Screening for Developmental Delay and Social-Emotional Learning among Children in India

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The research presented and reported in this thesis was conducted in accordance with the National Health and Medical Research Council (NHMRC) National Statement on Ethical Council in Human Research, 2007. The proposed research studies received human research ethics approval from JCU Human Research Ethics Committee (Approval number: H8285).

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The school principals and staff members of the following schools

School Name	School Principal	Staff
St Columba's School	Brother EV Miranda	Mrs. Ritu Kaushal (Junior School Headmistress) Ms. Vandana Mehrotra Ms. Vandana Sharma
Sanskriti School	Ms. Richa Sharma Agnihotri	-
Sankar Valley School	Mr. Anil Kumar	Ms Rama
Kangra Valley School	Ms. Meera Bedi	-
Alpine Public School	Ms. Meena Sharma	-
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DAV Noida	Mrs I P Bhatia	-
DAV Patiala	Mr Vivek Tiwari	-
Hansraj Public School	Mrs. Jaya Bhardwaj	Ms. Anupama Mahajan

Abstract

Screening for developmental delay and social-emotional learning (SEL) is essential in early childhood. However, low- and medium-income countries lack adequate screening instruments. The Parents' Evaluation of Developmental Status (PEDS), the PEDS: Developmental Milestones (PEDS:DM), and the Strength and Difficulties Questionnaire (SDQ) are suitable for a developing country like India because of their low cost, use of self-report, and good psychometric properties. Nevertheless, there is limited literature on using the PEDS and SDQ in India. The aims of this study were to: (1) describe the physical, cognitive, and social-emotional development of young children with typical development (TD) and developmental disability (DD) in India, (2) compare parent and teacher reports on the social-emotional development of children with TD and DD, and (3) examine the relationship between developmental status and psychosocial functioning for children with TD and DD. The participants were the parents and teachers of 407 children with TD and 59 children with DD recruited from different socioeconomic backgrounds living in Chandigarh, Himachal Pradesh, Punjab, Haryana, and the National Capital Region in India. The measures were translated to Hindi and participants had a choice of answering either the English language or Hindi versions. Parents completed the PEDS measures and both parents and teachers completed the SDQ. Administration of the measures was conducted online, and reports were obtained for children aged between 4 to 8 years. Results from the PEDS found a significant relationship between the general and specific domains of concern for children with TD and DD. Furthermore, the parental concerns for developmental delay were more prominent for children with DD than for TD. This finding indicates that while the PEDS could describe the overall development of children from both clinical and community samples, it also distinguished between children with TD and DD. Parents reported more concerns for both groups of children than teachers on the SDQ subscales. Parents and teachers of children with

DD expressed more concerns across all scales than those of TD children. PEDS classification had a significant relationship with psychosocial functioning for both groups of children. That is, children with two or more predictive concerns on the PEDS received higher concerns on the four difficulties subscales of the SDQ and lower prosocial behaviour than children with one predictive and no concerns. Therefore, the measures demonstrated the ability to distinguish between children with TD and DD, allowed for comparison between parent and teacher report, and showed a significant relationship between developmental status and psychosocial functioning.

Keywords: developmental disability, social-emotional learning, PEDS, SDQ, children, India

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Chapter 1: Screening for Developmental Delay and Social-Emotional Learning: A General Overview

Human Development

Human development is a continuous process that involves changes throughout one's lifespan. Throughout the human development process, some broad categories of development can be universally observed: physical, cognitive, and psychosocial. Physical development refers to physical changes, including growth, motor skills, and fundamental aspects of perception (Eisenhower et al., 2009). Cognitive development involves the psychological process through which an individual learns, processes information, and thinks about their environment. Psychosocial development refers to the growth of personality, social knowledge, and skills (Eisenhower et al., 2009).

Physical growth is slower during early childhood (3 - 6 years) compared to infancy (0-2 years). Children's gross motor skills, such as balancing on one foot, changing directions while running and not falling, and fine motor skills, such as using scissors, copying, and writing simple letters and numbers, and building complex structures with blocks, are considerably formed by the early childhood stage of development. Cognitive development happens concurrently with physical development. Children acquire new skills in thinking, master number concepts, and can group objects according to a criterion. With appropriate physical and cognitive development, children in this phase can regulate their emotions, participate in prosocial behaviour, and show lower levels of antisocial behaviour and aggression towards family and peers (Hoffnung et al., 2015). In contrast, children who have not met these developmental milestones often show heightened behavioural problems, such as instrumental aggression, conduct disorder, and self-injurious behaviour (Eisenhower et al., 2009).

Developmental Delay

The term “developmental delay” is often referred to as mental retardation (Petersen et al., 1998). Nevertheless, “developmental delay” is used in a clinical setting as a descriptive term and not a diagnosis (Levy, 2018). The term describes children whose performance differs from those with typical development (TD; Levy, 2018). A developmental delay is the inability of a child to achieve a significant milestone or acquire skills relevant to their age (Poon et al., 2010).

Developmental delay can be global or specific (Levy, 2018). The specific developmental delay includes a delay in a particular development stream such as expressive and receptive language, visual problem-solving, gross and fine motor skills, and social-emotional learning (Petersen et al., 1998). Global developmental delay is defined as a significant delay in two or more developmental performance areas (Williams, 2010). In the global development delay, children are more vulnerable to deficits expressed as, for example, the posturing of body parts, reduced looking into a camera, visual fixation on an object, and less animated affective expressions (Provost et al., 2007). The early identification of delay has been difficult, with learning disabilities rarely being identifiable before children enrol in primary school (First & Palfrey, 1994). However, a screening tool can identify a developmental delay with reasonable accuracy. Nevertheless, only a small percentage of clinicians use standardised screening tools. A few of the reasons for not using screening tools to assess children for developmental delay include time constraints, cost burdens, staffing requirements, and a lack of confidence because of insufficient training and expertise (Mackrides & Ryherd, 2011).

Developmental delay affects 15% of children around the world (Limbos & Joyce 2011). Early recognition of delay often results in the implementation of diagnosis and intervention services to identify and improve children’s cognitive, behavioural, and adaptive

functioning (Limbos & Joyce 2011). Recently, the acceptance of developmental delay as an eligibility category in the United States has allowed children to receive necessary services without being assigned to a specific disability label (Delgado et al., 2006). Furthermore, children are either enrolled in mainstream or special educational programs upon entering elementary schools (Delgado et al., 2006). Therefore, the early identification of developmental delay in children can result in families and communities promoting strategies and resources to help the child and improve family functioning (Drillien et al., 1988).

Developmental Disability

Developmental disability (DD) is a broad spectrum of impairments or a lack of developmental features appropriate to a child's age and vital for their growth (Chen et al., 2018). DD indicates a significant delay in two or more human development domains (gross and fine motor, cognition, speech and language, social and emotional, or activities of daily living; Tikaria et al., 2010). In addition, it also includes specific learning disabilities (Arun et al., 2013). DD might result from impoverished physical, social, emotional environments. The primary model for DD is a transactional one. The development process is viewed from the perspective of a child's interactions with their environment and their effects on one another (First & Palfrey, 1994). Developmental domains fall into the four main categories of motor development, language performance, personal development, and cognitive development (Rydz et al., 2005):

- **Motor development:** includes gross motor skills (the ability to coordinate large groups of muscles for daily activities such as walking, sitting, and changing from one position to another) and fine motor skills (the ability to work with one's hands to eat, play, and draw). Fine and gross motor skills are the strongest predictors of special education referrals, and delays in this area may indicate learning difficulties (Cameron et al., 2012).

- **Language performance:** comprises the capability to use expressive language, articulate, and use nonverbal cues through innate communications and environmental influences. A delay in language development is often indicated by slower language comprehension and production and smaller gaps between receptive and expressive vocabulary than is typically observed (Weismer et al., 2010).
- **Personal development:** is the ability of children to meet their personal needs, cope with environmental demands, independently take care of their well-being and safety, communicate, and engage effectively in academics, recreation, and their communities in socially acceptable ways (Ditterline & Oakland, 2009).
- **Cognitive development:** encompasses a child's competence to solve problems through reasoning, perception, and intuition. This form of development emphasises the ability not only to understand and learn but also to retain information for later use (Rydz et al., 2005).

Social-Emotional Learning

In addition to screening for developmental delay, an emerging concern among parents and clinicians is screening children for social-emotional learning (SEL; Owens et al., 2015). SEL is the ability to engage appropriately in social interactions and regulate emotions effectively (Xie et al., 2019). Social-emotional competence enables children to form close relationships and experience emotions in an appropriate social and cultural context (Chen et al., 2019). SEL is essential for young children's adequate development and school readiness, which is crucial for their future academic performance (Chen et al., 2019).

SEL enables children to apply their knowledge, skills, and attitudes to understanding and managing peer relations, exploring emotions, and making responsible decisions (Domitrovich et al., 2017). Denhman et al. (2012) introduced the SEL developmental phenomena focusing on critical milestones to be completed by children in each age range.

SEL skills such as managing emotional arousal and peer relations are essential during early childhood. Middle childhood (6 - 12 years) comprises milestones that move from a bare social interaction to more complex ones, such as peer inclusion and acceptance. Children often undertake more difficult academic tasks at this stage, including exposure to new subjects, transitioning from one activity to another, and being more responsible with their time and organisational strategies.

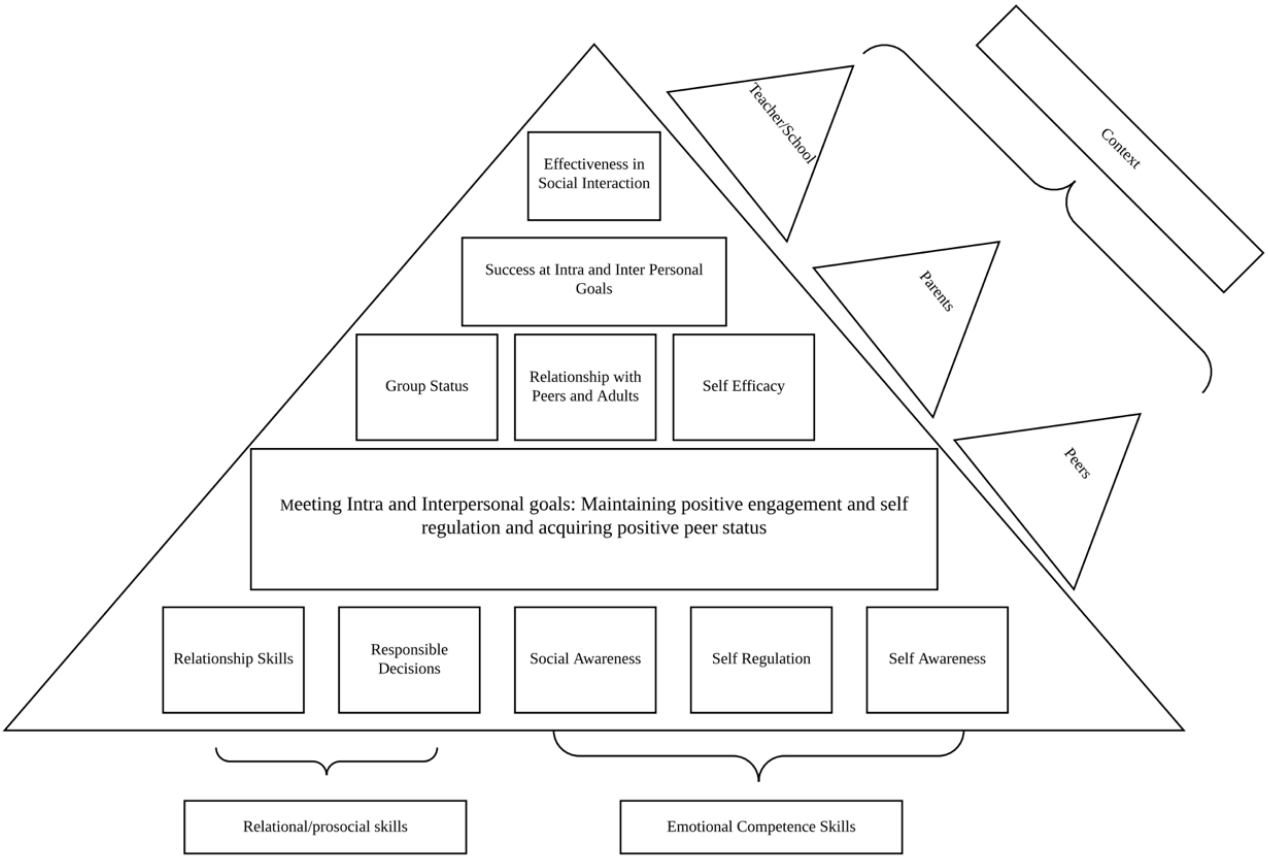
Denham and Brown's (2010) SEL phenomena were adapted from the model of social competence by Rose-Krasnor (1997) and the model of social-emotional learning by Payton et al. (2000). Rose-Krasnor (1997) defined social competence as the ability to engage in social interactions and being comprised of three levels: the theoretical level, index level, and skill level. First, on the theoretical level, behaviour is not reduced to any single index, and competence is often transactional. Furthermore, context-dependent factors play a vital role in developing appropriate behaviour. Second, the index level encompasses a fundamental distinction between self and others. Individuals work towards achieving personal goals while maintaining positive relationships with others. However, they may face situations where self and other-oriented needs may conflict. Therefore, a supportive parent-child relationship is essential for developing healthy relationships. Lastly, the skill level includes specific abilities vital for competence, such as communication, empathy, social problem-solving, and self-regulation. The three levels combine to help elucidate social competence from self and others' perspectives (Rose-Krasnor, 1997).

Payton et al.'s (2002) model of SEL focuses on systematic classroom instructions that enable children to understand and regulate their emotions, empathise with others, and develop the interpersonal skills to handle developmentally relevant tasks. Key SEL competencies such as awareness of self and others, positive attitude and values, responsible decision-making, and social interaction skills contribute to a child's development. Furthermore, SEL-related

outcomes in well-designed evaluation studies are an essential criterion for quality programs executed in schools (Payton et al., 2002). Figure 1.1 shows the integration of the Rose-Krasnor's (1997) Model of Social Competence and the Payton et al.'s (2000) Model of Social-Emotional Learning.

Figure 1.1

Integration of the Rose-Krasnor (1997) Model of Social Competence and the Payton et al. (2000) Model of Social-Emotional Learning as reported in Denham and Brown's (2010)



The Construct of Social-Emotional Learning

The construct of SEL focused on Thorndike's concept of a social intelligence component, that is, the ability to relate to and understand others (Goleman, 1998; Mayer et al., 2001). In the 1980s, the need for incorporating SEL in schools grew with the emphasis on

emotional intelligence. The emotional intelligence construct was defined with reliable and valid measures (Mayer et al., 2001). In the 1990s, educators became interested in applying social and emotional intelligence in the educational environment. During the 2000s, the term "social-emotional learning," which was derived from a journey driven by research, theories, and practices, started being used to explore the prevention of mental illnesses, behavioural-emotional disorders, and problem behaviours as a method of promoting social competence (Elias et al., 2008, pp. 266–281). The following different skills relevant to SEL were explored:

- **Emotional regulation:** Emotional competence is the ability to act effectively in emotionally arousing situations (Suveg & Zeman, 2004). Emotional regulation plays a crucial role in adaptation during middle childhood and predicts a child's competence in different domains such as behavioural regulation and social competence (Shields & Cicchetti, 1997). Children with TD are flexible in their abilities to integrate positive and negative emotions, in contrast, children with DDs find difficulty in interpreting emotions especially in social situations and show problematic comprehension of verbal and nonverbal cues (Bauminger & Kimhi-Kind, 2008).
- **Behaviour:** Children with DDs often show elevated emotional and behavioural difficulties (Stevenson et al., 2010). Information on the age at which the emotional and behavioural difficulties emerge is also relevant because it could have significant implications for the design of any intervention provided to a child (Emerson & Einfeld, 2010). Furthermore, the reasons for behavioural problems in children with DDs range from biological aetiologies to family functioning (Paczkowski & Baker, 2007).
- **Peer relations:** In the growth process, children often encounter peers in the form of siblings. As children grow older, their networks of peers become more significant and complex (Hay et al., 2004). Children with TD can engage in cooperative play with their

peers and participate in sustainable interactions that entail mutual engagement and the repetition of key actions (Hay et al., 2004). However, children with DD exhibit a marked absence of sustained interaction, engage in a high level of solitary play, have less preferred playmates, and often display less involvement in group play (Guralnick et al., 1996). Furthermore, mothers and teachers generally agreed that these children have peer relationship problems and often rate them higher on items related to peer deviance (Pelham & Milich, 1984).

- **Prosocial behaviour:** Prosocial behaviour is the ability to help others and includes actions such as sharing, cooperating, and conforming (Janssens & Deković, 1997). At age 1 year, children can understand others' emotions. By the time they have reached 4 years, children are able to react appropriately to others' emotional expressions through verbal expressions of sympathy (Thompson & Gullone, 2003). In contrast, studies have indicated that children with DD have less developed prosocial behaviour, as reported by their parents and teachers (Bakopoulou & Dockrell, 2016; Hart et al., 2004; Timler, 2008).

SEL contributes to early childhood school readiness and classroom and school adjustment (Denham & Brown, 2010). Increased attention on social-emotional problems in children has resulted in more awareness among clinicians and parents of the escalated risk of associated adverse outcomes, such as poor academic performance and psychiatric disorders (Briggs-Gowan & Carter, 2008). However, SEL screening tools face similar concerns to those surrounding screening for developmental delay, including the lack of appropriate training available to paediatricians to perform the screenings, which often results in their relying only on clinical impressions. Moreover, failing to implement screening measures in schools and clinics leads to delayed identification of social-emotional problems, resulting in late formal placements (Muzzolon et al., 2013; Squires et al., 2001). In other words, the assessment of

social-emotional competence in young children is often ignored until problems reach a level of severity for which significant intervention efforts are required (Squires et al., 2001).

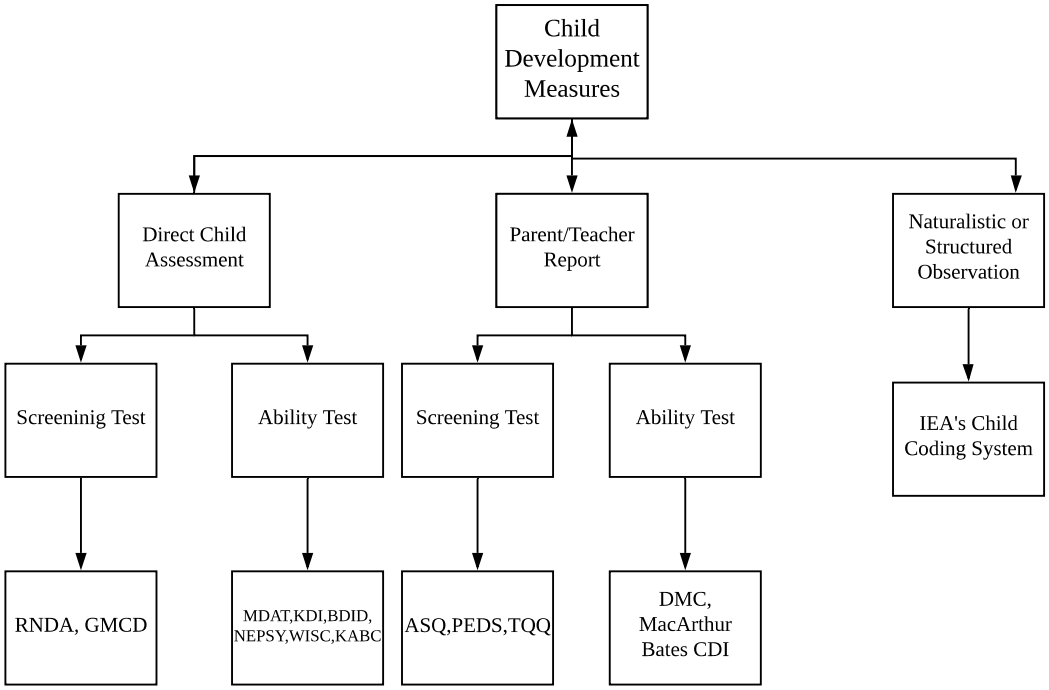
Developmental Screening

Developmental screening is "a brief assessment procedure designed to identify children who should receive a more intense diagnosis and assessment" (Meisels, 1988, p. 545). Screening has excellent potential for improving the lives of young children and has been in use around the globe for more than two decades (Meisels, 1988). Screening and surveillance are essential to prevent identified delays from becoming more significant and severe DD conditions (Singh, 2015). The American Academy of Paediatrics published a policy statement in 2001 regarding the importance of further expanding surveillance and screening for infants and young children as part of a nationwide effort to improve developmental screening (Sand et al., 2005). In 2006, a new and refined policy replaced the one from 2001. The new American Academy of Paediatrics (2006) policy provided an algorithm to support health care professionals in tracking developmental milestones beyond 3 years of age (Council on Children with Disabilities et al., 2006). Specifically, the policy emphasised screening tools that do not result in diagnosis but that screen and identify areas in which a child's development differs from same-age norms (Bagnato et al., 2007; McLean, 1996; Neisworth & Bagnato, 2004). The tools' scoring methods range from providing cut-off scores, as in the Ages and Stages Questionnaire (ASQ; Bricker et al., 1999), to categorising risk as high, medium, or low, as in the Parents Evaluation of Developmental Status (PEDS; Glascoe, 1997) and the Bayley Infant Neuro-Developmental Screen (Bayley, 1993), and to the use of quantitative analysis, as in the Child Developmental Inventories (Ireton, 1992). Furthermore, Fernald et al. (2017) provided a taxonomy of child developmental measures (Figure 1.2) that emphasises the importance of the type of developmental assessment, such as physiological and behavioural measures. Moreover, this taxonomy highlights three methods

of behavioural measurement: direct child assessment, parent/teacher report, and naturalistic or structured observation.

Figure 2.2

Taxonomy of Child Development Screening Measures



Note. IEA = International Association for the Evaluation of Educational Achievement; RNDA = Rapid Neurodevelopmental Assessment; GMCD = Guide for Monitoring Child Development; MDAT = Malawi Developmental Assessment Tool; KDI = Kilifi Developmental Inventory; BDID = Bayley Scales of Infant Development; NEPSY = Developmental Neuropsychological Assessment; Wechsler Intelligence Scale for Children; KABC, Kaufman Assessment Battery for Children; ASQ, Ages & Stages Questionnaires; PEDS, Parents' Evaluation of Developmental Status; TQQ, Ten Questions Questionnaire; DMC, Developmental Milestones Checklist; CDI, Communicative Development Inventories

Selecting Screening Measures

Screening measures identify children who require special attention and further detailed assessments, but these measures do not provide a definite diagnosis (Rydz et al., 2005). Service providers must consider factors when selecting a screening instrument ranging from screening criteria to their abilities to administer the instrument (Drotar et al., 2008). Furthermore, recent literature has stressed the importance of psychometric properties when considering the appropriate use of children's developmental and SEL screening tools (Drotar et al., 2008; Rydz et al., 2005; Salvia et al., 2012). To be considered effective, instruments must meet the psychometric standards listed in Table 1.1.

Table 1.1

Psychometric Standards of Effective Instruments

Standard	Description
Reliability	Stability of findings (Mohajan, 2017). Instruments used for screening purposes should have a reliability coefficient greater than .70 (Nunnally, 1978).
Validity	Ability of a device to measure what it claims to measure (Swanson, 2014).
Sensitivity	Proportion of children correctly identified as having DD. The sensitivity of a scale should range from 70% to 90% (Rydz et al., 2005; Trevethan, 2017).
Specificity	Proportion of children identified through the screening tool as not having DD. Specificity should be in the range of 70% to 80% (Rydz et al., 2005; Trevethan, 2017).
Representative sample	Sample within a population that represents the entire population of interest. Factors such as gender, income, education, culture, and urban and rural population distribution play important roles (Salvia et al., 2012).

Screening Tools Relevant for Low- and Medium-Income Countries

More than 200,000,000 children in low- and medium - income countries (LMICs) cannot reach their developmental milestones, placing more emphasis on early childhood initiatives (World Health Organization & United Nations Children's Fund, 2012). These initiatives include early intervention services and screenings that will most impact a child's development (Sabanathan et al., 2015).

Health services need to be available, accessible, and affordable to the general public to improve young children's health in LMICs. However, debates regarding conducting assessments have been disorganised and controversial. Furthermore, health care in low- and middle-income nations cannot adhere to screening standards. Therefore, children are frequently not evaluated for any delay or disability and do not receive the necessary support (Nickerson et al., 2015).

Screening services must be standardised, comprehensive, accessible, and cross-culturally validated to cater to a larger population (Trani et al., 2015). Furthermore, developing countries emphasise using tools that are not time-consuming, are less expensive, and can be completed by parents (Flamant et al., 2011).

Cross-Cultural Translation, Adaptation, and Administration of Screening Measures

Cross-cultural translation and adaptation are integral to implementing screening tools in different cultures from the ones in which they were developed (Anderson, 1994). Cross-cultural research explores the same question in different cultures and measures differences across cultures through different screening and assessment measures. The adaptation process is used with the expectation that it will produce equivalent measures (Epstein et al., 2015). However, several challenges arise in translation and adaptation, including ensuring that a scale is culturally applicable and comprehensible while maintaining the meaning of the original items (Emam et al., 2019) and the fact that cultures can differ so greatly that the way of thinking within each culture may vary (Jen & Lien, 2010). There are two conventional approaches to adapting a scale in the cross-cultural context. The first approach is to produce the scale in another language, and the second is to examine the cross-cultural utility of the scale. This research study adopted the first approach and aimed to translate and administer three suitable screening tools to children with TD and DD in India.

Statement of Problem

Children in India

In India, about 10% of children have developmental delays resulting in disabilities, while nearly 6% of infants are born with congenital disabilities (Shekhawat et al., 2022). Social-economic factors such as poverty, poor health, lack of infrastructure, and limited developmental literacy are risk factors for the delayed identification of children with impaired developmental and cognitive functioning (Kvestad et al., 2013). In addition, the perspective on developmental disability varies across cultures, especially in South Asian countries like India, where children and their parents face social deprivation due to the stigma associated with disability. Cultural beliefs have a stronger hold than treatment options for delay and disabilities in parents' decisions regarding their child (Faruk et al., 2020). Lack of early intervention, diagnosis, and support often results in identified delays becoming more significant and producing more severe developmentally delayed conditions (Singh, 2015).

Cities across India lack clinics and trained professionals to provide rigorous diagnoses and interventions under one roof (Mukherjee et al., 2021). Furthermore, there is limited research conducted on children from a specific population and a lack of comparative studies between children with TD and DD in India (Mukherjee et al., 2014; Mukherjee et al., 2021).

Screening Children for Developmental Delay and Social-Emotional Learning

The recent research literature on India has revealed multiple issues within universal developmental and SEL surveillance and screening (Juneja et al., 2012; Mukherjee et al., 2014). To begin with, parents are unaware that screening services exist, nor are they aware of why those services are necessary. Health care is given priority only when there is an acute illness. Furthermore, the population of doctors who serve the needs of Indian children is heterogeneous, with varying skills. If parents express concerns, they often receive inaccurate information without proper evaluation (Mukherjee et al., 2014). Most traditional screening

tools that detect developmental and social-emotional difficulties involve the direct elicitation of children's skills and are cumbersome. They are both time-consuming and expensive and require a child to cooperate in an unfamiliar setting (Juneja et al., 2012). Postgraduate paediatric courses in India lack formal training in developmental and SEL screening and assessment. Pediatricians may be cognitively aware of the need for screening but lack the delivery skills to screen patients effectively (Mukherjee et al., 2014). Moreover, in India, pediatricians make clinical judgements on unstructured probing of developmental milestones, and India has a shortage of developmental pediatricians (Mukherjee et al., 2014, 2021).

The screening tools used in India are mainly of foreign origin, making them costly, challenging to access, and requiring training. The Indian Academy of Paediatrics has yet to formulate a recommendation for developmental screening in India. Screening tools developed in India are linguistically and culturally reasonable. Nonetheless, their psychometric properties are suboptimal, and their use has been restricted to a specific population, given that health professionals initially developed them for community services (Mukherjee et al., 2014).

Direction of Chapters

With the goal of determining the screening tools suitable for a LMIC such as India, the structure of this thesis is as follows: Chapter 2 examines which screening tools are most relevant based on their strengths and weaknesses. Chapter 3 presents the aims and method of the study, including information on the translation and pilot testing of the identified measures in India. Chapters 4 and 5 provide the hypotheses, results, and discussion for the chosen measures of developmental delay (PEDS, PEDS:DM), and SEL (SDQ). Chapter 6 discusses the results and implications of this study and the use and importance of screening children in India.

Chapter 2: Screening Tools for Developmental Delay and Social-Emotional Learning: A Critical Review

DDs are impairments in functioning caused by problems in the development of the nervous system. These limitations are indicated through delays in meeting developmental milestones such as cognition, motor skills, vision, hearing, and speech and behaviour during infancy and childhood (Jablensky et al., 2001). Currently, global DD in children is recorded as 4% (Marlow et al., 2019). However, the World Health Organization (WHO) indicates no reliable and representative estimates of the actual number of children with DD (World Health Organization & United Nations Children's Fund, 2012).

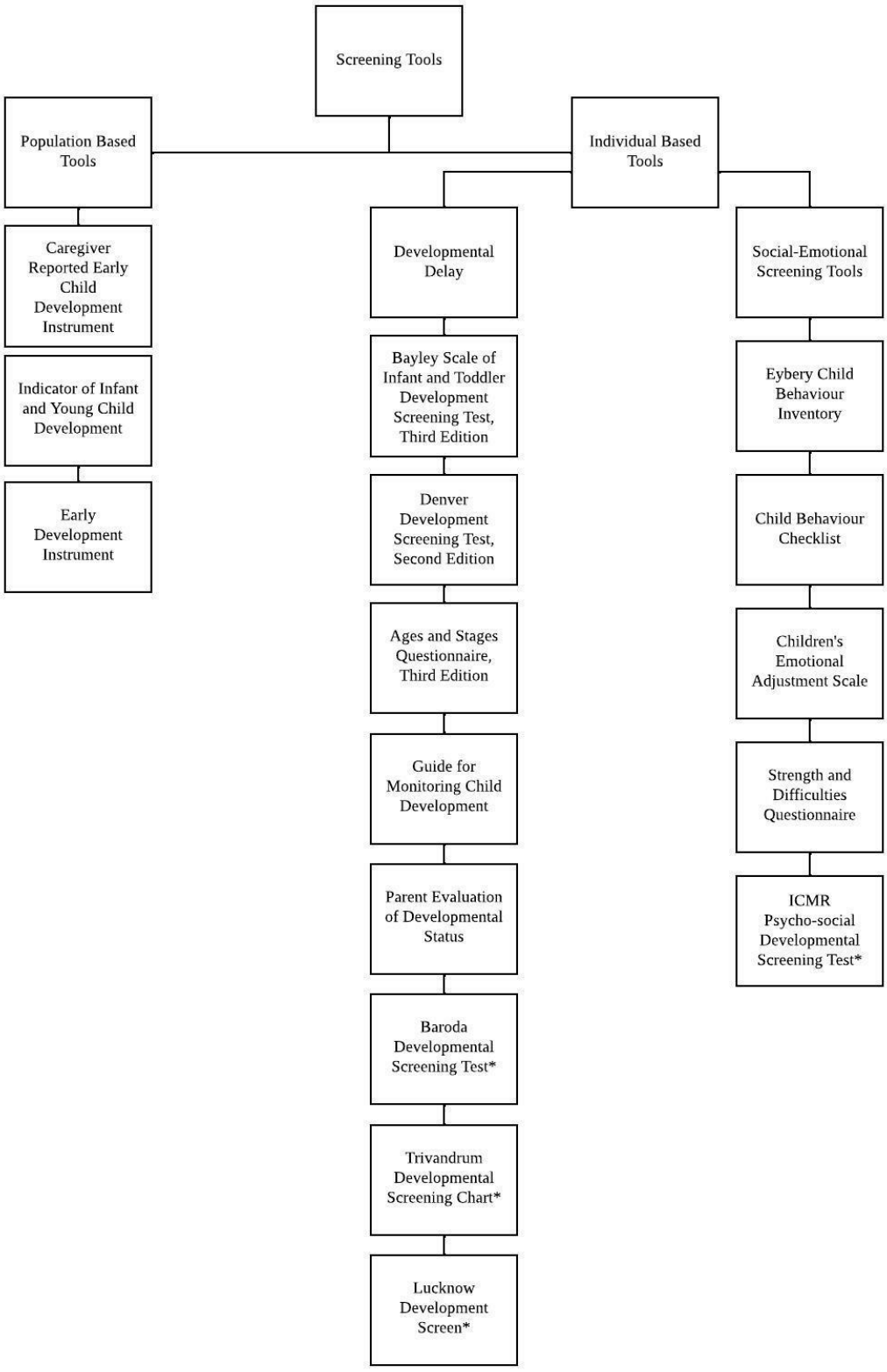
Specifically, India lacks community-based data on the number of children assessed for DDs due to the absence of routine developmental screening and surveillance (Mukherjee et al., 2014). Past literature indicates that India has a 1.5 – 2.5% prevalence of children diagnosed with DD under two years of age (Nair & Radhakrishnan, 2004; Nair et al., 2009). In addition, the data derived from rural India reveals the prevalence of specific learning disabilities to be 13% among primary school children (Arun et al., 2013). Therefore, screening services are essential during doctor visits and school enrolments to promptly provide children with early assessments and intervention services (Poon et al., 2010).

Developmental screening aims to identify children who require a more extensive assessment, leading to a definitive diagnosis (Meisels & Provence, 1989). Screening tools are often developed at two levels: the population level and the individual level. At the population level, developmental observation can inform policy regarding estimated levels of developmental challenges in the population so that appropriate resources for interventions can be allocated and future intervention needs can be determined. The individual level involves evaluating each child's developmental risk and determining the support type caregivers need to be given to enhance their child's development (Dworkin, 1989; Ertem et al., 2008; Kuo et

al., 2006). Knoblock and her associates developed the first developmental screening tool, which adapted the Gesell Developmental Schedules to be appropriate for infant screening (Meisels, 1988). The Denver Developmental Screening tool was the second tool to be published and was developed by Frankenburg and his colleagues. It has become the most widely used screening tool for detecting developmental delays in children (Frankenburg et al., 1971). This chapter reviews the existing tools used to screen children for developmental delay and SEL. Several factors, like psychometric properties, translation, adaptation, cost, training, and accessibility, play a vital role in choosing a suitable screening tool for LMICs. Other relevant concerns, such as lack of awareness among pediatricians, poverty, and lack of education among parents, also contribute to the lack of screening in LMIC where resources and financial aid is limited compared to High Income Countries (HIC). Finally, LMIC's need to consider screening tools with sound psychometric properties, that are adapted and translated for easy accessibility, are less costly, and do not require any training. Screening tools are divided into two categories: Population-based tools and individual-based tools. Under individual-based tools, there are two categories of tools which includes screening tools for developmental delay and screening tools for SEL (Boggs et al., 2019). Figure 1.3 presents a framework for this critical review and the different tools evaluated under the two categories.

Figure 3.3

Population-Based and Individual-Based Screening Tools



Note. *Represents screening tools developed in India.

Population-Based Tools

Population-level tools are used to identify and provide information on children's average skills at the community, national, and regional levels (McCoy et al., 2018). Furthermore, population-based screening tools were used to examine the relationship between children's sociodemographic characteristics and developmental delay (Simon et al., 2013). Population-based tools are simple and straightforward to implement (McCoy et al., 2018). However, they do not measure the individual-level assessment which provides easy interpretation, a clear threshold for action and structure for counselling response and contextually appropriate referral (Boggs et al., 2019). The three population-level tools rated strongly for accuracy, feasibility, reliability, and validity are the Caregiver Reported Early Child Development Instrument (CREDI, McCoy, 2017), Indicator of Infant and Young Child Development (IYCD, WHO, 2007), and Early Development Instrument (EDI, Janus & Offord, 2007).

Caregiver Reported Early Child Development Instrument (CREDI)

The CREDI was developed by Dana Charles McCoy, Gunther Fink, and Marcus Waldman at Harvard University in 2016. This screening tool aims to address several challenges faced (practical and conceptual) during the direct assessment of infants and toddlers (McCoy et al., 2017). The CREDI requires limited training and implementation time and provides a more generalised perspective on children's development. Furthermore, the scale comprises a long form with 100 items and a short form with 20 items across five domains: Motor, Language, Cognition, Social-Emotional, and Mental Health (McCoy et al., 2017). The tool is directly administered to the child's primary caregiver using a yes/no response scale.

The CREDI has satisfactory psychometric properties with test-retest reliability ranging from .40 to .80, internal consistency of .89, and concurrent criterion validity of .23 - .47

(McCoy et al., 2017). The CREDI has recently gained importance and has been adapted to various LMIC to evaluate interventions (Simon et al., 2013). However, like other population tools, the CREDI is not designed to provide information on individual children and often does not cover personal-social, adaptive, disability screener, vision, and hearing domains (Boggs et al., 2019).

Indicator of Infant and Young Child Development (IYCD)

The Indicator of Infant and Young Child Development (IYCD) screening tool was developed by the World Health Organization and was aimed at creating a new prototype for measuring early development across multiple contexts. The IYCD contains a robust set of 100 items that reflect development for children in 0 - 3 years (Lancaster et al., 2018). This screening tool comprises of four developmental domains: cognitive, motor, language, and socioemotional and is completed by primary caregivers on a four-point Likert scale (Isacson et al., 2020).

The IYCD has sound psychometric properties with good face, content, and construct validity. The tool's discriminatory validity (ability to discriminate between TD and DD and across different age groups) was assessed using gold-standard diagnostic tools (Lancaster et al., 2018). The IYCD has worked consistently well across the LMIC setting (Lancaster et al., 2018). However, the tool has been rated low in training, and like most population-level tools, the IYCD is not easily and freely accessible online (Boggs et al., 2019).

Early Development Instrument (EDI)

The Early Development Instrument (EDI) is a population-based screening tool developed by Dan Offord and Magdalena Janus at the Offord Centre for Child Studies - McMaster University. The EDI aims to screen children for school readiness in grade one. The tool comprises 103 questions across multiple domains, including physical health and well-being, emotional maturity, language and cognitive development, communication skills, and

general knowledge. The EDI is completed by parents and teachers using a yes/no response format (Janus & Offord, 2007).

The EDI has sound psychometric properties with an inter-rater reliability of moderate to high (.53 – .80) for teacher rating and low for (.34 – .36) parent-teacher rating. Each domain's internal consistency was measured using Cronbach's alpha and was considered good (Physical health and well-being = .84; social competence = .96; emotional maturity = .92; language and cognitive development = .93; and communication skills and general knowledge = .95). Furthermore, the EDI domains also indicated good criterion validity and discriminant validity (Janus & Offord, 2007). However, population-based tools like the EDI are developed specifically for community use in the Western world. They cater in a limited capacity to children in LMIC and cultural variations (Marlow et al., 2019).

Individual-Based Tools

Developmental delay and SEL can be accurately identified using individualised screening tools (Mackrides & Ryherd, 2011). Early identification of delays and concerns can result in the implementation of prevention and intervention programs. However, only a small percentage of clinicians' screen children (Limbos & Joyce, 2011). The tools mentioned below have achieved the highest ratings in the heat map of accuracy and feasibility ratings for early developmental measurement tools for children (Boggs et al., 2019). Screening tools include the Bayley Scale of Infant and Toddler Development Screening Test (BSITDS-III) (Bayley, 1993; Bayley, 2006), the Denver Developmental Screening Test-II (DDST-II) (Frankenburg et al., 1992), the ASQ (Bricker et al., 1999), the Guide for Monitoring Child Development (GMCD) (Ertem et al., 2008), and the Parents Evaluation of Developmental Status with Developmental Milestones (PEDS:DM) (Glascoe, 1998).

Bayley Scale of Infant and Toddler Development Screening Test, Third Edition (BSITDS-III)

The BSITDS-III determines whether a child follows an appropriate developmental path, or needs a more rigorous investigation (Bayley, 1993). This scale is a gold-standard reference test that can assess children in the age range of 1 month to 42 months (Bayley, 2006; de Albuquerque et al., 2015). The scale includes five domains: receptive communication, expressive communication, fine motor, gross motor, and cognitive. Furthermore, this screening tool ensures thorough screening through engaging toys and activities. Scoring is performed by summing the raw scores for each subscale the child receives credit for and the number of items administered. Besides the raw score, the BSITDS-III provides four norm-referenced scores (Hoskens et al., 2018).

The reliability coefficients for BSITDS-III subtests are .86 for fine motor, .87 for receptive communication, and .91 for cognitive, expressive communication, and gross motor (Bayley, 2006). A moderate-to-high correlation (.51 – .83) is found for the BSITDS-III compared with other scales, such as the Wechsler Preschool and Primary Scale of Intelligence concluding good concurrent validity (Bayley, 2006). However, this scale is costly, complex, and requires standardised training. Furthermore, the BSITDS-III is more quantitative and may lack the sensitivity to detect subtle differences in the quality of movements seen in infants since the quality of movement plays a vital role in balance and co-ordination in the later stages of life (Spittle et al., 2008).

Denver Developmental Screening Test, Second Edition (DDST-II)

Frankenburg and his colleagues introduced the DDST-II for infants and children aged 0 to 6.4 years (Barnes & Stark, 1975). The second edition of the tool aimed to improve language delay detection and replace challenging items (Frankenburg et al., 1990). The DDST-II contains 125 items and detects developmental delay in children in four areas: expressive and receptive language, gross and fine motor, personal, and social. The tool is

administered to the child by an administrator. Items are scored as pass, fail, or refused. The screening tool is available in English and Spanish (Frankenburg et al., 1992).

The DDST-II has satisfactory psychometric properties. Its sensitivity is reported at .56 – .83, and its specificity at .43 – .48. Also, the scale has an average-to-good correlation compared with other scales such as the Bayley, Stanford-Binet, and Cattell (Frankenburg et al., 1992), demonstrating good concurrent validity. Although the test's accuracy is fair, the test has not been validated for developing countries and its sensitivity and specificity have not been quantified for LMIC (Rydz et al., 2005).

Ages and Stages Questionnaire, Third Edition (ASQ-3)

The ASQ was created and designed at the University of Oregon (Bricker et al., 1999). The questionnaire's third edition (Ages and Stages Questionnaire, Third Edition [ASQ-3]) acknowledges developmental success in children aged 1 to 66 months. The tool consists of 21 intervals, each with 30 items in five areas: communication, gross motor, fine motor, problem-solving, and personal-social. Three response options are available: 'yes,' 'sometimes,' and 'not yet.' The score for the ASQ-3 is obtained by adding up the responses under each domain. The response 'yes' receives a score of 10 points, 'sometimes' receives 5 points, and 'not yet' receives 0 points (Bricker et al., 1999). The scale is available in different languages (Richter & Janson, 2007).

The ASQ-3 is reported to have good psychometric properties, with test-retest reliability of .91, interrater reliability of .92, sensitivity of 87.4%, and specificity of 95.7%. Concurrent validity for this test ranges from 76% to 88% when compared to standardised tests (Kerstjens et al., 2009). However, research on the questionnaire's psychometric properties for all age bands has been limited (Velikonja et al., 2017). Furthermore, the personal-social and problem-solving scales of the ASQ-3, which are more culturally specific, were also the most affected by the translation and adaptation process. Therefore, the ASQ-3 is translated in

different ways, but the translation quality is varied and is not comprehensively evaluated (Velikonja et al., 2017)

Guide for Monitoring Child Development (GMCD)

The GMCD was developed for children aged between 6 to 10 months in Turkey to provide a suitable means for the early detection of developmental difficulties through open-ended interviews used by clinicians (Ertem et al., 2007). The GMCD includes rows that constitute questions, columns comprising the age range, and cells containing pre-coded developmental milestones (Ertem et al., 2007). If a child exhibits all milestones for their age level, the GMCD interprets and classifies the child as 'appropriate for age'. If the child does not exhibit the appropriate milestones, the GMCD classifies the child as 'requires follow-up evaluation with or without intervention' (Ali, 2011).

The GMCD has sound psychometric properties. Its item-total scale correlation ranges from .28 to .91. Its interrater reliability was high (.83 to .88). Its sensitivity, specificity, and positive and negative predictive values were .88, .83, .84, and .94, respectively (Ertem et al., 2007). Outside of Turkey, this scale has been validated in Argentina, India, and South Africa, and it has not yet been used in high-income countries (Ertem et al., 2007). Implementing the GMCD in health and education systems remains a challenge for global research (Goldfeld & Yousafzai, 2018).

Parents' Evaluation of Developmental Status (PEDS)

The PEDS (Glascoe, 1998) is a surveillance and screening tool for children aged 0 to 8 years. The tool elicits parent's concerns about their children's development, behaviour, and mental health. The tool comprises one form with 10 questions across 10 categories (expressive language, receptive language, social-emotional, behavioural, fine motor, gross motor, self-help, school, cognitive, and health). The questions in the PEDS extract parent's perspectives of their child's development, rating each as high, medium, or low risk. The

response options include ‘yes’, ‘no’, or ‘a little’. The scoring for the PEDS includes columns for each age range, and it identifies which concerns predict problems and which do not. Furthermore, the form directs the investigator to one of five evidence-based recommendations regarding the results. Path A indicates two or more concerns, Path B includes one predictive concern, Path C includes non-predictive concerns, Path D includes parental difficulties in communicating, and Path E offers a conclusion of “no concerns”. The PEDS interpretation form provides an algorithm to indicate whether to refer, screen further, observe, counsel parents, or reassure them of the results obtained (Glascoe, 1998).

The PEDS was re-standardised and re-validated in 2013 (Glascoe, 2013). Its interrater reliability was .95, and its test-retest reliability was .88. The predictive validity of the PEDS ranges from .84 to .99 when compared with later deficits and diagnoses (Glasco, 2013). With a sensitivity of 86% and specificity of 74%, the PEDS accurately differentiates children with developmental delay, especially when compared with other tools that take longer to administer (Kiing et al., 2019). The PEDS is one of the promising tools for use across settings in LMIC (Marlow et al., 2019).

Parents’ Evaluation of Developmental Status: Developmental Milestones (PEDS:DM)

The Parents’ Evaluation of Developmental Status: Developmental Milestones (PEDS:DM) is a new measure used with the PEDS. The tool aims to strengthen the diagnostic accuracy of screening. The PEDS:DM comprises six to eight items per age group and aims to predict children’s developmental status accurately. Each item on the PEDS:DM addresses a different domain (fine motor, gross motor, expressive language, receptive language, self-help, social-emotional, and for older children, reading and mathematics). The age-appropriate questions are presented on a single page within a laminated book that includes essential visual stimuli depending on the domain that is being measured. Parents answer the PEDS:DM items via a multiple-choice format in less than 5 minutes. A single scoring template is used to

determine whether milestones are being met and is built into the binder. Once answers are marked, the scoring template is placed on top of the questions and answers and aligned to the registration marks. Any marks that show through the template are unmet milestones. The met and unmet milestone results are then marked on the recording form by colouring in boxes and drawing a line corresponding to the child's age and developmental milestones, respectively (Brothers et al., 2008). Furthermore, the PEDS:DM uses the same evidence-based recommendations for the results as the PEDS (e.g., Path A, B, C, D, and E).

The internal consistency of the PEDS:DM across all domains produced a value of .98, its test-retest reliability was .98 and .99, and its interrater reliability revealed an agreement of .82 to .96 across subtests. In addition, the specificity and sensitivity of this scale are 80% and 85%, respectively (Brothers et al., 2008).

Social-Emotional Learning

Besides screening for developmental delay, an emerging concern among parents and clinicians is screening children for SEL (Owens et al., 2015). SEL is the ability to engage appropriately in social interactions and effectively regulate emotions (Xie et al., 2019). Social-emotional competence enables children to form close relationships and experience emotions in an appropriate social and cultural context (Chen et al., 2019). SEL is essential for adequate development and school readiness among young children, which is crucial for future academic performance (Chen et al., 2019).

Increased attention to social-emotional problems among children has resulted in more awareness among clinicians and parents of the escalated risk of adverse outcomes, such as poor academic performance and psychiatric disorders (Briggs-Gowan & Carter, 2008). However, SEL screening tools face similar concerns to those surrounding screening for developmental delay, including the lack of appropriate training available to pediatricians to perform the screenings, which often results in relying only on clinical impressions. Moreover,

failure to implement screening measures in schools and clinics leads to delayed identification of social-emotional problems, which results in late formal placements (Muzzolon et al., 2013; Squires et al., 2001). In other words, the assessment of social-emotional competence among young children is often ignored until problems reach a level of severity for which significant intervention efforts are required (Squires et al., 2001).

Screening Tools Used to Measure SEL

A growing body of research shows sufficient evidence of the feasibility and effectiveness of developmental screening tools (Xie et al., 2019). In contrast, there is scant literature on SEL screening tools for young children (Briggs et al., 2012). Screening measures for social-emotional competence are essential in early childhood (Xie et al., 2019), and access to an accurate, usable, and affordable screening tool is critical to ensure appropriate assessment of children with SEL concerns (Squires et al., 2001). SEL screening would help educators and clinicians determine children's strengths and needs and guide decisions on school curriculum and instruction methods. In addition, SEL screening tools would monitor children's social-emotional development in response to interventions and help determine whether special services are required (McKown, 2017). Moreover, SEL screening tools can also help determine whether a developmental delay is associated with SEL among children.

Parent-reported measures of children's outcomes are considered a less costly and more reliable alternative to observation methods (Gridley et al., 2019). Parents have extensive knowledge of their child's behaviour and can accurately report concerns through structured questionnaires, thus efficiently identifying those at risk of social-emotional problems (Sheldrick et al., 2012). Different parent-report SEL screening tools exist, such as the Eyberg Child Behaviour Inventory (ECBI) (Eyberg & Ross, 1978), the Strengths and Difficulties Questionnaire (SDQ) (Goodman, 1997), the Child Behaviour Checklist (CBCL) (Achenbach, 1991), and the Children's Emotional Adjustment Scale (CEAS) (Thorlacius & Gudmundsson,

2015). These screening tools can comprehensively evaluate a child's social-emotional functioning.

Eyberg Child Behaviour Inventory (ECBI)

The ECBI is a 36-item parent rating scale used to assess social-emotional functioning and behaviour problems among children and adolescents aged 2 to 17 years (Boggs et al., 1990). The ECBI response format comprises two dimensions: the frequency of the behaviour and identifying whether it is problematic. The frequency rating ranges from 1 ('never happens') to 7 ('always happens'). The total frequency score is obtained by adding the raw scores. The problem behaviour score requires parents to circle 'yes' or 'no' for specific questions (Eyberg & Ross, 1978).

The ECBI has satisfactory psychometric properties with internal consistency, test-retest, and split-half reliability of .70, .90, and .95, respectively. There is a moderate-to-high correlation between ECBI scores when compared with other tools and across different population samples suggesting good validity (Robinson et al., 1980). However, the high cost of using the ECBI is a limitation to its widespread use (Gridley et al., 2019).

Child Behaviour Checklist (CBCL)

The CBCL is a parent and teacher reported questionnaire used to screen children for behavioural and emotional problems (Achenbach, 1991). The CBCL assesses children in the preschool years, aged 2 - 3, and school-aged children aged between 4 to 18 years. The measure comprises 99 and 118 behaviour problems (for each of the two age ranges) and is reported through a three-point scale: 'not true,' 'somewhat true,' and 'often true' (Nolan et al., 1996). Raw scores are converted to T-scores. A T-Score of below 60 is categorised as being in the nonclinical range, 60 – 63 is the borderline clinical range, and above 63 is classified as the clinical range (Nolan et al., 1996).

The CBCL has an excellent internal consistency of .93 and test-retest reliability of .85 (Gridley et al., 2019). But it has a low discriminant validity (.59 – .70) when used to distinguish between individual children with ASD and non-ASD disorders (Mazefsky et al., 2011). Furthermore, a comparison between the parent and teacher report versions of the CBCL failed to reach the Terwee threshold of > .70, yielding a limited level of evidence with negative findings for the psychometric properties (Gridley et al., 2019).

Children's Emotional Adjustment Scale (CEAS)

The CEAS evaluates children's ability to endure negative emotions and assesses their confidence in social situations. The 47-item parent-reported measure assesses children in the age ranges of 3 to 5 and 6 to 18 years across four broad categories: temper control, anxiety control, social assertiveness, and mood repair (Thorlacius & Gudmundsson, 2015, 2019). Parents are asked to rate items on a five-point Likert scale (0 = *never* to 4 = *always*). Notably, the CEAS is anchored on evaluating the emotional competence of mainstream children (Thorlacius & Gudmundsson, 2019)

The CEAS demonstrated good psychometric properties in a sample of parents of pre-adolescent children (Thorlacius & Gudmundsson, 2019). The CEAS has an adequate internal consistency of .92, satisfactory concurrent validity (established by comparing the tool with the SDQ), established at .70, and moderate-to-high correlation (.35 – .87) compared with other screening tools measuring social-emotional functioning in children (Thorlacius & Gudmundsson, 2015). However, this tool only considers emotional adjustment and is validated in children from mainstream schools.

Strength and Difficulties Questionnaire (SDQ)

The SDQ was developed in the United Kingdom by Robert N. Goodman. This screening measure evaluates mental health problems in children aged 2 to 17 years (Goodman, 2001). The SDQ is completed by parents and teachers and comprises 25 questions

under five domains: emotional symptoms, conduct problems, hyperactivity/inattention, peer relation problems, and prosocial behaviour (Goodman, 1997). This screening tool involves a three-point rating scale ranging from ‘not true’, ‘somewhat true’, and ‘certainly true’. The scoring for the SDQ comes from the total difficulties score, which is obtained by summing the scores for four of the scales, excluding the prosocial scale. The resulting scores range from 0 – 40. The cut-off points for the SDQ scores are separated into normal, borderline, and abnormal categories (Goodman, 2001).

The SDQ has acceptable psychometric properties. The internal consistency of the screening tool is .73, and its test-retest reliability is .62. Its discriminative and convergent validity was .80 and .50, respectively, and its specificity and sensitivity were above 70% (Kersten et al., 2016).

Screening Tools Developed in India

Developmental screening identifies areas where the child does not match other children in the same age group and allows for planning appropriate interventions to help the child (Nair et al., 2014). However, screening becomes more vital for LMIC because of poor health, poor nutrition, and poverty which significantly impacts the brain and cognitive development (Kvestad et al., 2013). Furthermore, tools developed in India consider cultural context while developing items and aim at using the tool for a wide range of children and at a low cost (Kvestad et al., 2013). However, the quality of most of the tools developed in India is questionable because of their psychometric properties (Mukherjee et al., 2014). The most widely used screening tools developed in India are the Baroda Developmental Screening Test (Phatak & Khurana, 1991), Trivandrum Developmental Screening Chart (Nair et al., 1991), Lucknow Development Screen (Bhave et al., 2010), and the ICMR Psychosocial Developmental Screening Test (Vazir et al., 1994).

Baroda Developmental Screening Test

The Baroda Developmental Screening Test (BDST) is derived from the Bayley Scale of Infant Development (BSID) and has been developed in India by Phatak et al. (1991). The BDST comprises 54 items under motor and cognitive domains and is directly administered to the child. Furthermore, the tool caters to children in the age range of 0 - 30 months and takes 10 minutes to complete (Mukherjee et al., 2014; Phatak et al., 1991).

The BDST has limited psychometric properties with sensitivity and specificity of 65% and 77%, respectively (Phatak et al., 1991). Furthermore, there is finite information on the BDST corroboration with gold-standard tools like the Differential Ability Scale (DAS-II) and the Developmental Screening Test (DST), resulting in a lack of evidence to determine the validity of the tool (Kishore et al., 2018). The BDST was developed in 1991, and since then the tool has not been revalidated with a current population sample (Kishore et al., 2018).

Trivandrum Developmental Screening Chart

The Trivandrum Developmental Screening (TDSC) Chart was developed in Trivandrum, India, for children aged 0 to 6 years. The tool comprises 17 items selected from the Baroda Developmental Screening Test (BDST) under motor and cognitive domains (Nair et al., 1991, 2013). The tool is directly administered to children and takes 5 minutes to complete (Mukherjee et al., 2014; Nair et al., 2013).

The TDSC has good psychometric properties with sensitivity and specificity of 84% and 90 %, respectively. The test-retest reliability was .77 over two weeks, and the interclass correlation was .97 (Nair et al., 2013). The tool is used to screen children for intellectual disability, cerebral palsy, and, in rural areas of South India, for DD (Chauhan et al., 2019; Meenai & Longia, 2009; Vora et al., 2013). However, the tool has not been revalidated since its inception 20 years ago (Mukherjee et al., 2014). Furthermore, in the original validation of the TDSC, the authors did not use a gold standard diagnostic tool (Mukherjee et al., 2014).

ICMR Psychosocial Developmental Screening Test

The ICMR Psychosocial Developmental Screening Test was developed by the Indian Council of Medical Research (ICMR) and the WHO. This tool aims to screen children for psychosocial development in rural India (Vazir et al., 2014). The ICMR is administered to parents of children in the age range of 0 - 6 years via interviews and comprises 67 questions across five domains: gross motor; vision and fine motor; hearing; language and concept development; self-help skills (Mukherjee et al., 2014; Vazir et al., 2014).

The ICMR has been standardised on Indian children and has separate norms for urban and rural children (Pispati et al., 2019). The scale is free of cost and requires minimum training. Furthermore, the tool is often used to screen Indian children for global developmental delay and explore the role of biological and environmental factors in the child's psychosocial development (Sachdeva et al., 2010). However, limited information is provided on the scale's psychometric properties (Mukherjee et al., 2014).

Lucknow Development Screen

The Lucknow Development Screen is aimed at screening Indian children in the age range of 6 months to 2 years. The scale comprises 27 milestones across four domains: gross motor, fine motor, language, and social. It is completed by the child's primary caregiver (Bhave et al., 2010).

The scale has sound psychometric properties with sensitivity and specificity of 95% and 71%, respectively. Cohen Kappa for inter-rater and test-retest reliability equalled 1, and the scale was validated against a gold standard tool; the Vineland Social Maturity Scale (Bhave et al., 2010).

Overview of Screening Tools Developed in India

Screening tools developed in India are essential in identifying children who require further diagnosis and intervention services. However, specialised training in these tools is not widely available, and contact with healthcare services is constrained (Fischer et al., 2014).

Furthermore, pediatricians in India refrain from using screening tools to identify delays due to insufficient time, lack of treatment choices, and lack of knowledge regarding referral options (Desai & Mohite, 2011).

Tools Suitable for Use in LMIC

Among all the screening tools developed in the Western world and India, the prominent screening tools suitable for LMIC like India are the Parent Evaluation of Developmental Status (PEDS), PEDS: Developmental Milestone (PEDS:DM), and Strength and Difficulties Questionnaire (SDQ).

The PEDS and the PEDS:DM are more appropriate than other screening tools such as the ASQ-3, DDST-II, and the GMCD for a developing country like India for the following reasons: First, the PEDS and PEDS:DM are self-reporting instruments that consider concerns as either 'predictive' or 'not predictive' of DDs. These tools can classify children as having a low, moderate, or high risk of DDs (Glascoe, 1997); categorising children according to plausible risk for DD rather than labelling them 'disabled' or 'not disabled' can reduce parents apprehension regarding having their child assessed further. Labelling children is strongly associated with experiences of stigma, embarrassment, social restrictions, and the challenges of raising a child in a society that devalues disability (Chavan & Rozatkar, 2014; Rajan & John, 2017). Second, the PEDS is also less expensive than other scales, such as the ASQ-3, DDST-II, and GMCD (Brothers et al., 2008). Furthermore, the PEDS includes 10 questions, and the PEDS:DM only has an additional six to eight items (according to age range), making it shorter than other developmental screening tools (Mukherjee et al., 2014). Third, the measure has good sensitivity and specificity in high-income countries and LMIC (Glascoe, 2013).

In comparison to the PEDS and the PEDS:DM, the other screening tools reviewed above (i.e., BSITDS-III, DDST-II, ASQ-3, and GMCD) have several limitations (Barnes &

Stark, 1975; Bayley, 2006; Bricker et al., 1999; Ertem et al., 2008). First, these four scales' psychometric properties have been questioned for LMIC because research outcomes from the Western world cannot be applied to LMIC (Boggs et al., 2019). Second, tools such as the BSITDS-III and the GMCD require professional training, which is time-consuming and costly (Goldfeld & Yousafzai, 2018). Finally, scales such as the ASQ-3 and the BSITDS-III need parents and clinicians to attempt multiple developmental tasks with the child before filling in the questionnaire, which may hinder the evaluation due to the longer administration time and the child's level of comfort with the activity and the environment (Limbos & Joyce, 2011; Marlow et al., 2019). Therefore, because of PEDS and PEDS:DM strengths and the limitations of the other screening tools, it is clear that the PEDS is the most accurate, practical, and feasible screening tool for use in India.

Among all the SEL screening tools, the SDQ is the most appropriate for screening purposes for the following reasons: First, the questionnaire is free to use and is easily accessed by clinicians, parents, and teachers (Goodman, 1997). Second, the tool has good psychometric properties compared to the ECBI and the CBRS (Kaptein et al., 2008). Lastly, in contrast to other screening tools, such as the CEAS, the SDQ has been adapted to LMIC, such as India (Malhi et al., 2014; Singh et al., 2015; Woerner et al., 2004).

In conclusion, the SDQ, the PEDS, and the PEDS:DM appear to be the most appropriate screening tools for the early detection of developmental delay in children in India, and specifically for use in government plans such as the 'Child Health Screening and Early Intervention Services' program (Singal, 2019).

Role of Culture in Screening Children

Although western screening tools such as PEDS and SDQ are considered suitable for LMIC like India, it is vital to understand that culture may influence the understanding of child’s development (Ertem et al., 2007). Children around the world attain developmental

milestones at a similar age. However, caregivers' knowledge regarding children's developmental skills appears to differ across cultures (Ertem et al., 2007). Culture influences how emotional competence is defined by parents and parenting practices adopted by caregivers in emotional socialisation (Qiu & Shum, 2022; Raval & Walker, 2019).

Parents from different cultures may explain their child's development as a combination of multiple factors, such as socio-cultural and folk beliefs. Also, families present with varied understandings of what constitutes delay or disability, which often results in misunderstandings between them and professionals who attempt to help and educate the parents (Valdivia, 1999). Therefore, it is essential to understand that, biologically, children's developmental milestones are the same across cultures. What differs is the cultural understanding and interpretations of these milestones and subsequent reporting of them to pediatricians (Ertem et al., 2007).

Correspondence between Parent and Teacher Evaluation

Parents are exclusively regarded as the primary source of obtaining developmental and behavioural information about their children, and there is extensive literature to support parent-completed screening tools (Glascoe, 1997; Squires et al., 1997). First, parents are encouraged to participate in the early intervention and identification process, and screening tools enable parents to make a detailed consideration of their child's abilities and skills (Dawson & Osterling, 1997). Second, studies report that if parents express concerns in one area, it often points to delays in other areas (Glascoe, 1998; Ilić et al., 2020). Third, parents' concerns are easy to elicit, providing a family-focused and collaborative approach to addressing developmental problems (Glascoe, 1999). Last, in an unfamiliar environment (a clinical setting), a child may not behave the way they behave in known surroundings, resulting in parents being able to provide the more comprehensive assessment of their child (Hickson et al., 1983; Palfrey & Rodman, 1999). Moreover, parents of children with DD often

report more concerns when screened for their child's development than parents of children with TD (Eisenhower et al., 2005; Glascoe, 1997; Nachshen & Minnes, 2005; Watson et al., 2007).

However, recently, there has been a growing appreciation for the teacher's contribution to the screening and diagnostic process (Schanding et al., 2012). Given structural criteria, teacher's rating of a child's SEL appears to be of considerable value. Evidence indicates that classroom teachers can reliably rate children's learning effectiveness. Furthermore, these ratings were highly correlated with concurrent and subsequent interpersonal and academic achievements (Dean & Steffen, 1984). Teachers can differentiate between students at risk for anti-social behaviour and typically developing students at an early age (Dwyer et al., 2006). Some screening tools, like the SDQ, have equivalent forms for both parents and teachers to complete. Teachers of children with autism spectrum disorder (ASD) and DD reported more concerns about the children's development and problematic relationships (less closeness and more conflict) than children with TD (Blacher et al., 2014). Further, when teachers compared children with ASD and DD in preparing them for kindergarten transition, teachers reported significantly more concerns for children in the ASD group than for children in the DD group (Quintero & McIntyre, 2011).

Studies have reported that teachers put forward more concerns than parents regarding children's development and SEL (Iizuka et al., 2010; Shahrivar et al., 2009). Concerns include repetitive behaviour because these behaviours are disruptive in the classroom, compared to parents who may have adapted to this behaviour at home (Azad & Mandell, 2016). However, recent research also suggests that there is low concordance between parent and teacher reports of behavioural and emotional functioning of children with DD, with parents being more likely to report problems than teachers (Hundert et al., 1997; Llanes et al., 2020; Marsh & Ng, 2017). Teachers report significantly fewer apprehensions compared to

parents about children with at-risks concerns due to multiple factors such as a difference in perception rather than actual behaviour differences, differences in the opportunities to observe problem behaviour in a different setting and the tendency of children to show their actual conduct only at home (Foley Nicpon et al., 2010). A lower inter-rater agreement between parents and teachers may make it difficult to perform a clinical assessment based on multiple informants (Fält et al., 2018). Despite this, gathering teacher ratings increases the number of children needing further evaluation because single-source information results often lead to fewer children with the problem being identified (Brown et al., 2006).

Chapter Summary

In presenting the different screening tools developed in the Western world and India, this chapter critically reviewed screening tools used to screen children for developmental delay and SEL. The framework of the current chapter was divided into two sections. The first section explored population-based screening tools used to identify and provide information on children's average skills at the community, national, and regional levels. The second section focused on individual screening tools more widely used to screen individual children for developmental delay and SEL and determine whether a child is provided with further diagnosis or early intervention. These individual screening tools were developed in the Western world and cater to high-income countries. Screening tools developed in LMIC consider their respective population and cultural context. However, these LMIC screening tools have been questioned for their inadequate psychometric properties and for being developed by healthcare workers to only cater to specific child populations.

Culture impacts parent’s understanding of their child's developmental milestones as much as the milestone themselves. Factors such as limited developmental literacy and folk beliefs contribute to the differences in understanding children's developmental milestones across cultures. Both parents and teachers need to screen children for developmental delay

and SEL because a single source of information often results in fewer children being identified for further diagnosis and early interventions.

In conclusion, among all the screening tools reviewed here that have been used to screen children for developmental delay and SEL, the PEDS, PEDS:DM, and SDQ are more appropriate for LMIC because they have sound psychometric properties compared to other screening tools, are less costly, are easily accessible, and require no training and can be adapted to LMIC. However, little is known about whether these tools have been translated and adapted for children in India.

Conclusions from a Scoping Review

A scoping review to assess whether the PEDS, PEDS:DM, and SDQ have been widely utilized in India was conducted as part of this study (Sheel, Suarez, & Marsh, 2023; Appendix A). This review found that only a few studies have employed these screening tools. The PEDS:DM has not been used and scant published literature exists on the use of the PEDS in India. Most of the literature consists of text and opinion-based evidence that emphasises the lack of screening in India and the limited use of the PEDS to screen children for developmental delays. Furthermore, only two studies briefly mentioned translated PEDS questionnaires (Marlow et al., 2019; Poon et al., 2010). The review also found that the SDQ has been administered to the Indian population and used as a screening tool to compare mental health across age groups. The SDQ has been found to effectively differentiate groups of individuals concerning SEL and behavioural concerns. Because India is a diverse country with many regional languages, the studies that used the SDQ catered to various population types and translated the questionnaire to regional and national languages. However, the PEDS and SDQ have yet to be used together to screen children for developmental delay and SEL in India.

Chapter 3: The Current Study – Aims and Method

Rationale for the Current Study

Regarding screening children for DD and SEL concerns, India lacks a literature base and evidence of practice. Evidence on the use of the PEDS and SDQ suggests that these screening tools have not been widely used with children in India. Furthermore, there is scant literature on the translation and administration of the tool with parents and teachers of children in the age range of 4 - 8 years, and in assessing clinical and community samples together in one study. Therefore, the translation and administration of the PEDS, PEDS:DM and SDQ will be the first step in assessing if these screening tools are relevant and applicable to the Indian population. Furthermore, concurrent use of these tools will provide a better understanding of the relationship of DD with SEL concerns among children. Using both community and clinical samples will help to validate whether the tools can distinguish between children with TD and DD. Therefore, it is important that research is undertaken and published to address the current gap in local literature and practice.

Aims of the Study

The study aims to assess two screening tools for appropriateness in a developing country, India, and: (1) describe the physical, cognitive, and social-emotional development of young children with TD and DD in India, (2) compare parent and teacher reports on the social-emotional development of children with TD and DD, and (3) examine the relationship between developmental status and SEL for children with TD and DD

Translation and Pilot Testing of the Measures

Developmental screening seeks to identify impairments in specific areas by healthcare professionals/doctors using a brief questionnaire (Faruk et al., 2020). Identifying which children may have a learning disability and require early intervention is the initial step (Faruk et al., 2020). Measures developed in Western countries are frequently used when assessing

children for DD and SEL in LMIC (Gladstone et al., 2008). Specifically, measures from the United States and the United Kingdom are increasingly used in cultures other than those in which they were developed (Soto et al., 2015). In theory, culture plays a vital role in a child's social, cognitive, and motor development (Gladstone et al., 2008). However, there is no consensus regarding the most effective screening tool for detecting delay and disability in children from diverse cultural settings. There is a scarcity of validated tools available to identify children with DD and SEL in LMIC (Marlow et al., 2019).

Face validity is the extent to which a measure appears to the user to reflect what it is intended to measure (Hardesty & Bearden, 2004). Although face validity is not a true measure of validity, it is essential for obtaining participant cooperation and engagement, so it is typically considered during preliminary checks of questionnaires (Goorts et al., 2019). Experts and professional judgments are often used to assess measures' content and face validity. However, what experts may consider suitable face validity may not be appropriate to service users (Connell et al., 2018). Therefore, this study aims to translate the three measures (PEDS, PEDS:DM, and SDQ) from English to Hindi using the forward-back translation process and conduct pilot testing interviews with service users to determine any discrepancies and difficulties between the original English and translated Hindi questionnaires (Chapman & Carter, 1979; Guillemin et al., 1993). This process will also determine the face validity of the translated measures with members of the intended participant groups.

For the translation process, four independent translators translated the PEDS, PEDS:DM, and SDQ to Hindi and back translated them to English, and two experts in the field of DD and SEL reviewed them. Once all the translators and experts agreed on the translation quality and found no disparity between the original and translated questionnaires, the researcher then conducted pilot test interviews.

Translation of PEDS, PEDS:DM and SDQ to Hindi

Language is essential in all self-report instruments, where the responders answer many questions in oral and written format (DuBay & Watson, 2019). Thus, translating an instrument to meet another country's language and cultural needs is essential. However, rigorous translation and cultural adaptation processes for self-report instruments have not been adopted in DD and Autism Spectrum Disorder (Kondolot et al., 2016; Windham et al., 2014). The current study utilised the forward-backward translation method (Chapman & Carter, 1979; Guillemin et al., 1993). In addition, the guidelines recommended by Guillemin et al. (1993) were followed. These guidelines recommend translation, back translation, committee meetings, expert review of this translation and back translation, and pilot-testing interviews.

Translation

Guillemin et al. (1993) stated that translations are of higher quality when undertaken by at least two translators. Therefore, two independent translators conducted the forward translation process. The PEDS, PEDS:DM, and SDQ were translated into the target language, Hindi. The translators were native to the target language and culture. They were aware of the objective underlying the material to be adapted and the concepts involved, to provide more restitution of the intended measurement (Guillemin et al., 1993). To ensure quality, the two translators helped identify discrepancies in translation interpretations (Beaton et al., 2000).

Back Translation

Back translation helps to improve the quality of the final version of the instrument and compromises one or multiple translators (Guillemin et al., 1993). This method helps to highlight translation errors that may have occurred in the forward translation and would impact the study’s validity (Guillemin et al., 1993). Two additional translators conducted the back translation for the three forms (PEDS, PEDS:DM, and SDQ). Back translation aimed to

determine any discrepancy between the original and translated forms and help improve the overall quality of the final version of the translated questionnaire. A similar process was followed by Juneja et al. (2012), where the authors translated and back translated the ASQ to screen children with DD in India.

The forward-back translations used bilingual translators. The translators' first language was Hindi, they all had completed a degree in English or Hindi and worked as language translators of content and video scripts for Indian government schools and organisations.

Committee Meeting

Once the translation and back translations were completed, the researcher chaired a meeting with the four translators to proofread the translated questionnaires and compared the preliminary translation with the original English questionnaires. There were three questions in PEDS, one question in PEDS:DM, and six questions in SDQ that had discrepancies in the forward-back translation process. During the meeting, the researcher and the translators resolved the questions with more culturally appropriate words and phrases. Thus, the panel (researcher and the translators) agreed on the screening tools' translation quality.

Expert Review

Two experts in the field of DD and SEL, with experiences working with young children, fluent in both English and Hindi languages, and registered with the Rehabilitation Council of India (RCI) reviewed the original and final versions of the PEDS, PEDS:DM, and SDQ on the domains of target language and culture (Sousa & Rojjanasrirat, 2011). The experts reviewed the tools, agreed with the translation, and found no discrepancy or difficulty between the English and Hindi translation, thus ensuring face validity and cultural acceptability of the questionnaires. The final version of the instrument demonstrated semantic

equivalence, idiomatic equivalence, experiential equivalence, and conceptual equivalence before pilot testing was conducted (DuBay & Watson, 2019; Guillemin et al., 1993).

Pilot Testing Interviews

Brooks et al. (2016) defined pilot testing interviews as "an initial small-scale implementation that is used to prove the viability of the project idea" (p. 52). In the current study, pilot testing interviews included evaluating whether respondents understood the meaning of items, identified rarely used phrases in the local context, and determined disparity in sentence structure between the original and translated forms (Mehrotra, 2007).

The pilot study was approved by the Human Research Ethics Committee of James Cook University (HREC number: H8285; Appendix B). The Participant Information Sheet, detailing the study and the type of information required, was provided to participants through Qualtrics. Once the participants read the information and consented to participate in the study, they were presented with the three measures (PEDS, PEDS:DM, and SDQ (English and Hindi). The participants completed the questionnaires, and each participated in an online interview to check their interpretation and understanding of the screening tools. The total time to complete the form and answer the interview questions was 30 min.

Participants. In February 2021, we recruited 55 participants to demonstrate their interpretation and understanding of the original and translated questionnaires for the pilot test. Through purposive sampling, 21 parents and 34 teachers of children aged 4 – 8 were recruited from various socioeconomic backgrounds in Chandigarh and the National Capital Region (NCR), India. Inclusion criteria for participants were parents of children aged 4 – 8 years, who were citizens of India and could read, write, and speak at least at the Primary 6 level in either English or Hindi. Inclusion criteria for teachers were teaching children ages 4 – 8 who were citizens of India and could read, write, and speak at least at the Primary 6 level in either

English or Hindi. Exclusion criteria are parents whose child was not currently attending school.

Of the 21 parents that completed the PEDS, PEDS:DM, and SDQ questionnaires, 19 (90%) were mothers and the remaining 2 (10%) were fathers. Their highest education qualification was: Certificate/diploma 2 (10%), undergraduate degree 1 (4%), and postgraduate degree 18 (86%). The yearly household income was: <75,000 INR 4 (19%), INR 0.75 - 1.5 lakhs 1 (5%), INR 1.6 - 3 lakhs 1 (5%), INR 3.1 – 5 lakhs 4 (19%), INR 5.1 – 10 lakhs 3 (14%), and > 10 lakhs 8 (38%). The children's mean age was 5.9 years (*SD* = 1.44, range = 4 – 8 years) and the majority (*n* = 13, 62%) were female. Most of the children (*n* = 20, 95%) were TD. However, a few parents indicated on the three screening tools that their child displayed speech and hearing problems, low attention span, or behavioural concerns.

The 34 teachers filled out the SDQ questionnaire regarding a specific child they were teaching. The child reference group had a mean age of 6.29 years (*SD* = 1.29, range = 4 – 8 years) and the majority (*n* = 27, 79%) were male. Most of the children (*n* = 30, 88%) were TD. Only four children had DD, such as speech and hearing impairment and mild to severe autism spectrum disorder.

Procedure. The sample size was adequate for a pilot study since studies have concluded that data must be collected with purposive sampling until saturation is reached (Carlsen & Glenton, 2011; Guest et al., 2006). Parents were recruited through schools and social media tools by sharing links of the questionnaire with groups and requesting parents and teachers of children in the age range of 4 - 8 years to fill the questionnaires and participate in an online interview using Qualtrics.

The pilot study was conducted using Qualtrics, where participants filled out the original and translated questionnaires and participated in an online structured interview. Fully structured interviews require the questions, probes, and responses necessary to be

standardised where no practitioner-based inquiries are allowed (Rogers, 1997). In the Qualtrics structured interviews, the researcher asked the following questions regarding the original and translated questionnaire: *Was there any difficulty in understanding the English and Hindi questions? Did you find the questions upsetting and offensive? Did you find any questions confusing to understand? And did you find any discrepancy between the original English and translated Hindi questions presented to you?* Participants responded with either "Yes "or "No." If they answered yes to any question, the researcher sought further clarification on those specific questions.

Parents and teachers' responses were collated and summarised. Ninety-five percent of the participants agreed that there was no discrepancy between the original English and translated Hindi Questionnaire for PEDS, PEDS:DM, and SDQ. However, two teachers were unclear about the intent and context of the English SDQ questions like "Constantly fidgeting or squirming" and "Gets on better with adults than with other children.". Furthermore, one parent raised a question regarding the intent of the "Logs" question in PEDS:DM. The parent did not understand the rationale of associating numbers with logs which aimed to explore the math concepts of the child. The researcher took note of the queries and provided clarifications on those specific questions to the participants through a telephonic conversation. The questions were not altered for the final study since the concerns were regarding the intent of the original questionnaire (English) and not the translation quality of the questionnaire from English to Hindi.

Summary of Translation and Pilot Testing Findings

This pilot study demonstrated the face validity and cultural accessibility of PEDS, PEDS:DM, and SDQ for the Indian population. Fifty-five participants (34 teachers and 21 parents) of children aged 4 - 8 years who were citizens of India and fluent in English and Hindi participated in the pilot study. The questionnaires were subjected to forward-backward

translation and were reviewed by experts. Pilot testing interviews determined any discrepancies and difficulties in the original English and translated Hindi versions of the questionnaire.

Epstein et al.'s (2015) study concluded that the forward-backward translation method aids in reducing discrepancies between the original and source document resulting in more satisfactory results. Rigorous translation provides an equivalence between the two versions of the questionnaires, ensuring that any difference detected results from the difference between the groups and not as a result of contrasts inherent in the measurement tool used to gather the data (Eremenco et al., 2005). The translation and pilot study resulted in all participants agreeing on no discrepancies and difficulties in the PEDS, PEDS:DM, and SDQ English and Hindi forms, ensuring the cultural acceptability of the questionnaire. Therefore, the current study adhered to DuBay and Watson's (2019) standards of a rigorous approach to translation, adaptation and validation of screening tools where cultural differences exists.

Research Setting

The education system in India follows the British structure, with kindergarten for 4 - 6 years of age, primary school for grades 1–5 (children ages 6 – 11), and middle school for grades 6 – 8 (children ages 11 – 14; Cheney et al., 2005). Furthermore, schools are categorised into three categories. The first includes private schools affiliated with the Central Board of Secondary Education, India Certificate of Secondary Education, or International Baccalaureate. In addition, private schools are of two types: private-aided and private-unaided. The main difference between the two is that in private-aided schools the government provides all or most of the funding (aid), but the school is run privately. Private-unaided schools are funded and run privately (Chudgar & Quin, 2012). The second category comprises government schools that the government state boards run. The third category comprises primary schools run with the municipal cooperation of the cities in which they exist

(Misty, 1982). The language of instruction is English in private schools, with Hindi being the secondary language. But it is Hindi and regional languages for government and municipal schools (Cheney et al., 2005). However, India's government has emphasised the importance of providing education in English with the support of various NGOs, such as Teach for India (Subramanian, 2020). Schools are also categorised as urban or rural based on their geographical location, annual household income, and the social and economic infrastructure available to meet a child's needs (Katrak, 2010).

In 2013, the Indian government launched the Rashtriya Bal Swasthya Karyakram, also known as the 'Child Health Screening and Early Intervention Services scheme,' which caters specifically to government schools (Mayank, 2015). The scheme aims at early identification and early intervention for children from birth to 18 years to cover the four Ds: defects at birth; deficiencies; diseases; and development delays, including disability. The target population included newborns, children in Anganwadi centres (rural childcare centres across India), and government schools (Ministry of Health and Family Welfare, 2013). However, the annual progress report of the scheme for 2018 – 2019 provided scant information on the tools used for screening purposes and the number of children screened for developmental delays, and it was labelled 'some important problems in 4 Ds' (Ministry of Health and Family Welfare, 2019). Mukherjee et al. (2021) concluded that the number of children identified for delay and disability has increased since the inception of the scheme. However, some states, such as Maharashtra and Odisha, faced issues with implementation, infrastructure constraints, and limited resources (Hema Priya et al., 2022). Furthermore, the scheme does not cater to private schools in India.

Private schools in India educated 49% of children in urban areas and 21% in rural areas ages 6–11 in 2014 – 2015. In addition, the states with the most children attending private schools include Punjab and the National Capital Region (NCR; Kingdon, 2020). Yet,

developmental screening measures have not been implemented in private schools across India, and the need for early screening is essential to reduce the school dropout rate and provide education and intervention suitable for children (Nair & Rekha Radhakrishnan, 2004).

Special Needs Education in India

The Indian education system comprises of four types of education systems: mainstream education, an alternate form of education; nonformal education; and the National Institute of Open Schooling. Nonformal education caters to children who cannot physically attend school, and the National Institute of Open Schooling provides for children interested in skill-based vocational courses. However, mainstream, and alternative forms of education were only provided to children with TD and did not include education for children with disabilities (Singal, 2006).

India's government in the 1880s introduced the term 'special education,' which later changed to 'special needs education,' which focuses on providing education to children and youth whose needs arise from disabilities or learning difficulties (Sanjeev & Kumar, 2007). Later, the Kothari Commission (1964 – 1966), the National Policy on Education (1986), and more recently The Sarv Shiksha Abhiyan programme (2000 – 2001) emphasised the need for inclusive education, resulting in the establishment of inclusive schools (Singal, 2006). The term 'inclusive' is founded on normalisation, emphasising the assimilation of children with TD and DD and eliminating insecurity among children with DD (Kalgotra & Warwal, 2017). Furthermore, inclusive schools aim to strengthen the education system's capacity by reaching out to all learners, such as children with TD and DD and are an extension of mainstream schools (Taneja Johansson, 2014).

The Sarv Shiksha Abhiyan programme reported a rapid increase in the number of children with disabilities enrolled in mainstream schools from 2003 to 2008, which resulted in

the implementation of inclusive education in multiple states and union territories across India (Singal, 2019). Therefore, for this project, I recruited participants from private inclusive schools in rural and urban areas of Chandigarh, Himachal Pradesh, Punjab, Haryana and the National Capital Region, India. All the states and union territories are located in North India, where people are fluent in Hindi, English, and the states' regional languages (Gupta & Roshan, 2020).

Participants

Bujang and Adnan (2016) recommended a sample size of 300 children. Considering a potential attrition rate of 20% (Heo, 2014), 720 (360 parents and 360 teachers) participants of children with TD and additional 240 participants (120 parents and 120 teachers) of children with DD were required to be recruited for the current study.

Participants comprised a convenient sample of parents and teachers of 466 children: 454 with TD and 61 with DD. Data for 47 children with TD and 2 with DD were excluded due to missing data and/or because the participants did not meet the inclusion criteria. Therefore, the final sample consisted of parents and teachers of 407 children with TD and 59 children with DD.

TD sample

The parents of the TD sample were 276 (68%) mothers and 131 (32%) fathers. Parents age ranged from 23 years to 51 years (M = 34.75, SD = 5.73). The highest educational level and yearly household income for the parents of the TD sample are presented in Table 3.2. The ages of children with TD ranged from 4 to 8 years (M = 5.81, SD = 1.03). For the TD sample the majority (n = 259, 64%) were male and 148 (36%) were female (Table 3.2). Table 3.1 provides the distribution of the TD children across the age groups. A group of 102 teachers completed the SDQ for the TD sample.

DD sample

The parents of the DD sample were 41 (69%) mothers and 18 (31%) fathers. Parents' age ranged from 25 years to 51 years (M = 35.54, SD = 4.44). The highest educational level and yearly household income for the parents of the DD sample are presented in Table 3.2. The ages of children with DD ranged from 4 to 8 years (M = 4.63, SD = 0.82). For the DD sample the majority (n = 43, 73%) were male and 16 (27%) were female (Table 3.2). Table 3.1 provides the distribution of the TD and DD children across the age groups and Table 3.2 indicates the sociodemographic characteristics of participants (parents) of children with TD and DD. A group of 36 teachers completed the SDQ for the DD sample.

Table 3.2

Age Groups of the Children (TD and DD)

Age groups	Typical Development		Developmental Disability	
	n	%	*n*	%
4 – 4.5 years	57	14.00	3	5.08
4.6 – 5.11 years	166	40.78	21	35.59
6 – 7 years	125	30.71	11	18.64
7 – 8 years	59	14.49	24	40.67

Table 3.2

Sociodemographic Characteristics of Participants

Demographic Characteristics	TD		DD	
	n	%	*n*	%
Gender				
Males	259	64	43	73
Females	148	36	16	27
Parent				
Mother	276	68	41	69
Father	131	32	18	31
Highest Educational Level				
Middle school	14	3.43	23	39
High school	35	8.63	4	6.78
Diploma	21	5.15	5	8.47
Undergraduate degree	118	28.99	15	25.42
Postgraduate degree	219	53.80	12	20.33
Yearly household income				
< 75k	67	16.46	28	47.46
75k – 1.5 Lac	55	13.51	6	10.17
1.6 – 3 Lac	42	10.31	9	15.26
3.1 – 5 Lac	90	22.11	4	6.78
5.1 – 10 Lac	88	21.64	11	18.64

>10.1 Lac	65	15.97	1	1.69

Note: A lakh in Indian rupees is equivalent to one thousand US dollars

All participants were offered a choice of either the English-language or Hindi-language versions of the measures. Household income positively correlates with educational attainment among India's rural and urban populations (Pieters, 2009). Therefore, it is important to provide access to Hindi-language versions for parents from lower socioeconomic backgrounds, usually rural residents who may not have completed much of their education in English.

Inclusion criteria for participants were: parents and teachers of children in the age range of 4 – 8 years who are citizens of India and can read, write, and speak at least to Primary 6 level in either English or Hindi. Exclusion criteria were parents whose child is not currently attending school.

Measures

A demographic questionnaire was designed for this study to collect information from the parents on the child's age, gender, and class; parent's gender, level of education, age, and yearly family income; and whether the child had a disability (Appendix G and H). In addition, we administered the following questionnaires, PEDS, PEDS:DM, and SDQ. A description of these measures has been previously reported in Chapter 2 and, for completeness here, is reproduced below.

Parents' Evaluation of Developmental Status (PEDS)

The PEDS (Glascoe, 1998) is a surveillance and screening tool for children ages 0 – 8. The tool elicits and addresses parents' concerns about development, behaviour, and mental health. The tool comprises one form with 10 questions across 10 categories (expressive language; receptive language; and social–emotional, behavioural, fine motor, gross motor,

self-help, school, cognitive, and health issues). The questions in the PEDS elicit parents' perspectives of their child's development as high/medium/low risk. The response options are 'yes', 'no', and 'a little'. The scoring for the PEDS includes columns for each age range and identifies which concerns predict problems and which do not. Furthermore, the form directs the investigator to one of five evidence-based decisions regarding the results. Path A indicates two or more concerns, Path B includes one predictive concern, Path C includes nonpredictive concerns, Path D includes parental difficulties in communication, and Path E includes no concerns. The PEDS-interpretation form contains an algorithm to decide whether to refer, screen further, or observe the children or counsel or reassure the parents on the results obtained (Glascoe, 1998).

The PEDS was restandardized and revalidated in 2013 (Glascoe, 2013). The interrater reliability was .95, and the test–retest reliability was .88. The PEDS's validity ranges from .84 to .99 compared to later deficits and diagnoses (Glasco, 2013). The PEDS accurately differentiates children with developmental delay compared to other tools that take longer to assess them, with a sensitivity of 86% and specificity of 74% (Kiing et al., 2019). The PEDS is considered one of the promising tools for use across settings in LMIC (Marlow et al., 2019). Descriptive information on the measures is presented in Appendix I.

Parent Evaluation of Developmental Status: Developmental Milestones (PEDS:DM)

Glascoe et al. (2006) developed PEDS:DM, a new measure to be used with the PEDS. It comprises six to eight items per age and aims to predict children's developmental status accurately. Each item on the PEDS:DM addresses a different domain (fine motor, gross motor, expressive language, receptive language, self-help, and social–emotional and for older children, reading and maths). The age-appropriate items are presented on a single page in a laminated book that includes essential visual stimuli. Parents answer the PEDS:DM items via a multiple-choice format in less than 5 minutes. A single scoring template built into the binder

is used to determine whether the milestones are met or unmet. Once answers are marked, the scoring template is placed on top of the questions and answers and aligned with the registration marks. Any marks that show through the template are unmet milestones. The results regarding met and unmet milestones are then shifted to the recording form and captured through colouring the boxes and drawing a line according to the child's age and developmental milestones, respectively (Brothers et al., 2008). Furthermore, the PEDS:DM uses the same evidence-based decision (different paths) process for the results as the PEDS.

The PEDS:DM's internal consistency across all domains is .98, the test–retest reliability was .98 and .99, and the interrater reliability revealed an agreement of .82 – .96 across subtests. The concurrent, discriminant, and criterion-related validity for the PEDS:DM are satisfactory compared to other similar disabilities and screening tools. In addition, the scale's specificity and sensitivity are 80% and 85%, respectively (Brothers et al., 2008). Descriptive information on the measure is presented in Appendix I.

Strengths and Difficulties Questionnaire (SDQ)

Robert N. Goodman developed the SDQ in the United Kingdom. This screening measure evaluates mental health problems in children ages 2 – 17 (Goodman, 2001). It comprises 25 questions under five domains: (a) emotional symptoms, (b) conduct problems, (c) hyperactivity/inattention, (d) peer-relation problems, and (e) prosocial behaviour, and parents and teachers complete it (Goodman, 1997). This screening tool includes a 3-point rating scale: *not true*, *somewhat true*, and *certainly true*. The scoring for the SDQ comprises the total difficulty score, which is obtained by summing the scores for all scales except the prosocial scale. The total score ranges from 0 to 40. The cut-off points for the SDQ scores are 'normal', 'borderline', and 'abnormal' (Goodman, 2001). Table 3.3 presents the cut- off points for the subscales of the SDQ for parent and teacher form (Appendix J and K).

Table 3.3

Cut-off Points for the Subscales of the SDQ (Parent and Teacher Forms)

SDQ subscales	Normal	Borderline	Abnormal
		Parent	
Total Difficulties	0 – 13	14 – 16	17 – 40
Emotional Problem	0 – 3	4	5 – 10
Conduct Problem	0 – 2	3	4 – 10
Hyperactivity	0 – 5	6	7 – 10
Peer Problem	0 – 2	3	4 – 10
Prosocial Behaviour	6 – 10	5	0 – 4
		Teacher	
Total Difficulties	0 – 11	12 – 15	16 – 40
Emotional Problem	0 – 4	5	6 – 10
Conduct Problem	0 – 2	3	4 – 10
Hyperactivity	0 – 5	6	7 – 10
Peer Problem	0 – 3	4	0 – 4
Prosocial Behaviour	6 – 10	1	2 – 10

The SDQ has sound psychometric properties. The screening tool's internal consistency is .73, and the test–retest reliability is .62. The discriminative and convergent validity were .80, and .50, respectively, and the specificity and sensitivity were above 70% (Kersten et al., 2016).

Procedure

The study received a Human Research Ethics Committee approval (H8285) to administer the screening questionnaires to parents and teachers of children ages 4 – 8. Data collection was conducted online between August and December 2021 using Qualtrics. Qualtrics is a survey tool to conduct survey research and evaluations. The platform is fast, easy, and can store large volumes of data at any given time (Boas et al., 2020). School principals of the following schools consented to take part in the study as seen in Table 3.4.

Table 3.4

Name of the Schools and the City (All Inclusive Schools)

Name of the schools	City
St. Columba's School	New Delhi
Sanskriti School	New Delhi
Lotus Petal Foundation	New Delhi
Sanskar Valley School	Hoshiarpur
Kangra Valley Senior Secondary School	Dharamshala
Alpine Public School	Kangra
Dhauladhar Public School	Kangra
DAV Schools	Panchkula

Parents were given a choice of either the English-language or the Hindi-language version of the measures. Parents clicked on the language in which they were most comfortable answering the questions.

All participants were provided with a Participant Information Sheet describing the study and the type of information that would be requested from them (Appendix C and D). If participants had any questions about the study, they could email the researcher to receive

answers to their queries. After providing informed consent, parents filled out the demographic questionnaire, PEDS, PEDS:DM, and SDQ. The total time to complete the form was 15 – 20 minutes.

Parents of children with TD and DD were also asked whether they would consent for their child's class teacher to fill out the SDQ questionnaire on their child. If parents agreed, the English and Hindi versions of the SDQ were emailed to teachers. The teachers clicked on the language in which they were most comfortable answering.

Data Analysis

Data analysis was conducted using SPSS 18.0 and AMOS 18. The statistical analysis undertaken to address the first aim includes Chi-squared (test of contingencies) to explore the relationship between general and specific concerns of parents of children with TD and DD on the PEDS. Mann-Whitney U test was used to determine whether the PEDS could differentiate between children with TD and DD. The Kruskal-Wallis test was used to determine whether the frequency of concerns elicited by parents on the PEDS varied across the children's age groups. ROC curve evaluated the specificity and sensitivity of PEDS and PEDS: DM.

The statistical analysis completed to address the second aim includes Confirmatory-factor analysis (CFA) to determine whether the SDQ data fit the 25-item, 5-factor structure model that Goodman (1997) proposed. However, CFA was not undertaken for PEDS since each domain consisted of only one question. Byrne (2010) recommended each scale consist of at least five questions to perform CFA. The internal consistency of the SDQ was assessed using Cronbach's alpha and Omega.

Paired sample *t*-test was used to compare parents and teachers' responses to the SDQ subscales for children with TD. One-way ANOVA was used to compare the SDQ subscale results for TD versus DD sample by parents and teachers.

The statistical analysis addressing the study's third aim involved multivariant analysis of variance (MANOVA) followed by one-way ANOVA to explore whether there was any relationship between Developmental Status and Psychosocial Functioning.

Chapter 4: The Use of Parents' Concerns in Screening Children for Developmental Delay

Early detection of developmental and behaviour problems among children is often impeded by a lack of evidence (Glascoe, 1999). Especially in India, where rural and urban schools lack the ability to screen children for developmental delays and SEL. Healthcare authorities are often unaware of screening tools that can be used to help parents understand their children's developmental milestones, and physicians often rely on informal methods of early identification (Glascoe, 1998; Ilić et al., 2020). Such methods often result in children with mild to moderate learning difficulties and emotional problems not being identified (Glascoe, 1999). One approach for early detection is to use parents' concerns regarding their child's development. Parents concerns can assist clinicians in determining whether a child requires additional diagnosis, early intervention, and routine monitoring (Glascoe, 1997).

Several studies have suggested a strong parallel relationship between the type of concerns elicited by parents regarding their child's development and subsequent diagnosis of disabilities (Glascoe, 1999; Ilić et al., 2019; Ozonoff et al., 2009). When parents are questioned regarding their child's development, parents typically make a range of statements (Glascoe, 1999). Parent statements, when statistically evaluated, reported a high likelihood of representing a disability. When a parent and child interact, parents may be worried about the child because of how they behave at home and in the community. Furthermore, behind a single parental concern, a child may be struggling with various issues that are invisible to the parents (Ilić et al., 2020). Studies have also reported that parents of children with DD will report more concerns on the PEDS test compared to TD children, and parents of younger children raise fewer concerns than the parents of older children (Glascoe, 2000, 2000a; Ilić et al., 2019; Maleka et al., 2019; Mukherjee et al., 2021; Simon et al., 2013).

Therefore, this study aimed to report on the use of parents' concerns in screening children for developmental delay. Specifically on the use of the PEDS and PEDS: DM for screening. For the PEDS measure, the analyses conducted and the format for the presentation of results followed that of Ilic et al. (2020) study of 289 parents of TD children in Serbia. Illic's study reported a significantly large correlation between general and specific concerns regarding behaviour and social-emotional functioning and a small significant correlation between fine motor skills and expressive language (Ilic et al., 2020). This study also included an analysis of parents whose children have DD.

The PEDS was administered to parents of children with TD and DD. The study's main aim was to describe the physical, cognitive, and social-emotional development of young children with TD and DD in India. Further, examination of whether the PEDS could distinguish between children with TD and DD and whether the frequency of concerns of parents of younger children would be less than older children in the screening tool was undertaken. This study also assessed the diagnostic accuracy of the PEDS and PEDS:DM for developmental screening of children in India aged 4 - 8 years (Chunsuwan et al., 2016; Mukherjee et al., 2022). Consistent with these investigations, the following hypotheses were constructed:

Hypothesis 1.1. Parents' general concerns will significantly correlate with specific concerns for all domains for children with TD and DD (Ilic et al., 2020).

Hypothesis 1.2. Parents of TD children will, on average, report higher levels of physical development on the PEDS than parents of DD children of the same age.

Hypothesis 1.3. Older TD children will, on average, be reported by their parents to have more concerns regarding physical development on the PEDS than younger TD children.

Hypothesis 1.4. The diagnostic accuracy using sensitivity and specificity for PEDS and PEDS:DM will be suitable for screening children from clinical and community samples aged 4-8 years in India.

Results

Parents' Concerns in General and with Specific Developmental Domains

This study assessed the parents' general concerns in their replies to the first questions of the PEDS form and the specific concerns they expressed regarding all developmental milestones on the rest of the PEDS form. Both the PEDS and PEDS:DM use ordinal levels of measurement. Assumption testing carried out for ordinal data reported that the distribution of data for the groups (TD and DD; age groups) was not the same. Therefore, nonparametric statistics were used in analysing the results.

Table 4.1 presents the distribution of scores for parents who completed PEDS for children with TD and DD. PEDS categorises children into three categories: High risk (two or more predictive concerns), one predictive concern (medium risk), and no concern (low risk) for delays.

Table 4.1

Distribution of Scores for Parent Completed PEDS for Children with TD and DD

Classification	Two or more concerns*		One concern*		No concern	
	n	%	*n*	%	*n*	%
TD	69	17	120	29	218	54
DD	46	78	8	13	5	8

Note: *Predictive concerns; concerns that predict delay or disability.

Following Ilic et al. (2020) chi-square test of contingencies analysis was used to assess the relationship between the parents general and specific concerns. Certain questions on the PEDS form received no "Yes" answers from the participants. Therefore, the only other two responses on the PEDS form ("No" and "A little") were tabulated. Furthermore, the responses were tabulated as "concerns" and "no concerns" for the health and global or cognitive development domains because these questions were open-ended on the PEDS form.

Children With Typical Development

The frequency of concerns raised by the parents of children with TD indicated that n = 218 (54%) of the parents had no concerns, n = 120 (29) % had one concern, and n = 69 (17%) had two or more concerns regarding their children's development (Table 4.1).

A Person's chi-square test of contingencies (with $\alpha = .05$) was used to explore whether there was any relationship between general concerns and expressed concerns on specific developmental domains on the PEDS test for children with TD. Parents' general concerns regarding their child's development, interpreted through the first question of PEDS, had a significant relationship with expressed concerns on specific developmental delay domains answered through other questions of the PEDS. This was statistically significant for expressive language and articulation (p =.009), behaviour (p = .001), self-help (p = 02), cognitive development ($p < .001$), and Health ($p < .001$). The relationship indicates that parents who express general concern for their child's development also express similar concerns when responding to specific developmental milestone screening questions (Table 4.2).

Table 4.2

Relationship between General Concerns and Expressed Concerns on PEDS test for Children with TD

General Concerns	Specific Concerns			χ^2
	Yes	No	A little	
	Expressive language and articulation			
No	1 (< 1%)	229 (56%)	29 (7%)	9.46*
Yes	0	115 (28%)	33 (8%)	
	Receptive language			
No	0	235 (58%)	24 (6%)	.253
Yes	0	132 (32%)	16 (4%)	
	Fine motor skills			
No	0	244 (60%)	15 (4%)	.208
Yes	0	141 (34%)	7 (2%)	
	Gross motor skills			
No	0	248 (61%)	11 (3%)	.633
Yes	0	144 (35%)	4 (<1%)	
	Behaviour			
No	0	228 (56%)	31 (8%)	10.45*
Yes	0	112 (27%)	36 (9%)	
	Social–emotional learning			
No	0	237 (58%)	22 (6%)	1.43
Yes	0	130 (32%)	18 (4%)	

	Self-help			
No	0	244 (61%)	15 (3%)	5.13*
Yes	0	130 (32%)	18 (4%)	
	School			
No	0	234 (58%)	25 (6%)	3.13
Yes	0	125 (31%)	23 (5%)	
	Global or Cognitive Development			
No	1 (<1%)	258 (63%)	0	402.70*
Yes	148 (37%)	0	0	
	Health			
No	9 (2%)	250 (62%)	0	5.19*
Yes	13 (3%)	135 (33%)	0	

Note: *p <.05

Children With Developmental Disability

The frequency of concerns raised by the parents of children with DD indicated n = 5 *(*8%) of the parents had no concerns, n = 8 (13%) had one concern, and n = 46 (78%) had two or more concerns regarding their children's development (Table 4.1).

Table 4.3 presents the relationship between general concerns and expressed concerns on specific developmental domains on the PEDS test for children with DD. Parents general concerns reported through the first question of PEDS indicated that parents also expressed the same concerns in expressive language and articulation (p = .021), fine motor skills (p =.004), behaviour (p =.027), school (p =.028), cognitive development (p < .001), and Health (p =.015).

Table 4.3

Relationship between General Concerns and Expressed Concerns on PEDS test for Children with DD

General Concerns	Specific Concerns			χ^2
	Yes	No	A little	
	Expressive language and articulation			
No	2 (3%)	22 (37%)	09(16%)	8.61*
Yes	1 (1%)	8 (14%)	17 (29%)	
	Receptive language			
No	6 (11%)	14 (24%)	13 (22%)	2.85
Yes	1 (1%)	13 (22%)	12 (20%)	
	Fine motor skills			
No	9 (15%)	14 (24%)	10 (17%)	10.37*
Yes	0	20 (34%)	6 (10%)	
	Gross motor skills			
No	3 (5%)	20 (34%)	10 (17%)	0.81
Yes	1 (1%)	18 (31%)	7 (12%)	
	Behaviour			
No	4 (7%)	17 (29%)	12 (20%)	7.93*
Yes	1(1%)	6 (10%)	19 (33%)	
	Social–emotional learning			
No	3 (5%)	21 (36%)	09 (15%)	1.47
Yes	2 (3%)	13 (22%)	11 (19%)	

	Self-help			
No	4 (7%)	12 (20%)	17 (29%)	3.79
Yes	0	13 (22%)	13 (22%)	
	School			
No	10 (17%)	7 (12%)	16 (28%)	6.48*
Yes	2 (3%)	12 (20%)	12 (20%)	
	Global or Cognitive Development			
No	33 (56%)	0	0	59*
Yes	0	26 (44%)	0	
	Health			
No	29 (49%)	4 (7%)	0	5.57*
Yes	16 (27%)	10 (17%)	0	

Note: *p <.05

Comparison of Results on the PEDS for Children with TD and DD

A Mann-Whitney *U* test was conducted to explore whether the PEDS could distinguish between children with TD and those with DD. The independent variable was the two groups (children with TD and DD), and the dependent variable was the children's score on PEDS.

Data was collected from inclusive schools that cater to children with TD and DD. Children were categorised as DD by their school records. Clinicians assess children in government hospitals using standardised tests and present their reports to the school for admission.

Results from the Mann–Whitney *U* Test indicated that parents of children with DD reported significantly higher concerns on PEDS test (*Mean Rank* = 373.01, n = 59), than

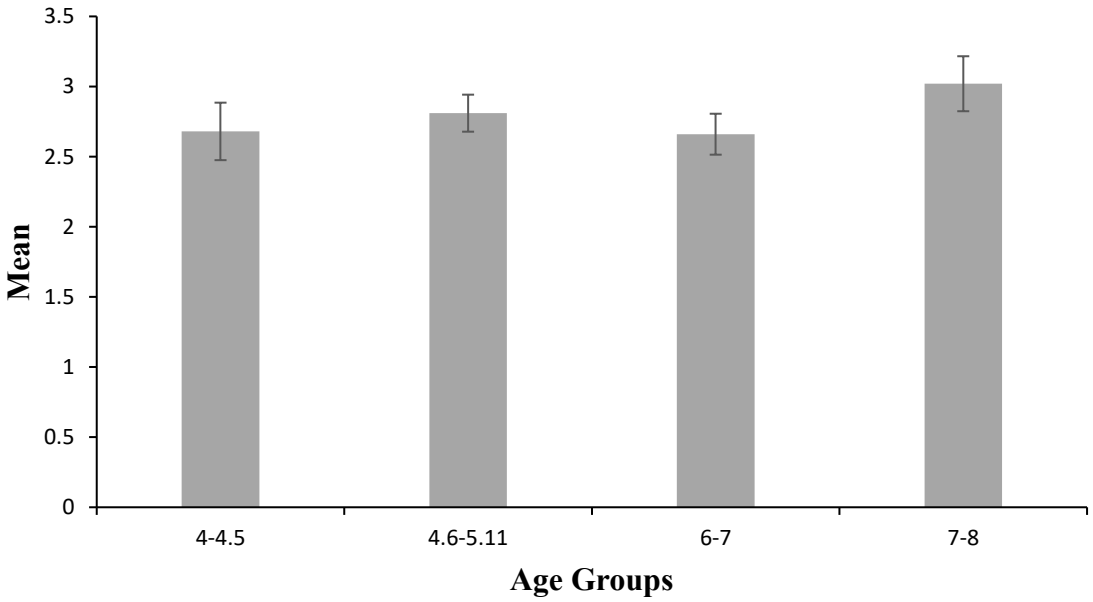
parents of children with TD (*Mean Rank* = 213.28, *n* = 407), *U* = 3775.500, *z* = -8.92, *p* < .001, two-tailed. The effect size is descried as medium (*r* = .41).

Frequency of Concerns by Children's Ages

The children with TD were categorised into four groups based on the PEDS scoring and interpretation sheet. A Kruskal-Wallis ANOVA indicated that there was no statistically significant difference in parents' concerns between children's age group of 4 – 4.5 years (*Mean Rank* = 195.51), 4.6 – 5.11 years (*Mean Rank* = 208.56), 6 - 7 years (*Mean Rank* = 195.46), and 7 – 8 years (*Mean Rank* = 217.46), *H* = 2.219, *df* = 3, *N* = 407 *p* = .528 (Figure 4.1)

Figure 4.4

Frequency of Concerns by Children's Ages (Typical Development)



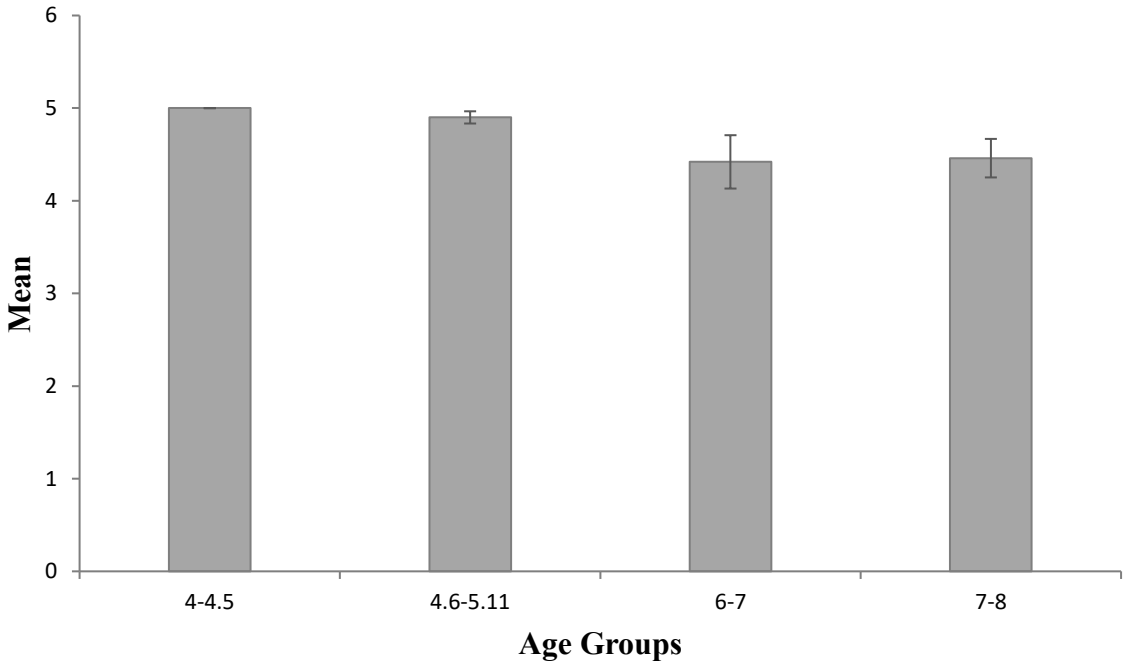
Note. The bars present the average frequency of concerns across the different age groups and the error bars represent the standard errors of the means in a measurement.

The children with DD were categorised similarly to the children with TD. A Kruskal-Wallis ANOVA indicated that there was no statistically significant difference in parents' concerns between children's age group of 4 – 4.5 years (*Mean Rank* = 36.50), 4.6 – 5.11 years

(*Mean Rank* = 33.93), 6 – 7 years (*Mean Rank* = 24.55), and 7 – 8 years (*Mean Rank* = 28.10), $H = 5.428$, $df = 3$, $N = 59$ $p = .143$ (Figure 4.2).

Figure 4.2

Frequency of Concerns by Children's Ages (Developmental Disability)



Diagnostic Accuracy of the PEDS and the PEDS:DM

The PEDS and PEDS:DM results were compared for diagnostic accuracy. The PEDS demonstrated good sensitivity of 91% and low specificity of 47%, whereas the PEDS:DM demonstrated poor sensitivity of 17% and specificity of 6% for children in India. Furthermore, 117 (26%) parents indicated two or more concerns on the PEDS. Classified as high risk (≥ 2 significant concerns), the PEDS:DM results for these children reported a lower-than-expected sensitivity and sensitivity of 30% and 26%, respectively.

Discussion

Similar relationships were found in both cohorts between general concerns and concerns in specific developmental domains. Results from the parents of both children with TD and children with DD showed significant relationships between their general concerns and

the specific domains of expressive language and articulation, behaviour, global or cognitive development, and health. In addition, the results from the parents of children with TD showed a significant relationship between their general concerns and the self-help domain, and the results from the parents of children with DD indicated significant relationships between their general concerns and both the fine motor skills and school domains. However, the relationships between the parents' general concerns and concerns about the four specific domains of receptive language, fine and gross motor skills, SEL, and school were not statistically significant for children with TD. The association between the parents' general concerns and concerns about the four specific domains of receptive language, gross motor skills, SEL, and self-help were not significant for children with DD, therefore not supporting hypothesis 1.1.

According to the PEDS form, the majority of significant correlations between the general and specific domains of concerns for children with DD are attributable to predictive concerns, whereas the majority of significant correlations for children with TD are attributable to non-predictive concerns. Predictive concerns are related to skills that indicate developmental delay or disability. Participants require referrals when their overall scores on the PEDS are high. For children with DD, the relationship between the general and specific domains of concern was prevalent in predictive concerns that indicate delay among children. On the contrary, the significant relationships among children with TD are mostly related to non-predictive concerns that do not indicate disability (Maré et al., 2017).

High income countries such as Australia (Coghlan et al., 2003), the United States (Huntington et al., 2016), and LMIC such as Bhutan (Wong et al., 2019) and Israel (Diamond et al., 2015) have also reported similar results, where parents of children with TD and DD expressed concerns on all domains other than cognitive development. Ilić et al.'s (2020) Serbian study partially supported the findings from the current study with significant

correlations in behaviour, fine motor skills and expressive language for children with TD and DD.

Specifically for a clinical sample, studies conducted in the United States (Soucy et al., 2012) reported concern on at least one domain of the PEDS. In Australia, the PEDS form was administered to children with ASD, specific language impairment (SLI), DD, and TD and results showed that the parents of children with ASD had the highest concerns, followed by the parents of children with DD, the parents of children with SLI, and the parents of children with TD (Veness et al., 2012). In a study of children with ASD, evaluated using the Modified Checklist for Autism in Toddlers Revised and the PEDS, the parents of children who screened positive for the disorder on the test reported developmental concerns on the PEDS (Wiggins et al., 2014). These results were contrary to those of a study by Pinto-Martin et al. (2008) which found that children screened for ASD using an ASD-specific screening instrument did not elicit developmental concerns on the PEDS. Furthermore, a study by Glascoe (1999) reported similar findings, where parents of children with an IQ of less than 79 reported concerns in multiple domains such as behaviour, academic writing, speech, and language development.

In the current study, the PEDS distinguished between children with TD and DD, thus supporting hypothesis 1.2. These results are the same as those reported in a South African study, where most parents of children at risk of DD had higher concerns than parents of their age-equivalent peers. Specifically, like the current findings, the developmental domains that parents reported high concerns consistently across the PEDS included behaviour, school, cognitive development, and health (Maleka et al., 2019).

Studies conducted in Indonesia (Gustawan et al., 2010), South Africa (PEDS translated to Northern Sotho; Fyvie et al., 2016), and the United States (Hodges et al., 2016) reported the PEDS to have good sensitivity and specificity for children with TD. However, in

the current study conducted in India, the PEDS had good sensitivity and low specificity for children with TD and DD. Therefore, hypotheses 1.4 was not supported. However, the current findings are consistent with those from studies conducted in Australia (Wake et al., 2005) and Canada (Limbos & Joyce, 2011). Tests with low specificity produce more false positive results, often leading to inappropriate referrals. The PEDS:DM had below acceptable sensitivity and specificity for children with TD and DD (sensitivity of 17% and specificity of 6%). Although, the percentage slightly increased for children who were classified as high risk on the PEDS. These findings were similar to those from another study conducted in India (Mukherjee et al., 2022), where the PEDS and PEDS:DM were administered to children 0 – 2 years of age, with the scores showing the screening tool had high specificity and low sensitivity. The current findings also aligned with the findings reported from a study in Thailand (Chunsuwan et al., 2016).

Studies that administered the PEDS to participants in the United States (Nelson et al., 2019) and Canada (Thomas et al., 2016) reported that the tool could not differentiate between participants belonging to an early intervention group and a control group. In addition, the referral rate between the two groups was the same. Specifically, in Canada, the authors provided multiple explanations for the results, such as the fact that the physician's comments on the PEDS form for children in the intervention groups were brief and offered little information on the problems identified by the screening instrument (Thomas et al., 2016).

Current findings of the PEDS with high sensitivity and low specificity and the PEDS:DM with below acceptable sensitivity and specificity demonstrate that the tool should not be regarded as the gold standard and should be used as an initial screening test to detect a developmental delay in children (Gustawan et al., 2010). Low specificity would result in increased false positives, burdening the healthcare system (especially in LMIC) and increasing parents' anxiety, expenditure, and stigmatisation (Mukherjee et al., 2021).

Specifically, low sensitivity and specificity for PEDS:DM suggests that parents do not comprehend their child's development (Chunsuwan et al., 2016). Glascoe (1997) reported that excessively concerned parents should be considered vigilant observers who notice behavioural and developmental problems that fall in the grey zone between the disabled and the average. However, in the current study, the PEDS had reasonable test characteristics, supporting its use for developmental screening in a primary care setting (Limbos & Joyce, 2011).

Importantly, language may have played a role in the results obtained from the current study. Most parents are unaware of their children's developmental milestones in LMIC (Chunsuwan et al., 2016; Mukherjee et al., 2021). Words such as "concerns" may make it difficult to elicit any response from the parents, resulting in no concerns being recorded (Mukherjee et al., 2021). A cross-cultural interpretation could also increase the proportion of children recognised as being at high risk of disability (Kiing et al., 2012). Especially in Asian countries, concerns are often understood as worry, and the phrase "a little concern" is often considered ambiguous (Kiing et al., 2012). Parents understanding of normal development and behaviours may differ between LMICs and the United States (Chunsuwan et al., 2016).

Furthermore, mismatches between question intent and actual parent concern can occur, and the parents misunderstanding of what is developmentally appropriate for their children could have affected the results obtained in the current study (e.g., Cox et al., 2010; Wong et al., 2019). For example, Question 1 of the PEDS form asks whether parents have any concerns regarding their children's development and behaviours. Most of the parents often did not specify any concerns and instead emphasised how online education during the COVID-19 pandemic had affected their children and families. Multiple factors, including inappropriate developmental expectations, limited health literacy, and culturally distinct

comments, may contribute to the discrepancy between the screening tool's intended purpose and its actual outcome (Cox et al., 2010).

The parents' concerns regarding their children's development did not differ according to the age range of the children. Therefore, hypothesis 1.3 was not supported. These findings contradict previous studies, which found a significant difference in the concerns raised by parents across age groups, with the parents of younger children raising fewer concerns than the parents of older children with TD (Glascoe, 2000, 2000a). American (Simon et al., 2013), Serbian (Ilić et al., 2019), and Indian studies (Mukherjee et al., 2021) found similar results in children with TD. However, notably, India does not regularly ask parents about their children's development, which is believed to be one of the reasons why parents in LMIC have lower developmental literacy than parents in high-income countries (Mukherjee et al., 2021).

Conclusion

Many studies have been conducted in India using different screening tools. Specifically, a few studies have used the PEDS to evaluate the reliability and validity of the tool with Indian participants. The results of the current study are useful because they clarify the relationship between general and specific concerns on the PEDS developmental domains. This study found that for children with DD, significant relationships existed between general concerns and specific developmental domains that predict delay or disability, also known as predictive concerns. On the contrary, for children with TD, the relationships existed with specific developmental domains that do not predict delay or disability, that is, non-predictive concerns. This study found that the PEDS could differentiate between children with TD and DD. However, the frequency of concerns of parents of younger children did not differ from the frequency of parents of older children for both the TD and DD samples.

Furthermore, the PEDS and PEDS:DM had poor specificity; therefore, the screening tool should be used cautiously. Nonetheless, this study provides helpful pilot information on

PEDS implementation as a screening tool for children aged 4 - 8 years in India. This research also provides arguments for introducing this type of parental screening into health care and preschool practices.

Chapter 5: Assessing Social-Emotional Learning: Parent and Teacher Reports for Children with TD and DD

Parents and teachers play a vital role in a child's development and learning. As informants, they can provide their evaluation of the child's behaviour (Ren & Fan, 2021). However, empirical evidence reports that there is low concordance between parents and teachers reporting regarding child's development and behaviour of children with TD and DD (Hundert et al., 1997; Iizuka et al., 2010; Llanes et al., 2020; Marsh & Ng, 2017; Shahrivar et al., 2009). There may be differences between the home and school learning environments that contribute to this disparity. Parents and teachers may have varying opportunities and experiences to observe children's learning behaviours, resulting in divergent perceptions of children's performance (Ren & Fan, 2021). However, it is essential to note that a single source informant would result in fewer children being screened for further diagnosis and early intervention. Therefore, for improved and accurate screening of children, it is essential to obtain ratings from multiple informants. Moreover, specifically in India, there is scant literature comparing parent and teacher ratings of children from clinical and community samples together using the SDQ.

The SDQ was developed using the Rutter Questionnaire, a screening questionnaire with good psychometric properties (test-retest reliability of .89 and inter-rater reliability of .72) and comprising the comprise the exact domains of emotional problems (EP), conduct problem (CP), hyperactivity (HI), peer problem (PP), and prosocial behaviour (PB) (Goodman, 1994; Goodman, 1997).

Before reporting the results from the SDQ, it was essential to explore whether the SDQ five-factor model, which examines the multidimensionality of a theoretical construct (social-emotional learning) comprising of five factors (emotional symptoms, conduct problem, hyperactivity, peer problem, and prosocial behaviour) was a good fit for the data

obtained from parents and teachers. Consistent with the original development of the SDQ, this was determined using the data from the TD (nonclinical) sample.

Studies in the past have reported that the parent and teacher SDQ five-factor model was a good fit for children aged 4-12 years with TD (Bull et al., 2016; Chiorri et al., 2016; Croft et al., 2015; Dahlberg et al., 2019; Goodman, 2001; Hall et al., 2019; Hawes & Dadds, 2004; Theunissen et al., 2013; Van Widenfelt et al., 2003). Specifically, the two-factor model consisting of two factors of the SDQ (total difficulties and prosocial behaviour) and the five-factor model of the English and Hindi version of the SDQ assessed adolescents with TD in India and reported a good fit for self-report (Singh et al., 2015; Stevanovic et al., 2015). However, studies have yet to evaluate whether the five-factor model is a good fit for parents and teachers of children aged 4-8 in India.

Therefore, in the current study, the SDQ was administered to parents and teachers of children with TD and DD in India. This data was used to: (a) determine whether the original five-factor model of the SDQ could be used in India, (b) compare parent reports of the social-emotional development of children with TD with the parent reports of the children with DD, (c) compare teacher reports for children with TD to teacher reports for children with DD, (d) determine the degree of agreement between parents and teachers reports on the social-emotional development of children with TD, and (e) examine the relationship between developmental status, as assessed by the PEDS, and psychosocial functioning, as assessed by the SDQ, among children aged 4 – 8 years in India.

To investigate these aims, the following hypotheses were constructed:

Hypothesis 2.1. The internal structure validity of the SDQ will be demonstrated by finding the five factors (emotional problem, conduct problem, hyperactivity, peer problem, and prosocial behaviour) previously reported in the literature for parents of children with TD (Chiorri et al., 2016; Goodman, 2001).

Hypothesis 2.2. The internal structure validity of the SDQ will be demonstrated by finding the five factors (emotional problem, conduct problem, hyperactivity, peer problem, and prosocial behaviour) previously reported in the literature for teachers of children with TD (Chiorri et al., 2016; Goodman, 2001).

Hypothesis 2.3. Parents of children with TD will, on average, report lower levels of problems on each of the four domains (emotional problem, conduct problem, hyperactivity, and peer problem) of the SDQ than parents of children with DD, of the same age.

Hypothesis 2.4. Parents of children with TD will, on average, report higher levels of prosocial behaviour on the SDQ) than parents of children with DD, of the same age.

Hypothesis 2.5. Teachers of TD children will, on average, report lower levels of problems on each of the four domains (emotional problem, conduct problem, hyperactivity, and peer problem) of the SDQ than teachers of children with DD, of the same age.

Hypothesis 2.6. Teachers of TD children will, on average, report higher levels of prosocial behaviour on the SDQ than teachers of children with DD, of the same age.

Hypothesis 2.7. Parents will, on average, report the children with TD to have lower levels of problems on each of the four domains (emotional problem, conduct problem, hyperactivity, and peer problem) of the SDQ than teachers.

Hypothesis 2.8. Parents will report the children with TD to have higher levels of prosocial behaviour on the SDQ) than teachers.

Hypothesis 2.9. Parents will, on average, report the children with DD to have lower levels of problems on each of the four domains (emotional problem, conduct problem, hyperactivity, and peer problem) of the SDQ than teachers.

Hypothesis 2.10. Parents will report the children with DD to have higher levels of prosocial behaviour on the SDQ) than teachers.

Factor Structure of the SDQ in India

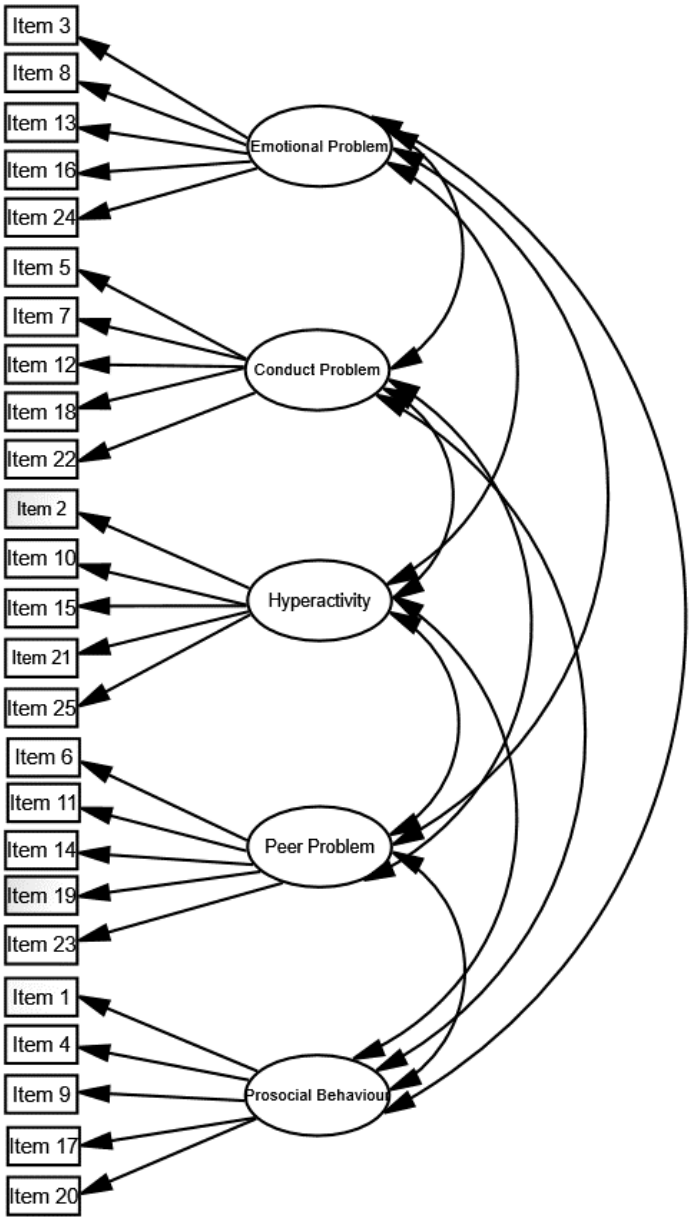
The Confirmatory Factor Analysis (CFA) technique used was maximum likelihood estimation. Each SDQ item was specified to load on only one latent factor. The five latent factors, emotional symptoms (ES), conduct problem (CP), hyperactivity/inattention (HI), peer problem (PP), and prosocial behaviour (PB), were allowed to correlate with one another. All measurement errors were assumed to be uncorrelated (Figure 5.1).

In carrying out the CFA, the comparative fit index (CFI) and Tucker–Lewis Index (TLI) were employed to determine the model fit. A cut-off value greater than .90 on these two fit indices is considered acceptable, and a cut-off value greater than .95 indicates a good fit (Brown et al., 2006). The root means error of approximation (RMSEA), which determines how well a hypothetical model reproduces a sample covariance, was also employed. The guidelines by Hu and Bentler (1998) indicate that values close to .06 or below are considered a good fit, close to .07 and less than .08 as a moderate fit, close to .08 to .10 as a marginal fit, and above .10 as a poor fit.

Gomez and Stavropoulos (2019) reported that only three out of 13 studies that have validated the SDQ have CFI and TLI values of .90 and above, and all studies have RMSEA values of below .08 with 10 studies having a value of less than .06. Most studies have used RMSEA to determine model fit compared to CLI and TLI (Gomez & Stavropoulos, 2019). Therefore, the model fit for the five-factor model will be determined by RMSEA values. A five-factor model was recommended for the current study, as seen in Figure 5.1.

Figure 5.5

Proposed Five-Factor-Model of Parents and Teacher SDQ Data to be Tested



Results from the CFA

There were no missing values for the SDQ rating used in the current study. Results of the CFA performed on 25 items of the five-factor SDQ model using the responses from parents of children with TD suggested a good fit on the RMSEA value (RMSEA = .060; $\chi 2$ = 650.501; CFI = .699; TLI = .659). The RMSEA value for teachers of children with TD suggested a marginal fit (RMSEA = .090; $\chi 2$ = 988.80; CFI = .738; TLI = .704).

Considering that each SDQ item was specified to load on just one latent factor in the model, the standardised estimates were regarded as factor loadings (Kline, 2011). Tables 5.1 and 5.2 show the complete results of the CFA analysis conducted for parents and teachers. The parent SDQ responses reported all item parameter estimates, except item number 22 of conduct problem (CP) and 23 of peer problem (PP) subscales, were statistically significant at the $p < .001$ level. For teachers, other than items 11 and 23 of the PP, all item parameters were also statistically significant at $p < .001$. Three-fourths of the parent and teacher SDQ items were moderately to strongly associated with their latent variables, suggesting that the item factor relationship was good.

Table 5.1

Results of the CFA for Parents of TD Children on the SDQ

SDQ Subscales	Item	Standardised estimates	Standard estimate	Critical ratio	*p*-value
EP	Q3*	.373	-	-	-
EP	Q8	.415	.245	4.972	***
EP	Q13	.552	.256	5.746	***
EP	Q16	.529	.360	5.270	***
EP	Q24	.568	.390	5.396	***
CP	Q5*	.479	-	-	-
CP	Q7	.473	.152	5.623	***
CP	Q12	.321	.088	4.855	***
CP	Q18	.500	.116	6.691	***
CP	Q22	.179	.064	2.788	.003
HI	Q2*	.381	-	-	-
HI	Q10	.378	.184	4.309	***
HI	Q15	.499	.219	5.300	***
HI	Q21	.386	.283	3.160	***
HI	Q25	.543	.321	3.713	***
PP	Q6*	.277	-	-	-
PP	Q11	.330	.466	2.82	***
PP	Q14	.399	.400	3.059	***
PP	Q19	.344	.301	3.59	***

PP	Q23	.109	.299	1.654	0.90
PS	Q1*	.422	-	-	-
PS	Q4	.441	.221	5.463	***
PS	Q9	.572	.219	6.168	***
PS	Q17	.468	.205	5.680	***
PS	Q20	.556	.219	6.064	***

Note. ES: emotional symptoms; CP: conduct problem; HI: hyperactivity; PP: peer problem; PS: prosocial behaviour

*This parameter was fixed to 1.00 for specification purposes; *** p <.001

Table 5.2

Results of the CFA for Teacher of TD Children on the SDQ

SDQ Subscales	Item	Standardised estimates	Standard estimate	Critical ratio	*p*-value
EP	Q3*	.686	-	-	-
EP	Q8	.281	.117	11.131	***
EP	Q13	.559	.106	12.511	***
EP	Q16	.521	.141	9.901	***
EP	Q24	.411	.117	10.370	***
CP	Q22*	.411	-	-	-
CP	Q7	.281	.079	8.865	***
CP	Q12	.559	.063	8.354	***
CP	Q18	.521	.047	6.664	***
CP	Q5	.676	.108	4.398	***
HI	Q2*	.725	-	-	-
HI	Q10	.673	.083	10.114	***
HI	Q15	.730	.088	11.279	***
HI	Q21	.420	.087	6.674	***
HI	Q25	.363	.0.87	5.747	***
PP	Q6*	.451	-	-	-
PP	Q11	.146	.142	2.640	.008
PP	Q14	.323	.156	4.357	***
PP	Q19	.578	.100	7.686	***

PP	Q23	.169	.160	3.118	.002
PS	Q1*	.597	-	-	-
PS	Q4	.692	.136	8.936	***
PS	Q9	.673	.139	9.104	***
PS	Q17	.644	.121	8.427	***
PS	Q20	.626	.138	8.553	***

Note. ES: emotional symptoms; CP: conduct problem; HI: hyperactivity; PP: peer problem; PS: prosocial behaviour

*This parameter was fixed to 1.00 for specification purposes; *** p <.001

Internal Consistency for the Five Factor Model

For the current study, Cronbach's alpha and omega values were calculated for the parent and teacher five-factor model. The internal consistency value of the total difficulties scale based on 20 questions for the parent-reported SDQ was .63, which was unacceptable. For the teachers, SDQ was an acceptable value of .78 on Cohen's (1977) criteria. Table 5.3 reports the weightage average Cronbach's alpha for all domains of the SDQ. Low and unacceptable internal consistency reliability is inferred from all the domains of the SDQ, specifically the CP and HI scales for parents and CP and PP scales for teachers.

Table 5.3

Internal Consistency of Parents and Teachers on the SDQ for the TD Children (Five-Factor Model)

	Parents		Teachers	
SDQ subscales	Cronbach's alpha	Omega	Cronbach's alpha	Omega
Emotional Symptoms	.61	.61	.82	.02
Conduct Problem	.48	.48	.56	.55
Hyperactivity	.53	.50	.70	.70
Peer Problem	.30	.22	.40	.38
Prosocial Behaviour	.61	.61	.78	.78

Modification of the Five-Factor Model

The five-factor model modification indices recommended cross-loading between factors and indices to provide a more suitable five-factor model. The following cross-loadings between indicators and variables were identified as yielding an improved model fit across the parents sample: Item 14 ("Generally liked by other children") and item 15 ("Easily distracted, concentration wanders"); item 15 ("Easily distracted, concentration wanders") with Prosocial Behaviour Scale; item 13 ("Often unhappy, down-hearted, or tearful") with Prosocial Behaviour Scale; item 12 ("Often fights with other children or bullies them") with Emotional Problem Scale; and item 10 ("Constantly fighting or squirming") with Hyperactivity Scale.

For teachers, the following cross loadings were identified: Item 15 ("Easily distracted, concentration wanders") and item 18 ("Often lies or cheats"); item 9 ("Helpful if someone is

hurt, upset, or feeling ill") and item 19 ("Picked on or bullied by other children"); item 7 ("Generally obedient, usually does what adults request") and item 18 ("Often lies or cheats"). In addition, item 18 ("Often lies or cheats"), item 15 ("Easily distracted, concentration wanders"), item 7 ("Generally obedient, usually does what adults request"), and item 14 ("Generally liked by other children") were with Prosocial Behaviour Scale.

These cross-loadings were permitted because they slightly improved the model fit for parents (RMSEA = .058; $\chi 2$ = 616.583; CFI = .722; TLI = .682) and provided significant change for teachers (RMSEA = .076; $\chi 2$ = 760.150; CFI = .819; TLI = .789). The cross-loading were allowed for the parent and teacher model because, for parents, items 14 and 15 captured response bias similarly to item 7 and 18 of the teacher form. Items 9 and 19 focus on social relationships, and items 15 and 18 concern delinquent behaviour in the classroom.

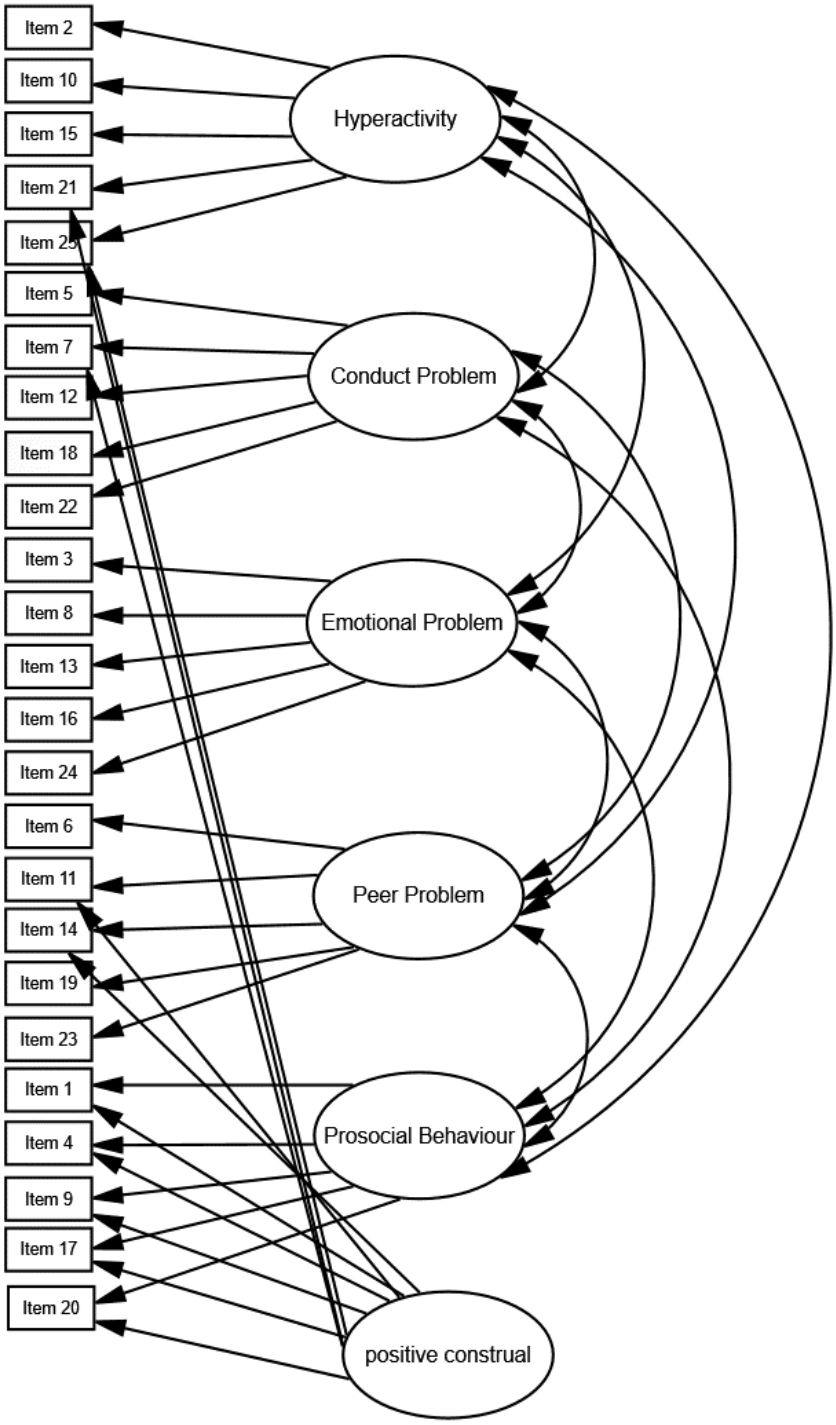
Five-Factor Model with Positive Construal

The SDQ five-factor model results suggested a good fit for parents and a marginal fit for teachers (based on the RMSEA value). Further analysis of this current model indicated that a five-factor model with positive construal would be a better fit compared to the five-factor model (Goleman, 1998; Kaiser & Halvorsen, 2022; Lee, 2018; Palmieri & Smith, 2007; Vugteveen et al., 2020). The five-factor model with positive construal comprises five items from Prosocial Behaviour (PB) and five reverse-keyed problem-oriented items (Gomez and Stavropoulos, 2019).

The RMSEA value concluded that the five-factor model with positive construal is a good fit for parents (RMSEA = .044; $\chi 2$ = 454.443; CFI = .844; TLI = .817) and a moderate fit for teachers of children with TD (RMSEA = .064; $\chi 2$ = 607.985; CFI = .872; TLI = .850), as shown in Figure 5.2

Figure 5.2

Five-Factor Model with Positive Construal for Parents and Teachers of Children with TD on the SDQ



Alpha and Omega Internal Consistency for the Five-Factor Model with Positive Construal Factor

Table 5.4 reports the weightage average Cronbach's alpha and omega for all the domains of the SDQ. Low and unacceptable internal consistency reliability is inferred from most of the domains of the SDQ except positive construal (parents and teachers) and EI, HI, and PB (teachers). Specifically, the CP, HI, and PP scales for parents and CP and PP scales for teachers had low internal consistency. However, the values reported through omega were considered more reliable as psychometricians have argued that omega is a more realistic internal consistency indicator than the alpha coefficient (Revelle & Zinbarg, 2009). Therefore, the five-factor model with positive construal provided better internal consistency than did the five-factor model alone.

Table 5.4

Internal Consistency of Parent and Teacher on the SDQ for TD Children (Five-Factor Model with Positive Construal)

	Parents		Teachers	
SDQ subscales	Cronbach's alpha	Omega	Cronbach's alpha	Omega
Emotional Symptoms	.61	.61	.82	.02
Conduct Problem	.48	.48	.56	.55
Hyperactivity	.53	.50	.70	.70
Peer Problem	.30	.22	.40	.38
Prosocial Behaviour	.61	.61	.78	.78
Positive Construal	.72	.72	.83	.83

Conclusion

An examination of whether the SDQ five-factor model was a good fit for the Indian sample was conducted**.** Data from 407 parents and 102 teachers of children with TD, aged 4 – 8 years were used in this study. The results showed that the five-factor model was a good fit for parents supporting hypothesis 2.1. However, it was considered a marginal fit for teachers, hence, not supporting hypothesis 2.2.

Goodman (2001) evaluated the psychometric properties of the SDQ by gathering data from parents and teachers of children aged 4 - 16 years in the United Kingdom, and factor analysis recommended a five-factor solution for both parents and teachers (Chiorri et al., 2016; Goodman, 2001). Goodman (1997) recommended using the five-factor model for parents and teachers, and the current results align with the author's recommendations for parents.

Other CFA studies on the English language version of the SDQ on children aged 4 to 8 years provided mixed findings for the SDQ five-factor model. In Australia (parent), the Netherlands (parent and teacher), Singapore (parent), Sweden (parent and teacher), and the United Kingdom (parent and teacher), the SDQ five-factor model was considered a moderate or good fit (Bull et al., 2016; Croft et al., 2015; Dahlberg et al., 2019; Hall et al., 2019; Hawes & Dadds, 2004; Theunissen et al., 2013; Van Widenfelt et al., 2003). Furthermore, multicultural assessments also concluded that the parent SDQ five-factor model was a good fit (Achenbach et al., 2008; Downs et al., 2012). Specifically, in LMIC such as Mongolia (parent), the SDQ five-factor model was considered a moderate to good fit (Aoki et al., 2021).

But, in contrast, CFA studies carried out in Australia (parent), Canada (parent), Gaza (parent), the United States (parent), Pakistan (parent), and Norway (parent and teacher) indicated that the five-factor model was a poor fit for parents and teachers (Dickey &

Blumberg, 2004; Kaiser & Halvorsen, 2022; Oliver et al., 2009; Thabet et al., 2000; Williamson et al., 2014). Consistent with the current findings, in the United States, the five-factor model was better suited for parents than teachers (Hill & Hughes, 2007).

The internal consistency of three SDQ subscales in the five-factor model for parents and teachers was below the acceptable range. But because each scale had only five items, these results were not surprising (Muris et al., 2003). The current findings on the SDQ's psychometric properties, when used in India, are very similar to findings in other LMIC, such as Congo (Kashala et al., 2005), South Africa (Mellins et al., 2018), and Turkey (Dursun et al., 2020), as well as western countries like Australia (Hawes & Dadds, 2004), Germany (Becker et al., 2004; Rothenberger et al., 2008), Sweden (Malmberg, et al., 2003), and the United Kingdom (Edmunds et al., 2005). Although the five-factor model based on teacher's responses was not a good fit for the Indian sample, the current study utilised the same five-factor model for both the parent and the teacher responses to the SDQ for children with TD and DD. Using the same model for both groups of respondents allow for comparisons between the parent and teacher reports.

The five-factor model modification indices recommended a few cross-loadings for using the SDQ with both parents and teachers to improve the existing five-factor model. The cross-loadings did not result in a significant change in the model fit for parents. However, there was a significant change in the model fit for the teachers group. One possible reason may be due to cross-loadings allowing for items with similar content and positively worded items. Items 7 and 14 were cross loaded with prosocial behaviour, resulting in a better fit. Similar findings were also evident in Rogge et al. (2018) and Matsuishi et al.'s (2008) studies, where the parent and teacher SDQ results reported a good fit when the cross-loading between SDQ items were allowed with similar content.

Gomez and Stavropoulos (2019) concluded that the five-factor model with positive construal, that is, all 10 positive-worded items, would be better than the five-factor model on its own. These findings were supported by the current study's findings, which showed that the five-factor model with positive construal for parents and teachers fit that five-factor model better, as shown in Figure 5.2. Similar findings were also evident in New Zealand (Lee, 2018), the Netherlands (Vugteveen et al., 2020), Norway (Kaiser & Halvorsen, 2022), and the United States (Palmieri & Smith, 2007). In contrast, McCrory and Layte (2012) concluded that the five-factor model with positive construal was unsuitable for Irish children. Furthermore, the internal consistency for the five-factor model with positive construal was better than the five-factor alone (McCrory & Layte, 2012). Gomez and Stavropoulos (2019) reported that Nunnally recommended that the internal consistency reliability values of at least .70 are considered acceptable. However, even if Nunnally's recommendation is adopted, the internal consistency reliabilities for the five-factor model and the five-factor model with positive construal were inadequate for both parents and teachers in the present study.

Although, the five-factor model with positive construal was a better fit than the five-factor model alone, the original model is still an adequate fit and by keeping this model it is possible to compare our results with those of other studies. Thus, providing an opportunity for a direct comparison with findings from previous research (Bull et al., 2016; Chiorri et al., 2016; Croft et al., 2015; Dahlberg et al., 2019; Goodman, 2001; Hall et al., 2019; Hawes & Dadds, 2004; Theunissen et al., 2013; Van Widenfelt et al., 2003). The current study will use the five-factor model to compare parents and teachers of children with TD and DD on the five subscales of emotional problem (EP), conduct problem (CP), hyperactivity (HI), peer problem (PP), and prosocial behaviour (PB) scales and the total difficulties scores of the SDQ.

SEL Results from the SDQ: Findings for Children with TD and DD for both Parent Report and Teacher Report

The results from the SDQ were analyzed to determine the differences on the parent report SDQ for children with TD and children with DD, and on the teacher report SDQ for children with TD and children with DD.

SEL in Children with TD and Children with DD: Reports from Parents

The distribution of scores for the parent completed SDQ for children with TD and DD is shown in tables 5.5 and 5.6.

Table 5.5

Distribution of Scores for SDQ Parent Report for Children with TD

	Normal		Borderline		Abnormal	
SDQ Domains	*n*	%	*n*	%	*n*	%
Total Difficulties	330	81%	38	9%	39	10%
Emotional Symptoms	330	81%	32	8%	45	11%
Conduct Problem	304	74%	56	15%	47	11%
Hyperactivity	320	74%	42	10%	45	11%
Peer Problem	252	62%	77	19%	78	19%
Prosocial Behaviour	355	87%	39	10%	13	3%

Table 5.6

Distribution of Scores for SDQ Parent Report for Children with DD

	Normal		Borderline		Abnormal	
SDQ Domains	*n*	%	*n*	%	*n*	%
Total Difficulties	22	37%	9	15%	28	40%
Emotional Symptoms	28	48%	8	13%	23	39%
Conduct Problem	25	42%	14	24%	20	34%
Hyperactivity	30	50%	9	15%	20	35%
Peer Problem	16	27%	17	28%	26	45%
Prosocial Behaviour	42	71%	7	12%	10	17%

Before statistically comparing reports from parents of children with TD and parents of children with DD on the six scales of the SDQ, assumption testing was carried out for one-way ANOVA. All scales showed an average of eight outliers. Outliers were assessed by inspecting the boxplots. However, outliers were included in the sample because scores were within the score range of the SDQ. The Durbin–Watson test of independence of error for all scales was within the acceptable range of 1.5 to 2.0. Data were not normally distributed across all conditions, as Shapiro–Wilk's test assessed ($p < .05$). Lastly, homogeneity of variances was violated for emotional problem, conduct problem, hyperactivity, prosocial behaviour, and total difficulties scale. However, homogeneity of variances was not violated for peer problem ($p > .05$). Due to heterogeneity of variance between groups, Welch statistics was reported for one-way ANOVA instead of the F statistic (Allen et al., 2019).

Reports from parents of children with TD and DD were significantly different on all six scales of the SDQ: Total Difficulties ($p < .001$) with large ($\eta p^2 = .10$) effect size; Emotional Symptoms ($p < .001$), with medium ($\eta p^2 = .08$) effect size; Conduct Problems ($p < .001$) with medium ($\eta p^2 = .09$) effect size; Hyperactivity ($p < .001$) with small ($\eta p^2 = .04$) effect size; Peer Problems ($p < .001$) with medium ($\eta p^2 = .06$) effect size; and Prosocial Behaviour ($p <.001$) with small ($\eta p^2 = .02$) effect size. These findings are presented in Table 5.7.

Table 5.7

Means, Standard Deviations, and One-Way Analysis of Variance for Parents of Children with TD and DD

	Parent (TD)		Parent (DD)		W(1, 465)	η2
SDQ subscales	*M*	*SD*	*M*	*SD*		
Total Difficulties	17.38	4.42	22.81	6.78	29.91*	.10
Emotional Symptoms	1.98	1.86	3.79	2.40	30.69*	.08
Conduct Problem	1.66	1.86	3.23	2.35	24.52*	.09
Hyperactivity	3.92	1.98	5.18	2.50	13.75*	.04
Peer Problem	2.22	1.55	3.44	1.52	32.45*	.06
Prosocial Behaviour	8.02	1.76	7.15	2.21	8.44*	.02

Note. $p <.$ 01*

SEL in Children with TD and Children with DD: Reports from Teacher

The distribution of scores for children with TD and DD for the teacher completed SDQ is presented in Tables 5.8 and 5.9.

Table 5.8

Distribution of Scores for Teachers Completed SDQ for Children with TD

	Normal		Borderline		Abnormal	
SDQ Domains	*n*	%	*n*	%	*n*	%
Total Difficulties	291	86%	36	11%	10	3%
Emotional Symptoms	317	94%	5	2%	15	4%
Conduct Problem	312	93%	13	4%	12	3%
Hyperactivity	312	93%	13	4%	12	3%
Peer Problem	275	82%	45	13%	17	5%
Prosocial Behaviour	291	87%	36	10%	10	3%

Table 5.9

Distribution of Scores for Teachers Completed SDQ for Children with DD

	Normal		Borderline		Abnormal	
SDQ Domains	*n*	%	*n*	%	*n*	%
Total Difficulties	19	33%	7	12%	31	54%
Emotional Symptoms	34	60%	8	14%	15	26%
Conduct Problem	23	40%	14	25%	20	35%
Hyperactivity	28	49%	9	16%	20	35%
Peer Problem	32	56%	12	21%	13	23%
Prosocial Behaviour	41	72%	6	11%	10	17%

Before statistically comparing reports from teachers of children with TD and teachers of children with DD on the six scales of the SDQ, assumption testing was carried out for one-way ANOVA. All scales consisted of an average of seven outliers. However, outliers were included in the sample because scores were within the score range of the SDQ. Outliers were assessed by inspecting the boxplots. The Durbin–Watson test of independence of error for all scales was within the acceptable range of 1.5 to 2.0. Data were not normally distributed across all conditions, as Shapiro–Wilk's test assessed ($p < .05$). Lastly, homogeneity of variances was violated for emotional problem, conduct problem, hyperactivity, and total difficulties scale. However, homogeneity of variances was not violated for peer problem and prosocial behaviour ($p > .05$). Due to heterogeneity of variance between groups, Welch statistics was reported for one way ANOVA instead of the F statistic (Allen et al., 2019).

Reports from teachers of children with TD and DD were significantly different on all six scales of the SDQ: Total Difficulties ($p < .001$) with large ($\eta p^2 = .27$) effect size; Emotional Symptoms ($p < .001$) with large ($\eta p^2 = .20$) effect size; Conduct Problems ($p < .001$) with large ($\eta p^2 = .27$) effect size; Hyperactivity ($p < .001$) with large ($\eta p^2 = .17$) effect size; Peer Problems ($p < .001$), with medium ($\eta p^2 = .09$) effect size; and Prosocial Behaviour ($p <.001$) with small ($\eta p^2 = .02$) effect size. These findings are presented in Table 5.10.

Table 5.10

Means, Standard Deviations, and One-Way Analysis of Variance for Teachers of Children with TD and DD

	Teacher (TD)		Teacher (DD)		W (1,393)	η2
SDQ subscales	*M*	*SD*	*M*	*SD*		
Total Difficulties	6.32	5.16	15.77	6.64	104.74*	.27
Emotional Symptoms	1.08	1.84	3.84	2.44	66.58*	.20
Conduct Problem	.75	1.18	3.26	2.41	59.18*	.27
Hyperactivity	2.45	2.03	5.22	2.33	61.36*	.17
Peer Problem	2.03	1.51	3.43	1.54	40.50*	.09
Prosocial Behaviour	7.99	1.94	7.19	2.23	6.50*	.02

*$p < .001$

Summary of SEL for Children with TD and Children with DD

A comparison of the SEL for the children with TD and the children with DD was undertaken. This was done for both the parent completed and teacher completed SDQ. The study aimed to determine whether parents and/or teachers of children with TD and DD differed in their reports of the children on the SDQ. However, a qualitative description of the children's psychosocial functioning was undertaken before statistically comparing the reports on the two groups of children.

On the parent completed SDQ for children with TD, 81% of the parents reported their children as normal, 9% indicated their children were borderline, and 10% classified their children as abnormal on the total difficulties scale. Furthermore, regarding prosocial behaviour, 87% of parents reported their child as being normal, 10% indicated borderline, and 3% classified it as abnormal. In comparison, parents of children with DD said 37% of their children were normal, 15% were borderline, and 48% were abnormal in the total difficulties scale. Notably, 71% of parents of children with DD reported that their children were normal, 12% borderline, and 17% abnormal on the SDQ's prosocial behaviour scale.

A similar classification was reported on the teacher completed SDQ for children with TD, with 86% of teachers reporting the children as normal, 11% reporting the children as borderline, and 3% reporting the children as abnormal. The classification was the same for prosocial behaviour. However, teachers of children with DD reported 33% as normal, 12% as borderline, and 54% as abnormal on the total difficulties scale. Interestingly the same set of teachers also reported 72% of DD children as normal, 11% as borderline, and 17% as abnormal on the prosocial behaviour scale.

The statistical analysis revealed that both parents and teachers reported significant differences on all SDQ scales between the community-based (TD) and clinical (DD) samples. These findings were consistent with existing literature where parents and teachers reported

increased concerns for children with DD compared to their age-equivalent peers (Becker et al., 2004; Emerson, 2005; Strømme & Diseth, 2000), therefore supporting hypotheses 2.3, 2.4, 2.5, and 2.6. Tables 5.7 and 5.10 show that, on average, parents and teachers of children with TD and DD expressed more concern on the SDQ's hyperactivity, conduct problem, and emotional symptoms subscales.

Hyperactivity includes increased activity, impulsive actions, a shorter attention span, and the ability to be easily distracted (Wilens & Spencer, 2010). Children with DD often score high on hyperactivity due to frequent attention disturbances (Iizuka et al., 2010). *Conduct Problem* includes children showing aggression, temper tantrums, and self-injurious behaviour (Lecavalier, 2006). Children with TD and DD often show conduct problems in LMIC countries like India for multiple reasons, such as adverse social circumstances such as poverty, family fragmentation, and socio-economic status (Ma et al., 2021). Furthermore, for children with DD, conduct problem is expressed through destroying their things, deficits in social skills leading to being negative and difficult when conflicts with peers arise, and vandalism (Crnic et al., 2004; Dekker et al., 2022). *Emotional Symptoms* are classified as either internalising (such as depression or anxiety) or externalizing (disruptive behaviour) problems (Ogundele, 2018). Studies report that children with DD show significant emotional symptoms and conduct problems (Crane et al., 2017; van den Heuvel et al., 2016) from an early age, which persist over a long time and contribute to caregiver stress (Herring et al., 2006). Teachers identify more emotional and conduct problems in children due to their ability to observe children regularly in the school environment and having the opportunity to compare behaviour of children of similar age every day (van den Heuvel et al., 2016) like the current study.

In conclusion, the current results show that the SDQ is suitable for use as a screening tool in India because it could differentiate between children with TD and DD based on both

parent and teacher reports, which demonstrates known group validity, with more concerns reported for the clinical sample than the community sample.

Correspondence between Parent and Teacher Reports of SEL in Children with TD and DD

Assumption testing was carried out before conducting a series of six paired sample t-tests to compare parents and teachers' evaluations of children with TD and DD on the SDQ. All scales consisted of outliers; however, outliers were included in the sample as scores that were within the score range of the SDQ. Outliers were assessed by inspecting the boxplots. Data were not normally distributed across all conditions for parents of TD children, as the Shapiro–Wilk's test assessed ($p < .05$). However, the data was normally distributed for parents of DD children ($p > .05$).

Reports from parents and teachers of children with TD were significantly different on four six scales of the SDQ; Total Difficulties ($p < .001$) with medium ($\eta p^2 = .68$) effect size; Emotional Symptoms ($p < .001$), with medium ($\eta p^2 = .50$) effect size; Conduct Problems ($p < .001$) with medium ($\eta p^2 = .66$) effect size; Hyperactivity ($p < .001$) with medium ($\eta p^2 = .72$) effect size; and Peer Problems ($p < .001$) with small ($\eta p^2 = .10$) effect size indicating that parents reported more concerns than teachers. However, parents and teachers did not significantly differ on Peer Problem ($p = 1.75$) and Prosocial Behaviour ($p = .700$). These results are presented in Table 5.11

Table 5.11

Means, Standard Deviations, t-statistics, and Effect Sizes for Parent and Teacher Completed Responses on the SDQ for Children with TD

	Parents		Teachers		*t* (337)	*p*	Cohen's *d*
SDQ subscales	*M*	*SD*	*M*	*SD*			
Total Difficulties	9.75	4.89	6.32	5.16	9.04	< .001	0.68
Emotional Symptoms	2.02	1.90	1.08	1.84	6.70	< .001	0.50
Conduct Problem	1.62	1.45	.75	1.18	8.87	< .001	0.66
Hyperactivity	3.90	1.98	2.45	2.03	9.81	< .001	0.72
Peer Problem	2.19	1.57	2.03	1.51	9.04	.175	0.10
Prosocial Behaviour	8.04	1.71	7.99	1.94	.385	.700	0.20

Reports from parents and teachers of children with DD were significantly different on all six scales of the SDQ; Total Difficulties ($p < .001$) with large ($\eta p^2 = .92$) effect size; Emotional Symptoms ($p < .001$) with medium ($\eta p^2 = .50$) effect size; Conduct Problems ($p < .001$) with medium ($\eta p^2 = .54$) effect size; Hyperactivity ($p < .001$) with medium ($\eta p^2 = .74$) effect size; Peer Problems ($p < .001$) with small ($\eta p^2 = .37$) effect size reporting parents had more concerns than teachers. However, for Prosocial Behaviour ($p < .001$), teachers reported more prosocial behaviour than teachers with a small ($\eta p^2 = .28$) effect size. These results are presented in Table 5.12.

Table 5.12

Means, Standard Deviations, t-statistics, and Effect Sizes for Parent and Teacher Completed Responses on the SDQ for the Children with DD

	`Parents		Teachers		*t* (57)	*p*	Cohen's *d*
SDQ subscales	*M*	*SD*	*M*	*SD*			
Total Difficulties	15.70	6.65	10.07	6.69	5.28	< .001	0.92
Emotional Symptoms	3.77	2.22	2.10	2.20	4.20	< .001	0.50
Conduct Problem	3.26	2.41	1.43	1.89	5.01	< .001	0.54
Hyperactivity	5.22	2.53	3.73	2.35	3.61	< .001	0.74
Peer Problem	3.43	1.54	2.79	1.86	2.02	.048*	0.37
Prosocial Behaviour	5.98	1.96	6.84	2.21	-2.07	.042*	-.028

Note. *p <.05

Summary of Correspondence between Parent and Teacher Reports of SEL

Overall, the comparison between parent and teacher ratings on the SDQ for the children with TD and DD showed that parents had significantly higher concerns than teachers did on four scales of the SDQ (Emotional Problem, Conduct Problem, Hyperactivity, and Total difficulties scale) contrary to hypotheses 2.7, 2.8, 2.9 and, 2.10. However, there was no significant difference between parents and teachers on Peer Problem and Prosocial Behaviour for children with TD.

Recent research suggests there is low concordance between parent and teacher reports of children's behavioural and emotional functioning, with parents being more likely to report

problems than teachers are (Llanes et al., 2020; Marsh & Ng, 2017). Teachers report significantly fewer concerns about children with at-risk concerns than parents do due to multiple factors, such as differences in perception rather than actual behaviour differences, differences in opportunities to observe problem behaviour in a different setting, and children's tendency to show their actual behaviour only at home (Foley Nicpon et al., 2010). Furthermore, parents are more likely to report a positive behaviour and understate a problem behaviour. In comparison, teachers are more likely to rate children relative to other students in the class. Specifically, the demand primary school places on children may be an example of how the environment influences the rating (Rogge et al., 2018), an idea which is consistent with the findings in this study.

Similar findings were also reported in New Zealand (Kersten et al., 2018) and Brazil (clinical and community-based sample; Cury & Golfeto, 2003; Goodman et al., 2000), where parents expressed more concerns than teachers. In Gaza, a significant correlation was inferred between parents and teachers on Total Difficulties score, Hyperactivity, Conduct Problem, and Emotional Symptoms (Thabet et al., 2000).

Although parents and teachers differed on four domains of the SDQ, they did not indicate any significant differences in Prosocial Behaviour and Peer Problem for children with TD. One possible reason may be a low level of awareness among parents and teachers regarding social problems with children (Van Widenfelt et al., 2003). Hartas (2011) indicated a decline in parent-rated behaviour and social difficulties between 3 to 5 years. In addition, the effects of the COVID-19 pandemic may also have contributed to the results obtained. With online education taking place across schools in India, parents and teachers would have been unable to identify whether children had any problems with social interaction, which are more able to be identified in a face-to-face classroom setting through students' body language and nonverbal cues (Jena, 2020; Nambiar, 2020).

In India, parents and teachers differ in their concerns regarding children. A low level of agreement between parents and teachers may make it difficult to perform a clinical assessment based on multiple informants (Fält et al., 2018). However, single-source information results often lead to fewer children with the problem being identified (Brown et al., 2006). Therefore, it is vital to gather teacher ratings because it may increase the number of children needing further evaluation. Parents and teachers had similar high concerns on the SDQ scales, demonstrating that when the SDQ was given to numerous informants, the results could better predict and detect problems than single-informant results (Goodman et al., 2004). Children's capacity to identify and predict others' emotions and responses to emotional situations are crucial for regulating emotions, their behavioural expression, and ultimately, reducing problem behaviour (Egger & Angold, 2006). Inappropriate behaviour may reflect difficulties with emotional understanding rather than language or other cognitive skills (Hughes & Ensor, 2009). Therefore, gathering information from multiple sources is important when considering a child's SEL. The use of the same measure completed by both parent and teacher can only increase the validity of the assessment process.

The Relationship between Developmental Status and Psychosocial Functioning

A comprehensive assessment of a child incorporates, among other factors, consideration of both their developmental status and their psychosocial functioning (Sattler, 2001). To date very few studies have examined the relationship between these two aspects of a child's functioning. The results from the PEDS allow a child's developmental status to be classified as being in one of three categories: no concerns, one predictive concern, or two or more predictive concerns. Assessing the child's social-emotional learning on the SDQ provides information on various aspects of the child's psychosocial functioning.

Several studies have separately screened children for DD and SEL using PEDS and SDQ in LMIC. Specifically, in south-east Asian countries, PEDS has been used in Bhutan

(Wong et al., 2019), India (Malhi & Singhi, 2001, 2002; Mukherjee et al., 2022), and Thailand (Wantanakorn et al., 2016). The SDQ was used to screen children in India (Anita & Maninder, 2016; Bele et al., 2013; Chari & Hirisave, 2020; Huynh et al., 2019; Kiron, 2012; Malhotra et al., 2009; Trinh, 2020), Vietnam (Dang et al., 2017), Pakistan (Samad et al., 2005), Indonesia, Philippines, and Thailand (Graham & Jordan, 2011). However, only one study, conducted in New Zealand (Schluter et al., 2020), used PEDS and SDQ concurrently. Schluter et al. (2020) explored the characteristics of children receiving health checks and early intervention-based interventions. However, they did not examine the relationship between the findings of the two measures. Furthermore, no studies have simultaneously used PEDS and SDQ to screen children in India. Therefore, the current study aims to investigate the relationship between developmental status and psychosocial functioning using the two measures.

To investigate these aims, the following hypotheses were constructed:

Hypothesis 2.11a. Children reported as not having developmental concerns will score lower on emotional symptoms, conduct problem, hyperactivity, and peer problems, and higher on prosocial behaviour than children with one or more concerns.

Hypothesis 2.11b. Children reported as having one developmental concern will score lower on emotional symptoms, conduct problem, hyperactivity, and peer problems, and higher on prosocial behaviour than children with two or more concerns.

A one-way MANOVA was used to determine whether children (TD and DD) classified according to PEDS differed on the 5 subscales of the SDQ. The PEDS classification (children with no concerns, one predictive concern, two or more predictive concerns) was the between-subjects IV and emotional symptoms, conduct problem, hyperactivity, peer problems, and prosocial behaviour were the DVs. Before conducting the MANOVA, assumption testing was carried out. The assumption of independence and cell size were met.

Univariate Normality was assessed using Shapiro-Wilk tests, and data was not normally distributed across all conditions ($p < .05$). Two multivariate outliers were identified. However, no deletion or transformation of the data was done because MANOVA is robust against violations of normality when groups exceed 30 or so. Our groups contained children with no concerns *(*$n = 217$), one predictive concern ($n = 126$), two or more predictive concerns ($n = 101$), and the multivariate outliers did not have an impact on the efficacy of the regression model as a whole (Cook's distance < 1) (Allen et al., 2019). No multicollinearity was found (rs < .447). Furthermore, scatterplots between the dependent variables (and for all groups) indicated linearity. The assumption of homogeneity of variance-covariance matrices was violated ($p < .001$). However, the MANOVA is robust against that violation if group sizes are larger than 30 participants (Allen et al., 2019). Therefore, a MANOVA was conducted.

Results reported that there was a significant difference between the three groups categorised according to PEDS on the subscales of the SDQ; Emotional Problem ($p < .001$), Conduct Problem ($p < .001$), Hyperactivity ($p < .001$), Peer Problem ($p < .001$), and Prosocial Behaviour ($p < .001$). The results are presented in Table 5.13.

Table 5.13

Means, Standard Deviations, t-Statistics, and Effect Sizes for relationship between Developmental Status and Psychosocial Functioning

	High risk		Medium risk		Low risk		*F* (2,466)	η2
SDQ subscales	*M*	*SD*	*M*	*SD*	*M*	*SD*		
Emotional Symptoms	3.40	2.24	2.01	1.90	1.71	1.71	30.23*	.11
Conduct Problem	2.68	2.12	1.80	1.49	2.68	2.12	20.67*	.08
Hyperactivity	4.90	2.30	4.23	2.07	3.55	1.83	17.09*	.06
Peer Problem	2.97	1.59	2.40	1.69	2.05	1.46	12.95*	.05
Prosocial Behaviour	7.33	1.94	8.06	1.80	8.14	1.76	8.03*	.03

Note. High risk (two or more predictive concerns); low risk (one predictive concern); and low risk (no predictive concerns).

*$p < .001$

To explore further the differences found, a one-way ANOVA was conducted to compare no concerns versus one or more concerns and one concern versus two or more concerns for each variable. PEDS classification was the IV, and each subscale of the SDQ was the DV.

The one-way ANOVA (Welch statistic) reported a significant difference between the three PEDS groups on SDQ subscales. Furthermore, the first planned contrast between children not having any developmental concerns and having one or more concerns and the second planned contrast between children with one concern and children with two or more

concerns also differed on the SDQ subscales (p <.05). Table 5.14 presents the Welch statistics, contrast tests and contrast effect size for the three PEDS categorization on the different subscales of the SDQ.

Table 5.14

Welch Statistics, Contrast Tests, and Contrast Effect Size for the Three PEDS Categorization on the Different Subscales of the SDQ

SDQ Subscales		Contrast 1			Contrast 2		
	W (2,466)	*t*	*p*	Cohen's *d*	*t*	*p*	Cohen's *d*
Emotional Symptoms	24.80*	-5.59	< .001	-1.03	-5.17	< .001	-.72
Conduct Problem	15.21*	-5.03	< .001	-.93	-3.72	< .001	-.54
Hyperactivity	15.93*	-5.93	< .001	-.99	-2.37	< .001	-.32
Peer Problem	13.15*	-4.37	< .001	-.80	-2.71	.007*	-.36
Prosocial Behaviour	7.37*	2.36	.009*	.48	3.04	.003*	.40

Note. The first planned contrast between children not having any developmental concerns and having one or more concerns and the second planned contrast between children with one concern and children with two or more concerns.

*p < .01

Summary of Relationship between Developmental Status and Psychosocial Functioning

The current study explored whether children's developmental status, categorised according to PEDS, was related to their psychosocial functioning, as reported on the SDQ

subscales. The results showed that children with the worst development status (i.e., two or more predictive concerns on the PEDS) were reported to have higher scores on the four specific difficulties subscales of emotional symptoms, conduct problem, hyperactivity and peer problem than children with one predictive concern and no predictive concern. However, parents of children with no concerns reported more prosocial behaviour than children with one predictive concern and two or more predictive concerns, supporting hypotheses 2.11a and 2.11b.

Studies have reported that children and adolescents with DD such as unilateral cerebral palsy, specific language impairments, and learning disabilities show a higher rate of problems on the four difficulties subscales of SDQ and lower prosocial behaviour (Buonomo et al., 2017; Conti-Ramsden et al., 2013; Whittingham et al., 2014). However, Ross et al. (2011) reported that children with traumatic brain injury were reported to have difficulties only on hyperactivity and emotional problems scales of the SDQ. Nevertheless, limited literature exists on the use of the PEDS and SDQ together in India to determine the relationship between developmental status and psychosocial functioning.

Children with DD are often identified through difficulties with reading, writing, listening, attention, and memory. However, their difficulties should not be restricted only to cognitive abilities (Cavioni et al., 2017). Studies have also reported that children with DD often struggle in social relationships (Adams, 2013; Cavioni et al., 2017; Elias, 2004). They cannot interact with their peers and have difficulties understanding and interpreting non-verbal cues, contrary to children with TD (Elias, 2004). Therefore, timely and accurate screening of children with potential social and emotional problems is essential (Tede et al., 2016).

Summary of Findings on SEL

CFA was used to examine the degree to which the structure of the SDQ when used with parents of children aged 4 – 8 years in India was similar to the original five-factor structure report by Goodman (2001) study. The results from this CFA concluded that the five-factor model was a good fit for parents. However, the five-factor model was adequate for teachers based on the RMSEA value. Cross-loading between factors was recommended, which marginally improved the model for parents. But it significantly enhanced the teacher's five-factor model. Following the Gomez and Stavropoulos (2019) study, the five-factor model with positive construal was a better fit for parents and teachers than the five-factor model alone.

A comparison of the SEL of children with TD to the SEL of children with DD based on reports from parents found that parents of children with DD reported more concerns about SEL and less prosocial behaviour than parents of children with TD who reported less SEL concerns and more prosocial behaviour. A similar comparison based on reports from teachers found teachers of children with DD also indicated that children with DD had more SEL concerns and less prosocial behaviour than children with TD, who displayed less SEL concerns and more prosocial behaviour.

An examination of the degree of agreement between parents and teachers on the SEL of children with TD found parents reported more concerns than teachers on emotional problem, conduct problem, hyperactivity, and total difficulties. However, there was no significant difference in parent and teacher reporting on prosocial behaviour and peer problem. For children with DD, parents reported more concerns than teachers in all domains except prosocial behaviour where teachers indicated children with DD express more of this behaviour than parents.

There was a significant relationship between developmental delay and psychosocial functioning. Parents of children with two or more concerns on the PEDS reported more concerns on the four difficulties subscales and less prosocial behaviour on the SDQ than parents with one predictive concern and no predictive concerns. Overall, these findings suggest that the concurrent use of the PEDS and the SDQ would facilitate effective screening of children. This would ensure that parents' and teachers' concern regarding children are acknowledged, and that they become active partners in evaluating and helping the children.

Chapter 6: Summary, Limitations, and Future Recommendations

The purpose of the current study was to translate the PEDS, PEDS:DM and SDQ to Hindi and assess developmental delay and SEL among children in India using these screening tools.

In the current study, the PEDS, PEDS:DM and SDQ were translated to India's national language (Hindi) to cater to a larger population and screen children with TD and DD for delays or learning concerns. Parents and teachers were recruited across schools in Punjab, Haryana, Himachal Pradesh, and National Capital Region, India, completed the questionnaire in the language they were most comfortable using.

Summary and Implication of Empirical Findings

Translation and Face Validation of PEDS, PEDS:DM, and SDQ

The translation and face validation of PEDS, PEDS:DM, and SDQ using the forward-back translation method reported no discrepancy between the original English version and the translated Hindi versions. The original forms and the Hindi versions of the three screening tools (PEDS, PEDS:DM, and SDQ) demonstrated good face validity and cultural acceptability. Participants reported that the tools were appropriate and catered to issues relevant to the Indian population.

Demographic Characteristics of the Participants

The current study comprised children with TD and DD; most of the sample for both cohorts included males. The data could have been skewed for multiple reasons. First, the female sex ratio has continuously declined in India from the 1900s to the 2000s. Specifically, the proportion of girls born per 1000 males declined from 962 in 1981 to 927 in 2001 (Jha et al., 2006). Second, India is a patriarchal society that sees girls doing more household work and boys as more likely to help the family by working to obtain income. This suggests that sending a girl to school may be perceived as more costly than the school attendance of a boy,

at least at younger ages (Zimmermann, 2011). Specifically for children with DD, studies have reported that delay and disability are more prominent in males than females (Giarelli et al., 2010; Peacock et al., 2012; Silove et al., 2013)

Parents' educational qualifications also varied across the clinical and community sample, with parents of children with DD reported as being less educated than parents of children with TD. Factors contributing to this disparity in educational qualification include the fact that children with DD are more likely to be identified in rural inclusive schools, where access to education, infrastructure, annual household income, and other resources are more limited than in urban areas (Katrak, 2010).

The Use of Parents' Concerns in Screening Children for Developmental Delay

Based on the results from the PEDS questionnaire, 78% of parents of children with DD were concerned about their children's developmental milestones, compared to 17% of parents of children with TD, indicating that these children require additional assessments and early interventions. Furthermore, the results showed a significant relationship between general concerns and the specific domains of expressive language and articulation, behaviour, global or cognitive development, and health for children with TD and DD. In addition, for parents of children with TD there was a significant relationship between general concerns with the self-help domain, and for parents of children with DD there was a significant relationship with the domains of fine motor skills and school.

Parents of children with DD reported a stronger relationship between general and specific domains that predict delay or disability than parents of children with TD (Maré et al., 2017). Furthermore, the PEDS results were able to distinguish between children with TD and DD. However, the frequency of concerns of parents of younger children did not differ from the concerns of parents of older children with either TD or DD. The PEDS had good sensitivity and low specificity, while and the PEDS:DM had below-acceptable sensitivity and

specificity. Specifically, for parents who reported their children as having a high risk of delay on the PEDS, the PEDS:DM sensitivity and specificity for those children was below an acceptable level.

In India, physicians, pediatricians and schools do not regularly ask and update parents about their children's development. This is why parents from LMICs have lower development literacy than parents in high-income countries (Mukherjee et al., 2021). Therefore, parents' knowledge about their children's developmental milestones could be improved through developmental screening tools such as the PEDS, which would further improve parent–child relations and reduce misdiagnoses.

Assessing Social-Emotional Learning: Parent and Teacher Reports for Children with TD and DD

Parents and teachers completed the SDQ, and analysis of the results found that the five-factor model was a good fit for parents. However, it was only a marginal fit for teachers. The modification indices recommended cross-loading between factors. However, the cross-loading only resulted in a slight improvement in fit for the parents. In contrast, it resulted in a significant change for teachers. This was because the items were cross loaded with similar content. Moreover, a further evaluation of the parent and teacher SDQ indicated that the five-factor model with positive construal was a better model fit than the five-factor model on its own. The parent report SDQ five-factor model with positive construal was a good fit, and the teacher report SDQ was a moderate fit, showing that the five-factor model with positive construal was better than the five-factor model on its own.

The internal consistency for the parent report five-factor model was acceptable. However, the same was not found for teachers' report. In accordance with Gomez and Stavropoulos's (2019) study, the five-factor model with positive construal showed better internal consistency for parents and teachers than the five-factor model.

According to parent and teacher reports on children with TD and DD, parents and teachers of children with DD reported more concerns across all scales than they did for children with TD. These findings are consistent with existing literature showing that parents and teachers reported increased concerns for children with DD compared to their age-equivalent peers (Becker et al., 2004; Emerson, 2005; Strømme & Diseth, 2000). In addition, parents reported more concerns than teachers did on four scales of the SDQ (Emotional Problem, Conduct Problem, Hyperactivity, and Total Difficulties score). However, the discrepancy between teachers and parents report regarding Peer Problems and Prosocial Behaviour were not statistically significant. For children with DD, parents reported more concerns than teachers. Interestingly, teachers reported more prosocial behaviour than parents did. These findings resonated with the notion that parents are more likely to report problems than teachers (Llanes et al., 2020; Marsh & Ng, 2017).

This study also found a significant relationship between developmental delay and psychosocial functioning. Parents of children with two more concerns on the PEDS (high risk) reported higher concerns and lower prosocial behaviour on the SDQ than parents of children with one predictive concern (medium risk) or no concerns (low risk). Therefore, the PEDS and the SDQ were able to distinguish between clinical and community samples, providing evidence of their effectiveness in the Indian population Furthermore, the tools provided first-hand information on the developmental literacy of parents and teachers.

Limitations

The study has several limitations, which are discussed below.

Translation and Face Validation of the PEDS and SDQ

The two screening questionnaires underwent rigorous translation and a pilot study to determine whether there was any discrepancy between the original and translated

questionnaires. However, whether this methodology would produce different results in a face-to-face interview is unknown.

Gathering Information from Parents and Teachers for the PEDS and SDQ

First, the PEDS and SDQ data were collected online during the COVID-19 pandemic, as schools provided online education. Glascoe (2003) recommended interviewing parents who could not understand the PEDS questions, because illiteracy is common in many ethnic minority groups. Poor reading skills may have obstructed parents' ability to respond, but it was not possible to conduct in-person interviews in this study (Glascoe & Marks, 2011). Online learning may make it difficult for parents and teachers to assess children properly. Parents in India identify children with disabilities 6 – 10 months later compared to parents in Western cultures, and often provide cultural reasons that facilitate and normalise early unusual behaviour (Desai et al., 2012). The generalisability of the current results may be limited by the fact that the study comprised only children aged 4 – 8 years and the sample was collected from a few states in North India; this is not a national representation of India, which comprises 28 states and multiple languages. Third, since the data was collected during the COVID-19 pandemic, caution is recommended in generalizing the results for a non-pandemic environment where physical attendance at school in the norm.

For the SDQ in the current study, the questionnaire had low internal consistency. Although the reliability was not as high as recommended for such studies, the likely cause for the low reliability is the small number of items per subscale. Therefore, the findings from the scale may actually be reliable with the low internal consistency being an artefact of the scale structure.

Future Directions

Future studies could conduct face-to-face pilot-testing interviews for a more detailed evaluation of the screening tools (Queirós et al., 2017). Furthermore, the study used English

and translated Hindi PEDS and SDQ forms; these languages may be dominant in North India. However, India is multilinguistic, so the questionnaires may need to be adapted to regional languages to cater for a specific population. Studies have shown that parents of children from low socioeconomic backgrounds, who often speak their native languages, can better report on their children when interviewed in that native language (Tsimpli et al., 2020).

For the SDQ model fit, more models could be evaluated, such as the one-factor model with the total difficulties scale, the three-factor model involving internalizing and externalising, and the strength scale, to determine which scale could better fit than the five-factor model alone (Gomez & Stavropoulos, 2019; Karlsson et al., 2022; Niclasen et al., 2013). Second, the study did not investigate whether sociodemographic factors, such as household income and education, could impact parents' evaluation of their child. Indian parents are often unwilling to address children's developmental concerns, and they are hesitant to consider special education for children categorised as "slow learners" (Karande et al., 2008). Although this study has its limitations, it provides important insights into using the SDQ with Indian children.

Contribution and Conclusion

This study contributed the field in a number of ways. To begin with, the translation and face validation of the tool ensured relevance to the Indian context and population. Second, the finding that the PEDS and SDQ differentiated between children with TD and DD gives confidence for their use with children across a range of abilities, and the emphasises on parents' concerns about screening children helped us understand parent's developmental literacy. Third, this was the first study to determine whether the five-factor model was a good fit for parents and teachers of children aged 4–8 years in India. Finally, the study was also the first to examine the important relationship between DD and SEL by using the PEDS and SDQ together in India.

To conclude, pediatricians and physicians are pressed for time. They have limited time to administer screening tools that involve activities to gauge a child's physical, mental, and social development, especially in a developing country such as India. Screening tools such as the PEDS and SDQ, which are low-cost, easily accessible, and self-report, can help practitioners and schools across India reliably determine whether a child needs further assessments and early intervention. In addition, following the AAP recommendation of screening children beyond 3 years, the PEDS and SDQ brought forward parents and teachers' evaluations of children aged 4 – 8 years, providing insight into their concerns and developmental literacy regarding children. Goodman et al. (2000) reported that multi-informant reporting on the SDQ could increase the detection of childhood psychiatric disorders and improve access to effective interventions. In LMICs such as Bangladesh, the SDQ was able to distinguish between clinical and community samples, resulting in the SDQ being utilized with more frequency. This could apply to other LMICs, such as India (Mullick & Goodman, 2001).

Screening for developmental delay and problems with SEL is essential to understand that growth is multi-dimensional, emphasizing physiological, interpersonal, and social domains. Children's development assessment has been limited in developing countries such as India due to a lack of relevant infrastructure, poverty, and limited parental literacy on child development (Ali, 2013). Concurrent use of the PEDS and SDQ would remove the critical issues in testing such as human resource constraints, costly tools, lack of knowledge, and at times overconfidence of parents in their children's developmental milestones. Screening helps initiate and maintain regular screening across schools and clinical practices and acknowledges parents and teachers concerns regarding the child's development (Shekhawat et al., 2022). Therefore, using the PEDS and SDQ will not only provide parents evaluation of their

children. It will also facilitate teacher evaluation of children regularly, initiating further assessments and interventions (Wake et al., 2005).

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Appendix A: Sheel, H., Suárez, L., Marsh, N.V. (2023). Parents' Evaluation of Developmental Status and Strength and Difficulties Questionnaire as Screening Measures for Children in India: A Scoping Review. *Pediatric Reports*, *15*, 175-196.

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Review

Parents' Evaluation of Developmental Status and Strength and Difficulties Questionnaire as Screening Measures for Children in India: A Scoping Review

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Abstract: Due to the limited availability of suitable measures, screening children for developmental delays and social–emotional learning has long been a challenge in India. This scoping review examined the use of the Parents' Evaluation of Developmental Status (PEDS), PEDS: Developmental Milestones (PEDS:DM), and the Strength and Difficulties Questionnaire (SDQ) with children (<13 years old) in India. The scoping review was conducted following the Joanna Briggs Institute Protocol to identify primary research studies that examined the use of the PEDS, PEDS:DM, and SDQ in India between 1990 and 2020. A total of seven studies for the PEDS and eight studies for the SDQ were identified for inclusion in the review. There were no studies using the PEDS:DM. Two empirical studies used the PEDS, while seven empirical studies used the SDQ. This review represents the first step in understanding the use of screening tools with children in India.

Keywords: PEDS; SDQ; screening; children; India; scoping review

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1. Introduction

Developmental disability (DD) is a broad spectrum of impairments or a lack of developmental features appropriate to a child's age and vital for their growth [1]. DD is usually present at birth and negatively impacts the individual's physical, intellectual, and/or social development. DD results in impairments in the ability to learn, reason, and solve problems, and it also impairs adaptive behaviour, which consists of social and life skills [2]. The *Diagnostic and Statistical Manual of Mental Disorders, 5th edition, text revision* (DSM-5-TR) characterised DD as an Intellectual Developmental Disorder (IDD), where an individual lacks in general mental abilities and adaptive functioning [3]. The *International Classification of Diseases, Eleventh Revision* (ICD-11) considered DD as a neurodevelopmental disorder that arises during the developmental period and involves difficulties in intellectual, motor, language, or social functions [4].

Social–emotional learning (SEL) is a child's ability to understand themselves and others, regulate emotions and attention, and engage with others [5]. Individuals with DD may have difficulties with social relationships when compared to neurotypical peers and have differences in their reading of neurotypical nonverbal and subtle social cues [6]. Therefore, they usually have impairments in SEL too.

In India, 2.5–3.4% of children had various developmental problems diagnosed using screening tools. The most common forms were developmental delay, speech delay, global delay, gross motor delay, and hearing impairment [7]. In addition, in India, a review of recent studies showed that the prevalence of mental health problems in school-going children varies from 6.33% to 43.1%. Specifically, the prevalence of behavioural and emotional problems among orphans and other vulnerable children ranges from 18.3% to 64.53%. In children with typical development, it was reported to range between 8.7% and 18.7% [8].

The recent research literature in India has revealed multiple issues within universal developmental and SEL surveillance and screening [9,10]. To begin with, parents are unaware that screening services exist, nor are they aware of why those services are necessary. Health care is given priority only when there is an acute illness. Furthermore, the population of doctors who serve the needs of Indian children is heterogeneous, with varying skills. If parents express concerns, they often receive inaccurate information without proper evaluation [10]. Postgraduate paediatric courses in India lack formal training in developmental and SEL screening and assessment [10]. Moreover, in India, paediatricians make clinical judgments based on unstructured probing of developmental milestones, and India needs more developmental paediatricians [10,11].

In 2013, the Indian government launched the Rashtriya Bal Swasthya Karyakram, also known as the 'Child Health Screening and Early Intervention Services scheme', which caters specifically to government schools [12]. The scheme aims at early identification and early intervention for children from birth to 18 years old to cover the four Ds: defects at birth; deficiencies; diseases; and development delays. This includes disability. The target population included new-borns, children in Anganwadi centres (rural childcare centres across India), and government schools [13]. However, the annual progress report of the scheme for 2018–2019 provided scant information on the tools used for screening purposes. Mukherjee et al. [11] concluded that the number of children identified for delay and disability has increased since the inception of the scheme. However, some states, such as Maharashtra and Odisha, faced issues with implementation, infrastructure constraints, and limited resources [14]. Furthermore, the scheme does not cater to private schools in India, which constitute 49% of children in urban areas and 21% in rural areas [15].

Developmental screening "is a brief assessment procedure designed to identify children who should receive a more intensive diagnosis or assessment" [16]. Developmental surveillance monitors the child's progress by gathering information on the child's development from multiple sources and determining whether the rate and extent of a child's development elicits concerns [17].

The World Health Organization (WHO) has emphasised the importance of screening children for any form of disability, explicitly highlighting the relevance of interventions that promote young children's development [18]. Screening tools developed in India, such as the Baroda Development Screening Test (BDST), Developmental Assessment Scale for Indian Infants (DASII), and Trivandrum Developmental Screening Chart (TDSC), are linguistically and culturally reasonable. Nonetheless, their psychometric properties are suboptimal, and their use has been restricted to a specific population given that health professionals initially developed them for community services [10,19].

Most low- and medium-income countries (LMIC) use tools developed in Western countries to screen children for DD and SEL. However, there are three main limitations to using these screening tools. First, most screening tools measuring DD in children aged 0–8 years are developed in Western and high-income countries. They require extensive training, which is not readily available in LMIC due to limited funds to purchase tools and training costs [20]. Second, tools developed in Western countries lack psychometrically valid translations to use in other cultures [21,22]. Third, most screening tools are copyrighted and require permission to translate them into other languages for schools and clinics to use; this is often expensive [23].

Screening tools that have been adapted and translated for use in LMIC include the Bayley Scale of Infant and Toddler Developmental Screening test (BSITDS; ref. [24]), Ages and Stages Questionnaire (ASQ; ref. [25]), Guide for Monitoring Child Development (GMCD; ref. [26]), and Parent Evaluation of Developmental Status (PEDS; ref. [27]) for assessing DD. The Eyberg Child Behaviour Inventory (ECBI, ref. [28]), Child Behaviour Checklist (CBC; ref. [29]), Children Emotional Adjustment Scale (CEAS; ref. [30]), and Strength and Difficulties Questionnaire (SDQ; ref. [31]) have been adapted and translated for assessing SEL.

In comparison to the PEDS, PEDS:DM, and SDQ, the other screening tools reviewed such as the BSITDS, Denver Developmental Screening Test (DDST), ASQ-3, GMCD, ECBI, and CEAS have several limitations [22,24–26,28,30,32]. First, these scales' psychometric properties have been questioned for LMIC because research outcomes from the Western world cannot be applied to LMIC [33,34]. Second, tools such as the BSITDS and GMCD require professional training, which is time consuming and costly [35]. Finally, scales such as the ASQ-3 and BSITDS-III need parents and clinicians to attempt multiple developmental tasks with the child before filling in the questionnaire, which may hinder the evaluation due to the longer administration time and the child's level of comfort with the activity and the environment [36,37].

Among the screening tools for DD and SEL, the PEDS and SDQ are probably the most appropriate for use in India because they are less costly and cater to a wider age range (compared to tools such as GMCD and CEAS). The PEDS and SDQ are also easily accessible, do not require extensive training for administration, and have proven psychometric properties for use in LMIC [31,38]. Some preliminary studies have validated PEDS in LMIC such as Thailand [39], Bhutan [40], Tehran [41], and India [42,43], and the SDQ has been validated in Nigeria [44], Vietnam [45], Turkey [46], Thailand [47], and India [48–50]. However, the PEDS studies carried out in India were challenged by the PEDS developer for its scoring procedure and the gold standard tool the study used for its cross-validation [42,43,51]. Furthermore, these studies did not use Parents' Evaluation of Developmental Status: Developmental Milestone (PEDS:DM). Philips Owen et al. [49] translated and validated the SDQ in the regional language (Malayalam) instead of the Indian national language of Hindi. Michelson et al. [48] and Singh et al. [50] used the Hindi version of the SDQ in their respective studies. Nevertheless, these studies validated the Hindi SDQ on adolescents and did not consider children. Therefore, there is limited research on whether these measures have been translated, adapted, and validated with Indian children [21,47].

The PEDS [27] is a surveillance and screening tool for children aged 0 to 8 years. The tool elicits and addresses parents' concerns about development, behaviour, and mental health. The tool comprises one form with 10 questions across 10 categories (expressive language, receptive language, social–emotional, behavioural, fine motor, gross motor, self-help, school, cognitive, and health). The questions in the PEDS elicit parents' perspectives of their child's development as high/medium/low risk. The response options include yes, no, and a little. The scoring for the PEDS includes columns for each age range and identifies which concerns predict problems and which do not. The PEDS interpretation form houses an algorithm to decide whether to refer, screen further, observe, counsel parents, or reassure them on the results obtained [27]. PEDS has sound psychometric properties and was re-standardised and revalidated in 2013 [52]. The interrater reliability was 0.95, and the test–retest reliability was 0.88. The validity of the PEDS ranges from 0.84–0.99 when compared with later deficits and diagnoses [52].

The PEDS:DM is a new measure that can be used with the PEDS or by itself. The PEDS:DM comprises six to eight items per age and aims to predict the developmental status of children accurately. Each item on the PEDS:DM addresses different domains (fine motor, gross motor, expressive language, receptive language, self-help, social–emotional, and, for older children, reading and math). The age-appropriate items are presented on a single page within a laminated book that includes essential visual stimuli. Parents answer the PEDS:DM items via a multiple-choice format in fewer than 5 min. A single scoring template that is built into the binder is used to determine whether the milestones are met or unmet. Furthermore, the PEDS:DM uses the same evidence-based decision regarding the results as the PEDS. The PEDS:DM is reported to have good psychometric properties, with internal consistency across all domains being 0.98. The test–retest reliability was 0.98 and 0.99, and the interrater reliability is reported to range from 0.82 to 0.96 across subtests. The concurrent, discriminant, and criterion-related validity for PEDS:DM is satisfactory compared with other similar disability and screening tools. In addition, the specificity and sensitivity of the scale are 80% and 85%, respectively, indicating that PEDS:DM reports few

false negative results. Thus, fewer children with developmental disabilities were missed in addition to correctly identifying children with no delays or disabilities [53].

The SDQ screening measure evaluates children's mental health problems in the age range of 2–16 years [54]. The SDQ is completed by parents and teachers and comprises 25 questions under five domains: emotional symptoms, conduct problems, hyperactivity/inattention, peer relation problems, and prosocial behaviour [31]. This screening tool comprises a three-point rating scale ranging from not true, somewhat true, and certainly true. The scoring for the SDQ comprises the total difficulties score, which is obtained by summing the scores for all scales except the prosocial scale. The resulting scores range from 0 to 40. The cut-off points for SDQ scores are categorised as normal, borderline, and abnormal [54]. The SDQ has good psychometric properties. The tool was administered to 10,435 British participants by their parents, teachers, and self-evaluation. The internal consistency of the tool was 0.73, the test–retest reliability was 0.62, and the sensitivity and specificity of the scale were 95% and 35%, respectively [54]. The SDQ reported high sensitivity, i.e., the tool correctly identified individuals 95% of the time with mental health problems. However, the SDQ inaccurately identified participants with no mental health problems as false positives, as reported with low specificity. There have been recent attempts to examine the usefulness of the SDQ for children with DD [55].

2. Objective and Research Question for the Scoping Review

Scoping reviews are used in healthcare research to map the scope and depth of a concept in a specific research area and to identify the sources and types of evidence available [56]. This scoping review's primary objective is to determine the extent to which two developmental screening tools (PEDS and PEDS:DM) and one SEL screening tool (SDQ) have been used with children in India. This review aims to do the following: first, increase awareness among parents and professionals in health and education about the relevance of screening children for DD and SEL. Incorporating screening tools during doctor visits and school enrolments may result in earlier and more rigorous assessment and intervention. Second, it aims to promote the use of valid, reliable, and accessible low-cost tools in LMIC such as India. Third, since PEDS, PEDS:DM, and SDQ meet the criteria, the study aims to determine whether these tools are validated for use in India.

The scoping review addresses the following three research questions: (1) what is the published evidence for the use of the PEDS, PEDS:DM, and SDQ in screening children aged 0–12 years for DD and SEL in India, (2) what are the demographic characteristics of the studies' participants, and (3) what conclusions have been drawn from the empirical research using the PEDS and SDQ screening tools in India?

3. Inclusion and Exclusion Criteria

This scoping review was completed using the PRISMA extension for scoping reviews and the Joanna Briggs Institute (JBI) Protocol for evidence synthesis (Appendix B) [57].

3.1. Population

The study included children aged 0–12 years and living in India. Exclusion criteria included studies conducted on people older than 12 years.

3.2. Concepts

Studies included in this review had to use the PEDS, PEDS:DM, or SDQ as screening tools. Only studies written and published in English and between the years 1990 and 2020 were considered for this review.

3.3. Context

The context of this review was limited to studies conducted in India. However, the setting across India could vary from children in schools to orphanages or institutional homes.

3.4. Types of Sources

Primary research studies, systematic reviews, meta-analyses, experimental studies and epidemiological (grey literature) research were included in this scoping review.

4. Search Strategy

4.1. Pre-Identification Process

The pre-identification process consisted of identifying and refining the research question. In the current scoping review, three questions were developed to explore whether the PEDS and SDQ screening tools have been used with the population of India, the participants' demographic characteristics, and the findings obtained from these studies.

4.2. Identification Stage

The identification stage involved identifying relevant studies published between 1990 and 2020 using databases such as the Web of Science, Scopus, PEDS and SDQ websites, and Google Scholar for grey literature. Different variations of keywords were included. For the PEDS, the keywords were Parent Evaluation of Developmental Status; PEDS; Parent Evaluation of Developmental Status: Developmental Milestones; PEDS:DM; children; and India. For the SDQ, the keywords included Strength and Difficulties Questionnaire; SDQ; children; and India. The grey literature was also searched using Google Scholar. The literature included consensus, opinion, and position papers. A total of 61 articles for the PEDS (PEDS website = 28, Web of Science = 3, Scopus = 8, and Google Scholar = 22) and 184 articles for the SDQ (SDQ website = 13, Web of Science = 22, Scopus = 29, and Google Scholar = 120) were identified for possible inclusion in the scoping review. The identification stage processes were conducted by the first author (HS).

4.3. Screening Stage

The first author (HS) carried out the initial screening and intentionally maintained the screening process as inclusive. In this stage, Endnote was used to accumulate all articles (61 articles for the PEDS and 184 articles for the SDQ) identified through the different databases and removed duplicate articles. The PEDS:DM is a new measure recommended to be used with the PEDS. However, the PEDS:DM was not mentioned in any articles in the initial screening. Therefore, it was eliminated from the PRISMA diagram. Relevant titles and articles that mentioned DD and SEL were retained. The first and third authors (HS and NVM) then conducted 100% of the screening using the inclusion and exclusion criteria. The JBI System for the Unified Management, Assessment, and Review of Information (JBI SUMARI) was used to gather and screen all the articles for the PEDS and SDQ.

4.4. Eligibility Stage

The second screening stage involved screening titles and abstracts to determine the use of the PEDS and SDQ in India. At this stage, 38 articles from the PEDS collection and 132 articles from the SDQ collection were removed for not meeting the inclusion criteria.

The first and third authors conducted 100% of the screening. Overall, an interrater reliability of 98% was obtained between the two reviewers on the agreement of including 20 full-text articles for the PEDS and 29 articles for the SDQ for review. The 2% disagreement between the reviewers was resolved by reviewing and discussing the articles again. The reviewers agreed to not include these articles in the scoping review.

4.5. Final Screening Stage

At this stage, only studies such as empirical research, systematic reviews, literature reviews, and grey literature (dissertation, opinion pieces, etc.) that mentioned the use of the PEDS and SDQ in India were incorporated into the scoping review. For the review decision process, the first author (HS) reviewed all the full-text articles.

The reviewer excluded full-text articles that: (1) did not use the PEDS or SDQ in India, (2) used the PEDS or SDQ on adolescents, or (3) did not provide sufficient information on

if, and if so how, the tools were translated to Hindi. As a result, 13 full-text articles were removed from the PEDS collection, and 21 articles were removed from the SDQ collection. A total of seven articles (six peer reviewed and one grey literature) were included in the final review for the PEDS, and eight articles (six peer reviewed and two grey literature) were included in the final review for the SDQ (Figures 1 and 2).

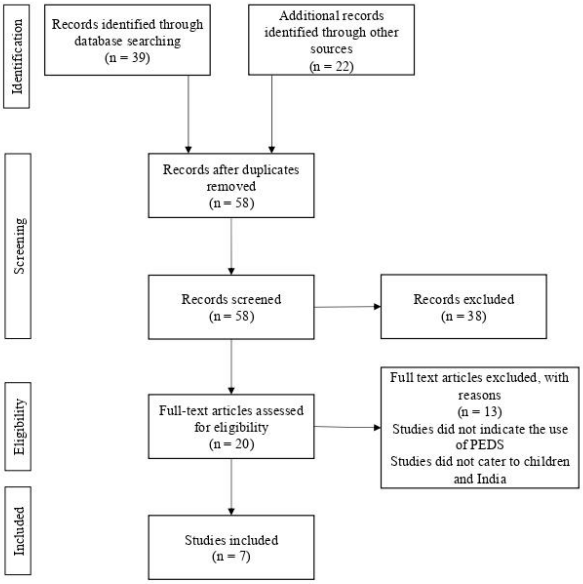

Figure 1. PRISMA diagram of studies included in the comprehensive scoping review for the PEDS.

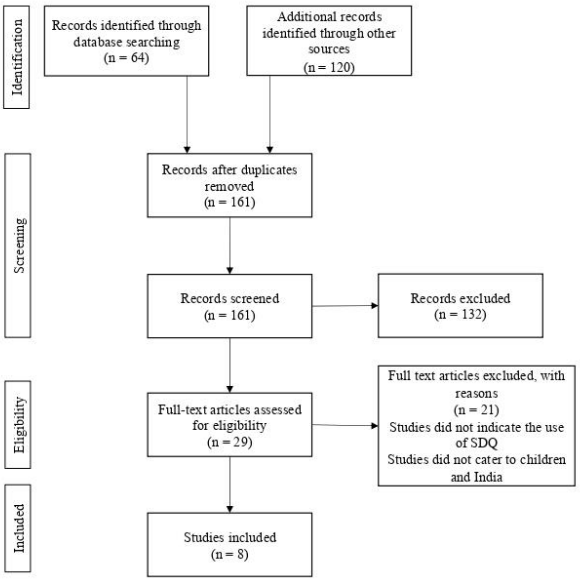

Figure 2. PRISMA diagram of studies included in the comprehensive scoping review for the SDQ.

5. Data Extraction Process

The following information was extracted from the seven articles for the PEDS and the eight articles for the SDQ: (1) author and date of publication, (2) type of article, (3) type of study, (4) where the study was conducted in India, (5) aim of the study, (6) the sample size and age range, (7) the setting in which the PEDS and SDQ were used, and (8) the main findings of the study (Appendix A).

6. Results and Discussion of the Scoping Review

The aim of this review was to examine the amount of published evidence on the use of the PEDS, PEDS:DM, and SDQ for screening children for DD and SEL in India, to explore the demographic characteristics of the studies' participants, and to report the conclusions drawn from the empirical research using the PEDS and SDQ screening tools.

7. PEDS and PEDS:DM

The scoping review for the PEDS found seven full-text articles on the use of the PEDS for DD in India. However, only two studies were empirical research, and none used the PEDS:DM, either alone or with the PEDS. The participants belonged to north India and were between 6 and 60 months of age. The conclusion drawn was that the PEDS could detect concerns among parents regarding their child's developmental milestones.

The number of PEDS studies varied across years. No studies were reported for 1990–2000, three (43%) were reported for 2001–2005, one (14%) was reported for 2006–2010, two (29%) were reported for 2011–2015, and one (14%) was reported for 2016–2020. Three (42%) of the studies were text- and opinion-based evidence, two (29%) were empirical studies, and two (29%) were systematic reviews.

Malhi and Singhi [42,43] reported the results from two empirical studies using the PEDS. These two studies did not use the PEDS:DM and aimed to identify the range of concerns that parents have about their children's development and its relationship to the child's developmental status. The first study included 55 parent–child dyads recruited through outpatient paediatric care in a tertiary care teaching hospital in Chandigarh. The second study recruited 79 parent–child dyads from the same hospital and city in India. The age range of the children was 6–60 months. The first study concluded that 38% of the parents indicated no concerns, while 20% raised non-significant developmental problems. Among these children, 91% passed the developmental screening. The second study concluded that parents' concerns regarding their children's developmental milestones were moderately sensitive predictors of DD in children aged 2 to 5 years. The authors suggested that since the PEDS's specificity (34.8%) and sensitivity (65%) were lower in LMIC than in the United States, the tool is not recommended as an alternative to standardised screening measures. Instead, it may be used as a pre-screening tool in an outpatient setting to identify those children who require more in-depth developmental screening [43].

In response to the conclusions of Malhi and Singhi [41,42], Glascoe [51] wrote a letter to the editors indicating that their findings may not be accurate for two reasons. First, there was a lack of clarity regarding their scoring of the PEDS. Second, their use of the Developmental Profile-II as the criterion measure was problematic, as it tends to both under- and over-detect developmental concerns among children [51].

Poon et al. [58] provided an opinion piece discussing the prevalence of DD in children. This article emphasised the benefits of early identification using developmental screening and surveillance. The authors believed that it is necessary to listen to parents' concerns with regularity, integrate routine screening with health maintenance visits, refer patients to paediatricians and therapists early, and provide early intervention services and therapies that have proven effective independent of the medical diagnosis. The authors reported that the PEDS has been translated into more than 10 different languages and completed by parents. Mukherjee et al. [10] also found the PEDS to be reliable in developing countries. However, the authors concluded that there is limited research from India.

Marlow et al. [37] conducted a systematic review of DD and autism spectrum disorder (ASD) screening tools and provided DD and ASD screening recommendations for LMIC. The review included children aged 0–7 years, studies published in English, the tools used for screening purposes, studies that included at least one of the developmental domains, and provided information on the measure's performance. The review confirmed that the PEDS has been translated for use in India and that it can detect DD among children in LMIC.

Woolfenden et al. [59] aimed to understand the use of the PEDS in evaluating parental concerns of children with developmental risk and associated risk factors. Their systematic review's inclusion criteria specified primary observational studies with available prevalence data. Their review found that the PEDS reported 13% of parents indicating their child as high developmental risk and 19% of parents reporting moderate to low developmental risks. However, these evaluations depended on the children's body weights, socioeconomic conditions, and access to medical care, which provided variation in the quality of studies included in the systematic review. Furthermore, comparing the PEDS to other measures of developmental risk such as the DDST, ASQ, and the Australian Early Developmental Index showed the same confidence interval around the pooled prevalence estimates of high and moderate developmental risks. Therefore, the two systematic reviews concluded that there is a substantial literature on the prevalence of parental concern for developmental risk in children. However, most of the findings were flawed due to the methodological issues of a small sample size and the use of an inappropriate measure to screen children for developmental delay. Furthermore, only eight studies used the PEDS in LMIC, including India. Table 1 summarises the studies conducted using PEDS in India. The table reports the authors, the article type, the design of the study, the city/state where the study was conducted, the aim of the study, the population setting (size and age range), the measures used, the results, and the key findings of the study.

Table 1. Summary of studies on Parent Evaluation of Developmental Status (PEDS) use in India.

				Population					
Author	**Article Type**	**Design**	**City in India**	**Aim/Purpose**	**Size**	**Age Range**	**Setting and Measures Used**	**Main Results**	**Key Findings**
Marlow, Servili, and Tomlinson, 2019	Peer reviewed	Systematic review	Chandigarh, India (Reference to Malhi and Singhi, 2001 study)	Identify current screening instruments for DD and ASD, create screening profiles, and provide recommendation for screening in LMIC.	A sample of more than 300 participants for each instrument	0–7 years	Search Strategy of the tools (2014–2017); Inclusion and exclusion criteria and specific criteria for screening instruments.	The review identified 10 screening tools suitable to screen children in LMIC for ASD and 7 screening tools for DD.	PEDS is adapted and able to detect DD in LMIC.
Woolfenden et al., 2014	Peer reviewed	Systematic review	Chandigarh, India (Reference to Malhi and Singhi, 2001 study)	To understand the worldwide prevalence of parental concerns measured by PEDS that indicated developmental risks and associated risk factors.	20 to 54,602	Less than 1 month to 7 years and 11 months	Search Strategy of PEDS; Inclusion and exclusion criteria for study participants and review process.	14% of parents raised concerns associated with a high risk of developmental problems, and 19% raised concerns about a moderate risk for developmental problems.	Eight studies of PEDS were conducted in low- and medium-income countries (including India).
Malhi and Singhi, 2001	Peer reviewed	Diagnostic test accuracy	Chandigarh, India	To identify the range of concerns that parents have about their child's development and its relationship to the child's developmental status.	55 parent–child dyads	6 to 60 months	Patients recruited through outpatient paediatric care in a tertiary care teaching hospital.	38% of parents indicated no concerns, and 20% raised non-significant developmental concerns about their child's development. From these children, 90.6% passed the development screening.	Of the parents who expressed one or more significant developmental concerns about their child, 47.8% of these children failed the screening. In addition, 43% of the parents whose children failed developmental screening expressed medical concerns, 35.7% reported expressive language concerns, and 28% indicated global/cognitive concerns.
Malhi and Singhi, 2002	Peer reviewed	Diagnostic test accuracy	Chandigarh, India	To identify the range of concerns parents have about their child's development and evaluate the relationship between parent concern and the child's developmental status.	79 parent–child dyads	24 to 60 months	Patients recruited through outpatient paediatric care in a tertiary care teaching hospital; Two questionnaires used: PEDS and Developmental Profile II.	Parents' concerns about the developmental milestones of their child were moderately sensitive predictors of DD in children between 2 and 5 years.	The authors advised against using the PEDS as a substitute for standardized developmental screening measures because its specificity and sensitivity were lower than those reported by the US. The PEDS can be used as a pre-screening tool to find children who might need comprehensive developmental screening in outpatient settings.

Table 1. *Cont.*

					Population				
Author	**Article Type**	**Design**	**City in India**	**Aim/Purpose**	**Size**	**Age Range**	**Setting and Measures Used**	**Main Results**	**Key Findings**
Glascoe, Malhi, and Singhi, 2001 and 2003	Grey literature	Letter to the authors	N.A.		79 parent–child dyads	24 to 60 months	Patients recruited through outpatient paediatric care in a tertiary care teaching hospital; Two questionnaires used: PEDS and Developmental Profile II.	Parents' concerns about the developmental milestones of their child were moderately sensitive predictors of DD in children between 2 and 5 years.	The author's letter noted that the scoring method utilized in the paper was not clear. Given that DP-II has a propensity to overidentify developmental issues, the concurrent test utilized to evaluate the accuracy of PEDS is questionable. PEDS would gain from the use of a different scoring system.
Poon, Larosa, and Pai, 2010	Peer reviewed	Text and opinion study		The paper discusses the prevalence of DD in children and recent literature regarding the benefits of early identification and benefits of developmental screening and surveillance.	Not specified		N.A.	The review's key conclusions stated that it is important to pay attention to parents' worries while maintaining regular surveillance, integrating routine screening, making early referrals to paediatricians and therapists, and offering early intervention services and therapies that have been proven to be successful regardless of the medical diagnosis.	PEDS has been used in India. The tool has been translated to over 10 different languages and is completed by parents.
Mukherjee et al., 2014	Peer reviewed	Text and opinion Study	India	The aim of the article was to review existing tools for children under the age of five that were validated in India and to provide a purposed paradigm for developmental screening in office practice.	Not specified	Under the age of 5 years	N.A.	Tools developed in India lack psychometric properties and were developed by healthcare workers, and the screening tools developed in the US are costly and not easily accessible.	PEDS has been found reliable in developing countries. However, there is limited research from India.

Note: PEDS was administered in English for all studies.

8. SDQ

From the 184 abstracts and titles screened for the SDQ scoping review, only eight full-text articles met the inclusion criteria (seven empirical studies and one literature review). The participants were recruited from different parts of India, and the children were up to 12 years old. The studies concluded that the SDQ was able to differentiate between different groups of children on the basis of their total difficulties score. No studies were conducted from 1990 to 2000, one (13%) study was conducted in both 2001–2005 and 2006–2010, two (25%) studies were conducted in 2011–2015, and four (50%) studies were conducted in 2016–2020. There was one (13%) study each in the format of a case-control study and a literature review, and there were three (38%) studies each using cross-sectional and longitudinal designs.

Of the three cross-sectional studies conducted in India using the SDQ, one study used a community sample [60], and two studies used clinical samples [61,62]. Bele et al. [60] assessed the prevalence of emotional and behavioural difficulties among children living in urban slums in Andhra Pradesh, India. Their study evaluated 370 children aged 5–10 years using the SDQ completed by parents. They concluded that for the children, residing in urban slums was significantly associated with behaviour problems. Boys had a higher risk of mental health difficulties than girls. Factors such as low nutrition, low socioeconomic status, financial constraints, and conflicts in the family were predictors of behaviour problems among the children.

Two cross-sectional studies examined the psychological health of children with acute lymphoblastic leukaemia and congenital heart disease [61,62]. Chari and Hirisave [61] assessed 40 children (20 children with acute lymphoblastic leukaemia and 20 children from a healthy group) aged 4 to 8 years in terms of psychiatric disturbance using the SDQ completed by parents. The study was carried out at the paediatric oncology ward at Kidwai memorial institute of Oncology, Bangalore, Karnataka. The results showed that children with acute lymphoblastic leukaemia demonstrated more disruptive behaviour and peer problems than healthy children.

Kiron [62] examined 242 children aged 10 years and below for the psychosocial impact of congenital heart disease. They used the Malayalam version of the SDQ, which was completed by parents at the Sree Chitra Tirunsal Institute of Medical Science and Technology, Kerala. They reported that children aware of their congenital heart disease had a higher total difficulty score on the SDQ than children unaware of their congenital heart disease. The children with awareness of their congenital heart disease also exhibited more behaviour problems and less prosocial behaviour than the children without awareness of their congenital heart disease [62].

The three longitudinal studies were carried out across several LMIC, including India. One was carried out in India alone [63], one in India and Vietnam [64], and one in Cambodia, Kenya, Tanzania, Ethiopia, and India [65]. The scoping review included these multi-country studies, as they met the inclusion criteria of including participants from India.

Malhotra et al.'s [63] study in Chandigarh, India, aimed to establish the incidence of psychological difficulties in 727 school children aged 4–11 years. At the six-year follow up, children with psychological disorders were compared to children with no psychological disorders on socio-demographic factors and psychological variables. The findings, based on parent reports, found no significant differences between the two groups on age, gender, or psychological parameters such as temperament, parental handling, life events, and IQ.

Trinh's [64] study compared the mental health impact of child labour in India and Vietnam. The study was of 1934 children aged 7–9 years assessed over a period of 15 years on parent-completed SDQ. The study concluded that the effect of child labour on the five dimensions of the SDQ was not uniform across the two countries. In Vietnam, children who participated in the labour market were likely to have worse conduct problems, hyperactivity, peer problems, and reduced prosocial behaviour compared to those who did not work. In India, child labour and mental health symptoms were significantly correlated with hyperactivity and reduced prosocial behaviour.

Huynh et al.'s [65] longitudinal study compared the psychological wellbeing of 2837 orphans and separated children in the age range of 6–12 years over 36 months in five LMIC (Cambodia, India, Kenya, Tanzania, and Ethiopia). The study used the self-report version of the SDQ and translated the questionnaire to its native languages in the five countries. The findings revealed no meaningful difference in the SDQ total difficulties score across care settings (residential versus community-based) or between orphaned and separated children in residential care settings. In this study, orphans were defined as children who had lost one or both parents, and separated children were defined as children separated from their parents with no expectation of return. This study demonstrated that in under-resourced societies in LMIC, orphaned and separated children's overall wellbeing may depend on the quality of care rather than the type of care setting itself [65].

A prospective case-control study was conducted in Mumbai, Maharashtra, to study the impact of neurobehavioral disorders in children with and without epilepsy [66]. The children, aged 5–12 years, were classified on the etiologic classification: epilepsy, epilepsy control, irregular school attendance, and school dropouts. The 222 children with epilepsy were matched with 226 non-epileptic children on age, gender, and socioeconomic status. The parent version of the SDQ was administered in the Indian language to screen for neurobehavioral disorders. The authors reported that 63% of the children with epilepsy had emotional problems and abnormal conduct scores, high hyperactivity, poor peer relations, and poor pro-sociality, leading to low school attendance. The SDQ total difficulties score was abnormal in 39%, borderline in 16%, and normal in 45% of the cases for children with epilepsy. It was abnormal for 8%, borderline for 3%, and normal for 89% of the cases for children without epilepsy.

A literature review (grey literature) by Galab et al. [67] focused on childhood poverty in Andhra Pradesh, India, and how the national policies have impacted the state. The report used the parent and translated version (Telegu) of the SDQ to assess the mental health problems of children aged 1–8 years. The report concluded that nearly 20% of children were classified as abnormal and 20% as borderline However, the author cautioned that the SDQ had not been validated for use in Andhra Pradesh and that local normative data were not available [55]. Table 2 summarises the studies conducted using SDQ in India. The table reports the authors, the article type, the design of the study, the city/state where the study was conducted, the aim of the study, the population setting (size and age range), the measures used, the results, and the key findings of the study.

Table 2. Summary of studies on the Strength and Difficulties Questionnaire (SDQ) use in India.

					Population				
Author	**Article Type**	**Design**	**City in India**	**Aim/Purpose**	**Size**	**Age Range**	**Setting and Measures Used**	**Outcome**	**Key Findings**
Bele et al., 2013 *	Peer reviewed	Cross-sectional study	Gauthaminagar in Karimnagar district of Andhra Pradesh	To estimate the prevalence of emotional and behavioural disorders using standardised instruments among children in urban slums.	N = 370	5–10 years	Emotional and behavioural problems among children were evaluated using the Strength and Difficulties Questionnaire (SDQ), and depression was assessed using Patient Health Questionnaire (PHQ-9).	On at least one SDQ domain, 22% of the children scored abnormally. The children's behavioural issues and poorer academic achievement were found to be significantly correlated.	SDQ scores and mean values for affected and unaffected groups were compared, and a significant variance was found in the total problems score in the affected group (borderline and abnormal score) compared to the unaffected group.
Malhotra et al., 2009 **	Peer reviewed	Prevalence study/Longitudinal study	Chandigarh, India	To establish the incidence of psychiatric disorders in school children in India.	N = 873	4–11 years	Rutter B (teachers rating), Childhood Psychopathology Measurement Schedule, Temperament Measurement Scale, Parent Handling Questionnaire, Parent Interview Schedule, Life event scale for Indian children, and SDQ.	A total of 20 of the 186 children that were monitored had a psychological condition. In terms of age, gender, and psychological (temperament, parental handling, life stress, and IQ) factors at baseline, children with the disorder at follow-up did not vary from those without it.	Children scoring above a cut-off score on the SDQ ($\geq$14) were clinically examined by a psychiatrist at home or at the clinic.
Trinh, 2020 *	Peer reviewed	Longitudinal study	India and Vietnam	To study the mental health impact of child labour.	N = 978 children in Vietnam and 956 children in India	7–9 years	SDQ to measure child mental health and child participation in the labour market was assessed by understanding if the child has undertaken any activity to earn money.	Child labour did not uniformly affect the five dimensions of the SDQ. Compared to children who did not work, those who participated in the labour market in Vietnam were more likely to experience conduct problems, hyperactivity, peer issues, and less prosocial behaviour. The outcomes for working children in Vietnam were noticeably lower regarding peer issues and less prosocial behaviour. Hyperactivity and a decline in prosocial behaviour were significantly linked with child labour and mental health symptoms in India.	In the five scales of the SDQ, peer problems and prosocial behaviour were found to be significantly impacted by working in both countries.

Table 2. *Cont.*

				Population					
Author	**Article Type**	**Design**	**City in India**	**Aim/Purpose**	**Size**	**Age Range**	**Setting and Measures Used**	**Outcome**	**Key Findings**
Anita et al., 2016 **	Peer reviewed	Prospective case control study	Mumbai, India	To study the prevalence, type, and impact of neurobehavioral disorders in children with and without epilepsy.	N = 222	5–12 years	SDQ was assessed in four groups: epilepsy, epilepsy control, irregular school attendance, and school dropout.	The study revealed that 14.4% of children with epilepsy during schooling had learning problems, and 10.3% had behavioural problems compared to non-epileptics. In addition, 63% of the people with epilepsy had emotional difficulties and abnormal conduct scores. High hyperactivity, poor peer relations, and poor pro-social behaviour led to low school attendance in 35% of epileptic patients.	Screening of cases and controls with the SDQ-P (parent version) was conducted, and the total difficulties score was abnormal in 39% of cases and 7.9% of controls, and it was normal in 44.5% of cases and 88.9% of controls.
Chari and Hirisave, 2020 *	Peer reviewed	Cross-sectional study	Bangalore, India	To examine the psychological health of young children undergoing treatment for acute lymphoblastic leukaemia.	N = 40	4–8 years	SDQ to assess psychiatric disturbances, feeling cards to examine the subject's current emotional state, and teddy bear's picnic to examine personal construct.	Children with ALL (acute lymphoblastic leukaemia) were reported on SDQ to display more behavioural disturbances.	On the SDQ, there were significant differences between groups in total difficulties, conduct, and peer problems. However, median scores were in the normative range. Children with ALL demonstrated more disruptive behaviours and peer problems than healthy children.
Galab et al., 2003 ***	Grey literature	Literature review	Andhra Pradesh	The report provides a brief literature on childhood poverty in Andhra Pradesh in India and explains how national policies have impacted childhood poverty in that state.	N = 3000	1–8 years	The SDQ was used to assess the mental health of children of 8 years of age.	The Young Lives results reported that nearly 20% of children were classified as abnormal and 20% as borderline. However, the authors recommended that these results should be interpreted with caution since the SDQ has not been validated in Andhra Pradesh and normative data is not available.	Previously, the SDQ had not been validated in Andhra Pradesh, and normative data were unavailable. The study was the first to use the SDQ in Andhra Pradesh, and the findings suggest that child mental health issues may be a potential problem, especially in the rural areas of Andhra Pradesh, where the prevalence of abnormal cases was over 20%.

Table 2. *Cont.*

Population									
Author	**Article Type**	**Design**	**City in India**	**Aim/Purpose**	**Size**	**Age Range**	**Setting and Measures Used**	**Outcome**	**Key Findings**
Huynh et al., 2019 **	Peer reviewed	Longitudinal study	Five low- and middle-income countries: Battambang District, Cambodia; Nagaland and Hyderabad, India; Bungoma District, Kenya; Kilimanjaro Region, Tanzania; and Addis Ababa, Ethiopia. Children were enrolled between 2006 and 2008 and followed biannually	To examine the psychological wellbeing of orphans and separate children in under-resourced societies in LMIC and to associate quality of care with children's psychosocial wellbeing.	N = 2013 (923 residential care and 1090 community-based sample)	6–12 years at baseline; 36 months of follow-up data	Quality of care was assessed using the Child Status Index, and child's psychosocial wellbeing was assessed using the SDQ.	Child psychosocial well-being across different levels of quality of care showed negligible differences between residential- and community-based care settings, suggesting the critical factor in child well-being is quality of care rather than environment of care.	When the authors controlled the orphan's gender, status, and age, components of quality of care predicted SDQ total difficulties better than care setting. Mean SDQ total difficulties scores across "high" and "low" quality of care showed differences between care settings to be minimal. There were no meaningful differences in SDQ total difficulties across care settings. Orphans and separated children (OCS) in residential care settings had higher SDQ total difficulties scores than in community-based settings.
Kiron, 2012 ***	Grey literature	Cross-sectional study (Project 2)	Sree Chitra Tirunal Institute of Medical Science and Technology, Kerala, India	To analyse whether those children who grow up without being aware of their congenital heart disease have any psychosocial advantage over those children who grow up being aware that they have undergone a major interventional procedure for their congenital heart disease.	N = 242 (only 147 parents responded to SDQ)	Less than 10 years	The SDQ was used to ascertain the impact of CHD in children.	On being assessed with the total difficulties score, children who were aware of their congenital heart disease were at substantial risk of clinically significant problems compared to the other group.	Children not aware of their CHD had significantly lower levels of problems compared to children who were aware and had experienced CHD. In addition, children in the first group were higher in prosocial behaviour compared to the second group.

Note: * demonstrates SDQ administered in English, ** demonstrates SDQ administered in Hindi and *** demonstrates SDQ administered in the regional languages.

9. Summary

The key findings addressed the three aims of the scoping review. First, there is scant published literature on the use of the PEDS in India. Most of the literature exists in the form of text- and opinion-based evidence that emphasised the lack of screening in India and the limited use of the PEDS as a tool to screen children for DD. Furthermore, only one study briefly mentioned the use of translated versions of PEDS questionnaires [37]. Overall, the articles highlighted the importance of early identification of children with DD and listening to parents' concerns through regular surveillance and screening. The SDQ compared mental health across different LMIC and was administered more frequently than PEDS to screen children in India.

Second, the characteristics of the participants included in the PEDS study were children aged 6–60 months with typical development living in Chandigarh, India. The SDQ studies comprised children aged 0–12 years from clinical and community samples recruited from different parts of the country.

Third, empirical studies using PEDS reported the tool as having below acceptable sensitivity and specificity. The SDQ studies reported that the tool was effective in differentiating groups of individuals based on SEL and behavioural concerns. Since India is a diverse country with many regional languages, the studies that used the SDQ catered to different population types and translated the questionnaire to regional and national languages.

9.1. Limitations of the Existing Research

The limited number of studies identified in this scoping review were conducted in different parts of India and examined the use of the PEDS and SDQ with children. Empirical research on the use of the PEDS in India is scarce (Table 1). The PEDS:DM was not used together with the PEDS in any of the studies. The studies that reported using translated versions of the PEDS in India provided limited to no information on the psychometric properties of the translated versions. Marlow et al. [37] noted that Malhi and Singhi's [42,43] study translated PEDS to Hindi. However, the original article does not provide this information.

The SDQ has been used more frequently than the PEDS in India (Table 2). However, most of the studies did not consider teacher evaluation and lacked transparency in the translation process of the SDQ. Two studies (grey literature) translated the SDQ to the relevant regional language [62,67]. Two studies indicated that they had translated the SDQ to the Native or Indian language without explicitly saying which language [65,66], and three studies did not translate the SDQ to Hindi [60,61,64]. Only one study explicitly indicated that they had used the Hindi version of the SDQ in their research [63]. The psychometric properties of the translated questionnaire in the regional and national languages of India must be considered with caution. The recommended cut-off value for the UK cannot be assumed to be suitable for use in countries where cultural differences exist [37].

9.2. Strengths, Limitations, and Implications of this Scoping Review

Strengths of this review are its comprehensive search strategy and its addressing of a broad research question related to the use of two screening tools in the population of India. The review process evaluated the quality of the studies that met the inclusion criteria for the PEDS and the SDQ. However, the review only assessed papers in English that were published within a certain year range. Future studies could possibly include studies in other languages used in India.

10. Conclusions

In terms of screening children for DD and SEL concerns, India lacks both a literature base and evidence of practice. Evidence on the use of the PEDS and SDQ suggests that these screening tools have not been widely used with Indian children. Therefore, the translation and administration of the PEDS, PEDS:DM, and SDQ will ensure that these screening tools are relevant and applicable to the Indian population. Furthermore, concurrent use of these

tools will provide a better understanding of the relationship of DD with SEL concerns among children. It is important that research is undertaken and published to address the current gap in local literature and practice.

11. Implications for Practice

Due to the limited availability of suitable measures, screening children for developmental delay and social–emotional learning is a challenge in India. A scoping review was conducted on the use of the Parent's Evaluation of Developmental Status (PEDS) and the Strength and Difficulties Questionnaire (SDQ) with children in India. There is an absence of research demonstrating the complementary use of both measures to provide a holistic screening of children.

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Research Ethics: This is a literature review; research ethics approval was not required.

Appendix A

Table A1. Data Extraction Table.

Background Information
Author and Date of Publication
Article Type
Type
City/State
Aim of the Study
Sample
Number of Participants
Age Range
Setting and Measures used
Results
Main Results
Key Findings

Appendix B

Table A2. Preferred Reporting Items for Systematic reviews and Meta-Analyses extension for Scoping Reviews (PRISMA-ScR) Checklist.

SECTION	ITEM	PRISMA-ScR CHECKLIST ITEM	REPORTED ON PAGE #
TITLE			
Title	1	Identify the report as a scoping review.	Page 1
ABSTRACT			
Structured summary	2	Provide a structured summary that includes (as applicable): background, objectives, eligibility criteria, sources of evidence, charting methods, results, and conclusions that relate to the review questions and objectives.	Page 2
INTRODUCTION			
Rationale	3	Describe the rationale for the review in the context of what is already known. Explain why the review questions/objectives lend themselves to a scoping review approach.	Page 5
Objectives	4	Provide an explicit statement of the questions and objectives being addressed with reference to their key elements (e.g., population or participants, concepts, and context) or other relevant key elements used to conceptualize the review questions and/or objectives.	Page 7
METHODS			
Protocol and registration	5	Indicate whether a review protocol exists; state if and where it can be accessed (e.g., a Web address); and if available, provide registration information, including the registration number.	OSF
Eligibility criteria	6	Specify characteristics of the sources of evidence used as eligibility criteria (e.g., years considered, language, and publication status), and provide a rationale.	Page 8
Information sources *	7	Describe all information sources in the search (e.g., databases with dates of coverage and contact with authors to identify additional sources) as well as the date the most recent search was executed.	Page 8
Search	8	Present the full electronic search strategy for at least one database, including any limits used, such that it could be repeated.	Page 8–10
Selection of sources of evidence †	9	State the process for selecting sources of evidence (i.e., screening and eligibility) included in the scoping review.	Page 8–10
Data charting process ‡	10	Describe the methods of charting data from the included sources of evidence (e.g., calibrated forms or forms that have been tested by the team before their use, and whether data charting was done independently or in duplicate) and any processes for obtaining and confirming data from investigators.	Page 10–13
Data items	11	List and define all variables for which data were sought and any assumptions and simplifications made.	Page 13
Critical appraisal of individual sources of evidence §	12	If done, provide a rationale for conducting a critical appraisal of included sources of evidence; describe the methods used and how this information was used in any data synthesis (if appropriate).	-
Synthesis of results	13	Describe the methods of handling and summarizing the data that were charted.	Page 11–12
RESULTS			
Selection of sources of evidence	14	Give numbers of sources of evidence screened, assessed for eligibility, and included in the review, with reasons for exclusions at each stage, ideally using a flow diagram.	Page 16–18 and 23–25
Characteristics of sources of evidence	15	For each source of evidence, present characteristics for which data were charted, and provide the citations.	Page 16–18 and 23–25
Critical appraisal within sources of evidence	16	If done, present data on critical appraisal of included sources of evidence (see item 12).	-

Table A2. *Cont.*

SECTION	ITEM	PRISMA-ScR CHECKLIST ITEM	REPORTED ON PAGE #
Results of individual sources of evidence	17	For each included source of evidence, present the relevant data that were charted that relate to the review questions and objectives.	Page 16–18 and 23–25
Synthesis of results	18	Summarize and/or present the charting results as they relate to the review questions and objectives.	Page 26
DISCUSSION			
Summary of evidence	19	Summarize the main results (including an overview of concepts, themes, and types of evidence available), link to the review questions and objectives, and consider the relevance to key groups.	Page 13–15 and 19–22
Limitations	20	Discuss the limitations of the scoping review process.	Page 26–27
Conclusions	21	Provide a general interpretation of the results with respect to the review questions and objectives, as well as potential implications and/or next steps.	Page 27–28
FUNDING			
Funding	22	Describe sources of funding for the included sources of evidence as well as sources of funding for the scoping review. Describe the role of the funders of the scoping review.	N.A.

JBI = Joanna Briggs Institute; PRISMA-ScR = Preferred Reporting Items for Systematic reviews and Meta-Analyses extension for Scoping Reviews. * Where *sources of evidence* (see second footnote) are compiled from, such as bibliographic databases, social media platforms, and Web sites. † A more inclusive/heterogeneous term used to account for the different types of evidence or data sources (e.g., quantitative and/or qualitative research, expert opinion, and policy documents) that may be eligible in a scoping review as opposed to only studies. This is not to be confused with *information sources* (see first footnote). ‡ The frameworks by Arksey and O'Malley (6) and Levac and colleagues (7) and the JBI guidance (4, 5) refer to the process of data extraction in a scoping review as data charting. § The process of systematically examining research evidence to assess its validity, results, and relevance before using it to inform a decision. This term is used for items 12 and 19 instead of "risk of bias" (which is more applicable to systematic reviews of interventions) to include and acknowledge the various sources of evidence that may be used in a scoping review (e.g., quantitative and/or qualitative research, expert opinion, and policy document). *From:* Tricco, A.C.; Lillie, E.; Zarin, W.; O'Brien, K.K.; Colquhoun, H.; Levac, D.; Moher, D.; Peters, M.D.J.; Horsley, T.; Weeks, L.; et al. PRISMA Extension for Scoping Reviews (PRISMAScR): Checklist and Explanation. *Ann. Intern. Med.* **2018**, *169*, 467–473. https://doi.org/10.7326/M18-0850. [68].

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Appendix B: Ethics Approval Form

This administrative form has been removed

Appendix C: Participant Information Sheet

PARTICIPANT INFORMATION SHEET

PROJECT TITLE: **Developmental Status of Children aged 4 to 8 years in India**

INVITATION TO PARTICIPATE: You are invited to participate in a research project being conducted by Ms. Hina Sheel. The research will contribute to her thesis for the Doctor of Philosophy (Health) degree at James Cook University (Singapore Campus).

PURPOSE OF THE STUDY: The study aims to gather information on the developmental status of children between the ages of 4 to 8 years in India. The study will describe the physical, cognitive, and social-emotional behaviours of the children. Information will be obtained from parents and teachers. Information will be gathered on both children with typical development and children with developmental disability.

WHAT DO I HAVE TO DO? You will be invited to complete a set of questionnaires (original English or translated Hindi versions) about your child's physical, cognitive, and social-emotional behaviour. The total time taken to complete the questionnaires will be 15-20 minutes.

Part II- If you agree, you may be further contacted for a follow-up study to
1. Fill the same set of questionnaires after two weeks (and/or)
2. Be interviewed about your child's behaviour and allow your child to be assessed on a test of cognitive functioning.

The total time taken for part I will be 15-20 minutes, and part II will be 45-60 minutes. The assessment for Part II will be conducted on the school premises.

WILL THE INFORMATION BE KEPT CONFIDENTIAL? Please be assured that your responses and contact details will be strictly confidential. Once the information has been collected from both parents and teachers, and combined for each child, identifying information

will be removed from the file and your child's information will be anonymous. That is, there will then be no way that the information provided on your child can be linked to them.

WHAT ARE THE POSSIBLE BENEFITS OF THE STUDY? By participating in this study, you will contribute to existing knowledge on the developmental status of young children in India as a result of participating in this study, you will provide us with information about useful ways of screening children during school enrolments and doctor visits in India.

WHAT WILL HAPPEN TO THE DATA GATHERED? The data from the study will be used in research publications and reports to a wider audience; however, you and your child will not be identified in any way in these publications.

WILL THE DATA BE SHARED WITH US? A summary of the research findings will be shared with the junior school headmistress of your child's school. In addition, no results of a specific child will be provided. If you have any questions about the study, please contact Ms. Hina Sheel. The contact information is provided below:

Principal Investigator: Hina Sheel
James Cook University, Singapore
Email: hina.sheel1@my.jcu.edu.au

Primary Research Supervisor:
Name: Professor Nigel Marsh
James Cook University, Singapore
Email: nigel,marsh@jcu.edu.au
Phone:

If you have any concerns regarding the ethical conduct of the study, please contact:

Human Ethics, Research Office

James Cook University, Townsville, Qld, 4811

Phone: (07) 4781 5011 (ethics@jcu.edu.au)

Appendix D: Participant Information Sheet (Hindi)

प्रतिभागी सूचना पत्र

परियोजना शीर्षक: **भारत में 4 से 8 वर्ष की आयु के बच्चों की विकासात्मक स्थिति**

भाग लेने के लिए निमंत्रण: आप एक अनुसंधान सुश्री हिना शील द्वारा आयोजित किया जा रहा परियोजना में भाग लेने के लिए आमंत्रित कर रहे हैं ।यह शोध जेम्स कुक यूनिवर्सिटी (सिंगापुर कैंपस) में डॉक्टर ऑफ फिलॉसफी (हेल्थ) की डिग्री के लिए उनकी थीसिस में योगदान देगा ।

अध्ययन का उद्देश्य: अध्ययन का उद्देश्य भारत में 4 से 8 वर्ष की आयु के बच्चों की विकासात्मक स्थिति के बारे में जानकारी एकत्र करना है।अध्ययन में बच्चों के शारीरिक, संज्ञानात्मक और सामाजिक-भावनात्मक व्यवहारों का वर्णन किया जाएगा।माता-पिता और शिक्षकों से जानकारी ली जाएगी । ठेठ विकास और विकासात्मक विकलांगता वाले बच्चों के साथ दोनों बच्चों के बारे में जानकारी जुटाई जाएगी ।

मुझे क्या करना है? आपको अपने बच्चे के शारीरिक, संज्ञानात्मक और सामाजिक-भावनात्मक व्यवहार के बारे में प्रश्नावली (मूल अंग्रेजी या अनुवादित हिंदी संस्करण) का एक सेट पूरा करने के लिए आमंत्रित किया जाएगा।प्रश्नावली पूरी करने में कुल 15-20 मिनट का समय लगेगा।

भाग-द्वितीय-यदि आप सहमत हैं, तो आप आगे

1 करने के लिए एक अनुवर्ती अध्ययन के लिए संपर्क किया जा सकता है ।दो सप्ताह (और/या)

2 के बाद प्रश्नावली का एक ही सेट भरें ।अपने बच्चे के व्यवहार के बारे में साक्षात्कार किया जाए और संज्ञानात्मक कामकाज के परीक्षण पर अपने बच्चे का आकलन करने की अनुमति दें।भाग के लिए लिया गया कुल समय मैं 15-20 मिनट होगा, और भाग द्वितीय 45-60 मिनट होगा ।भाग-2 के लिए मूल्यांकन स्कूल परिसर में कराया जाएगा।

क्या जानकारी गोपनीय रखी जाएगी? कृपया आश्वस्त रहें कि आपकी प्रतिक्रियाएं और संपर्क विवरण कड़ाई से गोपनीय होंगे।एक बार जब माता-पिता और शिक्षकों दोनों से जानकारी एकत्र की गई है, और प्रत्येक बच्चे के लिए संयुक्त, पहचान की गई जानकारी फ़ाइल से हटा दी जाएगी और आपके बच्चे की जानकारी गुमनाम हो जाएगी।यानी इसके बाद ऐसा कोई तरीका नहीं होगा कि आपके बच्चे पर दी गई जानकारी को उनसे जोड़ा जा सके ।

अध्ययन के संभावित लाभ क्या हैं? इस अध्ययन में भाग लेकर, आप इस अध्ययन में भाग लेने के परिणामस्वरूप भारत में छोटे बच्चों की विकासात्मक स्थिति पर मौजूदा ज्ञान में योगदान देंगे, आप हमें स्कूल नामांकन और भारत में डॉक्टर की यात्राओं के दौरान बच्चों की स्क्रीनिंग के उपयोगी तरीकों के बारे में जानकारी प्रदान करेंगे ।

एकत्र किए गए आंकड़ों का क्या होगा? अध्ययन से डेटा अनुसंधान प्रकाशनों और एक व्यापक दर्शकों के लिए रिपोर्ट में इस्तेमाल किया जाएगा; हालांकि, आप और आपके बच्चे को इन प्रकाशनों में किसी भी तरह से पहचाना नहीं जाएगा।

क्या डेटा हमारे साथ साझा किया जाएगा? शोध के निष्कर्षों का सारांश आपके बच्चे के स्कूल की जूनियर स्कूल प्रधानाध्यापिका के साथ साझा किया जाएगा। इसके अलावा, एक विशिष्ट बच्चे का कोई परिणाम प्रदान नहीं किया जाएगा| अगर आपके पास पढ़ाई को लेकर कोई सवाल है तो सुश्री हिना शील से संपर्क करें।संपर्क जानकारी नीचे दी गई है:

प्रमुख अन्वेषक: हिना शील

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प्राथमिक अनुसंधान पर्यवेक्षक:

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ईमेल: nigelmarsh@jcu.edu.au

मोबाइल फोन:

यदि आप अध्ययन के नैतिक आचरण के बारे में कोई चिंता है, कृपया संपर्क करें:

मानव नैतिकता, अनुसंधान कार्यालय

जेंस कुक विश्वविद्यालय, टाउंसविले,

Qld, ४८११ फोन: (07) ४७८१ ५०११ (ethics@jcu.edu.au)

Appendix E: Participant Consent Sheet

PARTICIPANT CONSENT FORM

PRINCIPAL INVESTIGATOR	Hina Sheel
PROJECT TITLE	Developmental Status of Children aged 4 to 8 years in India
COLLEGE	JCU Singapore

I understand the aim of this research study is to obtain information on the developmental status of children aged from 4 to 8 years in India. I consent to participate in this project, the details of which have been explained to me, and I have been provided with a Participant Information Sheet to keep.

I understand that my participation will include me completing questionnaires about my child. I agree that the Principal Investigator may use the results as described in the Participant Information Sheet.

I acknowledge that:
Taking part in this study is voluntary, and I am aware that I can stop taking part at any time without explanation or prejudice, and I can ask to withdraw any unprocessed data that I have provided.

That any information I give will be kept strictly confidential and that no names will be used to identify me or my child with this study

(Please tick to indicate consent)

I consent to fill in the questionnaires	☐ Yes	☐ No
I consent for my child's class teacher to be contacted to fill in a questionnaire on my child.	☐ Yes	☐ No
I consent to be interviewed (Part II only)	☐ Yes	☐ No
I consent for my child to be given a test of cognitive. functioning (Part II only)	☐ Yes	☐ No

Please indicate whether you wish to receive the questionnaires in (circle): English / Hindi

Name:	
Signature:	Date:

Appendix F: Participant Consent Sheet (Hindi)

प्रतिभागी सहमति फॉर्म

प्रमुख अन्वेषक	हिना शील
प्रोजेक्ट शीर्षक	भारत में 4 से 8 वर्ष की आयु के बच्चों की विकासात्मक स्थिति
कॉलेज	जेसीयू सिंगापुर

मैं समझता हूं कि इस शोध अध्ययन का उद्देश्य भारत में 4 से 8 वर्ष की आयु के बच्चों की विकासात्मक स्थिति के बारे में जानकारी प्राप्त करना है ।मैं इस परियोजना में भाग लेने के लिए सहमति, जिसका विवरण मुझे समझाया गया है, और मैं एक भागीदार सूचना पत्रक रखने के साथ प्रदान की गई है ।

मैं समझता हूं कि मेरी भागीदारी मुझे अपने बच्चे के बारे में प्रश्नावली पूरा शामिल होंगे ।मैं मानता हूं कि प्रमुख अन्वेषक प्रतिभागी सूचना पत्रक में वर्णित परिणामों का उपयोग कर सकते हैं ।

मैं स्वीकार करता हूं कि:
इस अध्ययन में भाग लेना स्वैच्छिक है, और मुझे पता है कि मैं स्पष्टीकरण या पूर्वाग्रह के बिना किसी भी समय भाग लेना बंद कर सकता हूं, और मैं मेरे द्वारा प्रदान किए गए किसी भी असंसाधित डेटा को वापस लेने के लिए कह सकता हूं ।

कि किसी भी जानकारी में दे कड़ाई से गोपनीय रखा जाएगा और है कि कोई नाम मुझे या इस अध्ययन के साथ मेरे बच्चे की पहचान करने के लिए इस्तेमाल किया जाएगा

(Please tick to indicate consent)

मैं प्रश्नावली भरने के लिए सहमति	☐ हां	☐ नही
मैं अपने बच्चे के वर्ग शिक्षक के लिए सहमति के लिए अपने बच्चे पर एक प्रश्नावली में भरने के लिए संपर्क किया जाएगा	☐ हां	☐ नही
मैं सहमति साक्षात्कार के लिए (केवल भाग द्वितीय)	☐ हां	☐ नही
मैं अपने बच्चे के लिए सहमति संज्ञानात्मक कामकाज का परीक्षण दिया जा करने के लिए (केवल भाग द्वितीय)	☐ हां	☐ नही

कृपया इंगित करें कि क्या आप प्रश्नावली प्राप्त करना चाहते हैं (सर्कल): अंग्रेजी / हिंदी

नाम:	
हस्ताक्षर:	दिनांक:

Appendix G: Demographic Information Sheet

Subject ID: _ _ _

Developmental Status of Children aged 4 to 8 years in India

Demographic Sheet

Please fill below the personal details of your child.

Name of your child:	
Age of your child (in years):	
Gender of your child (circle):	Male / Female
Class:	
Does your child have a disability?	Yes / No
If yes (Please specify):	

Please provide your personal information. For each of the following statements, mark the one best response.

Name:	
Relation to the child (circle):	Mother / Father
Your age (in years):	
Your Highest Educational Qualification	O High school O Certificate or Diploma O Undergraduate (Bachelor's) Degree O Postgraduate (Master's or Doctorate) Degree
Yearly Income of the household	O Less than INR 75,000 O INR 0.75 lakhs to 1.5 lakhs

	O INR- 1.6 lakhs- 3 lakhs O INR- 3.1 lakhs to 5 lakhs O INR- 5.1 Lakhs to10 Lakhs O More than 10.1 lakhs

Part II of Study

Consent to be contacted for filling the same questionnaires after a period of two weeks

□ Yes, I agree to be contacted for filling the same questionnaires after a period of two weeks.

My contact details are: _____ (mobile) _____ (email)

□ No, I do not agree to be contacted for filling the same questionnaires after a period of two weeks.

Consent to be contacted for future assessment of your child on a test of cognitive functioning and to be interviewed about her child's behaviour

□ Yes, I agree to be contacted for future assessment of my child's cognitive functioning and to be interviewed

My contact details are: _____ (mobile) _____ (email)

□ No, I do not agree to be contacted for future assessment of my child and to be interviewed

Appendix H: Demographic Information Sheet (Hindi)

विषय आईडी:_ _ _

भारत में 4 से 8 वर्ष की आयु के बच्चों की विकासात्मक स्थिति

जनसांख्यिकीय पत्रक

कृपया अपने बच्चे के व्यक्तिगत विवरण नीचे भरें।

अपने बच्चे का नाम:	
अपने बच्चे की उम्र (वर्षों में):	
अपने बच्चे का लिंग (सर्कल):	पुरुष/महिला
कक्षा:	
क्या आपके बच्चे को विकलांगता है?	हां/नहीं
यदि हां (कृपया निर्दिष्ट):	

कृपया अपनी व्यक्तिगत जानकारी प्रदान करें। निम्नलिखित बयानों में से प्रत्येक के लिए, एक सबसे अच्छी प्रतिक्रिया चिह्नित करें।

नाम:	
बच्चे से संबंध (सर्कल):	मां/पिता
आपकी उम्र (वर्षों में):	
आपकी उच्चतम शैक्षिक योग्यता	O हाई स्कूल O प्रमाण पत्र या डिप्लोमा O स्नातक (स्नातक) डिग्री O स्नातकोत्तर (मास्टर या डॉक्टरेट) डिग्री
घर की वार्षिक आय	O 75,000 रुपये से कम O 0.75 लाख से 1.5 लाख रुपये O 1.6 लाख- 3 लाख O 3.1 लाख- 5 लाख O 5.1 लाख- 10 लाख O 10.1 लाख से अधिक

अध्ययन का भाग II

दो सप्ताह की अवधि के बाद एक ही प्रश्नावली भरने के लिए संपर्क करने के लिए सहमति

□ हां, मैं दो सप्ताह की अवधि के बाद एक ही प्रश्नावली भरने के लिए संपर्क करने के लिए सहमत हूं ।

मेरे संपर्क विवरण हैं:_____ (मोबाइल)_____

(ईमेल)

□ नहीं, मैं दो सप्ताह की अवधि के बाद एक ही प्रश्नावली भरने के लिए संपर्क करने के लिए सहमत नहीं हूं ।

संज्ञानात्मक कामकाज के परीक्षण पर अपने बच्चे के भविष्य के मूल्यांकन के लिए संपर्क करने और उसके बच्चे के व्यवहार के बारे में साक्षात्कार के लिए सहमति

□ हां, मैं अपने बच्चे के संज्ञानात्मक कामकाज के भविष्य के आकलन के लिए संपर्क करने के लिए सहमत हूं और साक्षात्कार किया जाएगा

मेरे संपर्क विवरण हैं:_____ (मोबाइल)_____

(ईमेल)

□ नहीं, मैं अपने बच्चे के भविष्य के आकलन के लिए संपर्क करने के लिए सहमत नहीं हूं और साक्षात्कार के लिए

Appendix I: Parents Evaluation of Developmental Status (PEDS), Developmental Milestone (PEDS:DM) (Retracted due to copyright regulations)

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Appendix J: Strength and Difficulties Questionnaire (SDQ)

Strengths and Difficulties Questionnaire T 4-17

For each item, please mark the box for Not True, Somewhat True or Certainly True. It would help us if you answered all items as best you can even if you are not absolutely certain or the item seems daft! Please give your answers on the basis of the child's behaviour over the last six months or this school year.

Child's Name ..... Male/Female

Date of Birth.....

	Not True	Somewhat True	Certainly True
Considerate of other people's feelings	☐	☐	☐
Restless, overactive, cannot stay still for long	☐	☐	☐
Often complains of headaches, stomach-aches or sickness	☐	☐	☐
Shares readily with other children (treats, toys, pencils etc.)	☐	☐	☐
Often has temper tantrums or hot tempers	☐	☐	☐
Rather solitary, tends to play alone	☐	☐	☐
Generally obedient, usually does what adults request	☐	☐	☐
Many worries, often seems worried	☐	☐	☐
Helpful if someone is hurt, upset or feeling ill	☐	☐	☐
Constantly fidgeting or squirming	☐	☐	☐
Has at least one good friend	☐	☐	☐
Often fights with other children or bullies them	☐	☐	☐
Often unhappy, down-hearted or tearful	☐	☐	☐
Generally liked by other children	☐	☐	☐
Easily distracted, concentration wanders	☐	☐	☐
Nervous or clingy in new situations, easily loses confidence	☐	☐	☐
Kind to younger children	☐	☐	☐
Often lies or cheats	☐	☐	☐
Picked on or bullied by other children	☐	☐	☐
Often volunteers to help others (parents, teachers, other children)	☐	☐	☐
Thinks things out before acting	☐	☐	☐
Steals from home, school or elsewhere	☐	☐	☐
Gets on better with adults than with other children	☐	☐	☐
Many fears, easily scared	☐	☐	☐
Sees tasks through to the end, good attention span	☐	☐	☐

Do you have any other comments or concerns?

Please turn over - there are a few more questions on the other side

Overall, do you think that this child has difficulties in one or more of the following areas: emotions, concentration, behaviour or being able to get on with other people?

No	Yes- minor difficulties	Yes- definite difficulties	Yes- severe difficulties
☐	☐	☐	☐

If you have answered "Yes", please answer the following questions about these difficulties:

• How long have these difficulties been present?

Less than a month	1-5 months	6-12 months	Over a year
☐	☐	☐	☐

• Do the difficulties upset or distress the child?

Not at all	Only a little	Quite a lot	A great deal
☐	☐	☐	☐

• Do the difficulties interfere with the child's everyday life in the following areas?

	Not at all	Only a little	Quite a lot	A great deal
PEER RELATIONSHIPS	☐	☐	☐	☐
CLASSROOM LEARNING	☐	☐	☐	☐

• Do the difficulties put a burden on you or the class as a whole?

Not at all	Only a little	Quite a lot	A great deal
☐	☐	☐	☐

Signature ..... Date .....

Class Teacher/Form Tutor/Head of Year/Other (please specify:)

Thank you very much for your help

Appendix K: Strength and Difficulties Questionnaire (SDQ) (Hindi)

मजबूत/सशक्त पक्ष और कठिनाईयों को समझने से सम्बंधित प्रश्नावली

दिए गए हर प्रश्न के लिए पूर्णत: असत्य, आंशिक सत्य या पूर्णत: सत्य इन तीन विकल्पों में से एक को चिन्हित करें. अगर आप किसी प्रश्न के जवाब को लेकर आश्वस्त नहीं हैं या वह आपको अनावश्यक लगता है, तो भी अपनी तरफ से सभी प्रश्नों का उचित जवाब दें. यह हमारी मदद करेगा.
कृपया अपने जवाब बच्चे के पिछले छह महीनों या इस विद्यालयीन वर्ष के व्यवहार के आधार पर देवें.

बच्चे/बच्ची का नाम लड़का/लड़की

जन्म की तारीख

	सत्य/सही नहीं है	कुछ हद तक सत्य/सही है	पूरी तरह से सत्य/सही है
दूसरों की भावनाओं का ध्यान/ख्याल रखता/रखती है	☐	☐	☐
चंचल और बहुत अधिक सक्रिय है, अधिक समय तक शांत/स्थिर नहीं रह सकता/सकती	☐	☐	☐
अक्सर सिरदर्द, पेट में दर्द या बीमारी की शिकायत करता/करती है	☐	☐	☐
अपनी चीजें (खाने-पीने का सामान, खिलौने, पेंसिल आदि) दूसरे बच्चों के साथ आसानी से साझा करता/करती है	☐	☐	☐
अक्सर चिड़चिड़ाता/चिड़चिड़ाती है या गुस्से में आ जाता/जाती है	☐	☐	☐
अधिकतर एकांत में, अकेले खेलता है	☐	☐	☐
सामान्यत: आज्ञाकारी है, आमतौर पर बड़ों के कहे अनुसार काम करता/करती है	☐	☐	☐
बहुत चिंता करता/करती है, अक्सर चिंतित दिखाई देता/देती है	☐	☐	☐
अगर कोई आहत, परेशान या बीमार महसूस कर रहा हो तो मदद करने के लिए तैयार रहता/रहती है	☐	☐	☐
लगातार असहज या अधीर रहता/रहती है	☐	☐	☐
उसके पास कम से कम एक अच्छा/अच्छी दोस्त है	☐	☐	☐
अक्सर अन्य बच्चों के साथ झगड़ता/झगड़ती या उन्हें धमकाता/धमकाती है	☐	☐	☐
अकसर दुखी, उदास या रूआंसा रहता/रहती है	☐	☐	☐
आम तौर पर अन्य बच्चे उसे पसंद करते हैं	☐	☐	☐
आसानी से ध्यान भटक जाता है, एकाग्र नहीं रह पाता/पाती	☐	☐	☐
नई परिस्थितियों में घबराहट हो जाता/जाती है या परिचितों से चिपके रहना चाहता/चाहती है, आसानी से आत्मविश्वास खो देता/देती है	☐	☐	☐
अपने से छोटे बच्चों के साथ सम्वेदनापूर्ण/नरम व्यवहार करता/करती है	☐	☐	☐
अक्सर झूठ बोलता/बोलती या चालाकी करता/करती है	☐	☐	☐
उसे दूसरे बच्चों द्वारा निशाना बनाया या सताया/तंग किया जाता है	☐	☐	☐
अक्सर दूसरों (माता-पिता, शिक्षक, अन्य बच्चों) की मदद करने के लिए तैयार रहता/रहती है	☐	☐	☐
कुछ करने से पहले उस पर सोचता/सोचती है	☐	☐	☐
घर, स्कूल या अन्य जगहों से सामान चुराता/चुराती है	☐	☐	☐
दूसरे बच्चों की बजाय वयस्कों/बड़ों के साथ अधिक सहज रहता/रहती है	☐	☐	☐
कई डर हैं, आसानी से डर जाता/जाती है	☐	☐	☐
किसी भी काम को उसकी पूर्णता में देख पाता/पाती है, एकाग्रता की अवधि अच्छी है	☐	☐	☐

क्या आप कुछ और बताना या जानना चाहते हैं?/क्या आपकी कुछ और चिंताएं या सुझाव हैं

कृपया पृष्ठ पलटें - दूसरी तरफ कुछ और प्रश्न हैं.

कुल मिलाकर, क्या आपको लगता है कि बच्चे/बच्ची को निम्नलिखित क्षेत्रों में से एक या अधिक क्षेत्र में कठिनाई/परेशानी हो रही है: भावनाएं, एकाग्रता, व्यवहार या अन्य लोगों के साथ सहज होने में?

नहीं	हाँ- थोड़ी बहुत कठिनाईयां/परेशानियां हैं	हाँ-स्पष्ट कठिनाइयाँ हैं	हाँ-गंभीर कठिनाइयाँ हैं
☐	☐	☐	☐

अगर आपने "हाँ" में जवाब दिया है, तो कृपया इन कठिनाइयों/परेशानियों के बारे में निम्नलिखित प्रश्नों के उत्तर दें:

- ये कठिनाई/परेशानी कब से हो रही है?

एक महीने से भी कम समय से	1-5 महीनों से	6-12 महीनों से	लगभग साल भर से
☐	☐	☐	☐

- क्या इन कठिनाईयों से बच्चा/बच्ची परेशान होता/होती है या तनाव में आता/आती है?

बिल्कुल नहीं	थोड़ा सा	बहुत	बहुत ही ज्यादा
☐	☐	☐	☐

- क्या इन कठिनाइयों से बच्चे के दैनिक जीवन के निम्नलिखित क्षेत्रों में बाधा आती है?

	बिल्कुल नहीं	केवल थोड़ी सी	बहुत	बहुत ही ज्यादा
• साथियों के साथ रिश्तों में	☐	☐	☐	☐
• कक्षा में सीखने-सिखाने में	☐	☐	☐	☐

- क्या ये कठिनाईयां आपके लिए या पूरी कक्षा के लिए परेशानी का कारण बनती हैं?

बिल्कुल नहीं	केवल थोड़ी सी	बहुत	बहुत ही ज्यादा
☐	☐	☐	☐

हस्ताक्षर ..... दिनांक .....

कक्षा शिक्षक/फार्म ट्यूटर/वर्ष प्रमुख/अन्य (कृपया स्पष्ट बताएं:)

आपके सहयोग के लिए बहुत धन्यवाद