

Language Development in Arabic-Speaking Children with Cochlear Implants: Evidence from a Saudi Context

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INTRODUCTION & AIM

- Language development in early childhood naturally occurs through exposure to a language-rich environment.
- Congenital sensorineural hearing loss (SNHL) disrupts this critical developmental pathway.
- Children implanted at 6 months achieved language scores 1.4 SD higher at age 5 than those implanted at 24 months (Ching et al., 2014).
- Arabic, a Semitic language, features complex morphology and syntax — posing unique learnability challenges for Cochlear Implant (CI) recipients.
- This study addresses a critical gap: evidence-based data on Arabic-speaking children with CIs in Saudi Arabia.

Objectives

1. Describe language ability profiles from basic auditory skills to complex sentence production in Arabic-speaking children with CIs.
2. Investigate the relationship between linguistic development and: age at implantation, duration of device use, and age at intervention onset.
3. Identify specific Arabic language domains presenting the greatest challenges for this clinical population.

METHOD

Design: Descriptive analytical cross-sectional study.
Setting: Medina, Saudi Arabia.
Participants: 78 Arabic-speaking children with cochlear implants (ages 1–5 years).
 • Gender: 55.13% Female | 44.87% Male
 • Age: 57.69% aged 5 years
Instrument: 28-item structured questionnaire (5-point Likert scale) across 3 domains:
 • Domain 1: Basic Linguistic & Auditory Skills
 • Domain 2: Comprehension & Expressive Abilities
 • Domain 3: Advanced Sentence Construction & Vocabulary
Informants: Parents (74.36% mothers) and Speech-Language Pathologists.
Reliability: Excellent — Overall Cronbach's $\alpha = .949$

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RESULTS & DISCUSSION

A clear rank-ordering of language skills was identified. Basic receptive skills were attained at high rates, while complex expressive and syntactic skills were significantly impaired.

HIGHEST PERFORMING SKILLS (Receptive/Basic):

- Recognizes personal belongings 93.59%
- Uses visual communication/facial expressions 90.77%
- Recognizes dangers (heights/fire) 90.00%
- Engages in physical play 90.00%
- Plays alongside others 90.00%
- Responds to name 88.97%

LOWEST PERFORMING SKILLS (Expressive/Syntactic):

- Produces 3–4 word utterances (age 3–3.6 yrs) 55.90%
- Understands complex questions (why/who/how many) 57.69%
- Produces 5–10 words (13–15 months post-CI) .. 64.62%
- Responds to yes/no questions 71.03%
- Understands spoken language 71.79%

Figure 1. Language Skills Achievement Rates Among Arabic-Speaking Children with Cochlear Implants (N = 78)

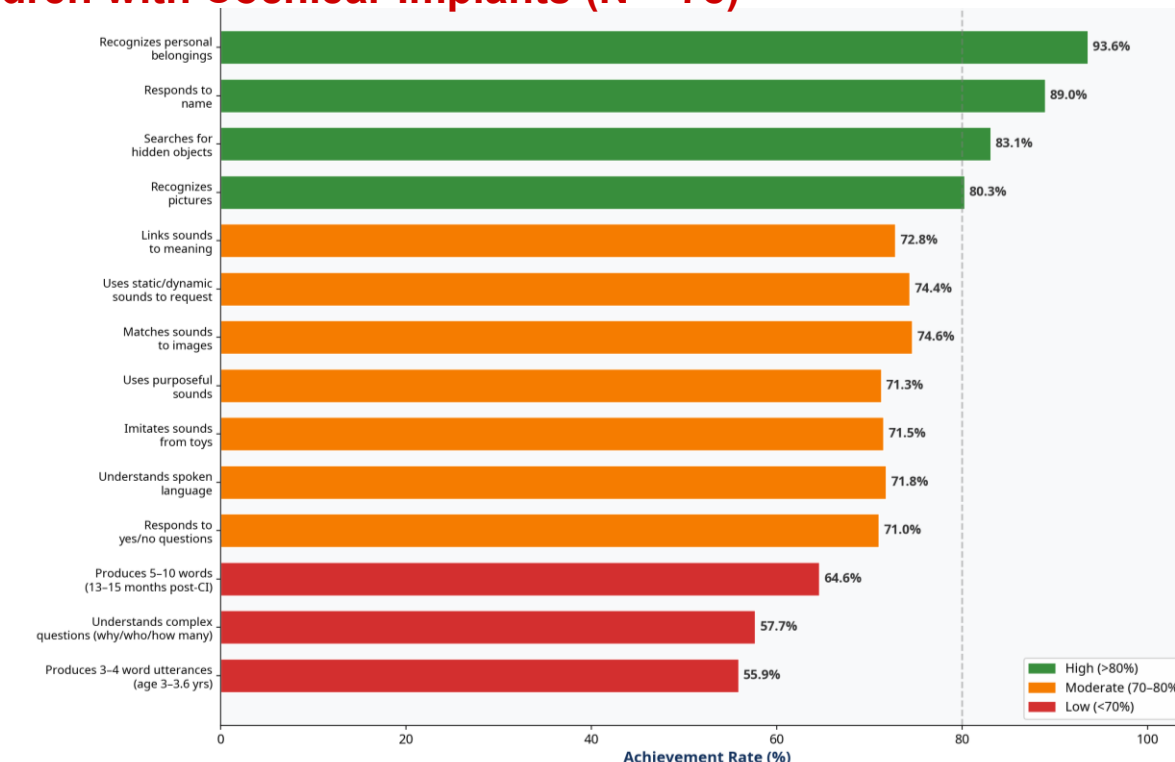
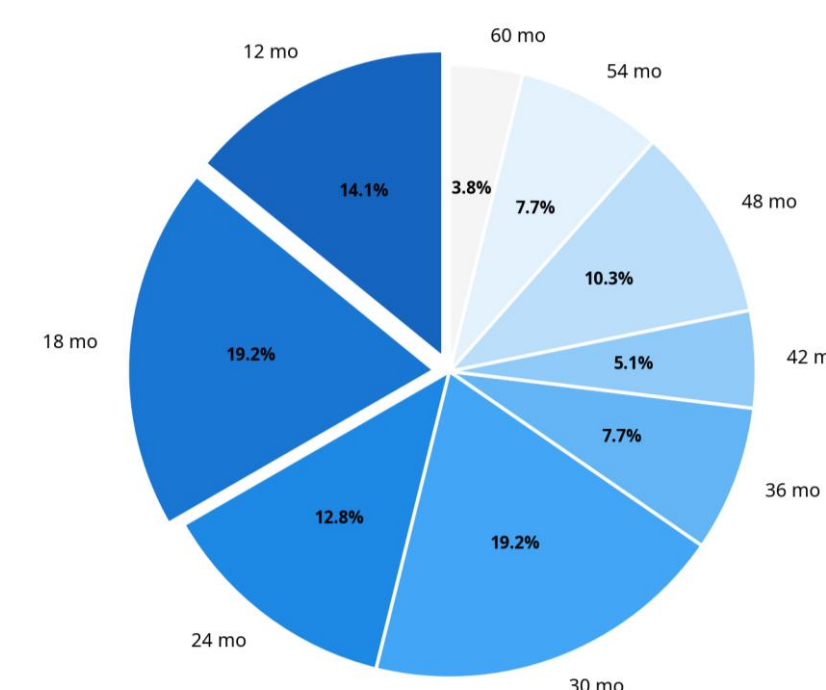


Figure 2. Distribution of Age at Cochlear Implantation Among Arabic-Speaking Children with Cochlear Implants (N = 78)



- Basic vs. Complex Skills: Children successfully developed foundational auditory and receptive skills, yet exhibited persistent delays in grammatical intricacies and complex sentence structures.
- Arabic Morphological Complexity: The root-and-pattern structure of Arabic places a high cognitive load on the developing auditory system when processing a degraded CI signal.
- Critical Period Alignment: Findings corroborate global literature emphasizing implantation within the first 3.5 years of neural plasticity.

Impact of Clinical

Age at Implantation:

- Younger age at implantation showed a trend toward significantly higher language outcomes.
- The largest group (19.23%) was implanted at 18 and 30 months respectively.

Duration of Device Use:

- Greater device experience correlated strongly with better overall language performance.
- 20.51% had 4 years of device use — the largest single group.

Early Language Intervention:

- Earlier onset of intervention was associated with higher linguistic profiles.
- 24.36% commenced intervention at 12 months of age.