TYPES OF WRITING ERRORS AMONG CHILDREN WITH COMORBID DYSLEXIA AND DYSGRAPHIA

Yomna Hassan ElFiky, Dalia Maged Mohamed Hassan, Sabah Mohamed Hassan and Nahla Abdel-Aziz Rifaie

Otorhinolaryngology Department, Phoniatrics Unit, Faculty of Medicine, Ain Shams University, Cairo, Egypt

Corresponding author
Yomna Hassan ElFiky
Mobile: 01111889805
E.mail: yomna@med.asu.edu.eg

Received: 8/2/2022
Accepted: 11/3/2022

Online ISSN: 2735-3540

ABSTRACT:

Background: *Dysgraphia means difficulty with handwriting. People having dysgraphia have handwriting that is illegible with irregular and inconsistent letter formations. Others may write legibly, but slowly and/or very small.*

Aim of the work: *Screening for copying and spelling errors in patients with dyslexic dysgraphia for better strategies of intervention.*

Patients and methods: *23 patients with dyslexic dysgraphia with age that ranges from 8 to 10 years, administered "The Modified Arabic Dyslexia screening test", with further detailed assessment of the two subtests assessing the writing tasks, including copying and spelling for detection of the writing errors among this group.*

Results: *Varieties of writing errors were seen among these patients with dyslexic-dysgraphia errors. In copying task, the most common error to occur among these patients is deletion (21.7%) and the least is morphological error (4.3%). In spelling task, it was found that the most common error to occur among these patients is deletion (87.0%) and the least error is the visual error (4.3%).*

Conclusion*: Assessment and rehabilitation of writing errors should go hand in hand with assessment and intervention of the reading errors in children with comorbid dyslexia and dysgraphia.*

Keywords*: Dysgraphia; Copying; Spelling.*

INTRODUCTION:

Decoding (word reading) and encoding (word spelling) involve many of the same processes. These skills require mastery of the alphabetic principle or knowing how sounds and symbols correspond.

Writing seems to be more demanding than reading as described in the following part [(1)]**:**

Phoneme-to-grapheme-correspondence (PGC) is much more complex than grapheme-to- phoneme- correspondence (GPC).

The second reason is that “full cues versus partial cues” is associated with the first reason and refers to an incomplete and or non-existing orthographic representation in the lexicon. It is easier to identify a word for reading than to write a word correctly.

Recall is a higher function than recognition. In reading, visual representation of the words needs to be recognized only but writing is a more complex process. Orthographic representation should be retrieved from the mental lexicon completely as well as independently.

Throughout life more time is spent in reading than in writing. As a motoric process, writing takes longer time than reading, and should be rapid and automatized process.

This complex process can be explained by the dual route hypothesis. In writing there are three starting points:

1. The semantic lexicon (i.e., starting our thoughts with a specific meaning)
2. Written words (during copying).
3. Spoken words (during dictation or taking notes from a speech / lecturer.

Multiple orthographic errors as substitution, deletion, insertion or transposition of letters occur in children with Dyslexia-Dysgraphia who rely on standard phoneme to grapheme correspondence with misspelling of irregular words or very long words, since these words are hard to pronounce by grapheme-phoneme conversion only [(2)].

Visual, semantic, morphological errors and concreteness effect occur in children with Dyslexia-Dysgraphia who rely on writing from visual or semantic whole word representations that are transformed into grapheme patterns. This is characterized by writing and spelling disturbances in which the spelling of unfamiliar words and phonetically irregular words is impaired due to impaired phoneme grapheme correspond-dence[(3)].

AIM OF THE WORK:

This study aims to Screen for copying and spelling errors in patients with dyslexic dysgraphia for better interventional strategies.

PARTICIPANTS AND METHODS:

Patients:

The type of the study is cross sectional. It is applied on patients Dyslexia and comorbid dysgraphia clinically and objectively. They attended the Phoniatric outpatient clinic, Ain Shams University Hospitals. 23 patients with age ranging from 8 to 10 years with complaints of poor scholastic achievement and reading difficulties were enrolled in the study from February 2018 to June 2019.

Selection criteria:

Children included in this study are of average mentality with no hearing, visual, language disabilities and were diagnosed as dyslexic patients clinically and objectively.

Ethical considerations:

Parents of patients enrolled in the study, signed an informed consent. Ain Shams Institute's Ethical Committee of Human Research approved the study protocol.

Methods:

-Patients included in this study were assessed for writing errors using Modified Arabic Dyslexia Screening test (MADST)[(3)].

-Copying errors were screened using the one minute writing subtest, where the child copy a passage (tested and standardized according to his age) in an unlined paper and a pencil.

Spelling errors were screened using the Two minute spelling subtest that includes words with variable difficulties to be decoded by the child as words with" long vowels, nunation = Tanwin", "germination = Shadda", "hamza" and "ta-marbota") and pleural (regular and irregular).

Scoring of both subtests is included among the rest of the test eleven items. Raw scores of each item is converted to percentiles which is collapsed into risk categories. Below the 25^{th} percentile is a state of below average performance that needs intervention [(3)].

Statistical Analysis*:*

Using Statistical package for Social Science (SPSS 20), the data was statistically revised, tabulated and analysed.

Descriptive statistics:

1. Mean and Standard deviation (± SD) for numerical data.

2. Frequency and percentage of non-numerical data.

RESULTS:

Demographic data:

As shown in table 1, the age ranged from 8-10 years in the studied groups. The mean is 8.91± 0.71 years.

Regards gender, as shown in table 2, 11 patients were females (48%) and 12 patients were males (52%). All patients were right handed 39 patients (100%).

Table (1): the mean of the age among cases:

	Min	Max	Mean	Standard deviation
Age	8 years	10 years	8.91 years	0.71

Table (2): gender and handedness among cases:

		Cases 23	
		Number	Percentage
Gender	Female	11	48%
	Male	12	52%
Handedness	Lt	0	0%
	Rt	23	100%

Types of writing errors among patients in copying and spelling tasks:

Writing errors were evident in most of the dyslexic-dysgraphia children. The types of writing errors among these patients in copying and spelling tasks and their percentage of occurrence is shown in table (3).

In copying task, it was found that the most common error to occur among these patients is deletion (21.7%), followed by substitution (13%), Then morphological error (4.3%).

In spelling task, it was found that the most common error to occur among these patients is deletion (87.0%), followed by addition (73.9%), followed by substitution (78.3%), followed by regularization error (17.4%) and the least error is the visual error (4.3%).

Table (3): Types of writing errors among patients in copying and spelling tasks

	Copying		Spelling	
Error	N (23)	**%**	N (23)	**%**
Deletion	5	21.7%	20	87.0%
addition	0	0.0%	17	73.9%
Substitution	3	13.0%	18	78.3%
Morphological error	1	4.3%	0	0.0%
Regularization error	0	0.0%	4	17.4%
Visual error	0	0.0%	1	4.3%
Short vowel problem	0	0.0%	0	0.0%
Transposition	0	0.0%	0	0.0%
Function word problem	0	0.0%	0	0.0%

DISCUSSION:

Writing errors should be assessed through assessment of lexical and sublexical routes for reading and writing. This is done through copying and spelling tasks that include regular and irregular word writing[(4)].

Writing includes two main tasks: copying and spelling (dictation). Spelling

"Encoding" is much more difficult process than copying. According to the "dual-route model of the spelling processes "retrieval of spelling information happens by both lexical and sub lexical procedures[5].These routes are activated and interact together during spelling processes. The outcome of these two processes is integrated and kept in "orthographic working memory" for precise written production [6].

Sub lexical route has role in writing new unfamiliar words or regular words where the phoneme grapheme conversion will lead to correct spelling i.e.

zæ.hæb
gæ.bæl

Irregular words that does not apply to the simple phoneme grapheme conversion rules have to be kept in the "orthographic lexicon" to be written Such words has to use both routes to be written correctly i.e.

wa. ṭa.non
hodæ

In this study errors such as deletion, addition, transposition and substitution were considered as a subcategory of orthographic errors such as:

Deletion was the most common error seen in writing tasks as in:

3æ.gi:b → 3æ.gæb
3a.zi:m → 3azm

Examples of addition errors are:

ʔæl.wæ.fæʔ → ʔæl.wæ:.fæʔ

Example of substitution are:

do.rus → to.rus

Errors as substitution (city-sity) deletion (comb-com), transposition (flies-files), and addition (root-roote) as a subcategory of the orthographic errors by **Masterson (2017)**[7] as well as **Sotiropoulos & Hanley (2018)** [5].

Regularization errors happens when the word is brought back to its root [8].. Some studies considered regularization errors i.e (broad –brode and steak –steek) and morphological errors i.e (happily-happy and fixing –fixed) seen among the errors of writing as two distinct subcategories of errors [9].

Examples of morphological and regularization errors seen in writing in the current study i.e.

ʔæ.dæ:b → ʔæ.dæb
ʔæl.mox.ta.ra:3at → ʔæl.mox.ta.ra3

While a morphological error occurs when a suffix or prefix of a word is deleted or changed as

dæ:h.mu → dæ:.hæm

Visual errors were seen in the current study which occurred when the incorrect response was related to the stimulus

3a.zi:m → 3æzm

Assessment and rehabilitation of writing errors should go hand in hand with assessment and intervention of the reading errors in children with comorbid dyslexia and dysgraphia.

REFERENCES:

1. Döhla, D. and Heim, S. (2016): Developmental Dyslexia and Dysgraphia: What can We Learn from the One about the other? Frontiers in Psychology; 6:2045.
2. McCloskey, M. and Rapp, B (2017): Developmental dysgraphia: An overview and framework for research. Cognitive neuropsychology; 34(3-4): 65-82.
3. El Fiky YH, El-Sady SR, Hegazi M (2016) Modification and Standardization of Egyptian dyslexia screening test for children. Ain Shams Med J 67(1, 2, 3): 127–134.
4. Marinelli, C., Putzolu, A., De Salvatore, M., Iaia, M. and Angelelli, P. (2018): Developmental phonological dyslexia and dysgraphia in a regular orthography: a case study. Journal of interdisciplinary Research Applied to Medicine; 2(1): 67-82.

5. Sotiropoulos, A. and Hanley, J.R. (2018): Developmental surface dysgraphia without surface dyslexia. Cognitive Neuro-psychology; 35(5-6): 333-341.
6. Friedmann, N. and Coltheart, M. (2018): Types of developmental dyslexia. In A. Bar- On, & D. Ravid (Eds.), Handbook of communication disorders: Theoretical, empirical, and applied linguistics perspectives (pp.721-751). Berlin, Boston: De Gruyter Mouton.
7. Masterson, J. (2017): On how we read non-words: data from different populations. In surface dyslexia; 289-300. Rouledge.
8. Marinelli, C., Putzolu, A., De Salvatore, M., Iaia, M. and Angelelli, P. (2018): Developmental phonological dyslexia and dysgraphia in a regular orthography: a case study. Journal of interdisciplinary Research Applied to Medicine; 2(1): 67-82.
9. Karanth, P. (2003): Deep Dyslexia. In: Cross-Linguistic Study of Acquired Reading Disorders. Neuropsychology and Cognition; 24. Springer, Boston, MA.

أنواع أخطاء الكتابه بين الأطفال المصابين بعسر القراءة وعسر الكتابة

.يمنى حسن الفقي، داليا ماجد محمد حسن،صباح محمد حسن، نهلة عبد العزيز رفاعي

المقدمة: يعاني الأشخاص المصابون بعسر الكتابة صعوبة في الكتابة من خط يد غير مقروءوأحرف غير منتظمة وغير متسقةأو الكتابه ببطء.

الهدف من العمل: فحص أخطاء النسخ والهجاء لدى مرضى عسر القراءة من أجل استراتيجيات تدخلية أفضل.

المرضى وطرق العلاج: تمت الدراسة علي ٢٣ مريضًا يعانون من عسر القراءة وتتراوح أعمارهم من ٨ إلى ١٠ سنوات ، يخضعون لـ "اختبار فحص عسر القراءة العربي المعدل" ، مع مزيد من التقييم التفصيلي للاختبارين الفرعيين لتقييم مهام الكتابة ، بما في ذلك النسخ والتهجئة للكشف عن الكتابة أخطاء بين هذه المجموعة.وذلك في الفترة من فبراير ٢٠١٨ حتي يونيو ٢٠١٩.

النتائج: شوهدت أنواع مختلفة من الأخطاء الكتابية بين هؤلاء المرضى الذين يعانون من أخطاء عسر القراءة وعسر الكتابة. في تقييم النسخ ، وجد أن الخطأ الأكثر شيوعًا الذي يحدث بين هؤلاء المرضى هو الحذف (٢١.٧٪) وأقلها الخطأ المورفولوجي (٤.٣٪). في تقييم التهجئة وجد أن الخطأ الأكثر شيوعاً بين هؤلاء المرضى هو الحذف (٨٧.٠٪) وأقل خطأ هو الخطأ البصري (٤.٣٪).

الخلاصة: يجب أن يسير تقييم وإعادة تأهيل الأخطاء الكتابية جنبًا إلى جنب مع التقييم والتدخل لأخطاء القراءة لدى الأطفال المصابين بعسر القراءة المصاحب لعسر الكتابة.