Arab Journal of Applied Linguistics
e-ISSN 2490-4198
Vol. 07, No. 01, 2022, 35-60

http://www.arjals.com

Acquired communication disorders in Qatar: Existing Resources and the Future Roadmap

Tariq Khwaileh[1], Department of English Literature and Linguistics, College of Arts and Sciences, Qatar University. Doha, Qatar.

Amna Hamouda, Department of English Literature and Linguistics, College of Arts and Sciences, Qatar University. Doha, Qatar.

Abstract

The aim of this study is to provide a review of published and peer-reviewed resources for acquired communication disorders in Qatar. The study followed a systematic review of studies and resources published for Qatari Arabic in major journal databases. In addition, the review made use of personal communication with clinicians in the field to identify any non-standardised tests currently used in speech and language therapy clinics. We reviewed all published studies on Arabic acquired communication disorders and narrowed down the search from Arabic to Eastern Arabic, then Gulf Arabic and finally Qatari Arabic. This made it possible to compare the richness of data and studies coming from Qatar compared to other Arabic countries. The review revealed a dearth of resources available for the country in question in two major areas: limited availability of assessments specifically designed for the country and a nonexistence of therapy and intervention studies with patients from the country.

Keywords: *Arabic; Qatar; language; Acquired Communication Disorders; rehabilitation; assessment; intervention*

[1] Corresponding author: *Tariq Khwaileh*
Email: tariq.khwaileh@qu.edu.qa

Introduction

The success of speech and language therapy requires a number of pillars to be available, including the availability of well-designed standardized assessment tools, purpose-driven intervention protocols, well-trained professional personnel or clinicians, and finally the resources to allow enough therapy time to create a dent in the impairment and see some tangible progress. The assessment tools and therapy protocols further require a well-trained research team preferably with clinical experience to ensure that these tools are culturally and linguistically informed, psychometrically reliable and valid, and clinically relevant. The presence of such tools at the disposal of clinicians contributes to the service to people with speech and language impairment, directly. Such tools are well developed for English and Indo-European languages but are sparse for the Arabic Language (Khwaileh & Grosvald, 2019). The aim of this paper is to systematically review published literature on the development of clinical tools in the State of Qatar (hereafter, Qatar) for patients with acquired communication disorders. Reviewing the literature for all speech and language pathologies would be inviable and out of the scope for the purposes of this study; therefore, attention was given to acquired speech and language pathologies, sparing the literature on tools and resources developed for developmental communication disorders for another in-depth review (in preparation).

Acquired Communication Disorders

Acquired communication disorders refer to speech, language and communication disorders resulting from neuropathology or brain trauma. These include cerebrovascular accidents (CVA), closed-head injuries (CHI)/ traumatic brain injuries (TBI), brain tumours (BT), or progressive neurodegenerative diseases such as dementia. For example, CVAs usually result in aphasia, a language impairment that includes difficulties in word retrieval and improper use of words, inability to express ideas, and impaired or compromised use of grammatical patterns. All of the above could affect both modalities: production and comprehension of spoken language, extending to written language. In addition, neuropathology and brain trauma may result in swallowing and motor speech disorders including apraxia and dysarthria; both are a result of difficulties in planning and coordinating motor movements for speech production, and are secondary to muscle weakness, paralysis, or incoordination. Finally, such injuries to the brain can affect cognitive processes underlying language and communication, such as memory, attention, executive functions, problem-solving and pragmatics of language use, collectively referred to as cognitive communication disorders (Chapey, 2014). The impact of such disorders on the individual's life may be extreme, resulting in employment loss, and difficulty maintaining personal relationships.

Surveying the above-mentioned aetiologies, and prevalence in Qatar is outside the scope of this study. Further, the literature on such aetiologies in Qatar is sparse. However,

the authors identified two relatively recent studies reviewing incidents that result in acquired speech and language impairment (Christos et al., 2013; Khan et al., 2008). Both surveys focus on CVA, i.e., strokes. Their findings are in harmony as they both yield the following findings. First, over half of CVA cases are younger than 55 years. Second, the cases are predominantly males. Third, half of the sample were deemed overweight, with almost one third being diagnosed as obese. Fourth, diabetes was the strongest preventable risk factor for CVA, hypertension was the second highest preventable risk factor for CVA. High levels of cholesterol and tobacco consumption were potentially preventable risk factors. Finally, most patients arrived at the hospital more than 3 hours from stroke onset due to unawareness of stroke symptoms. These two studies highlight the lack of awareness of acquired communication disorders and their causes. In addition, they propose the question of what resources and services are there for patients following such injuries.

The results reported in these two studies validate the urgency of the need for available resources to tackle the neurogenic communication disorders resulting from neuropathology such as CVA. Before reviewing what is available, the reader should be introduced to the language scene in the Arabic speaking world and Qatar.

The Arabic Language

The Arabic language is diglossic; where two dialects are used by a single language community. One clinical test or therapy protocol would not be suitable for all Arab countries due to the variations among different varieties of Arabic. There are a number of dialects within the Arabic-speaking world depending on the region. The Arabic language can be classified into three separate varieties, Classical Arabic (CA), Modern Standard Arabic (MSA), and Spoken Arabic (SA). CA is the Arabic variety that is exclusively found in religious and classical Arabic literature contexts. It is the language of the Qur'an and old literature. It is learned by Muslims across the world and is considered the sacred language. Nowadays, it is spoken in religious contexts only. MSA is considered to be the modernization of the syntactic structures and vocabulary of CA. It is widely spoken among educated and intellectual individuals within the Arab world and used in formal and official contexts in Arab countries. SA is the colloquial form of Arabic that has many variations depending on the region and country, such as the Arabic spoken in Qatar. However, it is important to note that the grammatical rules and syntax of CA and MSA are not fully represented in SA. SA is a colloquial form of Arabic that omits a number of syntactic features, such as morphological case marking, that are present in CA and MSA syntax. Qatari Arabic is a form of SA, and is considered part of Gulf Arabic, which branches from Arabic spoken varieties referred to as Eastern Arabic (see Johnstone, 1962).

The Scope of the current study

Within the domain of speech and language pathology, the use of linguistically informed clinical and research tools is essential for drawing accurate conclusions about the nature of language breakdown. Such tools may include standardized comprehensive assessments, screening tests, intervention protocols, response categorization protocols, and standardized databases with lists of stimuli for clinicians to choose from when testing a patient. The development of clinical tools and resources for the Arabic Language is crucial to research and clinical practice. A trustworthy tool would have to take into account the linguistic features of the Arabic language, cultural norms, and be informed by the language's morpho-phonology and syntax, according to the most up to date psycholinguistic, neurolinguistic and clinical linguistic findings. Therefore, the aim of this paper is to systematically review published literature on the development of clinical tools for acquired communication disorders in Qatar. A secondary aim is to compare the status of Qatar to the rest of the Arab countries with regard to the development of such tools.

Methodology

Data source

The methodology used in the current review was a systematic review in line with the guidelines outlined in Dennis and Abbot (2006). The source of the data was identified

and can be divided into three types: indexed journals and research databases, official, governmental and non-governmental (NGOs) reports, and personal communication with specialists and clinicians in the field. These sources were identified prior to the review process and included:

- Hamad Medical Corporation (HMC) official publications and reports.
- Qatar-based private hospitals' official publications and reports.
- MEDLINE Database
- LINGBUZZ Database
- Project MUSE Database
- PUBMED Database
- PUBPSYCH Database
- PsychInfo Database
- One current and one previous speech and language therapists.

Search settings

Researching the above sources was carried out in a systematic approach. We first started by researching different combinations of the following terms and their branches: "Qatar"+ [names of various acquired communication disorders mentioned in the introduction]; "Qatar"+ [speech and language therapy subdisciplines]; "Qatar" + [rehabilitation, therapy, protocol]; "Qatar" + [psychometrics, validity, reliability,

standardization]; "Qatar" + [tests, assessments, batteries]. Then, we did a second round of research with the same categories as in the first round but with replacing "Qatar" with the names of other Gulf Corporation Council (GCC) country members. The final round of search involved the same categories and replacing "Qatar" with "Arabic" to include results relevant to all Arabic-speaking countries. All the papers found in the search stage described above, were downloaded in PDF formats for further processing, filtering and eventually reviewing. The downloaded PDFs were filtered based on a number of parameters: 1) Studies specific to Qatar; 2) Studies specific to the GCC countries; 3) Studies specific to non-GCC Arab countries.

Results

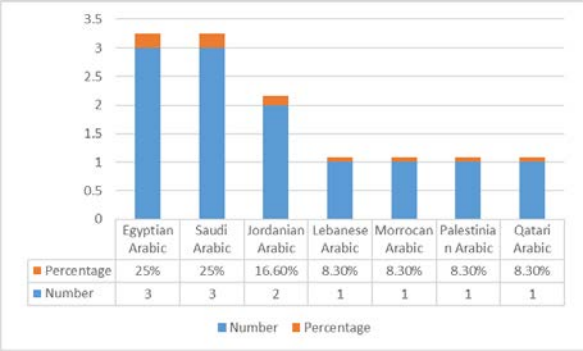
Quantitative findings

The search resulted in a total of 41 published studies on Arabic acquired communication disorders, ranging from 1994 to 2021. Of these studies, there were only 12 (29.2%) published studies on the development of assessments, and therapy protocols for the Arabic language. The remaining 29 (70.8%) studies were studies that used data from acquired communication disorders to investigate various linguistic (phonetic, phonological, morphological, semantic, and syntactic) theories (e.g., Beland & Mimouni, 2001; Boumaraf, & Macoir, 2015; Idrissi & Kehayia, 2004; Idrissi et al., 2008; Khwaileh, 2011; Khwaileh et al., 2015; 2016; 2017; 2019; 2020; Mimouni et al., 1998; Mimouni & Jarema, 1997). In terms of the tools developed (the 12 studies), 9 (75%) studies aimed at

introducing tests and assessments for various Arabic dialects, while only 3 (25%) aimed at developing therapy protocols for the Arabic language (Al-shdifat et al., 2018; Elhakeem et al., 2021; Knoph, 2013). Out of the nine studies on developing clinical assessments for acquired communication disorders, only one study (11%) addressed the development of a clinical assessment for Qatari Arabic (Khwaileh et al., 2016). In terms of the aetiology of the cases used in the development of assessments described in all 12 studies, 92 % aimed at patients with aphasia following CVA, and one case (8%) aimed at primary progressive aphasia. No studies were found for acquired dysarthria or acquired apraxia, based on this review. However, there were more assessments developed for developmental communication disorders (e.g., Shaalan, 2017).

Figure 1

Assessments and Therapy Protocols for Acquired Communication Disorders Across Various Arabic Dialects



In terms of target dialects, there was a clear discrepancy among dialects. Some dialects received more attention than others. Figure 1 shows the distribution of studies aiming at developing assessments and therapy protocols for acquired communication disorders across various Arabic dialects.

As the figure demonstrates, most of the Arabic dialects were not represented in this dataset, this was due to three reasons. First, the current review aimed at reviewing assessments and therapy protocols/tools that were developed from scratch for Qatari Arabic and other Arabic dialects and excluded adaptations and assessment translations. Second, the current review identified a number of non-standardised and informal assessments used in Qatar, and other Arabic speaking countries, but these tools are not published anywhere and hence were not available for a comprehensive review of how they were developed. Our personal communication with local clinicians and hospitals has shown that most of the clinics across the Arab world depend primarily on assessments that are either adapted/translated from other languages, or non-standardised assessments developed in-house by clinicians. One limitation of this review is the lack of data published in languages other than English and Arabic, i.e. French. French is used as a language of publication in some Arab countries such as Morocco, Algeria or Tunisia. Within Qatar, there has been a number of adapted and translated tests in use, such as:

1- The Boston Diagnostic Aphasia Examination

2- Western Aphasia Battery

3- Stuttering Severity Index

4- Apraxia of Speech Test (for adults)

5- The Kaufman Speech Praxis Test

6- The Preschool Language Test (PLS-3)

(Dr. Saleh Shaalan, Personal Communication)

It is worth mentioning that other clinicians from other Arabic-speaking countries have reported the use of adapted versions of the above list of tests, with addition of one more test that is not on the above list provided by our contact, i.e. The Comprehensive Aphasia Test (Swinburn et al., 2004).

To summarise the quantitative findings, the status of assessments developed for Qatari Arabic is in harmony with what is available for other Arabic dialects. Only one assessment was developed for the dialect in question (The Qatari Arabic Aphasia Test, Khwaileh et al., 2016), and the majority of tests used are adaptations and translations of tests from other languages. This is the same case for other dialects within the Arabic speaking world. On the other hand, therapy and intervention studies, acquired dysarthria and apraxia assessments for Qatari Arabic are currently non-existent. This will be further discussed in the discussion section below.

Qualitative findings

The qualitative analysis aimed at assessing the content of the available resources for Qatari Arabic compared to similar resources in the Arabic speaking world. It is

noteworthy that our comparison aimed at comparing linguistically driven and culturally motivated resources only, and not adapted or translated resources (e.g., the Egyptian Arabic version of the Comprehensive Aphasia Test: Abou El-Ella et al., 2013; non standardized translations of the Boston Diagnostic Aphasia Examination for various Arabic dialects: Goodglass & Kaplan, 1983; the Object and Action Naming Battery for Saudi Arabic: Alyahya & Druks, 2016).

According to our results, the Qatari Arabic Aphasia Test (Khwaileh et al., 2016) is the only assessment developed for Qatari Arabic. In addition, there were no published therapy or intervention studies addressing Qatari Arabic. The remaining tests used in clinics across Qatar were not linguistically driven by the structures of the Arabic language, nor from knowledge of communication disorders in Arabic. Of interest to this comparison are tests that have been developed for Arabic dialects independent from translated and adapted tests (e.g., Jordanian Arabic: Al Swaiti, 2019; Saudi Arabic: Aseeri, 2019 and Altaib et al. 2021; Egyptian Arabic: Elsaad et al., 2018). We compared the Qatari Arabic Aphasia Test (QAAT) with the above mentioned tests at multiple levels. First, these tests are not all comprehensive batteries. As described in their study, Altaib et al. (2021) report the preliminary psychometric evaluation of the short aphasia test for Gulf Arabic; the test is not a comprehensive test and still awaiting further validation. This is the same case for the test reported in Aseeri (2019). Al Sawiti's (2019) study describes the content validity of a test developed for Jordanian-Arabic speakers with aphasia, and does

not report on any patient or normative data, and states that these are to be completed in the future. Elsaad et al.'s (2018) assessment is a screening test for aphasia patients. It is based on the syndrome approach rather than building a comprehensive neuropsychological profile of the patient's language. Second, most of these tests are works in progress, and the actual tests were not found to be published anywhere. Third, these tests do not report matching controlling their stimuli for psycholinguistic variables affecting language processing for Arabic, such as frequency, name agreement, image agreement, visual complexity, age of acquisition, familiarity, and healthy naming latencies. This could well be part of the authors' future plans; however, to date, this is not evident in any of the above mentioned tests.

On the other hand, the QAAT (Khwaileh et al., 2016) is a comprehensive test. In addition, all the stimuli used in the QAAT test are controlled for the visual complexity of their pictures, image agreement, imageability, age of acquisition, frequency, familiarity, phonemic and syllabic length, name agreement, and normative naming latency. The authors describe four phases for the development of their Qatari Arabic aphasia test: a comprehensive review of Arabic linguistics and psycholinguistics; a linguistically-informed normative database development; the development of a comprehensive set of aphasia subtests and validation of the subtests with control participants and patients with aphasia (Khwaileh. et al., 2016). These are within the guidelines described in Khwaileh

and Grosvald (2019)'s paper, in which they describe important steps in developing clinical tests for speech and language impairment.

In terms of therapy and intervention studies, none of the three therapy and intervention studies were aimed at Qatari Arabic. Knoph (2013) reports on a bilingual speaker of Arabic with chronic moderate to severe non-fluent aphasia. The purpose of the study was to establish whether treatment in one language (the second language) would have a positive impact on the other language (the first language). Their result indicated that the treatment of the less dominant English language resulted in an improvement of the patient's performance in the untreated native language, Arabic. This finding is in line with Edmonds and Kiran (2006), and Faroqi-Shah et al. (2010), who maintained that training the less-dominant language may lead to improvement in the dominant language. The second intervention study on Arabic was carried out by Al-Shdifat et al., (2018). The authors reported on the efficacy of melodic intonation therapy in a Jordanian Arabic speaker (patient MK) with Broca's aphasia. Al-Shdifat et al. (2018) reported that their patient improved his expressive productions post-treatment in automatic (75% accuracy criterion) and self-generated phrases (reached criterion and remained constant at follow-up). The third intervention study on Arabic was a post-stroke aphasia rehabilitation study using a computer-based Arabic software programme (Elhakeem et al., 2021) in which the authors assessed the effectiveness of Arabic aphasia therapy using computer-based programmes with 50 aphasic patients, receiving 48

sessions using computer-based therapy. Their findings showed a significant improvement from the baseline, suggesting that computer-based Arabic software programme was as effective as the conventional therapy programme in the improvement of language abilities in Arabic aphasia. None of the above therapy studies aimed at Qatari Arabic.

In addition to the QAAT, the current review has identified another clinical resource that is based on Qatari Arabic acquired communication disorders. The tool described in Khwaileh et al., (2020) is a response categorisation protocol for Qatari patients with aphasia. The authors introduce a linguistically driven list of responses that have been yielded by testing patients with aphasia. The emerging error categories have been categorised according to their linguistic features. The authors mentioned that such a protocol is useful for clinicians to use to classify errors produced by Arabic speaking patients with aphasia. They further added that such a protocol can be easily adapted to other Arabic varieties.

Discussion

The aim of this paper was to review published literature on the development of clinical tools (assessments and therapy protocols) for acquired communication disorders in the State of Qatar, and compare the findings to what is available in other Arabic countries. The review excluded translated and adapted clinical tools from the analysis. The review

reports on one assessment tool found for Qatari Arabic patients with aphasia (Khwaileh, et al., 2016), one response categorisation protocol (Khwaileh et al., 2020), and one standardised normative database for nouns, and verbs (Khwaileh et al. 2018). This was representative of the speech and language therapy scene across the Arabic speaking world. While some Arabic dialects had limited availability of assessments that are linguistically and culturally driven, assessments for other dialects were non-existent as shown in the results section above. The review yielded that Egyptian and Saudi Arabic dialects received more attention in this regard than Qatari Arabic. In this regard, assessment tools for Qatari Arabic are not underdeveloped, considering the population size of the state of Qatar compared to other more populated Arab countries. The review also yielded that the Qatari test has its advantages over tests developed for other Arabic dialects in terms of its comprehensiveness and stimuli selection. A further finding yielded by the current review is the Arabic response-categorisation protocol developed for Arabic speakers, a tool that stemmed from Qatari Arabic but not present in other Arabic dialects. This linguistically informed and data-driven response-categorisation protocol supports researchers and clinicians in categorising responses from healthy and brain damaged participants in language production tasks. The categories presented in the protocol are informed by extensive processing evidence on Arabic non-linear morphology. It categorises both word- and phrase-level responses based on the non-concatenative nature of the Arabic morphology. Finally, the current review reports on the absence of

therapy studies for Qatari Arabic as opposed to other dialects, but overall all published therapy protocols are sparse in all Arabic dialects. The fact that only three intervention and therapy protocols were reported (Al-Shdifat et al., 2018; Elhakeem et al., 2021; Knoph, 2013) in the review, reflects on resources and services available to acquired communication disorders patients in the Arab world. This warrants the need for such resources for Arabic-speaking patients. Finally, the review did not find studies reporting on the quality of life and social support of patients with acquired communication disorders in the Arab world, and Qatar.

The aforementioned findings are direct findings of this review; presupposing a number of indirect crucial findings related to the speech and language therapy scene in the state of Qatar and other Arab countries. The first of these findings is that the vast majority of literature published on Arabic acquired communication disorders is skewed toward one atypical population and overlooks others. To elaborate, aphasia has attracted much of the attention of researchers and clinicians, while disorders such as acquired dysarthria and apraxia have received less interest. The review did not yield a body of research on other acquired communication disorders other than aphasia. This is translated into a lack of resources and tools for apraxia and dysarthria in the Arabic speaking world, including the State of Qatar.

The current review also yielded a lack of lesion data reports on acquired communication disorders. None of the studies reviewed provided lesion data on the

population samples used in developing or even adapting resources for the Arabic language. Lesion data is of substantial relevance to acquired communication disorders due to the different aetiologies that can result in such disorders and how the same disorders can manifest themselves in different aetiologies. A further observation of the Arabic data in relation to acquired communication disorders is the imbalance in aetiologies reported in the literature. CVAs formed the vast majority of acquired communication disorders causes in reported cases, with one case only reporting a patient with primary progressive aphasia (PPA). None of the reviewed studies reported on resources or tools based on patients with closed-head injuries (CHI)/ traumatic brain injuries (TBI), or brain tumours (BT).

The review also yielded an abundance of work on developmental communication disorders over acquired communication disorders. The area of developmental communication disorders has been in steady development when compared to acquired communication disorders. A number of clinical assessment tools have been reported in the literature targeting non-adult populations (e.g. Shaalan, 2017). The results also showed that while some Arabic varieties have received attention in relation to the development of clinical tools for acquired communication disorders, other dialects such as Iraqi Arabic and Libyan Arabic, have gone under the radar.

Overall, the review shows that the Arabic speaking world, in general and the State of Qatar in specific suffers from a shortage of tools and resources designed and developed

specifically for the Arabic language acquired communication disorders, despite the modest attempts and existing literature reviewed. This is by far not a unique finding, as previous researchers and clinicians in the field have pointed this out. There has been a number of reasons put forward to account for such a shortcoming. Shaalan (2009, and 2010) maintains that the demand for speech and language specialists and professionals surpasses the numbers available in Arab countries. This in turn has an effect on the development of such tools and resources. He further elaborates that the field is under-developed and requires development at many levels including the assessments that are standardised and criterion-referenced. Shaalan (2009) mentions that the lack of collaborative research groups in the Arabic speaking world has led to the sparsity of clinical resources and tools. Khwaileh et al. (forthcoming) maintain that the majority of researchers publishing on communication disorders aim at testing or validating linguistic theories using atypical data, with limited focus on the clinical applications of such data. Khwaileh (forthcoming) attributes this to the fact that most of this research is carried out by academics with no clinical background. As mentioned in the results section of this review, 70.8% of the studies found during the current review were studies that used data from acquired communication disorders to investigate various linguistic theories. The State of Qatar is no exception to the rest of the Arabic-speaking world, and the above explanations account for the scarcity of clinical tools and resources used by health services providers within Qatar.

In the absence of such tools and resources, Qatar and the Arabic-speaking world remain over-dependent on in-house adaptations and translations of acquired communication disorders assessments and protocols developed for other languages, mainly English (Khoja, 2017). These were excluded from the analysis of data collected for the current study in order to develop an accurate picture of the speech and language therapy scene in the Arabic speaking world, and Qatar. While this has been working for clinicians in the field for the past few decades, it is important to mention that such tools do not take into account linguistic and socio-cultural features (Khamis-Dakwar & Froud, 2012). Furthermore, most of the adapted and translated tools lack standardisation, and psychometric validation with Arabic speakers.

To overcome this situation and based on the recommendations from previous published reports and reviews in the field (e.g., Khamis-Dakwar & Froud, 2012; Khoja, 2017; Khwaileh & Grosvald, 2019; Shaalan, 2009 and 2010), clinical tools need to be developed by collaborative teams made of academic researchers, clinicians and professionals in the field of language sciences. A well-developed clinical tool or assessment, requires expertise in multiple areas including speech and language pathology, formal linguistics, sociolinguistics, psycholinguistics, psychometrics, neurology, and cognitive psychology. Moreover, stimuli for clinical tools need to be carefully selected based on inherent features of the selected stimuli, a translation or substitution of a stimulus from a foreign test, simply does not work. The selection stimuli

need to be based on lexical databases for the Arabic language, providing information about variables such as cultural suitability, word familiarity, concept familiarity, frequency, age of acquisition, imageability, image agreement, visual complexity of stimuli, and name agreement. These databases have been growing for various Arabic dialects since 2014 (Tunisian Arabic: Boukadi et al., 2016; Lebanese Arabic: Kanj et al. in press; Levantine Arabic: Khwaileh, et al., 2014; Gulf Arabic: Khwaileh et al., 2018). This conclusion is in harmony with what Khoja (2017) stated:

> Therefore, it is constructive for universities to have assessment tools professionally translated and adapted by a team of SLPs who are proficient in assessment procedures and testing rationales and who have the appropriate knowledge of the linguistic structures of English and Arabic. In addition, those SLPs should be knowledgeable of the non-standard dialects used in the various regions. (p. 6)

While all of the above discussion is in favour of the use of standardised tests in assessing acquired communication disorders, it is worth mentioning that this may not apply to all regions. Based on the feedback received by an anonymous reviewer of the current manuscript, over-relying on standardised tests may not be ideal for cosmopolitan communities such as major cities in Qatar and the GCC states, due to the presence of rich cultural and linguistic diversity. Instead, the success of an assessment in such contexts relies on the training and skills of the clinicians themselves; the adaptation of stimuli at

their disposal in accounting for individual, cultural and linguistic differences among their patient population.

References:

Abou El-Ella, M., Alloush, T., El-Shobary, A., Hafez, N., Abd El-Halim, A. & El-Rouby, I. (2013). Modification and standardisation of Arabic version of the Comprehensive Aphasia test. *Aphasiology*, *27*(5), 599-614.

Abou-Elsaad, T., Baz, H., Belal, T., & Elsherbeny, S. (2018). Developing an Arabic Screening Test for Adult-Onset Chronic Aphasia. *Folia Phoniatrica et Logopaedica*, *70*(2), 74-81.

Al-Shdifat, K. G., Sarsak, J., & Ghareeb, F. A. (2018). Exploring the efficacy of melodic intonation therapy with Broca's aphasia in Arabic. *The South African journal of communication disorders*, *65*(1), 1–8.

Altaib, M.K., Falouda, M., & Meteyard, L. (2021). From informal to formal: the preliminary psychometric evaluation of the short aphasia test for Gulf Arabic speakers (SATG), *Aphasiology*, *35*(8), 1048-1066.

Alyahya, R. & Druks, J. (2016). The adaptation of the Object and Action naming battery in to Saudi Arabic. *Aphasiology*, *30*(4)**,** 463-482.

Aseeri, A. (2019). Development and Validation of the Arabic Aphasia Battery (ARABY): Pilot Study. *Conference Abstract: Academy of Aphasia 56th Annual Meeting. doi: 10.3389/conf.fnhum.2018.228.00085.*

Boukadi, M., Zouaidi, C., & Wilson, M. A. (2016). Norms for name agreement, familiarity, subjective frequency, and imageability for 348 object names in Tunisian Arabic. *Behavior Research Methods, 48*(2), 585–599.

Boumaraf, A. & Macoir, J. (2015). The influence of visual word form in reading: single case study of an Arabic patient with deep dyslexia. *Reading and Writing, 29*(1), 137-15.

Chapey, R. (2014). *Language intervention strategies in aphasia and related neurogenic communication disorders*. Lippincott Williams & Wilkins.

Dennis, J., & Abbott, J.S. (2006). Information retrieval: Where's your evidence? *Contemporary Issues in Communication Science and Disorder*, *33*, 11-20.

Edmonds, L.A., & Kiran, S. (2006). Effect of semantic naming treatment on crosslinguistic generalization in bilingual aphasia. *Journal of Speech Language Hearing Research. 49*(4), 729-48.

Elhakeem E, Saeed S., Elsalakawy, R., Elmaghraby, R., & Ashmawy, G. (2021). Post-stroke aphasia rehabilitation using computer-based Arabic software program: a randomized controlled trial. *The Egyptian Journal of Otolaryngology*, *37*(1), 1-17.

Faroqi-Shah, Y., Frymark, T., Mullen, R., & Wang, B. (2010). Effect of treatment for bilingual individuals with aphasia: A systematic review of the evidence. *Journal of Neurolinguistics,* 23, 319-341.

Goodglass, H., & Kaplan, E. (1983). *The assessment of aphasia and related disorders* (2nd ed). Lea & Febiger.

Swinburn, K., Porter, G., & Howard, D. (2004). *Comprehensive Aphasia Test* (CAT). Routledge.

Idrissi A, and Kehayia, E. (2004). Morphological units in the Arabic mental lexicon: evidence from an individual with deep dyslexia. *Brain and Language*, *90*(1-3),183-97.

Idrissi, A., Prunet, J. F., & Béland, R. (2008). On the mental representation of Arabic roots. Linguistic Inquiry, *39*(2), 221-259.

Johnstone, T. M. (1962). *Studies on the Arabic dialects of the Persian Gulf*. SOAS: University of London.

Khamis Dakwar, R., Ahmar, R., Farah, R.,and Froud, K. (2018). Diglossic aphasia and the adaptation of the Bilingual Aphasia Test to Palestinian Arabic and Modern Standard Arabic. *Journal of Neurolinguistics*, 47, 131-144.

Khamis-Dakwar, R., & Froud, K. (2012). Aphasia, language, and culture: Arabs in the US. *Aspects of Multilingual Aphasia*, *8*, 275–288. Khwaileh, T. (2011). *Lexical*

retrieval and morpho-syntactic processing in healthy speakers and speakers with aphasia: Evidence from Arabic. [Unpublished PhD Thesis]. The University of Sheffield.

Khwaileh, T. , Body, R. & Herbert, R. (2013). Determiner cuing in word retrieval after aphasia. *Procedia – Social and Behavioral Sciences*, *94*, 140-142.

Khwaileh, T., Body, R., & Herbert, R. (2014). A normative database and determinants of lexical retrieval for 186 Arabic nouns: effects of psycholinguistic and morpho-syntactic variables on naming latency. *Journal of Psycholinguistic Research*, *43*(6), 749-769.

Khwaileh, T., Body, R. & Herbert, R. (2015). Morphosyntactic processing of Arabic plurals after aphasia: dissecting lexical meaning from morpho-syntax within word boundaries. *Cognitive Neuropsychology*, *32*(6), 340 -367.

Khwaileh, T., Body, R. & Herbert, R. (2017). Lexical retrieval after Arabic aphasia: Syntactic access and predictors of spoken naming. *Journal of Neurolinguistics*, *42*, 140-155.

Khwaileh, T.,& Grosvald, M. (2019). The use of translated materials in assessing CVA patients in Qatar: Problems and solutions. *Arab Journal of Applied Linguistics, 4*(1), *38-49.*

Khwaileh, T. Mustafawi, E., & Al-Bustanji, Y. (2020). A linguistically-driven response categorization system for Arabic nouns and verbs: Clinical and research implications. *Clinical Linguistics and Phonetics, 34*(9), *861-877.*

Khwaileh, T., Mustafawi, E., Elbuy, S., and Nidal, N. (in preparation). Arabic aphasiac data literature and linguistic theory: a systematic review.

Khwaileh, T., Mustafawi, E., Herbert, R., Howard, D. (2018). Gulf Arabic nouns and verbs: A standardised set of 319 object pictures and 141 action pictures, and

predictors of naming latencies. *Behavior Research Methods*. doi.org/10.3758/s13428-018-1019-6.

Khwaileh, T. A., Mustafawi, E., Howard, D., & Herbert, R. (2016). *An aphasia battery for Qatari/Gulf Arabic. Frontiers in psychology*. Conference abstract: 54th annual academy of aphasia meeting. doi:10.3389/conf.fpsyg.2016.68.00026

Knoph, M.K. (2013). Language intervention in Arabic–English bilingual aphasia: A case study, *Aphasiology*, *27*(12), 1440-1458.

Mimouni, Z., Kehayia, E. & Jarema, G. (1998). The Mental Representation of Singular and Plural Nouns in Algerian Arabic as Revealed through Auditory Priming in Agrammatic Aphasic Patients. *Brain and Language*, *61*(1), 63–87.

Mimouni, Z., & Jarema, G. (1997). Agrammatic aphasia in Arabic. *Aphasiology*, *11*(2), 125–144.

Prunet, J., Béland, R. & Idrissi, A. (2000). The mental representation of Semitic words. *Linguistic Inquiry, 31*(4), 609–648.

Shaalan, S. (2009). Considerations for developing and adapting language and literacy assessments in Arabic-speaking countries. In E. Grigorenko (Ed.), *Multicultural psychoeducational assessment* (pp. 287–314).Springer.

Shaalan, S. (2010). Investigating grammatical complexity in Gulf Arabic speaking children with specific language impairment (SLI) [Unpublished doctoral dissertation]. University College London.

Shaalan, S. (2017). Reliability and validity of four Arabic language tests: A comparison of performance of Qatari school-aged children with and without language impairment. *Arab Journal of Applied Linguistics*, *2*(1), 20–48.