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Expressive language skills in Chinese Singaporean preschoolers with nonsyndromic cleft lip and/or palate

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ABSTRACT

Objective: The main objective of the present study was to examine THE EXPRESSIVE LANGUAGE SKILLS and obtain a prevalence estimate of expressive language IMPAIRMENT (not skills) in Chinese Singaporean preschoolers with nonsyndromic cleft lip and/or palate (CLP).
Methods: A group of 43 Chinese Singaporean preschoolers aged 3 to 6 years with a diagnosis of nonsyndromic CLP was assessed using the Singapore English Action Picture Test (SEAPT). The SEAPT is an English Language screening tool standardised on typically developing English–Mandarin Chinese Singaporean preschoolers that assesses expressive vocabulary and grammatical usage. A grammar and/or information score below the 20th percentile on the SEAPT is indicative of an expressive language impairment. In addition, the medical records of this cohort were examined retrospectively for documentation of surgical timings, audiological history, articulation and resonance.
Results: Based on the results of the SEAPT, 33% of the preschoolers with CLP were identified as having a—possible expressive language impairment. Hence, the likelihood that a child with CLP with normal cognitive functioning will have an expressive language impairment is between 3.9 to 12.7 times more likely than in the general population. There was no statistical significance when comparisons were made between dominant language groups or CLP groups on SEAPT measures of information and grammar content. Significantly more males than females were identified with language difficulties, relative to the sex ratio in the sample. No significance was found for the other participant variables.
Conclusions: The findings of this study suggest that Chinese Singaporean preschoolers with CLP have more difficulty in the expressive use of grammar and vocabulary than their peers of typical development, with significantly more males affected than females. As language performance was not related to hearing, articulation or resonance; these early results suggest that a comprehensive investigation of cognition, literacy and family aggregation of communication disorders is urgently warranted to study other possible aetiologies for language impairment in children with CLP in Singapore.

1. Introduction

The main purpose of the present study was to examine the expressive language skills and obtain a prevalence estimate of expressive language impairment in Chinese Singaporean preschoolers with nonsyndromic cleft lip and/or palate (CLP). Research investigating the communication skills in children with CLP has predominantly focused on articulation and resonance disorders, with fewer studies exploring language skills in this population [1–3]. Studies that have tested language skills have shown that children with CLP display uneven skills in literacy development and receptive and expressive language when compared with typically developing peers [4–9]. As such, a clearer understanding of the co-occurrence of CLP and expressive language impairment in these children is required to ensure adequate and early identification of children who require a broader speech and language intervention programme.

Clefting is a common and complex birth defect, with multifactorial aetiologies resulting from genetic and environmental consequences [10]. Internationally, rates of clefting (per 1000 live births) vary across ethnic groups, with the highest rates of 1.1–2.2 in Asians and American Indians, intermediate levels of 0.8–1.4 in Caucasians, and lowest levels of 0.2–0.4 in Africans [11,12]. Singapore, with its primarily Asian population has one of the highest rates of clefting at 2.07 per 1000 live births [13]. Furthermore, the incidence of clefting also varies across the four main racial groups in Singapore (i.e., 1.64 in Chinese, 0.29 in Malays, 0.10 in Indians and 0.04 in Other Ethnic Groups).

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Clefts are classified as syndromic or nonsyndromic. Here, the focus is on nonsyndromic CLP which accounts for approximately 70% of all cases with CLP and 50% of cases with isolated cleft palate [14]. Syndromic forms can be subclassified into Mendelian disorders, chromosomal syndromes and uncategorised syndromes [15]. While communication difficulties are reported to be more common in individuals with syndromic versus nonsyndromic CLP [16], the presence of expressive language impairment in nonsyndromic CLP and the relationship to clefting patterns across different ethnic groups has not been adequately studied.

1.1. Language skills in children with CLP

Research examining language skills in children with CLP has been ongoing for the past five decades [1]. Infants and toddlers with CLP are frequently found to be at increased risk of impairment in speech and language development compared to their peers without CLP [17]. Studies have reported delays on global language development measures [18,19], as well as delays in vocabulary comprehension [5,6] and acquiring first words [20,21]. As well, children with CLP produce sentences of reduced length, appear less assertive in conversations, show lexical retrieval difficulties in verbal naming tasks, and exhibit lexical selectivity based on phonological or articulatory characteristics [4,7,8,22,23].

Commonly reported reasons for language disruption include poor early hearing history, articulation disorders, compromised velopharyngeal integrity, decreased speech and language stimulation, and central auditory processing deficits [1,24–29]. However, there is still insufficient longitudinal research evidence to determine how each aetiology impacts on subsequent language development in children with CLP.

High prevalence estimates of expressive language disorders in children with CLP have also been documented. Dalston [30] used the Test of Language Development-Primary to assess 19 preschoolers from the United States aged 4–5 years with a diagnosis of CLP. Results for these preschoolers indicated that 26% had an expressive language disorder [31]. In the Netherlands, the Groningen Diagnostic Speech Norms were used in two studies to assess the expressive language skills of 2-year-old toddlers with CLP [32,33]. This involved analysing the utterances of the toddlers with CLP according to norms based on 527 randomly selected Dutch children, and categorising the toddlers with CLP as having adequate or inadequate language production. In the first study, 20% of the 43 toddlers with CLP were identified with expressive language difficulties [32]. Using the same criterion, 21% of the 63 toddlers with CLP were also documented to have language production difficulties [33]. Vallino et al. (2008) documented 18% of 95 three-year-old preschoolers from Canada with isolated cleft lip to have an expressive language impairment based on The Preschool Language Scale-2 [34,35]. Furthermore, in the UK, a nationwide survey of speech pathologists across England and Wales indicated that 27% of children with CLP aged 8–18 years were experiencing persisting language difficulties [36].

These prevalence estimates are several times higher than the published language impairment rates of 2.6–8.4% for the general child population [37–39]. Moreover, the rates of language difficulties appear to be highest among children with CLP, followed by isolated cleft lip, with the lowest in the general population. This evidence does demonstrate that individuals with CLP are at increased risk of language impairments that persist from infancy and school-age, and remain well into adolescence and adulthood [1,28,33,40–42].

Currently it is not known if this increased risk of language impairment is consistent across different ethnic groups. Previous studies have mainly focused on the language skills of European or American Caucasian children with CLP and it is not known if Asian children with CLP may have a different phenotypic presentation. To date, the Asian population with CLP has not been studied with respect to the prevalence and types of language difficulties they may exhibit.

In addition, evidence of fluctuating asymmetry (a phenotypic indicator of developmental instability evaluated through dermatoglyphics and dental traits) [43], between individuals with CLP within Asian and between non-Asian populations would support the proposal that differences in other areas such as language abilities may exist. Even within Asia, Asians with CLP have been shown to have varied phenotypic presentations. Chinese individuals with CLP from Shanghai in China have been shown to display a higher frequency of fingerprint whorls when compared to Filipino individuals from the Negro Occidental and Cavite provinces in the Philippines [10,44]. Likewise, the difference in the number of asymmetrical tooth pairs between Chinese children with and without CLP in Hong Kong is higher than that reported for other ethnic groups [45]. Also, fluctuating asymmetry has also been associated with indicators of developmental stability (e.g., psychometric intelligence), specific disorders (e.g., Fragile X syndrome) and nonspecific forms of mental retardation [43].

Since the incidence of CLP and levels of fluctuating asymmetry do vary based on ethnic background, it is conceivable that the incidence of language impairment in different ethnic groups may also be different. These mixed findings within and across diverse ethnic groups and cultures therefore support the need for more inter-cultural research to be performed, to confirm whether similar research trends and findings exist, and are consistent across cultures [46]. Furthermore, we hope to elucidate whether the oral language skills of Chinese Singaporean children with CLP differ from their typically developing peers, as well as from the reported profiles of non-Asian children with CLP.

1.2. The context of Singapore

Despite the fact that Asians have the highest rates of clefting in the world [12,47], the majority of language studies on CLP have been conducted with monolingual European or American Caucasian children with CLP. Thus, this present study seeks to narrow this gap, by examining the expressive language skills of bilingual Chinese Singapore children with CLP within Southeast Asia.

Of the resident population in Singapore, the Chinese comprise 77.2% of the population of four million people, with Malays constituting 14.0%, Indians 7.5% and Other Ethnic Groups 1.23% [48]. The Chinese cohort was selected for our study not only because it represented the majority racial group, but more importantly because it has the highest rate of clefting in Singapore, which justifies further study. In addition, the preschool period offers us an early opportunity to study when children first develop proficiencies in their oral language and early literacy skills in both the home and school environments. It is vital to study the skills children bring to preschool, as they have been found to be predictors of later academic achievement [49,50]. In a study by Dixon [51], English vocabulary and phonological awareness skills were identified as significant predictors of later English literacy in 169 Chinese Singaporean preschool children. As such, the need for early identification of language difficulties is essential if future academic problems are to be avoided.

Singapore is officially a multilingual and multicultural nation which adopts English as the main medium of instruction, administration and commerce; co-functioning as a neutral language for all races to communicate [52]. In 1979, despite English being a non-native language for the majority of Singaporeans, the Singapore government embraced a unique bilingual education policy for all children who attend formal schooling [51,53]. Since the inception of this policy, the Singapore education