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Teacher's knowledge and approaches to supporting preterm children in the classroom

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Abstract

Background & Aims: Teachers in the UK receive little training about the long-term consequences of preterm birth on children's development. Our aim was to assess knowledge and elicit suggestions for improving educational practice in the US by means of a mixed-method study.

Methods: 246 US teachers (92.7% female) completed the validated Preterm Birth – Knowledge Scale (PB-KS). Of the participating teachers, 50.9% reported professional experience with preterm born children. A representative subsample of 35 teachers responded to a case vignette by describing how they would support the child in the classroom. Answers were coded using thematic content analysis.

Results: Overall, the *mean* PB-KS score was 15.21 (*SD*=5.31). Participating teachers who had professional experience with a preterm child had higher mean PB-KS scores than teachers without (16.95 vs. 15.24, $p=.012$). Qualitative responses provided specific content for classroom intervention.

Conclusions: Our findings show that US teachers have limited knowledge of the long-term impact of preterm birth. They provided important indicators for the design of targeted classroom interventions to support the learning of preterm children.

Keywords: preterm birth; educational practice; teacher knowledge; classroom support; intervention; mixed-methods study

Introduction

About 15 million babies (~10% of all births) are born preterm (<37 weeks gestational age (GA)) every year worldwide [1, 2]. In 2017, in the United States alone, 358,372 (9.9%) babies were born preterm [3]. With ongoing improvements in neonatal care, the survival rate of preterm infants, especially those born very (<32 weeks GA) and extremely (<28 weeks GA) preterm, continues to increase [4]. Although there is a stable high prevalence of cognitive problems in preterm populations [5, 6], educational attainment for extremely preterm born children may be deteriorating despite improved survival and neonatal care [5]. Consequently, the number of preterm born children with developmental difficulties entering school systems continues to increase year on year. As most preterm children attend mainstream schools [7], general education teachers are highly likely to encounter preterm born children in their everyday work [8]. This fact has largely been neglected in educational policy and practice to date.

Although many parents and teachers expect that preterm born children will have developmentally caught up with their term born peers by school entry, studies have shown that cognitive deficits are relatively stable from two years of age through to adulthood [9-11]. A large body of research has documented various sequelae of preterm birth at school-age [12] that are cross-culturally consistent [13, 14]. In fact, preterm children's specific problems often become more apparent during the first years of elementary school when greater demands are placed on attention regulation - an area of difficulty for many preterm born children yet essential for learning [15]. In addition, preterm born children have deficits in specific cognitive abilities that affect attainment, such as processing speed [16, 17], executive functions [15, 18, 19], visuospatial and fine motor skills [20], and working memory [19, 21]. Accordingly, on average, preterm born children show significantly poorer academic performance than their term-born peers [22-26], with especially low performance in mathematics [23, 27]. Additionally, compared with their term-born peers, preterm born

children tend to have more internalizing problems, in particular emotional problems and peer relationship difficulties [12]. Researchers have defined this characteristic set of attention, social and emotional problems as the ‘preterm behavioral phenotype’ [28].

On top of a high risk for the problems that define the preterm behavioral phenotype, very and extremely preterm born children often have multiple learning difficulties, with a prevalence of comorbid intellectual and learning disability of up to 24% [20], and many require special educational support in the classroom [25, 27, 29, 30]. For example, Brogan et al. (2014) reported that 42% of the very preterm children in their sample had special educational needs (SEN) at 8 to 10 years of age, compared to 18% of term-born children.

Whilst these difficulties are not unique to preterm born children, their frequent co-occurrence comes with particular challenges regarding the identification of children with difficulties. Due to the pattern of behaviors that characterize the preterm phenotype, including internalizing rather than externalizing difficulties, preterm children’s difficulties with learning may go undetected as they tend not to disrupt the classroom or come to the teacher’s attention as needing support. Thus, educating teachers in terms of identifying these difficulties is important to ensure the provision of appropriate support and facilitation of learning [31]. Teachers may lack training about how certain challenges affect children’s ability to profit from instruction [32, 33], in particular with regard to the biobehavioral and neurodevelopmental underpinnings of learning [34]. In addition, previous studies have shown that, despite feeling responsible for managing the implications of chronic illnesses, teachers lack knowledge and training about common chronic health conditions and feel ill equipped to meet the needs of many children [33, 35]. This is concerning considering education professionals’ knowledge of chronic health conditions is vital for supporting children. Moreover, teachers believe it is important to increase awareness of disability and chronic disease in education settings [36].

To assess to what extent teachers and other education professionals may be equipped to provide the support for preterm born children, Johnson et al. (2015) developed the Preterm Birth-Knowledge Scale (PB-KS). They found that UK teachers had poor knowledge of the long-term consequences of preterm birth on children's development and learning, and, although they expected to be teaching preterm born children, they did not feel adequately equipped [8]. These findings indicated a critical need for the development of novel, targeted interventions for teachers, to help provide specific support for preterm born children in the classroom. Likewise, Church et al. (2019) found that Canadian parents and educators were unprepared to meet preterm children's needs. The findings from this mixed-methods study included a lack of consensus amongst educators on facilitators or barriers to support children born preterm [37]. Similarly, Blackburn and Harvey (2020) recently found that British parents of preterm children feel that early years practitioners (i.e., educators of children from birth to 5 years) lack understanding and awareness of their children's specific needs and consequently do not individually adapt their teaching strategies. Accordingly, researchers suggest that teachers should receive training about the potential needs of preterm children and how best to communicate with their parents [37, 38].

In education, as in other fields, it is critical to involve the primary stakeholders in the research process in order to achieve the best possible implementation of scientific knowledge into practice [34]. Previous findings indicate that educationally relevant findings on preterm born children may not have been delivered to teachers or integrated into teacher training curricula [8]. Thus, it is both timely and essential to facilitate collaboration between health and education professionals to design targeted evidence-based interventions. Accordingly, the number one research priority identified by stakeholders in the field of learning difficulties is to determine what knowledge, skills and training education professionals need to be able to identify the early signs of learning difficulties and provide optimal support for children and young people [39]. Moreover, multidisciplinary stakeholders including professionals, preterm

children, and their parents, have recently identified education as the top current research priority for research focused on preterm birth [40].

Our aim was to address these priorities for research in education of preterm children by assessing the knowledge and information needs of teachers and other education professionals in the United States. Our first hypothesis was that the previous findings of UK teachers' limited knowledge of the long-term consequences of preterm birth and the need for specific training would be replicated among teachers in the US. Secondly, we aimed to elicit specific suggestions and strategies from teachers for improving educational practice to better support preterm born children.

Materials and Methods

Sample and procedures

Participants were recruited into an online survey via social media and education-related email listservers. Respondents were $N=246$ pre-K-12 United States teachers and other education professionals aged <25 to 60+ years (Table 1). Of these participants, 228 (92.7%) were female, the median age was 35 to 39 years, and they had a median professional experience of 11 to 15 years (see Table 1). These demographic characteristics are very similar to the total population of elementary school teachers in the US (e.g., 89% female, 40% with 10-20 years teaching experience [41]).

Ethical approval details

The study was approved by the University of Tennessee Knoxville Institutional Review Board (Reference # UTK IRB-16-02967-XM).

Survey Measures

Preterm Birth – Knowledge Scale (PB-KS). A US-adapted version of the validated PB-KS Scale [8] was administered online. The original scale comprises 33 items assessing teachers' knowledge about preterm children's developmental and educational outcomes with

good internal consistency of *Cronbach's* $\alpha = .81$ for teaching staff and *Cronbach's* $\alpha = .77$ for educational psychologists. Similarly, internal consistency of the current data was good (*Cronbach's* $\alpha = .78$) after excluding one item (#27). The remaining 32 items were summed into an overall knowledge score and scaled to be comparable to the 33-item UK version ($[\Sigma/32]*33$), higher scores indicating greater knowledge.

In addition, participants' demographic background, professional training received, need for information on preterm birth, and personal and professional experiences with preterm born children were assessed as part of the online survey (Appendix).

Qualitative study

A subsample of 35 teachers and other educational professionals additionally participated in a qualitative study. Primed on the focus of the study having previously completed the PB-KS and the professional background questions, they were presented the following case vignette delineating the preterm behavioral phenotype:

Imagine you have a student in class who is quiet and reserved. He does not talk to many of his peers, rarely disrupts class but often seems like he is not paying attention. Additionally, he often doesn't finish assignments on his own. He is performing below grade level in their academic assessments.

Participants were then asked to respond to the case vignette by describing how they would support the child in four domains: (1) academic performance, (2) attention, (3) peer relationships, and (4) emotion regulation. Demographic characteristics of the qualitative study subsample are presented in Table 1.

Table 1 about here

Statistical analyses

Data were analyzed using SPSS v26. Descriptive sample characteristics were assessed for all participants. In order to test whether the subsample of the qualitative study was representative of the total sample, independent samples t-tests and χ^2 -tests were used. Multivariable linear regression was used to assess the independent effects of demographic variables, training received, need for information on preterm birth, and personal or professional experiences with preterm children on PB-KS scores.

The qualitative responses to the case vignette were coded using thematic content analysis [42]. By thoroughly and repeatedly going through the responses, a coding system was jointly developed by the first and senior author (CE, JJ). For this purpose, codes were identified from the raw data and then integrated into underlying themes for each of the four previously addressed domains (Table 2). Subsequently, both authors independently coded the data according to the broader themes. After the first round of coding, which resulted in *Cohen's* $\kappa \geq .70$ for all coded items across categories (6.0% disagreement), disagreements were discussed and resolved, whereby an integrative coding was achieved.

- Table 2 about here -

Results

Characteristics of respondents

Demographic sample characteristics are shown in Table 1. Results of the independent samples t-test and χ^2 -tests documented that the subsample that participated in the qualitative study was fairly representative of the total sample (Table 1), the only significant difference was that teachers in the qualitative study had fewer median years of professional experience (6-10 vs. 11-15 years, $\chi^2=20.10$, $p=.028$).

Knowledge of preterm birth

50.9% of respondents had professional experience and 50.0% had personal experience with preterm born children. Overall, 25.2% had received formal training about preterm birth and 13.4% as part of their initial teacher training. The mean knowledge score was 15.21 ($SD=5.31$; range 0-27) and 90.7% of respondents requested more information about preterm birth. The most requested modalities for training were online seminars (57.7%), seminars for staff at the place of work (45.1%), and information sheets (31.7%).

Simple linear regression analyses for each predictor showed that those participants who reported to have professional experiences with preterm children ($\beta=-.17$, $R^2=.03$, $p=.010$) and those who had received formal training ($\beta=.14$, $R^2=.02$, $p=.042$) had significantly better knowledge as indicated by higher total PB-KS scores. There were no significant effects of other predictors (see Table 3). Multivariable linear regression showed that, when controlled for each other, neither demographic variables, nor training received, need for information on preterm birth, nor personal or professional experiences with preterm children had significant effects on PB-KS scores ($R^2=.06$, $F=1.75$, $p=.089$; Table 3).

Table 3 about here

The accuracy of US teachers' scores on individual PB-KS items is shown in Figure 1. Similar to previous studies [8], respondents demonstrated poorest knowledge across developmental dimensions that are most affected by preterm birth. An example of such a characteristic of the preterm behavioral phenotype is inattentive behavior in the classroom, which only 27.2% were aware of as an outcome associated with preterm birth. Moreover, only 15.0% of teachers knew that mathematic difficulties are likely to be a particular problem area for children born preterm, and 76.0% were not aware that very preterm children are likely to have poorer peer relationship skills than term-born children.

Figure 1 about here

Qualitative results

The qualitative responses contained rich data about approaches to supporting preterm born children in the classroom. Thematic content analysis yielded 3-4 themes for each of the four dimensions. Results are outlined in Table 2. For supporting academic performance (1), four different themes emerged. 28.6% of participants suggested using *assessment* to inform approaches to support (1a), for instance:

“First, gather data through observation and specific, targeted assessment. Next, provide support [...] building on assessment data” (participant #9)

Approaches that focused on adapting tasks to support students’ academic performance constituted the theme of *modifying assignments* (1b), which was suggested by 57.1% of participants, indicated by responses such as:

“Differentiate activities, try small groups if possible” (participant #37)

“Differentiate instruction to scaffold their learning” (participant #62)

“Adjust tasks so that the child is able to complete them and build confidence”
(participant #87)

Thirdly, *modification of the classroom environment* (1c) was suggested by 42.9% of respondents. This theme included creating a positive atmosphere in the classroom and encouraging students to support each other:

“Use buddy system” (participant #119)

“I would first look at his environment – what kind of environment does he need to thrive; is he not performing well because he needs that 1:1 attention, is he bored, is he shy to ask for help etc.?” (participant #94)

“Make him feel comfortable and welcomed in the classroom. Have him work with specific peers that may be more outgoing” (participant #67)

247 Finally, the theme of *seeking conversations* (1d) arose in 40,0% of responses.
248 Participants suggested having conversations with different persons involved in the situation
249 who could potentially help the child:

250 “*Meet with the family and discuss options where both school and home would be*
251 *involved in learning*” (participant #99)

252 “*Talk to him one-on-one to discuss what’s going on and how he feels about the class*
253 *material. Go from there based on what he says*” (participant #8)

254 Analysis of responses regarding the provision of support for attention difficulties (2)
255 also yielded four themes. 65.7% of respondents addressed *scaffolding or other forms of*
256 *immediate support* (2a), which was the most frequently addressed theme for supporting
257 attention, for instance:

258 “*Frequent checks to see that he’s on task*” (participant #31)

259 “*close observation by teacher and prompting the student*” (participant #119)

260 “*gentle reminders to stay on task or give him warnings about how many more minutes*
261 *we have left to complete a task*” (participant #32).

262 45.7% of respondents suggested *modification of assignments* (2b) to support attention
263 by keeping the child interested and focused:

264 “*An individual schedule*” (participant #106)

265 “*Extended time, chunking of assignments*” (participant #38)

266 “*Shorten tasks or give him a task that they are interested in*” (participant #65)

267 Respondents also suggested *modification of the classroom environment* (2c), which
268 focused on positive reinforcement and students supporting each other. This theme was
269 mentioned in 45.7% of responses, such as:

270 “*I would pair the child with an outgoing peer mentor who could help redirect*
271 *attention and attempt to foster a friendship with the child*” (participant #56)

272 *“Large celebrations for small victories, intentionally building a relationship with this*
273 *child”* (participant #114)

274 The final theme reoccurring in this dimension was *external support* (2d), which was
275 mentioned by 14.3% of respondents with answers like:

276 *“Have a special educator work with him in our classroom ”* (participant #90)

277 *“Ask permission to speak to his Pediatrician or ask the parents to share info re how he*
278 *plays, follows directions at home and completes different tasks at home”* (participant
279 #120).

280 Three underlying themes were identified in the responses regarding support for peer
281 relationship difficulties (3). 82.9% of respondents suggested *encouraging social interaction*
282 (3a) in the classroom. This was the overall most prominent theme:

283 *“Start by having him work with different peers on smaller projects. Continue*
284 *encouraging. find students with similar interest”* (participant #67)

285 *“Pair child with peer partner/Peanut Butter and Jelly partner”* (participant #26)

286 *“Help him to build relationships with his classmates”* (participants #85)

287 Another theme was *creating a positive community* (3b; 42.9%), which was
288 characterized by teaching social skills and using positive reinforcement to build the child’s
289 confidence, for example:

290 *“Teach and model how a community works, how relationships/friendships in a*
291 *community interact and care for one another”* (participant #62)

292 *“Role play how to interact with others”* (participant #104)

293 *“We did character education with a new character trait each month, generally*
294 *focusing on being a person you feel is responsible, caring and a positive member of*
295 *society. I used a lot of picture books to continually have these conversations”*
296 (participant #84)

297 Finally, 17.1% of respondents mentioned seeking *external support* (3c), such as:

298 “refer to a counselor” (participant #14).

299 Analyses of the fourth dimension, the support of emotion regulation (4), again yielded
300 four themes. 57.1% of respondents addressed *creating a positive environment* (4a). In this
301 theme self-regulation and well-being were focused, while confidence and social skills were
302 stressed for supporting peer relationships:

303 “Make sure the student feels valued” (participant #32)

304 “Providing a safe place to retreat when overstimulated” (participant #9)

305 “conversations about our feelings, expressing ourselves, and what to do when we feel
306 upset” (participant #30)

307 Additionally, *modification of work routines* (4b) to support emotion regulation was
308 suggested by 22.9% of participants, for instance:

309 “Make time for quick check-ins at the beginning and end of the day to make sure the
310 student has all their assignments and resources” (participant #90)

311 “Conduct morning meetings; conduct share times” (participant #26)

312 42.9% of respondents reported they would *seek conversations* (4c) with the child or
313 their parents:

314 “I would also attempt to build a relationship with the child during recess. Further, I
315 would contact his family/ caregiver to ask about how to best support him at school”
316 (participant #56)

317 Finally, the underlying theme of seeking *external support* (4d) was identified in 31.4%
318 of responses, for example:

319 “Talk with another teacher for assistance” (participant #65)

320 “Refer to counselor if needed, refer parents to outside mental health help if needed”
321 (participant #106).

322

323

Discussion

This mixed-methods study provides a novel window into US teachers' knowledge and training needs relating to preterm birth and offers specific recommendations for supporting preterm children in their classrooms. Our findings are twofold: firstly, they show that US education professionals lack knowledge about the long-term consequences of preterm birth on children's development and learning, addressing critical research priorities in the field of education of preterm born children [40]. In addition, the majority of participants reported not to have received any form of formal training about the long-term outcomes of preterm birth and 91% expressed the need for further information. These results replicate previous findings from the UK in which teaching staff had a mean PB-KS score of 14.7 ($SD=5.5$; [8]) and from a study conducted in Canada that documented a substantial lack of knowledge and communication strategies amongst educators [37]. At the same time, the current study confirmed the validity and reliability of the PB-KS for US education professionals. Secondly, as part of the qualitative findings, teachers offered extensive suggestions for how to support preterm born children in the classroom, thereby indicating the high utility of including education professionals in research and policy efforts related to preterm birth. In combination, these results provide a strong rationale for raising awareness of prematurity in the education sector through improved training for teachers and other education professionals and investing in educational intervention research that incorporates teachers' perspectives and unique expertise.

A large body of research has shown that preterm children are at risk for developmental sequelae at school age, including cognitive impairments [20], attention [28, 43] as well as behavioral and emotional problems [12], which may decrease their academic success [16, 32]. The 10% prevalence of preterm birth [3] means that most US teachers are working with preterm children in their classrooms. In addition, despite advances in neonatal treatment and improved survival rates, recent studies point to a potentially concerning trend of higher

executive dysfunction among children born extremely preterm (<28 weeks gestation) in more recent decades compared with those born in the 1990s [44]. While such reports require replication, this may be associated with the trend towards worsening academic achievement also observed in these cohorts [5]. While previous studies have shown the importance of supporting preterm children at school, the current study revealed an expected lack of knowledge in this regard. Accordingly, we argue that the design and implementation of targeted training is critical and is in line with recent European policy guidelines for follow-up after preterm birth [45]. Due to the frequent co-occurrence of difficulties characterizing the preterm phenotype and, in particular, the lack of an excess of externalizing behavior relative to term-born controls, the challenge for education professionals lies in recognizing and identifying children who may present with problems [31]. Targeted training for education professionals should therefore focus on raising awareness of the developmental consequences of preterm birth to ensure that they are able to identify and support children with additional needs.

With regard to the qualitative data, thematic content analysis allowed a differentiated exploration of teachers' suggested approaches to supporting children in relation to their identified difficulties. Results showed that they had multifaceted ideas for supporting preterm children in the classroom. This finding has important clinical implications in light of studies showing, for instance, both persistent and transient difficulties in preterm children's executive functions that may be associated with uneven academic outcomes [46]. Accordingly, it has been documented that performance-based assessment results are not consistently associated with parent and teacher reports, while the more comprehensive evaluation of children's behaviors across situations may be ecologically more valid than a test that is administered under restricted conditions [47]. This implies that teacher-led approaches to intervention that take children's individualized developmental profiles into account may be an effective approach to intervention. Comparing the different dimensions of preterm children's

difficulties illustrated that, while some approaches were used across domains, their focus depended on the dimensional content. Thus, education professionals offered differentiated support measures that holistically addressed the difficulties most commonly associated with preterm birth. Our study thus yielded extensive suggestions from teachers to supporting preterm born children in the classroom, facilitating the involvement of practitioners in the research process, which is beneficial for successful practical implementation of scientific findings [34]. By collecting individual teachers' suggestions to supporting four different dimensions of development, the qualitative data provided a rich collection of ideas which may serve as the foundation for the development of interventions aimed at improving educational training and practice. Importantly, the differentiation into themes should be retained to ensure social and emotional skills, critical factors contributing to children's quality of life, are addressed by intervention approaches to the same extent as academic and attention skills.

Recently, a free e-learning resource addressing the consequences of preterm birth on children's development and learning was developed in the UK for online use by education professionals [48]. By combining scientific knowledge with practical suggestions for daily practice it substantially improved teachers' knowledge and was evaluated positively [48]. Since the current study detected that US teachers' knowledge was similar to UK education professionals, this novel resource may be applicable to the US education context. This is supported by the finding that many of the same strategies to support preterm children in the classroom implemented in the e-learning resource were mentioned by participants in our qualitative study. Future feasibility and effectiveness trials should explore its validity for US teachers and other education professionals, effects on daily classroom practices, and preterm children's academic outcomes.

Strengths and limitations. The strengths of this current study lie in the mixed-methods approach. As the quantitative approach consisted of a replication of previous findings from the UK, it facilitates international comparability and reliability. The qualitative approach

resulted in a broad and rich overview of teachers' approaches, an area that has not been explored before and can be used as the foundation for the development of targeted interventions. The study is limited by the selective sample and moderate sample size, however, participants' descriptive characteristics were comparable to the current total population of teachers in the US.

Conclusions

The current study revealed a substantial gap in US education professionals' knowledge about the long-term outcomes of preterm birth on children's development and learning and a need for further information to ensure tailored support for children at school. Importantly however, having a documented 'lack' of neonatal and pediatric knowledge did not prevent participants from providing practical suggestions for educational support for those preterm children who may need it. Each child, whether born preterm or term, has an individual developmental profile that may need repeated careful assessment in order to provide optimally tailored educational instruction. Overall, our findings stress the importance of the provision of training around preterm birth for education professionals in the US and the evaluation of classroom-based support for improving educational outcomes for this population of children.

Highlights

- Mixed-methods study
- Teacher training for preterm children
- Practical strategies

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565 **Table 1**

566 *Descriptive characteristics*

	Total sample (N = 246)	Subsample qualitative study (n = 35)	Differences between samples	
	<i>n</i> (%)	<i>n</i> (%)	χ^2	<i>p</i>
Gender (female)	228 (92.7)	33 (94.3)	0.28	.868
Age (years)			4.83	.776
<25	24 (9.8)	5 (14.3)		
25-29	40 (16.3)	6 (17.1)		
30-34	47 (19.1)	7 (20.0)		
35-39	36 (14.6)	5 (14.3)		
40-44	26 (10.6)	4 (11.4)		
45-49	18 (7.3)	3 (8.6)		
50-54	21 (8.5)	1 (2.9)		
55-59	12 (4.9)	0 (0.0)		
60+	22 (8.9)	4 (11.4)		
Professional experience (years)			20.10	.028
Still in training	12 (4.9)	4 (11.4)		
<6	50 (20.3)	10 (28.6)		
6-10	48 (19.5)	8 (22.9)		
11-15	46 (18.7)	2 (5.7)		
16-20	38 (15.4)	5 (14.3)		
21-25	20 (8.1)	1 (2.9)		
26-30	15 (6.1)	1 (2.9)		

31-35	3 (1.2)	0 (0.0)		
36-40	7 (2.8)	2 (5.7)		
41+	4 (1.6)	0 (0.0)		
Retired	3 (1.2)	2 (5.7)		
Job type ^a			8.13	.228
General Education Teacher	127 (52.5)	15 (40.5)		
Special Education Teacher	11 (4.5)	-		
Subject Specialist Teacher	12 (5.0)	3 (8.1)		
School Counselor	4 (1.7)	1 (2.7)		
School Director or Principal	14 (5.8)	2 (5.4)		
Paraeducator	5 (2.1)	-		
Other	69 (28.5)	16 (43.2)		
Professional experience with preterm children ^b	117 (50.9)	17 (48.6)	0.88	.643
Personal experience with preterm children ^b	115 (50.0)	13 (37.1)	3.10	.213
Formal training received ^b	58 (25.2)	13 (37.1)	3.11	.078
Need for information ^b	223 (90.7)	34 (97.1)	0.01	.924
	<i>M (SD)</i>	<i>M (SD)</i>	<i>t</i>	<i>p</i>
PB-KS score	15.21 (5.31)	14.31 (5.81)	1.08	.283

Note. ^a The total sample of respondents was $n = 242$; ^b The total sample of respondents was $n = 230$.

570 **Table 2**

571 ***Qualitative Coding System Derived from Thematic Content Analysis***

<i>Coding Dimension / Category</i>	<i>Coded Content Examples</i>	<i>Frequency n (%)</i>
<i>1. Academic Performance</i>		
1a. Assessment	Diagnostic assessment, standardized testing	10 (28.6)
1b. Modification of assignments	Group instruction, differentiated activities, repeated instruction	20 (57.1)
1c. Modification of classroom environment	Buddy System, assistant for support, creation of positive atmosphere	15 (42.9)
1d. Seek conversations	e.g. with child, parents, counselor, ...	14 (40.0)
<i>2. Attention</i>		
2a. Immediate support/ scaffolding	Setting reminders, monitoring, close supervision, minimizing distractions	23 (65.7)
2b. Modification of assignments	Differentiate activities, shorten assignments	16 (45.7)
2c. Modification of classroom environment	Pair with other child, rewards, behavior sheets	16 (45.7)
2d. External support	e.g. involve parents, counselor, pediatrician	5 (14.3)
<i>3. Peer Relationships</i>		
3a. Create positive community	Build confidence, positive reinforcement, teaching social skills	15 (42.9)

3b. Encourage social interaction	Group instruction, group tables, Buddy System	29 (82.9)
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3c. External support	Involve counselor or speech therapist	6 (17.1)
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4. *Emotions*

4a. Create positive environment	Foster self-regulation, provide safe place, positive reinforcement	20 (57.1)
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4b. Modification of work routines	Morning meetings, check ins, group instructions	8 (22.9)
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4c. Seek conversations	e.g. with child, parents (find causes, build relationship)	15 (42.9)
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4d. External support	Create a behavior support plan, include trusted others	11 (31.4)
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573 **Table 3**

574 Regression results

Predictors	Multivariable linear		Simple linear		
	regression coefficients		regression coefficients		
	<i>beta</i>	<i>p</i>	<i>beta</i>	<i>R</i> ²	<i>p</i>
Gender	-.04	.537	-.06	.00	.378
Age	.04	.735	.01	.00	.197
Years of experience	-.09	.478	.01	.00	.877
Professional experience	-.14	.060	-.17	.03	.010
Personal experience	-.09	.186	-.13	.02	.053
Job type	.00	.997	.03	.00	.692
Formal training	.10	.146	.14	.02	.042
Need for information	.07	.317	.08	.01	.225

575 *Note.* The PB-KS sum score was the dependent variable in all regressions.

576

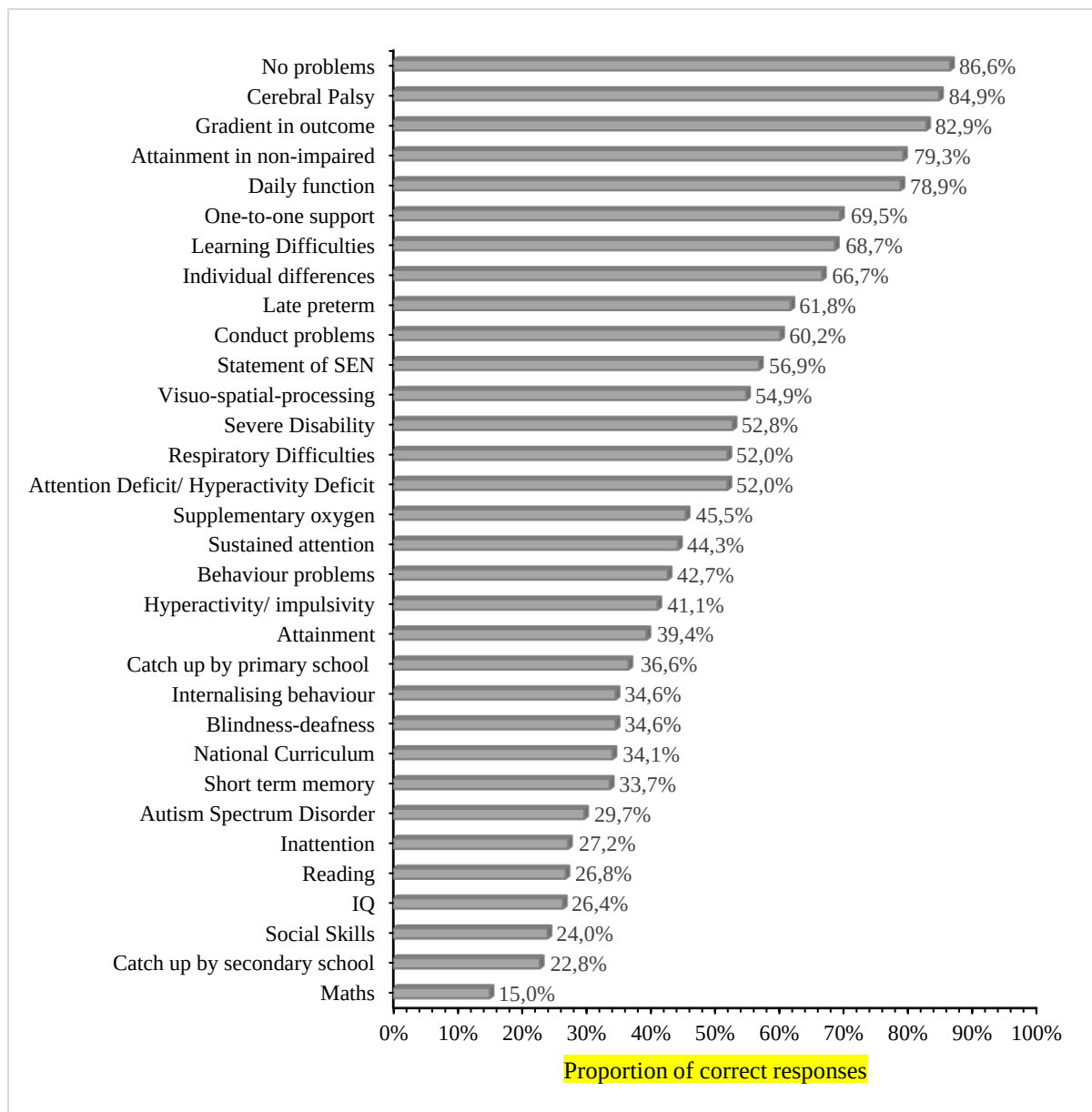


Figure 1. Proportion of correct responses (% of all participants) on individual Preterm Birth-Knowledge Scale (PB-KS) items. The y axis gives a summary descriptor of the PB-KS item content.

583 **Appendix**

584 Online questionnaire details

585 *Demographic Questions*

586 1. Gender: Please mark how you identify yourself.

587 a. Female

588 b. Male

589 c. Other (please specify) _____

590 d. Prefer not to answer

591 2. Age: Please mark your age.

592 a. <25

593 b. 25-29

594 c. 30-34

595 d. 35-39

596 e. 40-44

597 f. 45-49

598 g. 50-55

599 h. 55-59

600 i. 60+

601 3. Ethnic Background: Please mark how you identify yourself. You may check all that
602 apply.

603 a. American Indian/ Alaska Native

604 b. Asian/Pacific Islander

605 c. African American

606 d. Caucasian

607 e. Hispanic/Latino

608 f. Other (please specify) _____

- 609 g. Prefer not to answer
- 610 4. Highest Education degree: Please mark the highest degree you obtained.
- 611 a. Doctorate
- 612 b. Master's degree
- 613 c. Bachelor's degree
- 614 d. Associate's degree
- 615 e. High school or GED
- 616 f. Other (please specify) _____
- 617 g. Currently in progress towards (please specify) _____.
- 618 5. What was the area of concentration in your highest degree? _____
- 619 6. Please list your current licensure types or qualifications (e.g., TN Early Childhood
- 620 Education Preschool-3, WA English/Language Arts 5-12, Nationally Certified School
- 621 Psychologist) _____
- 622 7. Job type: Please mark the option that best represents your current job type.
- 623 a. General Education Teacher
- 624 b. Special Educator Teacher
- 625 c. Subject Specialist Teacher
- 626 d. School Counselor
- 627 e. Educational Psychologist
- 628 f. School Director or Principal
- 629 g. Paraeducator
- 630 h. Other (please specify) _____
- 631 8. Age range of students: Please mark the age range of the students you primarily teach.
- 632 a. Early Childhood (Birth through Preschool)
- 633 b. Elementary (Kindergarten through 5th grade)
- 634 c. Middle School (6th - 8th grade)

- 635 d. High School
- 636 e. Other (please specify) _____
- 637 9. Please enter the state in which you currently work.
- 638 a. If you work outside of the United States, please enter the country in which you
- 639 currently work.
- 640 10. Years working: Please mark the amount of time you have been working in the
- 641 education field.
- 642 a. in training
- 643 b. 1-5 years
- 644 c. 6-10 years
- 645 d. 11-20 years
- 646 e. 21-30 years
- 647 f. 31-40 years
- 648 g. 41 years and over
- 649 h. retired

650

651 12. Have you ever taken a class related to the mind, brain, or neuroscience?

652 i. Yes/No check box

653 11. If answered yes: Describe the type of brain-based education that you have been

654 exposed to.

655

656 *Questions regarding educational management of preterm children*

657 For Statements 1-7, response categories are: Strongly Disagree; Disagree; Neither Agree nor

658 Disagree; Agree; Strongly Agree

1. I am unlikely to come into professional contact with a child born very preterm.

2. Educational management of very preterm children is not the job of the class teacher.
3. Disclosing a child's preterm birth status to the school would be beneficial for the child.
4. Disclosing a child's preterm birth status would lead to problems because of the negative effect of labelling.
5. I feel adequately equipped to support the learning and development of preterm children.
6. I have received sufficient training in how to support the learning and development of preterm children.
7. I would like to know more about strategies I can use to help support the learning and development of preterm children.

Additional Survey Questions

1. Training and Information needs
 - a. Have you been given any formal training about the outcomes of children who are born preterm or very preterm?
 - i. No
 - ii. Yes – as part of training
 - iii. Yes – at a conference
 - iv. Yes – via an information sheet
 - v. Yes – at a training session at work
 - vi. Yes – at another seminar
 - b. How do you like to hear information about, for example, how you can help support the learning of preterm children?
 - i. Information sheets
 - ii. Online resources
 - iii. Seminar for staff at your place of work

- iv. Module as part of standard training
 - v. Training course run by local university
 - vi. I don't want any more information.
 - c. Which of the following dimensions do you feel you need the most information about to best support preterm children?
 - i. ADHD- inattentive subtype
 - ii. General cognitive deficits
 - iii. Basic math deficits
 - iv. Peer relationships
 - v. other
- 2. Personal and Professional experience with preterm children:
 - a. Do you have personal experience with a preterm child?
 - i. Yes
 - ii. No
 - iii. Not sure
 - b. Do you have professional experience with a preterm child?
 - i. Yes
 - ii. No
 - iii. Not sure