LITERATURE REVIEW INSTRUMENT DEVELOPMENT AND RISK ASSESSMENT FOR EARLY DETECTION OF CHILD GROWTH AND DEVELOPMENT

Vistra Veftisia[1,3], Widya Hary Cahyati[2*]

[1] Postgraduate Program, Semarang State University, Indonesia

[2] Department of Public Health Science, Semarang State University, Indonesia

[3] Faculty of Health, Ngudi Waluyo University, Indonesia

*Corresponding Author: widyahary27@mail.unnes.ac.id

Abstract. Risk factors for child growth and development and health problems should be used to detect health problems early so that prevention or treatment efforts to prevent child growth and development problems can be carried out early. Researchers conducted a literature review on how to develop instruments and risk assessments for the early detection of child growth and development. This study was written using the narrative literature review method. The unit of analysis of this study is the development of instruments and risk assessments for the early detection of child growth and development problems published in international journals in English. Researchers conducted a data-based search from Pubmed, Science Direct published from 2013-2023, with keywords using English, namely development, risk assessment, test instruments, early detection, growth and developmental problems, children, from 1,545 articles identified and from 1,496 articles excluded based on titles and abstracts and 35 articles did not meet the inclusion criteria so that 14 articles were reviewed. 20 child growth and development detection instruments both developed through the process of preparing early detection instruments, as well as assessing or testing early detection/screening instruments, each instrument has shown its usefulness in detecting child growth and development problems and optimizing child growth and development outcomes. Early detection instruments for child growth and development can optimize child growth and development outcomes, more effort is needed to implement early detection programs for optimal outcomes in the future and implementation needs to be more pursued in children with risk groups.

Keywords: [Development, Risk Assessment, Test Instruments, Early Detection, Growth, and Developmental Problems, Children]

INTRODUCTION

Malnutrition in children under five years of age in Indonesia ranks 5th highest for stunting and 4th highest for wasting in the world, based on the following (Kementerian Kesehatan RI, 2018) stunting at 30.8%, wasting at 10.2% and overweight at 8%. Research by the United Nations Children's in Indonesia in 2018 found that 29.9% of children under 24 months of age experienced some form of stunting, a decrease from the previous year but still well above the regional average (22%) and the prevalence of stunting has decreased from 37% in 2013 to 30.8% (United Nations Children's, 2020).

Data on the percentage of nutritional status in toddlers 0-59 months in Central Java based on the weight-for-age index (weight/ age) in 2020 was 9.5% (Dinas Kesehatan Profinsi Jawa Tengah, 2021), in 2021 to 6.2%, weight-for-height index (weight/ height) 2021 by 3.7%, the percentage of short and very short or stunting by 8.9% (Dinas Kesehatan Profinsi Jawa Tengah, 2022).

The proportion of early childhood development index (age 36-59 months) in Indonesia is 88.3 which includes numeracy literacy 64.6, physical ability 97.8, social-emotional ability 69.9, and learning ability 95.2. Central Java province achieved a child development index of 90.6 which includes numeracy literacy 67.2, physical ability 98.4, social-emotional ability 72.2, and learning ability 97.9 (Kementerian Kesehatan RI, 2018).

The impacts of the triple burden of malnutrition include undernutrition in the form of stunting or wasting: poor growth, infection and mortality, poor cognition, school readiness, and school performance, and poor earning potential in later life. Hidden hunger in the form of micronutrient deficiencies is poor growth and development, poor immunity and tissue development, poor health, and risk of death. In overweight including obesity, the short-term impacts are cardiovascular problems, infections, and low self-esteem and the long-term impacts are obesity, diabetes, and other metabolic disorders. (United Nations Children's Fund, 2019). Likewise, developmental problems because if the child has good motor development, it will make the child more adaptable and adjust to the school

environment. This adaptability encourages children to be more able to make friends with others when doing activities. Normal motor development allows children to play or mingle with their peers, while abnormal ones will prevent children from being able to mingle with their peers and they will even be isolated or become marginalized children (Marmi & Rahardjo, 2012).

The results of the study for factors that affect child growth (underweight, underweight, wasting) include children born with small body size, uneducated mothers, belonging to poor households, living in rural areas, not breastfeeding, older maternal age, and higher birth order, consuming formula milk (Siddiqa et al., 2022). Low birth weight (<2500 g) and maternal weight gain <10.00 kg were significantly associated with an increased risk of stunting, and large family size increased the risk of being underweight (Li et al., 2022). Factors affecting child development i.e. Girls are less likely to have suspected developmental delay than boys, Maternal education of more than 12 years is a protective factor for suspected developmental delay among the observations (Wu et al., 2020), prenatal factors: higher maternal education, mothers with height <145 cm, mothers with low BMI (<18.5 kg/m2). for child factors: children born with low birth weight (<2500g) have significantly worse cognitive and motor scores, and Children with birth weight <2000 grams, are premature babies (Sania et al., 2019).

The quality of a child's future is determined by their optimal development and growth. So the detection, stimulation, and intervention of various growth and development storage are carried out early on (Marmi & Rahardjo, 2012). So it is very necessary to identify early clinical, maternal, and family risk factors that affect growth and development to improve the quality of children's future through early detection of children's growth and development problems, it must be sought further and further analyze the development of instruments and risk assessments for early detection of children's growth and development both in the world and in Indonesia, therefore researchers feel the need to conduct literature review-based research related to the development of instruments and risk assessments for early detection of children's growth and development.

METHODS

Search strategy and selection criteria

The literature review was conducted and reported using the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) guidelines (Moher et al., 2009). Dua database elektronik (Pubmed dan Sciencedirect) dicari artikel yang diterbitkan dari 2013 – 2023. Strategi pencarian menggunakan istilah pencaraian dan kata kunci : *Development, Risk Assessment, Test Instruments, Early Detection, Growth and Developmental Problems, Children*, reference lists of relevant studies and reviews are also used for additional research that may have been missed.

Full-text, review articles are included if they meet the following criteria: 1) the article aims to develop an early detection instrument, 2) the article aims to assess the validity of the early detection/screening instrument, and 3) the article targets the problem of child growth and development.

Title abstracts of all articles were identified and screened and if not enough to determine eligibility as per the criteria then full-text articles were reviewed for eligibility criteria. And for the articles that met the eligibility Criteria, the full-text articles were reviewed with the criteria: 1) Author, Year, Country 2) Title, 3) Objective, 4) Instrument, 5) Target, Setting 6) Analysis, 7) Method, 8) Result.

Result

The main results are 18 child growth and development detection instruments either developed through the process of developing early detection instruments, or assessing or testing early detection/screening instruments, each instrument has shown usefulness in detecting child growth and development problems and optimizing child growth and development outcomes. For instruments that measure autism, the article does not qualify as targeting child growth and development problems.

RESULTS AND DISCUSSION

Study Selection and Inclusion

A total of 1.544 articles were identified from electronic databases, 1.496 articles were excluded based on title and abstract, 49 articles with the remaining full text were reviewed, and 35 articles were excluded because they did not meet the inclusion criteria. And finally, 14 articles were reviewed. (Figure 1)

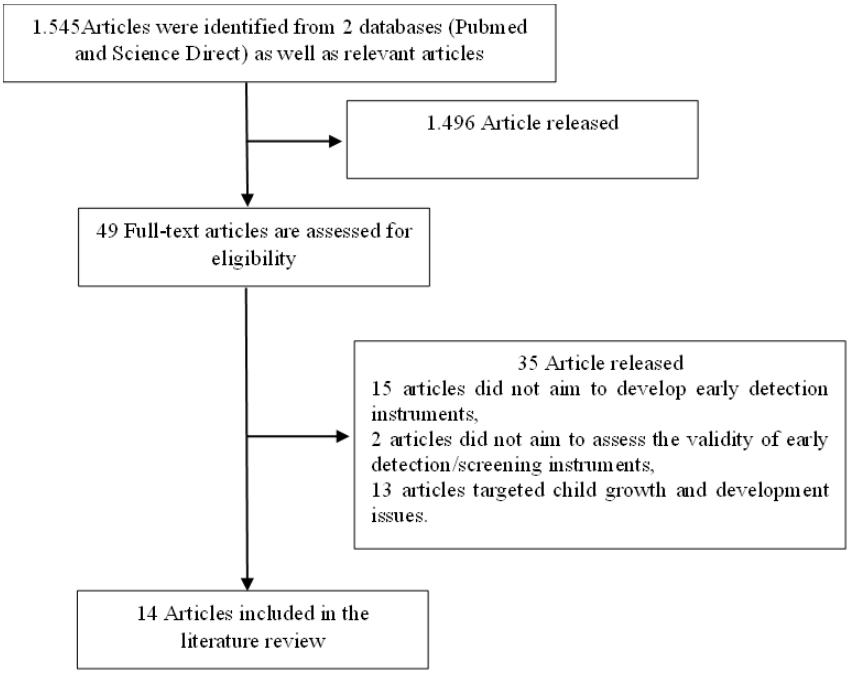

Figure 1. Reporting item selection Literature article review

Sample, and Study Characteristics (Table 1)

Presents characteristics of 14 articles Development and assessment/validity testing of instruments for early detection of child growth and development conducted in 10 countries. A total of 5 studies were conducted in the Netherlands, 2 studies in Brazil), and the others were conducted in South Africa, Taiwan, Mexico, Belgium, Iran, the USA, Ghana, and Malawi. The studies were published between 2013-2023. the majority of targets being children and parents and for research settings being in communities, hospitals and infant clinics, and health centers, and there was 1 study that was a Literature Review.

Of the 14 articles, 11 articles on the assessment/testing of instruments for early detection of child growth and development aimed to validate the usefulness/effectiveness of the instrument in detecting growth and development delays earlier, to assess whether the instrument can find more children with a high risk of experiencing growth and development problems, to evaluate the feasibility of the instrument is accepted practically by parents and health workers. The other 3 articles on the development of early detection instruments of child growth and development aim to create and validate instruments for monitoring child development indicators, identify components of screening tools so that they can detect early developmental delays, and develop risk assessments to identify at an early stage children who are at risk of experiencing growth and development problems.

Instruments Produced and Assessed

From 14 articles discussing 20 instruments for early detection of child growth and development, namely 1) R4U (the postnatal Rotterdam Reproduction Risk Reduction checklist) which is useful for identifying at an early stage children at risk of growth and development problems, 2) ASQ (Ages and Stages), 3) BTAIS-2 (Birth to Three Assessment Intervention System), 4) DAYC (Developmental Assessment of Young Childre), 5) E-LAP (Early Learning Accomplishment Profile), 6) IDI (Infant Development Inventory), 7) PEDS (Parents' Evaluation of Developmental Status) 8) PEDS: DM (Parents' Evaluation of Developmental Status: Developmental Milestones) which is useful for detecting early developmental delays in premature infants, 9) BSID-II (Bayley Scales of Infant Development—

2nd Edition), 10) DDST (Denver Developmental Screening Test) which is useful for determining the prevalence of MNDs (minor neurodevelopmental dysfunctions), cognitive and motor function at 6 months of age in neonates born prematurely, 11) SPARK (Structured Problem Analysis of Raising Kids) to detect more children at high risk of parenting and child development problems, 12) Katona's neurohabilitation method to diagnose and treat early for infants with prenatal and perinatal risk factors for brain damage that result in language problems, 13) SPARK36 (Structured Problem Analysis of Raising Kids (aged 36 months) to detect more children at high risk of parenting and child development problems for 36 months of age, 14) vPDMS-2 (Peabody Developmental Motor Scales 2nd edition) to assess motor development for LBW preterm infants, 15) ASQ-60 (The Ages and Stages Questionnaire 60-month version) detecting developmental delays earlier in children aged 60 months, 16) PQ-BC (Prodromal Questionnaire-Brief Child Version) for the measurement of self-reported psychotic experiences in childhood that impact motor and speech developmental delays, 17) DMC-II (Developmental Milestones Checklist-II), 18) MDAT (Malawi Developmental Assessment Tool) 19) NDW (Number Of Different Wordsto assess language development, 20) QAD-PIPAS (Questionnaire - Primeira Infância para Adultos Saudáveis) to assess child development.

Methods used

The methods used in the 14 articles reviewed in the article on include 11 articles on assessment/testing instruments for early detection of child growth and development with research designs: historically controlled study, prospective cohort 4 articles, non-randomized controlled trial, non-blinded trial, cross-sectional 2 articles, pilot testing, and methodological studies. For the other 3 articles on the development of early detection instruments of child growth and development using the intervention mapping method, integrated literature review (ILR), and EBP, methodological study, based on the World Bank proposition

Results of the reviewed articles

The reviewed articles, from 11 articles on the assessment / testing of instruments for early detection of child growth and development obtained results, that the instrument is able to reduce child growth and development problems, promote healthier lifestyles, need to correct the age of the child when screening for developmental problems in children in children with premature history, in children born prematurely, get the gold standard of screening for early childhood developmental delays, improve early detection of parenting and child development problems, identify more children at high risk of parenting and child development problems, obtained an instrument that is practical for parents and caregivers to use, obtained an instrument that is reliable, valid, acceptable internal consistency, more specific and more sensitive to find more children with growth and development problems, For the other 3 articles on the development of early detection instruments for child growth and development, the results of early detection instruments for postnatal neonates to detect the risk of child growth and development problems, in individual infants do not generalize any follow-up efforts, fill the gap, because it allows comprehensive evaluation of the development of children under 5 years.

Table 1. Characteristics of Included Research Articles

No	Author, year, country	Title	Objective	Instrument / how to make an instrument	Target, Setting	Analysis	Method	Result
1	(Van Minde et al., 2019), Netherlands	Reducing growth and developmental problems in children: Development of an innovative postnatal risk assessment	Develop an innovative postnatal risk assessment for use by Preventive Child Health Care (PCHC) to identify at an early stage children at risk of growth (growth spurts, overweight, and obesity) and developmental problems. (such as motor, cognitive, psychosocial, and language/speech problems)	Instrument: R4U (the postnatal Rotterdam Reproduction Risk Reduction checklist)	Target; health professionals Setting: Community	Qualitative research	Intervention Mapping. Step 1: Needs assessment: Review literature and focus group discussions. Step 2: Identify program objectives on how to develop and implement risk assessment in PCHC daily practice. Step 3: Application of the ASE model (attitudes, social influences/norms, and self-efficacy expectations) to initiate behavior change in the target group. Step 4: Producing intervention components and materials. Step 5: Planning for program adoption and implementation, Step 6: Planning for evaluation.	1. Needs Assessment: The primary outcomes were overweight (>1 SDS for length), obesity (>2 SDS for length) and catch-up growth (>0.67 SDS), and developmental problems (psychomotor, cognitive, psychosocial, and language/speech) in the first six months of life. Secondary outcomes were postnatal use of R4U and corresponding care pathways by PCHC professionals as well as their knowledge, attitudes, and intentions after implementation. 2. Identify program objectives; how to develop and implement risk assessment in daily PCHC practice. First, risk factors should be systematically identified by health professionals, to be able to screen objectively and without missing any risks. Secondly, based on the risk assessment, care pathways should be identified and developed, helping professionals to direct parents to the right care in a given neighborhood or municipality. 3. Theoretical models, theory-based methods, and practical strategies: selecting appropriate theoretical methods and conceptualizing

								practical strategies and tools for postnatal R4U implementation and care pathways 4. Producing intervention components and materials: risk factors identified in the literature or focus group discussions are categorized into different domains: (1) social, (2) ethnic and language barriers, (3) lifestyle, (4) healthcare behavior, (5) general medical and (6) obstetric. 5. Adoption and implementation of planning programs: The postnatal R4U has been incorporated in the PCHC central digital file, automatically transferring relevant risk factor data already obtained from the digital file to the risk assessment. 6. Evaluation planning: The outcomes and efficacy of postnatal R4U will be analyzed using an intervention cohort (n=320), where postnatal R4U has been implemented, and a historical cohort (n=320), where the instrument has not been used.
2	(Van Minde et al., 2020), Netherlands	Innovative postnatal risk assessment in preventive child health Care: A study protocol	Evaluate the predictive value of innovative postnatal risk assessments, and assess the risk of growth and developmental	Intrumen : R4U (the postnatal Rotterdam Reproduction Risk Reduction checklist)	Variables Independent: interventions include risk factor assessments in six domains:	The effectiveness of postnatal R4U is assessed by univariable and multivariable linear and logistic regression	Design: a historically controlled study, Sample: intervention: Children and their parents, who visited the healthy baby clinic during routine visits, (N=2,650).	1. innovative postnatal risks with a selection that combines medical and non-medical risk factors affecting child growth and development

			problems in young children; and the effectiveness with a combination of tailored care pathways		social, ethnic, health care, lifestyle, general medical, and obstetric Dependent: child growth and development Target audience: children and parents Setting: healthy baby clinics and health centers in three Dutch municipalities Amsterdam, Rotterdam, and Dordrecht	analysis with random effects and for prediction modeling using logistic regression analysis and ROC analysis. The prediction model will be tested for internal validity by bootstrapping.	historical controls (N=2,650) in the same neighborhood'. Intervention implemented for 2 months	2. Interventions can lead to healthier lifestyles
3	(Wessels et al., 2016), South Africa	Components of a Tool for Early Detection of Developmental Delays in Preterm Infants: An Integrative Literature Review	To identify the components of a screening tool, to detect early developmental delays in preterm infants, used by professionals with limited skills, knowledge, and experience regarding the assessment of preterm infants in families with limited resources.	ASQ (Ages and Stages), BTAIS-2 (Birth to Three Assessment Intervention System), Brigance – II, DAYC (Developmental Assessment of Young Childre), E-LAP (Early Learning Accomplishment Profile), IDI (Infant Development Inventory), PEDS (Parents' Evaluation of Developmental Status) dan PEDS: DM (Parents' Evaluation of Developmental Status: Developmental Milestones)	Previous research articles	1. Critical appraisal by principal investigators: The Johns Hopkins Research and Non-Research Evidence Appraisal Instruments: allows reviewers to compare different types of methodologies used by	Methods: Integrated literature review (ILR) and EBP to identify items to be included in a preterm infant screening tool appropriate for a limited resource setting to define concepts using keywords, such as developmental delay, screening tool, and preterm infant. Process; Using Evidence for Policy and Practice Information (EPPI) software, 308 titles were found, 7 articles read, n = 237 articles did not meet	1. Components of a screening tool for preterm infants during the first year of life are identified. Evidence suggests that it is important to focus on the individual infant, and not generalize to every follow-up appointment 2. corrected infant age should be used rather than chronological age. A shorter gestational age implies a lower birth weight and an increased likelihood of developmental delay. 3. Late preterm infants should be considered as preterm infants and not term infants

						different researchers. 2. Data extraction; only the components considered most important for identifying developmental delay were extracted from 20 good studies 3. Synthesis: combination and reconstruction of the collected data and Independent reviewers verified the identified categories and components to increase validity.	criteria, n = 60 studies for critical appraisal.		to prevent missing developmental delays 4. 20 good quality studies were identified, and components were identified and grouped into three categories: infant data, medical data, and parent data
4	(Hsu et al., 2013), Taiwan	Early detection of minor neurodevelopmental dysfunctions at age 6 months in prematurely born neonates	To determine the prevalence of MNDs and cognitive and motor function at 6 months of age corrected in a cohort of premature neonates, to investigate which sociodemographic or neonatal factors are associated with MNDs, and to find out whether MNDs in these high-risk neonates can be appropriately	BSID-II (Bayley Scales of Infant Development—2nd Edition) dan DDST (Denver Developmental Screening Test)	Target: children Setting: Community	Chi-square and Fisher exact test for categorical data, Student t-test was used for continuous variables with normal distribution, Wilcoxon/Mann-Whitney U test or Kruskal-Wallis test was used for continuous variables without normal distribution,	Design: Prospective cohort for 1 year Population: 392 preterm infants (gestational age during 2009-2010) Sample: 204 infants with exclusion: neonates with cerebral palsy, severe mental or sensory impairment due to hypoxic-ischemic encephalopathy, children with chromosomal anomalies with malformations and severe congenital participation rejects, and at the end 151	1. Of 151 neonates born before 37 weeks, 20 (13.2%) had MND at 6 months of corrected age. These proportions were 21.6%, 13.2%, and 8.2% for neonates born before 28 weeks, 29 weeks to 32 weeks, and 33 weeks to 36 weeks 2. Half of the neonates with MND had a birth weight of less than 1000 g. 3. BSID-II and DDST were highly correlated in assessing MND of preterm neonates at 6 months

			detected in early infancy.			Multivariate logistic regression was used to determine independent risk factors of MND in preterm neonates.	preterm neonates completed baseline, 3 months, and 6 months age-corrected assessments and analyzed.	corrected age. MND was independently associated with postnatal corticosteroid use (odds ratio [OR], 11.2; 95% confidence interval [CI], 1.9-66.0, P=0.008) and cholestasis (OR, 6.2; 95% CI, 1.16-33.1, P=0.033). 4. BSID-II is the gold standard in screening early childhood developmental delay and DDST is an additional tool to confirm MND
5	(Staal et al., 2016), Netherlands	Early detection of parenting and developmental problems in young children: Non-randomized comparison of visits to the well-baby clinic with or without a validated interview	Determine if early detection of parenting problems and developmental mental problems in young children improves with the help of validated structured interviews	Structured Problem Analysis of Raising Kids (SPARK)	Variables: independent : (family type, parents' age, parent's education level, and parents' employment status) Target: children and parents Setting: Preventive child health care (PCHC) services in the Netherlands.	Analysis: Scores on parent-reported questionnaires were compared using linear regression, using propensity score as a covariate. as a covariate,	Design: Non-randomized controlled trial December 2006 to January 2008 Intervention: Healthy infant clinic visits with and without (usual care) use of a validated structured interview for early detection of parenting and developmental problems in young children, Population: 4438 eligible 18-month-old children and their parents (Intervention: 2238, control: 2200), sample: (Intervention: 1937, control: 1524)	1. Nurses found fewer children with high (1.2 versus 2.6%) or increased (14.5 versus 20.7%) risk than during visits where Structured Problem Analysis in Raising Children was used (p = 0.002) 2. Structured Problem Analysis in Raising Children, a validated structured interview, improves early detection of parenting and child development problems in young children, compared to routine un instrumented visits.
6	(Staal et al., 2015), Netherlands	Early detection of parenting and developmental problems in toddlers: A randomized trial of home visits versus well-baby clinic visits in the Netherlands	Assess whether home visits improve early detection compared to well-baby clinic visits.	Structured Problem Analysis of Raising Kids (SPARK)	Target: Children Setting: Community and clinic	Population characteristics were analyzed using descriptive statistics, differences in characteristics between risk groups and	Design: non-blinded trial from December 2006 to January 2008. Population: All eligible children living in the Dutch province of Zeeland 4481 children (Home visits: 2243, Healthy baby clinic visits:	1. The response rate was 94.0% for the home visit group and 93.2% for the healthy baby clinic group. 2. Using SPARK at home identified significantly more high-risk children compared to clinic visits (3.7 vs 2.6%) and fewer children with

						differences in attendance and place of the visit were assessed using X2, Anova, or Mann-Whitney U-test, differences in the number of children with high, increased, and low risk between the two sites were calculated using ordinal regression analysis. the two sites were calculated using ordinal regression analysis with a proportional odds model.	2238), sample: (Home visits: 1958, well baby clinic visits: 1937).	increased risk (19.1 vs 20.7%; overall p = 0.028). 3. Home visits more often involved both parents and other children. At home, parents reported more concerns. Both parents and CHC nurses more often expressed the need for support and reported a much better experience at home 4. Aided by validated structured interviews, CHC professionals detected more children at high risk of parenting and child development problems during home visits than during clinic visits.
7	(Harmony, 2021), Meksiko	Early diagnosis and treatment of infants with prenatal and perinatal risk factors for brain damage at the neurodevelopmental research unit in Mexico	Development of diagnostic procedures and early treatment for infants with prenatal and perinatal risk factors for brain damage	Katona's neurorehabilitation method	Target: Children Setting: Hospital	Analysis: MRI results	Selective visual and auditory attention is explored from 3 months of age, deficits in language acquisition are evaluated from 4 months of age, implementing treatment through instructions to parents on how they should teach the child to speak (prospective cohort). This method has also been developed in the Unit and is in the process of validation.	Infants at risk of brain damage may develop language deficits, it is important to develop early care procedures. To provide early care to infants at risk of language deficits.
8	(Keymeulen et al., 2022), Belgia	Novel instrument to guide nurse-led consultations with parents of three-year-olds in school health	to evaluate the feasibility of a new broad-scope structured instrument in	Structured Problem Analysis of Raising Kids (aged 36 months)" (SPARK36)	Target: Nurse Setting: school health service	Analysis: Quantitative data were analyzed using descriptive statistics.	Design: cross-sectional. period October 2018 to December 2018	1. Parents were satisfied (97.0%) with what was discussed during the consultation and with the

		services in Flanders: A feasibility study of SPARK36	everyday SHS (School Health Services) practice			differences between parents and professionals using the Wilcoxon signed-ranks test, potential differences using multiple linear regression models, and Paired samples t-test was used to explore the evolution of nurses' self-assessment competencies over time, Qualitative data were analyzed based on pragmatic content analysis.	Population: 659 YHC nurses in SHS across Flanders were recruited. Sample: 10 nurses	structure of the consultation (98.8%). 2. After the training, all 20 nurses felt empowered in conducting consultations and making risk assessments. Interviews can be conducted in 20-30 minutes. During 561 interviews, nurses provided parenting support in 88.2% of cases 3. SPARK36 is acceptable, practically feasible for parents and nurses, and meets the needs of both parties
9	(Tavasoli et al., 2014), Iran	Reliability and Validity of the Peabody Developmental Motor Scales-Second Edition for Assessing Motor Development of Low Birth Weight Preterm Infants	To validate and use the Peabody Developmental Motor Scales 2nd edition (vPDMS-2) in Iran	Peabody Developmental Motor Scales 2nd edition in the study of motor development for LBW preterm infants admitted to the neonatal intensive care unit (NICU)	Target: Babies Setting: Hospital	Analysis: testing reliability, and internal consistency was tested using Cronbach's alpha coefficient, and an alpha of 0.70 was considered satisfactory, test-retest analysis was performed using the Intraclass Correlation Coefficient (ICC), and the Validity of the instrument was performed using known	Design: Cross-sectional June to November 2008 in Tehran, Iran. Population: preterm LBW and LBW infants hospitalized in the hospital and Sample: 88 infants including 58 LBW infants and 30 normal birth weight control patients	1. Cronbach's alpha coefficient for the second edition of the Peabody Developmental Motor Scales is 0.92. 2. Test-retest reliability was excellent (Intraclass Correlation Coefficient ¼ 0.98) 3. Validity conducted with known group comparisons showed satisfactory results. The instrument discriminated well among subgroups of the study sample that differed in birth weight. 4. The Psychomotor Development Index scores

						group comparisons, to test how well the measure differentiated between subgroups of patients differing in birth weight (VLBW, LBW, and NBW) by one-way analysis of variance, a correlation between PDMS-2 and BSID-II was calculated using Pearson's correlation coefficient.		correlated strongly with the second edition of the Peabody Developmental Motor Scale (r for Fine Motor Scale ¼ 0.91, P < 0.001, and r for Gross Motor Scale ¼ 0.93). 5. The Iranian version of the Peabody Developmental Motor Scales second edition is a reliable and valid measure
10	(Hornman et al., 2013), Belanda	Validity and internal consistency of the Ages and Stages Questionnaire 60-month version and the effect of three scoring methods	To evaluate the internal consistency and construct validity of the ASQ-60 with a large sample size, and to assess the effects of three scoring methods on this validity	The Ages and Stages Questionnaire (ASQ) 60-month version (ASQ-60)	Target: Children Setting: community and hospital (NICU)	Analysis: Dutch ASQ-60 mean scores were compared with mean scores of ASQ-60 versions in the US, Norway, and Korea, to assess comparability, t-test, and delta Cohen's effect size to assess the clinical relevance of the differences, Internal consistency was determined for each domain and total score using Cronbach's alpha and compared with ASQ-60	Design: Longitudinal Preterm Outcome Project (Lollipop) prospective cohort study, Population: 2072 children Sample: 1457 children (1063 children born preterm (gestational age)	1. Cronbach's alpha for the total score is 0.86, which confirms internal consistency. 2. Male gender, prematurity, low paternal education, low family income, and small gestational age were associated with a low 'ASQ total score', confirming construct validity 3. Construct validity with special education as the criterion, sensitivity was best using 'ASQ domain score' or 'ASQ total score' with parental attention (both 0.96). However, specificity was best (0.93) using ASQ total score

						versions in other countries.		
11	(Karcher et al., 2018), Amerika Serikat	Assessment of the Prodromal Questionnaire–Brief Child Version for Measurement of Self-reported Psychoticlike Experiences in Childhood	Test whether PQ-BC scores (1) show measurement invariance across race/ethnicity and gender; (2) show mean level differences across race/ethnicity or gender; (3) are positively associated with other PLE measures, including a family history of psychotic disorders and other PLE measures; and (4) are associated with higher levels of internalizing and externalizing symptoms, impaired cognition, or delayed motor and speech developmental milestones.	Prodromal Questionnaire-Brief Child Version (PQ-BC).	Target: children Setting: Community	Analysis: incremental changes in fit ($\chi 2$ test, comparative fit index, and root mean square error of approximation), and progressively restrictive nested models.	Design: prospective longitudinal June 1, 2016, to August 31, 2017. Population: 4524 individuals obtained from the ABCD (Adolescent Brain and Cognitive Development) study, Sample: 3,984 participants	1. Measurement invariance across race/ethnicity and gender. A family history of psychotic disorder was associated with a higher mean (SE) Total PQ-BC (3.883 [0.352]; β = 0.061 and Distress (10.210 [1.043]; β = 0.051), whereas a family history of depression or mania was not. 2. Higher PQ-BC scores were associated with higher levels of child-rated internalizing symptoms (Total score: β range, 0.218 to 0.273; Distress score: β range, 0.248 to 0.310, 3. performance deficits on neuropsychological tests such as working memory (Total score: β = -0.042 to -0.008; Distress score: β = -0.051 to -0.017]), 4. delayed motor and speech developmental milestones (Total score: β = 0.057 for motor; β = 0.042 for speech; Distress score: β = 0.048 for motor; β = 0.049 for speech)
12	(Prado et al., 2018), Ghana dan Malawi (Tenggara afrika)	A method to develop vocabulary checklists in new languages and their validity to assess early language development	Evaluate the validity of a method for developing a vocabulary checklist in a new language to assess early language development, based on the MacArthur-Bates	Developmental Milestones Checklist-II (DMC-II) language scale, Malawi Developmental Assessment Tool (MDAT) language scale, number of different words (NDW)	Target: mother/parents Setting: Community	Analysis: concurrent validity of language scores using Spearman correlation, predictive validity by calculating Spearman correlation, All	Design: pilot testing Sample: In Malawi, evaluated the validity of a vocabulary checklist among 29 children aged 17-25 months compared to three concurrently assessed language measures, In Ghana assessed the predictive	1. In Malawi, the Spearman correlation of vocabulary checklist scores with DMC-II language was 0.46 (p=0.049), with MDAT language was 0.66 (p=0.016) and with NDW was 0.50 (p=0.033). 2. In Ghana, 18-month vocabulary checklist scores

			Communicative Development Inventory			analyses were performed using SAS version 9.4.	validity of a vocabulary checklist at 18 months of age to forecast language, pre-academic, and other skills at 4-6 years of age among 869 children.	showed the strongest (rho = 0.12-0.26) and most consistent (8/12) associations with preschool scores, compared to other 18-month assessments. The largest coefficients were correlations of 18-month vocabulary scores with preschool cognitive factor scores (rho = 0.26), language scores (0.25), and pre-academic scores (0.24).
13	(Venancio et al., 2020), Brazil	Development and validation of an instrument for monitoring child development indicators	Create and validate child development indicator monitoring instruments	Assessment Questionnaire - Primeira Infância para Adultos Saudáveis (QAD-PIPAS)	Target: child and mother Setting: Community	Analysis: The analysis was based on the assumption that the instrument should be simple, quick to implement, and cover milestones from the four domains for each of the following	The Methodological study, based on World Bank propositions for monitoring child development indicators in low- and middle-income countries-development of an inventory of items for the evaluation of child development, based on an open-access instrument; validation of the content by a group of experts on the topic, using consensus techniques; selection of questions to describe children and their families; pre-test of the instrument during the 2016 vaccination campaign in three cities, and conducting cognitive interviews.	1. A total of 431 items were sent for specialist evaluation; 77 were initially excluded and the others were evaluated directly by the group, with 162 items covering motor, cognitive, language, and social-emotional domains, distributed across ten age ranges. 2. Questions on health, nutrition, early learning, protection and safety, and responsive care were also included. The instrument was applied by S1 student volunteers to 367 mothers of children under 5 years old, showing good compliance from caregivers. 3. Questionnaire application time averaged 20 minutes. 4. The cognitive interview allowed for the final customization of the 19 instrument items for better understanding by caregivers 5. The adequacy of the instrument for application during vaccination campaigns

								demonstrates the feasibility and usefulness of QAD-PIPAS, the result that the Instrument created and validated by experts fills a gap, as it allows a comprehensive evaluation of the development of children under 5 years old at the population level.
14	(Venancio et al., 2021) Brazil	Psychometric properties of the Child Development Assessment Questionnaire (QAD-PIPAS) for use in population studies involving Brazilian children aged 0---59 months	Analyzing the psychometric properties of the Child Development Assessment Questionnaire (QAD-PIPAS), focusing on reliability and construct validity, for a population-level study involving Brazilian children aged 0 -59 months	Child Development Assessment Questionnaire - Primeira Infância para Adultos Saudáveis (QAD-PIPAS)	Target: children Setting: Community	Analysis; descriptive analysis, logistic regression, and Scatterplot diagram were used to represent the correlation between the scores obtained by applying CREDI and QAD-PIPAS, and Cronbach's alpha coefficient was used to calculate internal consistency.	This methodological study consists of two axes, involving two different samples and procedures. The first aims to analyze the instrument's construct validity (discriminant and concurrent validity) and internal consistency. 638 The first years of life are crucial for laying the foundation for lifelong development. However, an estimated 250 million children under the age of five worldwide will not reach their developmental potential due to poverty and stunting, in addition to their exposure to violence, abuse, neglect, or abandonment.4,5 SI Venancio, GS Buccini, CR Alves et al. The second axis examines test-retest reliability	1. Construct validity showed that QAD-PIPAS was able to identify the relationship between the outcome (suspected child developmental delay) and expected risk and protective factors based on the Nurturing Care Framework (OMS/UNICEF) 2. Significant positive correlations were achieved between QAD-PIPAS and CREDI (Caregiver Reported Early Development Instruments) scores in six of the eight age groups analyzed, with the most significant correlations being in the 25-30, and 31-36 month age groups. 3. Acceptable internal consistency was identified across all age groups, with better performance above 36 months of age (Cronbach's alpha between 0.61 to 0.80) and adequate test-retest reliability (global Kappa 0.81).

We found the instrument for early detection of child growth and development that the instrument can reduce child growth and development problems, promote healthier lifestyles, need to correct the age of the child when screening for developmental problems in children with a history of prematurity, in children born prematurely obtained the gold standard of screening for early childhood developmental delays, improve early detection of parenting and developmental problems, identify more children at high risk of parenting and developmental problems.

Premature birth is one of the risk factors that need attention in the early detection of growth and development seen from child factors because many studies have said that babies born weighing < 2500 grams have a risk for children experiencing growth problems, as per Research findings (Khan et al., 2019) children born with a smaller than average birth weight were more likely to have a child with low child weight-for-age status (aOR = 1.67), a finding of (Siddiqa et al., 2022) children born with a small body size had an association with underweight children (p<0.001), findings (Li et al., 2022) child with low birth weight (<2500 g) was significantly associated with an increased risk of underweight (AOR=2.86), Research (Rahman et al., 2016) children with LBW significantly increased the risk of undernutrition/underweight status (RR=1.47), Findings (Emerson et al., 2020) where children born with normal or large body weight have a lower risk of becoming underweight. Likewise, research (Sania et al., 2019) Children born with low birth weight (<2500g) had significantly worse cognitive and motor scores, Children with birth weight <2000g had a mean low cognitive score (0.27 SD (95%CI -0.49 to 0.07), low motor score 0.26 SD (95%CI -0.40 to 0.12), low language score 0.28 SD (95%CI-0.60 to 0.05).

Although there are still many other factors that affect the growth and development of children other findings by (Berhe et al., 2019) that factors affecting child growth in addition to the factor that birth weight is less than 2.5 kg (AOR = 5.3), there are other factors, namely the lack of formal education of the mother (AOR = 6.4), mothers with a body mass index of less than 18.5 kg / m2 (AOR = 3.8), households that have two children under five and above (AOR = 2.9), dietary diversity WHO score < 4 (AOR = 3.2) and repeated episodes of diarrhea (AOR = 5.3), as well as research (Sania et al., 2019) tated that other factors that influence development include prenatal factors: higher maternal education (completed secondary school) scored higher on cognitive development 0.14 SD (95% CI 0.05 to 0.25), motor 0.12 SD (95% CI 0.06 to 0.18) and language 0.13 SD (95% CI 0.04 to 0.21), mothers with height <145 cm scored lower in cognitive development 0.10 SD (95%CI -0.20 to 0.004), motor 0.11 SD (95%CI -0.19 to 0.03) and language 0.11 SD (95%CI -0.31 to 0.09), mothers with low BMI (<18.5 kg/m2) scored lower in cognitive development (SD: -0. 10; 95%CI -0.19 to 0.02).

Other findings also obtained reliable, valid, acceptable internal consistency, more specific and more sensitive instruments found more children with growth and development problems, obtained the results of early detection instruments for postnatal neonates to detect the risk of child growth and development problems, in individual infants do not generalize any follow-up efforts, fill the gap, because it allows comprehensive evaluation of the development of children under 5 years.

Temuan lain Untuk yang lain tentang pengembangan instrument deteksi dini pertumbuhan dan perkembangan anak menggunakan metode pemetaan intervensi, Tinjauan literatur terintegrasi (ILR) dan EBP, Studi metodologis, berdasarkan proposisi Bank Dunia. Proses Intervention mapping is widely used in the preparation of creating programs and protocols that will be intervened in the community because it makes it easier for researchers because it increases the potential for behavior change, as in the study (Mann et al., 2015) although the IM (Intervention Mapping) process, while time-consuming, allows for the development of rigorous and systematic intervention components that are directly linked to behavior change theory and can increase the potential for behavior change within FCCHs (family child care homes), and research (Ball et al., 2017) with the IM (Intervention Mapping) results providing a practical framework to guide the systematic development of child weight management interventions for parents of children with obesity.

In summary, this review has strengths in that it provides an overview of the various types of early detection instruments for child growth and development, especially for children born with low birth weight, and shows the many benefits of existing and newly developed early detection instruments for child growth and development. Future reviews should include a literature search of more databases from unpublished articles, regional databases, and other languages to increase global coverage and reduce publication bias in the evidence base.

CONCLUSION

Early detection of child growth and development instruments can optimize child growth and development outcomes through early detection, follow-up efforts according to the problem, and lifestyle changes to prevent child growth and development problems, so more efforts are needed to implement early detection programs for optimal results in the future and implementation needs to be more pursued in children with risk groups.

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