



## Electroconvulsive therapy and suicide among the mentally ill in England: A national clinical survey

Isabelle M. Hunt <sup>\*</sup>, Kirsten Windfuhr, Nicola Swinson, Jenny Shaw, Louis Appleby, Nav Kapur and The National Confidential Inquiry into Suicide and Homicide by People with Mental Illness

Centre for Suicide Prevention, School of Community-Based Medicine, University of Manchester, Manchester, M13 9PL, UK

### ARTICLE INFO

#### Article history:

Received 2 March 2010

Received in revised form 29 November 2010

Accepted 4 December 2010

#### Keywords:

ECT

Suicide

Psychiatric patient

Suicide prevention

Mental health services

### ABSTRACT

We aimed to determine the number and characteristics of psychiatric patients receiving electroconvulsive therapy (ECT) who had subsequently died by suicide. Data were collected on an 8-year (1999–2006) sample of suicide cases in England who had been in recent contact with mental health services. Of 9752 suicides, 71 (1%) were being treated with ECT at the time of death. Although the number of patients who received ECT had fallen substantially over time, the rate of suicide in these individuals showed no clear decrease and averaged 9 deaths per year, or a rate of 10.8 per 10,000 patients treated. These suicide cases were typically older, with high rates of affective disorder and previous self-harm. They were more likely to be an in-patient at the time of death than other suicide cases. Nearly half of the community cases who had received ECT had died within 3 months of discharge. Our results demonstrated that the fall in the use of ECT has not affected suicide rates in patients receiving this treatment. Services appear to acknowledge the high risk of suicide in those receiving ECT. Improvements in care of these severely ill patients may include careful discharge planning and improved observation of in-patients in receipt of ECT.

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### 1. Introduction

Electroconvulsive therapy (ECT) is considered an effective short-term treatment for patients with severe depressive illness (UK ECT Group, 2003). It is usually an end-stage therapy, recommended for those who have not responded to other therapies and whose severity of illness may be life-threatening (National Institute for Health and Clinical Excellence, 2003). However, guidelines of the American Psychiatric Association task force state that ECT should not be reserved for use as a “last resort” but promotes its use as a first-line treatment when there is a need for a prompt and definitive response, when patients have responded well to previous ECT administrations, and when the treatment is preferred by the patient (Task Force on Electroconvulsive Therapy, 2001).

In England, there has been a reduction in its use over the past few decades. In 1999, 2835 patients received ECT over a 3-month period, equating to an annual estimated total of 11,340 patients (Department of Health (DoH), 1999). By 2002, this annual figure had dropped to an estimated 9088 patients (DoH, 2003). These figures may be underestimates, however, as administration of ECT may not always be documented and there has been no formal national monitoring of ECT activity in the UK (DoH, 2003). A more recent study in 2006

confirmed a further decline in ECT administrations overall, although reported an increase in the proportion of patients receiving ECT who had been detained under the Mental Health Act (Bickerton et al., 2009). Possible reasons for the decline in its use include the availability of newer antidepressants, improved care in the community and earlier recognition of mental illness (Eranti and McLoughlin, 2003). In the US, the use of ECT has also declined since the 1970s but there are still an estimated 100,000 ECT procedures conducted each year (Hermann et al., 1995).

There is good evidence that ECT is more effective than antidepressants in reducing depression and suicidal intent among patients with severe depression (UK ECT Group, 2003; Kellner et al., 2005). The incidence of suicide attempt has also been found to be lower in patients treated with ECT compared to antidepressants (Brådvik and Berglund, 2006). The impact of ECT on completed suicide, however, is less clear, particularly as the proportion of those who die by suicide who have received ECT is very low. In Finland, for example, Isometsä and colleagues found that, over a 12-month period, only 2 of the 1397 suicide cases had received ECT within 3 months of death, representing 0.14% of all suicides (Isometsä et al., 1996).

The majority of studies have found no relationship between ECT and completed suicide (Milstein et al., 1986; Black et al., 1989; Sharma, 1999). For example, of 30 patients who died within 14 days of receiving ECT between 1993 and 1998, Shiwach et al. reported 8 cases (27%) had died by suicide, but that there was no association with the treatment – the rate of suicide being high in those with severe depression (Shiwach et al., 2001). However, Munk-Olsen and

<sup>\*</sup> Corresponding author. Centre for Suicide Prevention, Jean McFarlane Building, University of Manchester, Oxford Road, Manchester, M13 9PL, UK. Tel.: +44 161 275 0706; fax: +44 161 275 0712.

E-mail address: [Isabelle.m.hunt@manchester.ac.uk](mailto:Isabelle.m.hunt@manchester.ac.uk) (I.M. Hunt).

colleagues reported an increased risk of suicide (relative risk = 4.82, 95% CI 2.12–10.95) in patients who had received ECT in the week before death compared to non-ECT patients (Munk-Olsen et al., 2007). The authors acknowledged this finding was based on a small sample (6 suicide cases) and may have been explained by selection bias in that patients treated with ECT were already at high risk of suicide. In addition, this finding may be related to early treatment response mechanisms that have been suggested with drug therapies. For example, antidepressants are known to improve depressive symptoms but they may also possibly increase suicidal thoughts and behavior in the early stages of treatment (Jick et al., 2004; Hall, 2006). Explanations include a delay in any therapeutic effects until later in the treatment phase, or that antidepressants are prescribed at a time when depressive symptoms are acute and therefore the risk of suicidal behavior is already increased (Jick et al., 2004). Alternatively, it may be that for some patients receiving pharmacological treatment a rise in energy levels precedes an improvement of depressive symptoms and they therefore may have the motivation to carry out suicidal acts (Bostwick, 2006). Suicides following ECT may also be an indication of treatment failure.

There have been no large detailed studies describing the characteristics of patients treated with ECT who have died by suicide. Our aims were firstly to determine the number of suicide cases by people under mental health care who were receiving a course of ECT treatment at the time of death in England over an 8-year period. Secondly, to compare the social, behavioral and clinical features of these suicide cases with those who had not received ECT. The study was carried out as part of the National Confidential Inquiry into Suicide and Homicide by People with Mental Illness (Appleby et al., 2001).

## 2. Method

The methods used in the National Confidential Inquiry have been described in detail elsewhere (Appleby et al., 2006; Hunt et al., 2006). Briefly, data collection involved three stages. First, the collection of a comprehensive national sample of deaths in England and Wales receiving a verdict of suicide or open verdict from the Office for National Statistics (ONS). Second, information on whether the deceased within the sample had been in contact with health services in the 12 months before death was obtained from the hospitals and community Trusts providing mental health services in the deceased's district of residence. Third, clinical data about people who had been in contact with services ('Inquiry cases') were obtained by sending a questionnaire to the responsible consultant psychiatrist. The questionnaire consisted of sections covering social/demographic characteristics, clinical history, details of suicide, aspects of care (including treatment received at the time of the suicide), details of final contact with services, and the respondents' views on prevention. The social and clinical items reflected many of the most frequently reported risk factors for suicide. The majority of the items were factual, while a number (e.g., compliance with medication) were based on the judgements of clinicians. The completeness of Inquiry case ascertainment has been shown to be robust (Hunt et al., 2003) and the response rate to the questionnaire was 97% in the period covered by this study.

The cases presented here consist of suicides and open verdicts in England registered by ONS from January 1, 1999 until December 31, 2006. Open verdicts were included as most are thought to be suicide cases and are conventionally used in suicide rate estimation in the United Kingdom (O'Donnell and Farmer, 1995; Linsley et al., 2001) and in previous research.

### 2.1. Statistical analysis

The main findings are presented as proportions with 95% confidence intervals (CIs). Subgroup analysis involved the use of Chi-square tests (unless any cell had an expected frequency of less than 5 in which case a Fisher exact test was used). A 2-sided *P* value of <0.05 was considered as statistically significant. If an item of information was not known for a case, the case was removed from the analysis of that item; the denominator in all estimates is therefore the number of valid cases for each item. Univariate analyses of the association between individual factors and receiving ECT were performed using logistic regression, adjusted by age and sex. Odds ratios (ORs) are presented with 95% CIs.

In order to calculate a rate of suicide per 10,000 patients, we used the estimated number of patients treated with ECT for the years 1999, 2002 and 2006 as the denominator, reported by the Department of Health (DoH, 1999, 2003) and Bickerton and colleagues (Bickerton et al., 2009). Based on these 3 years of data, a normal linear regression model was fitted to estimate the number of patients treated for the years

where data were unavailable. Analysis was carried out using Stata 10.0 software (Statacorp, 2007).

## 3. Results

Over the study period from January 1, 1999 until December 31, 2006, we received notifications of 36,934 cases of suicide, including 25,770 cases in which the coroner's verdict was suicide and 11,164 open verdicts or deaths from undetermined cause. Of these, 9954 (27%) were confirmed as having been in contact with mental health services in the year prior to death. Completed questionnaires were received on 9752 cases, a response rate of 98%.

There were 5948 (63%) cases who had been receiving some form of non-pharmacological treatment at the time of the suicide. Of these, 71 were reported by clinicians to have been recipients of ECT at the time of death, representing 1% of all patient suicide cases (around 9 deaths per year). There was no clear trend in the rate of suicide among those receiving ECT (Table 1) – the average rate of suicide was 10.6 per 10,000 patients treated with ECT. Method of suicide did not differ in the ECT cases compared to other cases. The most common methods were hanging/strangulation and self-poisoning, accounting for 65% of deaths in both groups.

### 3.1. Social and clinical characteristics

Those who had received ECT at the time of death were significantly older than other cases (median age 54, range 29–83 vs. median age 43, range 10–98; *P*<0.001), and they were more likely to be married (Table 2). Clinical characteristics suggested markers of increased risk in ECT patients. For example, they were significantly more likely to have previously self-harmed and to have been an in-patient at the time of death. The majority (89%) were suffering from affective disorder and these patients were over 7 times more likely to have received ECT compared to the remaining sample.

Management of ECT patients suggested that increased risk was recognized to a degree. For example, more patients receiving ECT were under enhanced levels of aftercare (the Care Programme Approach – a mechanism which provides supervision by a care co-ordinator and regular multi-disciplinary case reviews to patients with complex health and social care needs). All of the ECT cases were receiving concomitant drug treatment compared to 85% of other suicides (*P*<0.001).

### 3.2. In-patient suicides

Of the 47 in-patients who were receiving ECT, 9 (19%) died by self-poisoning, proportionally more than other in-patient suicide cases (*n* = 109, 9%; *P* = 0.02). Eight (17%) ECT in-patient deaths occurred during the period when discharge was being planned, fewer than non-ECT in-patients (*n* = 479, 39%; *P* = 0.004). Only 1 (3%) recipient of ECT died within the first week of admission compared to 154 (16%)

**Table 1**  
Rate of suicide among ECT recipients (England, 1999–2006).

	Patients treated with ECT		Suicide cases		Rate per 10,000 patients treated	
	<i>N</i>		<i>N</i>		CI	
1999	11340		8		7.1	3.0–13.9
2000	10603		11		10.4	5.2–18.6
2001	9706		20		20.6	12.6–31.8
2002	9088		5		5.5	1.8–12.8
2003	7913		13		16.4	8.7–28.1
2004	7017		5		7.1	2.3–16.6
2005	6120		5		8.2	2.7–19.1
2006	5104		4		7.8	2.1–20.1

LR  $\chi^2$  test (linear trend; 1 df) = 0.16 (*P* = 0.69).

CI = 95% confidence interval; LR = likelihood ratio; *P* = *P*-value.

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