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Assessment of Vocabulary Development in Preschool Children Using Peabody Picture Vocabulary Test-4

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ABSTRACT

Background: Receptive vocabulary plays a crucial role in early language development and literacy skills. The Peabody Picture Vocabulary Test-4 (PPVT-4) is a standardized tool for assessing receptive vocabulary, but its applicability in non-native English-speaking populations, such as Pakistani preschoolers, remains underexplored. **Objective:** To assess receptive English vocabulary development in preschool children aged 3–5 years using the PPVT-4 and determine whether their vocabulary skills align with age expectations. **Methods:** A cross-sectional study was conducted on 278 preschool children from four private schools in Lahore, Pakistan. The PPVT-4 was administered individually to assess receptive vocabulary. Data were analyzed using SPSS 25.0, with descriptive statistics, independent t-tests, and chi-square tests applied. $P < 0.05$ was considered statistically significant. **Results:** The mean PPVT-4 score for the 36–48 months group was 80.1 ± 10.2, while for the 49–60 months group, it was 90.3 ± 10.5 ($p < 0.001$). Only 33.5% of older children had age-appropriate vocabulary, compared to 79.5% of younger children. Gender differences were not significant ($p = 0.288$). **Conclusion:** Preschool children exhibited significant delays in receptive English vocabulary, particularly in older age groups. Early language interventions are recommended to improve vocabulary acquisition in bilingual settings.

INTRODUCTION

Vocabulary development is a crucial aspect of early childhood language acquisition and is commonly associated with a child's ability to comprehend and use words effectively (1). Vocabulary can be classified into two major components: expressive vocabulary, which refers to the words a child can produce, and receptive vocabulary, which pertains to words a child understands when spoken to them (2). The ability to develop strong vocabulary skills is essential for communication and future literacy success, as children with well-developed vocabulary skills are better equipped to negotiate their communicative acts, ask questions, seek information, and engage in social interactions (3).

A child's vocabulary development is significantly influenced by environmental factors, including parental interaction, school language exposure, and socio-cultural settings (4). Research indicates that children who are exposed to rich language environments, where parents and teachers frequently engage them in conversations, storytelling, and interactive reading, develop stronger vocabulary skills compared to children with limited language exposure (5,6). Additionally, peer interactions also play a role in vocabulary expansion, as children learn new words through social interactions with age-matched peers (7).

The Peabody Picture Vocabulary Test (PPVT) is a widely used standardized tool for assessing receptive

vocabulary across different age groups (8). It evaluates an individual's ability to comprehend spoken words by asking them to identify images corresponding to words spoken by the examiner. The PPVT has undergone multiple revisions since its introduction by Lloyd M. Dunn in 1959, with the most recent edition, PPVT-4, published in 2007 (9). The PPVT-4 consists of 228 items grouped into 19 sets, each containing 12 words of increasing difficulty (10). It is particularly useful for assessing early language development, diagnosing language delays, and comparing vocabulary growth across different linguistic backgrounds (11).

While the PPVT-4 is an effective tool for measuring receptive English vocabulary, its applicability in non-native English-speaking countries, such as Pakistan, has not been widely studied (12). English is widely used in educational settings in Pakistan, yet Urdu and regional languages dominate children's daily interactions, potentially impacting their English vocabulary development (13). Previous research suggests that bilingual children may demonstrate delays in one language due to the simultaneous acquisition of multiple languages (14). However, there is limited data on whether Pakistani preschoolers exhibit age-appropriate receptive English vocabulary skills as assessed by PPVT-4.

This study aims to assess the receptive English vocabulary development of preschool children in Pakistan using the Peabody Picture Vocabulary Test-4 (PPVT-4). By evaluating preschoolers' vocabulary levels, this study seeks to identify whether their receptive vocabulary aligns with international norms and whether environmental factors influence their language acquisition. The findings could have important implications for early childhood education policies and language development interventions in bilingual and multilingual contexts.

MATERIALS AND METHODS

This cross-sectional study was conducted over a period of six months, from October 2022 to March 2023, in multiple private schools in Lahore, Pakistan. The study aimed to assess the receptive English vocabulary development of preschool children aged 3 to 5 years using the Peabody Picture Vocabulary Test-4 (PPVT-4). A total of 278 children participated in the study, and a convenient sampling technique was used for participant selection. The inclusion criteria consisted of preschool children aged between 36 to 60 months who were enrolled in private schools with English as part of their curriculum. Children with known speech or hearing impairments, cognitive disabilities, or diagnosed neurodevelopmental disorders were excluded to ensure the reliability of results.

Data collection was conducted in four private schools: EFA School, Lahore Grammar School, Dar-e-Arqam School, and American Lycetuff School. Permission was obtained from school administrations prior to recruitment, and parents provided informed written consent for their children's participation. Ethical approval was granted by the Institutional Review Board (IRB), and the study adhered to the principles outlined in the Declaration of Helsinki for research involving human participants (15).

The PPVT-4 was used as the primary assessment tool to evaluate receptive vocabulary skills. This standardized test comprises 228 items, categorized into 19 sets with 12 items per set, progressively increasing in complexity (16). Each item consists of four full-color pictures, and children were required to select the image that best matched the word spoken by the examiner. The test was administered in a quiet and distraction-free classroom environment, ensuring optimal focus and response accuracy. Following the PPVT-4 manual's age-based starting point, participants were presented with an age-appropriate set of words. If a child made two or more errors in a set, an easier set was introduced until a basal set was established (17). Testing continued until the ceiling set was reached, defined as the set where the participant provided seven or more incorrect responses.

The assessment was conducted individually by trained speech-language pathologists, ensuring standardized administration and minimizing examiner bias. All sessions were conducted in English, with no prompts or translations provided to maintain the integrity of the test's standardized format. Each testing session lasted 5 to 20 minutes per child, depending on their performance and response time (18).

Data was analyzed using SPSS version 25.0 (IBM Corp., Armonk, NY, USA). Descriptive statistics, including frequency distributions, means, and standard deviations, were used to summarize the demographic characteristics of participants. The Chi-square test was applied to compare categorical variables, while an independent samples t-test was used to assess differences in receptive vocabulary scores between different age groups and genders. A p-value of <0.05 was considered statistically significant.

To ensure the reliability of findings, the results obtained were cross-verified by two independent assessors, and any discrepancies were resolved through discussion. Additionally, inter-rater reliability was assessed to confirm consistency in test administration and scoring. The study was conducted following ethical research guidelines, with participants' privacy and confidentiality strictly maintained throughout the research process.

RESULTS

A total of 278 preschool children participated in this study, with 108 children in the 36-48 months age group

(38.8%) and 170 children in the 49-60 months age group (61.2%). The gender distribution included 151 males (54.3%) and 127 females (45.7%).

Age-Based Differences in PPVT-4 Scores

The mean PPVT-4 score for children aged 36-48 months was lower than that of children aged 49-60 months, reflecting expected trends in vocabulary development. However, statistical analysis revealed that age differences in PPVT-4 scores were highly significant ($p < 0.001$), indicating that older children performed significantly better than younger children.

Table 1

Descriptive Statistics for PPVT-4 Scores by Age Group

Age Group	Mean Score	Standard Deviation	Minimum Score	Maximum Score	p-value
36-48 months	80.1	10.2	60	105	<0.001
49-60 months	90.3	10.5	65	120	

These results confirm that receptive vocabulary improves with age, but the overall scores remain below expected norms when compared with international benchmarks.

Gender-Based Differences in PPVT-4 Scores

The analysis of PPVT-4 scores by gender indicated that females had slightly higher mean scores than males. However, this difference was not statistically significant ($p = 0.288$), suggesting that gender does not play a major role in receptive vocabulary development in this study sample.

Table 2

Descriptive Statistics for PPVT-4 Scores by Gender

Gender	Mean Score	Standard Deviation	Minimum Score	Maximum Score	p-value
Male	85.2	10.4	62	110	0.288
Female	87.1	9.8	64	115	

These findings align with prior research indicating minimal gender-based differences in early receptive vocabulary acquisition.

Age Equivalence Analysis

A key aspect of this study was to assess whether children's receptive vocabulary was age-appropriate. The results showed that only 33.5% of children aged 49-60 months demonstrated age-appropriate vocabulary, compared to 79.5% in the 36-48 months age group. This suggests that a significant proportion of older preschoolers were delayed in receptive vocabulary development.

Table 3

Age Equivalence Results

Age Group	Age Appropriate (n)	Age Inappropriate (n)	Percent Age Appropriate (%)	Total (n)	p-value
36-48 months	86	22	79.5%	108	<0.001
49-60 months	57	113	33.5%	170	

These results highlight a concerning delay in receptive vocabulary development, particularly among older preschool children. The findings emphasize the need for early intervention programs and enhanced English language exposure in preschool settings.

DISCUSSION

The findings of this study indicated that receptive vocabulary scores among preschool children in Pakistan were significantly lower than international norms. The results showed a statistically significant difference ($p < 0.001$) in PPVT-4 scores between younger and older preschoolers, with older children performing better. However, despite this expected age-related improvement, a substantial proportion of children, particularly in the 49–60-month age group, had vocabulary levels below age expectations. This aligns with prior research highlighting delays in English vocabulary acquisition among non-native English-speaking children in bilingual and multilingual environments (19). In comparison to studies conducted in Turkey and India, where preschoolers demonstrated stronger receptive vocabulary skills when immersed in English-dominant learning environments, Pakistani preschoolers exhibited a slower rate of English vocabulary development (20,21). These disparities may be attributed to differences in language exposure, curriculum emphasis on English, and sociolinguistic contexts across different regions.

Previous studies have emphasized the role of home language environment, parental education, and socioeconomic status in shaping vocabulary development in young children (22). In developed countries where English is the primary language of instruction from early childhood, children often have greater exposure to rich linguistic environments, interactive storytelling, and print-rich surroundings, all of which enhance receptive vocabulary skills (23). In contrast, in Pakistan, many preschoolers acquire Urdu or regional languages as their primary language and are introduced to English as a second language at a later stage (24). This discrepancy in early language exposure may explain the significant delays in English receptive vocabulary observed in this study. Additionally, the prevalence of rote memorization teaching methods in many Pakistani schools, rather than interactive and immersive language-learning approaches, may contribute to slower vocabulary development (25). The findings suggest that Pakistani children may require more structured and interactive English language instruction at an early age to enhance their receptive vocabulary.

The lack of significant gender differences in PPVT-4 scores ($p = 0.288$) aligns with previous research that

found minimal differences between male and female children in early vocabulary development (26). While some studies have reported that females tend to develop stronger verbal skills at an early age, the present findings did not indicate a substantial gender-based discrepancy in receptive vocabulary. This suggests that environmental factors, rather than biological differences, play a more prominent role in vocabulary acquisition (27).

One of the key strengths of this study was its use of a standardized and widely recognized vocabulary assessment tool (PPVT-4) to objectively measure receptive vocabulary among preschoolers. The study also included a relatively diverse sample from multiple private schools, enhancing the generalizability of findings within urban educational settings. However, several limitations should be considered. The study utilized a convenience sampling technique, which may introduce selection bias and limit the generalizability of findings to public school children or those from lower socioeconomic backgrounds.

Furthermore, socioeconomic status, parental education levels, and home language exposure were not controlled for in the analysis, despite their well-documented influence on vocabulary acquisition (28). Future studies should incorporate a more comprehensive analysis of these contributing factors to better understand the underlying causes of English vocabulary delays in Pakistani preschoolers.

The results of this study have important educational implications. Given that a significant proportion of children aged 49-60 months had age-inappropriate vocabulary, policymakers and educators should consider implementing structured early English vocabulary interventions in preschool curricula. Approaches such as interactive storytelling, phonics-based instruction, vocabulary enrichment activities, and parent-led reading programs could be effective in enhancing receptive language skills. Previous research has shown that exposure to print media, bilingual language support, and frequent conversational engagement can significantly improve receptive vocabulary in young learners (29). Schools should also focus on reducing reliance on rote learning and increasing exposure to contextual and interactive language-learning activities.

Future research should adopt longitudinal study designs to track vocabulary development over time and examine the long-term effects of early language interventions. Additionally, intervention-based studies assessing the effectiveness of various teaching methodologies, such as play-based learning or digital language applications, could provide further insights into how to optimize vocabulary acquisition in non-native English-speaking environments. Expanding research to include children from diverse linguistic backgrounds, rural settings, and different educational models will also help in forming more comprehensive educational strategies.

CONCLUSION

In conclusion, the study identified delays in receptive English vocabulary development among preschool children in Pakistan, particularly in older preschoolers. While vocabulary improved with age, many children did not achieve age-appropriate vocabulary levels, underscoring the need for early intervention programs. The findings highlight the importance of enriched language exposure, interactive teaching methods, and structured preschool language development programs to enhance early vocabulary acquisition. Future studies should aim to address socioeconomic and environmental factors, while policymakers should work towards reforming early childhood education to foster stronger language skills in bilingual learners.

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