Physical complications of severe, chronic obsessive-compulsive disorder: A comparison with general psychiatric inpatients.

Lynne M. Drummond^{*,a,b}, Mark J. Boschen^c, Joshua Cullimore^a, Azmatthulla Khan^a, Sarah White^{a,b}, & Ruxandra Ion^a

^aSouth West London and St George's Mental Health NHS Trust, United Kingdom

^bSection of Mental Health, St George's, University of London, United Kingdom

^cSchool of Psychology, Griffith University, Australia

* Corresponding Author: Dr Lynne Drummond, Consultant Psychiatrist, National OCD/BDD Service, South West London and St George's Mental Health Trust, Springfield University Hospital, 61 Glenburnie Road, London SW17 7DJ, United Kingdom. Phone: +442035136961 Fax: +442035136965 Email: lynnemd@sgul.ac.uk

Abstract

This research examines the physical health of patients with severe, chronic obsessive-compulsive disorder and compares the findings with patients admitted to an acute general psychiatric ward. Successive admissions to a specialist inpatient unit treating patients with OCD were included in the study. Information including gender, age, weight and height were recorded along with the results of blood tests for urea, liver function tests and blood lipids. In addition type and dose of medication was also recorded. These data were compared with information obtained via the case records from successive admissions to a general psychiatric ward. A total of 104 patients with OCD and 101 patients admitted to an acute psychiatric unit were studied. OCD patients were generally younger than the controls, and were on a lower dose of antipsychotic medication. Despite this the OCD patients were more likely than the general psychiatric patients to have raised blood lipids. Raised creatinine was also more common amongst OCD patients. The study demonstrates that patients with severe OCD have significant evidence of serious physical health problems.

KEYWORDS: Obsessive-Compulsive Disorder, Renal Functioning, Physical Health

1. Introduction

Individuals with psychiatric illnesses are at increased risk of physical health problems. Patients with conditions such as depression^{1,2}, anxiety disorders³, and schizophrenia⁴ have all been demonstrated to be at increased risk of physical illness compared with the general population. Physical problems such as weight gain, obesity, metabolic abnormalities (diabetes and the metabolic syndrome), increased prolactin secretion, sexual dysfunction, gastrointestinal problems, genitourinary disease, and cardiovascular disease, as well as other problems including sedation/physical inactivity, adverse drug effects and poor self-care are observed at greater prevalence rates than would be expected in the general population.^{3,4}

Obsessive-Compulsive Disorder (OCD) is a chronic psychiatric illness with a lifetime prevalence of approximately 1.3%.⁵ Recent decades have seen a dramatic growth of research interest into OCD.⁶ The World Health Organization has previously estimated OCD to be the 11th leading cause of non-fatal disease burden in the world in 1990, accounting for 2.2% of total years lost to disability.⁷ OCD is associated with reduced quality of life⁸ and significant functional impairment.⁹ Most patients with OCD can be effectively treated, but a small, severely affected subgroup develop severe, chronic enduring illnesses despite treatment. Even these severely ill patients, however, can respond to psychological and psychopharmacological treatments in a specialised treatment service.¹⁰⁻¹³

Despite the considerable body of research examining physical illness in other psychiatric conditions, there is little research examining the physical health of patients with OCD. Self-report measures of quality of life in OCD have suggested that individuals with OCD experience more physical symptoms and ill-health than individuals from the general population,^{8,14,15} although not all previous research has

found this association.¹⁶ Using self-report, Albert and colleagues¹⁷ found that not only higher levels of OCD symptoms, but specifically contamination/washing symptoms, were associated with poorer health-related quality of life. Similarly specific association of washing symptoms and lower self-reported health-related quality of life was also reported by Fontenelle and colleagues.⁸ Of note is the fact that all of these previous studies have only conducted rudimentary assessment of physical illness through the use of self-report measures, rather than objective medical assessments. Furthermore, none of these previous studies have examined the prevalence of physical complications in individuals with the most severe presentations of OCD.

Assessment of physical illnesses is an important part of the treatment of individuals with OCD. Physical illnesses are associated with further reductions in quality of life,¹⁴ and as such treatment of these conditions may result in improved subjective wellbeing for those with OCD. Physical complications of OCD may also increase health service utilisation (and economic burden), or impact adversely on pharmacological treatment of the condition. Many physical illnesses such as increased cholesterol and renal dysfunction are also associated with increased mortality. As such, assessment and management of physical illness in OCD is an essential element in achieving optimal medical and psychiatric outcomes.

1.1 The National Inpatient Unit

In the United Kingdom, the National Institute for Health and Clinical Excellence (NICE) has provided guidelines for the treatment of OCD.¹⁸ In this guidance a stepped care model is proposed, in which treatment of OCD is divided into a hierarchy of six steps of treatment of increasing intensity. Step 6 treatment is for those severely affected individuals who require intensive inpatient treatment in a specialised unit. The National

Inpatient Unit based at South West London and St George's Mental Health NHS Trust has been treating patients with the most disabling OCD conditions for over 20 years.^{10,12} To be eligible for treatment by the service, patients need to meet a range of severity criteria, as outlined in Table 1.¹⁹ Patients have thus received a range of the standard treatments including treatment with serotonin reuptake inhibiting drugs; augmenting agents as well as psychological therapy involving graded exposure to the feared situation before being admitted. Occasional patients have an extreme fear of medication due to their obsessive worries and, in these cases, there is some flexibility in these admission criteria.

Over many years we have noted that our very severely ill group of patients frequently seemed to have medical problems and severe ill-health directly related to the OCD which had not been previously noted in earlier assessment or treatment. The current research presents an assessment of physical complications in this treatment cohort, and a comparison with similar medical complications in a general psychiatric inpatient population. Specifically we hypothesised that our cohort of patients with severe OCD would show a similar level of physical complications as those seen in a general psychiatric inpatient cohort.

2. Methods

2.1 Patients

The OCD cohort was comprised of successive admissions to the inpatient unit with a diagnosis of severe, chronic, disabling OCD were included in the study. Individuals were admitted between March 2004 and March 2010. Information was gathered from case records and direct observation. Inpatient treatment in the Unit involves maintaining patients on optimal psychopharmacological medication and cognitive-behavioural treatment with an emphasis on regular and predictable graded exposure and self-imposed response prevention. Details of medication used in the OCD cohort are provided in Table 2.

A comparison group of successive admissions to a general psychiatric ward were used as controls. This ward received referrals from the London Borough of Wandsworth and is based at the same hospital (Springfield University Hospital) as the National OCD/BDD service. Data for these individuals were obtained via case records. Diagnosis was made by a multidisciplinary team led by a consultant psychiatrist. Blood tests for urea and electrolytes, liver function tests and cholesterol, medication, medication dosage, antipsychotic equivalence dosage were recorded.

2.2 Measures

Demographic data including age and gender were recorded. Severity of OCD symptoms was measured using the Yale-Brown Obsessive Compulsive Scale.²⁰ Height and weight were recorded on admission, and used to calculate a Body Mass Index (BMI). As well as medical examination, it was noted whether there were any records of clinical dehydration or ill-health. Blood tests were conducted to assess urea and electrolytes. Liver function tests and lipid levels were also recorded. Current

medication regime was recorded, including type and dose of medication. Chlorpromazine-equivalent doses of antipsychotic agents were computed using the approved dosages of drug as given in British National Formulary. This was done to compare whether any findings could be directly related to the antipsychotic drug dosage received.

3. Results

3.1 OCD Group

A total of 104 patients with profound OCD were admitted during the study period. These comprised 57 (54.8%) men and 47 (45.2%) women, with a mean age of 37.7 years ($SD = 13.1$; range = 19 to 70). On admission these individuals had a mean Y-BOCS score of 34.8 ($SD = 3.1$, range 30 to 40) which reduced to 23.4 ($SD = 9.2$, range 6 to 40) by the time of discharge (with last observations carried forward where data was not available). This represents a mean reduction of 32.8% in OCD symptoms ($t = 12.15$, $df = 86$, $p < 0.001$) and a reduction from the category of *Profound* to *Moderate* on the Y-BOCS (scores over 24 are considered *Severe*, and over 32 are *Profound*). A total of 62 (59.6%) were taking antipsychotic medication, with a mean daily chlorpromazine equivalent dose of 142mg ($SD = 174$) for the entire OCD sample, and 218mg ($SD = 177$) for those taking antipsychotic medication. On admission 18 patients were not taking antidepressant medication although all patients had received some antidepressants prior to referral. Details of medication are detailed in Table 2. Comorbid psychiatric conditions were present in some members of the cohort, as detailed in Table 3. The range of other general medical conditions in the OCD cohort is presented in Table 4.

3.1.1 Self-Neglect and Incontinence

Self-neglect was coded on an ordinal scale, ranging from 0 ('No self-neglect') to 5 ('Life-threatening levels of self-neglect') and was rated for each patient on admission by medical and nursing staff. Results for the inpatient cohort are provided in Table 5. Eleven individuals (10.6%) were deemed to have such severe self-neglect as to be potentially life-threatening. Increasing self-neglect was significantly associated with

increasing severity of OCD symptoms (Spearman's $\rho = .26$, $p = .009$). Self-neglect assessments were not recorded for the general psychiatry cohort.

In addition, 44 patients (42.3%) were incontinent most of the time. This was most commonly urinary incontinence ($n = 32$, 30.8%), with 2 (1.9%) being fecally incontinent, and 10 (9.6%) being doubly incontinent. Incontinence was associated with higher levels of OCD symptom severity ($t = 2.37$, $df = 102$, $p = .02$).

3.1.2 Renal Impairment

Most patients (58, 54.7%) were noted to be dehydrated on admission but this examination was performed by a variety of doctors and thus different criteria may have been used in making this assessment. Most patients with dehydration described either difficulties in performing the act of drinking or preparing drinks due to compulsive rituals, or deliberately avoiding drinking as a way of reducing urinary elimination.

Of further concern was the high prevalence of renal pathology in the inpatient group. Elevated blood urea (above the normal range of 2.5 to 8.0 mmol/L) was found in 21 (20.2%) individuals. Blood creatinine was clinically elevated (above the normal range of 60-110 $\mu\text{mol/L}$) in 26 (25.0%) of the cohort. OCD symptom severity as measured by the Y-BOCS was not significantly different between those patients with/without elevated urea ($t = 0.46$, $df = 101$, $p = .65$), nor with/without elevated creatinine clearance ($t = 0.02$, $df = 101$, $p = .98$). Raised blood urea and creatinine can be caused by increase breakdown of protein either by ingestion of a high protein diet or by the breakdown of muscle tissue in starvation as well as in acute and chronic kidney disease. In none of our patients did the urea and creatinine worsen during their stay and thus it would appear to be due to chronic renal impairment in the majority of cases.

3.1.3 Nutrition and Weight

The Body Mass Index (BMI) of all patients was recorded on admission to the inpatient unit. Patients with a BMI less than 19 were recorded as underweight, while those with a BMI greater than 24 were recorded as overweight. On admission 21 (20.2%) were underweight, while 39 (37.5%) were overweight. There were no significant differences in OCD symptom severity between underweight, overweight, and normal weight individuals ($F_{2, 99} = 0.92, p = 0.44$). In general all patients tended to gain weight while in hospital with the exception of the clinically obese who tended to lose weight.

3.1.4 Blood Lipids

Over half (56, 61.5%) of the 91 OCD inpatients for whom blood lipid data was available had evidence of clinically significant abnormalities (i.e., either 1. cholesterol > 5.2 mmol/L and triglycerides > 2.00 mmol/L; or 2. cholesterol > 5.2mmol/L and non-HDL cholesterol > 5.0 mmol/L; or 3. HDL cholesterol < 0.90mmol/L). A further five patients were being treated for raised cholesterol with medication at the time of admission.

3.2 General Psychiatry Comparison Group

A total of 101 case records were examined as a comparison group. These comprised a group of consecutive general psychiatric inpatient admissions. The primary diagnoses for each member of the general psychiatry cohort is provided in Table 6. Demographic details for the general psychiatry cohort are presented in Table

7. Gender distribution was equivalent in the OCD and comparison groups, while individuals from the comparison group were significantly older than those from the OCD group, as shown in Table 7. Approximately two-thirds of the cohort were currently taking antipsychotic medication, as shown in Table 7. As shown in Table 7, there was no difference between the OCD and comparison group on the proportion taking antipsychotic medication. The mean chlorpromazine equivalent dose was significantly higher in the general psychiatry cohort.

3.2.1 Comparison Between OCD and General Psychiatry Groups

Comparisons were conducted between the OCD and general psychiatry groups on variables for which there was objective evidence included in the patient's chart. This included blood urea levels, increased creatinine levels, and blood cholesterol levels. Where data was not able to be located in the patient's chart, this was allowed to remain missing in all analysis of statistical significance.

As shown in Table 7, patients from the OCD group were more likely to have increased blood creatinine levels, when compared against a general psychiatric inpatient sample. This finding was surprising as individuals from the OCD cohort were significantly younger than those in the general psychiatry comparison group. Blood urea levels were not significantly different between the two cohorts.

Because patients were selected specifically due to self-neglect, we analysed those patients where the dehydration had not been noted prior to admission. Forty-two patients with OCD were considered to have reasonable self-care on admission and to be eating and drinking normally. Of these 42 patients however, 6 patients (14.3%) had raised creatinine indicating dehydration and 5 (11.9%) had raised urea, indicating some

renal impairment. This compared with 14 (13.9%) of control patients who had raised creatinine and 13 (12.9%) with raised urea.

Abnormal blood lipids were observed in 31 (37.3%) of the 83 general psychiatric inpatients for whom data was recorded. An additional four general psychiatric inpatients were being treated for raised cholesterol. The inpatient OCD cohort showed significantly higher rates of problem blood lipids than the general psychiatric inpatient group (see Table 7).

We also compared the OCD cohort against a homogenous subset of the general psychiatric inpatient group with a primary diagnosis of schizophrenia. Compared against the OCD cohort, the 44 inpatients with schizophrenia were older, and were equally likely to have raised urea or raised creatinine. They were also less likely to have raised blood fats. Descriptive and inferential statistics are presented in Table 8.

3.3 Comparisons and Antipsychotic Medication

To investigate the potential impact of antipsychotic medication on cholesterol levels, we compared sex, age, daily chlorpromazine equivalent dose, and proportion of patients with elevated cholesterol in those patients who were currently taking antipsychotic medication. As shown in Table 9, the general psychiatric patients taking antipsychotics were older than OCD patients receiving antipsychotics. General psychiatric inpatients taking antipsychotics were also on higher daily chlorpromazine equivalent doses than OCD patients taking antipsychotics.

In the OCD cohort who were also taking antipsychotics, abnormal blood lipids were observed in 32 out of 57 for whom data was available, with an additional 5 being treated for high cholesterol. In those of the general psychiatric inpatient group who were also taking antipsychotics 23 out of 58 had evidence of abnormal blood lipids,

with an additional 4 taking medication for high cholesterol. Individuals in the OCD inpatient group were more likely to have abnormal blood lipids than the general psychiatric group members (see Table 9).

We also investigated the same outcome variables in a subset of patients for each group, matched according to chlorpromazine equivalent antipsychotic dose. This subsample, yielded two groups of 66 individuals, with each group having a mean chlorpromazine equivalent antipsychotic dose of 166mg ($SD = 217$ mg). As shown in Table 10, the two dose-matched cohorts were equivalent in frequency of elevated blood urea, and of elevated creatinine, but the OCD cohort had a greater frequency of high cholesterol.

3.4 Sample Case Vignettes

Three brief case vignettes are provided here by way of example, describing the interaction between the psychiatric symptoms of the individuals with OCD, and the medical complications described above: One 50 year old lady restricted her fluid intake to under 600mls liquid a day so that she only had to visit the toilet once a day. This restriction was due to her fear of “contamination” from the toilet. Another male patient spent so long performing counting and checking rituals to ensure all his actions were performed “perfectly” that he had insufficient time in the day to drink fluid. A third patient felt unable to drink or perform any action if he had a “bad” thought and thus would repeatedly raise a cup to his mouth but be unable to drink until he had completed the action without any obsessive intrusive thoughts.

4. Discussion

This study examined the prevalence of medical complications in a cohort of inpatients with severe, treatment refractory OCD, and compared these to a group of individuals admitted to a general psychiatric ward. The results demonstrate that in addition to mental health problems, patients with the most severe obsessive-compulsive disorder also have significant physical morbidity. Indeed, factors such as potential renal impairment had almost universally gone unnoticed during the patient's previous psychiatric and physical treatments.

Within the cohort of individuals with OCD, there were high levels of physical complications. Most of the OCD patients demonstrated significant self-neglect, including problems with hygiene and food/fluid intake, which in itself seemed to result in some serious health consequences. Almost half of the OCD cohort had problems with urinary and/or fecal incontinence, related to either slowness in travelling to the toilet due to compulsive rituals or due to avoidance of toilet areas for fear of contamination. Abnormal creatinine levels were significantly more prevalent in the OCD group compared with individuals admitted to a general psychiatric ward, although this difference was not present when the OCD cohort was compared to a homogenous subgroup of general psychiatry inpatients with schizophrenia, or when cohorts were matched for daily equivalent chlorpromazine dose.

The high proportion (62%) of OCD patients with elevated cholesterol was of particular concern. The increased frequency of elevated cholesterol was a robust finding that was also present when the OCD cohort was compared with a cohort of patients with schizophrenia, and when patients taking antipsychotics and similar antipsychotic doses were compared. High cholesterol is known to make individuals more prone to cardiovascular and cerebrovascular incidents.^{21,22} This proportion of individuals with

high cholesterol was greater than the general psychiatric comparison group, despite an average lower dose of antipsychotic medication, and clearly exceeded that typically observed in the general population. A study of adults in the United States of America showed that only 17% of adults are now in the raised area for blood cholesterol.²³ It would seem likely that extreme self-neglect with periods of relative starvation, followed by periods of rapid weight gain may be responsible for at least part of this finding. Metabolic syndrome seen with increasing doses of antipsychotic agents may also play a part. It is notable that the OCD patients were on a lower dose of antipsychotic agents to the general psychiatric inpatient group, and yet still showed higher rates of elevated blood lipids. Patients in the inpatient OCD cohort were also treated with serotonergic medication, which is also known to be associated with abnormal blood lipids,²⁴ which may have also contributed to our finding.

Our results accord with previous research into medical complications observed in other psychiatric illnesses such as anxiety disorders, depression, and schizophrenia.¹⁻⁴ As such, our results provide additional evidence for a more broad need to assess medical illnesses in individuals with mental health problems as a way of reducing morbidity and mortality, as well as improving quality of life. Increasingly much of mental health care is being performed by non-medical personnel and in many cases it is considered a retrograde step to involve the “medical model” with mental health being increasingly viewed from a sociological and societal perspective.²⁵ Our results demonstrate that even within a multidisciplinary mental health approach, that assessment of medical state is an essential component of comprehensive health care.

The reader should be mindful of a number of limitations in the current study when interpreting our findings. Firstly the results presented cover only a small collection of variables that are important in assessing general health status. It is

possible that individuals with OCD may show clinical problems in other domains not covered by this study. As such, the reader should not interpret our findings as an exhaustive assessment of the entirety of potential medical complications that may arise out of the illness. Secondly, our cohort of individuals with OCD comprised individuals with the most profound level of OCD symptoms. As a result, our findings do not enable us to speculate about the level of medical disease in individuals with less severe levels of OCD symptoms.

Further research examining the physical status of individuals with OCD is needed to more fully elucidate the nature of medical complications in this population. Future studies may include less severely ill patients with OCD, and may attempt to assess a broader range of health complications than were examined in the present paper.

This study emphasizes the need to ensure that physical illness is not overlooked in psychiatric patients, particularly those with such severe illness that it impacts on their self-care. Individuals with severe OCD appear to be particularly prone to renal damage and hyperlipidaemia which may be related to the tendency for them to restrict fluids and to eat erratically. We believe that our results provide strong clinical guidance for those working with individuals with severe OCD to perform regular screening for medical complications of the illness, including renal functioning, cholesterol levels, and self-care.

Disclosures

This manuscript has been read and approved by all authors. This paper is unique and not under consideration by any other publication and has not been published elsewhere.

The authors and peer reviewers report no conflicts of interest.

References

1. Ayotte, B.J., Yang, F.M., Jones, R.N., 2010. Physical health and depression: A dyadic study of chronic health conditions and depressive symptomatology in older adult couples. *Journal of Gerontology: Psychological Sciences* 65B, 438-448.
2. Moussavi, S., Chatterji, S., Verdes, E., Tandon, A., Patel, V., Ustun, B., 2007. Depression, chronic diseases, and decrements in health: Results from the World Health Surveys. *Lancet* 370, 851-858.
3. Härter, M.C., Conway, K.P., Merikangas, K.R., 2003. Association between anxiety disorders and physical illness. *European Archives of Psychiatry* 253, 313-320.
4. Montejo, A.-L., 2010. The need for routine physical health care in schizophrenia. *European Psychiatry* 25, S3-S5.
5. Somers, J.M., Goldner, E.M., Waraich, P., Hsu, L., 2006. Prevalence and incidence studies of anxiety disorders: A systematic review of the literature. *Canadian Journal of Psychiatry* 51, 100-113.
6. Boschen, M.J., 2008. Publication trends in individual anxiety disorders: 1980-2015. *Journal of Anxiety Disorders* 22, 570-575.
7. Üstün, T.B., Ayuso-Mateos, J.L., Chatterji, S., Mathers, C., Murray, C.J.L., 2004. Global burden of depressive disorders in the year 2000. *British Journal of Psychiatry* 184, 386-392.
8. Fontenelle, I.S., Fontenelle, L.F., Borges, M.C., Prazeres, A.M., Rangé, B.P., Mendlowicz, M.V., Versiani, M., 2010. Quality of life and symptom dimensions of patients with obsessive-compulsive disorder. *Psychiatry Research* 179, 198-203.

9. Markarian, Y., Larson, M.J., Aldea, M.A., Baldwin, S.A., Good, D., Berkeljon, A., Murphy, T.K., Storch, EA., & McKay, D., 2010. Multiple pathways to functional impairment in obsessive-compulsive disorder. *Clinical Psychology Review* 30, 78-88.
10. Boschen, M.J., Drummond, L.M., Pillay, A., 2008. Treatment of severe, treatment-refractory obsessive-compulsive disorder: A study of inpatient and community treatment. *CNS Spectrums* 13, 1056-1065.
11. Boschen, M.J., Drummond, L.M., Pillay, A., Morton, K., 2010. Predicting outcome of treatment for severe, treatment resistant OCD in inpatient and community settings. *Journal of Behavior Therapy and Experimental Psychiatry* 41, 90-95.
12. Drummond, L.M., 1993. The treatment of severe, chronic, resistant obsessive-compulsive disorder: An evaluation of an in-patient programme using behavioural psychotherapy in combination with other treatments. *British Journal of Psychiatry* 163, 223-229.
13. Boschen, M.J., & Dummond, L.M., in press. Community treatment of severe, refractory obsessive-compulsive disorder. *Behaviour Research and Therapy*.
14. Hou, S-Y., Yen, C-F., Huang, M-F., Wang, P-W., Yeh, Y-C., 2010. Quality of life and its correlates in patients with obsessive-compulsive disorder. *Kaohsiung Journal of Medical Science* 26, 397-407.
15. Moritz, S., Rufer, M., Fricke, S., Karow, A., Morfeld, M., Jelinek, L., Jacobsen, D., 2005. Quality of life in obsessive-compulsive disorder before and after treatment. *Comprehensive Psychiatry* 46, 453-459.

16. Koran, L.M., Thienemann, M.L., Davenport, R., 1996. Quality of life for patients with obsessive-compulsive disorder. *American Journal of Psychiatry* 153, 783-788.
17. Albert, U., Maina, G., Bogetto, F., Chiarle, A., & Mataix-Cols, D., 2010. Clinical predictors of health-related quality of life in obsessive-compulsive disorder. *Comprehensive Psychiatry* 51, 192-200.
18. National Institute for Health and Clinical Excellence, 2006. Obsessive-Compulsive Disorder: Core Interventions in the Treatment of Obsessive-Compulsive Disorder and Body Dysmorphic Disorder. British Psychological Society and Royal College of Psychiatrists, London.
19. Drummond, L.M., Fineberg, N.A, Heyman, I., Kolb, P., Pillay, A., Rani, R.S., Salkovskis, P., Veale, D., 2008. Description of progress in the development of a national service for adolescents and adults with the most severe, refractory obsessive-compulsive and body dysmorphic disorder. *Psychiatric Bulletin* 32, 333-336.
20. Goodman, W.K., Price, L.H., Rasmussen, S.A., Mazure, C., Fleischmann, R.L., Hill, C.L., Heninger, G.R., Charney, D.S., 1989. The Yale-Brown Obsessive Compulsive Scale: I. Development, use, and reliability. *Archives of General Psychiatry* 46, 1006-1011.
21. Patel, A., Woodward, M., Campbell, D.J., Sullivan, D.R., Colman, S., Chalmers, L., Neal, B., MacMahon, S., 2005. Plasma lipids predict myocardial infarction, but not stroke, in patients with established cerebrovascular disease. *European Heart Journal* 26, 1910-1915.
22. Psaty, B.M., Anderson, M., Kronmal, R.A., Tracy, R.P., Orchard, T., Fried, L.P., Lumley, T., Robbins, J., Burke, G., Newman, A.B., Furberg, C.D., 2004. The

- association between lipid levels and the risk of incident myocardial infarction, stroke, and total mortality: The Cardiovascular Health Study. *Journal of the American Geriatric Society* 52, 1639-1647.
23. Carroll, M.D., Lacher, D.A., Sorlie, P.D., Cleeman, J.I., Gordon, D.J., Wolz, M., Grundy, S.M., Johnson, C.L., 2005. Trends in serum lipids and lipoproteins of adults, 1960-2002. *Journal of the American Medical Association* 294, 1773-1781.
24. Raeder, M.B., Bjelland, I, Emil Vollset, S., & Steen, V.M., 2006. Obesity, dyslipidemia, and diabetes with selective serotonin reuptake inhibitors: The Horland Health Study. *Journal of Clinical Psychiatry* 67, 1974-1982.
25. St John-Smith, P., McQueen, D., Michael, A., Ikkos, G., Denman, C., Maier, M., Tobiansky, R., Pathmanandam, H., Davies, T., Babu, V.S., Thachil, O., Iqbal, F., Rao, R., 2009. The trouble with NHS psychiatry in England. *Psychiatric Bulletin* 33, 219-225.

Tables

Table 1.

Criteria for Admission to the National Inpatient Unit.

1. A Yale-Brown Obsessive Compulsive Scale score of 30 or above; and
2. Two previous unsuccessful trials of serotonin reuptake inhibiting drugs, and British National Formulary approved doses for a minimum of three months each; and
3. Augmentation of serotonin reuptake inhibitor drugs with other medication, as described by Pallanti et al. (2002), for a minimum of three months; and
4. Two previous unsuccessful treatments with cognitive behavioural psychotherapy, which should include graded exposure and self-imposed response prevention, and one of these trials should normally have been delivered in the home environment, or wherever symptoms are maximal; and
5. Compelling reasons why the patients requires 24 hour nursing care, including one of the following
 - a. The patient being a danger to themselves, usually due to self-neglect such as failure to eat or drink sufficiently to sustain health, rather than suicidality; or
 - b. The patient being a danger to others, usually due to impulsivity rather than overt acts of violence; or
 - c. The patient demonstrating self-neglect that is serious but not life-threatening, for example regular incontinence or urine or faeces.

Table 2.

Antipsychotics and Antidepressants Used in Each Cohort During Admission.

(Details are given of the medication used throughout the inpatient stay and thus total n>104)

	OCD Cohort (N = 104)	General Psychiatry Cohort (N = 101)
First Generation	21 (20.2%)	5 (5.0%)
Chlorpromazine	1 (1.0%)	0 (0.0%)
Haloperidol	1 (1.0%)	1 (1.0%)
Sulpiride	17 (16.3%)	0 (0.0%)
Flupenthixol	1 (1.0%)	0 (0.0%)
Pipothiazine	1 (1.0%)	4 (4.0%)
Atypical	47 (45.2%)	73 (72.3%)
Aripiprazole	5 (4.8%)	1 (1.0%)
Clozapine	1 (1.0%)	11 (10.9%)
Olanzapine	13 (12.5%)	29 (28.7%)
Quetiapine	8 (7.7%)	10 (9.9%)
Risperidone	20 (19.2%)	22 (21.8%)
Antidepressants		
Clomipramine	31(30%)	0 (0.0%)
Sertraline	23 (22.1%)	2 (2.0%)
Paroxetine	19 (18.3%)	1 (1.0%)
Fluoxetine	41 (39.4%)	5 (5.0%)
Escitalopram	5 (4.8%)	0 (0.0%)
Citalopram	14 (13.5%)	8 (7.9%)
Fluvoxamine	2 (1.9%)	
Mirtazepine	0 (0.0%)	3 (3.0%)
Venlafaxine	0 (0.0%)	1 (1.0%)
Amitriptyline	1 (0.96%)	0 (0.0%)
Trazodone	1 (0.96%)	0 (0.0%)

Table 3.

Comorbid Psychiatric Conditions in the OCD Cohort

Diagnosis	Number
Obsessive Compulsive Personality Disorder	22 (21.2%)
Other Anxiety Disorder	16 (15.4%)
Autistic Spectrum Disorder	10 (9.6%)
Anorexia Nervosa	9 (8.7%)
Schizophrenia	5 (4.8%)
Body Dysmorphic Disorder	4 (3.8%)
Bipolar Mood Disorder	2 (1.9%)
Tourette's Disorder	2 (1.9%)

Note. Depression is not routinely recorded as a separate diagnosis as almost all patients have significant symptoms of depression on admission.

Table 4.General Medical Conditions in the OCD Cohort with Available Information (*n* = 97)

Diagnosis	Number
Genito-Urinary System Disorders	
Recurrent urinary tract infections	7 (7.2%)
Clinical symptoms of renal insufficiency (no specific diagnosis)	9 (9.2%)
Polycystic ovaries	2 (2.0%)
Renal abscess	2 (2.0%)
Bladder prolapse	1 (1.0%)
Previous hysterectomy	1 (1.0%)
Respiratory System Disorders	
Asthma	9 (9.2%)
Fibrocystic disease	1 (1.0%)
Sleep apnoea	1 (1.0%)
Cardiovascular System & Blood Disorders	
Hypertension	16 (16.5%)
Anaemia	12 (12.4%)
Deep venous thrombosis	4 (4.1%)
Cardiac arrhythmias	3 (3.1%)
Heart Murmurs (no specific diagnosis mentioned)	3 (3.1%)
Congenital heart disease	2 (2.0%)
Cardiac failure	1 (1.0%)
Central Nervous System Disorders	
Epilepsy	6 (6.2%)
Chronic migraine	3 (3.1%)
Cerebral small vessel disease	1 (1.0%)
Benign brain tumour	1 (1.0%)
Skin Disorders	
Eczema ^a	4 (4.1%)
Psoriasis	1 (1.0%)
Gastrointestinal System Disorders	
Gall bladder disease	2 (2.0%)
Rectal prolapse	2 (2.0%)
Crohn's disease	2 (2.0%)
Endocrine System Disorders	
Diabetes (juvenile)	1 (1.0%)
Diabetes (late onset)	4 (4.1%)
Hypothyroidism	10 (10.3%) ^b
Hyperthyroidism	6 (6.2%)
Breast Lump (male)	1 (1%)
Pituitary microadenoma	1 (1%)
Locomotor System Disorders	
Evidence of osteoporosis	4 (4.1%)
Osteoarthritis	4 (4.1%)
Carpal Tunnel Syndrome	1 (1%)
Polyarthritis	1 (1%)
Tendonitis	1 (1%)
Miscellaneous Other Conditions	
Malignancy previously treated	5 (5.2%)
Hearing impairment	3 (3.1%)

^a Not including hand dermatitis caused by excessive washing.^b n=4 currently being treated for hypothyroidism.

Table 5.

Self-Neglect in the Inpatient OCD Cohort

Code	Description	Number
0	No self-neglect.	10 (9.6%)
1	Basic self-care maintained.	11 (10.6%)
2	Unable to attend to basic hygiene. Eats and drinks OK.	24 (23.1%)
3	No self-hygiene. Problematic fluid intake.	35 (33.7%)
4	No self-hygiene. Problematic food and fluid intake.	13 (12.5%)
5	Life-threatening levels of self-neglect.	11 (10.6%)

Table 6.

Primary Diagnosis of the General Psychiatry Inpatient Cohort

Diagnosis	Number
Schizophrenia	44 (43.6%)
Major Depressive Disorder	13 (12.9%)
Bipolar Mood Disorder	16 (15.8%)
Schizoaffective Disorder	7 (6.9%)
Personality Disorder	6 (5.9%)
Substance Use Disorder	6 (5.9%)
Anxiety or Somatoform Disorder	5 (5.0%)
Complex Comorbid Axis I and Axis II Disorders	6 (5.9%)

Table 7.

Comparisons Between OCD and General Psychiatric Admissions

Variable	OCD Cohort (<i>N</i> = 104)	General Psychiatry Cohort (<i>N</i> = 101)	Significance Test
Sex	57 male, 47 female	49 male, 52 female	$\chi^2 = 1.62, df = 1, p = .20$
Age	$M = 37.70, SD = 13.08$	$M = 48.02, SD = 13.97$	$t = 5.46, df = 203, p < .001$
Using Antipsychotic Medication	62 / 104 (59.6%)	68 / 101 (67.3%)	$\chi^2 = 1.00, df = 1, p = .32$
Daily Chlorpromazine Equivalent	$M = 142, SD = 174$	$M = 247, SD = 268$	$t = 3.37, df = 203, p = .001$
Elevated Blood Urea Levels	21 / 104 (20.2%)	13 / 93 (14.0%)	$\chi^2 = 2.23, df = 1, p = .14$
Elevated Creatinine Levels	26 / 104 (25.0%)	14 / 93 (15.1%)	$\chi^2 = 4.91, df = 1, p = .03$
Elevated Cholesterol Levels	61 / 91 (67.0%)	35 / 83 (42.2%)	$\chi^2 = 33.09, df = 1, p < .001$

Table 8.

Comparisons Between OCD and Schizophrenia Cohorts

Variable	OCD Cohort (<i>N</i> = 104)	Schizophrenia Cohort (<i>N</i> = 44)	Significance Test
Sex	57 male, 47 female	24 male, 20 female	$\chi^2 = 0.01, df = 1, p = .97$
Age	$M = 37.70, SD = 13.08$	$M = 46.55, SD = 13.08$	$t = 3.76, df = 146, p < .001$
Daily Chlorpromazine Equivalent	$M = 142, SD = 174$	$M = 253, SD = 261$	$t = 3.06, df = 146, p = .003$
Elevated Blood Urea Levels	21 / 104 (20.2%)	4 / 42 (9.5%)	$\chi^2 = 2.97, df = 1, p = .09$
Elevated Creatinine Levels	26 / 104 (25.0%)	6 / 42 (14.3%)	$\chi^2 = 2.57, df = 1, p = .11$
Elevated Cholesterol Levels	61 / 91 (67.0%)	14 / 38 (36.8%)	$\chi^2 = 15.67, df = 1, p < .001$

Table 9.

Comparisons Between OCD and General Psychiatric Admissions Taking Antipsychotics

Variable	OCD Cohort (<i>N</i> = 62)	General Psychiatry Cohort (<i>N</i> = 68)	Significance Test
Sex	36 male, 26 female	35 male, 33 female	$\chi^2 = 0.57, df = 1, p = .45$
Age	$M = 37.21, SD = 12.78$	$M = 47.96, SD = 13.42$	$t = 4.67, df = 128, p < .001$
Daily Equivalent Chlorpromazine	$M = 218, SD = 177$	$M = 367, SD = 249$	$t = 3.90, df = 128, p < .001$
Elevated Cholesterol Levels	37 / 57 (65.4%)	27 / 58 (46.6%)	$\chi^2 = 3.93, df = 1, p = .04$

Table 10.

Comparisons Between OCD and General Psychiatric Admissions (Matched for Daily Chlorpromazine Equivalent Dose)

Variable	OCD Cohort (<i>N</i> = 66)	General Psychiatry Cohort (<i>N</i> = 66)	Significance Test
Sex	37 male, 29 female	31 male, 37 female	$\chi^2 = 3.03, df = 1, p = .08$
Age	$M = 38.11, SD = 13.54$	$M = 49.19, SD = 16.66$	$t = 4.55, df = 132, p < .001$
Elevated Blood Urea Levels	12 / 65 (18.5%)	7 / 55 (12.7%)	$\chi^2 = 2.12, df = 1, p = .15$
Elevated Creatinine Levels	15 / 65 (23.1%)	9 / 62 (14.5%)	$\chi^2 = 2.56, df = 1, p = .11$
Elevated Cholesterol Levels	39 / 59 (66.1%)	18 / 54 (33.3%)	$\chi^2 = 25.88, df = 1, p < .001$