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Title: Subjective ratings of neuropsychological functioning in depressed young people undergoing treatment: Utility of a brief screening tool

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Abstract

Aims

To determine how young people with depression rate their neuropsychological functioning during treatment, and whether these ratings are affected by depression severity, age, suicidal ideation and antidepressant status.

Methods

Fifty young people (12 to 25 years) engaged in psychological therapy completed the Neuropsychological Symptoms Self Report rating their neuropsychological functioning in a range of domains.

Results

In two domains, working memory/multitasking and motivation, more than 40% of the sample rated their functioning as improved, since commencing treatment. Ratings of neuropsychological functioning were affected by depression severity and suicidal ideation, particularly in the areas of wakefulness, attention and concentration, working memory/multi-tasking, and motivation. However, there were few differences related to age or antidepressant status.

Conclusions

The Neuropsychological Symptoms Self Report - a rapid measure of subjective neuropsychological functioning - can provide a snapshot of subjective changes in neuropsychological functioning during treatment for depression. This information may guide treatment approaches.

Keywords

Adolescent, Depression, Neuropsychology, Self Report, Young Adult

Introduction

Similar to adults (1-3), neuropsychological deficits in young people (12 to 25 years) with depression are common and are most consistently seen in the domains of executive functioning, attention, concentration, processing speed, working memory, memory and language functioning (4-10). A recent systematic review indicated that the largest magnitude effect sizes (Cohen convention $\geq .8$) are observed in the areas of psychomotor/cognitive/processing speed and working memory (11).

Research in young people with bipolar disorder and schizophrenia has demonstrated the negative influence of neuropsychological difficulties on engagement in treatment (12-16). Neuropsychological difficulties may also underpin problems with therapy engagement in youth depression (17). However, this is yet to be explored, despite reports from clinicians that engaging young clients in cognitive behaviour therapy (CBT) is difficult, particularly for those with severe and complex presentations (18). Further, antidepressant use in adults has been associated with subjectively reported neuropsychological side effects, most prominently reduced concentration and memory functioning (16). These, combined with other psychological side effects, are a common reason for discontinuing antidepressant (16). However, subjective neuropsychological side effects have not yet been investigated in young people. There is also little research investigating whether psychological treatment for depression has an impact on neuropsychological functioning. The aim of this study was to examine self-reported neuropsychological functioning in young people with depression and assess the relationship of these ratings with clinical, demographic and treatment

factors using a newly developed measure the Neuropsychological Symptoms Self Report (NSSR).

Methods

Setting

The study was conducted at primary, secondary and tertiary mental health settings: the Peninsula Family General Practice (PFGP) (<http://pfgp.com.au>); two **headspace** centres (Sunshine and Glenroy), and the Youth Mood Clinic (YMC) at Orygen Youth Health (OYH). headspace Sunshine and Glenroy are two of over 60 centres part of the headspace National Youth Mental Health Foundation that are youth mental health services that provide assessment and psychological and/or psychiatric treatment to young people aged 12-25 years, in addition to primary health care, vocational and education assistance and substance use services (19, 20). OYH is a public mental health service for people aged 15–24 years living in the western and northwestern metropolitan regions of Melbourne, Australia (oyh.org.au).

Sample

Eligibility: young people aged 12 to 25; with depressive symptoms as documented by their clinician with a Patient Health Questionnaire 9 (PHQ-9) score ≥ 5 indicating at least mild depression; receiving any kind of psychological therapy (+/- antidepressant medication); and had attended ≥ 5 sessions with their therapist. As a pragmatic study, co-morbidity was not an exclusion criterion. The only exclusion criteria were an inability to use a computer, insufficient English language skills to complete the online tool and/or a documented IQ < 70 .

Development of the Neuropsychological Symptoms Self Report tool (NSSR)

The eight NSSR questions were designed to focus on the areas identified by previous research as being affected in depression on objective neuropsychological measures (4-10, 21-26). Descriptions of these were then presented in plain language, so they were understandable to lay people, and to reduce the impact of literacy problems and lower IQ on completing the measure (see Figure 1). The NSSR takes approximately 5 minutes to complete.

Figure 1: The Neuropsychological Symptoms Self Report (NSSR)

Please answer the following questions about your thinking ability:

	Better than before I started treatment	Same as before I started treatment	Worse than before I started treatment
My ability to stay awake during the day has been	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
My ability to pay attention and concentrate has been	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
The speed of my thinking has been	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
My memory has been	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
My ability to think of words and get words out when speaking has been	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
My planning and organisation skills have been	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
My ability to think about more than one thing at a time has been	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
My motivation to do activities has been	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

In a series of focus groups, a beta version of the tool was presented to a range of stakeholders, including: 1. past and present users of the OYH service; 2. YMC clinicians; and, 3. primary care practitioners and academic GPs (27). It was also piloted on 15 current YMC clients (28). Adjustments were made in response to feedback, including minor amendments to the wording of questions (making them shorter, with simpler language) and the removal of drop down options from electronic presentation template. The NSSR was delivered within a broader set of online measures via iPad and administered with the Patient Health Questionnaire nine-item measure (PHQ-9) to determine depression symptom severity and the Suicidal Ideation Questionnaire-Junior (SIQ-JR).

Procedure

Ethics approval was granted from the Melbourne Health Research and Ethics Committee (reference 2010.240). Eligible clients (and their parent/guardian if aged <18 years) were posted consent forms with instructions to bring the signed forms to the next appointment with their clinician. Consent was also obtained from clients' clinicians to be a clinician participant. Before their next appointment, the study RA met the participant and clinician and facilitated completion of the online tool. The clinician completed basic questions confirming the young person's diagnosis and medication status.

Management of Risk

After completion of the online tool, the clinician checked the depression and suicidal ideation scores. These were presented with explanations about the level of severity and what the numerical score represented. If the suicidal ideation items were

indicative of significant risk, the clinician undertook a risk assessment and implemented standard risk management protocols.

Statistical Analysis

SPSS was used to calculate descriptive statistics, specifically means and standard deviations and frequency counts. Chi-Square analysis (discrete variables) and independent t-tests (continuous variables) were used to test for differences between groups on variables of interest. Alpha was set at .05.

Results

Fifty young people were included in the study; their characteristics are described in Table 1. There were no significant differences between the groups (mild/moderate depression and moderate/severe depression) in regard to age, sex or medication status.

Table 1: Participant Characteristics

	Mild/Moderate Depression (5-14 PHQ)	Moderately Severe/Severe Depression (PHQ 15-27)	Total Sample
Number	21	29	50
Age Mean (SD)	19.57 (2.04)	17.93 (2.87)	18.62 (2.66)
Gender Female	86%	79%	82%
PHQ-9 Mean (SD)	9.52 (2.36)	18.28 (2.83)	14.60 (5.09)
PHQ-9 Range	6-13	15-26	6-26
SIQ-JR Mean (SD)	16.81 (13.52)	43.97 (23.73)	32.56
SIQ-JR Range	2-68	2-74	2-74
≥10 Sessions†	6	12	18
On Antidepressants‡	6 (28.57%)	14 (48.28%)	20 (40%)

SD: Standard deviation, PHQ-9: Patient Health Questionnaire 9, SIQ-JR: Suicidal Ideation Questionnaire-Junior

† Mean number of sessions was 7.62 SD (2.05). There was no statistically significant difference between the mean number of sessions by group ($p = .183$)

‡ The majority of clients were medicated with fluoxetine, with the remainder taking another form of SSRI.

The results of the participants' NSSR responses are shown in Table 2. For the total sample, participants most commonly endorsed their neuropsychological functioning as unchanged since commencing treatment. However, 40 percent or more rated their working memory/multitasking and motivation as improved since engaging in treatment.

Table 2: Perceptions of Neuropsychological Functioning Since Beginning Treatment for Depression

Neuropsychological Domain†	Rating of functioning	Mild/Mod. Depression	Mod./Severe Depression	Total Sample
Daytime wakefulness (χ^2 (2) =9.06, p =.011)*	Better	52.4%	13.8%	30%
	Same	38.1%	58.6%	50%
	Worse	9.5%	27.6%	20%
Attention and concentration (χ^2 (2) =9.50, p =.009)*	Better	52.4%	17.2%	32%
	Same	47.6%	62.1%	56%
	Worse	0.0%	20.7%	12%
Speed of thinking (χ^2 (2) =4.40, p =.111)	Better	28.6%	17.2%	22%
	Same	71.4%	65.5%	68%
	Worse	0.0%	10.0%	10%
Memory (χ^2 (2) =2.61, p =.271)	Better	14.3%	13.8%	14%
	Same	81.0%	65.5%	72%
	Worse	4.8%	20.7%	14%
Language generation and articulation (χ^2 (2) =2.38, p =.394)	Better	28.6%	13.8%	20%
	Same	66.7%	72.4%	70%
	Worse	4.8%	13.8%	10%
Planning and organisation (χ^2 (2) =1.74, p =.419)	Better	47.6%	37.9%	42%
	Same	52.4%	55.2%	54%
	Worse	0.0%	6.9%	4%
Working memory/multitasking (χ^2 (2) =7.84, p =.020)*	Better	23.8%	3.4%	12%
	Same	76.2%	79.3%	78%
	Worse	0.0%	17.2%	10%
Motivation to do activities (χ^2 (2) =25.60, p <.000)*	Better	81.0%	10.3%	40%
	Same	14.3%	48.3%	34%
	Worse	4.8%	41.4%	26%

†Neuropsychological domains, in order, as per the eight items on the NSSR (Figure 1).

* indicates $p < 0.05$; significant difference between perceptions of those with mild/moderate to those with moderately severe/severe depression

Neuropsychological endorsements were then analysed according to depression severity. The ratings of participants with mild/moderate depression were significantly different from those with moderately severe/severe depression in the domains of wakefulness, attention /concentration, working memory/multi-tasking, and motivation. The pattern of results indicated that those with mild/moderate depression perceived their functioning as improved more often than those with moderately severe/severe depression. Those with moderately severe/severe depression were more likely to rate their functioning as worse since starting treatment, compared to their mild/moderate counterparts. This pattern was most notable for endorsements related to motivation.

With regard to medication status, there were no significant differences in terms of perceptions of neuropsychological functioning between the endorsement of those who were taking medication, and those who were not. The results were also analysed according to whether or not participants had clinically significant levels of suicidal ideation (defined as an SIQ-JR score ≥ 31). These results were similar to the pattern of depression severity; however, differences only reached significance for motivation to do activities ($p=.000$).

When stratified by age (≤ 18 vs. >18) there were few differences in endorsements of improved, same, or worse functioning between younger and older participants. The exception to this was motivation where a greater proportion of older participants rated their motivation as improved compared to those who were younger (older: better 65%, same 35.3%, worse, 15.4%; younger: better 35%, same 64.7% and worse 84.6%, $p=.015$).

Discussion

The novel and snapshot nature of this study (collected after completion of at least a partial course of 1:1 psychological therapy) provides useful information regarding the subjective perceptions of neuropsychological functioning in 50 young people undergoing treatment for depression. These ratings indicated perceived improvements by 40 percent of the respondents or more, in the areas of planning and organization and motivation to do activities. Differences according to depression severity were observed. Participants with mild to moderate depression were more likely to endorse improvements in their neuropsychological functioning, and less likely to endorse neuropsychological deterioration than their more severely depressed counterparts. These differences reached significance in the areas of wakefulness/alertness, attention and concentration, working memory/multi-tasking and motivation. A similar pattern was observed when the results were stratified by suicidal ideation, but only reached significance in regard to motivation to do activities. The results parallel those from the adult literature which have also shown that more severe depression is associated with a higher self-reported level of cognitive difficulties (29, 30).

There were few differences in endorsements, related to age, other than a greater improvement reported in the motivation levels of older participants (> 18 years). Whether or not participants were on medication made little difference to their perceptions. However, unlike adult studies (16) participants were not asked directly whether they believed their neuropsychological difficulties were related to their antidepressant medication.

Due to the limitations of the cross-sectional design it is not possible to determine why more severely depressed participants report worsening of neuropsychological functioning in some domains. Reasons for this may be related to a worsening of depressive symptoms or poorer response to therapy. Further longitudinal examination would be required to determine whether self-reported neuropsychological symptoms are reflective of depressive state or whether residual neuropsychological deficits (subjective and objective) are present during symptomatic remission.

These preliminary findings indicate the NSSR is an easy to use tool that assesses perceived neuropsychological changes in young people engaged in treatment for depression. Previous research has shown that, when provided with knowledge of formal neuropsychological evaluation results, clinicians frequently modify the treatment provided to their clients (9). Informing young people that they may experience subjective improvements in their thinking skills after commencing treatment (particularly for mild to moderately depressed clients), could encourage them to pursue a course of psychological treatment. Similarly, understanding how young people subjectively perceive their neuropsychological functioning could also help in ongoing treatment planning. For example, knowledge of perceived neuropsychological difficulties could enable clinicians to determine when it is best to use more effortful or demanding techniques such as the cognitive aspects of CBT.

While there are limitations to this small pilot study, it indicates that during therapy a brief self-report tool, the NSSR, can provide a snapshot of subjective improvements in an individual's neuropsychological functioning in the areas typically affected by depression (executive functioning abilities, attention, processing speed, memory,

language and motivation). Future research that examines the extent to which NSSR rated subjective neuropsychological difficulties affect treatment engagement and efficacy would be useful. Examining the correlation between NSSR subjective ratings and measures of objective neuropsychological test performance and apathy/motivation would also be helpful for extending the clinical utility of the tool.

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