

Psychometric Properties of Clinical Indicators for Identification and Management of Advanced Parkinson's Disease: Real-World Evidence From G7 Countries

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SUPPLEMENTARY INFORMATION

Table S1 Measurement of the 15 clinical indicators of advanced PD from the data collected from the Parkinson's DSP Patient Record Form (PRF)

Clinical indicators of APD ¹⁴	Measured as (Adelphi Real World Parkinson's DSP)
1 Moderate/Severe troublesome motor fluctuations*	PRF EQ9a – From which of the following motor complications does the patient suffer: <i>On-off fluctuations</i> <u>AND</u> PRF EQ9b - Record the severity below for each motor complication suffered: <i>Mild</i> <i>Moderate</i> <i>Severe</i>
2 ≥ 2hrs off-time/day	PRF EQ5b - On average, how many hours a day does this patient experience 'off' time? <u> </u> <i>hours per day</i>
3 Moderate/Severe sleep disturbances [†]	PRF DQ1 - Which of the following symptoms is the patient currently experiencing? <i>Sleep disturbances</i> <u>AND</u> PRF DQ2 - What is the severity of all current symptoms? <i>Mild</i> <i>Moderate</i> <i>Severe</i>
4 ≥ 1 hr troublesome dyskinesia/day	PRF EQ6b - On average, how many hours a day does this patient experience dyskinesias? <u> </u> <i>hours per day</i> <u>AND</u>
5 Has NMS fluctuations [‡]	PRF Q6c. What proportion of the patient's total time with dyskinesias is rated as troublesome? PRF DQ1 - Which of the following symptoms is the patient currently experiencing? <i>Non-motor symptoms sub-section</i> <u>AND</u> PRF DQ2 - What is the severity of all current symptoms? <i>Mild</i>

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		<i>Moderate</i> <i>Severe</i>
6	Has at least 5 times oral levodopa/day	PRF IQ2a. Current regimen - Please provide details of ALL of this patient's CURRENT Parkinson's disease drug therapy, even if not prescribed during this visit: <i>Levodopa+ddi</i> <i>IR Levodopa + carbidopa (e.g sinemet)</i> <i>CR Levodopa + carbidopa (e.g sinemet CR)</i> <i>Levodopa + carbidopa + entacapone (e.g. Stalevo)</i> <i>Levodopa intestinal infusion gel (e.g. Duopa)</i> <i>Rytary (modified release Levodopa + carbidopa)</i> <u>AND</u> PRF IQ3b. Dose frequency _____ <i>times per day</i>
7	Moderate/Severe limitations with ADLs	PRF BQ6 - Which of the following does this patient require assistance in managing? <i>Communication with others</i> <i>Help getting in and out of bed</i> <i>Help with preparing meals/cooking food</i> <i>Eating</i> <i>Getting dressed/washed</i> <i>Help with going to the toilet</i> <i>Help with shopping</i> <i>Travelling out of home</i> <i>Using household appliances</i> <i>Taking medication when required</i> <i>Help gardening</i> <i>Other (specify) _____</i> <i>None of the above</i> <i>Don't know</i>
8	Falls most/all of the time [†]	PRF DQ1 - Which of the following symptoms is the patient currently experiencing? <i>Falling/imbalance</i> <u>AND</u> PRF DQ2 - What is the severity of all current symptoms? <i>Mild</i> <i>Moderate</i> <i>Severe</i>
9	Has at least mild dementia [‡]	PRF GQ1 - Please indicate any diagnosed concomitant conditions for this patient: <i>Dementia</i> <u>AND</u>

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		PRF DQ1 - Which of the following symptoms is the patient currently experiencing? <u>Non-motor symptoms sub-section</u> <i>Confusion</i> <i>Poor concentration</i> <i>Short-term memory loss</i> <i>Difficulty planning activities</i> <i>Other cognitive impairment</i> <u>AND</u> PRF DQ2 - What is the severity of all current symptoms? <i>Mild</i> <i>Moderate</i> <i>Severe</i>
10	Moderate/Severe psychosis [†]	PRF GQ1 - Please indicate any diagnosed concomitant conditions for this patient: <i>Psychosis</i> <u>AND</u> PRF DQ1 - Which of the following symptoms is the patient currently experiencing? <u>Non-motor symptoms sub-section</u> <i>Hallucinations</i> <i>Confusion</i> <i>Behavioural problems</i> <i>Poor impulse control</i> <i>Other cognitive impairment</i> <u>AND</u> PRF DQ2 - What is the severity of all current symptoms? <i>Mild</i> <i>Moderate</i> <i>Severe</i>
11	Troublesome dysphagia [†]	PRF DQ1. Which of the following symptoms is the patient currently experiencing? <i>Dysphagia</i> <u>AND</u> PRF DQ2. What is the severity of all current symptoms? <i>Mild</i> <i>Moderate</i> <i>Severe</i>
12	Non-transitory troublesome hallucinations [†]	PRF DQ1. Which of the following symptoms is the patient currently experiencing?

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		<i>Hallucinations</i>
		<u>AND</u>
		PRF DQ2. What is the severity of all current symptoms? <i>Mild</i> <i>Moderate</i> <i>Severe</i>
13	Not able to perform complex tasks at least some of the time	PRF BQ6 - Which of the following does this patient require assistance in managing? <i>Finances</i> <i>Help planning and organizing everyday activities</i>
14	Moderate impaired mobility [‡]	PRF DQ1 - Which of the following symptoms is the patient currently experiencing? <i>Freezing of gait</i> <i>Shuffling walk</i> <i>Lack of arm swing</i>
		<u>AND</u>
		PRF DQ2 - What is the severity of all current symptoms? <i>Mild</i> <i>Moderate</i> <i>Severe</i>
15	At least moderate level of dyskinesia [¶]	PRF EQ6b. On average, how many hours a day does this patient experience dyskinesias?
		<u>AND</u>
		PRF EQ6d. Have you attempted to treat the patient's dyskinesias?

* Indicator present if answer to question PRF EQ9b was 'moderate' or 'severe'

† Indicator present if answer to question PRF DQ2 was 'moderate' or 'severe'

‡ Indicator present if answer to question PRF DQ2 was 'mild', 'moderate' or 'severe'

¶ Indicator present if answer to question PRF EQ6b is ≥1 hour and if answer to question PRF-EQ6d is 'yes'

Table S2 Measurement of the seven indicators of device-aided therapy eligibility from data collected from the Parkinson's DSP Patient Record Form (PRF)

Device-aided therapy Eligibility Criteria	Adelphi PRF Question/section
Troublesome dyskinesia and off-periods	PRF EQ6b - On average, how many hours a day does this patient experience dyskinesias? _____ <i>hours per day</i> . PRF Q6e. Have you attempted to treat the patient's dyskinesias?
At least 2 h of off-time	PRF EQ5b - On average, how many hours a day does this patient experience 'off' time? _____ <i>hours per day</i>
Off-period postural instability	PRF DQ1 - Which of the following symptoms is the patient currently experiencing? <i>Falling/imbalance</i> <u>AND</u> PRF DQ2 - What is the severity of all current symptoms? <i>Mild</i> <i>Moderate</i> <i>Severe</i>
Dystonia with pain*	PRF EQ9a. From which of the following motor complications does the patient suffer? <i>Dystonia</i> <u>AND</u> PRF EQ9b. Record the severity below for each motor complication suffered. <i>Mild</i> <i>Moderate</i> <i>Severe</i>
Freezing of gait during off [†]	PRF DQ1 - Which of the following symptoms is the patient currently experiencing? <i>Freezing of gait</i> <u>AND</u> PRF DQ2 - What is the severity of all current symptoms? <i>Mild</i> <i>Moderate</i> <i>Severe</i>
Night-time sleep disturbances [†]	PRF DQ1 - Which of the following symptoms is the patient currently experiencing? <i>Sleep disturbances</i> <u>AND</u> PRF DQ2 - What is the severity of all current symptoms?

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	<i>Mild</i>
	<i>Moderate</i>
	<i>Severe</i>
Limited ADL	PRF BQ6 - Which of the following does this patient require assistance in managing? <i>Communication with others</i> <i>Help getting in and out of bed</i> <i>Help with preparing meals/cooking food</i> <i>Eating</i> <i>Finances</i> <i>Getting dressed/washed</i> <i>Help with going to the toilet</i> <i>Help with shopping</i> <i>Travelling out of home</i> <i>Using household appliances</i> <i>Taking medication when required</i> <i>Help planning and organizing everyday activities</i> <i>Help gardening</i> <i>Other (specify) _____</i> <i>None of the above</i> <i>Don't know</i>

* Indicator present if answer to question PRF EQ9b was 'moderate' or 'severe'

† Indicator present if answer to question PRF DQ2 was 'moderate' or 'severe'

Table S3 Diagnostic accuracy of the presence of 1 or more of the 15 Delphi clinical indicators of suspected advanced PD or the presence of 1 or more of the 7 device-aided therapy indicators

Indicator	Adjusted OR (95% CI)	AUC	Correct classification rate (%)
Presence of 1 or more of the 15 indicators	15.73 (6.93, 35.69)	0.86	86.7
Presence of 2 or more of the 15 indicators*	18.56 (11.31, 30.46)	0.88	87.2
Presence of 4 or more of the 15 indicators [†]	11.95 (9.32, 15.33)	0.90	88.3
Presence of 1 or more of the 7 indicators	5.89 (4.59, 7.56)	0.78	82.8
Presence of 2 or more of the 7 indicators*	4.76 (3.97, 5.69)	0.79	82.8

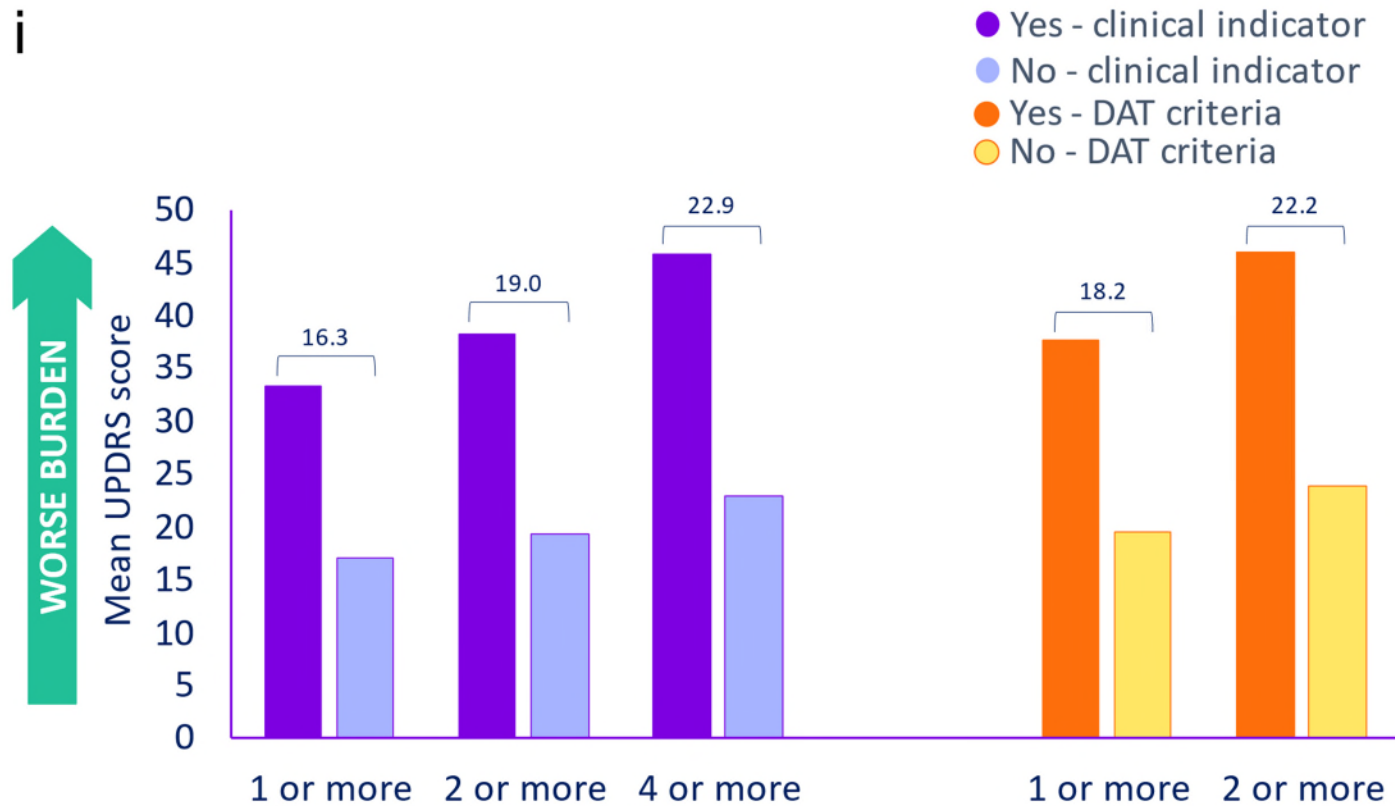
* Compared with the presence of 0 or 1 indicator.

[†] Compared with the presence of 0-3 indicators.

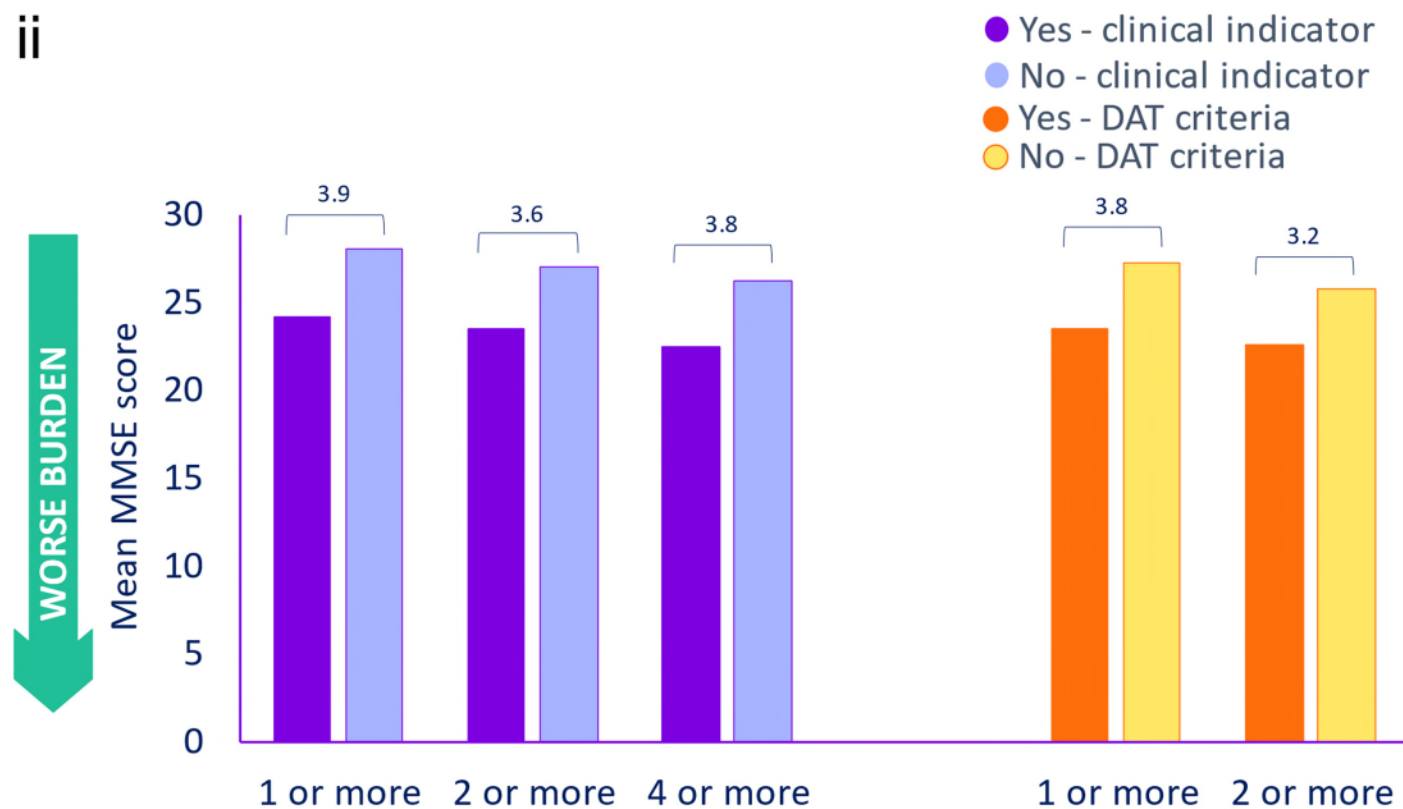
The AUC was calculated from the sensitivity (i.e., presence of the indicator in patients with advanced PD according to physician's judgement) and specificity (i.e., absence of the indicator in patients with early/intermediate PD according to physician's judgement). Correct classification rate was the percentage of patients with a given indicator who were classified as having advanced PD by the physician (expressed above as percentage/100). An AUC of ≥ 0.7 and correct classification rate $\geq 70\%$ were considered appropriate for screening performance.

AUC model adjusted to account for differences by country, age, gender, PD stage, years since PD diagnosis, and number of comorbidities.

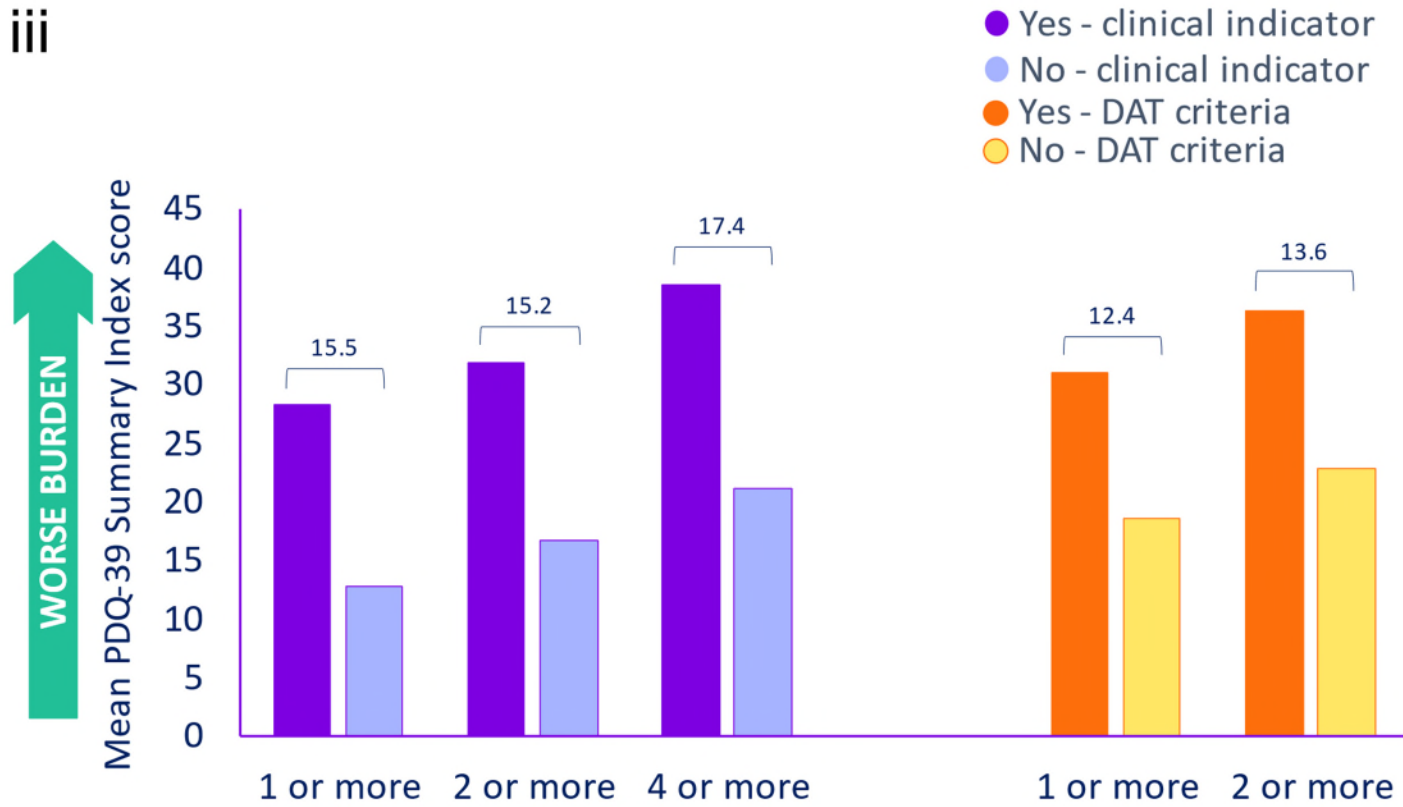
Fig S1 Construct validity of the presence of 1 or more of the 15 Delphi clinical indicators of suspected advanced PD or the presence of 1 or more of the 7 device-aided therapy indicators based on: (i) UPDRS total score; (ii) MMSE score; (iii) PDQ-39 Summary Index score; and (iv) ZBI score



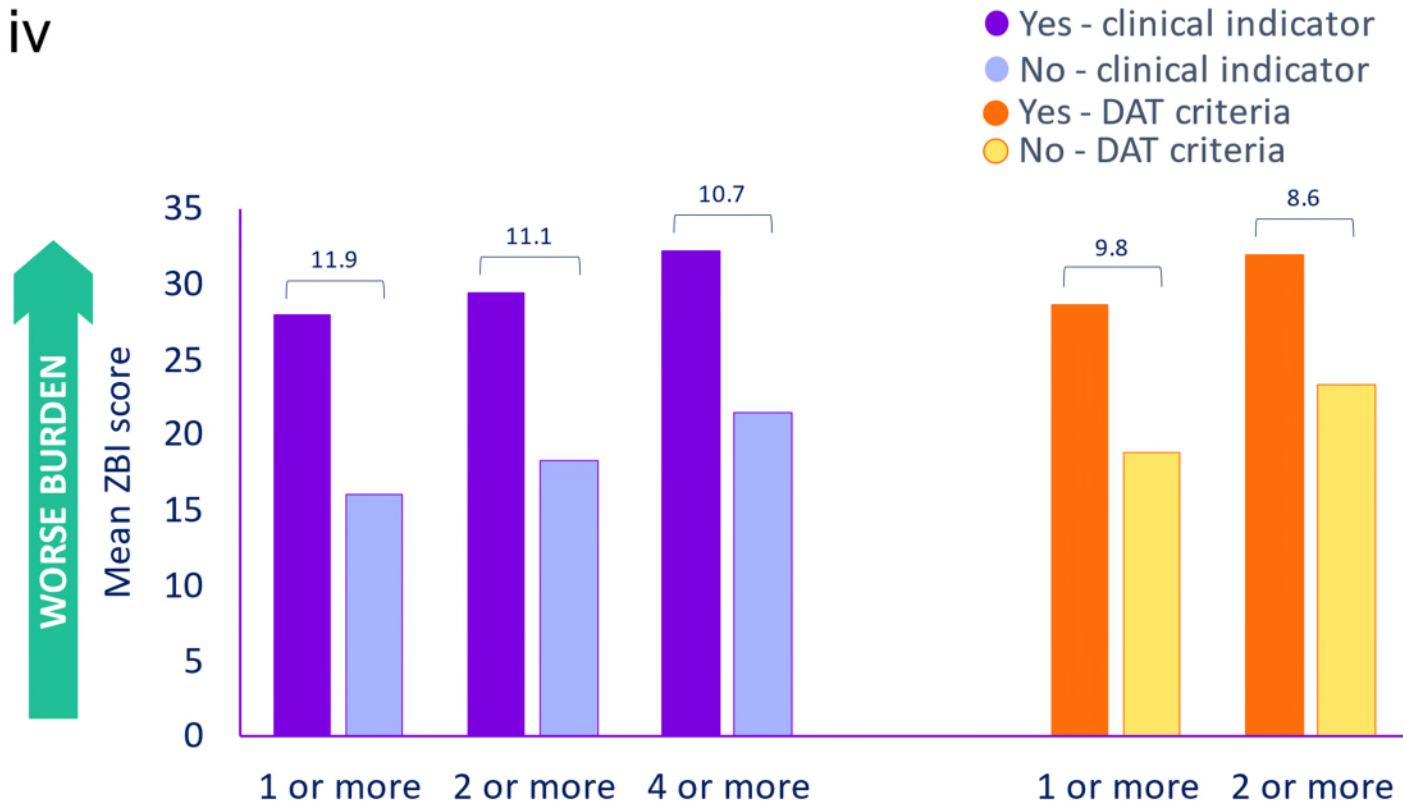
ii



iii



iv



All differences between presence and absence of clinical indicator or device-aided therapy criteria statistically significantly different ($p < 0.01$; t-test).

2 or more compared with the presence of 0 or 1 indicators/criteria.

4 or more compared with the presence of 0-3 indicators/criteria.