Use of *PEDS: Developmental Milestones®* to Identify Children at Risk for Social-Emotional/Behavioral Health Problems

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Background

Many US State-wide screening initiatives (e.g., TN AAP, Iowa DoE) focus on detecting social-emotional/behavioral health problems (SEBH). Many health care providers and other professionals use broad-band screens for early identification, particularly measures focused on children's skills/milestones. For SEBH-focused initiatives, should professionals view all domains of development or just SEBH risk? The goals of this study are to: a) Determine SEBH risk rates on *PEDS: Developmental Milestones®(PEDS:DM®)*; b) Identify whether developmental delays are associated with SEBH risk; and c) Evaluate family psychosocial risk factors correlated with SEBH risk. The results should assist professionals with decisions about types of further assessment and interventions.

Methods, Subjects and Sites

Using 2019 data from *PEDS® Tools Online*, parents or professionals working with 25,551 children were administered (in English, Spanish or other languages): *PEDS:DM®* and *Parents' Evaluation of Developmental Status (PEDS (R)®.* The *Modified Checklist of Autism in Toddlers – Revised (MCHAT-R)* was administered to 33% (N = 8511/25551). Children were 50% male and 50% female, ranging in age from birth to 8-years: 34% (N =8,567) were 3-years of age and older. Settings, 15% of which were rural, included Head Start/Early Head Start, preschools/day care, public schools and primary health care. Sites were located across 15 US States and represented all four US Census Bureau Regions. SEBH risk on *PEDS:DM®* was defined as one or more unmet milestones in social-emotional skills and/or receptive language (the latter is often an indicator of behavioral issues such as non-compliance) and, because prior research found the two domains to be highly correlated.

Demographic data were collected on children and families: 16% were Black/African-American, 22% Latino, 2% American Indian/Native American, 3% Asian, 1% Pacific Islanders. Family psychosocial risk factors (and rates) included:

a) Not speaking English well (25%) ; b) Poverty rates below Federal thresholds (18%); and, c) Lack of a high school education (33%). Professionals used any of the freely available 70+ *PEDS Online* translations (in about 15% of encounters) and tended to administer measures by interview (rather than by parent self-report) when families had psychosocial risk factors.

Results

Professionals and/or parents identified 23% of children (N = 5841/25551) as at risk for social-emotional/behavioral health problems on *PEDS:DM®*. Children in the 3- to 8-year age range were almost twice as likely to have SEBH risk than were younger children (29% versus 20%)[OR = 1.7; 95%CI (1.60 – 1.80) p < .001]. Boys had marginally higher SEBH risk than girls (28% versus 20%) [OR = 1.4; 95%CI (1.36 – 1.55) p < .001]. Children with SEBH risk had more unmet milestones on other domains of the *PEDS:DM®* (mean = 1.65 versus mean = 0.48) [$t_{(25549)}$ = 78.77, p < .0001]. Discriminant function analysis (DFA) identified the following unmet milestones as significant correlates of SEBH risk on *PEDS:DM®:* Expressive language (.69), fine motor (.63), self-help (.54), and academic skills in reading and math (.51), while gross motor milestones were non-contributory (.31) [$\chi^2_{(5)}$ = 5480.66, p < .0001].

Children with SEBH risk on *PEDS:DM®* were almost 4 times more likely to have high or moderate developmental risk on *PEDS (R)®* than were children without SEBH risk (43% versus 16%) [OR = 3.8; 95%CI (3.58 - 4.06) p < .0001] Children with SEBH risk on *PEDS:DM®* were 2 ½ times more likely to have SEBH risk on *PEDS (R)®* (39% versus 20%) [OR = 2.6; 95%CI (2.38 – 2.76) p < .001]. Via DFA, SEBH risk on *PEDS:DM®* was highly correlated with specific parent/professional concerns on *PEDS (R)®* including: Expressive Language (.82), Receptive Language (.57), Behavior (.47) School skills (.49), Self-Help (.42), Social-Emotional (.38), while Fine Motor (.33), Gross Motor (.22), Health/Other (.11) and Global/Cognitive (.14) were less contributory [$\chi^2_{(10)}$ = 2568.90, p < .0001].

SEBH risk on *PEDS:DM®* was highly associated with a failed *MCHAT-R*: Of the 8511 administered the *M-CHAT-R*, 6% (N = 541/8511) failed. Of the 541, 78% (N = 423/541) were identified by SEBH risk on the *PEDS:DM®*. At the same time, 78% (N = 6193/7970) of children without SEBH risk passed the *M-CHAT-R*. Despite adequate sensitivity and specificity to *MCHAT-R* performance, positive predictive value was low (19%), which is understandable because SEBH embraces many

conditions other than potential ASD. Children at risk for SEBH had nearly 8 times the risk of ASD as those not at risk [OR = 7.7; 95%CI (6.40 – 9.23) p < .0001].

In considering the potential impact of family psychosocial risk, children with and without SEBH risk were equally likely to have parents who did not speak English well (23% versus 23%) or to have less than a high school education (23% versus 23%). Only poverty was associated with SEBH risk (34% versus 22%) [OR = 1.8; 95%CI (1.70 – 2.01) p < .001].

There were no significant differences in SEBH risk by Census Bureau Regions: Northeast = 20%, South = 23%, Midwest = 20%, West = 22% (average SEBH risk rate = 22%, p = .03). Children living in rural areas had 2 times the risk of SEBH (40%) than children living in urban/suburban areas (23%) [OR = 2.2; 95%CI (1.86 – 2.72) p < .001].

Conclusion

SEBH risk is common and apparent in 23% of children birth to 8-years of age. Older children (3- to 8-years of age) have higher risk rates (29%) than younger children (20%). Risk for developmental problems was high when children had SEBH risk, i.e., more unmet milestones, greater number of parent/professional concerns, and higher likelihood of problematic performance on the *MCHAT-R*. Poverty and dwelling in rural areas contributed to SEBH risk and to developmental risk – implying that families living in these circumstances have unique difficulties procuring helpful educational toys, books, etc.

Although SEBH risk on the *PEDS:DM®* is higher than prevalence, not all children with SEBH risk require diagnostic work-ups. The *PEDS®/PEDS:DM®* Interpretation algorithm, indicates when to offer parent training (and careful monitoring) and when to evaluate further for IDEA eligibility. Ideally, broad-band mid-level assessment measures are administered after SEBH risk is identified because such tools: Are economical; Help professionals consider the contribution of developmental problems to SEBH risk; Identify types of further testing needed, and; Enable intervention plans to be modified according to children and families' specific needs.