance within 16 domains: health, self-esteem, goals and values, money, work, play, learning, creativity, helping, love, friends, children, relatives, home, neighbourhood, and community.	32-item	5 minutes	Each domain is rated in terms of its importance to overall happiness (0–2) and in terms of respondent's satisfaction with the area (-3 to 3). Importance ratings are multiplied by their satisfaction ratings to produce a weighted satisfaction score for each area of life.

Table I. Patient-reported outcome measures: assessing functioning, health-related quality of life, and symptoms.

sions of SDS compared with baseline scores.³⁶ Tükel et al²⁶ found that baseline Y-BOCS and SDS subscale scores of nonresponders were significantly higher than those of responders, and baseline SDS-work scores were found to be significant predictors of nonresponse to selective serotonin reuptake inhibitors (SSRIs). Studies

Name of instrument (ref)	Main domain of assessment/ Number of subscales	Number of items	Time for administration	Scoring
Quality of Life Scale (QOLS) ⁴⁷	Measures five conceptual domains of quality of life: material and physical well-being, relationships with other people, social, community and civic activities, personal development and fulfillment, and recreation. The instrument was later expanded to include Independence.	16-item	5 minutes	Seven-point scale anchored by "delighted," "pleased," "mostly satisfied," "mixed," "mostly dissatisfied," "unhappy," "terrible." Scores can range from 16 to 112.
The Lancashire Quality of Life Profile (LQoLP) ⁴⁸	For the subjective aspect, LQoLP focusses on 9 specific domains – work and education, leisure and participation, religion, finance, living situation, legal and safety, family relations, social relations and health.	105-item	30 minutes	All items are rated on a 7-point scale (can't be worse to can't be better). The sum of the nine dimension scores is the 'perceived QoL score.'
World Health Organization Quality of Life Assessment (WHOQOL-BREF) ¹	Measures quality of life across four domains- physical health, psychological, social relationships and environment.	26-item	10-15 minutes	1-5 point Likert scale for each item. Higher overall scores indicate higher quality of life.
Symptoms				
Clark-Beck Obsessive Compulsive Inventory (CBOCI) ⁸⁸	11 items that assess obsessive behaviors and 14 items that assess compulsive behaviors.	25-item	10-20 minutes	Items scored on 4 point Likert scale ranging from 0 (absence of symptoms) to 3 (high difficulty with symptoms). Items are summed for a total score.
Dimensional Obsessive-Compulsive Scale (DOCS) ⁸⁹	Measures the severity of the four most empirically supported OCD symptom dimensions: contamination, responsibility for harm and mistakes, symmetry/ordering, and unacceptable thoughts.	20-item	5-10 minutes	The responder first reads a description of the symptom dimension and following each description are five items (rated 0 to 4) that measure (a) time occupied by obsessions and rituals, (b) avoidance behavior, (c) distress, (d) functional interference, and (e) difficulty disregarding the obsessions and refraining from doing compulsions.
Hamburg Obsessive-Compulsive Inventory (HZI/HOCI) ⁹⁰	Measures obsessions and compulsions on six different subscales: checking behavior; washing and cleaning behavior; symmetry and ordering behavior; counting, touching, repetitive speaking; thoughts of words and pictures; aggressive impulses and fantasies towards oneself or others.	72-item	Approximately 23 minutes	Each subscale has 12 items and each item can be answered with "true" or "false." The "true" answers are summed for the subscale scores.
Maudsley Obsessive-Compulsive Inventory (MOCI) ⁹²	Measures overt rituals and their related obsessions within 4 subscales: checking, washing/ cleaning, slowness, and doubting.	30-item	Approximately 15 minutes	A dichotomous correct/incorrect format; "yes" answers are scored 1 point and "no" answers 0 point.

Table I. Continued

Clinical research

have also found significant improvements in functioning following cognitive behavioral therapy (CBT),²⁵ group behavior therapy³⁷ and Internet-administered

CBT,³⁸ as well as marginal improvement following multi-family behavior therapy.³⁷ Improved functioning was also reported following computer-guided behavior

Name of instrument (ref)	Main domain of assessment/ Number of subscales	Number of items	Time for administration	Scoring
Obsessional Beliefs Questionnaire-44 (OBQ-44) ⁹³	OBQ-44, a shortened version of the original 87-item OBQ, consists of 3 factor- analytically derived subscales assessing domains of cognition in: responsibility/threat estimation (16 items); perfectionism/certainty (12 items) and importance/control of thoughts (16 items).	44-item	10-20 minutes	Obsessional beliefs are rated on a 7-point scale from 1 (disagree very much) to 7 (agree very much). Higher scores indicate stronger beliefs.
Obsessive Compulsive Inventory, Revised (OCI-R) ¹²	OCI-R or OCI-Short Version, a revised version to address the limitations of OCI, measures the frequency and distress experiences across 6 domains: washing, obsessing, hoarding, ordering, checking, and neutralizing.	18-item	Approximately 10 minutes	This instruments uses a 5-point Likert scale (from 0= not at all, to 4= extremely). The maximum score on the OCI-R is 72, with a score of 21 reflecting clinically significant levels of symptoms.
Padua Inventory, Revised (PI-R) ⁹⁴	Several revisions of the original PI have been published. Derived from a factor-analytic study, the most widely used PI-R is a 5- factor structure scale that assesses impulses, washing, checking, rumination and precision.	41-item	10-20 minutes	This instrument uses a 5-point Likert scale (from 0 = not at all, to 4 = very much). The maximum score is 164 and higher scores represent greater interference in routine daily functioning.
Structured Clinical Interview for Obsessive-Compulsive Spectrum <i>Self-Report - Lifetime</i> (SCI-OBS-SR) ⁹⁵	Measures seven domains: childhood/adolescence experiences, doubt, hyper-control, attitude toward time, perfectionism, repetition and automation, and specific themes—contamination, cleaning, sexuality, existential attitudes toward religion, aggressiveness, impulsiveness, and somatic themes.	183-item	40 minutes	Subjects answer either Yes or No to each item on the questionnaire according to the lifetime presence/absence of the described manifestation.
Symptom Checklist-90-Revised (SCL-90-R) ⁹⁶	9 primary symptom dimensions are measured: somatization, obsessive-compulsive, interpersonal sensitivity, depression, anxiety, hostility, phobic anxiety, paranoid ideation, psychoticism, and a category of additional items.	90-item	12-15 minutes	Symptoms are rated on a 5-point scale ranging from 0 'not at all' to 4 'extremely.' Items are summed for a total score.
Vancouver Obsessional-Compulsive Inventory (VOCI) ⁹⁷	Measures a range of obsessions, compulsions, avoidance behaviour, and personality characteristics of known or theoretical importance in OCD: contamination, checking, obsessions, hoarding, just right experiences, and indecisiveness.	55-item	10-20 minutes	This instrument uses a 5-point Likert-type scale, with ratings being summed to provide scores on the six separate subscales.

Table I. Continued

therapy (BT STEPS). Those randomized to BT STEPS and clinician-guided behavior therapy improved significantly more than patients assigned to relaxation therapy.³⁹ Another study on patients using BT STEPS found that improvement, as measured by the Work and Social Adjustment Scale (WSAS), was significantly greater in patients who received additional scheduled help-line support from a clinician than patients who were asked to request support when they needed it.⁴⁰ Increased baseline work and social adjustment was found to be a positive predictor of intensive residential treatment (IRT) response.⁴¹ The authors hypothesized that this could be because those with better social skills established stronger peer support during treatment, benefited more from peer modeling, and engaged more in the treatment process than those with poorer social functioning.⁴¹ Alternatively, poorer social functioning may indicate more treatment-resistant, debilitating OCD.⁴¹

(See *Table IIa*, available in the online version of this article, for summary of included studies).

Patient-reported outcomes related to health-related quality of life

HRQoL is a patient-based concept that focuses on the impact of a perceived health state on the ability to live a fulfilling life.⁴² HRQoL is defined as optimum levels of mental, physical, role (eg, work), and social functioning, including relationships, and perceptions of health, fitness, life satisfaction, and well-being.⁴³ A number of scales have been used in various studies as PROMs pertaining to HRQoL among patients with OCD. These include SF-36, WHOQOL instruments, Quality of Life Enjoyment and Satisfaction Questionnaire (Q-LES-Q),⁴⁴ Quality of Life Inventory (QOLI),⁴⁵ Illness In-

trusiveness Rating Scale (IIRS),⁴⁶ Quality of Life Scale (QOLS)⁴⁷ and The Lancashire Quality of Life Profile (LqoLP, Subjective component),⁴⁸ *Table I*.

OCD patients have lower HRQoL compared with community samples or matched controls.^{18,23,49-66} Comparisons of HRQoL between patients with OCD and patients with other disorders have shown mixed results; some studies found that OCD patients tend to report higher HRQoL than patients with depression across all or some domains,^{56,59,67,68} though others report otherwise.^{50,55} Similarly, some studies have reported that HRQoL was similar in OCD and schizophrenia patients,^{55,69} whereas others reported lower scores in OCD patients in the domains of psychological well-being and social relationships^{57,68,70} as well as in overall HRQoL.⁵⁷ Patients with OCD have been reported to have lower HRQoL (in the mental health domain) than patients with diabetes⁵⁹ as well as end-stage renal failure patients (who were on hemodialysis or kidney transplant recipients).⁵⁵

Socio-demographic factors including age,^{51,52,57} gender,^{52,71} marital status,⁴⁹ employment,^{51,53,57} education,⁵² low social status,⁶⁵ and perceived lack of social support⁶⁵ are associated with self-reported HRQoL in OCD patients.

Illness-specific severity has been shown to impair HRQoL. While some studies have shown that Y-BOCS scores predicted or were correlated with HRQoL in some or all domains,^{23,24,49,50,52-54,60,63,64,67,68} others found that obsessive symptoms^{49,65,72,73} or compulsions alone⁷⁴ specifically contributed to lowered HRQoL in patients with OCD. Presence of hoarding,⁵¹ checking⁵⁴ and washing symptoms^{51,54} as well as the scores on the contamination/washing dimension of YBOCS have been reported to affect HRQoL.⁵² In addition, HRQoL scores

Name of instrument (ref)	Main domain of assessment/ Number of subscales	Number of items	Time for administration	Scoring
Yale-Brown Obsessive-Compulsive Scale, <i>Self-Report Version</i> (Y-BOCS-SR) ⁹⁸	Measures the severity of OCD symptoms independently of the type of clinical obsessions and compulsions the individual experiences.	10-item (5 on obsessions and 5 on compulsions)	Approximately 10 minutes	Respondent indicates the presence or absence of obsessions/compulsions from a checklist of 58 symptoms and answers 10 questions indicating: time spent, interference, distress, resistance, and control. These responses are rated on a 5-point Likert type scale (0 = 'none,' 4 = 'extreme'). The cutoff point for clinically significant symptoms is 16 or more.

Table I. Continued

Clinical research

were impacted by the degree of symptom interference and resistance against symptoms,⁶⁸ and correlated negatively with cognitive appraisals of thought control and inflated personal responsibility.⁵⁸ Adverse effects of medications have also been shown to be associated with poorer HRQoL.⁶⁵

Studies have consistently shown that comorbid depression or depressive symptoms predict decreased HRQoL among those with OCD, with associations across multiple domains of HRQoL.^{23,49-54,65,67,68,72,74,75} Comorbidity with other medical and mental illnesses also results in further decline in HRQoL.^{53,76}

A lower HRQoL in the psychological health and level of independence domain was found to predict help-seeking behavior.⁷⁷ Besiroglu et al⁷⁷ also found that Y-BOCS scores were significantly correlated with social relationships and level of independence domain in the help-seeking group. The authors postulated that individuals whose HRQoL is minimally impaired by OCD are less likely to seek help than significantly affected patients.

HRQoL has also been used as an outcome measure in clinical trials. Statistically significant improvements have been reported in patients in the active treatment arm in pharmacotherapeutic trials.^{24,78} Hollander et al²⁴ reported that compared with nonresponders, responders had a higher baseline HRQoL. Although baseline HRQoL did not predict future relapse, HRQoL continued to be correlated with symptom severity at end point. HRQoL was thus sensitive to both symptom improvement (treatment response) and symptom deterioration (relapse). However, Tenney et al⁷⁸ reported that improvements in HRQoL seemed to occur independently of symptoms and responders and nonresponders did not differ in their improvement in HRQoL. Patients on clinical treatment, followed up longitudinally, have similarly shown improvements in HRQoL,^{56,64,66,79} with only a few studies failing to find any significant difference between pre- and post-treatment HRQoL.⁸⁰ CBT as well as cognitive-behavioral group therapy (CBGT) were shown to improve HRQoL significantly among responders in clinical samples,^{54,62,81} though Internet-based CBT (ICBT) with therapist support was not shown to improve HRQoL.⁸² A randomized controlled trial (RCT) examining the effects of augmenting serotonin reuptake inhibitors (SRIs) with exposure and ritual prevention (ERP) versus stress management training did not find any significant difference in the rate of

change in quality of life between the two groups, post-hoc analyses however revealed modest but significantly superior quality of life at study completion (post-test).⁸³ A few studies have reported improvements in HRQoL among patients undergoing other forms of health behaviours and treatments. Patients showed improvement following acceptance and commitment therapy (ACT)^{84,85} and progressive relaxation techniques (PRT).⁸⁴ A preliminary study examining the impact of aerobic exercise as an adjunctive intervention to CBT and pharmacological treatment of OCD reported a significant improvement in overall sense of well-being after intervention.⁸⁶ Ooms et al⁶¹ observed significant improvement in HRQoL in their study exploring the long-term effects of deep brain stimulation in patients with therapy-resistant OCD.

Patient-reported outcomes related to OCD-specific symptoms

OCD is a heterogeneous condition and patients often present with multiple symptoms comprising both obsessional concerns and compulsive behaviors. There have been many attempts to subtype OCD based on symptoms. While early symptom subtyping approaches characterized OCD patients by their principal compulsive behavior, these were later extended to factor analysis of symptom measures.⁸⁷ Patients differ not only in the type of symptoms experienced but also in terms of the severity of the symptoms and the distress and interference caused by them. A number of scales have been used to report different aspects of symptoms in OCD such as symptom dimensions, severity, and distress caused by them. These include Clark-Beck Obsessive Compulsive Inventory (CBOCI),⁸⁸ Dimensional Obsessive-Compulsive Scale (DOCS),⁸⁹ Hamburg Obsessive-Compulsive Inventory (HZI/HOCI),⁹⁰ Leyton Obsessional Inventory (LOI),⁹¹ Maudsley Obsessive-Compulsive Inventory (MOCI),⁹² Obsessional Beliefs Questionnaire-44 (OBQ-44),⁹³ Obsessive Compulsive Inventory Revised (OCI-R),¹² Padua Inventory for Obsessive-Compulsive Spectrum Self-Report - Lifetime (SCI-OBS-SR),⁹⁵ Symptom Checklist-90-Revised (SCL-90-R),⁹⁶ Vancouver Obsessional-Compulsive Inventory (VOCI)⁹⁷ and Yale-Brown Obsessive-Compulsive Scale, Self-Report Version (Y-BOCS-SR),⁹⁸ *Table I*. These have been used in studies to report the

differences between patient and control groups, to investigate neuropsychological features across symptom-based OCD subtypes, association with imaging parameters and as treatment outcomes.

A number of studies have reported that patients with OCD score higher on symptom and/or dysfunctional belief measures as compared with controls.^{51,99-129} Studies comparing OCD with other psychiatric disorders found that symptom severity was similar among OCD and generalized anxiety disorder patients.¹⁰² One study reported similar scores in OCD and depressive patients¹⁰⁸ while others reported higher severity scores in OCD patients.^{116,130} Symptom scores and/or scores on dysfunctional beliefs of OCD patients were higher than those among patients with compulsive buying,¹³¹ Tourette's syndrome,^{109,126} anorexia nervosa,^{108,132} bulimia nervosa,^{115,132} binge eating disorder,¹³³ trichotillomania,¹³⁴ clozapine-treated schizophrenia,¹³⁵ schizophrenia,¹³⁶ bipolar disorder-I,¹³¹ other anxiety disorders,^{104,108,116,119,121,123,125,126,138,139} alcohol dependence,¹³⁶ and borderline personality disorder.¹³⁴ Individuals with OCD and obsessive-compulsive personality disorder (OCPD) reported higher severity scores as compared with patients with OCD alone²² and symptom dimensions were also differentially related to OCD and OCPD.¹⁴⁰ Patients with OCD reported higher symptom severity than pathological gamblers but dysfunctional belief scores were found to be similar in the two groups.¹³⁹ Those with chronic medical conditions scored higher on dysfunctional beliefs than those with OCD;¹⁴¹ non-affected first-degree relatives scored higher on dysfunctional beliefs than controls but scored lower than OCD patients.¹⁴²

Vulink et al¹⁴³ reported an exacerbation of OCD symptoms among female outpatients during the premenstrual period with a significant difference between the premenstrual and midmenstrual phase. Depression was positively correlated with symptom severity^{101,144} as was neuroticism,¹⁰¹ responsibility,^{101,145} perfectionism and intolerance of uncertainty,¹⁴⁵ worry,¹⁰² alexithymia,¹⁴⁶ magical ideation,¹⁴⁷ dissociation,¹³⁷ pessimistic attitudes,¹²⁹ and poor insight.¹⁴⁶

Factor analyses of PROMs of symptoms have yielded symptom dimensions that are largely consistent with clinical observations.¹⁴⁸ Associations with OCD symptom dimensions include that of cognitive attentional impulsiveness with aggressive obsessions and checking but not washing;¹⁴⁹ responsibility with checking and ru-

mination¹⁰⁴ and obsessions¹²¹; perfectionism/certainty with ordering,^{33,117,150} symmetry symptoms^{151,152} and checking and precision;¹⁵³ responsibility/threat estimation with obsessing,¹¹⁷ checking,^{33,117} contamination,¹⁵² rumination,¹⁵³ and washing and mental neutralizing;¹⁵⁰ importance/control of thoughts with obsessions,^{150,151} unacceptable/taboo thoughts,^{33,152} punishment,¹³⁸ and impulse phobia¹⁵³; amnesic dissociation with checking¹⁵⁴ and dissociative symptomatology with checking and symmetry and ordering,¹⁵⁵ magical ideation with washing,¹¹⁹ fantasy with hoarding,¹⁵⁶ and fear of contamination with low beliefs subgroup¹⁵¹ and being sexually nonsensual.¹⁵⁷ Perfectionism and intolerance of uncertainty were related to trait anger and anger expression in the checker group,¹²⁸ and obsessions with higher rates of antipsychotic use.³³ OCD dimensions of controlling behavior and specific obsessions in females were associated with core symptoms of eating disorders like bulimia and drive for thinness,¹⁵⁸ while obsessional impulses to harm self/others was predictive of depression severity.¹⁵⁹ Childhood experiences of sociotropy and perception of threat were found to be closely related to belief domains in OCD,¹⁶⁰ and it has also been suggested that the relationship between obsessive beliefs and obsessive-compulsive symptoms are accounted for by inferential confusion.¹⁶¹

Investigations of the association between symptom dimensions and neuropsychological profiles have been characterized by inconsistent findings. While some have found associations between symptom dimensions and deficits in memory^{105,111} others could only demonstrate a trend¹⁶² and some did not show any association.¹⁶³ Kyrios and Iob¹⁰⁰ failed to demonstrate any association of symptom dimensions with Stroop interference test, while Okada et al¹¹³ showed a negative correlation between Stroop color-word task correct scores and symptom severity in OCD patients. Rectification of preattentive inhibition was far less evident in checkers as compared with noncheckers¹⁶⁴ and attentional bias to personally salient stimuli was correlated with symptom severity.¹⁶⁵ Tumkaya et al¹¹⁴ found significant correlations between situation awareness scores and symptom severity as well as slowness and doubt dimensions of OCD patients.

No association was established between severity scores and gray matter volumes among OCD patients,¹⁶⁶ although dysfunctional belief (over importance and thought control) was negatively correlated

Clinical research

with gray matter volume¹⁶⁷ and a significant correlation was found between OC-related dysfunctional beliefs and morphometric variability in the anterior temporal lobe.¹²⁷ While a study found that washing symptoms were positively related to tumor necrosis factor receptor 1 (TNFR1) and chemokine (C-C motif) ligand 24 (CCL-24)¹⁶⁸ another reported that plasma levels of nerve growth factor (NGF) and glial cell-derived neurotrophic factor (GDNF) correlated significantly with severity of washing symptoms.³² Significant interaction effects of catechol-O-methyltransferase and brain derived neurotrophic factor (BDNF) genotype were found with dysfunctional beliefs—responsibility and overestimation of threat and over importance/need to control thoughts.¹⁶⁹

Studies have reported significant improvement in symptom severity and/or dysfunctional beliefs in OCD patients treated with behavioral therapy,^{118,170-174} group behavioral treatment,^{123,175-177} ICBT,^{38,82} danger ideation reduction therapy,^{109,178} ACT,⁸⁵ self-directed treatment,¹⁷⁹ SSRIs,^{180,181} and combination of SSRIs and behavioral therapy.¹⁸² No evidence was found to suggest that response prevention alone or gradual exposure in vivo alone had a differential effect on OCD symptoms although the patients showed significant overall improvement following treatment; ritualistic behavior was significantly more affected by response prevention than by exposure alone.¹⁸³ Antipsychotics (risperidone and haloperidol) were both found to be effective in reducing severity of obsessions in patients with treatment resistant OCD.¹⁸⁴ However, no improvement in symptom severity was found after an open-label trial of flutamide for OCD.¹⁸⁵

A study comparing differential efficacy of CBT and exposure and response prevention (ERP) versus their sequential combination with fluvoxamine found a significant decrease in symptom measures in patients randomized to all four arms but the four treatments did not differ among each other.¹⁸⁶ Low-frequency repetitive transcranial magnetic stimulation (rTMS) for 4 weeks was associated with significant decrease in symptom severity and furthermore, cortical excitatory measures correlated with effective treatment response.¹⁸⁷ A residential program using a multimodal approach for patients with OCD and coexisting eating disorder resulted in significant decreases in OCD severity⁸³ however another study found that concomitant OCD did not indicate a significantly poorer prognosis for patients with

anorexia or bulimia nervosa.¹⁸⁸ Patients also reported improvement after a computer-based treatment program that provided vicarious ERP for OCD.¹⁸⁹

Discussion

The objective of this review was to present an overview of PROs and their related measures in the context of OCD. A total of 155 publications fulfilled our inclusion criteria. The most common PROM used in OCD patients was the PI. The PI was used in 27 of the 155 included studies. Other commonly used instruments included MOCI, and OBQ. While a number of measures have been used in OCD patients to examine functioning, HRQoL and OCD-specific symptoms from the patient's perspective, the term "patient-reported outcome" is rarely used. These measures are instead referred to as "self-reported measure" and other than symptom measures, these are generic self-report instruments that capture functioning and HRQoL. Patient input into the construction of the measures which are currently being used is lacking. It is evident that OCD affects specific domains and these effects may vary across cultures. Thus, it is imperative that patients' input be included in the development of PROMs. In addition, the validity and responsiveness of these measures must be established using stringent study designs.

A number of studies have compared PROs to those of clinician-reported measures, and findings suggest that overall there is significant correlation between the two.^{19,25,26,36,49,123} However, some studies have found that clinician-based assessments do not correlate well with patient reports,^{14,118,127} with others discovering significant differences between clinician and patient reported outcomes. Eisen et al⁴⁹ reported that HRQoL became significantly more impaired after a certain cut-off point for symptom severity, suggesting that functioning and HRQoL may be preserved in individuals with OCD until a particular threshold of severity is crossed. However, the finding was not replicated with the clinician-administered Social and Occupational Functioning Assessment Scale (SOFAS), suggesting that the self-reported measure Q-LES-Q may be a more specific measure or that a self-report measure may be more sensitive than a rater-administered scale in detecting changes in HRQoL relative to OCD.⁴⁹ Stengler Wenzke et al⁵⁷ reported that HRQoL in patients with OCD was unexpectedly lower in the domains of 'psychological

well-being' and 'social relationships' compared with patients with schizophrenia—a finding that re-emphasises the point that patients' perception of their HRQoL tends to be different from that assessed by clinicians. Other studies have reported low correlations between the PI-R and Y-BOCS severity scale.^{190,191} However, the authors felt that the two scales measured relatively unrelated features of OCD and suggested that research should focus on patients for whom there is a high discrepancy between measures to clarify understanding of differences in the "measurement between measures."

PROMs can serve as screening instruments to identify the presence or absence of an OCD diagnosis as well as help focus attention on comorbidities which might otherwise be overlooked during busy clinical consultations.^{192,193} While these measures are not diagnostic in nature they can help highlight important areas of follow up during the clinical interview. PROMs have been shown to be as good as, and at times even better than, clinician-reported measures at predicting outcome. While Mantovani et al¹⁸⁷ reported correlations between neurophysiological measures of outcome and both patient- and clinician-administered scales, another study reported that there was no significant difference

in the clinician-administered Y-BOCS score between responders and nonresponders, though responders reported less severe psychopathology at baseline on self-reported scales.¹⁹⁴

Of particular importance are studies that have established a correlation between self-reported measures and putative biological markers.^{167,168,169} These studies lend further credibility to the use of self-report measures as patient-reported functioning and symptoms have been linked to plausible pathways and neural mechanisms, which may in turn affect treatment response,^{32,168} leading to the differences observed in outcome trials.

Overall, our review suggests that multiple measures must be used in the assessment of OCD, given the heterogeneity of the disorder. It would be ideal to have a single multidimensional patient-reported instrument that not only assesses the different domains affected in OCD but also serves other purposes, such as diagnosis and outcome monitoring. Unfortunately, no such instrument currently exists. Future research must focus on the development of such a multidimensional instrument while ensuring that patients are involved in all the stages of its development. □

REFERENCES

1. Foa EB, Kozak MJ, Goodman WK, Hollander E, Jenike MA, Rasmussen SA. DSM-IV field trial: obsessive-compulsive disorder. *Am J Psychiatry*. 1995;152:90-96.
2. American Psychiatric Association. *Diagnostic and Statistical Manual of Mental Disorders*. 5th ed. Arlington, VA: American Psychiatric Publishing; 2013.
3. Ruscio AM, Stein DJ, Chiu WT, Kessler RC. The epidemiology of obsessive-compulsive disorder in the National Comorbidity Survey Replication. *Mol Psychiatry*. 2010;15:53-63.
4. McEvoy PM, Grove R, Slade T. Epidemiology of anxiety disorders in the Australian general population: findings of the 2007 Australian National Survey of Mental Health and Wellbeing. *Aust N Z J Psychiatry*. 2011;45:957-967.
5. Subramaniam M, Abidin E, Vaingankar JA, Chong SA. Obsessive-compulsive disorder: prevalence, correlates, help-seeking and quality of life in a multiracial Asian population. *Soc Psychiatry Psychiatr Epidemiol*. 2012;47:2035-2043.
6. Kohn R, Saxena M, Levav I, Saraceno B. The treatment gap in mental health care. *Bull World Health Organ*. 2004;82:858-866.
7. Vos T, Flaxman AD, Naghavi M, et al. Years lived with disability (YLDs) for 1160 sequelae of 289 diseases and injuries 1990-2010: a systematic analysis for the Global Burden of Disease Study 2010. *Lancet*. 2012;380:2163-2196.
8. Ustun TB, Ayuso-Mateos JL, Chatterji S. Global burden of depressive disorders in the year 2000. *Br J Psychiatry*. 2004;184:386-392.
9. U.S Food and Drug Administration. Guidance for Industry. Patient-reported outcome measures: Use in medical product development to support labelling claims. *Federal Register*. 2009;74:65132-65133.
10. Ware JE, Sherbourne CD. The MOS 36-item Short-Form Health Survey (SF-36): I. Conceptual framework and item selection. *Med Care*. 1992;30:473-483.
11. The WHOQOL Group. The World Health Organization Quality of Life Assessment (WHOQOL): development and general psychometric properties. *Soc Sci Med*. 1998;46:1569-1585.
12. Foa EB, Huppert JD, Leiberg S, et al. The Obsessive-Compulsive Inventory: development and validation of a short version. *Psychol Assess*. 2002;14:485-96.
13. The Cochrane Collaboration. Patient reported outcomes. In: Higgins JPT, Green S. *Cochrane Handbook for Systematic Reviews of Interventions*. Version 5.1.0. Chichester, UK: Wiley; 2011.
14. Storch EA, Abramowitz JS, Keeley M. Correlates and mediators of functional disability in obsessive-compulsive disorder. *Depress Anxiety*. 2009;26:806-813.
15. Sheehan DV, Harnett-Sheehan K, Raj BA. The measurement of disability. *Int Clin Psychopharmacol*. 1996;(suppl 3):89-95.
16. Weissman MM, Bothwell S. Assessment of social adjustment by patient self-report. *Arch Gen Psychiatry*. 1976;33:1111-1115.
17. Marks I. *Behavioural Psychotherapy*. Bristol, UK: John Wright; London, UK: Institute of Psychiatry; 1986.
18. Didie ER, Walters MM, Pinto A, Menard W, Eisen JL, Mancebo M, Rasmussen SA, Phillips KA. A comparison of quality of life and psychosocial functioning in obsessive-compulsive disorder and body dysmorphic disorder. *Ann Clin Psychiatry*. 2007;19:181-186.
19. Rosa AC, Diniz JB, Fossaluza V, Torres AR, Fontenelle LF, De Mathis AS, da Conceição Rosário M, Miguel EC, Shavitt RG. Clinical correlates of social adjustment in patients with obsessive-compulsive disorder. *J Psychiatr Res*. 2012;46:1286-1292.

Clinical research

Resultados percibidos por el paciente en el trastorno obsesivo compulsivo

El propósito de este artículo fue proporcionar una panorámica de los resultados percibidos por el paciente (PROs) y las mediciones relacionadas que se han efectuado en el trastorno obsesivo compulsivo (TOC). La revisión se centró en las mediciones de los resultados percibidos por el paciente (PROMs) que evaluaron tres grandes áreas de resultados: funcionamiento, calidad de vida relacionada con la salud (CdVRS) y síntomas relacionados con el TOC. La presente revisión incluyó un total de 155 artículos individuales y 22 PROMs. Un análisis de los PROs reveló que los pacientes con TOC tienden a sufrir de una marcada incapacidad funcional y refieren una CdVRS menor que los controles. Los pacientes con TOC muestran una mayor gravedad sintomática que los pacientes con otros trastornos mentales y la evidencia indica que las PROMs son sensibles a los cambios y en la predicción de los resultados terapéuticos pueden ser incluso mejores que las mediciones realizadas por los clínicos. Sin embargo, hay que tener en cuenta que las mediciones revisadas carecían del aporte del paciente en su desarrollo. A futuro la investigación de las PROMs debe incluir las perspectivas del paciente e incorporar rigurosas evaluaciones psicométricas de estas mediciones.

Résultats rapportés par les patients dans les troubles obsessionnels compulsifs

Cet article étudie les résultats rapportés par les patients (PRO, patient-reported outcome) et leurs mesures, analysés dans le contexte des TOC (troubles obsessionnels compulsifs). Les mesures des résultats rapportés par les patients (PROM, patient-reported outcome measures) évaluent ici trois grands domaines : le fonctionnement, la qualité de vie liée à la santé (QdVLS) et les symptômes liés aux TOC. La revue actuelle a finalement inclus un total de 155 articles originaux et 22 PROM. L'analyse de PRO montre que les patients atteints de TOC souffrent d'incapacité fonctionnelle significative et rapportent une moins bonne QdVLS que les témoins. Leurs symptômes rapportés sont plus sévères que ceux des patients atteints d'autres troubles mentaux et des données montrent que les PROM sont sensibles au changement et peuvent même mieux prédire les résultats thérapeutiques que les mesures faites par les médecins. Notons cependant que les mesures analysées ne disposent pas, dans leur évolution, de la contribution des patients. La recherche future sur les PROM doit faire intervenir le point de vue des patients et inclure une évaluation psychométrique rigoureuse de ces mesures.

20. Kennedy BL, Lin Y, Schwab JJ. Work, social, and family disabilities of subjects with anxiety and depression. *South Med J*. 2002;95:1424-1427.

21. Lochner C, Mogotsi M, du Toit PL, Kamminer D, Niehaus DJ, Stein DJ. Quality of life in anxiety disorders: a comparison of obsessive-compulsive disorder, social anxiety disorder, and panic disorder. *Psychopathology*. 2003;36:255-262.

22. Starcevic V, Berle D, Brakoulias V, Sammut P, Moses K, Milicevic D, Hannan A. Obsessive-compulsive personality disorder co-occurring with obsessive-compulsive disorder: Conceptual and clinical implications. *Aust N Z J Psychiatry*. 2013;47:65-73.

23. Huppert JD, Simpson HB, Nissensohn KJ, Liebowitz MR, Foa EB. Quality of life and functional impairment in obsessive-compulsive disorder: a comparison of patients with and without comorbidity, patients in remission, and healthy controls. *Depress Anxiety*. 2009;26:39-45.

24. Hollander E, Stein DJ, Fineberg NA, Marteau F, Legault M. Quality of life outcomes in patients with obsessive-compulsive disorder: relationship to treatment response and symptom relapse. *J Clin Psychiatry*. 2010;71:784-792.

25. Diefenbach GJ, Abramowitz JS, Norberg MM, Tolin DF. Changes in quality of life following cognitive-behavioral therapy for obsessive-compulsive disorder. *Behav Res Ther*. 2007;45:3060-3068.

26. Tükel R, Bozkurt O, Polat A, Genç A, Atli H. Clinical predictors of response to pharmacotherapy with selective serotonin reuptake inhibitors in obsessive-compulsive disorder. *Psychiatry Clin Neurosci*. 2006;60:404-409.

27. Farris SG, McLean CP, Van Meter PE, Simpson HB, Foa EB. Treatment response, symptom remission, and wellness in obsessive-compulsive disorder. *J Clin Psychiatry*. 2013;74:685-690.

28. Fontenelle JM, Harrison BJ, Santana L, et al. Correlates of insight into different symptom dimensions in obsessive-compulsive disorder. *Ann Clin Psychiatry*. 2013;25:11-16.

29. Reid JM, Storch EA, Murphy TK. Clinical correlates and treatment response of the Yale-Brown Obsessive Compulsive Scale auxiliary items. *Cogn Ther Res*. 2011;35:404-413.

30. Mancebo MC, Greenberg B, Grant JE, et al. Correlates of occupational disability in a clinical sample of obsessive-compulsive disorder. *Compr Psychiatry*. 2008;49:43-50.

31. Chambless DL, Steketee G. Expressed emotion and behavior therapy outcome: a prospective study with obsessive-compulsive and agoraphobic outpatients. *J Consult Clin Psychol*. 1999;67:658-665.

32. Fontenelle LF, Barbosa IG, Luna JV, Rocha NP, Silva Miranda A, Teixeira AL. Neurotrophic factors in obsessive-compulsive disorder. *Psychiatry Res*. 2012;199:195-200.

33. Brakoulias V, Starcevic V, Berle D, et al. The use of psychotropic agents for the symptoms of obsessive-compulsive disorder. *Australas Psychiatry*. 2013;21:117-121.

34. Santana L, Fontenelle JM, Yücel M, Fontenelle LF. Rates and correlates of nonadherence to treatment in obsessive-compulsive disorder. *J Psychiatr Pract*. 2013;19:42-53.

35. Montgomery SA, Kasper S, Stein DJ, Bang Hedegaard K, Lemming OM. Citalopram 20 mg, 40 mg and 60 mg are all effective and well tolerated compared with placebo in obsessive-compulsive disorder. *Int Clin Psychopharmacol*. 2001;16:75-86.

36. Gérard A, Liard F, Crochard A, Goni S, Millet B. Disability in patients consulting for anxiety or mood disorders in primary care: response to antidepressant treatment. *Neuropsychiatr Dis Treat*. 2012;8:605-614.

37. Van Noppen B, Steketee G, McCorkle BH, Pato M. Group and multifamily behavioral treatment for obsessive compulsive disorder: a pilot study. *J Anxiety Disord*. 1997;11:431-446.

38. Wootton BM, Titov N, Dear BF, et al. An Internet administered treatment program for obsessive-compulsive disorder: a feasibility study. *J Anxiety Disord.* 2011;25:1102-1107.
39. Greist JH, Marks IM, Baer L, Kobak KA, Wenzel KW, Hirsch MJ, et al. Behavior therapy for obsessive-compulsive disorder guided by a computer or by a clinician compared with relaxation as a control. *J Clin Psychiatry.* 2002;63:138-145.
40. Kenwright M, Marks I, Graham C, Franses A, Mataix-Cols D. Brief scheduled phone support from a clinician to enhance computer-aided self-help for obsessive-compulsive disorder: randomized controlled trial. *J Clin Psychol.* 2005;61:1499-1508.
41. Stewart SE, Yen CH, Stack DE, Jenike MA. Outcome predictors for severe obsessive-compulsive patients in intensive residential treatment. *J Psychiatr Res.* 2006;40:511-519.
42. Bullinger M, Andersson R, Cella D, Aaronson N. Developing and evaluating cross-cultural instruments from minimum requirements to optimal models. *Qual Life Res.* 1993;2:451-459.
43. Bowling A. Health-related quality of life: A discussion of the concept, its use and measurement background: The 'Quality of Life' Presented to the Adapting to Change Core Course, September 1999. Available at: <http://info.worldbank.org/etools/docs/library/48475/m2s5bowling.pdf> last accessed on 16th Dec 2013.
44. Endicott J, Knee J, Harrison W, Blumenthal R. Quality of Life Enjoyment and Satisfaction Questionnaire: a new measure. *Psychopharmacol Bull.* 1993;29:321-326.
45. Frisch M, Cornell J, Villanueva M, Retzlaff PJ. Clinical validation of the Quality of Life Inventory. A measure of life satisfaction for use in treatment planning and outcome assessment. *Psychol Assess.* 1992;4:92-101.
46. Devins GM, Binik YM, Hutchinson TA, Hollomby DJ, Barré PE, Guttmann RD. The emotional impact of end-stage renal disease: Importance of patients' perceptions of intrusiveness and control. *Int J Psychiatry Med.* 1983;13 :327-343.
47. Flanagan JC. A research approach to improving our quality of life. *Am Psychologist.* 1978;33:138-147.
48. Oliver JPJ. The Social Care Directive: development of a quality of life profile for use in community services for the mentally ill. *Soc Work Soc Sci Rev.* 1991;3:5-45.
49. Eisen JL, Mancebo MA, Pinto A, et al. Impact of obsessive compulsive disorder on quality of life. *Compr Psychiatry.* 2006;47:270-275.
50. Rapaport MH, Clary C, Fayyad R, Endicott J. Quality-of-life impairment in depressive and anxiety disorders. *Am J Psychiatry.* 2005;162:1171-1178.
51. Fontenelle IS, Fontenelle LF, Borges MC, et al. Quality of life and symptom dimensions of patients with obsessive-compulsive disorder. *Psychiatry Res.* 2010;179:198-203.
52. Albert U, Maina G, Bogetto F, et al. Clinical predictors of health related quality of life in obsessive-compulsive disorder. *Compr Psychiatry.* 2010;51:193-200.
53. Rodriguez-Salgado B, Dolengevich-Segal H, Arrojo-Romero M, et al. Perceived quality of life in obsessive-compulsive disorder: related factors. *BMC Psychiatry.* 2006;6:20.
54. Moritz S, Rufer M, Fricke S, et al. Quality of life in obsessive-compulsive disorder before and after treatment. *Compr Psychiatry.* 2005;46:453-459.
55. Bobes J, González MP, Bascara'n MT, Arango C, Sáiz PA, Bousoño M. Quality of life and disability in patients with obsessive-compulsive disorder. *Eur Psychiatry.* 2001;16:239-245.
56. Srivastava S, Bhatia MS, Thawani R, Jhanjee A. Quality of life in patients with obsessive compulsive disorder: a longitudinal study from India. *Asian J Psychiatr.* 2011;4:178-182.
57. Stengler-Wenzke K, Kroll M, Matschinger H, Angermeyer MC. Subjective quality of life of patients with obsessive-compulsive disorder. *Soc Psychiatry Psychiatr Epidemiol.* 2006;41:662-668.
58. Kumar A, Sharma MP, Kandavel T, Janardhan Reddy YC. Cognitive appraisals and quality of life in patients with obsessive compulsive disorder. *J Obsessive Compuls Relat Disord.* 2012;1:301-305.
59. Koran LM, Thienemann ML, Davenport R. Quality of life for patients with obsessive-compulsive disorder. *Am J Psychiatry.* 1996;153:783-788.
60. Akdede BBK, Alptekin K, Akvardar Y, Kitis A. Quality of life in patients with obsessive-compulsive disorder: relations with cognitive functions and clinical symptoms. *Turk J Psychiatry.* 2005; 16:13-19.
61. Ooms P, Mantione M, Figee M, Schuurman PR, van den Munckhof P, Denys D. Deep brain stimulation for obsessive-compulsive disorders: long-term analysis of quality of life. *J Neurol Neurosurg Psychiatry.* 2014;85:153-158.
62. Norberg MM, Calamari JE, Cohen RJ, Riemann BC. Quality of life in obsessive-compulsive disorder: an evaluation of impairment and a preliminary analysis of the ameliorating effects of treatment. *Depress Anxiety.* 2008;25:248-259.
63. Gezginç K, Uguz F, Karatayli S, et al. The impact of obsessive-compulsive disorder in pregnancy on quality of life. *Int J Psychiatry Clin Pract.* 2008;12:134-137.
64. Koran LM, Bromberg D, Hornfeldt CS, Shepski JC, Wang S, Hollander E. Extended-release fluvoxamine and improvements in quality of life in patients with obsessive-compulsive disorder. *Compr Psychiatry.* 2010;51:373-379.
65. Hou SY, Yen CF, Huang MF, Wang PW, Yeh YC. Quality of life and its correlates in patients with obsessive-compulsive disorder. *Kaohsiung J Med Sci.* 2010;26:397-407.
66. Hertenstein E, Thiel N, Herbst N, et al. Quality of life changes following inpatient and outpatient treatment in obsessive-compulsive disorder: a study with 12 months follow-up. *Ann Gen Psychiatry.* 2013;12:4.
67. Vikas A, Avasthi A, Sharan P. Psychological impact of obsessive compulsive disorder on patients and their caregivers: a comparative study with depressive disorder. *Int J Soc Psychiatry.* 2011;57:45-56.
68. Kugler BB, Lewin AB, Phares V, Geffken GR, Murphy TK, Storch EA. Quality of life in obsessive-compulsive disorder: the role of mediating variables. *Psychiatry Res.* 2013;206:43-49.
69. Solanki RK, Singh P, Midha A, et al. Disability and quality of life in schizophrenia and obsessive compulsive disorder: a cross-sectional comparative study. *East Asian Arch Psychiatry.* 2010;20:7-13.
70. Gururaj GP, Math SB, Reddy J, Chandrashekar CR. Family burden, quality of life and disability in obsessive compulsive disorder: an Indian perspective. *J Postgrad Med.* 2008;54:91-97.
71. Farooqi YN, Rasul F. Gender differences in perceived quality of life of patients suffering from obsessive-compulsive disorder. *Pak J Psychol Res.* 2011;26.
72. Cassin SE, Richter MA, Zhang KA, Rector NA. Quality of life in treatment-seeking patients with obsessive-compulsive disorder with and without major depressive disorder. *Can J Psychiatry.* 2009;54:460-467.
73. Masellis M, Rector NA, Richter MA. Quality of life in OCD: differential impact of obsessions, compulsions, and depression comorbidity. *Can J Psychiatry.* 2003;48:72-77.
74. Stengler-Wenzke K, Kroll M, Riedel-Heller S, Matschinger H, Angermeyer MC. Quality of life in obsessive-compulsive disorder: the different impact of obsessions and compulsions. *Psychopathology.* 2007;40:282-289.
75. Beşiroğlu L, Uguz F, Saglam M, Agargun MY, Cilli AS. Factors associated with major depressive disorder occurring after the onset of obsessive-compulsive disorder. *J Affect Disord.* 2007;102:73-79.
76. Grant JE, Mancebo MC, Pinto A, Eisen JL, Rasmussen SA. Impulse control disorders in adults with obsessive compulsive disorder. *J Psychiatr Res.* 2006;40:494-501.
77. Beşiroğlu L, Cilli AS, Aşkin R. The predictors of health care seeking behavior in obsessive-compulsive disorder. *Compr Psychiatry.* 2004;45:99-108.
78. Tenney NH, Denys DA, van Megen HJ, et al. Effect of a pharmacological intervention on quality of life in patients with obsessive-compulsive disorder. *Int Clin Psychopharmacol.* 2003;18:29-33.
79. Dougherty DD, Jameson M, Deckersbach T, et al. Open-label study of high (30 mg) and moderate (20 mg) dose escitalopram for the treatment of obsessive-compulsive disorder. *Int Clin Psychopharmacol.* 2009;24:306-311.
80. Beşiroğlu L, Uğuz F, Yılmaz E, Ağargün MY, Aşkin R, Aydın A. Psychopharmacological treatment and quality of life in obsessive compulsive disorder. *Turk Psikiyatri Derg.* 2008;19:38-45.
81. Cordioli AV, Heldt E, Bochi DB, et al. Cognitive-behavioral group therapy in obsessive-compulsive disorder: a randomized clinical trial. *Psychother Psychosom.* 2003;72:211-216.

Clinical research

82. Andersson E, Ljótsson B, Hedman E, et al. Internet-based cognitive behavior therapy for obsessive compulsive disorder: a pilot study. *BMC Psychiatry*. 2011;11:125.
83. Simpson HB, Foa EB, Liebowitz MR, et al. A randomized, controlled trial of cognitive-behavioral therapy for augmenting pharmacotherapy in obsessive-compulsive disorder. *Am J Psychiatry*. 2008;165:621-630.
84. Twohig MP, Hayes SC, et al. A randomized clinical trial of acceptance and commitment therapy versus progressive relaxation training for obsessive-compulsive disorder. *J Consult Clin Psychol*. 2010;78:705-716.
85. Dehlin JP, Morrison KL, Twohig MP. Acceptance and commitment therapy as a treatment for scrupulosity in obsessive compulsive disorder. *Behav Modif*. 2013;37:409-430.
86. Brown RA, Abrantes AM, Strong DR, et al. A pilot study of moderate-intensity aerobic exercise for obsessive compulsive disorder. *J Nerv Ment Dis*. 2007;195:514-520.
87. McKay D, Abramowitz JS, Calamari JE, et al. A critical evaluation of obsessive-compulsive disorder subtypes: symptoms versus mechanisms. *Clin Psychol Rev*. 2004;24:283-313.
88. Clark DA, Beck AT. *Manual for the Clark-Beck Obsessive Compulsive Inventory*. San Antonio, TX: The Psychological Corporation; 2002.
89. Abramowitz JS, Deacon B, Olatunji B, et al. Assessment of obsessive-compulsive symptom dimensions: Development and evaluation of the dimensional obsessive-compulsive scale. *Psychol Assess*. 2010;22:180-198.
90. Klepsch R, Zaworka W, Hand I, Lunenschloss K, Jauernig G. Derivation and validation of the Hamburg Obsession/Compulsion Inventory-Short Form (HOCI-S): first results. *Psychol Assess*. 1991;3:196-201.
91. Cooper J. The Leyton Obsessional Inventory. *Psychol Med*. 1970;1:48-64.
92. Hodgson RJ, Rachman S. Obsessional-compulsive complaints. *Behav Res Ther*. 1997;15:389-395.
93. Obsessive Compulsive Cognitions Working Group. Psychometric validation of the obsessive belief questionnaire and interpretation of intrusions inventory-Part 2: Factor analyses and testing of a brief version. *Behav Res Ther*. 2005;43:1527-1542.
94. Van Oppen P, Hoekstra RJ, Emmelkamp PM. The structure of obsessive-compulsive symptoms. *Behav Res Ther*. 1995;33:15-23.
95. Dell'Osso L, Rucci P, Cassano GB, et al. Measuring social anxiety and obsessive-compulsive spectra: comparison of interviews and self-report instruments. *Compr Psychiatry*. 2002;43:81-87.
96. Derogatis L. *SCL-90-R: Administration, Scoring and Procedures Manual-1 for the Revised Version*. Baltimore, MD: Johns Hopkins University Press; 1977.
97. Thordarson DS, Radomsky AS, Rachman S, Shafran R, Sawchuk N, Hakstian AR. The Vancouver Obsessional Compulsive Inventory (VOCI). *Behav Res Ther*. 2004; 42:1289-1314.
98. Baer L. *Getting Control. Overcoming Your Obsessions and Compulsions*. New York, NY: Penguin Books; 1991.
99. Chik HM, Calamari JE, Rector NA, Riemann BC. What do low-dysfunctional beliefs obsessive-compulsive disorder subgroups believe? *J Anxiety Disord*. 2010;24:837-846.
100. Kyrios M, Iob MA. Automatic and strategic processing in obsessive-compulsive disorder: Attentional bias, cognitive avoidance or more complex phenomena? *J Anxiety Disord*. 1998;12:271-292.
101. Scarrabelotti MB, Duck JM, Dickerson MM. Individual differences in obsessive-compulsive behavior: The role of the eyensckian dimensions and appraisals of responsibility. *Pers Individ Dif*. 1995;18:413-421.
102. Dastgiri SS, Nateghian S. Investigating the overlap of Padua inventory and worry among patients with obsessive-compulsive disorder, generalized anxiety disorder and normal people. *Iran J Psychiatry*. 2008;110-113.
103. Fullana MA, Mataix-Cols D, Trujillo JL, et al. Personality characteristics in obsessive-compulsive disorder and individuals with subclinical obsessive-compulsive problems. *Br J Clin Psychol*. 2004;43(Pt 4):387-398.
104. Arntz A, Voncken M, Goosen ACA. Responsibility and obsessive-compulsive disorder: An experimental test. *Behav Res Ther*. 2007;45:425-435.
105. Exner C, Martin V, Rief W. Self-focused ruminations and memory deficits in obsessive-compulsive disorder. *Cogn Ther Res*. 2009;33:163-174.
106. Olatunji BO, Ciesielski BG, Zaid DH. A selective impairment in attentional disengagement from erotica in obsessive-compulsive disorder. *Prog Neuropsychopharmacol Biol Psychiatry*. 2011;35:1977-1982.
107. López-Solà C, Gutiérrez F, Alonso P, et al. Spanish version of the Dimensional Obsessive-Compulsive Scale (DOCS): Psychometric properties and relation to obsessive beliefs. *Compr Psychiatry*. 2014;55:206-214.
108. Emmelkamp PMG, Kraaijkamp HJM, van Den Hout MA. Assessment of obsessive-compulsive disorder. *Behav Modif*. 1999;23:269-279.
109. Müller N, Putz A, Kathmann N, Lehle R, Günther W, Straube A. Characteristics of obsessive-compulsive symptoms in Tourette's syndrome, obsessive-compulsive disorder, and Parkinson's disease. *Psychiatry Res*. 1975;70:105-114.
110. Jones MK, Menzies RG. Danger ideation reduction therapy (DIRT) for obsessive-compulsive washers. A controlled trial. *Behav Res Ther*. 1998;36:959-970.
111. Shin MS, Kim MS, Ha TH, Kwon JS. Deficits of organizational strategy and visual memory in obsessive-compulsive disorder. *Neuropsychology*. 2004;18:665-672.
112. Murayama K, Nakao T, Sanematsu H, et al. Differential neural network of checking versus washing symptoms in obsessive-compulsive disorder. *Prog Neuropsychopharmacol Biol Psychiatry*. 2013;40:160-166.
113. Okada K, Ota T, Lida J, Kishimoto N, Kishimoto T. Lower prefrontal activity in adults with obsessive-compulsive disorder as measured by near-infrared spectroscopy. *Prog Neuropsychopharmacol Biol Psychiatry*. 2013;43:7-13.
114. Tumkaya S, Karadag F, Mueller ST, et al. Situation awareness in obsessive-compulsive disorder. *Psychiatry Res*. 2013;209:579-588.
115. Rubenstein CS. Symptom overlap between OCD and bulimia nervosa. *J Anxiety Disord*. 1995;9:1-9.
116. Clark DA, Antony MM, Beck AT, Swinson RP, Steer RA. Screening for obsessive and compulsive symptoms: validation of the Clark-Beck Obsessive-Compulsive Inventory. *Psychol Assess*. 2005;17:132-143.
117. Moritz S, Kempke S, Luyten P, Randjbar S, Jelinek L. Was Freud partly right on obsessive-compulsive disorder (OCD)? Investigation of latent aggression in OCD. *Psychiatry Res*. 2011;187:180-184.
118. Belloch A, Roncero M, Garcia-Soriano, Carrio C, Cabedo E, Fernandez-Alvarez H. The Spanish version of the obsessive-compulsive inventory-revised (OCI-R): reliability, validity, diagnostic accuracy and sensitivity to treatment effects in clinical samples. *J Obsessive Compuls Relat Disord*. 2013;2:249-256.
119. Einstein DA, Menzies RG. Magical thinking in obsessive-compulsive disorder, panic disorder and the general community. *Behav Cogn Psychother*. 2006;34,351-357.
120. Hermans D, Martens K, De Cort K, Pieters G, Eelen P. Reality monitoring and metacognitive beliefs related to cognitive confidence in obsessive-compulsive disorder. *Behav Res Ther*. 2003;41:383-401.
121. Salkovskis PM, Wroe AL, Geldhill A, et al. Responsibility attitudes and interpretations are characteristic of obsessive compulsive disorder. *Behav Res Ther*. 2000;38:347-372.
122. Peng ZW, Xu T, Miao GD, et al. Neurological soft signs in obsessive-compulsive disorder: the effect of co-morbid psychosis and evidence for familiarity. *Prog Neuropsychopharmacol Biol Psychiatry*. 2012;39:200-205.
123. Souza FP, Foa EB, Meyer E, Niederauer KG, Cordioli AV. Psychometric properties of the Brazilian Portuguese version of the Obsessive-Compulsive Inventory - Revised (OCI-R). *Rev Bras Psiquiatr*. 2011;33:137-143.
124. Woo CW, Kwon SM, Lim YJ, Shin MS. The Obsessive-Compulsive Inventory-Revised (OCI-R): psychometric properties of the Korean version and the order, gender, and cultural effects. *J Behav Ther Exp Psychiatry*. 2010;41:220-227.
125. Huppert JD, Moser JS, Gershuny BS, et al. The relationship between obsessive-compulsive and posttraumatic stress symptoms in clinical and non-clinical samples. *J Anxiety Disord*. 2005;19:127-136.
126. Anholt GE, Cath DC, Emmelkamp PM, van Oppen P, Smit JH, van Balkom AJ. Do obsessional beliefs discriminate OCD without tic patients from OCD with tic and Tourette's syndrome patients? *Behav Res Ther*. 2006;44:1537-1543.
127. Alonso P, Orbegozo A, Pujol J, et al. Neural correlates of obsessive-compulsive related dysfunctional beliefs. *Prog Neuropsychopharmacol Biol Psychiatry*. 2013;47:25-32.
128. Radomsky AS, Ashbaugh AR, Gelfand LA. Relationships between anger, symptoms, and cognitive factors in OCD checkers. *Behav Res Ther*. 2007;45:2712-2725.

129. Niemeyer H, Moritz S, Pietrowsky R. Responsibility, metacognition and unrealistic pessimism in obsessive-compulsive disorder. *J Obsessive Compuls Relat Disord*. 2013;2:119-129.
130. Wahl K, Schönfeld S, Hissbach J, et al. Differences and similarities between obsessive and ruminative thoughts in obsessive-compulsive and depressed patients: a comparative study. *J Behav Ther Exp Psychiatry*. 2011;42:454-461.
131. Filomensky TZ, Almeida KM, Castro Nogueira MC, et al. Neither bipolar nor obsessive-compulsive disorder: compulsive buyers are impulsive acquirers. *Compr Psychiatry*. 2012;53:554-561.
132. Jiménez-Murcia S, Fernández-Aranda F, Raich RM, et al. Obsessive-compulsive and eating disorders: comparison of clinical and personality features. *Psychiatry Clin Neurosci*. 2007;61:385-391.
133. Fontenelle LF, Mendlowicz MV, de Menezes GB, et al. Comparison of symptom profiles of obese binge eaters, obese non-binge eaters, and patients with obsessive-compulsive disorder. *J Nerv Ment Dis*. 2002;190:643-646.
134. Stein DJ, Mullen L, Islam MN, Cohen L, DeCaria CM, Hollander E. Compulsive and impulsive symptomatology in trichotillomania. *Psychopathology*. 1995;28:208-213.
135. Doyle M, Chorcoraian AN, Griffith E, Trimble T, O'Callaghan E. Obsessive compulsive symptoms in patients with schizophrenia on clozapine and with obsessive compulsive disorder: a comparison study. *Compr Psychiatry*. 2014;55:130-136.
136. Mass R, Weigel S, Schneider S, Klepsch R. Schizophrenia-specific basic symptoms. A successful replication. *Psychopathology*. 1998;31:113-119.
137. Fontenelle LF, Domingues AM, Souza WF, et al. History of trauma and dissociative symptoms among patients with obsessive-compulsive disorder and social anxiety disorder. *Psychiatr Q*. 2007;78:241-50.
138. Tolin DF, Worhunsky P, Brady RE, Maltby N. The relationship between obsessive beliefs and thought-control strategies in a clinical sample. *Cogn Ther Res*. 2007;31:307-318.
139. Anholt GE, Emmelkamp PM, Cath DC, van Oppen P, Nelissen H, Smit JH. Do patients with OCD and pathological gambling have similar dysfunctional cognitions? *Behav Res Ther*. 2004;42:529-537.
140. Wellen D, Samuels J, Bienvenu OJ, et al. Utility of the Leyton Obsessional Inventory to distinguish OCD and OCPD. *Depress Anxiety*. 2007;24:301-306.
141. Baptista MN, Magna LA, McKay D, Del-Porto JA. Assessment of obsessive beliefs: comparing individuals with obsessive-compulsive disorder to a medical sample. *J Behav Ther Exp Psychiatry*. 2011;42:1-5.
142. Rector NA, Cassin SE, Richter MA, Burroughs E. Obsessive beliefs in first-degree relatives of patients with OCD: a test of the cognitive vulnerability model. *J Anxiety Disord*. 2009;23:145-149.
143. Vulink NCC, Denys D, Bus L, Westenberg HGM. Female hormones affect symptom severity in obsessive-compulsive disorder. *Int Clin Psychopharmacol*. 2006;21:171-175.
144. Tynes LL, Winstead DK. Subtyping obsessive compulsive patients by depressive symptoms: a retrospective pilot study. *Psychiatr Q*. 1999;70:53-61.
145. Taylor S, Abramowitz JS, KcKay D. Are there interactions among dysfunctional beliefs in obsessive compulsive disorder. *Cogn Behav Ther*. 2005;34:89-98.
146. De Berardis D, Campanella D, Gambi F, et al. Insight and alexithymia in adult outpatients with obsessive-compulsive disorder. *Eur Arch Psychiatry Clin Neurosci*. 2005;255:350-358.
147. Einstein DA, Menzies RG. The presence of magical thinking in obsessive compulsive disorder. *Behav Res Ther*. 2004;42:539-549.
148. Brakoulias V, Starcevic V, Berle D, et al. Further support for five dimensions of obsessive-compulsive symptoms. *J Nerv Ment Dis*. 2013;201:452-429.
149. Ettelt S, Ruhrmann S, Barnow S, et al. Impulsiveness in obsessive-compulsive disorder: results from a family study. *Acta Psychiatr Scand*. 2007;115:41-47.
150. Tolin DF, Brady RE, Hannan S. Obsessional beliefs and symptoms of obsessive-compulsive disorder in a clinical sample. *J Psychopathol Behav Assess*. 2008;30:31-42.
151. Calamari JE, Cohen RJ, Rector NA, et al. Dysfunctional belief-based obsessive-compulsive disorder subgroups. *Behav Res Ther*. 2006;44:1347-1360.
152. Wheaton MG, Abramowitz JS, Berman NC, Riemann BC, Hale LR. The relationship between obsessive beliefs and symptom dimensions in obsessive-compulsive disorder. *Behav Res Ther*. 2010;48:949-954.
153. Julien D, O'Connor KP, Aardema F, Todorov C. The specificity of belief domains in obsessive-compulsive symptom subtypes. *Personal Individual Diff*. 2006;41:1205-1216.
154. Rufer M, Fricke S, Held D, Cremer J, Hand I. Dissociation and symptom dimensions of obsessive-compulsive disorder. A replication study. *Eur Arch Psychiatry Clin Neurosci*. 2006;256:146-150.
155. Grabe HJ, Goldschmidt F, Lehmkuhl L, Gänsicke M, Spitzer C, Freyberger HJ. Dissociative symptoms in obsessive-compulsive dimensions. *Psychopathology*. 1999;32:319-324.
156. Fontenelle LF, Soares ID, Miele F, et al. Empathy and symptoms dimensions of patients with obsessive-compulsive disorder. *J Psychiatr Res*. 2009;43:455-463.
157. Aksaray G, Yelken B, Kaptanoğlu C, Oflu S, Ozaltin M. Sexuality in women with obsessive compulsive disorder. *J Sex Marital Ther*. 2001;27:273-277.
158. Grabe HJ, Thiel A, Freyberger HJ. Symptoms of eating disorders in obsessive-compulsive disorder. *Acta Psychiatr Scand*. 2000;102:449-453.
159. Yap K, Mogan C, Kyrios M. Obsessive-compulsive disorder and comorbid depression: the role of OCD-related and non-specific factors. *J Anxiety Disord*. 2012;26:565-573.
160. Careau Y, O'Connor KP, Turgeon L, Freeston MH. Childhood experiences and adult beliefs in obsessive-compulsive disorder: evaluating a specific etiological model. *J Cogn Psychother*. 2012;26:236-256.
161. Aardema F, O'Connor KP, Emmelkamp PM. Inferential confusion and obsessive beliefs in obsessive-compulsive disorder. *Cogn Behav Ther*. 2006;35:138-147.
162. Hashimoto N, Nakaaki S, Omori IM, et al. Distinct neuropsychological profiles of three major symptom dimensions in obsessive-compulsive disorder. *Psychiatry Res*. 2011;187:166-173.
163. Karadag F, Oguzhanoglu N, Ozdel O, Atesci FC, Amuk T. Memory function in patients with obsessive compulsive disorder and the problem of confidence in their memories: a clinical study. *Croat Med J*. 2005;46:282-287.
164. Enright SJ, Beech AR, Claridge GS. A further investigation of cognitive inhibition in obsessive-compulsive disorder and other anxiety disorders. *Person Individ Diff*. 1995;19:535-542.
165. Sizino da Victoria M, Nascimento AL, Fontenelle LF. Symptom-specific attentional bias to threatening stimuli in obsessive-compulsive disorder. *Compr Psychiatry*. 2012;53:783-788.
166. Choi JS, Kim HS, Yoo SY, et al. Morphometric alterations of anterior superior temporal cortex in obsessive-compulsive disorder. *Depress Anxiety*. 2006;23:290-206.
167. Nakamae T, Narumoto J, Sakai Y, Nishida S, Yamada K, Fukui K. The neural basis of dysfunctional beliefs in non-medicated patients with obsessive-compulsive disorder. *Prog Neuropsychopharmacol Biol Psychiatry*. 2012;37:22-25.
168. Fontenelle LF, Barbosa IG, Luna JV, de Sousa LP, Abreu MN, Teixeira AL. A cytokine study of adult patients with obsessive-compulsive disorder. *Compr Psychiatry*. 2012;53:797-804.
169. Alonso P, López-Solà C, Gratacós M, et al. The interaction between COMT and BDNF variants influences obsessive-compulsive-related dysfunctional beliefs. *J Anxiety Disord*. 2013;27:321-7.
170. Einstein DA, Menzies RG. Does magical thinking improve across treatment for obsessive-compulsive disorder? *Behav Change*. 2008;25:149-155.
171. O'Connor KP, Aardema F, Bouthillier D, et al. Evaluation of an inference-based approach to treating obsessive-compulsive disorder. *Cogn Behav Ther*. 2005;34:148-163.
172. Abramowitz JS, Tolin DF, Diefenbach GJ. Measuring change in OCD: sensitivity of the obsessive-compulsive inventory-revised. *J Psychopathology Behav Assess*. 2005;27:317-324.
173. Solem S, Håland AT, Vogel PA, Hansen B, Wells A. Change in meta-cognitions predicts outcome in obsessive-compulsive disorder patients undergoing treatment with exposure and response prevention. *Behav Res Ther*. 2009;47:301-307.
174. Anholt GA, van Oppen P, Cath DC, Emmelkamp PM, Smit JH, van Balkom AJ. Sensitivity to change of the Obsessive Beliefs Questionnaire. *Clin Psychol Psychother*. 2010;17:154-159.

Clinical research

175. Van Noppen BL, Pato MT, Marsland R, Rasmussen SA. A time limited behavioral group for treatment of obsessive-compulsive disorder. *J Psychother Pract Res.* 1998;7:272-280.
176. Kearns C, Tone Y, Rush G, Lucey JV. Effectiveness of group-based cognitive-behavioural therapy in patients with obsessive-compulsive disorder. *The Psychiatrist Online.* 2010;34:6-9.
177. Bortoncello CF, Braga DT, Gomes JB, Souza FP, Cordioli AV. Psychometric properties of the Brazilian version of the Obsessive Beliefs Questionnaire (OBQ-44). *J Anxiety Disord.* 2012;26:430-434.
178. Krochmalik A, Jones MK, Menzies RG. Danger Ideation Reduction Therapy (DIRT) for treatment-resistant compulsive washing. *Behav Res Ther.* 2001;39:897-912.
179. Fritzler BK, Hecker JE, Losee MC. Self-directed treatment with minimal therapist contact: preliminary findings for obsessive-compulsive disorder. *Behav Res Ther.* 1997;35:627-631.
180. Greist JH, Jefferson JW, Kobak KA, et al. A 1 year double-blind placebo-controlled fixed dose study of sertraline in the treatment of obsessive-compulsive disorder. *Int Clin Psychopharmacol.* 1995;10:57-65.
181. Selvi Y, Atli A, Beşiroğlu L, Aydın A, Gulec M. The impact of obsessive beliefs on pharmacological treatment response in patients with obsessive-compulsive disorder. *Int J Psychiatry Clin Pract.* 2011;15:209-213.
182. Overbeek T, Schruers K, Vermetten E, Griez E. Comorbidity of obsessive-compulsive disorder and depression: prevalence, symptom severity, and treatment effect. *J Clin Psychiatry.* 2002;63:1106-1112.
183. Keijsers GPJ, Hoogduin CAL, Schaap CPDR, de Jong T, de Koning. The immediate effects of exposure versus response prevention in the treatment of obsessive-compulsive disorder. *Behav Cogn Psychother.* 1995;23:35-44.
184. Li X, May RS, Tolbert LC, Jackson WT, Flournoy JM, Baxter LR. Risperidone and haloperidol augmentation of serotonin reuptake inhibitors in refractory obsessive-compulsive disorder: a crossover study. *J Clin Psychiatry.* 2005;66:736-743.
185. Altemus M, Greenberg BD, Keuler D, Jacobson KR, Murphy DL. Open trial of flutamide for treatment of obsessive-compulsive disorder. *J Clin Psychiatry.* 1999;60:442-445.
186. van Balkom AJ, de Haan E, van Oppen P, Spinhoven P, Hoogduin KA, van Dyck R. Cognitive and behavioral therapies alone versus in combination with fluvoxamine in the treatment of obsessive compulsive disorder. *J Nerv Ment Dis.* 1998;186:492-499.
187. Mantovani A, Rossi S, Bassi BD, Simpson HB, Fallon BA, Lisanby SH. Modulation of motor cortex excitability in obsessive-compulsive disorder: An exploratory study on the relations of neurophysiology measures with clinical outcome. *Psychiatry Res.* 2013;210:1026-1032.
188. Thiel A, Züger M, Jacoby GE, Schüssler G. Thirty-month outcome in patients with anorexia or bulimia nervosa and concomitant obsessive-compulsive disorder. *Am J Psychiatry.* 1998;155:244-249.
189. Kirkby KC, Berrios GE, Daniels BA, Menzies RG, Clark A, Romano A. Process-outcome analysis in computer-aided treatment of obsessive-compulsive disorder. *Compr Psychiatry.* 2000;41:259-265.
190. Anholt GE, van Oppen P, Emmelkamp PM, et al. Measuring obsessive-compulsive symptoms: Padua Inventory-Revised vs. Yale-Brown Obsessive Compulsive Scale. *J Anxiety Disord.* 2009;23:830-835.
191. van Oppen P, Emmelkamp PMG, van Balkom AJLM. The sensitivity to change of measures for obsessive-compulsive disorder. *J Anxiety Disord.* 1995;9:241-248.
192. Kennedy BL, Morris RL, Pedley LL, Schwab JJ. The ability of the Symptom Checklist SCL-90 to differentiate various anxiety and depressive disorders. *Psychiatr Q.* 2001;72:277-288.
193. Hunter EE, Penick EC, Powell BJ, Othmer E, Nickel EJ, Desouza C. Development of scales to screen for eight common psychiatric disorders. *J Nerv Ment Dis.* 2005;193:131-135.
194. Black DW, Monahan P, Gable J, Blum N, Clancy G, Baker P. Hoarding and treatment response in 38 nondepressed subjects with obsessive-compulsive disorder. *J Clin Psychiatry.* 1998;59:420-425.

Reference	Study sample (N, number of sites, country)	Study methodology	PROM(s) used	Major findings
Brakoulias et al ³³	154 participants with a primary OCD diagnosis; several sites in NSW; Australia	Cross-sectional	SDS	The use of psychotropic agents for treating OCD symptoms was associated with higher SDS work and social subscale scores.
Chambless & Steketee ³¹	60 patients with a primary OCD diagnosis, 41 patients with a primary PD with agoraphobia (PDA) diagnosis and relatives living with the patients; Washington, DC and Massachusetts; USA	Longitudinal	SAS-SR	The effect of hostility at baseline on post-treatment functioning was moderated by relative type such that the negative relationship between hostility and functioning was only observed with non-spousal relatives.
Didie et al ¹⁸	210 patients with a primary OCD diagnosis, 45 patients with a primary BDD diagnosis and 40 patients with comorbid BDD+OCD; USA	Cross-sectional	SAS-SR	All participants reported poorer overall social adjustment compared to community norms. BDD+OCD participants had significantly higher SAS-SR total scores than OCD participants. No difference in social functioning was found between OCD and BDD participants.
Diefenbach et al ²⁵	70 patients with a primary OCD diagnosis; Connecticut and Minnesota; USA	Longitudinal	SDS	SDS baseline scores were significantly and positively correlated with OC and depressive symptoms. Participants showed significant improvement in their SDS scores from pre- to post-treatment, with greater improvement observed in family functioning than work or social functioning. There was also a subset of patients who experienced clinically significant improvement in OC symptoms without showing a corresponding improvement in functioning.
Farris et al ²⁷	288 participants with a primary OCD diagnosis; 2 sites: Pennsylvania and New York; USA	Meta-analysis of 4 RCTs	SAS-SR	Greater OCD symptom severity was moderately associated with poorer social functioning at post-treatment.
Fontenelle et al ³²	40 patients with a primary OCD diagnosis and 40 community controls; Brazil	Cross-sectional	SDS	BDNF plasma levels were marginally and positively correlated with overall functioning in the OCD group.
Fontenelle et al ²⁸	60 patients with a primary OCD diagnosis; Brazil	Cross-sectional	SDS	Composite insight was significantly and positively correlated with social disability.
Gérard et al ³⁶	373 patients with OCD, 6270 patients with MDD, 2848 patients with GAD, 1213 patients with SAD and 656 patients with PD; France	Longitudinal	SDS	At baseline, even patients with low physician-rated illness severity reported significant disability. From pre-treatment to the 12-week follow-up visit, patients' SDS subscale scores improved significantly. Mean improvement in SDS subscale scores for all participants was moderately and positively correlated with physician-rated improvement.
Geist et al ³⁹	218 patients with a primary OCD diagnosis; 8 sites: Utah, Colorado, Florida, Texas, Ontario, North Carolina, Massachusetts, and Georgia; USA	RCT	WSAS,	Patients who underwent computer-guided exposure sessions (BT STEPS) or clinician-guided behavior therapy improved significantly more from baseline to endpoint on WSAS total score than patients in the placebo condition. There was no significant difference between BT STEPS and clinician-guided therapy.

Table IIa. Summary of the sample, interventions, and outcome measures used in included studies that measured functioning using patient-reported outcome measures (PROMs).

Clinical research

Reference	Study sample (N, number of sites, country)	Study methodology	PROM(s) used	Major findings
Hollander et al ²⁴	466 patients with a primary OCD diagnosis; 1) 58 sites in 7 countries and 2) 62 sites in 14 countries	Retrospective analysis of data from 2 previous RCTs	SDS	Patients with more severe OCD symptoms had significantly higher SDS subscale scores at baseline. Patients receiving active treatment showed a significant reduction in dysfunction compared to the placebo group. In addition, responders reported significantly less functional impairment than nonresponders, and relapsed patients had significantly higher SDS scores than non-relapsed patients.
Huppert et al ²³	66 patients with OCD, 36 healthy controls (HCs); USA	Cross-sectional	SAS-SR, SDS	SDS scores for HCs and patients in remission did not significantly differ, though both groups reported less disability than current OCD patients who, in turn, experienced less disability than comorbid OCD patients.
Kennedy et al ²⁰	14 participants with OCD, 77 participants with major depression, 21 participants with PD, 30 participants with social phobia, 21 participants with mixed anxiety disorder and 29 controls; USA	Cross-sectional	SDS	OCD participants had significantly greater work, social, and family disability than controls, but did not differ from the other clinical groups in work or social disability.
Kenwright et al ⁴⁰	44 patients with a primary OCD diagnosis; UK	RCT	WSAS	Improvement in WSAS total score was significantly greater among patients provided with scheduled help-line support than patients who were asked to request support when needed. However, all patients' WSAS scores improved significantly from pre- to post-treatment.
Lochner et al ²¹	220 patients with OCD, 53 patients with PD and 64 patients with SAD; South Africa	Cross-sectional	SDS	OCD patients reported greater current impairment in friendship, activities of daily living and extended family functioning than PD patients. However, they reported significantly less current impairment in social life and social functioning than SAD patients.
Mancebo et al ³⁰	238 participants with a primary OCD diagnosis; USA	Cross-sectional	SAS-SR	Participants with occupational disability reported greater impairment in their social and leisure, extended family and family unit functioning than those without occupational disability.
Montgomery et al ³⁵	401 patients with OCD; 53 sites in 12 countries	RCT	SDS	Improvement on SDS subscale scores was significantly greater in at least one treatment condition (the three treatment groups received varying doses of citalopram) compared to the placebo condition.
Rosa et al ¹⁹	815 patients with a primary OCD diagnosis; 7 specialized outpatient clinics comprising the Brazilian Research Consortium on Obsessive-Compulsive Spectrum Disorders; Brazil	Cross-sectional	SAS-SR	Greater OC symptom severity, poorer quality of life as well as current comorbidity with depression, PTSD or eating disorders predicted greater overall social dysfunction. The SAS work, social/leisure, family unit, marital role and economic situation subscale scores were related to poorer quality of life.

Table IIa. Continued

Reference	Study sample (N, number of sites, country)	Study methodology	PROM(s) used	Major findings
Santana et al ³⁴	60 patients with OCD diagnosis; Brazil	Cross-sectional	SDS	Patients who reported at least one refusal of pharmacotherapy had higher levels of family disability.
Starcevic et al ²²	148 patients with OCD diagnosis; several sites in NSW, Australia	Cross-sectional	SDS	No significant difference in SDS scores was found between participants with and without OCPD.
Stewart et al ⁴¹	476 patients with OCD; USA	Cross-sectional	WSAS	The responder group had higher psychosocial functioning at baseline than the non-responder group, and better initial psychosocial adjustment was found to be a predictor of IRT response.
Storch et al ¹⁴	87 treatment-seeking participants with a primary OCD diagnosis; 2 sites: Minnesota and Florida; USA	Cross-sectional	SDS	SDS total score was significantly and positively related to OCD symptom severity, anxiety, depression, and maladaptive interpretation of intrusions. Analyses revealed that the Y-BOCS Resistance/Control factor and depression fully mediated the relationship between OC symptoms and functional disability.
Tükel et al ²⁶	59 patients with a primary OCD diagnosis; Turkey	Randomised trial	SDS	Non-responders to the administered SSRI treatment scored significantly higher on the 3 SDS subscales than responders, even after adjusting for OCD symptom severity. The 3 subscales were positively correlated with OCD symptom severity. Greater work disability significantly predicted non-response to treatment.
Van Noppen et al ³⁷	36 patients with OCD; USA	Longitudinal	SDS	Patients who received group behavior therapy (GBT) improved significantly in overall functioning from pre- to post-test as well as from pre-test to 1-year follow-up. However, patients who received multi-family behavior therapy (MFBT) did not show significant improvement in functioning from baseline to either post-test or follow-up.

Table IIa. Continued

List of Abbreviations used in Table IIa

BDD	Body dysmorphic disorder	OCPD	Obsessive-compulsive personality disorder
BDNF	Brain-derived neurotrophic factor	PD	Panic disorder
GAD	Generalized anxiety disorder	PDA	Panic disorder with agoraphobia
GBT	Group behavior therapy	PTSD	Post-traumatic stress disorder
HC	Healthy control	RCT	Randomised controlled trial
IRT	Intensive residential treatment	SAD	Social anxiety disorder
MDD	Major depressive disorder	SAS-SR	Social Adjustment Scale-Self Report
MFBT	Multi-family behavior therapy	SDS	Sheehan Disability Scale
OC	Obsessive-compulsive	SSRI	Selective serotonin reuptake inhibitor
OCD	Obsessive-compulsive disorder	WSAS	Work and Social Adjustment Scale
		Y-BOCS	Yale-Brown Obsessive-Compulsive Scale

Clinical research

Reference	Study sample (N, number of sites, country)	Study methodology	PROM(s) used	Major findings
Albert et al ⁵²	151 patients with OCD; Italy	Cross-sectional	SF-36	Patients with OCD showed greater impairment in all domains of mental health-related quality of life, especially social functioning.
Andersson et al ⁸²	23 patients with OCD; Sweden	RCT	QOLI	At post-treatment, results indicated a non-significant trend on the EQ-5D with a small effect size of 0.24. The result for QOLI was non-significant.
Besiroglu et al ⁷⁷	25 health care-seekers with OCD and 23 non-health care-seekers with OCD; Turkey	Cross-sectional	WHO-QOL-103 TR	Individuals whose QOL is minimally impaired by OCD are less likely to seek health care compared to significantly affected patients.
Besiroglu et al ⁷⁵	43 patients with comorbid OCD and MDD and 67 patients with OCD only; Turkey	Cross-sectional	WHO-QOL-BREF-TR	The OCD-MDD group reported significantly lower physical and psychological health and social relationship domain scores compared with patients with OCD only.
Besiroglu et al ⁸⁰	53 patients with OCD; Turkey	RCT	WHO-QOL-BREF-TR	There was no significant difference between the pre and post-treatment quality of life domain scores. Social relationship scores at follow-up were associated with baseline compulsion severity.
Bobes et al ⁵⁵	36 patients with OCD; Spain	Cross-sectional	SF-36	OCD patients reported significantly lower mean scores on all SF-36 scales as compared to Spanish norms, especially in social functioning, role, emotional and mental health.
Brown et al ⁸⁶	15 patients with OCD; USA	RCT	Q-LES-Q	Results showed a significant improvement in overall sense of well-being following participation in a 12-week moderate-intensity exercise intervention.
Cordioli et al ⁸¹	47 patients with OCD; Brazil	RCT	WHO-QOL-BREF	Significant improvement in the quality of life in the four domains of QOL after 12 weekly cognitive behavioral group therapy sessions.
Dehlin et al ⁸⁵	5 patients with scrupulosity-based OCD; USA	Multiple baseline across participants design	QOLS	Patients showed a 26% increase in QOLS scores after undergoing ACT.
Cassin et al ⁷²	28 outpatients with OCD and 28 outpatients with comorbid OCD and MDD; Canada	Cross-sectional	Q-LES-Q	Patients with comorbid OCD and MDD scored significantly lower on Q-LES-Q subjective feelings, overall well-being, social relations and general activities.
Didie et al ¹⁸	210 patients with OCD, 45 patients with BDD and 40 patients with comorbid BDD and OCD; USA	Longitudinal	SF-36, Q-LES-Q	OCD subjects and BDD subjects had poorer quality of life as compared with the US population norms.
Dougherty et al ⁷⁹	30 patients with OCD (only 23 completers); USA	Longitudinal	Q-LES-Q	Pre-treatment and post-treatment analyses showed significant improvements in quality of life.

Table IIb. Summary of the sample, intervention, and outcome measures used in included studies that measured health-related quality of life using patient-reported outcome measures (PROMS).

Reference	Study sample (N, number of sites, country)	Study methodology	PROM(s) used	Major findings
Eisen et al ⁴⁹	197 patients with OCD; USA	Cross-sectional	Q-LES-Q	Marital status and symptom severity of obsessions and depression contributed to the degree of impairment in QOL. OCD patients showed marked impairment in domains such as the ability to work and perform household duties, subjective sense of well-being, social relationships and ability to enjoy leisure activities compared to community norms.
Farooqi & Rasul ⁷¹	60 patients with OCD; Pakistan	Cross-sectional	WHO-QOL-BREF	Female patients reported better overall QOL, especially in social and environmental domains as compared with male patients.
Fontenelle et al ⁵¹	53 patients with OCD and 53 community members; Brazil	Cross-sectional	SF-36	Patients with OCD reported significantly lower levels of QOL in all domains except bodily pain. Hoarding and washing symptoms contributed significantly for the decline in the social quality of life in OCD hoarders.
Gezginc et al ⁶³	25 pregnant outpatients with OCD and 25 pregnant healthy controls; Turkey	Cross-sectional	WHO-QOL-BREF	OCD pregnant women scored lower subscores in all 4 domains as compared to health controls. Also, OCD duration was negatively correlated to the psychological health domain.
Gururaj et al ⁷⁰	35 patients with OCD and 35 patients with schizophrenia; India	Cross-sectional	WHO-QOL-BREF	Patients with OCD reported better QOL in the physical and environmental domains as compared to patients with schizophrenia. However, in terms of psychological and social domains, both groups reported similar QOL.
Hertenstein et al ⁶⁶	73 patients with OCD; Germany	Longitudinal	WHO-QOL-BREF	At baseline, participants reported a significantly diminished psychological, social, physical, and global QOL compared to the German general population. The QOL was significantly improved after 12 months of treatment.
Hollander et al ²⁴	466 patients with OCD; USA	RCT	SF-36	Patients receiving escitalopram or paroxetine reported significant improvements on most SF-36 dimensions, but patients taking 20 mg/d escitalopram were seen to improve earlier in work-related functioning.
Hou et al ⁶⁵	57 outpatients with OCD and 106 healthy controls; Taiwan	Cross-sectional	WHO-QOL-BREF	OCD group reported lower QOL in the general, psychological and social relationship domains as compared to the control group. Also, severe obsession and compulsion symptoms and low social support were significantly correlated to poor QOL.
Huppert et al ²³	66 patients with OCD and 36 healthy controls; USA	Cross-sectional	Q-LES-Q	Greater severity of OCD was correlated to worse QOL. Results suggested a linear relationship between the Q-LES-Q and OCD severity. Individuals with OCD and comorbid disorders were more impaired than individuals with only OCD.

Table IIb. Continued

Clinical research

Reference	Study sample (N, number of sites, country)	Study methodology	PROM(s) used	Major findings
Akdede et al ⁶⁰	23 patients with OCD and 22 healthy controls; Turkey	Cross-sectional	WHO-QOL-BREF-TR	OCD patients reported worse QOL in the psychological and social domains. There were significant correlations between attention, visual tracking and working memory and the psychological, social and environmental domains of QOL.
Koran et al ⁵⁹	60 outpatients with OCD and U.S. population published norms (2474); USA	Cross-sectional	SF-36	Patients with OCD perceived the mental health domains of their quality of life as more impaired than the physical health domains. Severity of OCD was related to lower scores on the social functioning domain.
Koran et al ⁶⁴	147 patients with OCD, U.S. population published norms (2474); USA	RCT	SF-36	Both the active drug and placebo groups reported significant improvements in psychosocial domains of HRQOL. For subjects who went through 40 weeks of treatment with extended-release fluvoxamine, there were increased improvements in the psychosocial domains.
Kugler et al ⁶⁸	102 patients with OCD; USA	Cross-sectional	MOS-36	Social functioning QOL was significantly worse and physical health QOL was significantly better in OCD patients as compared to persons with PD, MDD and schizophrenia. Resistance against obsessive-compulsive symptoms mediated the relationship between obsessive-compulsive symptom severity and social functioning QOL.
Kumar et al ⁵⁸	31 patients with OCD and 30 healthy controls; India	Cross-sectional	WHO-QOL-BREF	OCD patients reported worse QOL as compared with healthy controls. Also, there was a negative correlation between cognitive appraisals (thought control, importance of thoughts and inflated responsibility) and psychological domains.
Masellis et al ⁷³	43 patients with OCD; Canada	Cross-sectional	IIRS	QOL was particularly affected by obsessional severity compared to compulsion severity. Comorbid depression severity greatly predicted poor QOL, accounting for 54% of the variance.
Moritz et al ¹¹⁶	79 patients with OCD and 32 healthy controls; Germany	Longitudinal	SF-36	OCD patients reported significantly decreased mean QOL scores for every domain as compared to healthy controls. Correlations with QOL were most evident for depression severity and number of OCD symptoms.
Norberg et al ⁶²	188 patients with OCD; USA	Cross-sectional	QOLI	OCD patient sample's total QOLI scores were at the 11th percentile in comparison to clinical norms.
Ooms et al ⁶¹	16 patients with OCD; Netherlands	Longitudinal	WHO-QOL-BREF	Baseline QOL scores of OCD patients were significantly lower in all domains as compared to a Dutch normative population. There were distinct improvements in the general score and in the physical, psychological and environmental domains following deep brain stimulation.

Table IIb. Continued

Reference	Study sample (N, number of sites, country)	Study methodology	PROM(s) used	Major findings
Rapaport et al ⁵⁰	521 patients with OCD, non-psychiatric community sample (67), MDD (366), chronic/double depression (576), PD (302), PTSD (139), dysthymia (315), SP (358), premenstrual dysphoric disorder (437); 11 multicenter trials; USA	Cross-sectional (retrospective data)	Q-LES-Q	OCD subjects showed greater impairment on the social relationship, family relationships, leisure, ability to function and vision items. Depression and anxiety comorbidity significantly predicted Q-LES-Q scores for OCD subjects.
Rodriguez-Salgado et al ⁵³	64 outpatients with OCD and 9151 respondents from the general population; Spain	Cross-sectional	SF-36	OCD patients had significantly decreased mean QOL scores for all SF-36 subscales except those related to physical health and pain in comparison to the general population.
Simpson et al ⁸³	108 patients with OCD. Study conducted at two academic outpatient Clinics; USA	RCT	Q-LES-Q	No significant difference in the rate of change in quality of life between the two groups (augmentation of SRIs with ERP versus stress management training), post-hoc analyses however revealed modest but significantly superior quality of life at study completion (post-test).
Solanki et al ⁶⁹	50 outpatients with OCD and 50 patients with schizophrenia; India	Cross-sectional	WHO-QOL-BREF	There was no statistically significant difference in the QOL between the OCD and schizophrenia group. Both groups scored the lowest on the social relationship domain.
Srivastava et al ⁵⁶	45 outpatients with OCD, 50 patients with MDD and 150 healthy controls; India	Cross-sectional	WHO-QOL-BREF	Compared with healthy controls, OCD patients reported a lower QOL in the physical well-being, psychological well-being, social and environmental domains. Compared to MDD patients, the QOL of patients with OCD was significantly higher in psychological well-being, social and environmental domains.
Stengler-Wenzke et al ⁵⁷	75 outpatients with OCD, 243 patients with schizophrenia and 315 respondents from the general population; Germany	Cross-sectional	WHO-QOL-BREF	Compared with general population, QOL of patients with OCD and schizophrenia was lower in all domains. OCD patients scored lower scores in the domains of psychological well-being and social relationship and overall QOL than patients with schizophrenia.
Stengler-Wenzke et al ⁷⁴	75 outpatients with OCD; Germany	Cross-sectional	WHO-QOL-BREF	Compulsions were found to be negatively associated with QOL. Depressive symptoms were also negatively associated with QOL.
Twohig et al ⁸⁴	79 patients with OCD; USA	RCT	QOLS	QOL improved in both conditions (ACT and progressive relaxation training) but was marginally in favor of ACT at post treatment.
Vikas et al ⁶⁷	32 patients with OCD and 30 patients with depression; India	Cross-sectional	WHO-QOL-BREF	OCD patients had the lowest scores in the psychological health domain whereas they had relatively high scores in the social relationship domains. OCD patients in comparison to depressed patients had significantly higher scores in QOL domains of physical and psychological health.

Table IIb. Continued

Clinical research

List of Abbreviations used in Table IIb

ACT	Acceptance and Commitment Therapy	QOL	Quality of life
BDD	Body dysmorphic disorder	QOLI	Quality of Life Inventory
ERP	Exposure and Response Prevention	QOLS	Quality of Life Scale
IIRS	Illness Intrusiveness Rating Scale	RCT	Randomised controlled trial
MDD	Major Depressive Disorder	SF-36	Short Form (36) Health Survey
MOS-36	Medical Outcomes Study SF-36 Health Survey	SP	Social phobia
OCD	Obsessive-compulsive disorder	SRIs	Serotonin reuptake inhibitors
PD	Panic Disorder	WHOQOL-	The World Health Organization Quality of Life-BREF
PTSD	Post-traumatic stress disorder	BREF	
Q-LES-Q	Quality of Life Enjoyment and Satisfaction Questionnaire	WHOQOL-	WHO Quality of Life-BREF-Turkish Version
		BREF-TR	

Reference	Study sample (N, number of sites, country)	Study methodology	PROM(s) used	Major findings
Aardema et al ¹⁶¹	85 OCD patients; Canada	Cross-sectional	OBQ, PI-R	The relationship between obsessive beliefs and OC symptoms decreased significantly when inferential confusion was controlled. Conversely, the relationship between inferential confusion and OC symptoms was not substantially affected when obsessive belief was controlled.
Abramowitz et al ¹⁷¹	77 OCD patients; 2 sites; Minnesota & Connecticut, USA	Cross-sequential	OCI-R	Analyses suggest that OCI-R is sensitive to treatment effects and that pre- to post-test change on this instrument reflects improvement in OCD and other symptoms following CBT.
Alonso et al ¹²⁷	50 OCD patients, 30 healthy controls; Spain	Cross-sectional	OBQ	A correlation between OBQ-44 domains and regional grey matter was not observed in OCD patients. Study also suggests a significant correlation between OC-related dysfunctional beliefs and morphometric variability in the anterior temporal lobe.
Alonso et al ¹⁶⁹	141 OCD patients; Spain	Cross-sectional	OBQ	Change in dysfunctional beliefs was not affected by the COMT and BDNF genotype in isolation. Their interaction, however, had an effect on the responsibility/overestimation of threat and over importance/need to control thoughts scores.
Aksaray et al ¹⁵⁷	23 OCD female & 26 GAD female patients; Turkey	Cross-sectional	MOCI	Women with OCD were more sexually nonsensual avoidant and anorgasmic than the women with GAD. The patients with fear of contamination obsessions on MOCI were more sexually nonsensual, and avoidant than obsessive compulsives with other types of fears.
Altemus et al ¹⁸⁵	8 OCD patients; USA	Longitudinal	MOCI	Subjects reported no significant improvements in OC symptoms on MOCI or Y-BOCS following 8 weeks open trial of flutamide. However, feelings of aggressiveness did fall.
Andersson et al ⁸²	23 OCD patients; Sweden	Longitudinal	Y-BOCS-SR, OCI-R	Participants reported statistically significant improvements in self-rated OCD symptoms (Y-BOCS & OCI-R) following a 15-weeks of internet-based CBT.

Table IIc. Summary of the sample, interventions, and outcome measures used in included studies that measured symptoms using PROMs.

Reference	Study sample (N, number of sites, country)	Study methodology	PROM(s) used	Major findings
Anholt et al ¹³⁹	66 OCD, 20 panic &/ or agoraphobia, 20 PG patients, 30 controls; Netherlands	Cross-sectional	OBQ, PI-R	OCD patients reported higher OBQ-87 scores than both panic patients and normal controls, but did not differ from the pathological gambling patients. Pathological gamblers however, reported no increase in OCD symptoms. The OC spectrum theory for pathological gambling is questionable.
Anholt et al ¹²⁶	50 tic-free OCD, 19 OCD +tic, 18 TS w/o OCD patients, 30 controls; Netherlands	Cross-sectional	OBQ, PI	Tic-free OCD patients scored higher OBQ-87 than TS patients while no differences were found between OCD with or without tic patients. Thus, dysfunctional beliefs have no discriminative power with respect to OCD with or without tic patients.
Anholt et al ¹⁹⁰	120 OCD patients; Netherlands	Cross-sectional	PI-R	Differences in neither the measurement between self- and clinician-administered measures nor the way severity is being calculated can account for the differences between the PI-R and the Y-BOCS Severity scale. Findings suggest that the two scales measure unrelated features of OCD.
Anholt et al ¹⁷⁴	104 OCD patients; Netherlands	Cross-sequential	OBQ, PI-R	OBQ-44 and OBQ-87 were compared for sensitivity to treatment change and other OCD measures. Results revealed identical medium effect size, the limitation of OBQ as a primary measure of treatment change and a lack of symptom dimension association to OBQ pre-post- treatment changes.
Arntz et al ¹⁰⁴	27 OCD, 37 non-OCD anxiety patients, 28 non patients; Netherlands	Cross-sectional	PI	Subjective OCD-like experience and checking behaviors were higher in OCD patients being exposed to a high responsibility classification task than in all other groups. Although the PI checking subscale correlated with their subjective ratings, it was not correlated with their checking behaviors, suggesting the causal role of responsibility in OCD.
Baptista et al ¹⁴¹	24 OCD and 24 Medical Clinic(MC) patients for chronic diseases; 2 sites; Brazil	Cross-sectional	OBQ	MC group scored higher than the OCD group in domains of OBQ-Tolerance for Uncertainty, Threat estimation, Responsibility and Perfectionism. The same findings occurred with DAS, which was significantly correlated with the OBQ.
Black et al ¹⁹⁴	38 non-depressed OCD patients; USA	RCT	MOCI, SCL-90-R	Respondents were less symptomatic on their MOCI doubting/conscientious and checking scores and marginally better on the SCL-90-R positive symptom distress index, given 12 weeks of treatment with paroxetine, placebo or CBT.
Bortocello et al ¹⁷⁷	104 OCD patients; Brazil	Longitudinal	OBQ	OBQ-44's sensitivity to treatment change following CBGT was good and all 3 belief domains declined significantly, hence proving the quality of this measure.
Brakoulias et al ³³	154 OCD patients; Australia	Cross-sectional	OBQ	The relationship between 5 Y-BOCS-derived OC symptom dimensions and the 3 OC cognitive Domains (OBQ) was examined. The symmetry/ordering dimension was associated with increased perfectionism/intolerance of uncertainty, the unacceptable/taboo thoughts dimension was associated with increased importance/control of thoughts and the doubt/checking dimension was associated with increased responsibility/threat estimation.

Table IIc. Continued

Clinical research

Reference	Study sample (N, number of sites, country)	Study methodology	PROM(s) used	Major findings
Brakoulias et al ¹⁴⁸	154 OCD patients; Australia	Cross-sectional	VOCI, SDS	VOCI obsessions were found to be correlated with higher usage rates of both psychotropic agent and antipsychotic agent.
Calamari et al ¹⁵¹	367 OCD patients; USA & Canada	Cross-sectional	OBQ, Y-BOCS-SR	Relations between belief and symptom -based subgroups were examined. Symmetry symptom subgroup membership was modestly associated with membership in the Perfectionism/Certainty beliefs subgroup.
Careau et al ¹⁶⁰	83 OCD patients, 213 student controls; Canada	Cross-sectional	OBQ	The relationship between 5 different childhood experiences to 5 conceptually matched OBQ belief domains was examined. Beliefs related to responsibility, threat perception, and perfectionism showed association to their theoretically related early experiences. Threat perception and sociotropy experiences were closely related to most OBQ belief domains.
Chik et al ⁹⁹	88 OCD, 44 OAD patients, 48 student controls; USA	Cross-sectional	OBQ, OCI-R	OCD patients with high, OCD-H or low, OCD-L dysfunctional beliefs differed in their 1) metacognitive beliefs which correlated with the OC symptom measures in the OCD-H and 2) monitoring tendencies which correlated with the OC symptom measures in the OCD-L.
Choi et al ¹⁶⁶	22 OCD patients and 22 matched healthy controls; South Korea	Cross-sectional	MOCI	Regional brain gray matter volumes were not correlated with the MOCI scores in patients with OCD despite significant volume reduction in bilateral planum polare.
Clark et al ⁸⁸	56 OCD patients, 38 non-obsessional psychiatric outpatients, 35 community adults and 403 undergraduate students; Canada, Australia, USA	Cross-sectional	CBOCI, PI-WSUR	A validation study of CBOCI. The OCD group scored significantly higher on the CBOCI total score than all other groups.
Dastgiri & Nateghian ¹⁰²	25 OCD, 25 GAD patients and 25 normal subjects; Iran	Cross-sectional	PI	Results revealed a significant correlation between PI scores and worry. While PI is able to differentiate OCD and GAD from normal subjects, PI is unable to differentiate OCD from GAD subjects unless worry score is being controlled.
de Berardis et al ¹⁴⁶	112 OCD patients; Italy	Cross-sectional	MOCI	TAS-20 (measure for Alexithymia) total score and sub factors positively correlated with score for item #11 on the Y-BOCS, severity of OCD (as measured by MOCI) and MADRS scores (depression measure).
Dehlin et al ⁸⁵	5 scrupulosity-based OCD patients; USA	Longitudinal	OCI-R	Treatment outcomes in 5 scrupulosity-based OCD patients following 8 sessions of ACT were assessed. Average daily compulsions and avoided valued activities decreased significantly.
Doyle et al ¹³⁵	62 patients with schizophrenia treated with clozapine, 35 OCD patients; Ireland	Cross-sectional	OCI	The OCD group reported significantly more symptoms for all OCI subscales compared to the clozapine group. In terms of profile, the clozapine group scored highest on the Doubting scale, a cognitive symptom whereas the OCD group scored highest on Washing, a behavioral symptom. Both groups reported greater distress with cognitive rather than behavioral symptoms.

Table IIc. Continued

Reference	Study sample (N, number of sites, country)	Study methodology	PROM(s) used	Major findings
Einstein & Menzies ¹⁴⁹	60 OCD patients; Australia	Cross-sectional	PI, OCI-SV	Magical ideation (MI) was found to correlate highly with impaired control over mental activities, and urges and worries about losing control over motor behaviors in PI. It also attained positive correlations with the checking subscales on the PI and on the neutralising, obsessing, and hoarding scales of the OCI-SV. Neither the PI nor the OCI-SV contamination/washing scales were significantly correlated with MI.
Einstein & Menzies ¹¹⁹	11 cleaning & 20 checking OCD patients, 19 PD patients, 21 controls; Australia	Cross-sectional	MOCI, OCI-SV	OCD group reported magical ideation scores higher than both the PD group and normal subjects. OCD washers obtained higher MI scores than OCD checkers but they did not differ on scores on MOCI and OCI-SV.
Einstein & Menzies ¹⁷⁰	34 OCD outpatients; Australia	Cross-sequential	MOCI, OCI-SV, PI	OC symptoms decreased significantly following CBT. MI improvement was significantly correlated with improvement on both the PI and the OCI-SV.
Emmelkamp et al ¹⁰⁸	89 OCD, 45 neurotic patients & 79 normal subjects; Netherlands	Longitudinal	MOCI, LOI	The MOCI may be used to evaluate effects of treatment, but it is less sensitive than target ratings of obsessional problems. It reliably discriminates between obsessional patients and normal, patients with anorexia nervosa and anxiety disorders; however, it failed to discriminate the obsessionals from depressives.
Enander et al ¹⁹⁵	48 OCD patients; Sweden	RCT	DOCS, OCI-R	DOCS found to show fair sensitivity treatment effects following Internet-delivered CBT with main intervention being exposure with response prevention.
Enright et al ¹⁶⁴	32 OCD patients and 32 with OAD; UK	Cross-sectional	MOCI	A distinction between checkers and non-checkers in the OCD group was made using MOCI. Non-checkers displayed greater negative priming across all presentation speeds compared to checkers.
Ettelt et al ¹⁴⁹	70 OCD patients & their 139 relatives, 70 control & their 134 relatives; 4 sites; Germany	Cross-sectional	PI	Significant correlations of cognitive impulsiveness (BIS-11 subscale) were found with PI subscales of aggressive thoughts concerning self/others, aggressive impulses concerning self/ others, checking and symmetry separately. No other subscale of impulsiveness was significantly associated with OCD symptoms.
Exner et al ¹⁰	19 OCD patients, 19 matched controls; Germany	Cross-sectional	PI-R	Study revealed that episodic and semantic memory performance, but not working memory, reduced significantly in OCD subjects compared to controls. Episodic memory performance in both samples was significantly related to the Padua Rumination and Checking, even after controlled for depression and OC symptom severity. Linear regression revealed that Rumination was most closely related to episodic memory performance in both samples above Checking.
Filomensky et al ¹³¹	35 OCD, 21 BP patients, 24 compulsive buyers; Brazil	Cross-sectional	PI-WSUR	OCD patients scored higher on OC symptoms than those with CB and BD; particularly higher on the PI contamination/ washing and checking dimensions; however, they did not score higher on any hoarding dimension.
Fontenelle et al ¹³³	23 OCD patients and 40 obese individuals; Brazil	Cross-sectional	SCL-90	Patients with OCD had significantly higher obsessive-compulsive scores than obese non-binge and obese binge eaters.

Table IIc. Continued

Clinical research

Reference	Study sample (N, number of sites, country)	Study methodology	PROM(s) used	Major findings
Fontenelle et al ¹³⁷	34 OCD, 30 SAD patients; Brazil	Cross-sectional	OCI	Patients with OCD reported significantly lower rates of exposure to traumatic events. Statistical analyses revealed that the OCI scores better predicted the variance on Dissociative Experience Scale scores in the OCD sample, while the Liebowitz Social Anxiety Scale did so better in the social anxiety group.
Fontenelle et al ¹⁵⁶	53 OCD patients, 53 matched individuals; 3 sites; Brazil	Cross-sectional	OCI-R	Patients with OCD displayed greater levels of affective sympathy and personal discomfort than controls. Analyses revealed that severity of hoarding symptoms in OCD correlated with empathic concern, fantasy, and personal discomfort.
Fontenelle et al ⁵¹	53 OCD patients, 53 matched controls; 2 sites; Brazil	Cross-sectional	OCI-R	Washing symptoms explained 31% of the variance of limitation due to physical health problems. Other analyses however concluded that depressive, but not obsessive–compulsive symptoms, explained the remaining SF-36 dimensions.
Fontenelle et al ³²	40 OCD patients, 40 healthy controls; Brazil	Cross-sectional	OCI-R	Patients with OCD displayed higher plasma levels of CCL3, CXCL8, sTNFR1, and sTNFR2 than controls. The levels of sTNFR1 correlated positively with washing symptoms while CCL24 levels correlated negatively with hoarding.
Fontenelle et al ¹⁶⁸	40 OCD patients, 40 healthy controls; Brazil	Cross-sectional	OCI-R	Patients with OCD displayed lower levels of BDNF and significantly increased levels of NGF as compared to healthy controls. A positive correlation between both NGF and GDNF and severity of washing symptoms was also found.
Fritzler et al ¹⁷⁹	9 OCD patients; USA	Cross-sectional	MOCI, Y-BOCS-SR	Subjects in the Delayed treatment condition following self-directed ERP showed no significant improvements. However, as a combined group with those in the Immediate treatment condition, improvements were observed in outcome measures of Y-BOCS and MOCI.
Fullana et al ¹⁰³	56 OCD patients, 40 healthy controls; Spain	Cross-sectional	PI	OCD patients scored higher in all PI subscales and were also more anxious and depressed than controls. Results showed that patients scored higher on Neuroticism, Sensitivity to Punishment and Psychoticism than normal controls; scored lower on Extraversion. No differences in Sensitivity to Reward found.
Grabe et al ¹⁵⁵	70 OCD patients; Germany	Cross-sectional	HZI/HOCI	The dimensions 'Checking' and 'Symmetry and Ordering' were significantly related to dissociative symptomatology. A clear-cut lack of association was found in 'Washing and Cleaning', 'Counting and Touching' and 'Aggressive Impulses and Fantasies'. HZI dimensions significantly discriminated patients with high from patients with low dissociative symptomatology.
Grabe et al ¹⁵⁸	61 OCD patients; Germany	Cross-sectional	HZI/HOCI	In female patients, controlling behavior and obsessions and compulsions associated with counting, touching and talking were associated with bulimia whereas obsessions associated with words, pictures or thought-chains were related to drive for thinness, thus pointing to a differential gender and symptom-specific relationship between OCD and ED.

Table IIc. Continued

Reference	Study sample (N, number of sites, country)	Study methodology	PROM(s) used	Major findings
Greist et al ¹⁸⁰	325 non-depressive OCD patients; USA	RCT	MOCI	Analysis of the MOCI administered at baseline and endpoint revealed significant improvement in pooled sertraline group compared to placebo group.
Hashimoto et al ¹⁶²	63 OCD patients, 50 healthy controls; Japan	Cross-sectional	PI	For the logical memory tasks, a positive association was observed with PI's washing scale but a negative association was observed with PI's precision scale. Positive correlation between interference scores and PI'S precision scale was also observed. Results support the hypothesis that different symptoms may represent distinct and partially overlapping neurocognitive networks in OCD.
Hermans et al ¹²⁰	17 OCD patients, 17 non-anxious control; Belgium	Cross-sectional	MOCI, PI	General reality monitoring ability, and selective reality monitoring ability for anxiety relevant actions in was examined. There was no difference observed for patients that reported low or high frequencies of checking behavior.
Hunter et al ¹⁹³	198 OCD patients, 1457 adult psychiatric outpatients in all; USA	Cross-sectional	SCL-90	SCL diagnostic scales were shown to differentiate patients positive for each of the eight psychiatric disorders from other psychiatric patients who did not have that disorder.
Huppert et al ¹²⁵	128 OCD, 109 PTSD, 63 OAD patients, 40 students; USA	Cross-sectional	OCI	Study revealed presence of relationship between symptoms of OCD and PTSD in all samples, largely accounted for by a combination of symptom overlap and depression.
Jiménez-Murcia et al ¹³²	90 female patients (30 OCD, 30 anorexia nervosa, 30 bulimia nervosa); Spain	Cross-sectional	MOCI	Higher MOCI scores and Eating Disorder Inventory (EDI)-Perfectionism scores predicted higher EDI score. Thus, severity of ED symptomatology increases as OC symptomatology increases.
Jones & Menzies. ¹¹⁰	21 OCD patients, 10 controls; Australia	RCT	MOCI, LOI	11 patients who received the Danger Ideation Reduction Therapy (DIRT) observed significantly greater improvements from pre-treatment to after-treatment on all measures including MOCI and LOI.
Julien et al ¹⁵³	126 OCD patients; Canada	Cross-sectional	OBQ, PI-R	Specificity of belief domains in OCD symptom subtype was investigated. Analyses revealed that participants in the rumination subtype scored higher on Importance/Control of Thoughts than those in the washing subtype when anxiety was controlled. Responsibility/Threat Estimation predicted rumination scores, Perfectionism/Certainty predicted checking and precision scores, and Importance/Control of Thoughts predicted impulse phobia scores when negative mood states were controlled.
Karadag et al ¹⁶³	32 OCD patients and 31 healthy controls; Turkey	Cross-sectional	MOCQ	MOCQ was used to define checkers from non-checkers using cut-off score of 5 and above. The OCD patients with checking compulsions were no different from the non-checking group for memory of OC relevant material and confidence.
Kearns et al ¹⁷⁶	24 OCD patients; Ireland	Longitudinal	MOCI	Significant reduction in clinical symptom ratings on completion of group based CBT for OCD patients was observed in measures including MOCI.

Table IIc. Continued

Clinical research

Reference	Study sample (N, number of sites, country)	Study methodology	PROM(s) used	Major findings
Keijsers et al ¹⁸³	40 OCD patients; Netherlands	Cross-sectional	MOCI	No differential treatment effects between exposure in vivo alone and response prevention alone could be found, although ritualistic behavior was less strongly affected by exposure in vivo following response prevention.
Kennedy et al ¹⁹²	280 patients with 6 diagnoses: 33 with OCD, others with major depression, panic disorder, GAD, social phobia and mixed anxiety and depression. 31 graduate students as comparison group	Cross-sectional	SCL-90	Each diagnostic group had a significantly high score on its corresponding subscale. The OCD group had only 2 high subscale scores – obsessive-compulsive and phobic anxiety subscale scores. OCD subjects had the lowest general anxiety and depression scores among the 6 diagnostic groups. Those with GAD endorsed many OCD symptoms.
Kirkby et al ¹⁸⁹	13 OCD patients; Australia	Longitudinal	PI-R	Across three computer treatment sessions that provided vicarious exposure and response prevention for OCD, all subjects increased their vicarious exposure behaviors that predicted symptom reduction on PI.
Krochmalik et al ¹⁷⁸	5 OCD patients; Australia	Longitudinal	MOCI, PI	On the MOCI, 4 of the 5 subjects (unchanged by ERP) met recovery criteria following DIRT. Changes were maintained at follow-up.
Kyrios & Iob. ¹⁰⁰	15 OCD patients, 15 normal controls; Australia	Cross-sectional	PI	Significant associations were found between interference scores of OCD- threat words (masked only) with both the depression and anxiety symptom measures, but not with OC symptom severity (measured on PI).
Li et al ¹⁸⁴	16 OCD patients; USA	Double-blind, placebo-controlled, crossover study	SCL-90	Significant reduction in the SCL-90R obsession and anxiety scale was observed with both risperidone and haloperidol compared to placebo augmentation of serotonin reuptake inhibitors in the treatment of OCD patients. On the depression scale, scores of those on risperidone but not haloperidol treatment separated out from placebo.
López-Solà et al ¹⁰⁷	110 OCD patients, 237 non-clinical sample; Spain	Cross-sectional	DOCS, OBQ	The association between OC symptom dimensions in DOCS and obsessive beliefs was examined. In OCD patients, Contamination, Responsibility for Harm, and Unacceptable Thoughts were predicted by OBQ-Responsibility. For the Symmetry dimension the OBQ-Perfectionism domain emerged as the only significant predictor.
Mantovani et al ¹⁸⁷	18 OCD subjects through stringent recruitment; USA	RCT (Sham)	Y-BOCS-SR	Correlation between changes in Y-BOCS-SR and cortical excitability measures was examined and results suggested that low-frequency repetitive transcranial magnetic stimulation are supportive of the role of SMA in the modulation of OCD symptoms.
Mass et al ¹³⁶	15 OCD, 50 schizophrenia (25 with severe negative symptoms) and 25 alcohol dependence patients; Germany	Cross-sectional	HZI-K/HOCI	OCD subjects had the highest compulsion scores but the obsessions scores on HZI-K did not differ among the groups.

Table IIc. Continued

Reference	Study sample (N, number of sites, country)	Study methodology	PROM(s) used	Major findings
Muller et al ¹⁰⁹	31 OCD, 18 with TS, 13 with Parkinson's Disease & 46 controls; Germany	Cross-sectional	MOCI, HZI-K	On most subscales -Checking, Ordering, and Counting/ touching, TS patients scored higher than controls but reported fewer symptoms than OCD patients, particularly on the MOCI subscales 'Checking' and 'Slowness/ Repetition' as well as on the MOCI total score and on the HZI subscales 'Cleaning' and 'Obsessive Thoughts'.
Murayama et al ¹¹²	22 OCD, 19 controls; Japan	Cross-sectional	MOCI	Both checkers and washers were compared with the controls on a symptom provocation task on fMRI. The checkers showed slightly higher activation in the left caudate and left AC which saw a positive correlation between activation and symptom severity. The washers showed higher activation in several bilateral cortico-cerebellar regions which saw a positive correlation between symptom severity and the bilateral fronto-temporal gyrus.
Nakamae et al ¹⁶⁷	23 non-medicated OCD patients, 23 healthy controls; Japan	Cross-sectional	OBQ	The relationship between gray matter volume and each dimension of OBQ was explored. Only a significant negative correlation was found between gray matter volume and OBQ-(over-importance and over-control of thoughts) scores in the left amygdala.
Niemeyer et al ¹²⁹	34 OCD, 34 healthy controls; Germany	Cross-sectional	OBQ, Y-BOCS-SR, OCI-R	Metacognition (measured on OBQ) contributed significantly but modestly to OC symptoms (measured on the OC scales) after responsibility was controlled for, and conversely responsibility made a significant contribution after controlling for metacognition.
O'Connor et al ¹⁷¹	44 OCD patients; Canada	Cross-sequential	PI, OBQ	After 20 weeks of treatment s (cognitive appraisal model, exposure and response prevention or inference-based approach), all groups showed a significant reduction in scores including PI. Participants with high levels of obsessional conviction showed greater benefit from IBA than CAM.
Okada et al ¹¹³	12 OCD subjects and 12 matched controls; Japan	Cross-sectional	MOCI	The study found that oxy-Hb changes in the OCD group during the Stroop color-word task (SCWC) were significantly smaller than those in the control group, especially in the frontopolar cortex. No significant correlations between the SCWC score and age, FIQ, and MOCI score.
Olantunji et al ¹⁰⁶	30 OCD and 30 non-clinical controls; USA	Cross-sectional	DOCS	DOCS score was found to correlate inversely with the disengagement efficiency score when erotic images served as the distractor, indicating that OCD subjects showed a weakened ability to disengage their attention.
Overbeek et al ¹⁸²	120 OCD patients for baseline ratings and 72 for post-treatment ratings; Netherlands	Longitudinal	MOCI	Severity of OCD symptoms on the 120 patients following a combined psychopharmacologic and behavioral therapy differed for depressed and nondepressed on the anxiety and depression measures, but not OCD measures. Post-treatment scores on YBOCS and MOCI were also found to be worse for depressed OCD patients despite the lack of difference at baseline.

Table IIc. Continued

Clinical research

Reference	Study sample (N, number of sites, country)	Study methodology	PROM(s) used	Major findings
Peng et al ¹²²	100 OCD, 38 OCD + other psychosis patients, 101 controls, 47 healthy OCD's relatives; China	Cross-sectional	OCI-R	OCD patients with or without comorbid psychosis scored higher in motor coordination and total neurological soft signs (NSS) than controls, with no significant difference between them in general.
Radomsky et al ¹²⁸	33 OCD patients, 143 students; Canada	Cross-sectional	OBQ, VOI	The compulsive checking group reported greater trait anger, but not greater anger expression, than the control group. Beliefs concerning perfectionism and intolerance of uncertainty were positively correlated with anger expression and trait anger among compulsive checkers but not among the control group.
Rector et al ¹⁴²	14 OCD probands, their 14 1st degree relatives, 87 normal controls;	Cross-sectional	OBQ	1st degree relatives scored significantly higher than controls on the OBQ domains- inflated responsibility and overestimation of threat. In addition, relatives of early onset OCD probands scored significantly higher than controls on both the inflated responsibility and overestimation of threat domain and the domain tapping perfectionism and intolerance of uncertainty.
Rubenstein et al ¹¹⁵	50 OCD, 69 normal weight bulimia nervosa patients & 28 controls (all females); USA	Cross-sectional	MOCI, SCL-90-R (OC)	Study confirmed that OCD patients scored higher than both normal volunteers and bulimics, and bulimics scored higher than normal volunteers on the OC subsection of the SCL-90-R and on the MOCI.
Rufer et al ¹⁵⁴	50 OCD patients; Germany	Cross-sectional study	HZI/ HOI	The checking dimension was most strongly related to dissociation, followed by the symmetry/ordering and obsessive thoughts dimensions. Multiple regression analyses revealed that: (1) only the checking dimension showed an independent positive correlation with dissociation, and (2) only higher scores on the DES subscale "amnesic dissociation" were associated with higher scores for checking compulsions.
Salkovskis et al ¹²¹	83 OCD, 48 anxiety & 218 non-clinical participants; UK	Cross-sectional	MOCI, OCI	Responsibility Attitude Scale (RAS) & Responsibility Interpretations Questionnaire (RIQ) were significantly correlated to both MOCI & OCI, indicating that the two responsibility scales are strong predictors of obsessions.
Scarrabelotti et al ¹⁰¹	20 OCD patients and 151 controls; Australia	Cross-sectional	PI	After controlling for depression, neuroticism and responsibility were significant predictors of discomfort from obsessions and compulsions (PI) in both the OCD and normal sample, while extraversion and psychoticism were not important.
Selvi et al ¹⁸¹	57 OCD patients; Turkey	Longitudinal	OBQ	Patients had reduced scores on OBQ-44 following 12 weeks of SSRI treatment. Mean changes in OBQ-44 Importance & Control of Intrusive Thoughts subscale of responders were significantly higher than those of SSRI-resistant patients.
Shin et al ¹¹¹	30 OCD patients and 30 healthy controls; South Korea	Cross-sectional	MOCI	The MOCI score was found to be negatively correlated with Immediate Presence and Accuracy, Delayed Presence and Accuracy, Immediate Retention, and Organization scores on the ROCF. This study indicates that people with OCD have poor memory function and organizational deficits.

Table IIc. Continued

Reference	Study sample (N, number of sites, country)	Study methodology	PROM(s) used	Major findings
Simpson et al ¹⁹⁶	56 OCD + eating disorder patients; USA	Longitudinal	Y-BOCS-SR	Significant decrease in OCD severity, measured by Y-BOCS was observed in patients following a residential treatment program
Solem et al ¹⁷³	83 OCD patients; Norway	Longitudinal	OBQ	Y-BOCS & OBQ were administered at pre-, post- treatment and follow ups to OCD patients undergoing ERP and results showed significant improvements in symptoms, metacognition score, responsibility and perfectionism.
Souza et al ¹²³	64 OCD, 33 social phobia, 33 panic disorder, 130 controls; Brazil	Longitudinal	OCI-R	OCI's sensitivity to change was evaluated by comparing changes in its total score administered before and after CBGT and by comparing these to changes in Y-BOCS scores. Analyses revealed that OCI-R showed a good ability to assess the effects of treatment in OCD patients.
Starcevic et al ²²	148 OCD participants, of which 70 had OCPD and 78 without; Australia	Cross-sectional	VOCI, SCL-90-R	Results on VOCI showed that all OCD symptom dimensions except for contamination and checking were significantly more prominent in participants with OCPD. OCPD participants also scored significantly higher on all dimensions of psychopathology based on SCL-90-R.
Stein et al ¹³⁴	17 OCD, 12 trichotillomania and 14 borderline personality disorder patients	Cross-sectional	LOI	Trichotillomania and borderline personality disorder patients had significantly lower scores of obsessive-compulsive symptoms than OCD patients.
Storch et al ¹⁴	87 OCD patients; 2 sites; Minnesota & Florida; USA	Cross-sectional	OCI-R	Factors associated with OCD related functional disability were examined. Depressive symptoms and the extent to which a patient attempts to resist and is able to control OCD symptoms predict functional disability strongly.
Taylor et al ¹⁴⁵	248 OCD patients; 12; USA, Canada & Australia	Cross-sectional	PI, OBQ	Given PI subscales and OBQ (inflated responsibility, perfectionism and controlling one's thought), analyses revealed significant main effects. There was no evidence that beliefs interact in their effects on OC symptoms.
Thiel et al ¹⁸⁸	75 female inpatients with anorexia or bulimia nervosa; 29 met criteria for concomitant OCD; Germany	Longitudinal	HZI/HOCI	Clinically significant change, as reflected by improvement in scores on the Eating Disorder Inventory, was seen more often in patients without concomitant OCD, but this trend was not statistically significant. The patients whose eating disorders were most improved at follow-up also showed the highest reduction of obsessions and compulsions.
Tumkaya et al ¹¹⁴	42 OCD patients and 42 healthy controls; Turkey	Cross-sectional	MOCI	There were significant correlations between situational awareness scores and slowness and doubt scores of MOCI in OCD patients. Results indicated that (I) OCD patients have problems of perception, integration, and comprehension of complex visual perceptions; (II) situation awareness deficits associated with severity and prevalence of obsessions and compulsions.
Tynes & Winstead. ¹⁴⁴	41 OCD patients; USA	Retrospective	MOCI	Total BDI score was found to be significantly correlated with total MOCI score in the 41 participants. Checking was correlated with Retarded depression while doubting correlated with both Guilty depression and Retarded depression.

Table IIc. Continued

Clinical research

Reference	Study sample (N, number of sites, country)	Study methodology	PROM(s) used	Major findings
Tolin et al ¹³⁸	77 OCD patients, 35 anxious control; USA	Cross-sectional	OBQ, OCI-R	Thought Control Questionnaire- Punishment scale correlated significantly with the OBQ-44 Importance/Control of Thoughts scale. Regression revealed that beliefs about the Importance/Control of Thoughts accounted for the relations between OCD and the use of Punishment as a thought control strategy.
Tolin et al ¹⁵⁰	99 OCD patients; USA	Cross-sectional	OCI	Relationship between OCD symptoms and obsessional beliefs was explored. Washing was predicted by responsibility/threat estimation beliefs. Checking/doubting was not predicted by any obsessional beliefs. Hoarding was predicted by perfectionism/ certainty beliefs. Neutralizing was predicted by responsibility/ threat estimation beliefs. Obsessing was predicted by importance/control of thoughts and perfectionism/certainty beliefs. Ordering was predicted by perfectionism/ certainty beliefs.
van Balkom et al ¹⁸⁶	117 OCD patients; Netherlands	RCT	PI-R, SCL-90	Study aimed to investigate the differential efficacy of cognitive therapy or exposure in vivo with response prevention for OCD versus the sequential combination with fluvoxamine. Results revealed decreases in OC symptom scales (including PI-R and SCL-90) across all 4 treatments, but they did not differ among each other.
van Noppen et al ¹⁷⁵	90 OCD patients; USA	Longitudinal	Y-BOCS-SR	A significant decrease was observed in the 90 OCD subjects on the Y-BOCS-SR scores; (mean \pm SD) 21.8 ± 5.6 at baseline and 16.6 ± 6.4 after the 10-week treatment of behavioral group therapy.
van Oppen et al ¹⁹¹	63 OCD patients; Netherlands	Longitudinal	PI-R	PI-R demonstrated not only significant treatment effects, but also large effect sizes, thereby providing evidence of its sensitivity to change. The PI-R and the Y-BOCS were comparable in terms of reliable change and clinical significance.
Victoria et al ¹⁶⁵	48 OCD patients, 24 controls; Brazil	Cross-sectional	OCI-R	Positive correlations between reaction time to content-specific stimuli and OC symptom severity was found, suggesting that OCD patients experience difficulty in disengaging attention from personally salient stimuli.
Vulink et al ¹⁴³	101 female OCD outpatients; Netherlands	Cross-sectional	Y-BOCS-SR	59 patients reported an exacerbation of OCD symptoms during premenstrual period, 9 during menopause and 17 patients during pregnancy, whereas 11 patients mentioned improvement of OCD symptoms during pregnancy.
Wahl et al ¹³⁰	34 OCD, 34 MDD; Brazil	Cross-sectional	OCI-R	OCI-R scores were significantly higher in OCD patients as compared to patients with major depressive disorder.
Wellen et al ¹⁴⁰	92 OCD and 376 non-OCD subjects; USA	Cross-sectional	LOI	The relationship between the factors, OCD and OCPD was evaluated using logistic regression. Five factors underlying the LOI were identified. Obsessional ruminations and compulsions, organizing activities, and contamination fears may indicate OCD, and ordering and arranging symptoms indicate OCPD.

Table IIc. Continued

Reference	Study sample (N, number of sites, country)	Study methodology	PROM(s) used	Major findings
Wheaton et al ¹⁵²	135 OCD patients; 3 sites; USA	Cross-sectional	DOCS, OBQ	Using DOCS and OBQ, contamination symptoms were predicted by responsibility/threat estimation beliefs, symmetry symptoms were predicted by perfectionism/certainty beliefs, unacceptable thoughts were predicted by Importance/control of thoughts beliefs and symptoms related to being responsible for harm were predicted by responsibility/threat estimation beliefs.
Woo et al ¹²⁴	91 OCD patients, 702 students; Korea	Cross-sectional	OCI-R, PI-WSUR	The receiver operating characteristic analyses showed that the OCI-R is an effective screening tool for OCD.
Wootton et al ³⁸	22 OCD patients; Australia	Longitudinal	OCI-R	Following an 8-week online CBT course, OCD participants improved significantly on outcome measures including OCI-R, hence providing support for the efficacy of Internet administered treatment program.
Yap et al ¹⁵⁹	56 OCD, 46 OCD+ depression patients; Australia	Cross-sectional	OBQ, Y-BOCS-SR, PI-R	The study examined differences between depressed and non-depressed OCD cohorts on OCD-related and non-specific factors. The two tested groups did not differ on these variables although depression severity was correlated with obsessional impulses to harm self/others.

Table IIc. Continued

List of Abbreviations used in Table IIc

BD	Bipolar disorder	MOCI	Maudsley Obsessive Compulsive Inventory
BDNF	Brain derived neurotrophic factor	MOCQ	Maudsley Obsessive Compulsive Questionnaire
CAM	Cognitive Appraisal Model	NGF	Nerve growth factor
BIS	Barratt Impulsiveness Scale	OAD	Other anxiety disorder
CB	Compulsive buyers	OBQ	Obsessional Beliefs Questionnaire
CBGT	Cognitive behavioral group therapy	OCD	Obsessive-compulsive disorder
CBT	Cognitive behavioral therapy	OCPD	Obsessive compulsive personality disorder
COMT	Catechol-O-methyltransferase	OCI-R	Obsessive Compulsive Inventory-Revised
DAS	Dysfunctional attitude scale	OCI-SV	Obsessive Compulsive Inventory-Short Version
DIRT	Danger Ideation Reduction Therapy	PI-R	Padua Inventory-Revised
DOCS	Dimensional Obsessive Compulsive Scale	PI-WSUR	PI-Washington State University revised form)
ED	Eating disorder	PG	Pathological gambling
ERP	Exposure and Response Prevention	PTSD	Post-traumatic stress disorder
fMRI	Functional magnetic resonance imaging	RAS	Responsibility Attitude Scale
GAD	Generalised anxiety disorder	RIQ	Responsibility Interpretations Questionnaire
GDNF	Glial cell-derived neurotrophic factor	ROCF	Rey-Osterrieth Complex Figure
HZI/HOCI	Hamburg Obsessive Compulsive Disorder	SAD	Social anxiety disorder
IBA	Interference-Based Approach	SCL-90-R	Symptom Checklist-90-Revised
LOI	Leyton Obsessional Inventory	SCWC	Stroop Color-Word Task
MADRS	Montgomery Åsberg Depression Rating Scale		
MDD	Major Depressive Disorder		
MI	Magical ideation		

Clinical research

SSRI Selective serotonin reuptake inhibitor
TAS Toronto Alexithymia Scale
TS Tourette syndrome

VOCI Vancouver Obsessional Compulsive Scale
Y-BOCS-SR Yale-Brown Obsessive Compulsive
Scale-Self Report