



Knowledge Attitude and Practice (KAP) survey among healthcare professionals in pediatrics on the psychomotor development of children. Case of urban and rural health areas in South Kivu in the Democratic Republic of Congo: a cross-sectional study

Kitoga Muke, MD^{a,b,d}, Balagizi Ganywamulume^{a,c,*}, Mambo Mwilo, MSc^{a,b}, Tumsifu Manegabe, MD^{a,b}, Masumbuko Bruno, MD, MSc, PhD^{d,e,f}, Birindwa Archippe, MD, MSc, PhD^{a,b}

Introduction: Development refers to change. The study of development is the understanding of how a subject functions at a particular age or time in life. The objective of this study was to evaluate the knowledge, attitude, and practice of pediatric healthcare personnel on the psychomotor development of the child.

Methods: This was a cross-sectional study of knowledge, attitude, and practice conducted in the health areas of South Kivu.

Results: Twenty-six caregivers participated in the survey. Men were the most represented (61.5%), mean age 27.62 ± 5.07 years; median experience in pediatrics: 1 year; predominantly urban setting with 69.2%. General practitioners were more represented, with 57.7%. The overall state of knowledge was insufficient in 69.2%. Knowledge1 improves with increasing experience in pediatrics ($P=0.008$), and qualification improves knowledge1 ($P=0.033$) and knowledge3 ($P=0.009$). Knowledge4 improved from rural to urban settings ($P=0.022$). A good knowledge of the scales used in the evaluation of psychomotor development influences the use of one or the other ($P=0.000$). The authors also notice that those who indicate and/or have physical therapy practiced in rehabilitation are generally those who have a good knowledge of the use of psychomotor development assessment tools ($P=0.010$).

Conclusion: This study highlights the low theoretical knowledge of caregivers on psychomotor development in our study setting, resulting in late diagnosis and consequently poor treatment of psychomotor development disorders. The results of this study indicate a need for continuing education for pediatric caregivers on the psychomotor development of the child.

Keywords: Democratic Republic of Congo, healthcare personnel, knowledge–attitude–practice, psychomotor development

Introduction

Development refers to change. The study of development involves understanding how a subject functions at a particular age or time in life. Functional change during development is also

^aFaculty of Medicine and Public Health, Evangelical University in Africa, ^bDepartment of Pediatrics, Panzi Hospital, ^cMedical Student Research Circle, Bukavu, South Kivu, ^dDepartment of Research, Medical Research Circle, Goma, ^eFaculty of Medicine, University of Goma, North Kivu and ^fAdministration, Democratic Republic of Congo Pediatric Society, Kinshasa, Democratic Republic of Congo

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*Corresponding author. Address: Evangelical University in Africa, Nkunda Street 243, Bagira, Bukavu, South Kivu, The Democratic Republic of Congo. Tel.: +243 975 734 947. E-mail: fabienbalagizi@gmail.com (B. Ganywamulume).

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HIGHLIGHTS

- The low theoretical knowledge of caregivers on psychomotor development is a cause of late diagnosis and, therefore, poor treatment of psychomotor development disorders.
- A good command of the psychomotor development assessment scales in pediatrics facilitates the diagnosis of developmental disorders and the indication of treatment.
- The etiological treatment of psychomotor development disorders is recommended after diagnosis.

fundamental, as it requires an understanding of the mechanisms that trigger or enable changes such as maturation, experience, stimulation, and desire^[1].

The association of developmental markers with theoretical models provides a framework for understanding the peculiarities and problematic occurrences of individual developments^[2].

Studies from around the world show that resource-limited countries are at high risk for delays in four developmental domains, with disability rates of ~20.4% (3.1–45.2%) in any one of these domains; these studies also found that language

impairments were more common, followed by motor, cognitive, and sensory impairments^[3,4].

In the Democratic Republic of Congo, according to UNICEF criteria, 66% of children aged 36–59 months are on track for development (Early Development Index score) in at least three of the following areas: literacy/calculus, physical, emotional, and/or learning^[5].

In young children, developmental processes are assessed holistically, including social contact, global and fine motricity, and language. In practice, composite developmental scales (including various components: motor, communication, cognitive, and emotional processes, etc.) are usually used to assess the child's overall level of development by examining these different aspects. These assessments are comprehensive, differentiated, and indicative of deficits, which initially helps to further analyze the child's developmental profile and possible heterogeneity^[3,6–9].

A device for assessing a phenomenon is based on a theoretical model of that phenomenon. This applies to the assessment of the psychomotor repertoire. It is based on models of development and its disorders that guide the collection of data by clinicians and specify the tools used for this purpose^[8].

Many different environmental factors are the many stimuli that can influence gene expression and, in turn, the development of developing beings, leaving a positive or negative imprint on life^[7–9]. Given the importance of early childhood and the treatment of brain development, every child deserves to live in a rich and supportive environment to reach their full potential. Poor nutrition in the early childhood growth cascade affects nearly one in four children under the age of 5 worldwide and affects early childhood development^[10].

Malnutrition in all its forms is one of the causes of disharmonious development in young children and, because of its persistence and impact on the cognitive life of the child, represents a current problem, sometimes severe and irreversible, especially for neurocognitive development despite supplementation. These consequences on myelination and synaptogenesis are well established, as well as deleterious effects on psychomotor and cognitive functions^[11].

In practice, many children with apparent psychomotor development disorders are neither cared for, nor referred to appropriate structures. This raises the question of whether pediatric healthcare staff have sufficient knowledge of psychomotor development assessment to detect and treat these disorders. Given the lack of reliable data on pediatric caregivers' current knowledge of the issue of children's psychomotor development in the Democratic Republic of Congo, the objective of this study was to assess the level of knowledge, attitude, and practice of pediatric caregivers in identifying, referring, and managing children's psychomotor development disorders.

Methods

This was a prospective cross-sectional study of Knowledge, Attitudes, and Practice that was conducted over a 1 month period from 1 September to 30 September 2022.

The study was conducted in the pediatric wards of general referral hospitals in Bukavu and surrounding areas selected by nonrandom sampling. The Panzi hospital in Bukavu, Luvungi hospital in Uvira, Mukongola hospital in Kabare and Monvu hospital in Idjwi were selected based on the accessibility

of the environment and the integration of the free treatment program of malnutrition. Malnutrition is considered as a major risk factor for psychomotor development disorders in children^[11].

In the selected hospitals, we included front-line healthcare personnel responsible for the consultation and treatment of children, including general practitioners, nurses, nutritionists, and training students.

To be included, the participant had to have worked at least 3 months in the pediatric department.

Sampling was voluntary; all pediatric healthcare personnel who met the inclusion criteria and were present during the survey were selected. Data collection was done with a tested and validated survey form.

The different variables studied were:

- (1) Theoretical knowledge on psychomotor development (Knowledge1 was based on the definition of psychomotor development, Knowledge2 on the signs suggestive of psychomotor development disorders, Knowledge3 on the systems affected by psychomotor development disorders, Knowledge4 on the scales used to assess psychomotor development, and Knowledge5 on the causes of psychomotor development disorders. General knowledge took an average of all the knowledge listed above).
- (2) Attitudes and practices in front of a case of psychomotor development disorder: opinion on the diagnosis of psychomotor development disorders, on the use of specific tools (psychomotor development evaluation scales: the Denver II^[12] and Brunet–Lezine scales^[13]) and on the managing of a psychomotor development disorder.

The data were analyzed with SPSS 23 software. Comparison of categorical variables was done by Fisher's exact test. The following hypothesis was verified: the knowledge state would influence attitude and practice. The statistical test was considered significant for a *P-value* lower than 0.05. The assessment of knowledge, attitudes, and practices was done using the scores of the Knowledge Attitudes Practices (KAP) surveys of Essi and Nyoya^[14].

Thus, knowledge was considered poor if the rate of correct answers was less than 50%; insufficient for a rate of correct answers between 50 and 65%; average for a rate of correct answers between 65 and 85%, and good for the rate of correct answers greater than or equal to 85%^[14].

The work has been reported in line with the Strengthening the Reporting of Cohort Studies in Surgery (STROCSS) criteria^[15].

Results

A total of five general referral hospitals were selected based on nonrandom sampling, two urban and three rural, in which 26 healthcare personnel gave their consent to participate in the survey. The average age where 27.62 ± 5.07 SDs. The median general experience of 1 year with the extremes of more than 18 years and less than 1 year, and the median experience in pediatrics of 1 year with the extremes of more than 12 years and less than 1 year. Table 1 presents the general description of the population.

The overall state of knowledge is insufficient for 69.2% of the participants in the study. A small proportion has a good state of knowledge in relation to knowledge1 (15.4%), knowledge2

Table 1
Description of the study population

	<i>N</i> = 26	%
Sex		
Male	16	61.5
Female	10	38.5
Age range		
< 25 years	5	19.2
25–35 years	18	69.2
> 35 years	3	11.5
Civil status		
Single	18	69.2
Bride	8	30.8
General experience		
< 2 years	15	57.7
2–5 years	6	23.1
6–10 years	2	7.7
> 10 years	3	11.5
Experience in pediatrics		
< 2 years	18	69.2
2–5 years	5	19.2
6–10 years	1	3.8
> 10 years	2	7.7
Place of practice		
Urban	18	69.2
Rural	8	30.8
Level of study		
University	24	92.3
MTI	2	7.7
Qualification		
General practitioner	15	57.7
Nutritionist	5	19.2
Nurse	3	11.5
Student	3	11.5

MTI, Medical Technical Institute.

(7.7%), knowledge3 (7.7%), knowledge4 (11.5%), and knowledge5 (15.4%). The majority of participants have insufficient knowledge compared to knowledge1 65.4%, knowledge2 84.6%, knowledge3 73.1%, knowledge4 26.9%, and knowledge5 26.6%. The majority of medical staff had insufficient overall knowledge with 46.2%. Knowledge1 was statistically associated with pediatric experience ($P=0.008$). That is, it improves with increasing pediatric experience. This knowledge status was also statistically associated with qualification ($P=0.033$), that is, it improved from student to nurse, from nurse to nutritionist, from nutritionist to Doctor. Knowledge3 is statistically associated with qualification ($P=0.009$), improving from student to nurse, from nurse to nutritionist, from nutritionist to General practitioner. Knowledge4 was statistically associated with location of practice ($P=0.022$) and improved from rural to urban. Table 2 presents the knowledge status in relation to pediatric experience, place of practice, level of education, and qualification.

The attitude and practice, in relation to the diagnosis of psychomotor development disorders is to resort to a routine practice in the majority of cases with 10 individuals (38.5%), to refer to the notes of the courses for 7 individuals (26.9%), and to use a scale of evaluation of psychomotor development for 9 individuals (34.6%); in relation to the use of specific tools in the evaluation of psychomotor development, the majority of the participants in the study do not use a scale (30.8%). The Denver scale is the most

used with 26.9% (seven individuals) against 15.4% (four individuals) who use the Brunet–Lezine scale. In the treatment of psychomotor development disorders, the majority recommended a referral to specialized structures and/or professionals (96.2%, i.e. 25 individuals); 16 individuals, that is, 61.5%, recommended preventive treatment of psychomotor development disorders in all children consulting a pediatrician. The etiological treatment of psychomotor development disorders is recommended by 12 individuals (46.2%). In the case of a proven psychomotor development disorder, five individuals (19.2%) recommended rehabilitation physiotherapy as part of the treatment. Table 3 presents the attitude and practice of the healthcare personnel in the evaluation of psychomotor development and the treatment of developmental disorders.

We found a statistically significant relationship between scale use and knowledge4 ($P=0.000$). Good knowledge of the scales used in the assessment of child psychomotor development influences the use of either scale. There were also statistically significant associations between the use of the Denver and Brunet–Lezine scales in the assessment of psychomotor development and knowledge4 ($P=0.000$ and $P=0.002$), and those who used these scales were generally those who had knowledge of the tools used in the assessment of psychomotor development. We also notice that those who indicate and/or have physical therapy practiced in the rehabilitation of children with psychomotor development disorders are generally those who have a good knowledge of the use of psychomotor development assessment tools ($P=0.010$). Table 4 presents the significant correlations between knowledge status and attitude–practice.

Discussion

Twenty-six caregivers participated in the survey. They have a notion on the psychomotor development of the child; apart from the theoretical courses received in training schools, none of them has received additional training on the psychomotor development of the child and its clinical evaluation.

Men were the most represented with 61.5%, sex ratio male/female of 1.6. These results are similar to those of Prudencio RDTK^[16] in an evaluation of nursing knowledge and practice in the accompaniment of patients at the end of life in the medical services of the Hubert-K.-Maga National Hospital and University Center in Cotonou (Benin), this being linked to the fact that men constitute the majority of care providers in our countries, given that women's professional activity is lower than that of men^[17]. The average age was 27.62 ± 5.07 years. Other studies conducted on the continent have reported a median age between 34 and 38 years^[18,19]. The median pediatric experience was 1 year; this would be explained by the young age of the study population. The majority of study participants practiced in urban areas 69.2%. This would be justified by the insecurity prevailing in the rural areas of South Kivu province, where we conducted our study.

General practitioners were the most represented with 57.7%. This is due to the fact that all General practitioners in rural hospitals also practice in pediatrics, unlike the other categories, which are directly assigned to pediatric services.

Knowledge1 was statistically associated with pediatric experience ($P=0.008$). That is, knowledge of the definition of psychomotor development improved with increasing years

Table 2

Knowledge status in relation to pediatric experience, location of practice, level of education, and qualification

	Experience in pediatrics				P	Place of practice		P	Level of study			P	Qualification				P
	< 1 year	> 10 years	1–5 years	6–10 years		Rural	Urban		Secondary school	University	Student		Nurse	GP	Nutritionist		
	n (%)	n (%)	n (%)	n (%)		n (%)	n (%)		n (%)	n (%)	n (%)		n (%)	n (%)	n (%)	n (%)	
Knowledge1																	
Good	1 (3.8)	–	3 (11.5)	1 (3.8)	0.008	3 (11.5)	1 (3.8)	0.134	–	4 (15.4)	0.582	–	–	1 (3.8)	3 (11.5)	0.033	
Insufficient	–	1 (3.8)	15 (57.7)	1 (3.8)		4 (15.4)	13 (50.0)		1 (3.8)	16 (61.5)		–	3 (11.5)	3 (11.5)	11 (42.3)		
Wrong	3 (11.5)	1 (3.8)	1 (3.8)			1 (3.8)	4 (15.4)		1 (3.8)	4 (15.4)		3 (11.5)	–	1 (3.8)	1 (3.8)		
Knowledge2																	
Good	–	–	1 (3.8)	1 (3.8)	0.306	–	2 (7.7)	1.000	–	2 (7.7)	1.000	–	–	–	2 (7.7)	1.000	
Insufficient	4 (15.4)	2 (7.7)	16 (61.5)			7 (26.9)	15 (57.7)		2 (7.7)	20 (76.9)		3 (11.5)	3 (11.5)	5 (19.2)	11 (42.3)		
Wrong	–	–	2 (7.7)			1 (3.8)	1 (3.8)		–	2 (7.7)		–	–	–	2 (7.7)		
Knowledge3																	
Good	–	–	2 (7.7)			1 (3.8)	1 (3.8)		–	2 (7.7)		–	–	1 (3.8)	1 (3.8)	0.009	
Insufficient	4 (15.4)	1 (3.8)	13 (50.0)	1 (3.8)	0.829	6 (23.1)	13 (50.0)	1.000	1 (3.8)	18 (69.2)	0.474	3 (11.5)	3 (11.5)	–	13 (50.0)		
Wrong	–	1 (3.8)	3 (11.5)			1 (3.8)	3 (11.5)		1 (3.8)	3 (11.5)		–	–	3 (11.5)	1 (3.8)		
Average	–	–	1 (3.8)			–	1 (3.8)		–	1 (3.8)		–	–	1 (3.8)	–		
Knowledge4																	
Good	–	–	3 (11.5)		0.582	–	3 (11.5)	0.022	–	3 (11.5)	1.000	–	–	–	3 (11.5)	0.273	
Insufficient	–	–	7 (26.9)			–	7 (26.9)		–	7 (26.9)		–	1 (3.8)	–	6 (23.1)		
Wrong	4 (15.4)	2 (7.7)	8 (30.8)	1 (3.8)		8 (30.8)	7 (26.9)		2 (7.7)	13 (50.0)		3 (11.5)	2 (7.7)	4 (15.4)	6 (23.1)		
Average	–	–	1 (3.8)			–	1 (3.8)		–	1 (3.8)		–	–	1 (3.8)	–		
Knowledge5																	
Good	2 (7.7)	1 (3.8)	1 (3.8)		0.050	1 (3.8)	3 (11.5)	0.240	1 (3.8)	3 (11.5)	0.354	2 (7.7)	1 (3.8)	–	1 (3.8)	0.218	
Insufficient	1 (3.8)	–	5 (19.2)	1 (3.8)		4 (15.4)	3 (11.5)		–	7 (26.9)		–	1 (3.8)	2 (7.7)	4 (15.4)		
Wrong	1 (3.8)	1 (3.8)	13 (50.0)			3 (11.5)	12 (46.2)		1 (3.8)	14 (53.8)		1 (3.8)	1 (3.8)	3 (11.5)	10 (38.5)		
General Knowledge																	
Insufficient	3 (11.5)	1 (3.8)	13 (50.0)	1 (3.8)	0.903	6 (23.1)	12 (46.2)	1.000	1 (3.8)	17 (65.4)	0.529	2 (7.7)	3 (11.5)	1 (3.8)	12 (46.2)	0.136	
Wrong	1 (3.8)	1 (3.8)	4 (15.4)			2 (7.7)	4 (15.4)		1 (3.8)	5 (19.2)		1 (3.8)	–	3 (11.5)	2 (7.7)		
Average	–	–	2 (7.7)			–	2 (7.7)		–	2 (7.7)		–	–	1 (3.8)	1 (3.8)		

GP, General Practitioner.

Table 3
Attitude and practice of caregivers in assessing psychomotor development and managing developmental disorders

	<i>N</i> = 26	%
In the diagnosis of a psychomotor development disorder		
Use of a ladder		
No	17	65.4
Yes	9	34.6
Refer to the notes		
No	19	73.1
Yes	7	26.9
Routine		
No	16	61.5
Yes	10	38.5
In the evaluation of psychomotor development		
No one		
No	18	69.2
Yes	8	30.8
Denver scale		
No	19	73.1
Yes	7	26.9
Brunet–Lezine scale		
No	22	84.6
Yes	4	15.4
In the management of psychomotor development disorders		
Prevention		
No	10	38.5
Yes	16	61.5
Etiological treatment		
No	12	46.2
Yes	14	53.8
Physiotherapy		
No	21	80.8
Yes	5	19.2
Reference		
No	1	3.8
Yes	25	96.2

of pediatric practice. These results are supported by the theory of P. Benner, quoted by Prudencio RDTK^[16]. Benner’s theory that «seniority is associated with the development of the professional abilities of the providers» and adds: ‘it is an indicator to judge the experience acquired by a professional in the exercise of his profession’.

Overall, we note a lack of theoretical knowledge about child psychomotor development in 69.2% of the study participants. Essi and Nyoya^[14] describe the state of knowledge as insufficient when the rate of correct responses varies between 50 and 65%. This is especially dangerous because it could delay the diagnosis and/or treatment of a psychomotor developmental disorder.

Qualification improves knowledge1 ($P=0.033$) and knowledge3 ($P=0.009$). This difference is related to the presence of certain clinical protocols including different tools for evaluating the child’s psychomotor development in urban areas than in rural areas.

The attitude and practice, in relation to the diagnosis of disorders of psychomotor development was to resort to a routine practice in the majority of cases with 10 individuals or 38.5%; in relation to the use of specific tools in the assessment of psychomotor development, many participants in the study (30.8%) do not use a scale. These results are related to those of an American study by Sand *et al.*^[20], which showed that despite the American Academy of Pediatrics’ recommendations, only a minority of General practitioners used standardized tests.

The Denver scale was the most used with 26.9% or seven individuals, this proportion is lower than that of Sices *et al.*^[21] for whom half of the pediatric caregivers used scales, with the Denver II scale being the first choice. This is justified by the fact that in our study, knowledge influenced practice ($P=0.000$). Pediatric caregivers tend to use the tools they are most familiar with, given the lack of tools adapted to our environment.

However, our study is limited by its sample size, which would be justified by the small number of caregivers in the pediatric wards, a large-scale study would be feasible to compensate for this limitation. This is also justified by data from the WHO,

Table 4
Knowledge status influencing attitude and practice

	Knowledge3				<i>P</i>	Knowledge4				<i>P</i>
	Wrong	Insufficient	Average	Good		Wrong	Insufficient	Average	Good	
	<i>n</i> (%)	<i>n</i> (%)	<i>n</i> (%)	<i>n</i> (%)		<i>n</i> (%)	<i>n</i> (%)	<i>n</i> (%)	<i>n</i> (%)	
Use of scale in diagnosis of disorders										
No	4 (15.4)	10 (38.5)	1 (3.8)	2 (7.7)	0.163	14 (53.8)	1 (3.8)	1 (3.8)	1 (3.8)	0.000
Yes	–	9 (34.6)	–	–		1 (3.8)	6 (23.1)	–	2 (7.7)	
No scale used in diagnosis of developmental disorders										
No	–	16 (61.5)	1 (3.8)	1 (3.8)	0.003	11 (42.3)	3 (11.5)	1 (3.8)	3 (11.5)	0.354
Yes	4 (15.4)	3 (11.5)	–	1 (3.8)		4 (15.4)	4 (15.4)	–	–	
Use of Denver Scale										
No	4 (15.4)	13 (50.0)	–	2 (7.7)	0.240	15 (57.7)	4 (15.4)	–	–	0.000
Yes	–	6 (23.1)	1 (3.8)	–		–	3 (11.5)	1 (3.8)	3 (11.5)	
Use of Brunet–Lezine scale										
No	4 (15.4)	15 (57.7)	1 (3.8)	2 (7.7)	1.000	14 (53.8)	7 (26.9)	1 (3.8)	–	0.002
Yes	–	4 (15.4)	–	–		1 (3.8)	–	–	3 (11.5)	
Use of physiotherapy in the management of disorders										
No	4 (15.4)	15 (57.7)	1 (3.8)	1 (3.8)	0.588	13 (50.0)	7 (26.9)	1 (3.8)	–	0.010
Yes	–	4 (15.4)	–	1 (3.8)		2 (7.7)	–	–	3 (11.5)	

which estimates that the human resources crisis in sub-Saharan Africa is a public health challenge, admitting that in these countries, there is a shortage of health personnel and infrastructure, with only two doctors, 11 nurses or midwives, and 10 hospital beds per 10 000 inhabitants^[22].

Conclusion

This study highlights the low-level of theoretical knowledge of caregivers on psychomotor development in our work environment and these results in a delay in diagnosis and/or poor treatment of this pathology in the Congo Democratic Republic.

In order to improve the treatment of this disorder, which is based on early diagnosis, it is the responsibility of health professionals to popularize the use of various tools for evaluating psychomotor development disorders in children. Since the identification of neurodevelopment disorders is a priority for public authorities, appropriate interventions, implemented as early as possible, can favorably modify the developmental trajectory of children. All Physicians, especially general practitioners, pediatricians, maternal and child healthcare providers, school physicians, and nutritionists, who see the child in the first instance, must use the tools in the context of the consultation where the difficulties are discussed or identified in the evaluation of disorders in the overall development of young children. The need for continuous training of pediatric caregivers on the evaluation of the psychomotor development of the child and the development of an easy and adapted tool draws its importance from the results of this study, which demonstrate the insufficiency of knowledge and use of the scales of evaluation of the psychomotor development of the child.

Ethical approval and consent

This study was approved by the scientific research department of the deanery of the Faculty of Medicine and Public Health of the Evangelical University in Africa and the pediatric services of the different health facilities selected for the survey. Oral informed consent was obtained from all caregivers who participated in the study. The data were collected and processed, and the results presented in strict compliance with anonymity.

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Author contribution

K.M. and M.B.: conception; B.G.: design; K.M.: administrative support; K.M., B.G., and T.M.: literature search; B.G. and K.M.: data collection; B.G. and K.M.: data analysis and interpretation of results; K.M., M.M. and T.M.: manuscript preparation; K.M. and B.G.: manuscript editing; M.B. and B.A.: manuscript review. Final approval of manuscript is done by all authors.

Conflicts of interest disclosure

The authors declare no conflicts of interest.

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Guarantor

Kitoga Muke is the guarantor of the work and accepts full responsibility for the work.

Data availability statement

Datasets analyzed during the current study are available upon reasonable request.

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