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What Parents Know Matters: Parental Knowledge at Birth Predicts Caregiving Behaviors at 9 Months

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Objective To examine the mediating role of socioeconomically disadvantaged parents' knowledge of early cognitive and language development at the first postpartum visit in the relation between education and caregiving behaviors at 9 months.

Study design Parental knowledge was assessed at the 1-week newborn visit (n = 468); anticipatory guidance received and desired at 1-month (n = 212) and 6-month (n = 191) visits were reported; and caregiving behaviors toward infants during a teaching task were observed at 9-month visit (n = 173).

Results We found substantial variation in knowledge and caregiving behaviors. Parents who had more knowledge of infant development at 1 week were more likely to respond to cues ($r = 0.18$; $P < .05$) and foster social-emotional ($r = 0.17$; $P < .05$) and cognitive growth ($r = 0.20$; $P < .05$) at 9 months. Importantly, the indirect effect of education on cognitive growth fostering at 9 months through knowledge at 1 week was significant, controlling for primary language and number of other children in the home (infancy: $\beta = 0.06$; B = 0.07; SE = 0.04; 95% CI, 0.007-0.165; early childhood: $\beta = 0.04$; B = 0.06; SE = 0.03; 95% CI, 0.008-0.152). Open-ended responses indicated that anticipatory guidance in the first 6 months focused on infant physical growth; however, parents did not request additional anticipatory guidance from their pediatricians.

Conclusions This study sheds light on the importance of promoting parental knowledge about cognitive and language development to foster parental cognitive stimulations and language inputs during the first year of life. This study highlights the important role of anticipatory guidance on cognitive and language development during the earliest well-child visits and the need to better understand parental baseline knowledge to tailor anticipatory guidance to the family strengths and needs. *(J Pediatr 2019; ■:1-9)*.

See editorial, p ••• and related article, p •••

Early social and language experiences represent an important social determinant of health.[1] Enhancing parental knowledge and input during the newborn stage of rapid brain growth is an important approach in ameliorating the impact of socioeconomic status (SES) on children's long-term development.[2-6] Pediatric health care providers are ideally positioned within well-child visits to inform parents of low SES about early cognitive and language development and strategies for enriching their children's early environments.[7] Additionally, pediatricians are often the primary source of guidance on childrearing and developmental milestones for parents of low SES.[8]

Parental knowledge of child development varies considerably within socioeconomically disadvantaged populations.[9,10] Qualitative research with families of low SES showed veteran parents attributed their knowledge to previous parenting experiences, whereas first-time parents reported lacking familiarity with developmental milestones.[10] Mothers of multiple children were determined to be more supportive than mothers of singletons in fostering their young children's development.[11] Yet, differences in knowledge and caregiving behaviors between first-time and veteran parents have never been quantitatively tested among families of low SES.

Notably, anticipatory guidance and evidence-based programs are often implemented using a one-size-fits-all approach without considering the heterogeneity among parents from low SES backgrounds.[12,13] Pediatric practitioners have limited resources to clinically assess parental baseline knowledge and caregiving behaviors. This limitation minimizes the personalization of anticipatory guidance provided about infant cognitive growth and language learning. Thus, the first aim of this study was to examine knowledge about cognitive and language development as well as caregiving behaviors among socioeconomically disadvantaged parents of newborn; differences between first-time and veteran parents were also explored.

NCAST	Nursing Child Assessment Satellite Training
SES	Socioeconomic status

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Research with families of low SES shows that more educated parents better understand early cognitive and language development.[14,15] Parents who better understand early cognitive growth and language learning provide more linguistic inputs and engage in more conversations with their toddlers.[9,15] Examining the mediating role of parental knowledge in the relation between education and caregiving behavior will help to identify a critical and malleable factor in enriching the language environments of low SES families as early as the first year. Additionally, parents of low SES who do not speak English show relatively low levels of knowledge about child development.[10] Parental primary language has been examined as a proxy for adherence to their cultural values, which in turn contribute to differences in caregiving behaviors.[16,17] Thus, the second aim of this study was to examine whether parental knowledge at 1 week mediated the relation between education and caregiving behaviors at 9 months among socioeconomically disadvantaged families, controlling for parental primary language and number of other children in the home (**Figure**). We hypothesized that parents who were more educated would have more knowledge of cognitive and language development, and would in turn engage in more facilitating and stimulating caregiving behaviors (ie, more frequent cognitive growth fostering).

Anticipatory guidance is traditionally provided to inform parents about all aspects of child development. Despite the evidence that early experiences are critical to foundational brain development and long-term child outcomes, anticipatory guidance delivered during the first year tends to focus on newborn care, physical growth, and injury prevention.[18] Incorporating discussion about early environments and brain development into anticipatory guidance beginning at birth and the first postnatal well-child visit is indeed essential. To gain insights on the existing anticipatory guidance delivered to parents, the third aim was to examine the anticipatory guidance parents of low SES desired and received at well-child visits using a qualitative approach.

Methods

This longitudinal study was conducted in conjunction with well-child visits at 10 pediatric clinics predominantly serving families with public assistance in Chicago, Illinois, between June 2016 and February 2018. The sample was a convenience sample of families presenting for the 1-week well-child visit. Parents who had a household income at or below 200% of the federal poverty line and did not receive education beyond the bachelor's level were considered living in low SES households. Parents were eligible if they were from low SES households, at least 18 years old, spoke English and/or Spanish, and their infants were born at a minimum of 36 weeks gestation without significant perinatal or neonatal complications or medical diagnoses. Parents were ineligible if they were foster parents, did not live with the infant, or their infant was older than 1 month of age. Parents were recruited by a research assistant in the waiting area to participate in a study on infant development. Consent was obtained from participants before they completed measures at the 1-week visit. Owing to time constraints and limited resources, a subsample was randomly selected using block randomization method to complete additional measures at the 1-, 6-, and 9-month visits.[19] Parents received up to $150 compensation; all research materials were presented in their preferred language (English or Spanish). The Biological Sciences Division Institutional Review Board at the University of Chicago Medicine (IRB#15-0914) approved this study.

Measures

All measures have been used with samples of low SES participants in previous studies.

Sociodemographic Characteristics and Parent Capacities. Parents reported basic demographics such as their primary language (English, Spanish, or other), education level ranging from 1 (8th grade or below) to 8 (4-year college degree), and the number of other children in the home. Two subtests of the Woodcock Johnson IV Tests of oral language, picture vocabulary, and oral comprehensions were administered to parents by a trained research assistant to obtain an aggregate measure of their comprehension-knowledge, including lexical knowledge, listening ability, and verbal comprehension.[20] Using the Woodcock Johnson IV Tests of Oral Language scoring online program, a grade equivalent score was calculated, reflecting each parent's oral language

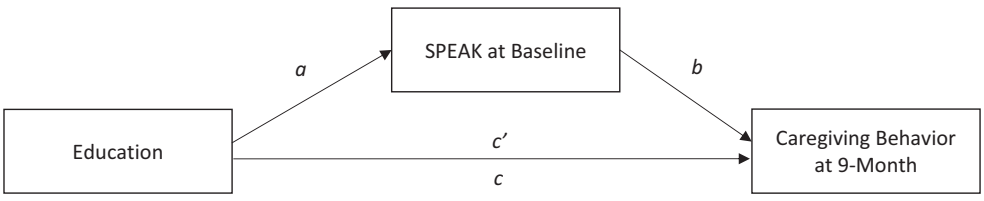

Figure. Mediation conceptual model testing the indirect effect of baseline knowledge on the relations between education and caregiving behaviors at 9-months. Note: The 2 knowledge scores (infancy and early childhood) and 5 caregiving behaviors (overall quality of caregiving, sensitivity to cues, response to distress, social-emotional growth fostering, and cognitive growth fostering) were tested individually in each of the ten models, with total effect of education on caregiving behavior (*c* path), direct effect of education on caregiving behavior controlling for knowledge (*c'* path), and indirect effect of education on caregiving behavior mediated by knowledge (*ab* path).

skills in terms of grade level in the norming sample.[21] The median reliability of the oral language cluster is 0.91 in the adult age range.[22] Parents also indicated the primary source of support for child care by responding to the question, "Who will care for your child the majority of the time?"

Knowledge. Parents completed the Scale of Parent/Provider Expectations and Knowledge at the 1-week visit regarding their expectations on developmental milestones and knowledge about the role of caregiver responsiveness and inputs in children's cognitive and language development during infancy (birth-12 months; 10 items) and early childhood (birth-5 years; 10 items).[14] Parents responded to 1 item on a 6-point scale, ranging from 0 (in elementary school 6 years and up) to 5 (as an infant 0-6 months), and 19 items on a 4-point scale, ranging from 0 (definitely true) to 3 (definitely not true). Two Scale of Parent/Provider Expectations and Knowledge sum scores including infancy ($\alpha = 0.74$) and early childhood ($\alpha = .72$) were calculated. Higher scores represented more knowledge.

Caregiving Behaviors. The Nursing Child Assessment Satellite Training (NCAST) Teaching Scale was applied to assess parental caregiving behaviors toward their infant at the 9-month visit.[23] Parents were given instructions to teach their infant to complete a 5-minute task. Certified NCAST research assistants, who obtained the required 90% interrater reliability, rated the videotaped teaching interaction on each of the 50 binary items either as yes (1) or no (0).

A sum score was calculated to assess the parent's overall quality of caregiving behaviors (parent total). Four subscale scores were calculated, assessing the parent's ability to recognize and respond to infant's cues (sensitivity to cues; 11 items), soothe or quiet a distressed infant (response to distress; 11 items), communicate a warm and positive tone when interacting with infant (social-emotional growth fostering; 11 items), and create opportunities to promote infant's cognitive growth and learning experiences (cognitive growth fostering; 17 items).

The NCAST Teaching Scale has been widely used among high-risk populations and across cultural/ethnic groups to assess parental caregiving behaviors toward infants from birth to 36 months of age.[23] The NCAST database provides norms based on demographic characteristics and identifies a clinically relevant 10th percentile cutoff score (30.70) for the Parent Total score.[23] In this study, normative scores on mothers who have a 0- to 12-month-old infant and attained 12 years of education were used for comparisons with the current sample.

Anticipatory Guidance Received at Well-Child Visits. Parents reported the topic(s) pediatricians discussed with them during their 1-month and 6-month well-child visits by responding to a checklist of potential topics adapted from the Recommendations for Preventive Pediatric Health Care by the *Bright Futures*.[24] Parents also indicated whether or not they desired additional information or had unanswered questions from their pediatrician.

Statistical Analyses

For aim 1, descriptive statistics of knowledge and caregiving behaviors were examined. Independent samples *t* tests were conducted to compare (1) first-time and veteran parents in terms of their knowledge and caregiving behaviors and (2) the current sample and NCAST normative sample in terms of caregiving behaviors. For aim 2, correlations between education, knowledge, and caregiving behaviors were examined. Mediation models were tested using the PROCESS macro for SPSS (SPSS Inc, Chicago, Illinois), applying 1000 bootstrap resamples with 95% bias-corrected CIs estimated around the indirect effect of knowledge on the relation between education and caregiving behaviors, controlling for primary language and number of other children in the home.[25,26] Notably, the purpose of the mediation analyses was to examine the impact of education on caregiving behaviors through parental knowledge. Given that there were 8 levels of education, education was examined as a continuous variable, rather than comparing across 8 groups of participants based on their education level, for the ease of interpretation. The 2 knowledge scores (infancy and early childhood) and 5 caregiving behaviors (overall quality of caregiving, sensitivity to cues, response to distress, social-emotional growth fostering, and cognitive growth fostering) were tested individually in each of the ten models. For aim 3, percentage scores of the most and the least frequently discussed topics during the 1-month and 6-month well-child visits were reported. The percentage of parents who did not desire additional information from their pediatricians was also reported.

Results

The sample included 468 parents (42.9% African American; 54.1% Hispanic) from low SES backgrounds, with an 88.3% recruitment rate among 539 parents (**Table I**). Close to two-thirds of the sample (64.8%) indicated English and one-third (34.5%) indicated Spanish as their primary language. One-half of the sample (49.4%) were single and almost one-half (48.5%) were married or living with a partner. Parents were generally undereducated, with less than 6% obtaining a 4-year college degree. They had low levels of oral language skills, with two-thirds (67.7%) scoring at or below the 5th-grade level (**Table I**). One-third (35.0%) were first-time parents. A majority of the parents (91.7% at 1 month; 92.2% at 6 months) had to rely on themselves to care for their infant the majority of the time in the first 6 months. Only a small portion (3.2% at 1 month; 10.2% at 6 months) had access to home- or center-based daycare.

Aim 1: Knowledge and Caregiving Behaviors

Although parents on average demonstrated low levels of knowledge about cognitive and language development in

Table I. Sociodemographic characteristics, source of support for childcare, and anticipatory guidelines pediatricians discussed

Characteristics	Demographics
Total sample*	468
Age (years)	27.1 ± 5.9
Race and ethnicity	
Non-Hispanic, African American	42.9
Non-Hispanic, any race	3.0
Hispanic, any race	54.1
Primary language	
English	64.8
Spanish	34.5
Other	0.6
Marital status	
Single	49.4
Married or living with partner	48.5
Divorced or widowed	2.1
No. of other children in the home	
0	35.0
1	28.8
2	23.4
3	7.9
4	3.4
5	1.1
6	0.4
Education level	
8th grade or below	7.9
9th-12th grade	20.9
High school graduate	34.0
Graduate equivalent degree completed	3.8
Postsecondary non-degree program	4.7
Some college credit	18.6
2-year associate's degree	4.5
4-year college degree	5.6
WJ-IV oral language skill grade equivalent	
5th grade and below	67.7
6th-8th grade	18.1
9th-12th grade	7.8
Postsecondary and above	6.5

	Well-Child Visit	
	1 Month	6 Months
Sample size	212	191
Source of support for childcare reported		
Self	91.7	92.2
Child's other parent	25.7	27.0
Family member	13.3	20.1
Home daycare or daycare center	3.2	10.2
Topics of anticipatory guidance pediatricians discussed†		
Feeding	78.4	60.3
Infant weight	69.7	47.2
Learning to talk	8.5	19.7
Infant learning	11.7	20.9
Brain growth	23.2	23.7

WJ-IV, Woodcock Johnson IV Tests of Oral Language.
Percentage scores are reported in Table I except for age, which is reported as mean ± SD.
*In this sample, 98% was mother and 2% was father.
†Pediatricians might discuss >1 topic(s) with each parent during the well-child visit.

infancy and early childhood, there was large variability within the sample (see descriptive statistics in Table II). More than three-fifths of the parents (66.4%) considered that infants learn little about language in the first 6 months of their life. More than one-half (59.4%) had a misconception that exposure to educational television is beneficial to infant and toddler vocabulary learning. In contrast, most parents were aware that babies communicate through crying, smiling, cooing, and babbling (93.1%-95.0%). More than three-fifths recognized the importance of caregiver responsiveness in fostering infant self-regulation skills (63.7%-69.6%). First-time and veteran parents were not significantly different in terms of knowledge and caregiving behaviors.

Descriptive statistics of the NCAST caregiving behaviors indicated variabilities within the current sample (Table II). One-quarter of the parents (28.9%) were below the 10th percentile of the NCAST normative sample on overall quality of caregiving behaviors. Independent samples *t* tests showed that parents in this sample were on average significantly lower than the NCAST normative sample in terms of the overall quality of caregiving behaviors, sensitivity to cues, response to distress, social-emotional growth fostering, and cognitive growth fostering (Table II).

Aim 2: Mediating Role of Baseline Knowledge in the Relation between Education and Caregiving Behaviors at 9 Months

Correlations (Table II) showed that parents who obtained higher education had more knowledge about cognitive and language development in infancy and early childhood. These parents also showed a higher quality of caregiving behaviors overall. They were more likely to respond to infant cues and foster infant social-emotional as well as cognitive growth. Moreover, parents who had more knowledge at 1 week showed a higher quality of caregiving behaviors at 9 months. Parents who better understood infant cognitive and language development as early as 1 week were more likely to respond to infant cues and foster infant social-emotional and cognitive growth at 9 months. Parents who knew more about early childhood cognitive and language development as early as 1 week were more likely to foster infant cognitive growth at 9 months.

Parental knowledge of cognitive and language development in infancy as well as early childhood at 1 week significantly mediated the relation between education and cognitive growth fostering at 9 months, controlling for primary language and number of other children in the home (Table III). Higher education was associated with more knowledge at 1 week (infancy: $\beta = 0.32$; B = 0.82; SE = 0.20; $P < .001$; early childhood: $\beta = 0.24$; B = 0.52; SE = 0.17; $P < .01$). More knowledge at 1 week in turn contributed to more frequent cognitive growth fostering at 9 months, above and beyond education level (infancy: $\beta = 0.18$; B = 0.09; SE = 0.04; $P < .05$; early childhood: $\beta = 0.18$; B = 0.11; SE = 0.05; $P < .05$). The indirect effect of education on cognitive growth fostering at 9 months through knowledge at 1 week was significant (infancy: $\beta = 0.06$; B = 0.07; SE = 0.04; 95% CI = 0.007-0.165; early childhood: $\beta = 0.04$; B = 0.06; SE = 0.03; 95% CI = 0.008-0.152).

Table II. Descriptive statistics of knowledge and caregiving behaviors, independent samples *t* tests of caregiving behaviors, and correlations between education, knowledge, and caregiving behaviors

Variables	Scale	Mean	SD	Variance	Minimum	Maximum
SPEAK knowledge at baseline (n = 468)						
Infancy: birth-12 months	0-30	19.7	5.4	29.2	4	30
Early childhood: birth-5 years	0-32	17.6	4.8	23.1	0	27
NCAST caregiving behaviors at 9 months (n = 173)						
Overall quality of caregiving	0-50	32.9	4.7	22.3	20	45
Sensitivity to cues	0-11	8.1	1.3	1.7	4	11
Response to distress	0-11	8.7	2.2	4.7	4	11
Social-emotional growth fostering	0-11	6.7	1.4	2.0	4	10
Cognitive growth fostering	0-17	9.5	2.6	7.0	1	16

	NCAST normative sample*		Independent samples *t* tests†	
	Mean	SD	*t*(*df* = 427)	*P* value
NCAST caregiving behaviors at 9 months (n = 173)				
Overall quality of caregiving	39.87	6.63	10.2‡	<.0001
Sensitivity to cues	8.95	1.73	5.6‡	<.0001
Response to distress	10.07	1.60	7.8‡	<.0001
Social-emotional growth fostering	9.10	1.68	15.4‡	<.0001
Cognitive growth fostering	11.75	3.31	7.6‡	<.0001

	Adjusted (partial) correlations§		
	Education	Knowledge of infancy at baseline	Knowledge of early childhood at baseline
SPEAK knowledge at baseline (n = 462; df = 458)			
Infancy: birth-12 months	0.32‡	—	—
Early childhood: birth-5 years	0.25‡	—	—
NCAST caregiving behaviors at 9 months (n = 171; df = 167)			
Overall quality of caregiving	0.27‡	0.19¶	0.15**
Sensitivity to cues	0.29‡	0.18¶	0.11
Response to distress	0.04	−0.06	−0.02
Social-emotional growth fostering	0.24††	0.17¶	0.05
Cognitive growth fostering	0.14**	0.21††	0.21††

	Unadjusted correlations‡‡		
	Education	Knowledge of Infancy at Baseline	Knowledge of Early Childhood at Baseline
SPEAK knowledge at baseline (n = 468)			
Infancy: birth-12 months	0.30††	—	—
Early childhood: birth-5 years	0.26††	—	—
NCAST caregiving behaviors at 9 months (n = 173)			
Overall quality of caregiving	0.27††	0.19¶	0.16¶
Sensitivity to cues	0.31††	0.18¶	0.12
Response to distress	0.03	−0.06	−0.02
Social-emotional growth fostering	0.22††	0.17¶	0.05
Cognitive growth fostering	0.16¶	0.20¶	0.22††

SPEAK, Scale of Parent/Provider Expectations and Knowledge.
*Normative scores were provided by the NCAST database of mothers who had a 0- to 12-month-old infant and attained 12 years of education (n = 256); the NCAST database with most relevant child age and maternal education was employed for comparisons with the current sample.
†Bonferroni adjusted *P* value of .01 was applied to correct a possible type I error in a series of 5 independent samples *t* tests.
‡$P < .001$.
§Parental primary language and number of other children in the home were examined as covariates in the adjusted partial correlation analyses.
¶$P < .05$.
**$P < .10$.
††$P < .01$.
‡‡None of the covariates was examined in the unadjusted correlation analyses.

Aim 3: Anticipatory Guidance Received at Well-Child Visits

Pediatricians were most likely to discuss feeding (78.4% at 1 month; 60.3% at 6 months) and infant weight (69.7 at 1 month; 47.2% at 6 months) with parents during well-child visits in the first 6 months. In contrast, they were least likely to discuss learning to talk (8.5% at 1 month; 19.7% at 6 months), infant learning (11.7% at 1 month; 20.9% at 6 months), or brain growth (23.2% at 1 month; 23.7% at 6 months; Table I). Yet, almost all parents (99.0% at 1 month; 99.7% at 6 months) did not desire additional information from their pediatricians.

Discussion

Well-child visits provide a universal touchpoint to support socioeconomically disadvantaged parents who are often underserved and difficult to reach.[7] The present study provides insights into the malleable factors fostering positive caregiving behaviors that will allow pediatric practitioners to

Table III. Mediation analyses testing the indirect effect of baseline knowledge on the relations between education and caregiving behaviors at 9 months

	Total effect (path *c*)			Education on knowledge (path *a*)			Knowledge on caregiving (path *b*)			Direct effect (path *c'*)			Indirect effect (*ab* path)			
NCAST caregiving behaviors at 9 months	β	B	SE	β	B	SE	β	B	SE	β	B	SE	β	B	SE	95% CIs
Adjusted mediation analyses*																
SPEAK knowledge of infancy (birth-12 months) at baseline																
Overall quality of caregiving behaviors	0.28†	0.66†	0.18	0.32†	0.82†	0.20	0.12	0.11	0.07	0.25‡	0.57‡	0.19	0.04	0.09	0.07	−0.016 to 0.263
Sensitivity to cues	0.31†	0.20†	0.05	0.32†	0.82†	0.20	0.10	0.03	0.02	0.28†	0.18†	0.05	0.03	0.02	0.02	−0.011 to 0.065
Response to distress	0.07	0.08	0.09	0.32†	0.82†	0.20	−0.10	−0.04	0.03	0.11	0.12	0.09	−0.03	−0.03	0.03	−0.103 to 0.020
Social-emotional growth fostering	0.24‡	0.16‡	0.05	0.32†	0.82†	0.20	0.12	0.03	0.02	0.20§	0.13§	0.06	0.04	0.03	0.03	−0.007 to 0.080
Cognitive growth fostering	0.17§	0.21§	0.10	0.32†	0.82†	0.20	0.18§	0.09§	0.04	0.11	0.14	0.11	0.06	0.07	0.04	0.009 to 0.168
SPEAK knowledge of early childhood (birth-5 years) at baseline																
Overall quality of caregiving behaviors	0.28†	0.66†	0.18	0.24‡	0.52‡	0.17	0.10	0.10	0.08	0.26‡	0.60‡	0.19	0.02	0.05	0.05	−0.027 to 0.174
Sensitivity to cues	0.31†	0.20†	0.05	0.24‡	0.52‡	0.17	0.04	0.01	0.02	0.30†	0.19†	0.05	0.01	0.01	0.01	−0.016 to 0.039
Response to distress	0.07	0.08	0.09	0.24‡	0.52‡	0.17	−0.04	−0.02	0.04	0.09	0.09	0.09	−0.01	−0.01	0.02	−0.054 to 0.033
Social-emotional growth fostering	0.24‡	0.16‡	0.05	0.24‡	0.52‡	0.17	0.002	0.001	0.02	0.23‡	0.16‡	0.06	0.001	0.0003	0.01	−0.026 to 0.029
Cognitive growth fostering	0.17§	0.21§	0.10	0.24‡	0.52‡	0.17	0.18§	0.11§	0.05	0.12	0.16	0.10	0.04	0.06	0.03	0.006 to 0.138
Unadjusted mediation analyses¶																
SPEAK knowledge of infancy (birth-12 months) at baseline																
Overall quality of caregiving behaviors	0.28†	0.67†	0.17	0.28†	0.72†	0.19	0.11	0.10	0.07	0.26‡	0.59‡	0.18	0.03	0.07	0.06	−0.018 to 0.232
Sensitivity to cues	0.31†	0.20†	0.05	0.28†	0.72†	0.19	0.10	0.02	0.02	0.29†	0.19†	0.05	0.03	0.02	0.02	−0.009 to 0.059
Response to distress	0.05	0.07	0.08	0.28†	0.72†	0.19	−0.09	−0.04	0.03	0.09	0.09	0.08	−0.03	−0.03	0.03	−0.086 to 0.017
Social-emotional growth fostering	0.22‡	0.15‡	0.05	0.28†	0.72†	0.19	0.12	0.03	0.02	0.18§	0.12§	0.05	0.03	0.02	0.02	−0.007 to 0.067
Cognitive growth fostering	0.19§	0.25§	0.10	0.28†	0.72†	0.19	0.16§	0.08§	0.04	0.15	0.19	0.10	0.05	0.06	0.04	0.001 to 0.153
SPEAK knowledge of early childhood (birth-5 years) at baseline																
Overall quality of caregiving behaviors	0.28†	0.67†	0.17	0.24‡	0.51‡	0.16	0.09	0.10	0.08	0.27†	0.61†	0.17	0.02	0.05	0.05	−0.024 to 0.178
Sensitivity to cues	0.31†	0.20†	0.05	0.24‡	0.51‡	0.16	0.04	0.01	0.02	0.30†	0.20†	0.05	0.01	0.01	0.01	−0.018 to 0.037
Response to distress	0.05	0.07	0.08	0.24‡	0.51‡	0.16	−0.04	−0.02	0.04	0.07	0.08	0.08	−0.01	−0.01	0.02	−0.059 to 0.023
Social-emotional growth fostering	0.22‡	0.15‡	0.05	0.24‡	0.51‡	0.16	0.002	0.001	0.02	0.21‡	0.15‡	0.05	0.0004	0.0003	0.02	−0.028 to 0.028
Cognitive growth fostering	0.19§	0.25§	0.10	0.24‡	0.51‡	0.16	0.18§	0.11§	0.05	0.15	0.20	0.10	0.04	0.05	0.03	0.008 to 0.147

β, standardized coefficient; *B*, unstandardized coefficient.
Sample size for the mediation analyses: n = 171.
Indirect effect was statistically significant when the 95% CIs do not contain zero.
*Parental primary language and number of other children in the home were examined as covariates in the adjusted mediation analyses.
†$P < .001$.
‡$P < .01$.
§$P < .05$.
¶None of the covariates was examined in the unadjusted mediation analyses.

better support parents in enriching their infant's early learning milieu. Results show that parental knowledge at 1 week significantly mediates the relation between education and cognitive growth fostering at 9 months, suggesting that parents of low SES who have more knowledge about cognitive growth and language learning as early as the first week are more likely to provide more cognitive stimulations and language inputs for their infants in the first year. These findings highlight the importance of parental understanding of cognitive and language development from day 1 and the critical role early anticipatory guidance can play in positively shaping the developmental trajectory of young children from low SES backgrounds.

Specifically, the present study found substantial variation in knowledge and caregiving behaviors among socioeconomically disadvantaged parents. Many parents were unaware that social experiences and language stimulations during the first 6 months are critical in fostering infant brain growth and language learning. More than one-half of the sample had misconceptions about using screen time exposure to foster infant vocabulary learning. In contrast, parents generally recognized infant communication signals and more than one-half of them considered caregiving responsiveness essential for infant development. Nevertheless, similarities between first-time and veteran parents suggested that parents did not passively learn more about cognitive and language development, or engage in more socioemotional and cognitive growth fostering simply from previously having had a child. Findings indicated the importance of understanding parental baseline knowledge and the need to personalize delivery of anticipatory guidance to address the needs and maximize the strengths of the families from low SES backgrounds.

Consistent with the literature, the present study found that parents of low SES who had lower educational attainment were less knowledgeable about early cognitive and language development.[14,15] They were also less likely to attend to infant communicative cues, foster infant socioemotional growth, or provide cognitive stimulations. Research shows caregiving sensitivity, social and emotional growth fostering, and cognitive growth fostering in early childhood predict children's cognitive abilities, language skills, and socioemotional outcomes.[27] Thus, understanding the mechanism linking education and knowledge to caregiving behaviors is essential for addressing disparities in early language environments.

Moreover, the present study found that parents of low SES who knew more about cognitive and language development in the first week were more likely to foster their child's cognitive growth (eg, providing verbal guidance/explanations in teaching the child) at 9 months. Importantly, parental knowledge of cognitive and language development as early as the first week significantly mediated the impact of education on their behaviors fostering infant cognitive growth at 9 months, indicating that differences in knowledge contributed to variations in the early cognitive stimulations and language inputs among parents of low SES. These results reveal the importance of increasing parental knowledge about early cognitive and language development for enriching the language environments for socioeconomically disadvantaged young children.

Likewise, parents who better understood infant cognitive and language development at the first postpartum visit were also more likely to recognize infant cues as well as foster infant social skills and emotion regulation at 9 months. Findings indicated that increasing knowledge about infant cognitive and language development among parents of low SES as early as the first week helps to promote caregiving sensitivity and positive affectivity toward their infants in the first year. However, such parental knowledge did not mediate the impact of education on their sensitivity and social and emotional growth fostering. It is possible that the mechanism linking education to these aspects of caregiving behaviors is mediated by parental knowledge specific to infant socioemotional development.

Despite these findings regarding the importance of knowledge of cognitive and language development, anticipatory guidance in the first 6 months often focused on infant physical growth. We also found no evidence of parents requesting additional anticipatory guidance from their pediatricians. Together, these results highlight the importance of engaging all parents proactively in understanding their newborn's developmental milestones, cognitive growth, and language learning. In an effort to mitigate the impact of poverty on early childhood disparities, an evidence-based program embedded into pediatric clinics Reach Out and Read has demonstrated significant impacts on promoting parent-child reading activities and social interactions in early childhood.[28] Although the Reach Out and Read program traditionally starts at 6 months of age, there has been an increased effort to extend the program to the newborn visit and inform parents about the importance of responsive and language-rich interactions with their infants starting from birth.

The present study showed that parents who attended the well-child visits in the first 6 months were often the primary caregivers caring for their infants the majority of the time. Close to two-thirds of the sample had no additional support for childcare other than themselves (71.7% at 1 month; 65.5% at 6 months). These findings underscore the critical importance of opportunities for providing essential educational support to the primary caregivers of newborns from low SES backgrounds early on through well-child care. These findings also support the need for embedding educational opportunities focused on infant development trajectories into prenatal parenting.

Furthermore, the present study indicates a need to increase awareness among pediatricians and family practitioners about the importance of anticipatory guidance on early cognitive and language development. This information should be emphasized in pediatric residency education curricula. Given the variability in parental knowledge among socioeconomically disadvantaged families, findings revealed the need for pediatric healthcare professionals to better understand parental baseline knowledge of these topics in

routine clinical practice. Information gathered will allow pediatric healthcare professionals to tailor anticipatory guidance to the strengths and needs of the parents using a culturally sensitive and asset-based approach.[29]

Past research shows that interventions (eg, the Play and Learning Strategies and the 3Ts Home Visiting curriculum) effectively promote knowledge of early cognitive and language development as well as foster positive affectivity, cognitive stimulations, and language inputs among parents from low SES backgrounds.[9,14,15,30] The results of the present study suggest that providing early anticipatory guidance to promote parental knowledge about cognitive and language development starting at or before the first postpartum visit is critical in addressing disparities in early socioemotional and cognitive growth fostering.

Some limitations of this study should be noted. This study was correlational in design. Future experimental studies are necessary to examine the impact of changing parental knowledge on promoting positive caregiving behaviors among socioeconomically disadvantaged families. Education level was examined as a continuous variable in this study. Further studies might compare parents with different education levels instead. The present findings should be interpreted with caution as they might not be generalized to parents from all SES backgrounds.

In conclusion, the present study reveals that parental knowledge about infant cognitive and language development is one of the factors contributing to the disparities in early language inputs among socioeconomically disadvantaged households. This study sheds light on the importance of promoting parental knowledge from day 1 to foster parental caregiving sensitivity, cognitive stimulations, and language inputs during the first year of life. We highlight the need to inform pediatric professionals about disseminating anticipatory guidance on early cognitive and language development during infant well-child visits. We also suggest the need to incorporate a screening tool to better understand parental baseline knowledge to tailor anticipatory guidance to the family strengths and needs. ■

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