Implementation of the evaluation of growth and psychomotor development in children under 5 years in the Grajau family health unit of the city of Brumadinho – MG, by the UFMG internship in rural areas

Implementação da avaliação do crescimento e do desenvolvimento neuropsicomotor em crianças menores de 5 anos na USF Grajaú na cidade de Brumadinho – MG, pelo internato rural da UFMG

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ABSTRACT

The most sensitive parameter for the early detection of diseases in children up to five years is, undoubtedly, appropriate growth, parallel to the curves established by the WHO. The methodical and rigorous monitoring of psychomotor development (PSMD) allows for timely diagnosis and interventions, saving the child from neurological and social sequelae. At the first contact with child care in the Grajau Family Health Program (PSF) in the city of Brumadinho, as an assignment of the rural Internship in Public Health, we faced deficiencies related to the standardization and use of the methodology proposed by the Ministry of Health regarding the evaluation of growth and psychomotor development in children from zero to five years of age. The curves of the graphics were not routinely or adequately filled in, generating great confusion, difficulty and even making it impossible to monitor the growth of patients The assessment of PSMD was often incomplete, resulting in gaps in completion of children's records. We aimed at implementing in the PSF Grajaú the evaluation of growth and psychomotor development of children under five years of age according to the graphs and tables currently recommended by the WHO. We attached to the children's records these newly implemented graphs. All mothers were informed about the new project, its importance and the need for follow-up. The idea of the project was disseminated so as to be adopted across the city. This work highlights the importance of a simple instrument in childcare and its implications for the promotion of health among children.

Key words: Child Development; Child Care; Child Health; Internship and Residency.

RESUMO

O parâmetro mais sensível para a detecção precoce de enfermidades em crianças de zero a cinco anos é, sem dúvida, o crescimento adequado, paralelo às curvas estabelecidas pela OMS. O acompanhamento metódico e rigoroso do desenvolvimento neuropsicomotor (DNPM) permite o diagnóstico e intervenções oportunas, poupando a criança de sequelas neurológicas e sociais. Ao primeiro contato com a puericultura do Programa de Saúde da Família (PSF) Grajaú do município de Brumadinho, atividade do Internato em Saúde Coletiva, deparou-se com deficiências em relação à padronização e uso de metodologia preconizada pelo Ministério da Saúde quanto à avaliação do crescimento e desenvolvimento neuropsicomotor das crianças de zero a cinco anos. As curvas dos gráficos não eram rotineiramente ou adequadamente preenchidas, gerando grande confusão, dificuldade e até mesmo impossibilidade de acompanhamento do crescimento do paciente. O exame do DNPM era muitas vezes incompleto, gerando lacunas no preenchimento do cartão da criança. Objetivou-se implementar na PSF Grajaú a avaliação do crescimento e do desenvolvimento neuropsicomotor em crianças menores de

cinco anos de idade de acordo com os gráficos e tabelas preconizados atualmente pela OMS. Anexaram-se ao prontuário das crianças os novos gráficos implementados. Todas as mães foram informadas quanto ao novo projeto, à sua importância e à necessidade de seu seguimento. A ideia do projeto foi disseminada, de forma a ser adotado em todo o município. Pode-se concluir, por meio deste trabalho, a importância de simples instrumento de puericultura e as suas implicações para a promoção de saúde da população.

Palavras-chave: Desenvolvimento Infantil;Cuidado da Criança; Saúde da Criança; Internato e Residencia.

INTRODUCTION

The most sensitive parameter for early detection of diseases in children ranging from zero to five years old is somatic growth. Concomitantly, methodical monitoring of neuropsychomotor development (NPMD) allows for timely diagnosis and intervention in childhood neurological disorders, so as to decrease the changes of sequelae in children.[1,2]

During the rural internship in Public Health, a requirement of the curriculum for medical degrees at the Universidade Federal de Minas Gerais (UFMG), we observed that childcare actions were not properly standardized in the Family Health Unit of the Grajaú district in the city of Brumadinho. The Unit lacked methodologies for evaluating growth and psychomotor development in children aged zero to five years, including collection of anthropometric data and analysis of development milestones, thus making it difficult, it not impossible, to conduct adequate follow-up of these children's health.

This situation reveals deficiencies in the training of health care professionals in the Unit and their lack of knowledge about the importance of assessing growth and development in children. The natural result is high infant and child morbidity and mortality, great individual suffering, and high social costs, with increased premature deaths, hospitalizations, delayed therapeutic interventions, and cognitive and/or motor deficits. This study also highlights aspects of the ways in which the health system is managed and how clinical evaluation measures are implemented among the patient population, in contrast with recommendations for best medical practice .[3]

The present study stems from an attempt to implement evaluations of growth and neuropsychomotor development (NPMD) in children up to five years of age, following the Adapted Denver Scale[4] (Table 1), as recommended by the World Health Organization (WHO), at the Family Health Unit in Grajaú, city of Brumadinho. The impact of these evaluations in periodic health control was also assessed. Additionally, this study attempted to raise awareness among the health care team and train them for better standardization and use of the instruments.

Table 1 - Adapted Denver Scale

Neuropsychomotor Development Screening Sheet – 0 to 36 months	
Gross Motor	
Activity	**Estimate age (months)**
Lift head	0.7 – 1.0
Head up 45°	1.9 – 2.0
Head up 90°	1.3 – 3.2
Chest up-arm support	2.0 – 4.3
Sit-head steady	1.5 – 4.2
Roll over	2.4 – 4.7
Sit-no support	3.4 – 6.3
Pull to sit-no head-lag	3.0 – 7.7
Get to sitting	4.8 – 7.8
Bear weight on legs	5.0 – 10.0
Pull to stand	6.0 – 10.0
Sit-no support	6.1 – 11.0
Stand-shortly	9.1 – 13.0
Walk-holding on	7.3 – 12.7
Stand alone	9.8 – 13.9
Stoop and recover	10.4 – 14.3
Walk well	11.3 – 14.3
Walk backwards	12.4 – 21.5
Walk up steps	14.0 – 22.0
Kick ball forward	15.0 – 24.0
Throw ball overhand	14.9 – 13.0
Balance each foot (1 second)	21.7 – 33.4
Hops	20.5 – 36.0
Pedal (tricycle)	21.0 – 36.0
Fine motor – adaptive	
Activity	**Estimate age (months)**
Follow to midline	0.7 – 1.3
Follow past midline	1.0 – 2.5
Follow 180°	1.8 – 4.0
Hands together	1.3 – 3.7
Grasp rattle	2.5 – 4.3
Regard raisin	2.5 – 5.0
Look for yarn	2.9 – 5.0
Take two cubes	5.1 – 7.5
Reaches	5.0 – 7.8
Pass cube	4.7 – 7.5
Bang two cubes held in hands	7.0 – 12.3
Thumb-finger grasp	7.1 – 10.6
Skilled grasp of small objects	9.4 – 14.7

Table 1 - Adapted Denver Scale

Adaptive fine motor	
Activity	**Estimate age (months)**
Scribble (spontaneous)	11.9 – 25.2
Tower of 2 cubes	12.1 – 20.0
Pick ball from box (spontaneous)	12.7 – 24.0
Picks ball from box (demonstrated)	13.7 – 36.0
Tower of 4 cubes	15.5 – 26.4
Imitate vertical line (error of 30°)	18.4 – 36.0
Tower of 8 cubes	21.0 – 40.8
Copy circle	26.4 – 39.6
Imitate bridge using cubes	27.6 – 40.8
Language	
Activity	**Estimate age (months)**
Respond to buzzer or bell	1.6 – 1.8
Vocalizes (not crying)	1.3 – 1.8
Laughs	1.4 – 3.3
Squeals	1.5 – 4.5
Turn to voice	3.8 – 8.3
Imitate speech sounds (echolalia)	5.7 – 11.2
Dada/mama (specific - lalism)	9.2 – 13.3
3 words other than dada/mama	11.8 – 20.5
Combine two words	14.0 – 27.6
Point body part	14.0 – 23.0
Name 1 picture	15.9 – 30.0
Performs two in three commands	14.8 – 32.4
Know plurals	20.0 – 38.4
Say name and surname	24.0 – 45.6
Knows 3 adjectives "cold, tired, hungry"	31.2 – 49.2
Understand 3 prepositions	32.4 – 54.0
Recognizes 3 colors	32.4 – 58.6
Personal – Social	
Activity	**Estimate age (months)**
Regard face	1.0
Smile spontaneously	1.0 – 1.9
Smiles responsively (without being touched)	1.4 – 5.0
Scared of strangers	5.5 – 10.0
Feed self	4.7 – 8.0
Work for toy	4.1 – 10.0
Plays hide	5.7 – 9.7
Indicate wants	4.9 – 9.0
Clap hands and kiss	7.0 – 13.0
Play ball with examiner	9.7 – 16.0
Point for wants (without crying)	10.4 – 14.3
Drink from cup	10.0 – 16.5
Imitate house activities	12.5 – 19.5

Table 1 - Adapted Denver Scale

Personal – Social	
Activity	**Estimate age (months)**
Use spoon	13.3 – 23.5
Help in house (simple chores)	14.8 – 23.5
Remove garment	13.7 – 21.9
Put on shoes (not shoelaces)	20.1 – 36.0
Wash & dry hands	19.0 – 38.4

Psychomotor Development Control Sheet – 0 to 5 year-olds
Activities expected from 2 to 3 years-old
Pedal tricycle and hop
Use cup and spoon: ready for weaning
Dress, no help
Copy circle
Play board/card game
Follow simple commands
Understand "above" and "under"
Anal sphincter control
Activities expected from 3 to 4 year-olds
Climb stairs alternating legs
Feed self, no help
Button and unbutton
Take off shoe and t-shirt
Draw circle, asked
Speech with plural, pronouns and verbs
Recognizes "in front", "behind" and "aside"
Say full name
Know own sex
Color recognition (start)
Bladder sphincter control (awake)
Activities expected from 4 to 5 year-olds
Run and turn without losing balance
Play outside for over one hour
Heel-to-toe walk
Button garments
Dress, no help (no shoelaces)
Count to 4
Dramatic game: the outside world
Copy cross, draw person (three parts)
Separate two out of four tongue depressors
Opposites: high/low; hot/cold
Follow orders (two out of four actions)
Recognize colors
Bladder sphincter control (sleeping)
Use of bathroom, maybe with help for cleaning

* Age range Lower limit (percentile 25) and upper limit (percentile 90).
Source: Silva B, *et al*.

PATIENTS AND METHODS

Following a literature review of scientific articles on psychomotor surveillance in infants and children in the LILACS database, a meeting with the health care team at the unit was scheduled. Special attention was given to the nursing staff responsible for some of the childcare appointments. The guiding principles of the work were presented in that meeting, and the importance of continuing it after the study was emphasized.

The health professionals in the unit were trained using several strategies, including discussions with the managing physician and nurse responsible for the Basic Health Unit. The discussions included topics on the importance of continuing the project and were based on a review of current literature.

After the training we defined the instrument to be used for following growth and psychomotor development in children aged zero to five years. Growth and development surveillance was carried out by the medical students in the rural internship through the use of printed material used in the Pediatrics Outpatient Clinics of the Hospital das Clínicas at UFMG, containing Z-score charts of length/height vs. age, weight vs. age and the adapted Denver scale.

These new charts were then presented to all nursing technicians in the unit, who were trained to fill them out, with great emphasis on the importance of proper and regular data collection. Professionals were instructed in the techniques used to measure children under and over two years of age, and on how to adequately measure head circumference.

These newly implemented charts were attached to the children's records. All mothers were informed of the new project, its importance, and the need for follow-up. Mothers were specifically told to request that Basic Health Unit professionals filled in the charts during all prescheduled childcare appointments, as well as in those appointments they scheduled themselves. During the Public Health Internship in the first quarter of 2002, the follow up included 30 patients.

The idea of the project was disseminated so as to be adopted throughout the city, through meetings with physicians and nurses of other Basic Health Units in the city of Brumadinho.

RESULTS

The training of physicians and nurses was very well received in the Basic Health Unit, both kinds of professionals showing awareness of the precariousness of the methods previously used for assessing growth and NPMD in children.

We found that the majority of children presented adequate growth and NPMD, according to the WHO guidelines.

Among the main problems we observed, we would like to highlight: the variety of nonstandard child record cards; lack of systematized and updated evaluations in accordance with WHO norms; the absence of development follow up based on the children's line of growth; anthropometric data incorrectly recorded on cards, sometimes undated; no data collection in several childcare appointments; underestimated head circumference data, which were measured and recorded only in the first months of life. NPMD was rarely assessed, and its designated fields left blank in children's record cards.

Two patients were diagnosed with inadequate development; one was underweight and the other obese. Mothers and the healthcare professionals in the unit were alerted of these findings and instructed about the need to make changes in hygiene and diet, so that the line of growth could go back to normal parameters.

DISCUSSION

Growth is the result of biological changes that lead to increases in body size among children, specifically weight, height and head circumference, all of which can be quantitatively measured. Growth is determined by genetic and environmental factors, both intrinsic and extrinsic. Child growth indirectly reveals genetic potential, overall health status and even the child's biopsychosocial environment. Absent or poor weight gain in children over time is the most sensitive and the least specific parameter for the early diagnosis of chronic diseases during childhood. Growth in height, conversely, presents later changes and can be more specific. Head circumference relates to neural growth and is characteristically accentuated in the first year of life, and thus a sensitive indicator of health in the central nervous system for that period. Although

losses in neural growth in this age group can result in severe neurological sequelae, these can be diagnosed easily with head circumference measurement.

Anthropometry is the method of choice for evaluating somatic growth. The WHO recommends measuring weight and height, correlated with sex and age, for all age groups. Because they are considered universally representative, the 2006 WHO growth charts[5] are usually recommended. Anthropometric indices based on the combination of two or more variables like weight, height, sex and age must be used for properly interpreting growth. Analyses of isolated variables such as weight mean very little.

Given that growth should be considered a process, i.e., a set of changes over time, a correct approach must follow the development of anthropometric data. Punctual anthropometric indices are not enough for adequate growth diagnosis. The definition of adequate growth is growth parallel to the curves, proportional to weight and height.

Growth development follow-up, carried out using growth lines, can be interpreted according to percentiles or to the number of standard deviations in relation to the central point, i.e., the median of a reference population (Z-score).

The WHO recommends using the Z-score to better differentiate extreme values. Similar outlying variations in anthropometric data are far more significant when rendered in Z-scores, given that in the percentile system variations that are distant from the median have low impact, thus making the most severe clinical situations difficult to interpret .[6]

NPMD, unlike growth, is a qualitative, non-measurable process, consisting of the acquisition of ever more complex abilities and functions[7]. Development is associated to central nervous system maturation and is divided into four great fields: gross motor, fine motor (adaptive), social and linguistic.

There is a fixed and invariable sequence of growth, characterized by its craniocaudal and near-distal standard. Individuals follow their own pace of growth without, however, escaping this sequence.

Following cortical development and white matter myelination, the primitive reflexes mediated by the basal ganglia are inhibited and children acquire new abilities in the four aforementioned fields and reach various development milestones.

Evaluation of NPMD consists of exploring these milestones, based on a scale adapted from Denver. Early diagnosis of delayed NPMD enables timely ther-

apeutic interventions, reducing the incidence of often permanent neurological complications.

Raising awareness at the Grajaú Health Care Unit in the city of Brumadinho was one of the activities of the Internship in Public Health, and the childcare staff realized their negligence in the proper evaluation of growth and NPMD of children.

Continuing education events focused on childcare are of utmost importance for training health professionals, especially doctors and nurses. The partnership established between the city and the UFMG could offer refresher and retraining courses for these professionals in order to improve the quality of care for the child population and also of the internship in Public Health itself. Concomitantly, it is necessary that nursing technicians in charge of collecting anthropometric data be periodically evaluated and updated by the family doctor or nurse in the unit with regards to the correct techniques for measuring. Harmonious interaction and coordination between the various professionals in the same Health Care Unit is essential in order to optimize health care service.

CONCLUSION

The use of adequate instruments, however simple, is extremely important in childcare and has various implications, leading to improvements in promoting health in the population. Anthropometric measurements and a questionnaire can predict conditions in patients and suggest actions to prevent them. The lack of qualified follow up can lead to human and social losses, as well as financial stress to the city as a result of late actions in cases of preventable development delays. Such losses are much larger than what would have been spent to implement the system described here in all health care units. Adopting the WHO recommended charts and monitoring for NPMD are of utmost importance in the city of Brumadinho.

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