



## Shorter communication

## Habit reversal training and educational group treatments for children with tourette syndrome: A preliminary randomised controlled trial



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## ABSTRACT

Quality of life of children with Tourette Syndrome (TS) is impacted greatly by its symptoms and their social consequences. Habit Reversal Training (HRT) is effective but has not, until now, been empirically evaluated in groups.

This randomised controlled trial evaluated feasibility and preliminary efficacy of eight HRT group sessions compared to eight Education group sessions. Thirty-three children aged 9–13 years with TS or Chronic Tic Disorder took part. Outcomes evaluated were tic severity and quality of life (QoL).

Tic severity improvements were found in both groups. Motor tic severity (Yale Global Tic Severity Scale) showed greatest improvements in the HRT group. Both groups showed a strong tendency toward improvements in patient reported QoL.

In conclusion, group-based treatments for TS are feasible and exposure to other children with tics did not increase tic expression. HRT led to greater reductions in tic severity than Education. Implications, such as cost-effectiveness of treatment delivery, are discussed.

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## 1. Introduction

Tourette Syndrome (TS) is a developmental neuropsychiatric disorder defined by multiple motor tics and at least one vocal tic present for over a year (American Psychiatric Association, 2013). TS has a prevalence of 0.7% among UK 13-year-olds (Scharf, Miller, Mathews, & Ben-Shlomo, 2012) and is four times more common in males (Freeman et al., 2000). Tics tend to fluctuate, occurring in bouts over time (Leckman et al., 1998) and symptoms peak between 10 and 12 years (Bloch & Leckman, 2009). The condition is associated with high comorbidity with Attention Deficit Hyperactivity Disorder (ADHD) and Obsessive Compulsive Disorder (OCD).

Children with TS report functional impairment (Storch et al., 2007) and diminished Quality of Life (QoL; Cutler, Murphy, Gilmour, & Heyman, 2009). The impact of having TS can continue into adulthood (Lewin et al., 2012).

There is good evidence supporting behavioural therapy for TS. Recent meta-analyses indicate that Habit Reversal Training (HRT) has the best empirical support for reducing tic severity (McGuire et al., 2014). HRT helps participants develop an awareness of when tics are about to occur. The individual then develops a behaviour to stop the tic when the urge to tic arises. Through practice, increased control is gained over each troublesome tic. HRT has been developed into a manualised Comprehensive Behavioural Intervention for Tics (CBIT; Woods et al., 2008). The eight-session treatment includes a relaxation component and additional functional analysis to minimise environmental triggers. CBIT has been evaluated for use with children in a large scale randomised controlled trial (RCT) and showed greater tic reduction when

Abbreviations: CI, Confidence interval; CMTD, Chronic Motor Tic Disorder.

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compared to “supportive psychotherapy and education”, with a medium effect size (Cohen’s  $d = 0.68$ ; Piacentini et al., 2010). Six months later “responders” demonstrated reductions in anxiety and disruptive behaviour and improved social functioning (Woods et al., 2011). HRT and its variants show tic reductions of 30–100% (Verdellen, van de Griendt, Hartmann, & Murphy, 2011) and medium to large effect sizes relative to control groups (McGuire et al., 2014). Studies examining effects of HRT on phonic and motor tics separately have reported mixed results and there is no clear pattern to date showing which tics respond most to treatment (Piacentini et al., 2010; Wilhelm et al., 2012).

Verdellen et al. (2011) argue that psycho-education could reduce uncertainty about the condition and self-stigma.

Group-based HRT has not yet been empirically evaluated, but could provide an additional option as a cost-effective treatment for large numbers. Group-based delivery may provide additional benefits, such as improved self-efficacy, reduced isolation and help children explain their symptoms to peers (Murphy & Heyman, 2007; Nussey, Pistrang, & Murphy, 2014).

The current study investigated feasibility and preliminary efficacy of HRT and Education groups for children aged 9–13 years with TS or Chronic Tic Disorder (CTD). The groups were evaluated in terms of tic severity and QoL outcomes. It was predicted that the HRT group would experience greater reductions in tic severity compared to the Education group, as tics were the direct focus of the intervention. Children in both groups were predicted to show significant post-treatment QoL improvements, as each treatment addresses different factors impacting QoL.

## 2. Method

The study was a single-blind RCT, reviewed and approved by London Queen Square Research Ethics Committee and by ethics committees for Royal Holloway, University of London and University College London. The trial is registered on the National Institute for Health Research Portfolio Database (ISRCTN 50798741, <http://www.controlled-trials.com>).

Recruitment was from a specialist TS clinic at a London hospital where participants had received a diagnosis of TS or CTD from an experienced multidisciplinary team. The recruitment period was predefined (June to November 2013). All children aged 9–13 years, assessed within the preceding five years, were invited to participate. Additionally, children referred during recruitment were invited if they met inclusion criteria. Each child was randomised to either an HRT or an Education group. Both groups were described to participants as active interventions with potential but unknown benefits. Pre-treatment assessments took place during the month prior to treatment (Time 1) and post-treatment assessments within a month of treatment end (Time 2). All assessments took place in participants’ homes with the exception of four pre-assessments which, for practical reasons, took place in the clinic. Participants were excluded if they had: a Yale Global Tic Severity Scale (YGTSS; Leckman et al., 1989) total tic severity score  $< 13$ ; a Full Scale IQ  $< 80$ ; insufficient spoken English to participate in treatment; attended an Education group at the clinic within the previous two years; attended more than four individual HRT sessions or if TS was not the primary presenting problem. Fig. 1 shows the progress of participants through the study.

Having given informed consent, participants were sequentially randomised to treatment group using an equal allocation ratio. Minimisation software maximally balanced age and gender across conditions (Treasure & MacRae, 1998). Assessors were blind to treatment condition. Following data entry, Bang’s blinding indices were calculated (Bang, Ni, & Davis, 2004), representing the proportion of unblinding occurring. In the HRT condition 35% of

condition assignments were correctly guessed by the researchers, beyond chance. In the Education condition there was a slight tendency for the researchers to incorrectly guess that participants had been assigned to HRT (12.5%).

### 2.1. Interventions

One HRT and one Education group ran from September to October 2013. A second of each group type ran from November 2013 to January 2014. Participants attended only the eight-session group to which they were randomised and received no individual TS related sessions. Participants received ongoing treatment-as-usual in terms of school liaison and medication. Alongside the children’s groups, parents were invited to attend four parent sessions.

All parent and child group sessions were structured and manualised (available on request). The core therapeutic content differed between the groups, but practical elements were similar. The initial two sessions lasted 90 min and remaining sessions an hour. Sessions took place at the clinic and were run by five clinicians (three qualified and two in training). All clinicians were trained in delivery of the group protocol by author TM, who facilitated the children’s groups.

Sessions involved group discussion, didactic teaching and small group activities. A small weekly homework task was completed with parental support. Both groups started with the same first session of education about tics and both included teaching on progressive muscle relaxation. Reward strategies were used to increase implementation of techniques learnt.

Fidelity to treatment manuals was monitored using a fidelity checklist similar to those used in previous studies (e.g. Sukhodolsky et al., 2009). The approach resulted in complete fidelity to the protocols except that several sessions ran out of time in the final few minutes, across both conditions.

**HRT group.** This protocol was based on individual HRT treatment for children with TS (Woods et al., 2008) and an HRT therapy manual and workbook developed by Verdellen, van de Griendt, Kriens, and van Oostrum (2011). The children chose up to three tics to treat, of which 73% were motor tics. Details of the tics chosen by each participant are given in Table 1. The most bothersome tics were selected and treated first and skills developed to apply to further tics. Following specific, detailed instruction on competing responses, participants worked in small groups, with support from clinicians to develop and evaluate competing responses for each chosen tic.

**Education group.** This protocol was based on a six-session psycho-educational intervention (Murphy & Heyman, 2007), adapted to increase structural similarity to the HRT intervention. The content of each session was: Tics and TS; Self-esteem; School; Anger; Anxiety and OCD; Attention; Planning and Organising; Review, Quiz and Certificates. Sessions used cognitive behavioural strategies, such as identification of triggers to anger and problem solving approaches to build self-esteem and organisational skills. No instructions on managing tics were provided.

Parent groups followed a similar structure to the children’s groups including homework review and support, written handouts, group discussions, group-specific content (linked to the content of the children’s groups) and implementation of reward strategies.

### 2.2. Measures

The YGTSS (Leckman et al., 1989) is considered the gold standard tic severity measure. A list is generated of motor and phonic tics present over the past week, followed by ratings of number,

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