

The Bayley Social-Emotional Scale and the Assessment of Preterm Infants: A Systematic Review¹

Greicyani Brarymi Dias¹
Edson Júnior Silva da Cruz¹
Janari da Silva Pedroso¹

¹Universidade Federal do Pará, Belém, Pará, Brazil

Abstract

The Bayley scale is one of the most widely used instruments for assessing infant development. This article aimed to systematically review the contribution of the Bayley social-emotional scale in the assessment of social-emotional development in preterm infants. This systematic review followed PRISMA guidelines and was registered in PROSPERO. According to the inclusion criteria, 19 articles were selected from electronic databases. The results indicate reduced rates in evaluating the scale for children with lower gestational age, birth weight, and the association with environmental, biological, and hospital clinical factors. However, no analysis was found between the axes that guide the social-emotional development milestones present in the Bayley assessment and the developmental outcomes of preterm children. Bayley's social-emotional scale and other assessment methods can jointly compose a detailed and sensitive protocol for preterm infants regarding early childhood emotional health care.
Keywords: Child; Child development; Preterm birth

Escala Socioemocional Bayley e Avaliação de Bebês Prematuros: Uma Revisão Sistemática

Resumo

A escala Bayley é um dos instrumentos mais utilizados para avaliação do desenvolvimento infantil. O objetivo deste artigo foi realizar uma revisão sistemática sobre a contribuição da escala socioemocional, pertencente à Bayley, na avaliação de crianças prematuras. A revisão seguiu as recomendações PRISMA e foi registrada no PROSPERO. Conforme critérios de inclusão, 19 artigos foram selecionados a partir de bancos de dados eletrônicos. Os resultados indicam índices reduzidos na avaliação da escala para crianças com menor idade gestacional, peso ao nascer e a associação com fatores ambientais, biológicos e clínicos hospitalares. No entanto, não foram encontradas análises entre os eixos que orientam os marcos de desenvolvimento socioemocional, presentes na avaliação Bayley e os resultados do desenvolvimento das crianças prematuras. A escala socioemocional da Bayley e outros métodos de avaliação podem conjuntamente compor um protocolo detalhado e sensível destinado ao cuidado da saúde emocional de crianças nascidas prematuras.

Palavras-chave: Criança; Desenvolvimento Infantil; Nascimento prematuro

Escala Socioemocional de Bayley y Evaluación para Bebés Prematuros: Una Revisión Sistemática

Resumen

La escala Bayley es uno de los instrumentos más utilizados para la evaluación del desarrollo infantil. El propósito del artículo fue revisar sistemáticamente la contribución de la escala socioemocional de Bayley en la evaluación de bebés prematuros. La revisión siguió las recomendaciones PRISMA y fue registrada en PROSPERO. Según los criterios de inclusión, se seleccionaron 19 artículos de bases de datos electrónicas. Los resultados indican índices reducidos en la evaluación de la escala para niños con menor edad gestacional, peso al nacer asociados con factores ambientales, biológicos y clínicos hospitalarios. Sin embargo, no se encontraron análisis entre los ejes que orientan los hitos del desarrollo socioemocional, presentes en la evaluación Bayley, y los resultados del desarrollo de los niños prematuros. La Escala Socioemocional de Bayley y otros métodos de evaluación pueden formar en conjunto un protocolo detallado y sensible para el cuidado de la salud emocional de niños prematuros.

Palabras clave: Niños; Desarrollo Infantil; Nacimiento prematuro

Introduction

Prematurity, characterized by births occurring before the 37th week of pregnancy (World Health Organization, 2018), can be related to numerous outcomes in important areas of the infant's neurodevelopment, such as cognitive, language, motor, adaptive

behavior, social-emotional, and neurosensory impairments (Do et al., 2020; Stack et al., 2019). Considering social-emotional development in preterm infants, interurrences may be a consequence of brain injury and/or dysfunction caused by neuronal immaturity, often present in this type of birth (Duncan et al., 2019; Fumagalli et al., 2018).

¹ Portuguese Version: <https://www.researchgate.net/profile/Greicyani-Dias>

Perinatal risks, maternal mental disorders, and social variables, such as parental level of education and socioeconomic conditions are also described as possible factors that may negatively influence the healthy course of social-emotional development in premature children (Metwally et al., 2016; Moe et al., 2016). Thus, these children must have protocols for detection and therapeutic follow-up, whenever necessary. Scales for the assessment of social-emotional development may be important tools in the composition of these therapeutic protocols, supporting in the identification of early changes, as well as fostering the understanding of how prematurity and other associated conditions can impact the social-emotional development of preterm children (Frantz et al., 2021).

Among the instruments highlighted by studies for social-emotional assessment in preterm children are the Infant Toddler Social Emotional Assessment, the Brief Infant and Toddler Social and Emotional Assessment, the Ages and Stages Questionnaire Social-Emotional, second edition, and the Personal-social scale of Griffith Mental Development Scales (Cheong et al., 2017; Duncan et al., 2019; Fumagalli et al., 2018; Ghetti et al., 2021). Another instrument employed in this type of assessment is the social-emotional scale belonging to the Bayley infant and young child development scale, third and fourth editions (Bayley-III and Bayley-4), the latter being the most recent version (Tan et al., 2021; White-Traut et al., 2018). The Bayley scale is a very comprehensive instrument for determining delays, considered the gold standard among scales for child development assessments (Del Rosario et al., 2021). This scale can be used for the age range from 16 days to 42 months, considering five developmental domains: cognitive scale; language scale (receptive and expressive communications); motor scale (fine and broad motor skills); social-emotional and the adaptive behavior scale (Aylward, 2020).

Bayley's social-emotional scale evaluates the development of children, identifying social-emotional milestones associated with more cohesive emotional patterns, not limited to isolated emotions. The assessment of this domain includes self-regulation and the ability to communicate needs and establish relationships, according to the following stages: the first (birth to 3 months) involves increasing self-regulation and interest in the world; the second (4-5 months) covers engagement in relationships; the third (6-9 months) begins to use emotions interactively and intentionally; the fourth, use of interactive emotional signals

or gestures to communicate (10-14 months) and solve problems (15-18 months); the fifth involves the use of symbols or ideas to convey intentions, feelings (19-24 months) and to express more than basic needs (25-30 months); in the sixth stage (31-42 months) there is an elaboration of logical pathways between emotions and ideas. The stages follow the developmental milestones referenced by the standards of "Greenspan's Social-emotional Growth Chart: a screening questionnaire for infants and young children" (Greenspan, 2004), later included and adapted by Bayley-III and Bayley-4 (Aylward, 2020; Breinbauer et al., 2010).

Despite the incidence of instruments that allow assessing neuropsychomotor domains, the assessment of the development of social and emotional skills should receive even more incentives for its use, as it is not always included as a goal of hospital follow-up programs for preterm infants, even though it is considered a key area for infant development (Olsen et al., 2022; Peralta-Carcelen et al., 2017; White-Traut et al., 2018). Added to these aspects is the absence of studies that present an overview of the contributions of assessment scales in social-emotional development, such as the Bayley scale, and that also consider the discussion of the social-emotional milestones and stages belonging to this instrument in the assessment of the premature child.

Thus, this article aims to present a systematic review on the contribution of the Bayley social-emotional scale in the assessment of preterm infants, based on the analysis of the conditions (biological, clinical, or environmental) associated with preterm birth and the outcomes of the social-emotional assessment promoted by this scale. The aim is to expand the knowledge about this field of research and understand how a widely used tool, such as the last two versions of the Bayley's scale, has contributed and been applied to the social-emotional development of the preterm infant.

Method

Inclusion and Exclusion Criteria

The systematic review protocol was registered by the International Prospective Register of Systematic Reviews (PROSPERO), protocol number [omitted to ensure blind review], and conducted according to PRISMA method guidelines (Page et al., 2021). Inclusion criteria for the studies were: publications in English, Portuguese, or Spanish; between 2009 and August

2021; results and discussion of Bayley social-emotional assessment (Bayley-SE) outcomes in preterm infants (primary outcome); social-emotional assessment conducted from birth to 42 months; cross-sectional, cohort, or case-control type studies; including preterm, moderate to late preterm (born between 32 and 37 weeks), very preterm (28 to 32 weeks), extremely preterm (less than 28 weeks), low birth weight (less than 2.500 g), very low birth weight (1,500 g or less), and extremely low birth weight (less than 1,000 g) participants (Fernandez-Baizan et al, 2020). Exclusion criteria were: articles on validity, accuracy, or comparisons between scales; case studies; conferences; protocols; reviews; dissertations or theses.

Study Selection

A search strategy involved the electronic databases: APA PsycNet, VHL (Virtual Health Library), Web of Science, PubMed, Scopus, and Cochrane Library. Among the descriptors used to retrieve the studies in the databases were: “Bayley”, “social-emotional”, “premature”, “child”, and “infant”. Variations and synonyms of the words, languages recommended for the review, and Boolean operators were also used.

Data Extraction

Two independent reviewers extracted the following data from the articles: author, year of publication, design, and objective of each study. Subsequently, the following data were also extracted: gestational age, birth weight, age at assessment, social-emotional assessment indices, data regarding biological, clinical (medical/nutritional conducts), and environmental factors (educational and socioeconomic level) associated with premature birth, and correlated with the results of the social-emotional assessment, correlation between the other areas measured by Bayley and the social-emotional development indices.

Quality Assessment of Studies

The checklist was based on the Newcastle-Ottawa Scale (NOS) (Wells et al., 2000) for non-randomized studies and an adaptation of this scale to assess the methodological quality of cross-sectional studies (Herzog et al., 2013) was used. Observational studies were classified according to indices adopted by Xing et al. (2016).

Data Analysis

Qualitative questions and research objectives guided the decision to conduct a systematic review

without meta-analysis. The data were analyzed from a narrative synthesis, considering the review objectives decided a priori. Thus, this review structured the categories of analysis and identified the variables of influence and their correlations with the Bayley social-emotional assessment outcomes (McKenzie & Brennan, 2021; Popay et al., 2006).

Results and Discussion

General Information about the Systematic Review Process

Initially, a total of 2,365 articles between 2009 and 2019 were retrieved from online databases. After exclusion for duplicity, 841 studies remained. After reading the titles and abstracts, 187 were left for a complete reading. After reading the full texts, 12 articles remained. New searches were conducted between 2019 and August 31, 2021, and 7 articles were added, resulting in a total of 19 articles that were read in full. The entire process of identification, selection, and inclusion of the studies is shown in Figure 1.

Evaluation of the Methodological Quality of the Studies

The designs of the articles in this review were longitudinal cohort and cross-sectional. The evaluation of the quality of the articles showed that 17 studies presented high quality, i.e., low risk of bias, while two studies scored for moderate quality. Detailed information about the methodological quality of the studies and scores according to the NOS scale are presented in Table 1.

General Information about the Studies Reviewed

The research conducted by the 19 studies selected for the review were conducted in countries such as Spain, Australia, Brazil, Greece, Taiwan, USA, South Korea, South Africa, Israel, Hungary, and Italy, between the years 2011 and 2021, according to Table 2. The assessment of social-emotional development occurred from Bayley-III and only one study presented the social-emotional development of preterm infants as the main objective of its analyses (Gray et al., 2018).

Bayley's Social-emotional Assessment and Preterm Birth

The analyses present in 14 of 19 reviewed articles, presented in Table 3, highlight the direct association between prematurity and lower scores on the Bayley-SE assessment (Courchia et al., 2020; E. S. Lee et al., 2021; Fernandes et al., 2012; Gray et al., 2018; Guerra et al.,

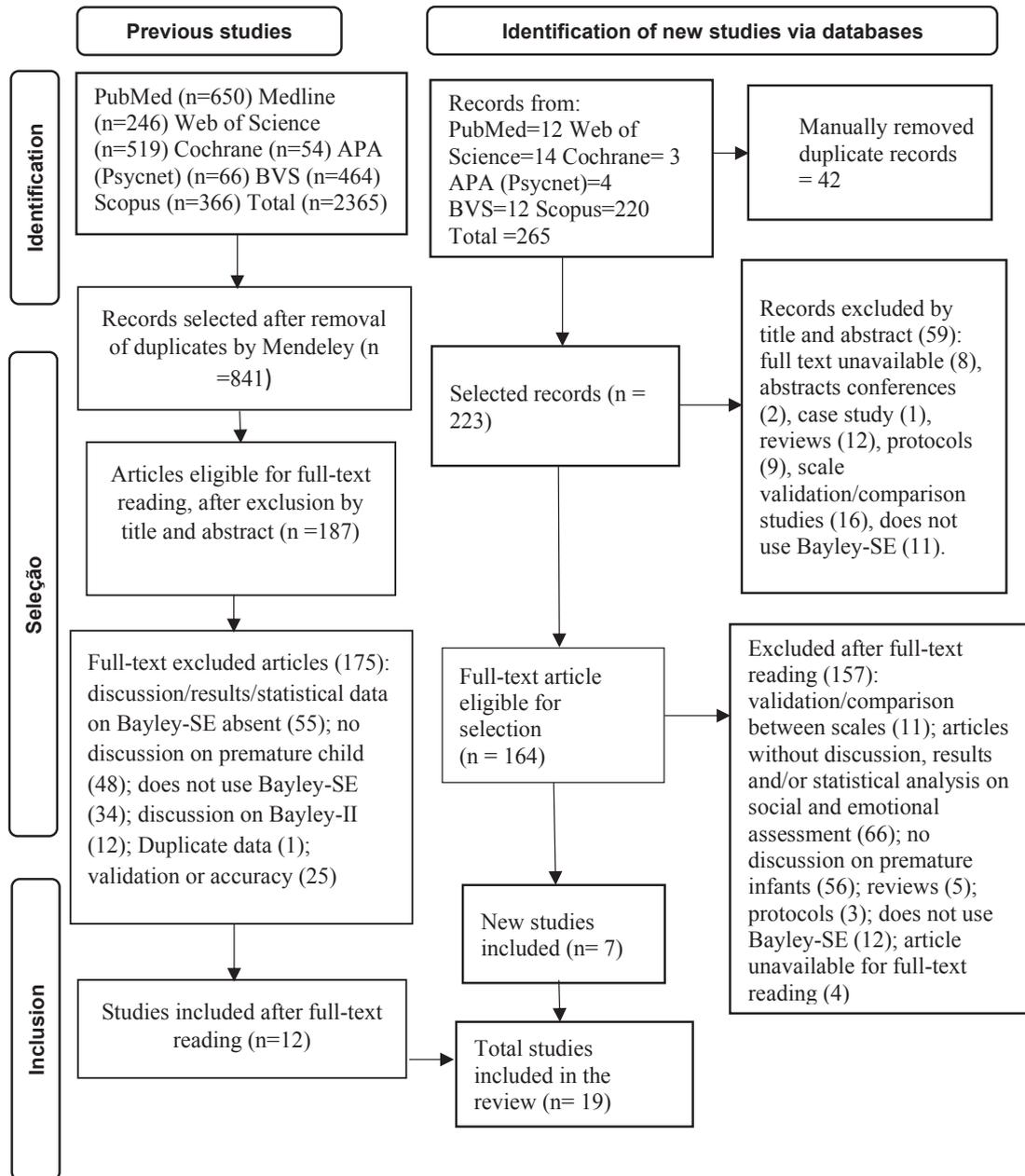


Figure 1. PRISMA diagram describing the selection process of the articles reviewed

2014; H. J. Lee et al., 2021; J. Y. Lee et al., 2021; Lecuona et al., 2016; Muñoz- Moreno et al., 2016; Nagy & Kenyhercz, 2020; Sierra-García et al., 2018; Terrin et al., 2021; Velikos et al., 2015; Yun et al., 2018). In these cases, the authors point out that the lower the gestational age and weight, the greater the social-emotional impairments. Nagy and Kenyhercz (2020), in a study of infants born with extremely low birth weight, confirm the high risk of this population for adverse outcomes in this area

at two years, with possible changes in self-regulation and for using emotions purposefully (social smiling and play). The review results also indicate that preterm infants considered late preemies should receive preventive attention and care, as they may have similar delay scores for social-emotional development as very preterm infants (Guerra et al., 2014; Palumbi et al., 2018).

The most prevalent age range in Bayley-SE assessments was 12 to 24 months (Benavides et al., 2019; E.

Table 1.
Quality Assessment using the Newcastle-Ottawa Scale

Study	Design	Selection and comparability	Exposure and outcome	Study quality
Benavides et al. (2019)	cross-sectional	5/2	3	10
Courchia et al. (2020)	cohort	4/2	2	8
E. S. Lee et al. 2021	cohort	4/2	2	8
Fernandes et al. (2012)	cross-sectional	5/2	3	10
Gabis et al. (2015)	cohort	2/2	3	7
Gardon et al. (2019)	cross-sectional	4/2	3	9
Gray et al. (2018)	cross-sectional	4/2	3	9
Guerra et al. (2014)	cross-sectional	4/2	3	9
H. J. Lee et al. (2021)	cohort	4/2	3	9
Huang et al. (2012)	cross-sectional	4/2	3	9
J. Y. Lee et al. (2021)	cohort	4/2	2	9
Lecuona et al. (2016)	cross-sectional	3/2	2	7
Muñoz-Moreno et al. (2016)	cohort	4/2	2	8
Nagy e Kenyhercz (2020)	cross-sectional	3/2	3	8
Padilla et al. (2011)	cohort	2/2	3	7
Sierra-García et al. (2018)	cross-sectional	4/2	3	9
Terrin et al. (2021)	cohort	4/2	2	8
Velikos et al. (2015)	cohort	3/0	2	5
Yun et al. (2018)	cohort	2/2	2	6

Note. Score for high-quality cross-sectional studies = 7 to 10 points; score for high-quality cohort studies = 7 to 9 points, moderate quality= 5 to 6 points.

S. Lee et al., 2021; Fernandes et al., 2012; Gardon et al., 2019; Gray et al., 2018; Guerra et al., 2014; H. J. Lee et al., 2021; J. Y. Lee et al., 2021; Muñoz-Moreno et al., 2016; Nagy & Kenyhercz, 2020; Padilla et al., 2011; Sierra-García et al., 2018; Terrin et al., 2021; Velikos et al., 2015; Yun et al., 2018). For Villar et al. (2019), assessments at 24 months would be relevant because this is the first age range in which developmental assessment is not confused with transient neurological disturbances that may be present in prematurity. Contrarily, Benavides et al. (2019) signal the importance of assessments up to one year of age. In this case, although brain development in utero is rapid and dynamic, the period between birth and one year of age is also critical in terms of structural and functional changes, which can set up an extremely important time to assess, understand, and potentially intervene in neurodevelopment.

Conducting assessments at early ages such as 12 months is important, but biological, clinical, or

environmental factors appear to continue to influence social-emotional development at later ages (J. Y. Lee et al., 2021; Velikos et al., 2015). This is corroborated by Metwally et al. (2016) in arguing that deficits in social-emotional development in premature infants may persist and cause subtle and more evident losses later in childhood or adolescence. Thus, assessments conducted before the age of two years can be an important ally in detecting social-emotional difficulties and targeting early intervention protocols in prematurely born children, but should be further explored at later ages to consolidate results (Lecuona et al., 2016; Yun et al., 2018).

Thus, the review highlights the possibility that low scores from the Bayley-SE assessment, presented in Table 4, predict the occurrence of emotional, internalizing or externalizing behavioral problems, and attention deficits at later ages (Gray et al., 2018; Huang et al., 2012). In relation to this aspect, Yun et

Table 2.
General Information about the Studies

Authors	Country	Goals
Benavides et al. (2019)	USA	Brain structure
Courchia et al. (2020)	USA	Adaptive behavior
E. S. Lee et al. (2021)	South Korea	Systemic inflammation
Fernandes et al. (2014)	Brazil	Prematurity and development
Gabis et al. (2015)	Israel	Multisensory intervention
Gardon et al. (2019)	Italy	Adaptive behavior
Gray et al. (2018)	Australia	DSE
Guerra et al. (2014)	Brazil	associated factors and development
H. J. Lee et al. (2021)	South Korea	brain structure and development
Huang et al. (2012)	Taiwan	low weight and development
J. Y. Lee et al. (2021)	South Korea	altered lateralization and development
Lecuona et al. (2016)	South Africa	sensory integration
Muñoz-Moreno et al. (2016)	Spain	brain networks and neurodevelopment
Nagy e Kenyhercz (2020)	Hungary	SED and adaptive behavior
Padilla et al. (2011)	Spain	brain changes and development
Sierra-García et al. (2018)	Spain	overview about premature child
Terrin et al. (2021)	Italy	Intensity of parenteral nutrition
Velikos et al. (2015)	Greece	Bayley's risk factors and outcome
Yun et al. (2018)	South Korea	SED and adaptive behavior

Note. SED= social-emotional development.

al. (2018) point out that reduced scores on the Bayley-SE assessment performed in children between 18 and 24 months were correlated to the incidence of internalizing changes such as anxiety, depression, and social isolation, present at school age. The predictive capacity of the Bayley-SE, although important, has not been fully correlated and/or discussed by most studies, leaving in this case only the possibility of this function to be mentioned.

The analyses of the studies indicate that, in addition to prematurity, biological, clinical, nutritional, and environmental factors may also interfere with social-emotional development. Male gender at birth is one such factor related to lower social-emotional assessment scores, especially for aspects of development that involve emotional engagement and regulation (Guerra et al., 2014). Lower socioeconomic and educational scores of caregivers have also been related to worse scores for Bayley assessment (Gray et al., 2018; Guerra et al., 2014). Do et al. (2020) agree that preterm infants in economically limited environments are more likely

to have neurodevelopmental changes, except when the mothers of these infants had higher education. According to this author, the possibility of neurodevelopmental changes in infants belonging to lower socioeconomic levels can be mitigated by the involvement of their caregivers and a higher level of education (Peralta et al., 2017).

Among the clinical complications related to the negative results obtained by the Bayley-SE are the neonatal changes associated with seizures, developmental and brain structure changes, necrotizing enterocolitis related to the presence of systemic inflammation (intestinal mucosa), and peri-intraventricular hemorrhages (intracranial hemorrhages) (Courchia et al., 2020; E.S. Lee et al., 2021; Gray et al., 2018; H. J. Lee et al., 2021; J. Y. Lee et al., 2021; Velikos et al., 2015). Guerra et al. (2014) agree and add that infants who present with hemorrhages, in addition to problems in their development, had lower gestational age and birth weight, higher incidence of clinical sepsis, and greater need for hospitalization.

Table 3.
Bayley's Social-emotional Assessment and Preterm Birth

Author (s) year	Gestational age (m)	Birth weight (g)	Results SED	Age (CA) at assessment (m)
Benavides et al. (2019)	30.56	1519.10	102.2	12
Courchia et al. (2020)	24.2	647.2	78.9	21-31
E. S. Lee et al. (2021)	26	770	90.0	18
Fernandes et al. (2014)	30.4	1287	95.0 (27.6%) < 85	20.6
Gabis et al. (2015)	30.55	1031	108.93	24-36
Gardon et al. (2019)	27.2	845.6	92.6	24
Gray et al. (2018)	27.6	1000-1074	103.18(7.3%)< 85	24
Guerra et al. (2014)	33.2	1743	96.3 (13%) <85	18-24
H. J. Lee et al. (2021)	28.65	1157.20	98.18	18–22
Huang et al. (2012)	29.41	1000-1499	90.48	26.64
J. Y. Lee et al. (2021)	30.08	1423.61	97.28	18
Lecuona et al. (2016)	30.5	1150.6	index 7.2	3-11
Muñoz-moreno et al. (2016)	30.9			20
Nagy e Kenyhercz (2020)	26.8	761.1	88.9	24
Padilla et al. (2011)	31	1058	114.47	18
Sierra-García et al. (2018)	29.34	1140	97.25	24
Terrin et al. (2021)	29	1214	95	24
Velikos et al. (2015)	28.6	1178	n 19 < 85 n 2 < 70	12
Yun et al. (2018)	27.5	927	95.3	18-24

Note. n=number; SED= social-emotional development; CA= corrected age for prematurity, m=months, g=grams

Parenteral nutrition therapy was another condition related to the outcomes of the social-emotional development assessment. Preterm or medically fragile infants are often submitted to parenteral nutrition until gastric feeding can be tolerated (Pineda et al., 2020). On this issue, Velikos et al. (2015) signal the possible association between delays in social-emotional development and the duration of interventions with this type of nutrition. Terrin et al. (2021) warn about the severity that a strategy of applying more intense parenteral nutrition may represent for the social-emotional development of these infants. For these situations, the authors emphasize the importance of well-designed nutritional protocols to prevent interurrences in long-term neurodevelopment.

Association between Bayley's Domain Results and the Indices of Social-emotional Assessment

Another point to be highlighted in this review concerns studies that have demonstrated the existence

of positive correlations between scores coming from the cognitive, motor, language, adaptive behavior, and social-emotional domains. In these cases, stronger predictors of a low Bayley-SE score are associated with reduced scores for other areas of the Bayley (Gardon et al., 2019; Gray et al., 2018; Nagy & Kenyhercz, 2020; Yun et al., 2018). On this issue, Peralta et al. (2017) point out that indices of language and cognition may behave as a significant mediating variable in the occurrence of social-emotional deficits, since self-regulation, one of the milestones of social-emotional development, may be associated with better child developmental outcomes in other areas (Duncan et al., 2019).

The results of the evaluations of the social-emotional and adaptive domains may indicate that children with low birth weight can achieve other developmental milestones, such as cognitive and motor skills (Courchia et al., 2020). Gardon et al. (2019) corroborate by emphasizing that mild interurrences in the cognitive and language domains in their sample would be related

Table 4.
Biological, clinical, nutritional and environmental factors and Bayley-SE

Authors	Biological	Environmental	Clinical Behavioral Nutritional	Bayley's Domains
Courchia et al. (2020)			seizure p = 0.05	
E. S. Lee et al. (2021)			si p = 0.038	
Gardon et al. (2019)				c p < 0.01 l p < 0.01 mt p < 0.01
Gray et al. (2018)			pih p = 0.048 dass p = 0.008 exb p = < 0.001	c p = 0.004 l p = 0.002 mt p = 0.001
Guerra et al. (2014)	m p = 0.047	per capita income 0.033 p = 0.001	pih p = 0.022	
H. J. Lee et al. (2021)	m p = 0.467		lc r = 0.31 p = 0.003	
Huang et al. (2012)			inattention p < 0.01	
J. Y. Lee et al. (2021)			frontolimbic asymmetry p = 0.008 hippocampus p = 0.032	
Nagy and Kenyhercz (2020)	elbw p < 0.001			c, l, mt r = 0.46-0.49
Terrin et al. (2021)			pn p < 0.005	
Velikos et al. (2015)			ne p = 0.046 pn p = 0.004	
Yun et al. (2018)			Internalization r = -0.368 p < 0.05	l r = 0.474, p < 0.01 mt r = 0.360 p < 0.05

Note. p = significance level, r = correlation coefficient, si = systemic inflammation, aa = age assessed, c = cognition, l = language, mt = motor, pih = peri-intraventricular hemorrhage, dass = depression, anxiety and stress scale, m = male, lc = left cingulum, exb = externalizing behavior; elbw = extreme low birth weight, pn = parenteral nutrition, ne = necrotizing enterocolitis.

to the immaturity of behavioral and emotional regulation, rather than by biological or organic delays. One possibility presented in the study is that cognitive functions, such as educational performance in preterm infants, may be affected by prior behavioral and social-emotional impairments (see Table 4).

The reviewed studies signal the possibility of under- or overestimation of children's social-emotional skills performed by the respondent of the scale, which in this review was the mother (Gray et al., 2018; Guerra et al., 2014; H. J. Lee et al., 2021). These may have occurred due to the presence of interferences associated with the mental health of these caregivers, which

could alter the establishment of interactive practices with their children (Takács et al., 2020; Zhang et al., 2018). Moe et al. (2016) confirm this possibility by suggesting that the incidence of social-emotional problems in preterm infants at 12 months may have originated from altered maternal perceptions due to the presence of depressed mood. It is noteworthy that trends regarding over- or under-reporting by the caregiver may lead to bias in the research, in addition to hindering the quantitative assessment considering this scale (Fernandez & Zaccario, 2007; Gabis et al., 2015).

Limitations present during the selection of studies for this article need to be highlighted. First, we observed

that many articles did not describe the social-emotional domain as belonging to the Bayley-III scale and, such as in the Bayley screening test, they only considered the cognitive, language, and motor domains (Morsan et al., 2018; Yoshida et al., 2020). While those which mentioned the five areas belonging to the Bayley scale, actually considered the cognitive, language (receptive and expressive), and motor (fine and gross) domains (Ranjitkar et al., 2018). It is emphasized that the analyses of the selected studies, although discussed, were based on individual readings by the authors of this review. There was no formal coding of effect sizes. Without such coding or a meta-analysis, conclusions about these results should be interpreted with caution. In addition, all analyses were restricted to the Bayley-SE, therefore we should be cautious about generalizations.

It is important to point out that this review presents a good overview with all the possibilities of correlations and contributions that Bayley-SE can offer in the composition of a protocol aimed at the social-emotional assessment of preterm children. The results of the evaluations in the studies indicated that lower gestational age and weight, as well as the association between lower educational and socioeconomic levels, male gender, presence of seizures, hemorrhages, and other changes in brain development, and the duration and intensity of parenteral nutrition were associated with lower Bayley-SE scores for social-emotional development in preterm children.

However, other findings are also worth noting. Within the 1,064 articles eligible for review, after the exclusion of duplicates, only one study focused on social and emotional development using the Bayley-SE. Although 19 studies considered the use of the Bayley-SE in the assessment of premature infants, no discussions were found on the axes that guide the milestones and stages of social-emotional development, present in this scale (Aylward, 2020; Breinbauer et al., 2010). It should be added that during the study selection process, the excluded articles did not use the Bayley scale in the assessment of social-emotional development, although this instrument was used for the other domains. Thus, the Bayley scale is still not configured as the priority choice to assess social-emotional development.

Final Considerations

This article aimed to discuss the contribution of Bayley's social-emotional scale in assessing the social-emotional development of preterm infants. According

to the results, the Bayley-SE can be used effectively in the assessment and early detection of interferences in the course of social-emotional development of preterm infants. This domain helps to increase the role of the primary caregiver in the assessment process and can foster communication between parents and the examiner about the child's abilities. The synthesis of the studies also highlights the importance of performing correlations between the results from the scale assessment and certain biological, clinical, nutritional, and environmental factors that may negatively influence the social-emotional development of these infants. Thus, we consider the possibility that prematurity is not the only factor responsible for the onset of emotional disorders.

Researchers and health professionals should be aware of the growing body of evidence on the need for attention to the social-emotional development of premature babies. Encouraging early identification of social-emotional problems contributes to the implementation of interventions during the second year of a child's life, preventing difficulties signaled by low scores from worsening and leading to the emergence of problems in this area at later ages, as pointed out by some reviewed studies.

The use of accurate instruments such as Bayley-SE and the other domains belonging to this scale, combined with other assessment methods, may allow the composition of a detailed and comprehensive protocol for early childhood health care. Future research should be conducted to further analyze the importance of the axes that guide the social-emotional development milestones, especially those belonging to the Bayley scale, as well as to expand the discussions about the correlations that may exist between intrinsic and extrinsic factors and the positive or negative influence on the results of the social-emotional development assessment. Studies on the predictive ability between low social-emotional assessment scores and the incidence of subsequent neurobehavioral problems also deserve to be expanded.

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About the authors:

Greicyani Brarymi Dias

Psychologist, Ph.D. student at the Graduate Program in Behavior Theory and Research at UFPA. Master's degree in psychology from the Graduate Program in Psychology at the Universidade Federal do Pará (UFPA).

ORCID: <https://orcid.org/0000-0003-2497-6588>

E-mail: greicyanipb@gmail.com

Edson Júnior Silva da Cruz

Psychologist. Ph.D. and Master in psychology from the Graduate Program in Psychology of the Universidade Federal do Pará (UFPA). Post-doctoral fellow in the Graduate Program in Behavioral Theory and Research at UFPA.

ORCID: <https://orcid.org/0000-0003-1884-3172>

E-mail: edsoncruzufpa@gmail.com

Janari da Silva Pedroso

Psychologist. Associate Professor IV at the Universidade Federal do Pará. CNPQ Productivity Fellow - level 2.

ORCID: <https://orcid.org/0000-0001-7602-834X>

E-mail: pedrosoufpa@gmail.com

Contato com os autores:

Federal University of Pará (UFPA)
Center for Behavioral Theory and Research.
Campus Universitário do Guamá
Av. Augusto Corrêa, 01
Belém-PA, Brazil
CEP: 66075-900