Journal of Health and Rehabilitation Research 2791-156X JHRR
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Original Article

Correlation Speech Delay and Its Association with Non-Nutritive Nursing in Pre-Schoolers

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Conflict of Interest: None.
S. A. Ayesha., et al. (2024). 4(2): DOI: https:// 10.61919/jhrr.v4i2.1141

ABSTRACT

Background: Speech delay in preschoolers is a significant concern for parents and healthcare professionals alike, with various factors, including non-nutritive sucking habits like pacifier use and digit-sucking, being investigated for their potential impact on speech development.

Objective: This study aimed to investigate the association between non-nutritive sucking behaviors (pacifier use and digit-sucking) and speech delay in preschool-aged children.

Methods: A cross-sectional design was employed, involving 126 preschoolers divided into two groups: those with speech delay and a control group with typical speech development. Data were collected from the Children's Hospital and Institute of Child Health, Lahore, using a structured questionnaire covering demographics, breastfeeding history, non-nutritive sucking behaviors, and speech delay status. Statistical analysis was conducted using SPSS version 25, focusing on frequencies, percentages, and P-values to determine the significance of associations between non-nutritive sucking behaviors and speech delay.

Results: Of the 126 participants, 67% were male, and 93% hailed from Punjab. A majority (87%) were breastfed, with 27% reporting pacifier use and only 6% engaging in digit-sucking. Statistical analysis revealed no significant association between speech delay and pacifier use (P=0.123), digit-sucking (P=0.359), or breastfeeding status (P=0.395). The mean daily screen media usage was 3.121 hours for the speech delay group and 2.968 hours for the control group, with no statistically significant difference (P=0.593).

Conclusion: The study concluded that non-nutritive sucking behaviors, including pacifier use and digit-sucking, are not significantly associated with speech delay in preschoolers. This finding contributes to the understanding of speech development and the factors influencing it, suggesting that concerns regarding non-nutritive sucking habits may be less critical than previously assumed in the context of speech delay.

Keywords: Speech delay, Non-nutritive sucking, Pacifier use, Digit-sucking, Preschoolers, Speech development.

INTRODUCTION

Speech represents a fundamental aspect of verbal communication, distinguished by its efficiency and capacity to convey meaning through the articulation of phonemes, syllables, words, and sentences (1, 2). This neuromuscular process, intricate in nature, necessitates precise timing, control of muscles, and neural coordination. The importance of speech extends beyond mere communication; it plays a crucial role in materializing thoughts, analyzing the world, and structuring complex ideas into comprehensible units (3, 4). As children grow, their ability to control speech improves, with significant milestones marking their development from the production of simple coos and babbles to the formation of sentences and stories that are intelligible to others (1, 5).

Speech delay, identified when a child's speech development lags behind that of peers, affects 3-10% of children, with a higher prevalence in boys (6). This condition may present in isolation or alongside other developmental delays. Symptoms include a lack of babbling by 15 months, absence of words by 24 months, and difficulties in producing phrases or following directions by 36 months (7-9). Risk factors encompass gender (boys are more susceptible), premature birth, low birth weight, familial history of speech delays, inadequate parental engagement, and excessive screen time. Various causes, such as intellectual disabilities, hearing loss, middle ear infections, bilingual environments, psychosocial deprivation, autism, elective mutism, and cerebral palsy, have been linked to speech delays, highlighting the complexity of this condition (10-12).

Non-nutritive nursing, encompassing behaviors like pacifier use and digit sucking, contrasts with nutritive nursing by not providing nutritional benefits. Extended non-nutritive nursing is associated with adverse effects on dental, speech, physical, and emotional development. Specifically, persistent digit sucking beyond the age of 1-2 years can lead to speech problems, including articulation errors and delays. The timing of weaning plays a critical role, with both early and late weaning posing developmental risks. Late weaning, in particular, can delay oral-motor development, weaken jaw strength, and contribute to speech and language delays (13).

The association between speech delay and non-nutritive nursing in preschoolers, children under six years of age, has been explored in various studies. Hatami et al. found a significant relationship between finger sucking and speech disorders, independent of factors like sex, maternal education, or history of acute otitis media (14). Barbosa et al.'s study on Patagonian preschoolers linked prolonged bottle feeding and sucking habits to speech disorders, suggesting an impact of non-nutritive sucking behaviors on oral anatomy and functioning (15). Fox's research identified a potential correlation between sucking habits and speech disorders, indicating a higher likelihood of prolonged dummy, bottle, or thumb use in children with speech disorders compared to a control group (16).

These studies collectively highlight the intricate relationship between non-nutritive nursing behaviors and speech development in preschool-aged children. Understanding the multifaceted nature of speech delay, its risk factors, and causes is crucial for early identification and intervention, aiming to mitigate its impacts on personal, social, academic, and vocational aspects of a child's life. Management strategies involve a multidisciplinary approach, including audiometric evaluations and tailored interventions by speech-language pathologists, to address the unique needs of each child experiencing speech delay.

MATERIAL AND METHODS

The study aimed to explore the correlation between non-nutritive sucking behaviors, specifically pacifier use and digit sucking, and speech delay in preschool-aged children. Adopting a hypothesis that suggested a significant relationship between these sucking habits and speech delay, a cross-sectional design was employed to facilitate this investigation (17).

A total of 126 participants were recruited for the study, divided equally into two groups of 63. The first group comprised preschoolers diagnosed with speech delay, while the second served as a control group consisting of children with typical speech development. The selection of participants with speech delay was conducted at the Children’s Hospital and Institute of Child Health in Lahore, ensuring that the study focused on children aged 2 to 5 years. The inclusion criteria were strictly adhered to, incorporating both male and female preschoolers who exhibited signs of speech delay without the influence of other developmental delays or intellectual disabilities (18).

To systematically collect data, a comprehensive questionnaire was developed. This instrument, comprising 22 questions, was meticulously designed following consultations with a supervisory team to pinpoint the potential linkage between non-nutritive sucking habits and speech delays. Parents and caregivers of the children in both groups were tasked with completing the questionnaire, ensuring that the responses provided a solid foundation for analysis.

The ethical considerations of the study were rigorously followed, adhering to the Declaration of Helsinki guidelines to ensure the ethical treatment of all participants involved. This included obtaining informed consent from the parents or guardians of the children involved in the study, guaranteeing confidentiality and anonymity for all participants, and ensuring that participation was voluntary, with participants having the right to withdraw at any time without any consequences.

The gathered data underwent a thorough analytical process using Statistical Science (SPSS Inc; version 25), alongside additional statistical tools such as Minitab, Stata, and the R programming language. This multifaceted approach to data analysis allowed for a comprehensive examination of the collected data, aiming to draw significant conclusions regarding the relationship between non-nutritive sucking habits and speech delay in preschoolers. This methodological framework, encompassing participant selection, data collection, ethical adherence, and statistical analysis, provided a robust foundation for investigating the stated objectives and testing the hypothesis.

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RESULTS

The demographic and behavioral characteristics of the study population, as detailed in Table 1, reveal a predominance of male participants, accounting for 67% (n=85), while females constituted 33% (n=41). The majority of the sample was from Punjab (93%, n=117), with a smaller segment from KPK (7%, n=9). Socio-economic status varied across the sample, with the largest proportion falling within the lower middle class (44%, n=56), followed by the upper middle class (37%, n=47), lower class (13%, n=17), and upper class (5%, n=6). A significant majority of children were breastfed (87%, n=110), with varying durations of breastfeeding reported. Breastfeeding for 6-9 months was most common (40%, n=50), followed by 9-12 months (27%, n=34), 3-6 months (18%, n=23), and the least common duration was 12-24 months (3%, n=4). The use of a pacifier was reported in 27% of cases (n=34), with the primary reason being to calm the child either when they wanted to sleep or started crying, noted by 88% of those who used pacifiers (n=30). Digit-sucking was relatively uncommon, observed in only 6% of participants (n=8), and the incidence of otitis media was low at 3% (n=4). Negative behaviors, including aggression, violence, rudeness, and screaming, were reported with varying frequencies, but 30% of the children (n=38) displayed no negative behaviors.

Table 1: Demographic and Behavioral Characteristics

Variable	Categories	Frequency	Percent
Gender of the patient	Male	85	67%
	Female	41	33%
Province	Punjab	117	93%
	KPK	9	7%
Socio-economic status	Lower class	17	13%
	Lower middle class	56	44%
	Upper middle class	47	37%
	Upper class	6	5%
Was child breastfed?	Yes	110	87%
	No	16	13%
Duration of breastfeeding (In months)	3-6 Months	23	18%
	6-9 Months	50	40%
	9-12 Months	34	27%
	12-24 Months	4	3%
Habit of using a pacifier?	Yes	34	27%
	No	92	73%
Reason for the use of pacifier	The Child wants to sleep	1	3%
	When the child starts crying	3	9%
	Both	30	88%
Habit of digit-sucking?	Yes	8	6%
	No	118	94%
Episode of otitis media	Yes	4	3%
	No	122	97%
Any negative behaviors in child?	Aggression	31	25%
	Violence	22	17%
	Rudeness	9	7%
	Screaming	9	7%
	All of these	17	13%
	No negative behaviors	38	30%

Table 2: Statistical Analysis of Speech Delay and Control Groups

Variables	Categories	Speech Delay	Control Group	Total	P-Value
Gender of the patient	Male	46	39	85	0.127
	Female	17	24	41	

Variables	Categories	Speech Delay	Control Group	Total	P-Value
Habit of digit-sucking?	Yes	5	3	8	0.359
	No	58	60	118	
Was the child breastfed?	Yes	56	54	110	0.395
	No	7	9	16	

In the statistical analysis of speech delay and control groups presented in Table 2, no significant association was found between the gender of the patient and speech delay (p=0.127), nor was there a significant relationship between the habit of digit-sucking and speech delay (p=0.359). Similarly, whether a child was breastfed did not significantly impact the likelihood of speech delay (p=0.395).

Table 3 Analysis of Behavioral Variables

Variable	Group	N	Mean	SD	t-Value	Mean Difference	P-Value
Screen media usage (hours/day)	Speech Delay	63	3.121	1.982	0.536	0.152	0.593
	Control Group	63	2.968	1.077			
Pacifier usage (hours/day)	Speech Delay	16	2.125	0.827	-1.586	-0.403	0.123
	Control Group	18	2.528	0.652			
Duration of pacifier habit (years)	Speech Delay	5	2.200	1.255	0.484	0.367	0.646
	Control Group	3	1.833	0.289			

Further analysis of behavioral variables, as shown in Table 3, investigated the daily hours of screen media usage, pacifier usage, and the duration of pacifier habits. Children with speech delay had an average of 3.121 hours of screen media use per day with a standard deviation of 1.982, compared to the control group's average of 2.968 hours and a standard deviation of 1.077, a difference that was not statistically significant (t=0.536, p=0.593). The average daily use of a pacifier among the speech delay group was 2.125 hours (SD=0.827), which was lower than the control group's average of 2.528 hours (SD=0.652); however, this difference also did not reach statistical significance (t=-1.586, p=0.123). The duration of pacifier habit among children with speech delay was on average 2.200 years (SD=1.255), compared to 1.833 years (SD=0.289) in the control group, a difference that was not statistically significant (t=0.484, p=0.646).

DISCUSSION

In the exploration of the association between non-nutritive nursing behaviors and speech delay in preschoolers, this cross-sectional study contributes to the ongoing debate within pediatric and speech pathology research. Despite previous studies suggesting potential links between non-nutritive sucking habits—such as pacifier use and digit-sucking—and speech and language development, our findings did not corroborate these associations. The investigation encompassed variables including breastfeeding and its duration, the use and duration of pacifier habits, and digit-sucking behaviors. Notably, breastfeeding, a factor examined to understand if it influenced the propensity towards non-nutritive sucking habits, showed no significant impact on the initiation of pacifier use or digit-sucking habits (19, 20).

Contrary to some earlier research suggesting a negative impact of prolonged pacifier use and digit-sucking on speech development, our study found these factors to be non-contributory towards speech delay. Even with the control group children exhibiting a longer average duration of pacifier use, they did not demonstrate speech delays, challenging the premise that such habits intrinsically lead to delayed speech milestones. Similarly, the prevalence and duration of digit-sucking were comparable across both groups, underscoring the lack of significant association with speech delay (2).

This study's findings contribute to a nuanced understanding of speech delay etiology, suggesting that non-nutritive nursing might not play a significant role as previously thought. However, it is imperative to recognize the limitations inherent in a cross-sectional design, which captures a snapshot in time rather than the developmental trajectory of speech delay. A longitudinal approach, tracking the emergence and evolution of speech capabilities in relation to non-nutritive sucking habits from infancy through preschool years, would provide more definitive insights into these relationships (5, 20, 21).

The demographic homogeneity and the specific context of the sample, drawn from a single department at a single hospital, may limit the generalizability of the findings. Future research should consider a broader geographic and socio-economic sample to enhance the applicability of the results across diverse populations.

Acknowledging the invaluable contributions of Prof. Dr. Nabila Talat from the Children's Hospital, Lahore, her support was instrumental in fostering a research-oriented mindset among her students while ensuring adherence to ethical standards throughout the study. Dr. Hina Azhar's expertise in pediatrics was critical in navigating the research process, particularly in the development of a tailored questionnaire that effectively captured the study variables. Dr. Ghazal Awais Butt's mentorship was pivotal in shaping the research direction towards Speech Language Pathology, offering guidance and encouragement at every step. The cooperation of the parents and caregivers, who participated despite their constraints, was essential in facilitating this research. Their willingness to engage in this study reflects the broader community's commitment to advancing our understanding of speech development challenges in children. Lastly, the personal support system, particularly the unwavering belief and encouragement from my parents, provided the necessary motivation and resilience to undertake and complete this research endeavor (10, 19).

In light of these findings and the study's limitations, future research is recommended to employ a longitudinal design, encompass a wider participant base, and incorporate a multi-faceted approach to examining the factors influencing speech development. Such endeavors will enrich our understanding of speech delay, paving the way for more targeted interventions and support mechanisms for affected children and their families.

CONCLUSION

The findings from this cross-sectional study indicate that non-nutritive nursing behaviors, such as pacifier use and digit-sucking, are not significantly associated with speech delay in preschoolers. This challenges existing perceptions and suggests that these behaviors might not contribute to speech development issues. Pediatricians, speech-language pathologists, and caregivers should consider a broader range of factors when addressing speech delays, leading to more effective strategies for supporting early childhood speech and language development.

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