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Instrumentalized evaluation for diagnosis of developmental disorders in childhood: a new Brazilian reality

Avaliação instrumentalizada do desenvolvimento infantil: nova realidade brasileira

Keywords

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ABSTRACT

Purpose: To present the Griffiths Mental Development Scale (GMDS), as well as its cross-cultural adaptation to Brazil. **Methods:** GMDS is a diagnostic tool for assessing child development. The result of its application allows verifying if development is typical or if there are alterations in a certain specific area (gross motor, personal-social, language, fine-adaptive motor and execution) or global development. After contact with the authors, permission to use GMDS was obtained and in compliance with ethical aspects, the Portuguese version of the instrument was adapted to Brazilian Portuguese with maintenance of semantic, idiomatic, experimental and conceptual equivalences. The adaptation was carried out by two speech therapists, experienced in evaluating infants, who were submitted to training course prior to the application of the instrument. The adapted final version was applied to 21 infants with typical development. **Results:** Thirty-nine items were adapted without any exclusion. All items were possible to be applied, suitable for the target age group, with no response in any item. **Conclusion:** GMDS has been trans-culturally adapted in several countries and widely used for performing diagnosis in the age group essential for stimulation with brain plasticity in full development. The cross-cultural adaptation of GMDS for Brazil was carried out, transforming the Brazilian scenario in relation to child care. After normalization and verification of psychometric measures, it was possible, in addition to early diagnosis, to improve the quality of care for this population; carry out cross-cultural studies and publish the results in international journals regarding the feasibility of GMDS being accepted and used worldwide.

RESUMO

Objetivo: Apresentar a Escala de Desenvolvimento Mental de Griffiths (EDMG), bem como sua adaptação transcultural para o Brasil. **Método:** EDMG é um instrumento diagnóstico de avaliação do desenvolvimento infantil. O resultado de sua aplicação permite verificar se o desenvolvimento é típico ou se há diagnóstico de alteração em determinada área específica (motora grossa, pessoal-social, linguagem, motora fina-adaptativa e execução) ou do desenvolvimento global. Após contato com autores, permissão de utilização da EDMG e cumprimento dos aspectos éticos, a versão do instrumento em português europeu foi adaptada para o português brasileiro, com manutenção de equivalências semântica, idiomática, experimental e conceitual. A adaptação foi realizada por duas fonoaudiólogas, experientes em avaliação de lactentes, que realizaram o curso de capacitação para aplicar o instrumento. A versão final adaptada foi aplicada em 21 lactentes com desenvolvimento típico. **Resultados:** Foram adaptados 39 itens, sem exclusão alguma. Todos os itens foram possíveis de serem aplicados, adequados à faixa etária alvo, sem ausência de resposta em nenhum item. **Conclusão:** A EDMG é adaptada transculturalmente em diversos países e amplamente utilizada por realizar diagnóstico em faixa etária essencial para estimulação com a plasticidade cerebral em pleno desenvolvimento. Foi realizada a adaptação transcultural da EDMG para o Brasil, transformando o cenário brasileiro em relação à atenção a lactentes. Após normatização e verificação das medidas psicométricas, será possível, além de diagnóstico precoce, melhorar a qualidade dos atendimentos a esta população; realizar estudos transculturais e publicar em revistas internacionais com a viabilidade de a EDMG ser aceita e utilizada internacionalmente.

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INTRODUCTION

Evaluating and diagnosing developmental changes in infants and children is of inestimable importance in relation to the possibility of performing essential stimulation, reducing or healing losses and sequelae throughout life, minimizing consequences in the family environment as well as optimizing the public services that this child comes to need.

This process is based on the knowledge about brain plasticity, which is vulnerable to environmental manipulations, with specific stimuli, opening the path for the treatment of neurological disorders, with the possibility of a favorable prognosis^(1,2). The earlier the diagnosis and initiation of essential stimulation, especially with family involvement to receive guidelines and training, the greater the ability of parents to deal with stress and anxiety related to having a child at risk for delay or already diagnosed with changes in development⁽³⁾.

In Brazil, objective assessment instruments with normative standards, adapted for culture and diagnosed in different developmental areas, especially in the infants and preschool years are scarce.

The Griffiths Mental Development Scale (GMDS) evaluates the fine, gross, linguistic, cognitive, and personal-social motor areas of children from zero to eight years old, making it possible to verify and monitor typical development or to diagnose global developmental disorder as well as being specific in areas it evaluates. It is widely used abroad, adapted and standardized for several countries⁽⁴⁻⁶⁾. It can be used to monitor the typical development^(7,8) or to diagnose changes in developmental areas in cases of global disorders⁽⁹⁾, genetic or metabolic syndromes^(10,11), prematurity^(12,13), muscular dystrophy and autism spectrum disorder⁽¹⁴⁾, among others.

In view of these findings, the objective of the study is to present the Griffiths Mental Development Scale (GMDS), as well as its cross-cultural adaptation to Brazil.

METHODS

The work was approved by the Ethics Committee in Research with Human Beings (CEP), respecting resolution 466/12, which deals with research ethics of the National Council of Ethics in Research - CONEP (CAAE: 34802014.0.0000.5417).

The GMDS Portugal Tutors Group, responsible for the version of the Portuguese-language scale, with the consent of the ARICD (Association for Research in Infant and Child Development), authorized the authors to carry out the cross-cultural adaptation of the GMDS to Brazilian Portuguese, as well as its standardization for infants (zero to 24 months).

Griffiths Mental Development Scale

Considered a diagnostic tool through the analysis of the Developmental Profile of children, the GMDS was first published in 1954, the British version, and covers five areas of development designated in European Portuguese (EP):

Locomotion, Personal-Social, Hearing and Language, Hand-eye Coordination and Realization. It is used in several countries and was translated and adapted into European Portuguese (EP) by a group of tutors and a publisher (CEGOC-TEA) in 2007.

The Griffiths Scales assess child development in two distinct age groups: from zero to two years and from two to eight years. The age range of the study is from zero to two years. The result of the application allows obtaining indexes as to the Developmental and Mental Age quotient, considering the result by Subscale or Global.

Process of cross-cultural adaptation

The Register of the version of the instrument in EP was adapted to Brazilian Portuguese (BP) with maintenance of semantic, idiomatic, experimental and conceptual equivalences. After studying the literature, the following concepts were assumed: **semantic** equivalence, translation maintaining grammatical and vocabulary (meaning); **idiomatic** equivalence, translation of idiomatic expressions that cannot be done literally, and must be equivalent in its meaning; **experimental** equivalence, coherence between the terms used and the experiences lived by the population for which it is intended, within its cultural context; **conceptual** equivalence, applied in cases where translation can be semantically equivalent, without, however, presenting equivalence of concept.

The adaptation process was carried out individually by two speech therapists, experienced in evaluating infants, who undertook the training course to apply the instrument. Subsequently, the compilation of the two documents was done through the analysis of the agreement among the professionals, discussion for consensus of the items that presented divergence and revision of the maintenance of the semantic, idiomatic, experimental and conceptual equivalences. The pre-final version of the instrument was designed to be used in a pilot study with the purpose of verifying the applicability and understanding of the adapted terms.

Pilot study

Twenty-one infants, with typical development, of both genders, aged between six and 24 months, proportionally distributed in GI (six to 11 months), GII (12 to 18 months) and GIII (18 to 24 months) were evaluated after signing the Term of Free and Informed Consent by the legal guardians. It is emphasized that the application of the pre-final version of the protocol was carried out with the objective of verifying the understanding of the terms adapted from the original version to the Brazilian version. Thus, since the adjusted terms in the age of zero to six months were also included in the later age range, infants between the ages of zero and six months were not evaluated in the pilot study.

Before the application of the GMDS, to consider infants with typical development, a Communicative Behavior Observation Protocol was developed by the authors of the present work, as well as the Denver II Development Screening Test⁽¹⁵⁾.

Statistical analysis was based on absolute and relative frequency values, as well as on the correlation between the skills evaluated.

RESULTS

Cross-cultural adaptation

Thirty nine items were adapted with no exclusions. Speech therapists who performed the adaptation of the EP words and expressions to BP performed 23.1% (N = 9) of semantic equivalence, 23.1% (N = 9) of idiomatic equivalence, 51.3% (N = 20) of experimental equivalence and 2.5% (N = 1) of conceptual equivalence.

Chart 1 describes the words/expressions that were adapted from the GMDS Registration Book from zero to two years (EP to BP).

Pilot study

All items in the BP version of the GMDS were possible to be applied to the participants of the pilot study and were presented appropriately to the target age group for each of the groups evaluated.

In Table 1 are described values of standard deviation, minimum and maximum score of the performance of the participants in the GMDS.

Chart 1. Adaptation of the EP GMDS Registration Book to BP (zero to 24 months)

EP	BP	Equivalence
Caderno de Registro	Folha de Resposta	Idiomatic
Morada	Endereço	Experimental
Localidade	Cidade	Experimental
Posição na Fátia	Posição de nascimento	Idiomatic
Locomoção	Motora grossa	Semantics
Audição e Linguagem	Linguagem	Conceptual
Coordenação olho-mão	Motora Fina-Adaptativa	Semantics
Realização	Execução	Semantics
Secção	Seção	Experimental
Activo	Ativo	Experimental
Trás	Decúbito Dorsal	Semantics
Pára	Para	Experimental
Gatinhar	Engatinhar	Semantics
Bebé	Bebê	Experimental
Pequenas frases balbuciadas	Jargão	Idiomatic
Miminhos	Carinho	Idiomatic
Interactivos	Interativos	Experimental
Actividades	Atividades	Experimental
Sineta	Sino	Semantics
Lalação	Vocalização	Idiomatic
Ri-se	Ri	Experimental
Direcção	Direção	Experimental
Frases de 4 sílabas	Balucio diferenciado	Idiomatic
Reacção	Reação	Experimental
Chávena	Xícara	Semantics
Objecto(s)	Objeto(s)	Experimental
Baloixa(r)	Balança(r)	Semantics
Amachuca	Amassa	Idiomatic
Apanha	Pega	Experimental
Para	Em	Experimental
Baixa-se	Se abaixa	Experimental
Activamente	Ativamente	Experimental
Frases de 4 ou mais sílabas	Frases simples	Idiomatic
Atira	Joga	Semantics
Deita	Transfere	Idiomatic
Comboio	Trem	Experimental
Controlo	Controle	Experimental
Controlo Anal Completo	Controle noturno e diurno	Experimental
Exceptuando	Exceto	Experimental

Table 1. Performance of Groups I, II and III in the GMDS

Instrument	SD			Minimum			Maximum			
	GI	GII	GIII	GI	GII	GIII	GI	GII	GIII	
GM	1.89	3.48		9.5	10.25	13.5	13	18.75		
SP	3.61	4.02		7	12	14	14	21		
GMD	LGG	3.69	2.79	It was not possible to calculate	8	11.5	15.5	15	19	> 24
	FAM	3.31	2.42		8.25	12	18.5	14.5	19	
	E	2.98	1.08		8.3	13.75	14.5	14	16.25	

Captions: GMDS – Griffiths Mental Development Scale; GM: gross motor area; SP: social and personal area; LGG: area of language; FAM: fine-adaptive motor area; E: execution area; SD: standard deviation; GI: Group I; GII: Group II; GIII: Group III

After applying the Pearson Correlation, there was a statistically significant correlation between all GMDS areas in Groups I and III and, in Group II, this same behavior was verified between the Execution, Language and Fine-adaptive motor.

DISCUSSION

The Griffiths Mental Development Scale was developed and based on studies of child development, respecting sedimented developmental concepts and milestones. The disposition of the evaluation items as well as the analysis system allow for the diagnosis of changes in the areas of development in a specific character or global changes in development⁽⁷⁻¹⁴⁾.

Most of the evaluation instruments of the developmental areas are to evaluate the risk for alteration, with sorting character. The fact that the GMDS presents psychometric measures as well as a rigorous statistical study to elaborate the normative tables, allowing to analyze the obtained result and to diagnose alterations in the specific areas or in the global development, evidences like the gold standard in the panorama of infantile evaluation.

The GMDS was adapted and standardized in several countries⁽⁴⁻⁶⁾. The present study is the first part of this process. The standardization process was started in order to be used in Brazil in the near future. It should be noted that for each country, in addition to the process of cross-cultural adaptation and standardization, psychometric measures must be verified, such as the reliability that encompasses the validity and accuracy of the instrument.

With the application of GMDS in the pilot study, verified was the ease in understanding the items to be applied as well as the coherence among the items to be evaluated, in a sequence that respects the developmental milestones. Because some items from different areas are applied with the same material, it is possible to maintain the attention and interest of the child, which makes the instrument pleasant for the applicator and for the child to be evaluated. In the present study, no child refused to perform the proposed items and there was no item without a response.

The study is still ongoing to complete the GMDS standardization for the Brazilian population as well as to carry out the application and verification of its psychometric measurements for the BP version. After completing this process, a sample calculation was performed based on the results of a pilot study and the data collection for the GMDS was started. With the availability of the instrument in Brazil, in addition to the direct favoring of infants, who will have early diagnoses and essential stimulation

to optimize their development, Brazilian researchers will be able to use this tool to perform cross-cultural studies as well as publish studies using the GMDS in journals since it is accepted and used in several languages and countries.

Two limitations or difficulties can be mentioned in the accomplishment of the present study that are based, first, on the adaptation between two Portuguese languages and, secondly, on the division of the scale by age group. It is not possible to perform a translation from one Portuguese language to another, a fact that has not been followed by any sedimentation methodology of instrumental adaptation known in the literature. The adaptations were carried out according to the knowledge of the GMDS construct, with which the speech therapists carrying out the study had contact in the accomplishment of the training course.

Regarding the age group, the GMDS is divided at 24 months, with change inclusive in the application material. In this way, children with chronological age between 22 and 24 months reached the maximum score, which culminated in the performance analysis over 24 months, without specifying the age itself. This factor influenced the statistical analysis applied in the pilot study.

The importance of this initial study and its focus is really to present this new evaluation instrument that will change the Brazilian panorama related to the evaluation and diagnosis of child development.

CONCLUSION

The Griffiths Mental Development Scale is used as a diagnostic tool for changes in developmental areas or global changes in several countries. The assertive diagnosis, in an age group essential for stimulation, with the cerebral plasticity in full development, allows prognosis favorable to development.

The cross-cultural adaptation of the GMDS to Brazil was carried out, transforming the Brazilian scenario in relation to the attention to infants. After normalization and verification of the psychometric measures, it will be possible, in addition to early diagnosis, to improve the quality of care for this population; carry out cross-cultural studies with scientific partnerships and publish in international journals with the feasibility of the GMDS being accepted and used internationally.

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Author contributions

ATFV and DACL conceptualized, constructed outlined and developed the work. ATFV performed the process of data collection, tabulation, analysis of results and writing of the article. DACL aided the entire process described, guiding and carried out the final correction of article writing.