

USEFULNESS OF THE RELIABLE CHANGE INDEX FOR PSYCHOLOGY AND PSYCHIATRY IN CLINICAL PRACTICE: A CASE REPORT OF COGNITIVE-BEHAVIORAL THERAPY

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Abstract

Objective: The reliable change index (RCI) is a simple statistical computation which estimate if changes in two psychometric measures are probably due to measurement error or can be accounted by other factor, as a clinical intervention. Despite its clinical usefulness, the method is underutilized by psychiatrists and psychologists. We consider the use of the RCI in clinical practice by a case report of cognitive-behavioral therapy.

Method: a female patient of 40 years old sought cognitive-behavioral therapy due to symptoms of depression. We structured the intervention in 16 sessions and used Beck Depression Inventory II (BDI-II) for the assessment of depressive symptoms and answered in each session. Using published data about the BDI-II reliability and its standard deviation, we calculated the RCI before and after the intervention.

Results and conclusions: The patient started the treatment with moderate to severe symptoms of depression and showed almost a linear decrease of the symptoms along the sections. Although no reliable change could be associated with the first month of treatment, starting at the second month, we documented a reliable decrease in the depressive symptoms from session 4 to 16. The RCI index it's a useful method to assess if changes in psychometric measures may represent real change or occur by measurement error.

Key words: reliable change index (RCI), cognitive-behavioral therapy, Beck Depression Inventory II, depression

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Introduction

The reliable change index (RCI) is a statistical procedure proposed by Jacobson and Truax (1991) which allows the comparison of two psychometric derived scores (from tests, questionnaires or scales). RCI assesses whether the score's difference of a patient in two time points is more likely explained for by measurement error or whether it consists in a real significant change (Jacobson and Truax 1991, Strauss et al. 2006). Despite being relatively unknown in clinical practice, RCI is recommended by clinical manuals, since it can provide an evidence-based analysis of change patterns associated with specific treatments or conditions (Del Prette and Del Prette 2008).

RCI is one of the favored methods to assess significant changes associated with psychotherapy and psychopharmacological treatment, once it provides a combination of a statistical (i.e., *pre* and *post* measurement comparison) and a clinical (i.e., founded on measure reliability) aspect (Zhara and Hedge 2010). However, at this point, we do not have a single method to evaluate the clinical significance or the responsiveness of a person to a health treatment (Liang 2000). Regarding mental health, remission is usually defined

by an interview-based measure with the interviewer not presenting full symptom criteria for a minimum period established by a classificatory manual. In depression, for example, remission can be defined by scoring less than a threshold value on an interview-based measure of depression severity such as the Hamilton Rating Scale for Depression (Ballenger 1999, Hamilton 1960). Additionally, there is evidence supporting the validity of self-report questionnaires, a more cost-effective option, as an index of remission status among treatment responders which is reflected in less psychosocial impairment and better quality of life (Zimmerman et al. 2006). At any rate, there is a large discrepancy between methods used to evaluate outcomes in research studies and by clinicians (Zimmerman et al. 2006).

In this sense, we aim to illustrate the usefulness of the RCI in a clinical context. We evaluated the significance of depressive symptoms' change through RCI in a case of a patient treated with Cognitive-Behavioral Therapy (CBT). CBT has been found to be effective for treating major depression (Butler et al. 2006). It has been shown that reduction of depressive symptoms to a minimum is very important, since residual symptoms largely increase the chance for a full depressive syndrome (Keller 2003). Although we used an example of CBT treatment, RCI can

be used for any pharmacological or non-pharmacological intervention with psychometric measures as estimates of treatment efficiency.

Methods

Case presentation

A female patient with 40 years old and higher education level sought for Cognitive-Behavioral Therapy (CBT). At the moment of the first evaluation, the patient was referred as having Major Depressive Disorder (MDD) and Attention Deficit/Hyperactivity Disorder (Inattentive presentation). Although both disorders were causing psychological distress, we focused the psychotherapy in the depressive symptoms. MDD often shows a significant improvement with CBT (Bockting et al. 2015), while psychotherapy is usually ineffective for inattentive symptoms (Sonuga-Barke et al. 2013). The patient was under psychostimulant treatment at the time of CBT beginning. The CBT was conducted under the guidelines proposed by Beck (2011). The intervention was structured in sixteen weekly individual sessions.

The CBT was structured in seven topics: 1) psychoeducational counselling about psychiatric disorders; 2) cognitive and behavioral definition of happiness, depression and apathy; 2) changing unhelpful thinking and behavior; 3) development of problem solving techniques; 4) training of selective attention; 5) observing and applying positive and negative reinforcements in daily life; 6) establishment of a physical wellbeing exercise routine; and 7) improvement of decision-making in daily life by predicting irrational behavior.

The second revised version of the Beck Depression Inventory (BDI-II) (Beck et al. 1996) was used to measure the depressive symptoms severity. BDI-II is a 21-item self-report inventory with a score system ranging from 0 to 63 with higher scores indicating higher depression severity. The items are related to depressive features such as sadness, hopelessness and social withdrawal or physical symptoms such as fatigue. The BDI-II mainly measures a global construct of depression, but a two factorial solution proposed by Beck et al (1996) is also reasonable suited (Vanheule et al. 2008). The BDI-II dimensions include

somatic-affective symptoms (12 items: 4, 10-13, 15-21) and cognitive symptoms (9 items: 1-3, 5-9, 14). The RCI in our study will be applied only in the total/global score due to the availability of psychometry parameters. However, the trajectory of the somatic-affective and the cognitive symptoms will be shown for descriptive purposes. The patient was required to answer the BDI-II at the baseline and before each CBT session.

RCI Calculation

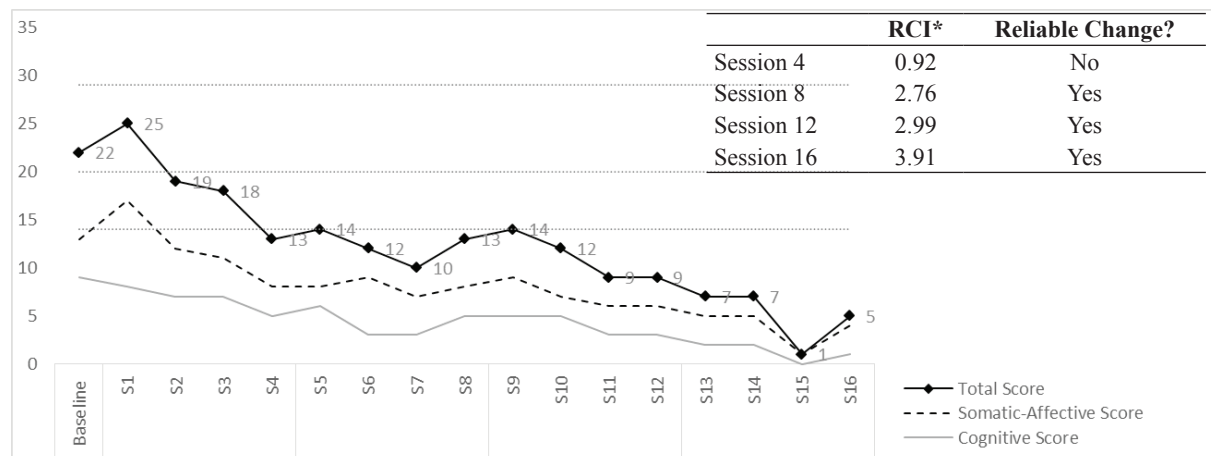
The RCI can be defined as the patient's score change (pre-test vs post-test) in a psychometric measure, divided by the standard error of the difference. Although several indexes of clinical change have been proposed (Spren et al. 2006), and different adaptations were performed in the original RCI method (Chelune et al. 1993, Maasen 2004), the original proposal from Jacobson and Truax (1991) is still one of the most robust to assess the real change in test scores (Temkin 2004). The standard error of the difference will be dependent of the measure's standard error, which involves the standard deviation of the normative sample of the instrument and the test reliability. The result represents a standard score. Values equal/higher than 1.96 or equal/smaller than -1.96 are representative of a reliable change at a 95% confidence level (p -Value=0.05), unlikely to be explained by measurement error.

To calculate the RCI we used the BDI-II reliability coefficient (Cronbach's α =0.93) and the standard deviation for women (11.62) of a community sample study (Gomes-Oliveira et al. 2012). The parameters for woman was preferred since the intensity and semiology of depression might differ between genders (Gobinath et al. 2015). The sample of our reference parameters had a mean age of 41 years (± 10.8), very similar to our patient. The RCI was computed for four strategic sessions, the ending points marking a new month of completed CBT treatment. A reliable change compared to the baseline was achieved for values equal or higher than 1.96.

Results

Figure 1 shows the patient's BDI-II scores at

Figure 1. Patient's Beck Depression Inventory II (BDI-II) Scores at baseline and through Cognitive-Behavioral Therapy and Reliability of Changes



*Comparison between the session BDI-II score and the Baseline BDI-II score.

RCI = Reliable Change Index

Note: The standardized cutoffs of BDI-II total score are: 0–13: minimal depression, 14–19: mild depression, 20–28: moderate depression, 29–63: severe depression. Score's range: 0–63: Total Score, 0–36: Somatic-Affective Score, 0–27: Cognitive Score

baseline and through CBT sessions along with the RCI of the difference between four month-ending sessions and the baseline. The patient started the treatment with a moderate depression and showed almost a linear decrease of the symptoms through sessions, in spite of depressive dimensions (*i.e.*, observed linear decreasing in both somatic-affective and cognitive dimensions). The patient dropped from a moderate to a mild depressive severity in the second session, and to a minimal depression in session four. A minimal depressive status was maintained through sessions 4-to-16 with a slight increase in symptoms' severity between sessions eight and ten, but with an overall linear decrease tendency until the end of the treatment with no item scored more than "1 (one)". Compared to the baseline, sessions 8, 12, and 16 showed reliable change indexes, which suggest a meaningful remission of the depressive symptoms under the CBT treatment as reported by the patient.

Discussion

In clinical practice it is often difficult to track the positive and negative effects of an intervention in mental health. Besides the mental health professional clinical judgment, participants self-report and the feedback of the families, which may be biased by several factors, the use of psychometric measures allow a more parsimonious analysis of symptoms' change. However, all psychometric measures involves measurement error, and this is particularly problematic in clinical settings. The use of statistics as the RCI, which considers test variability and measurement error, offers a conservative assessment of symptoms change due to clinical interventions (Jacobson and Truax 1991). The changes documented by the RCI are based on a psychometric criteria, and may not represent just the intervention, it may also be affected by concomitant treatments or even by the placebo effect, which, in the clinical setting, demands a previously validated intervention. Methods such as cognitive or behavioral therapy for the treatment of depressive symptoms are very efficient in the management of depression (Bockting et al. 2015, Clarke et al. 2015). In this sense, based on the intervention design and the change in patient's responses in the BDI-II documented by the RCI index, it is feasible to confirm the efficiency of the intervention for symptoms remission in the analyzed case.

Our aim was to illustrate the usefulness of the RCI in clinical practice focusing on psychology and psychiatry. As we found in this case report, cognitive based therapies is shown to have high effects on MDD treatment. The site of action of the cognitive therapies seems to be the informational processing system resulting in an overall depressive symptoms decrease independent of the depressive symptoms' nature (*i.e.*, vegetative or cognitive) (Bhar et al. 2008). A definition of remission should consider several aspects such as remission maintenance, psychosocial functioning and quality of life, but RCI is a potential tool to approximate the research and the clinical practice settings offering an objective measurement of remission, thus, a useful parameter to define the success of an intervention in individual clinical basis.

Conclusion

The RCI is a solid measure to track symptoms change in psychiatric and psychological interventions. Although it is sub used in the research context, its applicability in

the clinical setting is highly recommended to objectively state symptoms improvement beyond measurement error.

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