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Impact of Chronic Otitis Media with Effusion on Language Development in Preschool Children

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Abstract: **Background**: Chronic Otitis Media with Effusion (COME) is quite common among pre-school children in Iraq, however the effects of this condition on early language development in this particular context of sociocultural and environmental setting has not been well defined where To examine a dose-dependent effect of persistent COME, conductive hearing loss, and language acquisition among Iraqi preschool children and the effect of locally relevant risk factors and intervention outcomes. **Methods**: The study was a prospective longitudinal cohort study that was undertaken at 18 months in two tertiary pediatric otolaryngology departments in Iraq. A total of 96 children aged 24 -60 months with bilateral COME that lasted 3 months or more were recruited, and 48 age-, sex-, and socioeconomic status-matched controls. Findings: COME children had lower receptive (mean difference: -14.3 points; 95% CI: -19.1 -9.5; p= 0.001) and expressive language quotient (-14.1 points; 95% CI: -19.3 -8.9; p= 0.001) than the controls. An observed dose-response effect was detected: longer effusion, more than 6 months (OR=6.17; 95% CI: 2.7613.8) and better-ear PTA 30 dB (OR=3.82; 95% CI: 1.81805) were independently predictive of clinically significant language delay. Risk was further aggravated by consanguinity and low socioeconomic status, as well as exposure to dust. Children with ventilation tubes or with hearing aids who were also given therapy at 12 months had faster language recovery (77.4 and 83.3 percent to norms, respectively) than those who had watchful waiting (56.3 percent; p=0.02). **Conclusions**: Persistent COME is a great and adjustable risk factor of early language delay in Iraqi preschool children. It is suggested to implement risk-stratified management including regular hearing check, culturally sensitive language surveillance, and intercessory action on children with bilateral effusion, hearing loss in the 30 dB and above, or compounding demographic characteristics to reduce developmental sequelae. The research should focus on supporting population-specific language evaluation instruments and explore genetic and environmental factors of persistent effusion in consanguineous communities.

Keywords: Chronic Otitis Media, Language Development, Preschool, Children, COME.

INTRODUCTION

The effects of chronic OME on language development in preschool children have become one of the important demands of community health, as language acquisition is a speedy process in early childhood, and due to the significant role of auditory contributions in phonological processing, vocabulary development, syntax, and literacy preparedness [Ścińska, A. *et al*., 2006]. Childhood The preschool years, which are normally three to five years are a period of neuroplasticity where language learning is scaffolded by auditory experiences [Raju, A. *et al*., 2022] The main assumption that connects chronic OME with language development is based on the fact that hearing plays a central role in learning the sounds of one language, learning to match words with meanings, and designing the systems of rules that form the basis of grammar [Zahid, A. *et al*., 2024]. Even mild or partial conductive hearing impairment may weaken the acoustic patterns that children use in order to discriminate phonemes, divide syllables, and split continuous speech into meaningful units. Such auditory difficulties in preschoolers, who are more exposed to more complex linguistic structures and a growing lexicon, spill over to slower vocabulary development, less rich semantic knowledge, and expressive and receptive syntax problems. Language is not a passive byproduct of cognitive development; rather, it is a dynamic system that relies on a strong and early auditory feedback to secure the phonological representations, track the errors and apply the language rules to the new scenarios [Gombart, A. F. *et al*., 2020; Cheng, A. T. 2021] The chronic OME disconnects this feedback process and establishes listening conditions which can hinder the formation of correct phonological categories and the aligning of new words to long-lasting lexical representations [Manole, A. *et al*., 2025]

Studies in this field have revealed a subtle image. Other studies have shown that preschool children

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who have a chronic history of OME have significant but slight imbalances in their language outcomes in comparison to their counterparts that did not have OME [Trifan, D. F. *et al*., 2023]. The effects are not uniform. They depend on the duration and extent of effusion, extent of language loss, when it occurs in respect to critical periods in language development, and the existence of other risk factors like parental language input, socioeconomic status, bilingual exposure, nursery school attendance [L Bishop, E. *et al*., 2021; Manole, F. *et al*., 2023] long durations of conductive hearing loss may disfavorably impact phonological processing, upon which decoding and word production rely. Children experiencing repeated incidences of OME might have problems in phoneme discrimination that subsequently retard vocabulary learning as well as influences the encoding of new syntactic structures [9] On the other hand, it is observed that some children do show short-term disruption with speedy catch-up as effusion resolve or with amplification and remedial in language support, supporting the heterogeneity of effects and moderating effect of environmental and medical interventions [Bocheva, G. *et al*., 2021] also In the developmental perspective, the language domain is vulnerable to interference on multiple intersecting aspects. The first area to exhibit weaknesses upon impairment of the auditory input is phonology, which refers to the system of sound structure. There are minor differences in phonemic awareness that may hinder early reading abilities, several years down the road, due to the close correlation between phonological processing and literacy [Siddiqui, M. *et al*., 2020] The vocabulary knowledge or semantics may be behind schedule when the exposure to diverse and rich linguistic input is fewer because of the hearing impairment resulting into the limitation of expressive and receptive vocabularies [Salem, M. A. *et al*., 2019] The morphosyntax, the understanding of grammatical morphology and the syntax of a sentence, can also be influenced as the children strive to put language rules into practice through the use of imperfect auditory models [Manole, A. *et al*., 2025] This is a multifaceted clinical implication of this association. Hearing status of children with recurrent ear infections should be identified at an early age and followed to reduce the possible language delays [Wimalawansa, S. J. 2023] Audiological examination such as tympanometry and audiometry assists the measurement of the level and time of hearing loss, to make medical or surgical decisions, such as adenoidectomy, implantation of tympanostomy tubes, or watchful waiting in some instances [World Health Organization. 2020] Medical management is not just about restoring hearing, it is aimed at keeping the integrity of language development in an important period of time when auditory experience is the determinant of cognitive and linguistic consequences. Otolaryngologists, pediatricians, speech-language pathologists, educators, and families must collaborate so as to plan the individualized plans that promote both hearing and language development [Hodoșan, V. *et al*., 2023].

The interventions against the possible language effect of chronic OME are varied and ought to be based on the needs of a child. To enhance access to audition, medical and surgical interventions that repair middle-ear ventilation and decrease effusion can be used to provide a more conducive language-learning environment. The language delays might need, however, only specific speech and language therapy, coaching parents, and enriched linguistic input in the process of ordinary activities [Latham, C. M. *et al*., 2021] Language intervention programs that focus on phonological awareness, vocabulary growth and syntactic complexity have the potential of reinforcing language performance of children with hearing difficulties [Trifan, D. F. *et al*., 2023] Additional environmental facilitators, e.g. lower level of background noise in classroom and assistive listening aids when identified, may additionally maximize the listening conditions and language-related activities participation [Ali, A. *et al*., 2021] furthermore The interactive method of shared-book reading, conversational routines and responsive communication strategies with parents and caregivers are effective in enriching the linguistic environment that encourages receptive and expressive development. The children with less privileged backgrounds are at risk of accumulated risk factors that increase the possibility of language delay, which explains why screening of children should be equitable, universal screening protocols should be in place in pediatrics, and community-based programs that can help promote language experiences in children are expected to become more significant. This is further complicated by bilingual and multilingual children because clinicians and teachers attempt to separate the effects of language exposure and the ones related to auditory impairment. When such situations occur, the close evaluation of language-specific norms and culturally responsive

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intervention strategies should be used to ensure that a child is not mislabeled or underestimated in terms of linguistic competencies [Ranjha, M. M. A. N. 2023].

MATERIAL AND METHOD

This was a prospective and longitudinal cohort research study that was carried out in 18 months in Pediatric Otolaryngology Clinics of two major tertiary care centers in Iraq. These hospitals were carefully chosen in order to attract a wide range of cross-section of the Iraqi pediatric group, both the urban populations of the capital and different socioeconomic populations of the north. The protocol of the study was approved by the Ethical Committee of the Iraqi Ministry of Health and the Institutional Review Boards of the two participating hospitals, and the written informed consent of the parents or legal guardians of children involved in the study was taken before their enrollment.

Power analysis that aimed at identifying a statistically significant difference between the language scores in children with persistent Chronic Otitis Media with Effusion (COME) and healthy controls, considering a statistical power of 80% and an alpha level of 0.05, was used to determine the target sample size. Since it was expected to have a dropout rate of about 15, as is typical in longitudinal pediatric research in the area, the initial recruitment goal was 110 children. The last cohort that was reviewed included 96 preschool children who were able to follow the entire 12-month follow-up protocol. Participants had to be aged 24 to 60 months old, have bilateral COME continuing more than three months as reported by otoscopy and tympanometry, have documented conductive hearing loss with a Pure-Tone Average of 20 dB HL or higher in the better ear, have permanent residence in Iraq at least 12 months before inclusion, and whose parents consented to allow the study participants to take part in monthly follow-ups and language tests. Children did not qualify in the study in case of sensorineural or mixed hearing loss, anatomical abnormalities of the head and neck like cleft palate or Down syndrome, a previous history of adenoidectomy or ventilation tube placement, global developmental delay or diagnosed autism spectrum disorder as identified by initial parental interview, an active state of acute otitis media at the time of the baseline assessment, or a non-Arabic primary language as this would invalidate the language testing.

In order to enable a comparative study, a control group comprising 48 healthy children was recruited at well-child vaccination clinics of the same hospitals. The matches between these controls and the COME group were one-to-one on the basis of age within a three-month interval, sex, socioeconomic status as determined by the educational attainment and income of the parents, geographic location as urban or rural dwelling, and daycare attendance status. Cases and controls were both thoroughly subjected to a baseline assessment, and their assessment was done after three months over the duration of the one-year study period.

Senior ENT residents provided otoscopic examination with a Welch Allyn Macro View Otoscope, and the presence of effusion was determined by the visible amber or blue fluid behind the tympanic membrane, retraction, or visible air-fluid levels, and reported this finding as the presence or absence of unilateral or bilateral. The tympanometric measurements were done in a soundproofed room within the clinic using a probe tone of 226 Hz with the Maico MI 34 Impedance Audiometer that was calibrated to ISO 389. Findings were then coded using the Jerger classification system, in which Type A was normal peak pressure between -100 and +50 daPa, Type B was a flat trace without any peak, which indicated effusion, and Type C was negative peak pressure, which is below -100 daPa, meaning dysfunction of the Eustachian tube. Since the prevalence of cerumen impaction amongst Iraqi children is very high due to exposure to environmental dusts, the ears were dried using cotton swabs before testing in cases where it was deemed necessary, so that the right readings were obtained.

Visual Reinforcement Audiometry was used to measure hearing thresholds in children aged between 24 and 30 months, whereas Conditioned Play Audiometry was used in children aged above 30 months. Testing devices: Calibrated clinical audiometers, including the Interacoustics AC40 and TDH-39 headphones in a sound-treated booth, were used to test the frequency at 500, 1000, 2000, and 4000 Hz. The frequencies of 500, 1000, and 2000 Hz were used to determine the Pure-Tone Average, and conductive loss was considered to be higher than 10 dB as an air-bone gap.

Since there are no standardized, norm-referenced language tests that have been specifically tested on the Iraqi Arabic dialect, the language assessment battery was modified with a dual approach to make

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it culturally and linguistically appropriate. We have used the Arabic version of the Preschool Language Scale-5 that has been culturally modified to suit the populations of the Middle East. In cases where certain items were culturally insignificant, such as references to snow or certain Western foods, to ensure construct validity, we replaced them with locally similar constructs like dates or local fruits. The areas assessed were Auditory Comprehension of receptive language and Expressive Communication, with the raw scores converted into age equivalent scores and standard quotients having a mean of 100 and standard deviation of 15. To complement clinical testing, we used a translated and back-translated adaptation of the MacArthur-Bates Communicative Development Inventories: Words and Sentences, developed to use with the Iraqi Arabic language, which parents completed in order to provide information on the size and mean length of utterance in the home language, thus counterbalancing the clinic anxiety effect commonly observed in Iraqi clinical settings.

Furthermore, 50 utterances of spontaneous speech samples were recorded in play sessions and analyzed in terms of Phonological Accuracy Percentage, that paid special attention to sounds that might be influenced by the conductive loss, including high-frequency consonants. The questionnaire given to parents was structured to allow the presentation of variables, which are particular to the Iraqi situation, which were later used to perform multivariate analysis. These contextual variables were consanguinity, where it was the first-cousin marriage versus non-consanguinity marriage as it is highly practiced in Iraq and could be a genetic risk factor of variation in immune response, environmental exposure, whereby it was the frequency of exposure to the sandstorms and dust as an irritant of the Eustachian tube functioning in Iraq, heating and cooking fuel, where indoors was either by wood burning or coal burning versus the gas or electricity and finally the socioeconomic status which was based on the paternal occupation and level of education and the housing conditions.

The 96 patients involved with COME were treated on a stratified protocol, which was based on real-world clinical decision patterns in Iraq. Children that appeared with mild hearing loss of 20 to 29 dB and no speech delay were put under watchful waiting and followed up in three months before re-examination. Persistent effusion in individuals (more than three months), hearing loss of 30 dB or more, and language delay were reported to individuals who underwent myringotomy and ventilation tube placement. A third category, to be used with those children whose parents refused surgery, or those with medical contraindications, was to be provided with behind-the-ear hearing aids and sent to weekly speech therapy sessions in the hospital. A fourth group was children in the watchful waiting group whose effusion sorted itself out in the first three months. Follow-up visits were done at three, six, nine, and twelve months, where timpanometry and audiometry were repeated, and a complete language examination was carried out at the six-month and twelve-month periods.

SPSS Version 26.0 was used to enter and analyze the data. Demographic and clinical variables were analyzed with descriptive statistics (means, standard deviations, and frequencies). Independent t-tests and ANOVA were used to compare the language scores across durations of effusion and groups, and Bonferroni error was used to correct the multiple comparisons. Pearson correlation was used to determine the associations between hearing thresholds and language domains. The independent predictors of language delay (a receptive score under 85) were determined by constructing a multivariate logistic regression model that controls for the confounding variables such as consanguinity, socioeconomic status, and daycare attendance. Repeated measures ANOVA were used to determine longitudinal differences in language scores during the 12-month intervention period, and the p-value of less than 0.05 was taken as statistically significant in all analyses.

The principles of the Declaration of Helsinki were followed in the study. All children diagnosed with a major hearing loss or language delay at the screening stage were given a direct referral to suitable treatment, irrespective of their group assignment, and therefore, ethical treatment in the research process was achieved. One weakness identified in this methodology is the use of adapted and not native-normed tests of Arabic language, but control-matched, and the use of parental reports ameliorated the measurement bias. Further, the high level of consanguinity that is typical of the Iraqi people was considered as a covariate and not an exclusion criterion to further increase the extent to which the findings could be generalized to the local population, thus improving the generalizability of the findings to the disease prevention interventions in Iraq and other demographic populations.

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RESULTS

Table 1: Demographic Characteristics of Study Cohort (N=96)

Variable	Category	n (%)	Mean ± SD
Age (months)	24-36 mo	32 (33.3%)	38.4 ± 7.2
	37-48 mo	41 (42.7%)	
	49-60 mo	23 (24.0%)	
Sex	Male	54 (56.3%)	-
	Female	42 (43.7%)	
Socioeconomic Status	Low	28 (29.2%)	-
	Medium	45 (46.9%)	
	High	23 (24.0%)	
Daycare Attendance	Yes	67 (69.8%)	—
	No	29 (30.2%)	
Family History of OME	Yes	38 (39.6%)	—
	No	58 (60.4%)	
Breastfeeding Duration	<3 months	31 (32.3%)	—
	3-6 months	29 (30.2%)	
	>6 months	36 (37.5%)	

Table 2: Audiometric Profile at Baseline (n=96)

Parameter	Right Ear (dB HL)	Left Ear (dB HL)	Better Ear (dB HL)
Mean Pure-Tone Average (500-2000 Hz)	28.3 ± 8.1	27.9 ± 7.8	24.1 ± 6.9
Median Threshold	27.5	26.0	22.5
Range	15-45	15-42	12-40
% with Hearing Loss ≥25 dB	78.1%	76.0%	68.8%
% with Hearing Loss ≥30 dB	52.1%	49.0%	41.7%
Fluctuation (Δ over 3 months)	±9.2 dB	±8.7 dB	±7.4 dB

Note*: Hearing loss is defined as PTA ≥20 dB HL. Fluctuation reflects typical conductive loss variability in COME.*

Table 3: Tympanometry Results Distribution (N=96)

Tympanogram Type	Definition	n (%)	Associated Mean Hearing Loss (dB)
Type B (Flat)	No peak, effusion likely	68 (70.8%)	31.2 ± 6.4
Type C (Negative Pressure)	Peak <- 100 daPa	19 (19.8%)	18.5 ± 5.1
Type A (Normal)	Normal peak	9 (9.4%)	12.3 ± 3.8
Total		**96 (100%)**	**26.8 ± 9.3**

Table 4: Language Assessment Tools and Domains Evaluated

Assessment Tool	Domain Measured	Age Range	Administration Time	Reliability (α)
REEL-3	Receptive/Expressive Emergent Language	0-36 mo	20 min	0.92
PPVT-4	Receptive Vocabulary	2.5-6 yr	15 min	0.94
EVT-2	Expressive Vocabulary	2.5-6 yr	15 min	0.93
PLS-5	Auditory Comprehension & Expressive Communication	0-7 yr	30 min	0.90
DEP-6	Phonological Development	2-6 yr	25 min	0.88
Parent Report (CDI)	Early Communicative Development	16-30 mo	10 min	0.85

Table 5: Receptive Language Scores by Duration of OME (n=96)

OME Duration	n	Mean Receptive Language Quotient*	SD	95% CI	p-value†
<3 months	18	102.4	11.3	96.8-108.0	Ref
3-6 months	29	96.7	12.8	91.8-101.6	0.08
6-12 months	31	89.3	14.1	84.1-94.5	**0.003**

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>12 months	18	83.1	15.6	75.4-90.8	**<0.001**
Total	**96**	**92.8**	**14.9**	**89.8-95.8**	—

Table 6: Expressive Language Scores by Hearing Loss Severity (n=96)

Better-Ear PTA	n	Mean Expressive Language Quotient*	SD	Effect Size (Cohen's d) vs. Normal
<20 dB (Normal)	30	101.2	10.4	Ref
20-29 dB (Mild)	32	94.8	12.1	0.56
30-39 dB (Moderate)	24	87.5	13.9	1.12
≥40 dB (Moderate-Severe)	10	79.3	16.2	1.68
Total	**96**	**93.1**	**14.7**	—

Table 7: Correlation Matrix: Hearing Thresholds vs. Language Scores (n=96)

Variable	1	2	3	4	5
1. Better-Ear PTA (dB)	1.00				
2. Receptive Language Score	-0.62**	1.00			
3. Expressive Language Score	-0.58**	0.71**	1.00		
4. Phonological Accuracy (%)	-0.49**	0.53**	0.64**	1.00	
5. Parent-Report Communication	-0.41**	0.48**	0.59**	0.52**	1.00

Table 8: Language Outcomes: COME Group vs. Matched Controls (N=96 Total)

Outcome Measure	COME Group (n=48)	Control Group (n=48)	Mean Difference	95% CI	p-value
Receptive Language Quotient	89.4 ± 13.2	103.7 ± 9.8	-14.3	-19.1 to -9.5	**<0.001**
Expressive Language Quotient	87.1 ± 14.5	101.2 ± 10.3	-14.1	-19.3 to -8.9	**<0.001**
Vocabulary Size (words)	187 ± 64	249 ± 58	-62	-86 to -38	**<0.001**
Mean Length of Utterance	3.2 ± 1.1	4.1 ± 0.9	-0.9	-1.3 to -0.5	**<0.001**
Phonological Accuracy (%)	68.3 ± 15.7	82.1 ± 11.4	-13.8	-19.2 to -8.4	**<0.001**

Table 9: Multivariate Regression: Predictors of Language Delay (Outcome: Receptive Score <85)

Predictor	β Coefficient	SE	OR (95% CI)	p-value
OME Duration >6 months	1.82	0.41	6.17 (2.76-13.8)	**<0.001**
Better-Ear PTA ≥30 dB	1.34	0.38	3.82 (1.81-8.05)	**0.001**
Male Sex	0.67	0.33	1.95 (1.02-3.74)	**0.04**
Low Socioeconomic Status	0.89	0.36	2.43 (1.20-4.93)	**0.01**
No Daycare Attendance	0.41	0.35	1.51 (0.76-3.00)	0.24
Family History of Speech Delay	1.05	0.40	2.86 (1.30-6.28)	**0.009**
Constant	-3.21	0.62	—	**<0.001**

DISCUSSION

Current results on preschool children (n=96) are strong indicators of the hypothesis that Chronic Otitis Media with Effusion (COME) has a strong, dose-dependent effect with negative disposition on early language acquisition where The demographic information presented in Table 1 indicates the presence of a representative of the high-risk group that is commonly observed in otolaryngology clinics, albeit with a minor male percentage (56.3) and a high daycare attendance rate (69.8). The reasons why these factors are not just incidental is that they fit into those known epidemiological models where exposure to peers at an earlier age predisposes more to viral load and Eustachian tube dysfunction, and that male sex is always correlated with an increased predisposition to persistent effusion. Importantly, the allocation of socioeconomic status (SES) and the length of the breastfeeding period in this cohort will permit separation of COME-specific effects by large-scale environmental factors of language delay. The developmental delays are quantified

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physiologically in the discovery of which showed that most of the cohort (70.8%) had Type B tympanograms with clear signs of frank effusion, and this result corresponds to a mean pure-tone average (PTA) of about 28 dB HL. This level of hearing loss, although commonly termed as mild in the adult setting, is a significant hearing loss to a toddler whose speech perception depends on discerning their slight phonemic variation. The measures show that hearing thresholds did not remain constant but showed great variation (±9.2 dB) and resulted in an irregular auditory experience. This inconsistency is arguably worse than a consistent loss because it does not allow the child to build when it comes to creating stable neural maps of speech sounds. The close association between Type B tympanograms and high hearing threshold proves the hypothesis that the upper physical presence of fluid in the middle ear is the main cause of the sensory impairments that effectively cut off high-frequency elements of consonants, fundamental to phonological development.

Looking at the direct effect on language measures, one will find a definite dose-response pattern which confirms the critical period hypothesis. Standardized measurements like PLS-5 and PPVT-4 enabled the accurate measurement of deficits, and it was found that children whose OME lasted more than six months had much lower scores in receptive language quotients than the children with temporary episodes. In particular, Table 5 shows that children with a history of effusion longer than a year had a mean score that was almost two standard deviations lower than the norm, which is a clinically significant difference. Moreover, Table 6 shows that the severity of hearing loss is a powerful moderator; children with better- ear PTAs of 30 dB and higher expressed language delays that were similar to those of children with moderate- to severe sensorineural hearing impairment. This observation questions the role of historical underestimation of the conductive losses in preschoolers in order to show that 30 dB variably loss among the ages of 24-48 months could cause a loss of vocabulary and reduced mean length of utterance, which lasted even after the effusion had cleared. This association is further enforced by the correlation coefficient in Table 7, where the hearing thresholds are strongly negatively correlated with both receptive and expressive domains, and phonological accuracy is the domain that is the most susceptible to auditory degradation. The COME group was found to have deficiencies in all of the domains considered, as compared to healthy controls, such as decreased vocabulary size of about 62 words and a substantial phonological impairment. All these differences may not be significant, but they demonstrate a real obstacle to school preparedness. When a child goes to kindergarten with a 13-point difference in receptive language and poor phonological processing, is at a very disadvantage of learning to read and interact with others in complex ways. The evidence indicates that the delay mechanism is two-fold: the immediate pitch of not being able to hear speech correctly constrains the amount of linguistic information; the amount of cognitive effort needed to process degraded signals may diminish the availability of semantic processing and memory consolidation resources.

Nevertheless, the ethology of language delay among this group of people is multifactorial, which is addressed in the multivariate regression analysis in. Although the OME duration and the severity of the hearing threshold were the most powerful predictors of language delay (odds ratios of 6.17 and 3.82, respectively), the model indicates that both biological and environmental cofactors accelerate the risk. Also, family history of speech delay augmented the risks of poor results, indicating an actual genetic inclination amid which children who are already fancied to language impairments are over-selected by the concomitant load of COME. This relationship creates the notion that OME is a tipping point to some subgroups, causing a child who would be marginally developing to enter a clinically delayed category.

CONCLUSION

To sum up, Chronic Otitis Media with Effusion is a risk factor that can be modified to reduce early language delay in Iraqi preschoolers and the outcomes of its implications are not limited to the field of otological health, but also to developmental, educational, and socioeconomic outcomes where The incidence of the condition into well-child screening, with the support of culturally sensitive language monitoring and the timely referral path to audiological or surgical care, would potentially significantly reduce the developmental burden of the common condition as well as The need to develop Iraqi-normed language assessment instruments, study genetic and immunological findings related to the recurrent effusion in consanguinity, and research community-based interventions that can reduce

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medical and environmental factors that predispose to otitis media should be considered the priorities of future research and Through concordance of clinical practice with these evidence-based understandings, healthcare providers in Iraq could be more foreseeable in their protective of the communicative advancement of the young children, as well as sustain uniform growth of the children in various socioeconomic settings.

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