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Identifying Very Preterm Children at Educational Risk Using a School Readiness Framework

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KEY WORDS

very preterm, preschool, school readiness, neurodevelopment, outcome

ABBREVIATIONS

CELF-P—Clinical Evaluation of Language Fundamentals
FT—full term
OR—odds ratio
VPT—very preterm

Dr Pritchard conceptualized and designed the study, carried out the initial data analyses, and drafted the initial manuscript; Dr Bora acquired data, carried out the data analyses and interpreted the data, and critically reviewed and revised the initial manuscript; Dr Austin conceptualized and designed the study, acquired the health and motor development data, and critically reviewed the initial manuscript; Ms Levin acquired data and critically reviewed the manuscript; Dr Woodward conceptualized and designed the study, coordinated and supervised data collection and analyses, interpreted the data, and critically reviewed and revised the initial manuscript; and all authors approved the final manuscript as submitted.

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WHAT'S KNOWN ON THIS SUBJECT: Children born very preterm (VPT) are at high risk of educational delay. School readiness has been identified as a potentially useful clinical framework for early detection of those at greatest risk. However, evidence to support its predictive validity is limited.

WHAT THIS STUDY ADDS: VPT preschoolers are at risk of impairment across the 5 American Academy of Pediatrics school readiness domains. The number of domains affected predicted likelihood of later learning problems, supporting the utility of schoolreadiness frameworks for identifying children needing surveillance and/or support.

abstract

OBJECTIVES: Children born very preterm (VPT) are at high risk of educational delay, yet few guidelines exist for the early identification of those at greatest risk. Using a school readiness framework, this study examined relations between preschool neurodevelopmental functioning and educational outcomes to age 9 years.

METHODS: The sample consisted of a regional cohort of 110 VPT ($\leq$32 weeks' gestation) and 113 full-term children born during 1998–2000. At corrected age 4 years, children completed a multidisciplinary assessment of their health/motor development, socioemotional adjustment, core learning skills, language, and general cognition. At ages 6 and 9, children's literacy and numeracy skills were assessed using the Woodcock-Johnson III Tests of Achievement.

RESULTS: Across all readiness domains, VPT children were at high risk of delay/impairment (odds ratios 2.5–3.5). Multiple problems were also more common (47% vs 16%). At follow-up, almost two-thirds of VPT children were subject to significant educational delay in either literacy, numeracy or both compared with 29% to 31% of full-term children (odds ratios 3.4–4.4). The number of readiness domains affected at age 4 strongly predicted later educational risk, especially when multiple problems were present. Receiver operating characteristic analysis confirmed $\geq$2 readiness problems as the optimal threshold for identifying VPT children at educational risk.

CONCLUSIONS: School readiness offers a promising framework for the early identification of VPT children at high educational risk. Findings support the utility of $\geq$2 affected readiness domains as an effective criterion for referral for educational surveillance and/or additional support during the transition to school. *Pediatrics* 2014;134:e825–e832

Preschool children born very preterm (VPT) are at high risk for a range of neurodevelopmental impairments that include motor deficits, cognitive delay, language difficulties, and behavioral adjustment problems.[1–3] Comorbid problems are also common, with at least a third subject to difficulties across multiple functional domains such as cognition and motor.[1,3] Although these difficulties are widely recognized as likely to impede a child's readiness for school, their relationship with actual school achievement remains poorly understood. Even less is known about how best to screen and identify those at greatest risk who might benefit from timely remedial support during their transition to school and early school years. This is important because educational delay is a major morbidity for this group, with an estimated 60% to 70% of VPT children likely to require additional educational supports during their schooling.[4–6] Poor school achievement has also been linked with a wide range of later adverse social, economic, and health outcomes well into adulthood.[7–9]

The US National Education Goals Panel and, more recently, the American Academy of Pediatrics, have recommended a School Readiness Framework for assessing a child's developmental progress and support needs before school entry to identify children at high risk who might benefit from proactive support as they transition to school.[10] This framework identifies 5 key "readiness to learn" domains spanning physical well-being and motor development, social and emotional development, approaches to learning, communication skills, and general knowledge and cognition.[10] Using this framework, a recent Australian study showed that in all domains, VPT-born children obtained standard scores that were 0.5 to 1 SD below their full-term (FT) peers, with 44% compared with 16% subject to difficulties in multiple domains.[11] These rates of single and comorbid impairments are highly consistent with other preschool studies.[1,3] They are also in line with a US study that classified high-risk VPT children as not school ready if they had cerebral palsy, blindness, deafness, autism, or scored 1 to 2 SD below the normative mean on 3 standardized developmental tests or >2 SD on a single test.[12] On the basis of these criteria, they reported that 33% of VPT children were not school ready and as a result at risk for subsequent educational delay. Taken together, these findings highlight that a significant proportion of VPT children may need support as they transition to school to help them prepare for the cognitive, motor, and behavioral challenges of the classroom.

Despite the need for early identification of these children at high risk, studies examining associations between school readiness measures and later achievement are lacking, limiting the establishment of clear pediatric referral guidelines. To address this gap, the aims of this study were as follows:

1. To describe the neurodevelopmental functioning of a cohort of VPT- and FT-born children on 5 key school readiness domains assessed at corrected age 4 years. These domains included health and motor development, socioemotional adjustment, core learning skills, language, and general cognition.
2. To document the educational outcomes of VPT and FT children at ages 6 and 9 years on standardized measures of numeracy and literacy.
3. To examine relations between the extent of school readiness risk and children's later educational achievement, and in particular, to assess the effectiveness of a school readiness evaluation for the early identification of VPT children at educational risk.

METHODS

Participants

Two groups of children were included. For both groups, children with congenital anomalies, fetal alcohol syndrome, and/or non–English-speaking parents were excluded. The first group comprised a regional cohort of 110 children born VPT (≤32 weeks' gestation) admitted consecutively to a level III NICU at Christchurch Women's Hospital (New Zealand) from 1998 to 2000 (92% recruitment). This unit is the sole provider for the region. Excluding deaths ($n = 3$), retention at age 4, 6, and 9 years was 98%, 97%, and 96%, respectively.

The second group, recruited at age 2, included 113 FT (37–41 weeks' gestation) born children matched to the VPT cohort for gender, delivery hospital, and birth date (62% recruitment). No differences were found between recruited and not recruited children on measures of gestational age, birth weight, maternal ethnicity, or family socioeconomic status. Comparison of the socioeconomic profile of this group with regional census data[13] showed these families were representative of the region from which they were recruited. Sample retention was 98% at age 4 and 6 and 96% at age 9 years. Table 1 shows the clinical and social background characteristics of the 2 study groups.

Measures

Children completed a multidisciplinary neurodevelopmental assessment at age 4, 6 (corrected for gestational age at birth), and 9 years (uncorrected). At age 4, 5 school-readiness domains were assessed. Then at age 6 and 9, children completed a standardized educational evaluation. Developmental delay/impairment was defined as a score >1 SD below the mean or ≥90th percentile of the FT group. Study protocols were approved by our Regional Health

TABLE 1 Neonatal Clinical and Social Background Characteristics of the Sample

Measure	Very Preterm (*N* = 106)	Full-Term (*N* = 110)	*P*
Infant clinical characteristic			
Gestational age, M ± SD, wk	28 ± 2	40 ± 1	<.001
Birth wt, M ± SD, g	1066 ± 313	3580 ± 409	<.001
Male gender, %	51	54	.69
Twin birth, %	34	4	<.001
Small for gestational age,[a] %	10	1	.002
Antenatal corticosteroid use, %	84	—	—
Postnatal dexamethasone use, %	6	—	—
Oxygen therapy at 36 wk, %	34	—	—
Patent ductus arteriosus, %	43	—	—
Cystic periventricular leukomalacia, %	6	—	—
Intraventricular hemorrhage grade III or IV,[b] %	6	—	—
Social background characteristic			—
Maternal age, M ± SD, y	31 ± 5	31 ± 4	.75
Maternal minority ethnicity, %	13	12	.76
Mother not a high school graduate, %	40	19	.001
Single-parent family, %	19	12	.15
Family socioeconomic status[c]			
Professional/managerial, %	26	36	—
Technical/skilled, %	43	55	—
Semiskilled/unskilled/unemployed, %	30	10	.001

a Birth wt >2 SD below the mean for gestational age and gender.
b Based on Papile classification.
c Assessed using the Elley-Irving Socioeconomic Index.

and Disability Ethics Committee and written informed consent obtained from all parents/guardians.

School Readiness Measures

Physical well-being and motor development was assessed using children's medical records and pediatric neurologic examination at age 4 years. Children with >10 primary care visits in the past year (≥90th percentile FT score) were classified as having high health care needs. The national average for children between 0 and 5 years is 7 visits per year.[14] Cerebral palsy was diagnosed based on the quality of motor skills, gait, coordination, and behavior using standard criteria and severity assessment.[15] Developmental Coordination Disorder was diagnosed using the *Diagnostic and Statistical Manual of Mental Disorders* (4th edition) criteria. Overall, children were classified as having poor physical health/motor impairment if they had >10 primary care visits in the past year and/or were diagnosed with cerebral palsy or developmental coordination disorder.

Social and emotional development was assessed using the 25-item parent rated Strengths and Difficulties Questionnaire.[16] This scale assessed child emotional symptoms, conduct problems, inattention/hyperactivity, peer relationship problems, and prosocial behaviors. An overall adjustment score was computed by summing scores across all subscales except prosocial behavior.[16] Children were classified as having socioemotional problems if their adjustment score exceeded 13 (≥90th percentile FT score). The Strengths and Difficulties Questionnaire has good concurrent and predictive validity, with test–retest reliabilities for the overall score ranging from 0.72 to 0.86.[17]

Approaches to learning were assessed using the parent report Behavior Rating Inventory of Executive Function, Preschool Version.[18] This 63-item scale consists of 5 subscales that assess everyday executive functioning including inhibition, shifting, working memory, emotional regulation, and planning. A global executive composite score was computed and converted to an age- and gender-specific T-score. Children were classified as showing learning skill difficulties if their executive composite T-score exceeded 65 (≥90th percentile FT score). The Behavior Rating Inventory of Executive Function, Preschool is internally consistent (α = .95) and has good test–retest reliability and concurrent validity.[19]

Language development was assessed using the preschool version of the Clinical Evaluation of Language Fundamentals (CELF-P).[20] The CELF-P consists of 6 subtests assessing linguistic concepts, basic concepts, sentence structure, recalling sentences in context, formulating labels, and word structure. Children's performance across these subtests was summed to provide an overall measure of language abilities. Those scoring <85 (<FT mean-1 SD) were classified as language delayed. The CELF-P has good test–retest reliability (0.87–0.97) and correlates well with other preschool language measures (r = 0.90).[21]

General knowledge and cognition was assessed using a short form of the Wechsler Preschool and Primary Scale of Intelligence (WPPSI-R).[22] This consisted of 2 verbal (Comprehension and Arithmetic) and 2 performance (Picture Completion and Block Design) subtests. Children were classified as having cognitive delay if their total IQ score was <91 (<FT M-1 SD). Scores from this short form correlate highly with full-scale scores (r = 0.89–0.92).[23]

Educational Achievement Measures

Early educational achievement was assessed by using the Math Fluency (math), Understanding Directions (receptive language), and Passage Comprehension/Letter-Word Identification (reading) subtests from the Woodcock-Johnson III Tests of Achievement.[24] These subtests were selected on the basis of their developmental appropriateness and relevance to our national school curriculum. Test–retest reliabilities range from 0.75 to 0.95, and test performance correlates highly with other standardized measures of educational achievement (r = 0.59–0.80).[24] Developmental delay for each subtest was defined as a score >1 SD below the FT group mean.

RESULTS

School Readiness of VPT and FT Children

Table 2 describes VPT and FT born children's functioning in each school readiness domain at age 4 years. Across all measures, VPT children fared less well than FT children with mean differences ranging from 2–10 points ($P \leq .001$). Across the 5 school-readiness domains, VPT children were 2 to 3 times more likely to have problems (24%–38% vs 11%–15%; odds ratios [ORs] 2.5–3.5). With the exception of social and emotional adjustment problems which was reduced to marginal significance (unadjusted OR = 2.5, P = .01; adjusted OR = 2.1, P = .06), these risks remained unchanged after the selection effects of family socioeconomic status were take into account (adjusted ORs 2.1–3.6).

Table 3 shows the proportion of children in each group subject to varying levels of school readiness difficulties. Just over a quarter of VPT children were free of any difficulties compared with almost two-thirds (64%) of FT children. Although rates of single domain impairment/delay were similar across both groups (VPT, 27%; FT, 24%), VPT children were 3 times more likely to have multiple (2, 3, or ≥4) readiness difficulties (47% vs 16%).

TABLE 2 School Readiness Outcomes of VPT and FT Children at Age 4 Years

Outcome	Very Preterm (N = 105)	Full-Term (N = 107)	OR (95% CI)	P
Physical well-being and motor development				
Total number of primary care visits in past year, M ± SD	7 ± 7	4 ± 5	—	.001
Frequent health care visits, %	22	12	2.1 (0.97–4.6)	.06
Cerebral palsy, %	16	1	20.5 (2.7–156.9)	<.001
Developmental coordination disorder, %	7	2	3.8 (0.8–18.5)	.10
Any problem, %	38	15	3.5 (1.8–7.0)	<.001
Social and emotional development				
SDQ overall behavioral adjustment score, M ± SD	10 ± 6	8 ± 5	—	.001
Any problem, %	24	11	2.5 (1.2–5.4)	.01
Approaches to learning				
BRIEF-P global executive composite T-score, M ± SD	59 ± 11	55 ± 9	—	.001
Any problem, %	30	11	3.4 (1.6–7.1)	.001
Language development				
CELF-P total language score, M ± SD	91 ± 14	98 ± 13	—	<.001
Any problem, %	31	15	2.5 (1.3–4.9)	.008
General knowledge and cognition				
WPPSI-R total IQ score, M ± SD	95 ± 16	105 ± 13	—	<.001
Any problem, %	34	13	3.5 (1.7–6.9)	<.001

BRIEF-P, Behavior Rating Inventory of Executive Function, Preschool Version; SDQ, Strengths and Difficulties Questionnaire; WPPSI-R, Wechsler Preschool and Primary Scale of Intelligence.

Educational Achievement of VPT and FT Children

Table 4 describes the educational achievement of VPT and FT born children on measures of math, reading, and language at age 6 and 9 years. At both assessments, VPT children had higher rates of delay across all subject areas (27%–51% vs 13%–18%), with relative risks ranging from 1.7 to 2.8 and odds from 1.9 to 4.7. These risks persisted after taking into account the effects of family socioeconomic status (ORs 1.8–4.5).

Examination of educational delay over time, showed that from age 6 to 9 years, the odds of any educational delay for VPT children relative to FT children increased from 3.4 to 4.4. The nature of their learning difficulties also changed. At age 6, their most prominent area of difficulty was math (OR 4.7) and the least was reading (OR 1.9). However, by age 9 years, language delay was most common (OR 4.4), followed by reading (OR 3.5) then math (OR, 3.1).

School Readiness Difficulties and Risk of Educational Delay in VPT and FT Children

Table 5 examines the relationship between the number of school readiness difficulties at age 4 and risks of any educational delay at age 6 and 9 years. Results show that as the number of school readiness difficulties increased, odds of educational delay rose for both VPT and FT born children. For children with 1 school readiness difficulty, the odds of educational delay were small at age 6 (VPT, 1.9; FT, 2.8) and moderate at 9 (VPT, 3.8; FT, 2.8). However, as the number of difficulties increased to 2 and then 3 affected readiness domains, the odds of delay increased sharply (VPT, 7.2–14.0; FT, 7.4–10.6). Almost all children with ≥4 domains affected experienced later educational delay. These associations were robust to statistical control for the effects of family socioeconomic status.

Diagnostic Utility of a School Readiness Framework for Identifying Risk of Educational Delay in VPT Children

The results described here suggest that a school readiness assessment of a VPT-born child's developmental needs before school entry could offer a useful framework for the early identification of those needing learning supports. To examine this issue, the predictive

TABLE 3 Proportion of Children with School Readiness Difficulties at Age 4 Years

Number of Readiness Difficulties	Very Preterm (N = 103)	Full-Term (N = 107)	OR	95% CI
0	26	60	—	—
1	27	24	2.6	(1.3–5.1)
2	22	11	4.5	(2.0–10.4)
3	17	3	13.4	(3.6–49.6)
4+	8	2	9.5	(1.9–47.6)

accuracy of 3 potential school readiness cut points was examined. These included children having difficulties in at least 1, 2, or 3 readiness domains. The results of this analysis are summarized in Supplemental Table 6 and Figs 1 and 2. As shown in Supplemental Table 6, screening children for ≥1 readiness difficulties had the highest sensitivity (86%–87%) but lowest specificity (45%–50%) for later delay. That is, using this criterion, nearly 90% of VPT children subject to educational delay could be identified before starting school, but a substantial number of children not likely to develop problems, at least to age 9, would also be identified. Adopting the more stringent criterion of ≥3 difficulties had poor sensitivity (31%–37%) but good specificity (89%–93%) indicating that while correctly excluding most low-risk children, approximately two-thirds of children at clear risk would fail to be detected. This suggests that a single readiness difficulty may be too inclusive, whereas ≥3 difficulties may be overly stringent. Finally, a middle ground criterion of ≥2 readiness difficulties showed reasonable diagnostic accuracy, with moderate sensitivity (59%–67%) and good specificity (75%–80%). This was further confirmed by fitting receiver operating characteristic curves to the data. As illustrated in Fig 1, after taking into account the trade-off between sensitivity and specificity, ≥2 readiness difficulties provided the optimal threshold for identifying VPT children at risk of educational delay, with the area under the curve being 0.77 ($P < .001$) at age 6 years and 0.72 ($P < .001$) at 9 years (Fig 2).

DISCUSSION

Findings confirm that VPT born children are at high risk of neurodevelopmental problems that are likely to have an impact on their subsequent school achievement. Within a school readiness framework, these problems span health/physical development, socio-emotional adjustment, core learning skills, language, and general cognition. Rates of single-domain impairment ranged from 24% for social-emotional adjustment to 38% for physical health and motor functioning. Children in the VPT group were also at increased risk of comorbid or multiple domain impairments (47% vs 16%), potentially adding further to their long-term risk. Indeed children with ≥3 readiness domains affected were almost exclusively in the VPT group (8%–17% vs 2%–3%). These rates are remarkably consistent with those reported by Roberts et al[11] despite differences in the measures used. This consistency in findings across the 5 key “readiness to learn” domains suggests that the nature of the skills assessed may be more important than the actual measures used, provided of course that measures are psychometrically sound. If this is the case, this would alleviate, at least to some extent, concerns about the effects of measurement variation across centers and potentially allow clinicians some flexibility in measurement choice.[10,25] Studies in other contexts should help clarify this issue further.

By ages 6 and 9 years, at least 60% of VPT born children were subject to some form of educational delay compared with around a quarter of FT children. There was also some suggestion that the nature of VPT children’s learning difficulties changed somewhat over time. At age 6, the most prominent area of difficulty was math and the least prominent reading. However by age 9, VPT children’s risk of math delay had decreased somewhat relative to their FT peers, whereas language and reading difficulties had become more frequent. This suggests that for some VPT children, math fluency or the ability to quickly solve simple addition, subtraction, and multiplication problems improved with age. However, knowledge of mathematical facts is only 1 of the domain-specific skills involved in math performance. Thus, it will be important to assess how other, more complex skills develop in these children, such as selecting and applying the most appropriate math

TABLE 4 Educational Outcomes of VPT and FT Children at Age 6 and 9 Years

Educational Outcome	Very Preterm (N = 102)	Full-Term (N = 108)	OR (95% CI)
Age 6 y (1-y post school entry)			
Math delay, %	51	18	4.7 (2.5–8.8)
Reading delay, %	27	16	1.9 (0.98–3.8)
Language delay, %	30	15	2.4 (1.2–4.8)
Any educational delay, %	60	31	3.4 (1.9–6.0)
Remedial support, %	43	20	3.0 (1.6–5.6)
Age 9 y (4-y post school entry)			
Math delay, %	33	14	3.1 (1.6–6.1)
Reading delay, %	34	13	3.5 (1.7–7.0)
Language delay, %	45	16	4.4 (2.3–8.4)
Any educational delay, %	64	29	4.4 (2.4–7.8)
Remedial support, %	39	20	2.5 (1.3–7.8)

TABLE 5 Associations between School Readiness Difficulties at Age 4 and Risks of Educational Delay at Age 6 and 9 Years

Number of Readiness Difficulties	Educational Delay			
	Very Preterm (N = 100)		Full-Term (N = 106)	
	%	OR (95% CI)	%	OR (95% CI)
Age 6 y (1-y post school entry)				
0	31	—	16	—
1	46	1.9 (0.6–6.0)	35	2.8 (0.98–8.0)
2	78	8.1 (2.2–29.6)	67	10.6 (2.7–42.0)
3	82	10.5 (2.3–47.0)	100	—
4+	100	—	100	—
Age 9 y (4-y post school entry)				
0	33	—	16	—
1	65	3.8 (1.2–11.8)	35	2.8 (0.98–8.0)
2	78	7.2 (2.0–25.7)	58	7.4 (2.0–28.1)
3	88	14.0 (2.6–75.4)	100	—
4+	75	6.0 (1.0–35.9)	100	—

strategy to different problems. In their review, Simms et al[26] suggested that it may be these latter, more complex skills that pose the greatest challenge for VPT children. With respect to the observations that rates of language and reading delay appeared to increase with age and curricular demand, this is in line with results from a recent study examining the linguistic performance of 4- to 6-year-old and 6- to 12-year-old children, which found that VPT children tend to do well in early linguistics but experience more difficulties in complex than simple word reading at older ages.[27] Longer-term follow-up and analysis of domain-specific skills is needed to fully understand age and curricular variations in the development of math and reading difficulties over time.

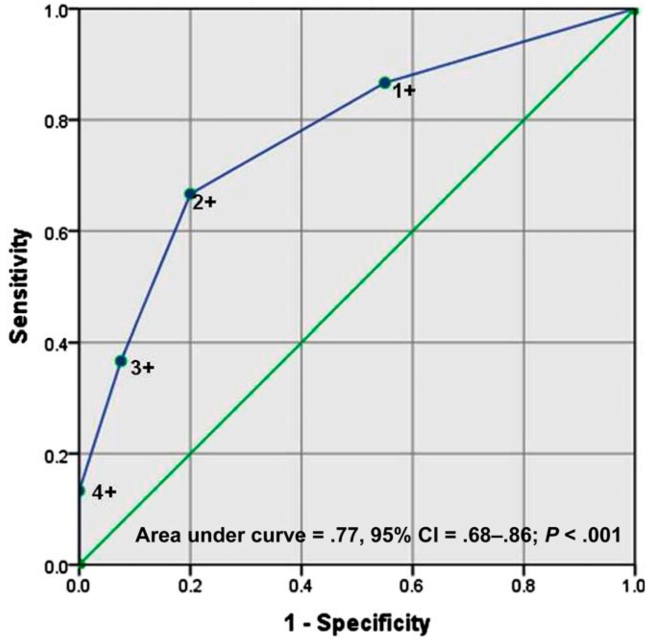

FIGURE 1
Receiver operating characteristic curve showing the predictive utility of different cut points for school readiness difficulties at age 4 to identify VPT born children at risk of educational delay by age 6 years. CI, confidence interval.

Importantly, as the number of affected school-readiness domains increased for both FT and VPT born children, there were corresponding increases in the likelihood of later educational delay. Children with problems in 1 school-readiness domain had odds of delay that ranged from 2 to 3 at age 6 and 3 to 4 at 9 years. At age 6, almost half of VPT and a third of FT children in this group were delayed. By age 9, the risk of delay for VPT children in this group had increased to 65%, whereas risks remained stable for FT children. This suggests that even 1 affected readiness domain carries considerable educational risk for VPT children. On the basis of these findings, it could be argued that early remedial support may be warranted for these children, especially given that they are likely to have less severe problems that may be more amenable to improvement through short, proactive interventions than children with multiple and probably more severe problems.

Consideration of children with problems in >1 school-readiness domain showed that for both VPT and FT children with problems in 2 domains, the odds of later educational delay rose to 8 to 11 at age 6 and to 7 at 9 years, with 80% of VPT and 58% to 67% of FT subject to later educational delay. For children with problems in ≥ 3 school-readiness domains, educational delay was almost inevitable (82%–100%), emphasizing the importance of assessing a child's preschool functioning across multiple domains.[28,29] Of those with some form of educational delay, only half were receiving additional learning supports, suggesting that, similar to other studies,[30] not all children in need of support were receiving it. Currently in New Zealand, children typically access government-resourced early childhood education from the age of 3; earlier, they use

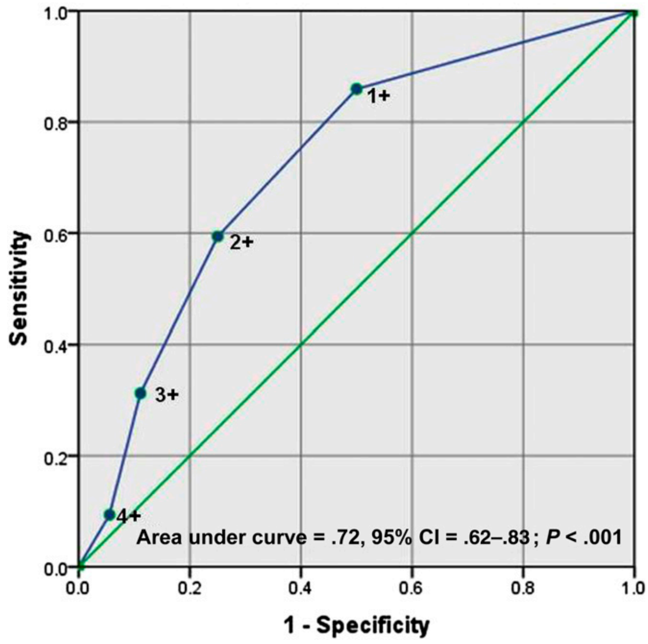

FIGURE 2
Receiver operating characteristic curve showing the predictive utility of different cut points for school readiness difficulties at age 4 to identify VPT born children at risk of educational delay by age 9 years. CI, confidence interval

private preschool settings. For children with high needs or who are enrolled in early intervention, an education support worker may be assigned for some attendance hours per week. Only very high-needs children are eligible for teacher aide on commencing school between the ages of 5 and 6 years.

Examination of the diagnostic utility of a school readiness framework for the early identification of VPT children at educational risk showed that adopting a criterion of ≥2 school-readiness problems offered the best trade-off between sensitivity and specificity. A cutoff of ≥1 readiness difficulties tended to be somewhat overinclusive, although also potentially justifiable given later risk rates. In contrast, the cutoff of ≥3 was too stringent and resulted in the exclusion of a large proportion of children at clear educational risk. We would note that this analysis was confined to VPT children because of the low base rate of problems in our FT control group. However, because similar associations were found between school readiness and educational risk across both study groups, evaluation of the diagnostic utility of a school-readiness framework using a larger general population sample would seem warranted.

Several study limitations should be acknowledged. First our FT comparison group was recruited at age 2 by retrospectively accessing hospital records. Second, although associations between school readiness and educational outcomes were adjusted for family socioeconomic status, measures of family social background were not included in predictive models despite clear evidence showing that they have an important influence on a child's long-term school success.[10,12,29] Although beyond the scope of the current study, including a measure of family social risk in predictive models may help to improve the identification of those at greatest educational risk. Nonetheless, current findings do offer useful risk and diagnostic information to guide the early identification of VPT children at educational risk and also to help advocate for additional educational resources for these children at high risk.

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