

## PEER-REVIEW REPORT

**Name of journal:** World Journal of Psychiatry

**Manuscript NO:** 49882

**Title:** Validity, reliability, and psychometric properties of a computerized, cognitive assessment test (Cognivue®)

**Reviewer's code:** 02445242

**Position:** Editorial Board

**Academic degree:** MD

**Professional title:** Professor

**Reviewer's country:** India

**Author's country:** United States

**Reviewer chosen by:** Ying Dou

**Reviewer accepted review:** 2019-07-29 01:06

**Reviewer performed review:** 2019-08-09 16:44

**Review time:** 11 Days and 15 Hours

SCIENTIFIC QUALITY	LANGUAGE QUALITY	CONCLUSION	PEER-REVIEWER STATEMENTS
<input type="checkbox"/> Grade A: Excellent	<input type="checkbox"/> Grade A: Priority publishing	<input type="checkbox"/> Accept	Peer-Review:
<input checked="" type="checkbox"/> Grade B: Very good	<input checked="" type="checkbox"/> Grade B: Minor language	(High priority)	<input checked="" type="checkbox"/> Anonymous
<input type="checkbox"/> Grade C: Good	polishing	<input type="checkbox"/> Accept	<input type="checkbox"/> Onymous
<input type="checkbox"/> Grade D: Fair	<input type="checkbox"/> Grade C: A great deal of	(General priority)	Peer-reviewer's expertise on the
<input type="checkbox"/> Grade E: Do not	language polishing	<input checked="" type="checkbox"/> Minor revision	topic of the manuscript:
publish	<input type="checkbox"/> Grade D: Rejection	<input type="checkbox"/> Major revision	<input type="checkbox"/> Advanced
		<input type="checkbox"/> Rejection	<input checked="" type="checkbox"/> General
			<input type="checkbox"/> No expertise
			Conflicts-of-Interest:
			<input type="checkbox"/> Yes
			<input checked="" type="checkbox"/> No

## SPECIFIC COMMENTS TO AUTHORS



**Baishideng  
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Group**

7041 Koll Center Parkway, Suite  
160, Pleasanton, CA 94566, USA  
**Telephone:** +1-925-223-8242  
**E-mail:** [bpgooffice@wjgnet.com](mailto:bpgooffice@wjgnet.com)  
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Cognivue® was cleared by the FDA in 2015. This was done based on two studies (reference 31 of manuscript). Page 7 of this reference states that: " The sponsor conducted two separate studies. The first study was conducted to determine the cut-off values for Cognivue (e.g., impaired, intermediate, and unimpaired cognitive function) by comparing the performance of Cognivue against a reference standard, the St. Louis University Mental Status (SLUMS) Examination. The second study was a clinical validation study which examined the agreement between the Cognivue classifications and the SLUMS classifications. The clinical validation study also examined the test - retest reliability study of Cognivue, and the determination of the construct validity of Cognivue via comparison with traditional paper and pencil neuropsychological tests." The "Cut-off" study had 92 participants and the "Clinical validation" study had 401 participants. More recently the same authors appeared to have presented their results as posters at the AAGP Annual Meeting 2019. One of these posters is about the "Cut-off study" with 92 participants (American journal of Geriatric Psychiatry - March 2019 Volume 27, Issue 3, Supplement, Page S211), while the other is regarding the results of the "Clinical validation" study with 401 participants (March 2019 Volume 27, Issue 3, Supplement, Page S212). Now in this manuscript the authors again present the results of "Cut-off" and "Clinical validation" studies. It is not at all clear if these 3 sources of data leading to the 3 pairs of studies are the same. I think the authors need to clarify this. Secondly, the authors have clearly disclosed their conflicts of interest and source of funding. One of them has acted as a consultant and speaker for Cognivue Inc. while the other two are employees of Cognivue Inc. Though this is not clearly stated the study appeared to be funded by the same company. Although the full disclosure is helpful, personally I would have been happier to read a paper on the usefulness of the Cognivue® by an independent set of authors. This would have done away with lingering suspicion of bias that will always exist when the authors have such a close



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connection with the company marketing the device. In this regard, something I found surprising was the lack of validation studies apart from the ones cited above. Since the Cognivue® has been around for 3-4 years I would have expected many more studies examining its properties in detecting cognitive impairment. However, I could find only one more study on multiple sclerosis (reference 30 of the manuscript). Perhaps the authors could let us know if there have been other studies. The authors present the results of cross-validation with the SLUMS in terms of negative percent agreement (NPA) and positive percent agreement (PPA). These are somewhat different the sensitivity, specificity, PPV and NPV values, which are the indices generally used to evaluate screening instruments including those for cognitive impairment (for example - Mitchell & Malladi, Am J Geriatr Psychiatry 2010; 18:759-782). It would be helpful if the authors could clarify the similarities and differences between the NPA/PPA and these more traditional indices of screening. The final question that needs to be answered is about the usefulness of the Cognivue® versus paper and pencil tests particularly the ones such as the MMSE, Mini-Cog and the MOCA which have been found useful earlier (Mitchell & Malladi, 2010; Tsoi et al. JAMA Intern Med. 2015;175(9):1450-1458). The authors do address this issue on pages 10 and 11 but it is quite apparent that without further testing on larger samples it would not be possible to comment on the usefulness of the Cognivue® versus other screening instruments. Moreover, some of its utility may be offset by the high costs of the test in settings where insurance is not available. In this regard, a recent systematic review of the diagnostic accuracy of automated tests for cognitive impairment concluded that: "Some tests have shown promising results for identifying MCI and early dementia. However, concerns over small sample sizes, lack of replicability of studies, and lack of evidence available make it difficult to make recommendations on the clinical use of the computerised tests for diagnosing, monitoring progression, and treatment response for MCI and early dementia. Research

is required to establish stable cut - off points for automated computerised tests used to diagnose patients with MCI or early dementia." (Aslam et al. Int J Geriatr Psychiatry. 2018;33:561-575) Incidentally, this review of 11 studies did not mention the Cognivue® studies. A second review systematic review & meta-analysis on neuropsychological measures that predict progression from mild cognitive impairment to Alzheimer's type dementia in older adults found that: "Verbal memory measures and many language tests yielded very high predictive accuracy. Other domains (e.g., executive functions, visual memory) showed better specificity than sensitivity. Predictive accuracy was highest when combining memory measures with a small set of other domains or when relying on broad cognitive batteries." (Belleville et al Neuropsychol Rev 2017 27:328-353) Thus, the nature of sub-tests included in the Cognivue® (page 4 of the manuscript) will probably be crucial in determining the ultimate utility of the test. I think it would be useful if the authors could comment on this issue.

## **INITIAL REVIEW OF THE MANUSCRIPT**

### ***Google Search:***

- ☐ The same title
- ☐ Duplicate publication
- ☐ Plagiarism
- ☐ [ Y ] No

### ***BPG Search:***

- ☐ The same title
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- ☐ Plagiarism
- ☐ [ Y ] No

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**Reviewer's code:** 02726248

**Position:** Editorial Board

**Academic degree:** MBChB, MD, MSc

**Professional title:** Chairman, Chief Doctor, Senior Researcher, Staff Physician, Statistician

**Reviewer's country:** Egypt

**Author's country:** United States

**Reviewer chosen by:** Ying Dou

**Reviewer accepted review:** 2019-07-24 08:54

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**Review time:** 18 Days and 12 Hours

SCIENTIFIC QUALITY	LANGUAGE QUALITY	CONCLUSION	PEER-REVIEWER STATEMENTS
<input type="checkbox"/> Grade A: Excellent	<input type="checkbox"/> Grade A: Priority publishing	<input type="checkbox"/> Accept	Peer-Review:
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publish	<input type="checkbox"/> Grade D: Rejection	<input type="checkbox"/> Major revision	<input type="checkbox"/> Advanced
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			<input type="checkbox"/> Yes
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## **SPECIFIC COMMENTS TO AUTHORS**

There is substantial repetition of a part from introduction in methods section. In methods there is a need to plot the 10 tests of cognitive in a more illustrative to illustrate the minimum and maximum score for each item and for each one of the 3 sub battery in order to make a more clear relation between each item with its relevant question in the gold standard test (SLUMS); this needs also to plot each question from SLUMS against its related test in cognitive. Authors present well the factor analysis table with the data reduced to 5 factors but it will be more illustrative to plot all the cognitive tests against the SLUMS questions also. Why was the standard Receiver operator Curve (ROC) not used to estimate the cutoff values? please elaborate on this point

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- ☐ No