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How to Improve Language Development of Preschoolers in Home Care

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What is already known on this topic?

- *The home environment is important for the development of preschool children.*

What this study adds on this topic?

- *Excessive paternal screen usage should be evaluated in cases of preschoolers with expressive language problems.*
- *Low receptive language scores could be associated with the absence of social support in care giving for children in isolated home care.*

ABSTRACT

Background/Aim: The home environment is important for early childhood neurodevelopment. The objective of this cross-sectional survey was to research the association between family characteristics and language development in healthy preschoolers under isolated home care.

Methods: This cross-sectional study included 115 children aged 5-60 months in isolated home care. The preschool language scale (PLS) assessed the receptive and expressive language scores of children. The scores of PLS were graded into 3 levels: high for the top 20-30%, low for the bottom 20-30%, and moderate for the children in between.

Results: When the covariates including parental education, age of the enrolled child, gender, number of children, and household size were adjusted, multiple logistic regression analysis (Model 1) revealed that excessive paternal screen usage (≥4 hours) had elevated odds ratios for both low receptive and low expressive PLS than counterparts, whereas early initiation (<12 months of age) of book reading significantly declined low expressive PLS compared to late initiation of book reading. Preschoolers having grandparents' social support have a lower odds ratio for low receptive PLS than those having no support. Additionally, after controlling for covariates, all the predictors, including paternal heavy screen usage, late initiation of book reading, and absence of grandparent support (Model 2), increased risks for low expressive language level.

Conclusion: Poor language scores in a child might be the outcome of late initiation of book reading in a child, absence of the grandparents' social support for the mother in child-rearing, and excessive paternal television viewing.

Keywords: Early book reading, grandparents' support, paternal screen usage, language development

INTRODUCTION

The home environment, where young children spend most of their time, is primarily where children develop linguistic and social skills. Many preschool children in low-income families are cared for at home and lack nursery education. Child development in these conditions depends on the care given by the mother, with facilities available at home. Social support from relatives is expected to improve the quality of child care as well as the health and development of children.[1,2]

Most healthy preschool children in home care spend their time with screen exposure that might have adverse effects on their development.[3] Studies on children's home environments have focused on the importance of children's engagement with books, especially as part of parent–child reading routines, as crucial determinants of school success.[4-7] Daily reading by a parent to a child was reported to increase scores of receptive and expressive

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language in children belonging to lower socio-economic families.[8] However, few studies have been conducted in Turkey on language development in children.[9,10]

Studies that investigate family characteristics supporting language development might help in preparing a guide for specific developmental counseling for parents of children in isolated home care and who have inadequate income. Therefore, this survey aimed to investigate the association between family characteristics and language development in preschoolers under isolated home care. The results can be used in anticipatory guidance in the child care follow-up of preschool children in families with poor resources.

METHODS

Study Subjects

This cross-sectional study included children aged 5-60 months who applied to outpatient clinics in Hacettepe University Ihsan Dogramacı Children's Hospital.

Healthy growing children without any risk for developmental delay were enrolled for the study during a 6-month period. When enrolling mother–child pairs, employed mothers, mothers with reported postpartum depression or known substance abuse, children with neurobehavioral disorders or any other kind of disability and genetic disorders, low birth weight or prematurity, children of bilingual families, children attending any day-care center or kindergarten, a history of any hearing impairment, and abnormal results for Denver II test in child health supervision were excluded.

The study followed the principles outlined in the Declaration of Helsinki. Informed written consent was obtained from the parents of children. The study was approved by the Ethics Committee of Başkent University Institutional Review Board (Project no: KA20/40).

Study Design

Each parent completed a structured questionnaire which was a form developed by the researchers to collect demographic information including age and gender of enrolled children, parental age and education, number of children, average daily television and screen time of parents and children, availability of grandparents' support for child care, household size, and child's age of initiation into bookreading,. Then, an expert audiologist evaluated children by the Preschool Language Scale-4 (PLS-4) language scores.

The PLS is a comprehensive assessment of language development from the pre-verbal stage to early literacy. The PLS is a test administered individually to determine whether children have a language delay or disorder. It is a standardized test of auditory comprehension and expressive communication for children. The test is completed within 20-40 min. Each item is scored as 1 or 0, according to passing the item. Then, crude scores are converted to scores standardized for age.[11,12] PLS-4 and PLS-5 have been validated in Turkey.[13,14] We used the PLS-4 in our study.

Statistical Analysis

Data analysis was performed with Statistical Package for the Social Sciences (SPSS) version 22.0 (IBM SPSS Corp.; Armonk, NY, USA).

In both PLS-4 and PLS-5 for children, scores at the bottom 20-30% of the group are graded as low, scores at the top 20-30% as high, and scores in-between these 2 levels as moderate. Based on previous studies in Turkey[3], excess screen time was defined as $\geq$ 4 hours for parents and $\geq$2 hours for children. Age at initiation of book reading to a child is classified as early if it was before 12 months of age (early initiation of book reading; EIBR) and late if it was later (LIBR).

Data were expressed as mean, standard deviation (SD), and quartiles (Q1, median, Q3) of percentages. After determining the data normality (Shapiro–Wilk test), groups were compared using the Kruskal–Wallis test or the one-way analysis of variance (ANOVA), as appropriate. When a significant relationship was detected in ANOVA, post hoc analysis was performed using the Duncan multiple range test. Differences in rates of categorical variables were explored by the chi-square test and adjusted standardized residuals; and adjusted *P* values with the Bonferroni method were calculated to identify groups that showed a significant difference.

The logistic regression (Model 0) revealed the association between paternal excessive screen usage, EIBR, and grandparents' support with being in low-score groups of the PLS subscales. The associations between low-score groups of PLS subscales and the individual factors of paternal excessive screen usage, EIBR, and grandparents' support were analyzed separately with the multiple logistic regression Model 1 after controlling selected covariates [maternal and paternal education (<8 vs. $\geq$8 years), child's age, gender (male vs. female), number of children (single vs. multiple), and size of household (< 5 vs. $\geq$ 5 people)]. Multiple logistic regression Model 2 was used to analyze the correlation between the occurrence of low-PLS language level and the predictor variables including paternal excessive screen usage, EIBR, and grandparents' support, when selected covariates were controlled. Odds ratio (OR) and 95% CIs were calculated. *P* value < .05 denotes a significant association.

RESULTS

General Characteristics

During the study period, 145 children applied, and 115 healthy growing children having no underlying developmental delay and meeting the inclusion criteria were enrolled. The mean (SD) age of children was 25.2 (15.6) months, the maternal age was 29.8 (5.5) years, and paternal age was 33.4 (6.4) years. Among the children, 48.7% were <24 months and 42.6% were male. We found that 41.2% of mothers and 26.5% of fathers had a low level of education ($\leq$ 8 years). Half (50.4%) of the enrolled mother–child pairs were provided social support for childcare by grandparents (Table 1).

Median (Q1-Q3) screen time was 2 hours (1.4-4.0) for mothers, 3 hours (2.0-4.0) for fathers, and 1 hour (0.3-2.0) for enrolled children. Of all, 70.4% of mothers and 62.6% of

Table 1. Characteristics of Children According to Low-, Moderate-, and High-Score Groups of Receptive and Expressive Language Levels in the Preschool Language Scale

	Overall	Receptive Language Level				Expressive Language Level			
		Low Score	Moderate Score	High Score	*P*	Low Score	Moderate Score	High Score	*P*
Number of children	115	23	67	25		29	53	33	
Child's age, months**	24 (10-38)	38 (24-49)	25 (8-37)	15 (10-25)	.001	24 (10-38)	25 (13-41)	18 (12-36)	.571
Child's age < 24 months, %	48.7	21.7[a]	49.3[ab]	72.0[b]	.002	48.3	43.4	57.6	.441
Gender, male, %	42.6	43.5	41.8	44.0	.978	37.9	43.3	45.4	.826
Single child, %	45.2	30.4	43.3	64.0	.058	27.6[a]	43.4[ab]	63.6[b]	.016
Maternal age, years*	29.8 ± 5.5	28.4 ± 4.9	30.3 ± 5.5	29.5 ± 6.2	.355	28.7 ± 5.9	30.0 ± 5.3	30.3 ± 5.7	.454
Paternal age, years*	33.4 ± 6.4	32.1 ± 5.1	33.7 ± 6.5	33.8 ± 7.1	.549	32.3 ± 5.5	33.4 ± 6.8	34.3 ± 6.3	.464
Maternal education ≤8 years, %	41.2	47.8	41.8	41.2	.595	41.4	45.3	34.4	.613
Paternal education ≤8 years, %	26.5	34.8	28.4	13.0	.216	31	32.1	12.9	.129
Household size ≥ 5 members, %	19.5	13.0[ab]	26.9[a]	4.3[b]	.043	37.9[a]	18.9[a]	3.2[b]	.003
Grandparents' social support to the mother, %	50.4	21.7[a]	55.2[b]	64.0[b]	.007	34.5	50.9	63.6	.072
Maternal screen time, ≥ 4 hours, %	29.6	30.4	31.3	24.0	.786	27.6	34.0	24.2	.603
Paternal screen time ≥ 4 hours, %	37.4	56.5	35.8	24.0	.061	62.1[a]	30.2[b]	27.3[b]	.006
TV is always on, %	27.8	30.4	32.8	12.0	0.133	34.5	34.0	12.1	.058
Child's screen time ≥2 hours, %	37.4	47.8	35.8	32.0	.484	27.6	43.4	36.4	.364
Age at initiation of book reading to child < 12 mo, %	33.0	26.1	31.3	44.0	.378	10.3[a]	34.0[b]	51.5[b]	.003

*Mean ± SD.
**Median (quartile 1-quartile 3).
[a,b,c]Different letters denote significant differences between groups; $P < .05$.

fathers viewed the screen for less than 4 hours. Overall, 27.8% of families left the TV on when they were not watching. Of all children, 37.4% spent more than 2 hours a day watching a screen (Table 1). However, 55.4% of children < 24 months and 86.4% of children ≥ 24 months had more than 1 hour of screen time.

Median (Q1, Q3) scores for PLS-4 scales were 91 (88-98) for receptive and 93 (89-97) for expressive communication.

Language Scores and Child-Parent-Grandparent Characteristics

Language score groups had similar distributions of gender, parental age, and education. Children were older in the low-score group of PLS-4 receptive subscales ($P < .001$, Table 1). The PLS-4 receptive high-score group had lower rates for crowded families than the moderate-score groups ($P = .043$). The proportions of grandparents giving social support for child-rearing in the moderate- and high-score groups of PLS-4 receptive scales were higher than in the low-score group ($P = .007$). The frequencies of EIBR and children with excess screen time did not change statistically among groups of PLS-4 receptive scales. Although the frequency of fathers with excess screen time was found to be low in the high score groups of PLS-4 receptive scales, this didn't reach statistical significance ($P = .061$).

The high-score group of PLS-4 expressive subscales had low rates for crowded families ($P = .003$, Table 1). Moreover, there were more single children in this group than in the low-score group ($P = .016$). Paternal excess screen usage was detected more in the low-score group of PLS-4 receptive subscales than other groups ($P = .006$). Only one-tenth of parents in the PLS-4 expressive low-score group reported EIBR, which was found to be significantly lower than other groups ($P = .003$, Table 1).

The association between low language levels and predictor factors are given in Table 2. After controlling the factors of maternal and paternal education, age of the child, gender, number of children, and size of the household, it was detected that the risk of low receptive scores was 4.43 times more when parental heavy screen usage increased (95% CI, 1.46-13.43). However, it was 80% less with the presence of grandparents to support child care (95% CI, 0.06-0.67). There was no association between low receptive scores and EIBR. Model 2 revealed the same association.

Table 2. The Association of Paternal Screen Usage, Child's Age at İnitiation of Book Reading, and Grandparents' Support in Caregiving, with Receptive and Expressive Language Level, OR (95% CI)

	OR (95%CI)	*P*	AOR (95% CI)*	*P*	AOR (95% CI)**	*P*
Having low receptive language level (Receptive PLS-low)						
Paternal screen usage ≥ 4 versus < 4 hours	2.69 (1.06-6.83)	.038	4.43 (1.46-13.43)	.009	5.63 (1.64-19.31)	.006
EIBR versus LIBR	0.66 (0.24-1.84)	.430	0.39 (0.11-1.37)	.141	0.45 (0.11-1.89)	.279
Grandparent support versus no	0.20 (0.07-0.60)	.004	0.20 (0.06-0.67)	.010	0.16 (0.05-0.60)	.006
Being low expressive language level (expressive PLS-low)						
Paternal screen usage ≥ 4 hours versus < 4	3.99 (1.65-9.65)	0.002	4.01 (1.58-10.18)	.003	4.78 (1.68-13.64)	.003
EIBR versus LIBR	0.17 (0.05-0.60)	.006	0.16 (0.04-0.64)	.009	0.17 (0.04-0.73)	.018
Grandparents' support versus none	0.42 (0.17-1.00)	.050	0.39 (0.14-1.09)	.710	0.27 (0.09-0.86)	.026

EIBR, early initiation of book reading; LIBR, late initiation of book reading; PLS, preschool language scale; OR, odds ratio; AOR, adjusted odds ratio.
*Model 1: every item adjusted for maternal and paternal education, child's age, gender, number of children, and household size for multiple logistic regression.
**Model 2: multiple logistic regression analyzed the association of predictor parameters including paternal screen usage time, initiation of book reading, and grandparents' support with a low level of language scores after controlling maternal and paternal education, child's age, gender, number of children, and household size.

Multiple logistic regression analysis of maternal and paternal education, age of the child, gender, number of children, and household size revealed elevated odds of a child having a low expressive language level in cases with paternal excessive screen usage (OR: 4.01, 95%CI: 1.58-10.18) and decreased odds in cases with EIBR (OR:0.16, 95%CI: 0.04-0.64). Multiple logistic regression Model 2 predicting for low expressive language level indicated links with paternal heavy screen usage, LIBR, and absence of grandparent support (Table 2).

DISCUSSION

In the present study, the number of children, household size, paternal screen time, grandparents' social support, and EIBR influenced language scores.

Being a single child showed an advantage in expressive language scores in our study. A previous study reported that first-born boys of mothers with high educational attainment had the highest language scores among children 18-36 months of age.[15] Parents living in crowded homes are less responsive to their children than those living in less crowded homes.[16]

Household crowding could lead to reduced verbal responsiveness and communication with children, and negatively affect the early language development of children, as seen in our study.

The children in the PLS-4 receptive low- and moderate-score groups were found to be older. This indicates that home care alone is insufficient for the development of language skills in older children. Children need intensive and diverse input to develop language skills appropriately.

Unfortunately, only one-third of children were exposed to a book before 12 months of age in our study. Both parental screen usage and EIBR had an association with expressive language scores of children in our study. The explanation might be that fathers who are more focused on child-rearing practices most likely read a book to their children and spend less time on-screen usage. After controlling confounding factors, EIBR decreased the ratios of low expressive language scores by 81%. The American Academy of Pediatrics formally emphasized counseling on shared reading from birth.[17] Parent–child interactions with book reading are important preschool activities that support children's language, cognitive skills, and further literacy acquisition.[18,19] Positive effects of reading books to children on their receptive and expressive language development consolidate the links between speech and grammar skills.[20] Senechal et al.[21] reported that children had better literacy skills at school age when their parents started reading to them as infants at 4 months of age. Murray et al.[22] showed that reading books had a positive association with the score of cognitive development in 9-month-old infants.

In our study, daily screen time was ≥ 2 hours for 37.4% of children. Previously, this rate was 65.2% for preschool children.[3] This shows a decline in heavy media exposure for children over time. The American Academy of Pediatrics recommends limiting children's total media time and co-viewing high-quality programming.[23] The recommended limit for screen use is just 1 hour a day for preschool children, ages 2-5. However, this is valid for only 13.6% of children in the present study. In contrast, Khan et al.[24] reported that young children's exposure to screen time is inversely related to the frequency with which their parents read with them. This might be explained by differences in what, how, and for how long the child watches media. In this study, we did not analyze the characteristics of media usage.

In our study, grandparents' support had positive effects on the language development of grandchildren; the percentage of grandparents' social support available for child-rearing was higher in the moderate- and high-score groups of PLS-4 receptive scales than the low-score group. Similarly, previous studies reported that grandparents' involvement as caregivers in their grandchildren's learning was associated with higher levels of socioemotional, behavioral, cognitive, and vocabulary development because they were talked to more frequently.[25-27] As a result, grandparents' social support for a mother in child-rearing practices might contribute to language development in a child cared for at home.

Our study had some limitations and strengths. We had a limited number of cases. However, we did not enroll cases with underlying risk for developmental delay. Due to the cross-sectional design, we could not determine the cause and effect in this study. Cases with reported maternal depression or substance abuse were not included, though undiagnosed cases might have been. Our selection of samples was the strength of the study. Given enrollment of unoccupied mothers and healthy growing children neither attending kindergarten nor having developmental risk factors,[28] it was be possible to examine only the effect of isolated home care on language development in children under 5 years. In our study, several family characteristics were examined at the same time. For the first time, grandparents' status, paternal screen exposure, and initial age for book reading to a child were investigated at the same time. We could not change the risk factors, including low parental education or crowded family. Close follow-up is necessary to mitigate the negative impact. However, the positive effect of low paternal screen time and grandparents' social support, which is cost-free, could be easily managed in anticipatory guidance for unoccupied mothers and their children in isolated home care.

CONCLUSION

The proportion of parents who initiated book reading to an infant was very low. Children with high expressive communication language levels more frequently had fathers who limited screen usage and initiated early book reading. Grandparents' social support for the mother in child-rearing practices has been shown to be related to the receptive communication language level. Social support should be taken into consideration to improve language development in low-income families, and reformative strategies should also involve fathers and grandparents.

Ethical Committee Approval: Ethical committee approval was received from the institutional review board of Başkent University (KA20/40).

Informed Consent: Written informed consent was obtained from all participants who participated in this study.

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