Deconstructing scales assessing cognition, psychosocial functioning,

and work ability in depression: a scoping review.

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Abstract

Major depressive disorder (MDD) is a common mental illness with negative effects on

cognitive, psychosocial, and work functioning. Many studies have shown that people

with depression often have difficulties in memory, attention, and decision-making,

which also affect their daily life and ability to work. However, there is no standard

method to assess these problems. Different studies use different scales to measure

depression symptoms, cognitive impairment, psychosocial disability, and work ability,

which makes it hard to compare results.

This scoping review aimed to identify the most used instruments in these four areas and

to classify their items using the International Classification of Functioning, Disability

and Health (ICF) model. The goal was to understand which areas are covered by current

tools and to find possible gaps. A total of 66 studies were selected from PubMed,

published in the last ten years. The analysis showed that instruments for depression and

cognition mostly use ICF categories related to body functions, especially emotional and

memory functions. In contrast, tools for psychosocial functioning and work ability focus

more on activities and participation.

Some items could not be clearly classified using the ICF, such as suicidal thoughts or

disorganisation, suggesting that the ICF might need to be expanded in these areas.

Mapping scales with the ICF helps identify what is measured and what is missing. This

work could support better harmonisation of future research and help define standard

tools for assessing the impact of depression on functioning and work ability.

Keywords: Depression, Cognitive impairment, Psychosocial functioning, Work ability,

ICF classification

Introduction

Major depression disorder (MDD) is a psychiatric disorder characterised by the presence of sadness or anhedonia accompanied by other symptoms such as weight loss or gain, appetite decreased, insomnia or hypersomnia, fatigue, psychomotor agitation or retardation, feelings of guilt, diminished ability to think and thoughts of death (Morrison, 2014). As a result, implications in quality of life (Brenes, 2007; Hohls et al., 2021), disability and functioning are reported (Akosile et al., 2018; da Silva et al., 2013; Fried & Nesse, 2014).

Depression involves cognitive impairment(Bornstein, 1999; Lam et al., 2014; Lee et al., 2012; Porter et al., 2007), even after remission of depressive symptomatology(Ali et al., 2021; McIntyre et al., 2015). Affections in psychomotor speed, attention, executive function and memory have been reported (Bora et al., 2013; Rock et al., 2014). To better understand the developmental cycle of MDD, a mediating role of cognitive impairment in the relationship between depression and quality of life, functioning and disability has been proposed and investigated(Buist-Bouwman et al., 2008; Lam et al., 2014; Schillerstrom et al., 2008).

Global surveys show that depression is associated with disability and is a leading cause of disability worldwide(WHO, 2021). Regarding life functioning, depressive symptomatology and cognitive impairment could interfere in the main living areas such as social, personal and work. There is empirical evidence of an association in the social domain concerning interaction, activity limitations, network size and participation (Saris et al., 2017; Steger & Kashdan, 2009). Dealing with daily routine, housework, and self-care (e.g. hygiene, dressing, feeding) is also a challenge for the depressive population(Gonzalez et al., 2008; Goudarzian et al., 2017; Hoshino et al.,

2016; Zhang et al., 2021). In the labour context, depressive symptomatology, including cognitive impairment, contributes to disease burden because of their impact on work functioning (i.e. productivity, absenteeism and presenteeism)(Clark et al., 2016).

Despite the empirical evidence of impaired cognitive function in depression and its interference with functioning, heterogeneity in the use of scales and instruments to assess cognitive deficits and functioning is reported(Bortolato et al., 2016; Fiorillo et al., 2018; Lam et al., 2014; Russo et al., 2015). Self-report measures are widely used in work performance and productivity studies(e.g.:Work Role Functioning Questionaire – WRFQ, Endicicott Work Productivity Scale – EWPS, Lam Employment Absence and Productivity Scale - LEAPS). Moreover, the range of items assessed differs across studies.

Bortolato et al., (2016) remarked on the absence of "gold standards" tools to asses cognition in MDD. There is a low level of work functioning scales development specifically for depression (Lam et al., 2014). This diversity impacts the consolidation of agreement of related domains mentioned in the field of study, making it difficult to pool data or even just compare studies.

An approach to reaching a consensus on gold standards between different instruments is deconstructing them and analysing their items and the domains they cover. For this purpose, the International Classification of Functioning, Disability and Health (ICF) is a good starting point to classify the domains covered by the items of the different instruments. The ICF is WHO's conceptual framework to provide a common language for conceptualising functioning, disability and health as a comprehensive model (WHO, 2001). The ICF is organised into categories through a hierarchical

structure of 4 levels from least to most accurate. A lower-level category automatically implies applicability to a higher-level category. For example, the ICF was used to design a list of core sets to assess depression in clinical studies (Cieza et al., 2004).

Following this approach, our purpose was to classify and assign ICF categories for the items of instruments evaluating depression, cognition, psychosocial functioning, and work ability. To select these instruments, we carried out a scoping review of studies to evaluate cognitive impairment, psychosocial disability, and work ability in depression. Therefore, this scoping review aims to map the categories to know which domains these instruments cover and to identify gaps and key concepts for further research. Mapping ICF categories may facilitate future data harmonisation to compare cohort studies more efficiently and progress in obtaining standards in this context.

Material and methods

We followed the methodological framework suggested by the Joanna Briggs Institute(Peters et al., 2015). The framework consists of six stages: (1) identifying the research questions, (2) identifying relevant studies, (3) selecting studies, (4) charting the data, (5) collating, summarizing and reporting results and (6) consultation.

Research questions

We proposed the following research questions:

- 1. Which are the most common instruments used to study cognitive impairment, work ability, disability and functioning in depression?
- 2. How are ICF categories distributed among the items of these instruments?
- 3. Are there any common patterns in these instruments used in the articles selected through ICF categories?
- 4. Are there any gaps in the domains covered by ICF in the study context on cognitive impairment, psychosocial disability, and work ability in depression?

Information sources and search studies

For this study, we performed a scoping review guided by the PRISMA statement as a framework. We did not publish or register any early formal protocol. The team was formed by two independent clinicians supported by two experienced researchers. We aimed to find recent and properly evidenced publications addressing cognitive symptoms of depression and its relation to work malfunction, disability and functioning. Hence, we included any experimental study published in the last ten years that gathered data about cognitive function and social and labour capacities. We used only PubMed as a primary database to execute the search. Eligibility criteria focused on evaluating depression severity, cognitive functions and psychosocial and work capability.

<>((depression[MeSH Major Topic]) AND (cognit* OR cognitive impairment[MeSH Major Topic])) AND (labor OR labour OR work OR psychosocial functioning)>>>

Selection of sources of evidence

The articles were selected by two independent researchers and then aggregated in a spreadsheet to be analysed. The reviewers screened all titles and abstracts of the retrieved citations. In case of disagreement, a consensus was determined by discussion and the criteria with experienced researchers.

Data charting process

Information was summarized in tables by both reviewers. It was outside the remit of this scoping review to assess the methodological quality of individual studies included in the analysis.

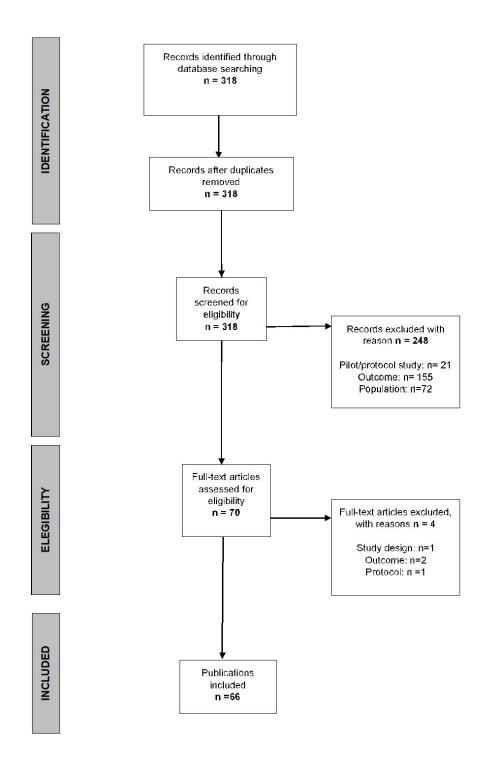
For the assignment of the ICF codes, the two reviewers made their assignment independently and then discussed and agreed on the codes.

Consultation excercise

A third external reviewer with experience in the field of ICF assisted the process by resolving doubts raised during the assignment based on consultations with external sources.

Results

In total, the database searches retrieved 318 records. We selected and analysed 66 articles in the main search. The excluded population includes articles with children or adolescents (population not working age) and studies focused on other diseases population (e.g., Diabetes Mellitus, cardiopathies, chronic pain, postpartum depression). Twenty-two records were identified as pilot or protocol studies. Studies excluded by the outcome did not study functioning, cognitive deficits or aspects of work ability. Figure 1 reports the PRISMA flowchart for article selection. The answers to each research question are presented in the following subsections.



1. Which are the most common instruments and scales used to study cognitive impairment, psychosocial functioning, and work ability in depression?

Depression assessment

We found 32 instruments to measure depressive symptoms in our sample. The three most used were the Hamilton Depression Rating Scale (HAMD) found in 26.5% of articles analysed, followed by the Beck Depression Inventory (BDI) (25%) and the Patient Health Questionnaire (PHQ-9) (14.7%). Even though several versions of the HAMD (HAMD-17, HAMD-21 and HAMD-24) and the BDI (BDI and BDI-2) were used, we decided to group them because some articles did not disclose the specific version they used. Two versions of the Center for Epidemiological Studies-Depression scale (CESD and CESD-10) were also grouped. All instruments are depicted in Table 1.

Table 1. Use percentage of most used instruments/scales

Depression assessment
HAMD
BDI
PHQ-914'71 %
HADS
Cognition assessment
MMSE
PDQ-D
DSST
CVLT
0127
Psychosocial functioning assessment
SF-36
SDS
WSAS
<i>GAF</i> 7'35 %
EuroQoL-5
Work ability assessment
SDS
WSAS
HPQ8'82 %
WLQ7'35 %
BDI: Beck Depression Inventory; CVLT: California Verbal Learning Test; DDST: Digit Symbol
Substitution Test; EuroQoL-5: European Quality of Life 5 Dimensions; GAF: Global Assessment

Functioning; HADS: Hospital Anxiety and Depression Scale; HAM: Hamilton Depression Rating Scale;

MADRS: Montgomery-Asberg Depression Rating Scale; MMSE: Mini-Mental State Examination; PDQ-D: Perceived Deficits Questionnaire Depression; PHQ-9: Patient Health Questionnaire; SF-36: Short Form; SDS: Sheehan Disability Scale; WLQ: Work Limitations Questionnaire; WSAS: Work and Social Adjustment Scale.

Cognition assessment

A total of 73 cognitive instruments were found in the first place. However, 9 of them were removed because they did not specifically evaluate cognitive function or were subtests of other instruments analysed. Their use was diverse, as can be seen in Table 1. The Mini-Mental State Examination (MMSE) was used the most in 8.8%. Tying at 4.4%, we found the Perceived Deficits Questionnaire Depression (PDQ-D), the Digit Symbol Substitution Test (DSST) and the California Verbal Learning Test (CVLT).

Psychosocial functioning assessment

For psychosocial functioning, we first found 50 instruments. However, we removed eight because they evaluated functioning related to specific conditions such as pain, stress or other diseases. We also removed one of the instruments because it could not be found through the linked reference, resulting in 41 instruments. The three main scales used were the Short Form (SF-36), the Sheehan Disability Scale (SDS) and the Work and Social Adjustment Scale (WSAS). The three of them appeared in 10.3% of the articles analysed. Both the Global Assessment Functioning Scale (GAF) and the European Quality of Life 5 Dimensions (EuroQoL-5) followed at 7.4%. Results are summarised in Table 1.

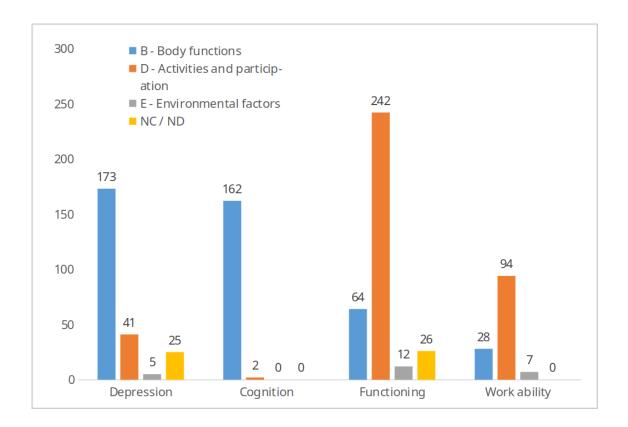
Work ability assessment

As for the work ability assessment, we first found 23 tests, but three evaluated global areas of psychosocial function, so they were later placed in the previous section. The most used were the SDS and WSAS, with a percentage of 10.3%. The following instruments were the Work Performance Questionnaire (HPQ) at 8.8% and the Work Limitations Questionnaire (WLQ) at 7.35%. We show the use of these instruments in Table 1.

2. How are ICF codes / categories distributed in this context? (mapping categories).

We found a predominance of "B Body functions" codes among the instruments for depression and cognition: 173 B codes among the 32 instruments for depression and 162 B codes among the 64 instruments for cognition. On the other hand, "D Activities and participation" codes were more prevalent in psychosocial functioning (242 D codes among 41 instruments) and work ability (83 D codes among 20 instruments). While some depression, psychosocial functioning and work ability instruments include few items related to E Environmental factors (5 codes among 32 instruments, 12 codes among 41 instruments, and 7 codes among 20 instruments, respectively), instruments for cognition did not include any code in this category as expected. Depression and psychosocial functioning tests also contained items without clear ICF links. They were classified as not-covered/not-defined (nc/nd) (25 items among 32 scales and 26 items among 41 scales, respectively). A summarised chart can be seen in Figure 2. Further descriptive results can be found in annexe 1.

Figure 2. Summary of ICF codes by domain.



3. Are there any common pattern in instruments/scales used in the articles selected through ICF categories.

As we already found, *b. body functions* items were the most prevalent in instruments assessing depressive symptoms. More specifically, the most explored categories were *b152 emotional functions* (29 out of 32 instruments analysed), *b160 thought functions* (26 out of 32), and *b130 energy and drive functions* (25 out of 32) which relate to core symptoms of MDD.

In terms of cognitive evaluation, the most explored categories were also *b. body* functions, mainly *b144 memory functions* (41 out of 64), followed by *b140 attention* functions (37 out of 64) and lastly, *b164 higher-level cognitive functions* (22 out of 64).

As for the psychosocial functioning assessment, we have found a predominance of *d.* activities and participacon codes, with d920 recreation and leisure being the most used item (17 out of 41). Other common items were d760 family relationships (14 out of 41),

b152 emotional functions (12 out of 41) and d845 acquiring, keeping and terminating a job (12 out of 41).

Finally, instruments assessing work ability also focused most usually on *d. activities* and participation, being d845 Acquiring, keeping and terminating a job (17 out of 20), the most explored code. They were followed by d859 Work and employment, other specified and unspecified (11 out of 20) and b140 Attention functions (9 out of 20).

4. Are there any gap in the domains covered by ICF in this context?

Among all items analysed, we found some features that did not fit the ICF. Following the ICF recommendations (Cieza A, 2016) we classified them into other categories that can be seen in the Figure 2. In *not-defined mental health* (*nd-mh*) we included global mental health evaluation and suicide ideation. We classified as *not-covered* (*nc*) behaviour alterations such as disorganisation, procrastination, and self-harm or suicidal attempts. General life and personal satisfaction, physical state or global health items were labelled under *not-defined quality of life* (*nd-qol*), *not-defined physical health* (*nd-ph*) and *not-defined global health* (*nd-gh*) categories.

Other difficulties encountered throughout the analysis of the instruments were that psychopathological evaluation items needed to be clearly categorised in the ICF. An example was the case of anhedonia, a core symptom of MDD. We included all items referring to hedonic capacity in the first level category *b1 mental functions*.

As for psychosocial functionality assessment, global or vague items were included in *not-defined functionality* (*nd-func*) (i.e., overall psychosocial functioning). Items referring to specific actions or situations but not clearly classifiable under any ICF

category were categorised as d2 general tasks and demands. (i.e., managing difficulties or doing poorly in subjects they used to be good at).

Discussion

Summary of evidence

Firstly, it should be noted that we found a larger amount of instruments assessing cognitive impairment than depressive symptoms, work ability and psychosocial functioning. The analysis of each of these areas showed a tendency towards major ICF categories. Depressive symptoms and cognitive impairment instruments focused more in *b.body functions* items at a first level while work ability and psychosocial functioning instruments mentioned more frequently *d. activities and participacion* items. Nevertheless, we also found heterogeneity regarding second and third level ICF items which is reported in the following paragraphs.

As found by Thomas (2004 https://pubmed.ncbi.nlm.nih.gov/15370748/), clinical instruments evaluating depression tend to focus more on the biological than the social or functional perspective. We have seen a predominance of items referring mainly to body functions, more frequently emotional, thought and energy and drive functions, all three core symptoms of MDD. However, items referring to other fundamental MDD symptoms like sleep alterations, loss of concentration, psychomotor retardation, or appetite or weight loss were less frequently found and thus less explored in the instruments of our sample. All these differences in symptom representation could indicate that depression tests have diverse approaches and understandings of severity when exploring MDD. Some authors such Cieza (2004 as https://pubmed.ncbi.nlm.nih.gov/15370760/) have worked towards integrating sets for evaluating depression using the ICF.

Regarding cognition evaluation, the instruments in our sample mainly focused on memory and attention functions. In contrast, perception, language, decision-making, problem-solving or high cognitive functions (i.e., abstraction, organisation or thought flexibility) were far less explored.

Regarding work ability, the ICF offered three principal codes when evaluating the items in the instruments, specifically, d845 Acquiring, keeping and terminating a job, d850 Work and employment, other specified and unspecified and d855 Remunerative employment. Since these categories are generic, the range of items included in them is broad and heterogeneous, thus making it challenging to analyse the content of the instruments deeply. Thus, the ICF is not the most suitable classification to analyse items in work ability instruments. Some instruments assessing work capacity also included items referring to other areas like attention, energy or emotional status.

Gaps detected

During the analysis of the instruments, we noted that the ICF placed certain limitations in classifying some items that did not fit any category.

Suicidal risk, although frequently explored, could not be individually classified in the ICF and needed generic labelling such as nd-mh in case of ideation and nc in case of suicidal or self-harm behaviour.

Considering suicidality is a crucial MDD symptom at a clinical level to assess both diagnosis and severity, its inclusion as a new item into the ICF should be contemplated.

Behavioural alterations are also relevant in MDD and other mental health disorders evaluation. Even some instruments explored items involving disorganization and

procrastination, they could not be specifically categorized and were finally classified as nc.

We used other general labels such as nd-func, nd-gh, nd-qol and nd-ph to refer to functionality, general or physical health and quality of life items that could not be clearly classified in the ICF for they needed to be more specific.

Limitations

This scoping review has several limitations. First, the search was restricted to a single database (PubMed), which may have limited the comprehensiveness of the literature retrieval. Including other databases such as PsycINFO, Scopus or Web of Science could have resulted in a broader and more diverse pool of instruments. Second, the inclusion criteria excluded populations with comorbid conditions and clinical subgroups, potentially overlooking instruments specifically adapted to real-world complexity. Third, we did not conduct a formal quality assessment of the included studies, as this lies outside the scoping review framework, but it may limit the interpretability of findings. Finally, the ICF classification itself posed challenges: while it served as a useful framework, some mental health-specific constructs could not be adequately captured, and subjective interpretation during item mapping may have introduced inconsistencies, despite the consensus process.

Conclusions

This review highlights the heterogeneity of instruments used to assess cognitive impairment, psychosocial functioning and work ability in the context of depression. The ICF model served as a useful conceptual framework for mapping item content, revealing key differences in the domains covered across instruments and areas. While

body functions dominated in the assessment of depressive symptoms and cognition, activities and participation were more prevalent in work and psychosocial functioning tools. Several items, particularly those related to suicidality or behavioural alterations, fell outside the scope of the current ICF classification, suggesting the need for its adaptation or expansion in the mental health field. This mapping exercise provides a foundation for future harmonisation of instruments, which is essential for improving the comparability of research findings and for guiding clinical and policy decision-making.

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ANNEXES

Table A1. Summary of instruments/scales used in included articles

REFERENCE	Depression	Cognition	Disability / Functioning / QoL / Social	Work capacity	Others
Camacho, A., et al. (2018)	CESD-10; STAI	B-SEVLT; WF; DSS; GCS	-	-	-
Soczynska, J. K., et al.(2014)	HAM-D-17; CGI-S; CGI-I	CVLT-II; BVMT-R	SDS	EWPS	-
Miyata, A., et al.(2018)	HAM-D-17; BDI-II	Continuous Performance Test (CPT-IP), Wisconsin Card Sorting Test(WCST), and Trail-Making Test(TMT-AB).	SASS; Driving Simulator	-	SSS
Schaub, A., et al.(2018)	HAM-D-17; MADRS; BDI	-	GAF	-	Test based on Hahlweg et al.(1995) ¹
Lam, R. W.,et al.(2016)	MADRS; CGI-S CGI-; QIDS-SR	CNS; BC-CCI; ACS-TOPF	SDS	LEAPS; HPQ	-
Hellerstein, D. J., et al.(2017)	HRSD-24; BDI- II; CDRS	MOTCS; ABNAS	SAS	SAS	BPI; TCI; ASEX
Kowalska, J., et al.(2019)	GDS	MMSE	BI	-	AIS
Wesnes, K. A.,et al.(2017)	MADRS	CDR System; Bond-Lader visual analog scale	SDS	-	
Chokka, P., et al.(2019b)	QIDS-SR; CGI-S and CGI-I	PDQ-D-20; DSST	WHODAS; SDS	WLQ; WPAI	GAD-7
Lemmens, L. H., et	BDI-II	-	WSAS, RAND-36;	-	SLSCSRV;

¹ Hahlweg, K., Dürr, H., & Müller, U. (1995). Familienbetreuung schizophrener Patienten: Ein verhaltenstherapeutischer Ansatz zur Rückfallprophylaxe; Konzepte, Behandlungsanleitung und Materialien. Beltz, Psychologie-Verlag-Union.

al.(2020)			EuroQol; DAS-A, IIP		WAI-O-S; BSI
Sumiyoshi, T., et al.(2019)	MADRS	PDQ-D; DSST-part of WAIS-III	SDS; WPAI; EuroQol-5	WPAI	-
Deckersbach, T., et al,.(2010)	HAM-D-17	FrSBe;RBANS; D-KEFS;WTAR	LIFE-RIFT	HPQ	YMRS
Lee, R. S. C., et al.(2013)	HAMD-17; BPRS-E	WTAR; TMT-A/B);LDSF and LDSB; CANTAB; Wechsler; RAVLT; FAS	SFS	-	-
Dillon, D. G.,et al.(2015)	QIDS-SR; SHAPS	Flanker Test	-	-	-
Lerner, D.,et al.(2015)	PHQ-9	-	EQ-5D-5L	WLQ	-
Kröger, C., et al.(2015)	Beck Depression Inventory (BDI); Symptom- Checklist 90- Revised (SCL- 90-R)	-	DIW	-	FLZ
Geraedts, A. S., et al.(2014)	CES-D; HADS; CIDI	-	-	MBI; HPQ	TIC-P
Downey, D., et al.(2019)	MADRS; MGHS	WTAR; MMSE; BDS; COWAT	-	-	-
Hallgren, M., et al.(2015)	PHQ-9; MADRS;MINI	-		WAI; EuroQol-5	AUDIT
Niemegeers, P., et al.(2019)	MADRS	COWAT; CPT; HVLT;SDST;L CT; Stroop task	-	-	-
Fauth, E. B., et al.(2012)	CES-D	Memory In Reality test FEIT	-	-	UCLA Loneliness
Zhu, S., et al.(2018)	HAMD-17	Eyes task Faux pas task	-	-	ASQ
Michalak, J., et al.(2015)	HAM-D; BDI	- -	SASS;SF-36	-	-
Jiang, W., et al.(2018)	HAM-D;BDI-II; STAI	-	SF-36, GHQ	-	PSS; Total Cardiopathy
Blomgren, C., et	HADS	BNIS	FAI	-	NIHSS; FIS

al.(2019)

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Eskilsson, T., et al.(2017)	HAD	D-KEFS(Stroop and TMT); WAIS- R;WAIS-III;LMRS;N- BTRCN;RAPM	-	SMBQ	-
Ekers, D., et al.(2011)	BDI-II	<u>-</u>	WSAS	WSAS	CSQ-8
Best, M. W., et al.(2019)	-	MATRICS; Tower of London	-	-	-
Hopstaken, J. F., et al.(2015)	BDI-II	-	-	-	-
Welch, E. S., et al.(2019)	MINI; HAMD- D-21; IDSSR;CGI; PHQ-9	-	-	-	-
Lam, R. W., et al.(2013)	MADRS;CGI-S / CGI-I		-	SDS; LEAPS); HPQ	-
Peters, A. T., et al.(2016)	K-SADS- P/L;RADS	-	CGAS; GAF; HONOSCA	-	-
Dos Santos, É. N., et al.(2020)	MINI-PLUS; BDI-II	-	FAST	-	-
Kaldo, V., et al.(2018)	MINI	-	-	WAS	-
Berman, M. G., et al.(2012)	PANAS	BDS Backwards Digit Span	-	-	-
Furukawa, T. A., et al.(2012)	BDI-II,Kessler Scale (K6)	-	-	HPQ	-
Adler, D. A., et al.(2015)	PHQ-9	-	-	WQL	-
Phillips, R., et al. (2014)	PHQ-9;CORE- 10	-	-	WSAS;EQ-5D-5L	GAD-7
Lerner, D., et al.(2020)	PHQ-9	-	-	WQL	GAD-7
Knekt, P., et al.(2011)	BDI-II,HDRS; SCL-90-GSI	-	WAI;SAS;PPF;GAF	-	SCL-90-Anx; HARS
Beiwinkel, T., et al.(2017)	PHQ-9;BDI-II	-	Manchester Short Assessment of Quality of Life (MANSA)	-	-

Miskowiak, K., et al.(2012)	HDRS	CPFQ	-	-	HARS;MAS
Ikebuchi, E., et al.(2017) Kim, B. J., et al.(2018)	HAM-D GDS-15	BACS;NART MMSE	GAF;LASMI IADL	- -	PANSS
Twamley, E. W., et al.(2019)	HAM-D-17	UPSA-Brief; MATRICS Consensus Cognitive Battery; TMT-B/A; WCST-64; MIST; WMS-III Spatial Span and University of Maryland (UM); HVLT-R; BVMT-R;NAB	SSPA;ILSS; QOLI	-	PANSS
Mahmood, Z., et al.(2019)	HAM-D	MATRICS Consensus Cognitive Battery; TMT-A/B; BACS-SC; CPT- IP; WMS-III SS; LNS; HVLT- R;BVMT-R;NAB; FAS;WCST-64; MIST; WRAT-III	UPSA-B;SSPA	-	PANSS
Chokka, P., et al.(2019a)	QIDS-SR; CGI	Perceived Deficits Questionnaire for Depression (PDQ-D-20),	WHODAS 2.0; SDS	WLQ; WPAI	GAD-7
Baş, T. Ö., et al.(2015)	HAM-D	RAVLT;WMS-R; SCWIT; TMT- A/B; NES),	FAST	-	YMRS
Goodyer, I. M., et al.(2017)	MFQ; DES-A;K- SADS-PL;RRS	-	HoNOSCA	-	RCMAS;LOI
McLaughlin, D. P., & McFarland, K. (2011)	GDS;CIDI	-	WPSI	-	-
Clarke, J., et al.(2019)	PHQ-9	-	-	WSAS	GAD; DDS; SMP- T2D
Enns, M. W., et al.(2018)	HADS; SCID Anxiety (ass dx) SCID ;Depression (ass dx)	LNS;CVLT;SDMT	D-FIS; MOS	WPAI	T25FW;9HPT; Self-Administered Comorbidity Questionnaire,
Schure, M. B., et al.(2019)	PHQ-9	-	WSAS	WSAS	GAD-7; CD-RISC10
Meyer, B., et al.(2019)	NDDIE;PHQ- 9;DASS	-	QoLIE-10	WSAS	GAD-7;INEP-ON

Afuwape, S. A., et al.(2010)	PHQ-9	-	-	WLQ	-
Thompson, R. D., et al.(2012)	K-SADS-PL ;CDI-27	-	CGAS	-	PCDAI
Katsuki, F., et al.(2018)	K6; BDI-II	-	SF-36	-	ZBI;FAS;FAD
Motivala, S. J., et al. (2018)	MADRS	-	GAS	-	YBOCS;HARS;PS WQ
van der Kemp, J., et al.(2019)	HADS	MoCA	USER-P; ADL; GSES	-	
Cavanagh, K., et al.(2011)	PHQ-9;CORE- 10	-	WSAS	WSAS	GAD-7
Ólason, M., et al.(2018)	BDI-II	-	SF-36	FABQ-W	NRS;BAI
Imamura, K., et al.(2015)	BDI-II	-	-	UWES; HPQ; Sick Leave Days	-
McCall, W. V., et al.(2018)	HRSD	WTAR; MMSE;CVLT-II); DRS-2 I/P	SF-36	-	-
Ko, H. J., et al.(2016)	BDI-II; GDS15	MMSE	SF-36; Brief Encounter Psychosocial Instrument	-	ISI;FSS
Hajek, A., et al.(2018)	GDS		LSNS;IADL;BI	-	-
Hummel, J., et al.(2017)	HAMD	MMSE	BI; IADL; SoS; Karnosfsky Performance Status Index.	-	Confusion Assessment Method; Pearlin sense of mastery; Groningen Fraility Indicator; CIRS; Tinetti Test; Timed up and go

ABREVIATIONS:

<u>Depression:</u> HAM-D-24; HAM-D-17(Hamilton Depression Scale); BDI or BDI-II(Beck Depression Inventory); PHQ-9 (Patient Health Questionnaire); MADRS (Montgomery-Asberg Depression Rating Scale); HADS(Hospital Anxiety Depression Scale); CGI-S + CGI-I(Clinical Global Impressions—Severity and —Improvement scales); GDS-15(Geriatric Depression Scale); QIDS-SR(Quick Inventory of Depressive Symptomatology—Self-Report); K-SADS-P/L(Kiddie Schedule for Affective Disorders and Schizophrenia for School Age Children — Present and Lifetime Version); SF-36(Short-Form 36); CORE-10(Clinical Outcomes in Routine Evaluation); K6 (Kessler Screening Scale for Psychological Distress); GHQ(Global Health Questionnaire); SCL-

90-GSI(Symptom Check List Global Severity Index); **RRS**(Ruminative Responses Scale); **IDSSR**(Inventory of Depressive Symptomatology); **CDRS** (Cornell Dysthimia Rating Scale); **RADS**(Reynolds Adolescent Depression Scale); **CDI**(Children Depression Inventory); **MEI-SF**(Motivation and Energy Inventory Short Form); **BPRS-E**(Brief Psychiatric Rating Scale – Expanded); **PANAS**(Positive and Negative Affect Schedule); **CESD**(Center for Epidemiological Studies-Depression scale); **CESD-10** (Center for Epidemiological Studies for Depression); **STAI** (Spielberger State-Trait Anxiety Inventory); **CIDI**(Composite International Diagnostic Interview); **SHAPS**(Snaith Hamilton Pleasure Scale); **MFQ**(Mood and Feelings Questionnaire); **MINI**(Mini International Neuropsychiatric Interview); **DES-A**(Depressive Experience Scale for Adolescents); **DASS**(Depression Anxiety Stress Scale); **NDDIE**(Neurological Disorders Depression Inventory for EPILEPSY).

Cognition: MMSE(Mini Mental State Examination); PDQ-D(Percieved Deficits Questionnaire Depression); DSST(Digit Symbol Substitution Test); CVLT or CVLT-II(Californa Verbal Learning Test 2nd Edition); DSS(Digit Symbol Subtest (igual anterior però menys temps);SDST(Symbol Digit Substitution Test); SDMT (Symbol Digit Modalities Test); GDS (Global Deterioration Scale); GDS (MCCB, TMT-B, FAS, WCST-64, MIST) Global Deficit Scale); CPT-IP(Continuous Performance Test Identical Pairs version); CPT(Continuous Performance Test); WCST(Wisconsin Card Sorting Test); TMT-AB(Trail Making Test parts A and B);MIST(Memory for Intentions Screening Test);MOTCS(Medical Outcomes Trust Cognitive Scale);MoCA(Montreal Cognitive Assessment); ABNAS (Aldenkamp-Baker Neuropsychological Assessment Schedule)); MATRICS (Letter-Number Sequencing (LNS) (Spatial Span Test (WMS-SS)); LNS(Letter-Number Sequencin); BACS(Brief Assessment of Cognition in Schizophrenia); NART(National Adult Reading Test); CDR System(Computerized assessment system); B-L-VAS(Bond-Lader visual analog scale); CNS VS(Central Nervous System Vital Signs); NCI(Neurocognition Index):BC-CCI(British Columbia Cognitive Complaints Inventory):ACS-TOPF(Advanced Clinical Solutions Test of Premorbid Functioning):WMS(Wechsler Memory Scale third edition):BVMT-R(Brief Visuospacial Memory Test Revised):CANTAB(Cambridge Neuropsychological Test Automated Battery); RAVLT(Rey Auditory Verbal Learning Test); CFT(Cognition Function Test); ROCF(Rey-Osterreith Complex Figure 3 Minute Recall); FAS(Letter Fluency); WF(World Fluency); BDS(Backwards Digit Span); CPFQ(Massachusetts General Hospital Cognitive and Physical Functioning Questionnaire); B-SEVLT(Brief Spanish English Verbal Learning Test); FrSBe(Frontal Systems Behavior Rating Scale); RBANS(Repeatable Battery of the Assessment of Neuropsychological Status); **DKEFS**(Delis-Kaplan Executive Functioning System); **WTAR**(Wechsler Test of Adult Reading); **MIR**(Memory In Reality):COWAT(Controlled Oral Word Association Test):BNIS(Barrow Neurological Institute Screen):FEIT(Face Emotion Identification Task):DSFB(Digit Span Forward and Backward):HVLT(Hopkins Verbal Learning Test);LCT(Line Coping Test):DRS-2IP(Dementia Rating Scale 2nd Edition Initiation / Preservation); LMRS(Letter Memory Running Span); N-BT(N-Back Task); RAPM(Raven's Advanced Progressive Matters); WAIS(Wechsler Adults Intelligence Scale); RCN(Recall of Concrete Nouns).

Functioning/Disability/QoL/Social: SF-36(Short-Form 36); GAF (Global Scale): **EQ-5D-5L**(EuroQol-5 Assessment Functioning Dimension-5 Level):IADL8Instrumental activities of daily living):UPSA- Brief(University of California, San Diego Performance-Based Skills Assessment-Brief):SSPA(Social Skills Performance Assessment): WHODAS (World Health Organization Disability Assessment Schedule 2.0): MOS (Modified Pain Effects Scale); CGAS(Children Global Assessment Scale); HoNOSCA(Health of the Nation Outcome Scales for Adolescents); FAI(Frenchay Activities Index); SASS (Social Adaptation self-evaluation Scale); SAS (Social Adjustment Scale); LSNS (Lubben Social Network Scale); LASMI (Life Assessment Scale for Mental Illness); PPF(Percieved Psychological Functioning); LIFE-RIFT(Longitudinal Interval Follow-up Evaluation-Range of Impaired Functioning Tool):GHQ(General Health Questionnaire):WPSI(Washington Psychosocial Seizure Inventory):SoS(Social Situation Scale): GFS(Groningen Frailty Scale):QOLI(Quality of Life Interview):ILSS(Independent Living Skills Survey));SDS(Sheehan Disability Scale); BI(Barthel Index); WSAS(Work and Social Adjustment Scalee): CORE-10(Clinical Outcomes in Routine Evaluation): IIP(Inventory Interpersonal Problems): SFS(Social Functioning Scale): PADL(Patient Activity Daily Living); DAS-A(Dysfunctional Attitude Scale form A); D-FIS(Adapted Fatigue Impact Scale);FAST(Functioning Assessment short test); MANSA (Manchester Assessment of Quality of Life); LASMI (Life Assessment Scale for Mental Illness); LEDS (Life Events and Difficulties Scale): GSES (General Self-Efficacy Scale): ISI (Insomnia Severity Index): BEPSI (Brief Encounter Psychosocial Instrument): CIRS (Cumulative Illness Record

Scale); IIP(Inventory of Interpersonal Problems).

Work: HPQ(World Health Organization Health and Work Performance Questionnaire):WLQ(Work Limitations Questionnaire):WSAS(Work and Social Adjustment Scale); WPAI(Work Productivity and Activity Impairment); JBQ(Job Content Questionnaire); FAST(Functioning Assessment short test); LEAPS(The Lam Employment Absence and Productivity Scale); DIW(Days of Incapacity to Work); UWES(Utrecht Work Engagement Scale); USER-P(Utrecht Scale Esvaluation Rehabilitation-Participation): FABQ-W - AP(Fear-Avoidance Beliefs Questionnaire (work and ph activity)): UPSA- Brief(University of California, San Diego Performance-Based Skills Assessment-Brief); MOS (Modified Pain Effects Scale); CGAS (Children Global Assessment Scale); HoNOSCA (Health of the Nation Outcome Scales for Adolescents); FAI (Frenchy Activities Index); WAS (Work Ability Score); SASS (Social Adaptation self-evaluation Scale); SAS(Social Adjustment Scale); LASMI(Life Assessment Scale for Mental Illness); WAI(Work Ability Index); LIFE-RIFT(Longitudinal Interval Follow-up Evaluation-Range of Impaired Functioning Tool); MBI(Maslach Burnout Inventory-General Scale); SBMQ(Shirom-Melamed Burnout Questionnaire). Others: CIRS(Cumulative Illness Rating Scale); ISI(Insomnia Severity Index); ;FSS(Fatigue Severity Scale); NRS(Nutritional Risk Screening); BAI(Beck Anxiety Inventory); GAD(Generalized Anxiety Disorder); YBOCS(Yale-Brown Obsessive Compulsive Scale); HARS(Hamilton Anxiety Rating Scale); PSWQ(Penn State Worry Questionnaire); ZBI(Zarit Burden Interview); FAS(Family Attitude Scale); FAD(Family Assessment Device); PCDAI(Pediatric Crohn's Disease Activity Index); CD-RISC-10(Connor-Davidson Resilience Scale 10-Item); T25FW(Timed 25-Foot Walk); 9-HPT(9-Hole Peg Test); DDS(Diabetes Distress Scale); SMP-T2D(Self-Management Profile for Type 2 Diabetes); RCMAS (The Revised Children's Manifest Anxiety Scale): LOI(Leyton Obsessional Inventory); ABQ(Antisocial Behaviour Questionnaire); YMRS (Young Mania Rating Scale); PANSS(Positive and Negative Syndrome Scale); SCL-90-R(Symptom Checklist-90-R); CSQ-9(Client Satisfaction Questionnaire); FIS(Fatigue Impact Scale); NIHSS(National Institute of Health Stroke Scale); PSS(Perceived Stress Scale); AUDIT(Alcohol Use Disorders Identification Test); FLZ(Fragebogen zur Lebenszufriedenheit- Life Satisfaction Questionnaire); BSI(Brief Symptom Inventory); SLSCSR(Self-Liking and Self-Competence Scale Revised Version); WAI-O-S(Working Alliance Inventory); AIS(Acceptance of Illness Scale); BPI (Brief Pain Inventory); ASEX(Arizona Sexual Experience Scale); TCI(Temperament and Character Inventory); SSS(Standford Sleepiness Scale); INEP-ON(Inventory for the Assessment of Negative Effects of Psychotherapy, Modified for Online Interventions); MAS(Bech - Rafaelsen Mania Scale); **ASQ**(Attributional Style Questionnaire); **TIC-P**(Treatment Inventory Cost in Psychiatric patients).

Table A2.Summary of insturments/scales used

Depression	Cognition	Disability functional ability social ability QoL	Work capacity
Hamilton Rating Scale for Depression(HRSD-17)	Brief- Spanish English Verbal Learning Test (B-SEVLT)	Sheehan Disability Scale (SDS)	Work Ability Score (WAS)
Hamilton Depression Scale (HAM-D)	Word Fluency Test (WF)	Social Adaptation Self-Evaluation Scale (SASS)	Work and Social Adjustment Scale (WSAS)
Beck Depression Inventory-II (BDI-II)	Digit Symbol Subtest (DSS)	Standford Sleepiness Scale	Life Assessment Scale for Mental Illness - Interpersonal Relations (LASMI-IR)
Montgomery-Asberg Depression Rating Scale (MADRS)	California Verbal Learning Test (CVLT)	Global Assessment Functioning Scale (GAF)	Work Ability Index (WAI)
Quick Inventory of Depressive Symptomatology, Self-Rated (QIDS-SR)	Continous Performance Test (CPT)	Social Adjustment Scale (SAS)	Percieved Psychological Functioning (PPF) -> social?
Cornell Dysthymia Rating Scale (CDRS)	Wisconsin Card Sorting Test (WCST)	Aldenkamp-Baker Neuropsychological Assessment Schedule (ABNAS)	Longitudinal Interval Follow-up Evaluation-Range of Impaired Functioning Tool (LIFE-RIFT)
Geriatric Depression Scale (GDS)	Trail-Making Test (TMT)	Brief Pain Inventory (BPI)	Endicott Work Productivity Scale (EWPS)
Brief Symptom Inventory	Cenral Nervous System Vital Signs Computerized Battery (CNS VS)	Barthel Index (BI)	The Lam Employment Absence and Productivity Scale (LEAPS)
Clinical Global Impression - Severity of Illness and Improvement subscales (CGI-S and CGI-I,)	British Columbia Cognitive Complaints Inventory (BC-CCI)	World Health Organization Disability Assessment Schedule 2.0 (WHODAS)	Work Performance Questionnaire (HPQ)
Patient Health Questionnaire-9 (PHQ-9)	Advanced Clinical Solutions Test of Premorbid Functioning (ACS-TOPF)	Work and Social Adjustment Scale (WSAS)	Work Limitations Questionnaire (WLQ)
Symptom-Checklist 90-Revised (SCL-90–R)	Mini Mental State Examination (MMSE)	RAND-36 = (SF-36)	Work Productivity and Activity Impairment (WPAI)
Center for Epidemiological Studies-Depression scale(CES-D)	Cognitive Drug Research (CDR)	EuroQoL-5d	Maslach Burnout Inventory (MBI)
Center for Epidemiological Studies for Depression (CES-D-10) Hospital Anxiety and Depression Scale (HADS)	Continuity of Attention (COA) score Power of Attention (POA) score	Dysfunctional Attitude Scale form A (DAS-A) Inventory of Interpersonal Problems (IPP)	Shirom-Melamed Burnout Questionnaire (SMBQ) Sheehan Disability Scale (SDS) Work Role item

Inventory of Depressive Symptomatholgy (IDSSR)
Reynolds Adolescent Depression Scale (RADS)
International Neuropsychiatric Interview (M.I.N.I)
Kessler Scale (K6)

The Mood and Feelings Questionnaire (MFQ)

Depressive Experiences Scale for Adolescents (DES-A)
Kiddie-Schedule for Affective Disorders and Schizophrenia for School-Age Children Present and Lifetime Version (K-SADS-PL)
Children's Depression Inventory (CDI-27)

Short Form 36 (SF-36)

Clinical Outcomes in Routine Evaluation (CORE)
General Health Questionnaire (GHQ)

Brief Psychiatric Rating Scale - Extended (BPRS-E)
Positive and Negative Affect Schedule (PANAS)
Composite International Diagnostic Interview (CIDI Depression)
Depression Anxiety Stress Scale (DAS)

Neurological Disorders Depression Inventory for EPILEPSY (NDDIE)

Perceived Deficits Questionnaire for Depression (PDQ-D-20)
Digit Symbol Substitution Test (DSST) -part of WAIS-III
Frontal Systems Behavior Rating Scale (FrSBe)
Repeatable Battery of the Assessment of Neuropsychological Status (RBANS)
Delis-Kaplan Executive
Functioning System (D-KEFS)

Wechsler Test of Adult Reading (WTAR)
Longest Digit Span Forward and Longest Digit Span Backward (LDSF and LDSB)
Cambridge Neuropsychological Test Automated Battery (CANTAB)
Logical Memory Scale (Wechsler) (LMS)
Rey Auditory Verbal Learning Test total score (RAVLT)
Letter Fluency (FAS)

Digit span (DGS)

Controlled Oral Word Association Test (COWAT) The Hopkins Verbal Learning Test (HVLT) Stroop Color - Word Interference Test (SCWIT) Line Copying Test (LCT) Social Functioning Scale (SFS)

Life Satisfaction Questionnaire FLZ Patient Activity of Daily Living (PADL) Short Form-36 (SF-36)

General Health Questionnaire (GHQ)

Frenchay Activities Index (FAI)

Fatigue Impact Scale (FIS)

Functional ability: Functioning Assessment short test (FAST)

Clinical Outcomes in Routine Evaluation (CORE10) Work Ability Index (WAI)

Manchester Short Assessment of Quality of Life Life Assessment Scale for Mental Illness (LASMI) Instrumental activities of daily living (IADL) Social Skills Performance Assessment (SSPA) Independent Living Skills Survey (ILSS) Quality of Life Interview (QOLI) Fear-avoidance beliefs for work (FABQ-W) Utrecht Work Engagement Scale (UWES) Job Content Questionnaire (JCQ) Functioning Assessment Short Test (FAST)

Utrecht Scale Esvaluation Rehabilitation-Participation (USER-P) Performance-Based Skills Assessment-Brief (UPSA-B) Social Adjustment Scale (SAS) <u>Motivation and Energy Inventory - Short Form</u> (MEI-SF)

Ruminative Responses Scale (RRS)

<u>Spielberger State-Trait Anxiety Inventory</u> (SSPTAI)

Snaith Hamilton Pleasure Scale (SHAPS)

Memory in Reality Test (MIR)

National Institute of Health Stroke Scale (NIHSS) Barrow Neurological Institute Screen for higher cerebral functions (BNIS) Wechsler Adults Intelligence Scale (WAIS) Massachusetts General Hospital Cognitive and Physical Functioning Questionnaire (CPFQ) Brief Assessment of Cognition in Schizophrenia (BACS)

Performance-Based Skills Assessment-Brief (UPSA-Brief) MATRICS Consensus Cognitive Battery Wide Range Achievement Test-III Reading subtest (WRAT-III)

III Reading subtest (WRAT-III)
Memory for Intentions Screening
Test (MIST)

Neuropsychological Assessment Battery (NAB) Mazes

Continuous Performance Test— Identical Pairs (CPT-IP) Wechsler Memory Scale

Revised (WMS-R) Neurological Evaluation Scale (NES)

Self-Administered Comorbidity Questionnaire (SCQ)

Letter Number Sequencing test (LNS)

Performance-Based Skills Assessment-Brief (UPSA-B) Washington Psychosocial Seizure Inventory (WPSI) Fatigue Impact Scale for Daily Use (D-FIS)

Events and Difficulties Schedule (LEDS)
Children's Global Assessment
Scale (CGAS)

Utrecht Scale for Evaluation of Rehabilitation-Participation (USER-P) General Self-Efficacy Scale (GSES) Insomnia Severity Index (ISI)

Fatigue Severity Scale (FSS)

Brief Encounter Psychosocial Instrument (BEPSI) Lubben Social Network Scale (LSNS) Social Situation Scale (SoS)

Cumulative Illness Rating Scale (CIRS)
Karnosfsky Performance Status Index
Longitudinal Interval Follow-up
Evaluation-Range of Impaired
Functioning Tool (LIFE-RIFT)
Percieved Psychological
Functioning (PPF)

Symbol Digit Modalities Test (SDMT) Montreal Cognitive Assessment (MoCA)

Dementia Rating Scale-2nd edition Initiation Perseveration Index (DRS-2 I P Global Deterioration Scale Symbol Digit Substitution Test (SDST)

Medical Outcomes Trust Cognitive Scale (MOTCS) Aldenkamp-Baker Neuropsychological Assessment Schedule (ABNAS) Tower of London

National Adult Reading Test (NART) Bond-Lader visual analog scale (B-L-VAS) Neurocognition Index (NCI)

Brief Visuospacial Memory Test Revised (BVMT-R) Osterreith Complex Figure 3 Minute Recall (CFT) Backwards Digit Span (BDS)

Flaker Test (FT)

Face Emotion Identification Task (FEIT) Eyes Task

Faux Pas Taks (FPT)

Digit Span Forward and

MOS Pain Effects Scale (PES)

Health of the Nation Outcome Scales for Adolescents (HoNOSCA) Groningen Frailty Scale Backwards (DSFB)

Emotional Stroop (ES)

Letter Memory Running Span (LMRS) N-Back Task (N-BT)

Raven's Advanced Progressive

Matters (RAPM)
Recall Concrete Nouns (RCN)

Memory for Intentions Screening Test (MIST)

Table A3. Use percentage of instruments/scales

Depression assessment

HAMD2	6'4	17	%
BDI	5'(00	%
PHQ-9	4'7	71	%
HADS	8'8	32	%
CGI-S and CGI-I	7	35	%
GDS-15			
QIDS-SR	5	88	%
CORE-10	4	41	%
K-SADS-P/L	4	41	%
RRS			
CESD	2	94	%
GHQ	2	94	%
K6	2	94	%
SF-36	2	94	%
SCL-90-GSI	2	94	%
SSTAI	2	94	%
BPRS-E	1'	47	%
CBQ	1'	47	%
CDI	1'	47	%
CDRS	1'	47	%
CIDI			
DASS	1'	47	%
DES-A	1'	47	%
IDSSR	1'	47	%
MEI-SF	1'	47	%
MFQ			
NDDIE	1'	47	%
PANAS	1'	47	%
RADS			
SHAPS	1'	47	%

Cognition assessment

9	
MMSE	8'82 %
PDQ-D	4'41 %
DSST	4'41 %
CVLT	4'41 %
Psychosocial functioning assessment	
SF-36	
SDS	10'29 %
WSAS	10'29 %
GAF	
EuroQoL-5	
Work ability assessment	
SDS	10'29 %
WSAS	
HPQ	
WLQ	

BDI: Beck Depression Inventory; CVLT: California Verbal Learning Test; DDST: Digit Symbol Substitution Test; EuroQoL-5: European Quality of Life 5 Dimensions; GAF: Global Assessment Functioning; HADS: Hospital Anxiety and Depression Scale; HAM: Hamilton Depression Rating Scale; MADRS: Montgomery-Asberg Depression Rating Scale; MMSE: Mini-Mental State Examination; PDQ-D: Perceived Deficits Questionnaire Depression; PHQ-9: Patient Health Questionnaire; SF-36: Short Form; SDS: Sheehan Disability Scale; WLQ: Work Limitations Questionnaire; WSAS: Work and Social Adjustment Scale.