

Prevalence of Oral HPV lesions in Pediatric Populations: A Systematic Review and Meta-Analysis

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INTRODUCTION

Human papillomavirus (HPV) infection of the oral cavity in pediatric populations (<22 years) is an increasingly recognized public health concern. Pediatric patients often see dentists more frequently than primary care providers, positioning pediatric dentists as key providers for early detection, patient education, and guidance in HPV management.

Oral HPV prevalence demonstrates a bimodal distribution, with higher rates in infants (<1 year) and adolescents (16–20 years). Common lesions include squamous papilloma, verruca vulgaris, condyloma acuminata, and focal epithelial hyperplasia. Transmission may occur vertically, horizontally, or via non-sexual contact, with risk factors including age, oral health status, and immunocompromised conditions.

METHODS

Systematic searches of PubMed, Embase, and the Cochrane Library were conducted for studies published from 2000 onward evaluating oral HPV prevalence in pediatric populations (<22 years). A random-effects meta-analysis was performed to estimate pooled prevalence. Heterogeneity among studies was assessed using I^2 statistics. Publication bias was evaluated using funnel plots and Egger's regression test. Influence analysis was conducted using a "leave-one-out approach" to assess the impact of individual studies on overall results. Parallel analyses were performed for combined pediatric and adult populations. Statistical significance was set at $p < 0.05$. All analyses were conducted using R software (version 4.3.0).

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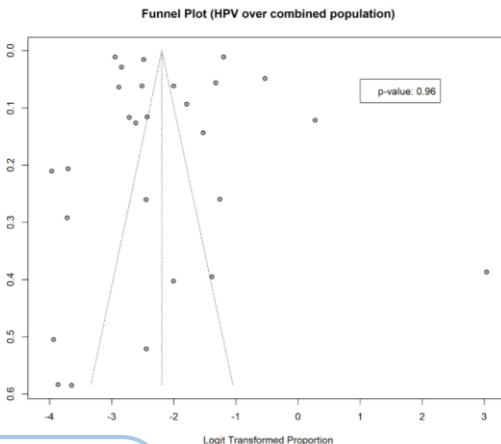
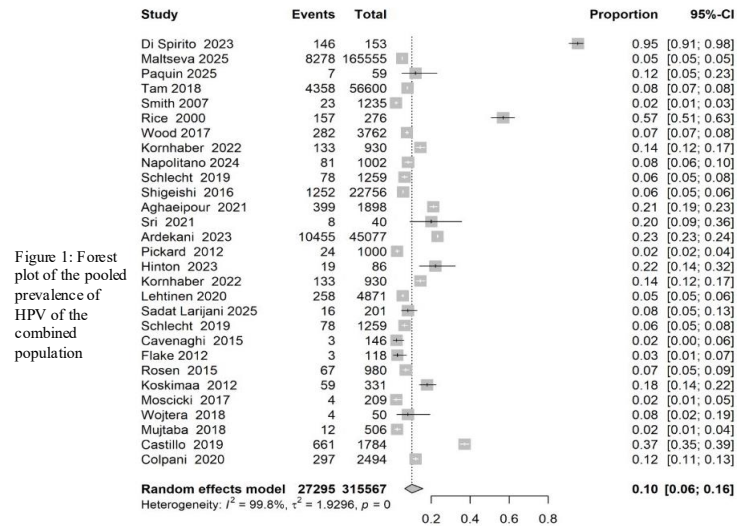


Figure 2: Funnel plot for the combined population

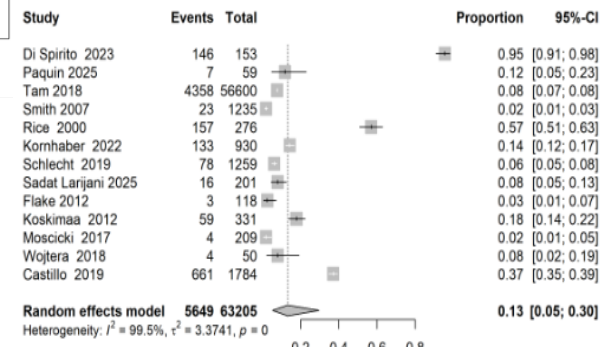


Figure 3: Forest plot of the pooled prevalence of HPV for the pediatric population

RESULTS

A total of 29 studies were included, with 13 evaluating pediatric populations (<22 years). The pooled prevalence of oral HPV in pediatric studies was 13% (95% CI: 5%–30%) using a random-effects model. Substantial heterogeneity was observed ($I^2 = 99.5\%$, $p < 0.0001$). Funnel plot analysis demonstrated symmetry, and Egger's regression test showed no significant publication bias ($p = 0.96$). Sensitivity analysis using a leave-one-out approach demonstrated stable prevalence estimates ranging from 9% to 15%.

Similar findings were observed in analyses of combined pediatric and adult populations, with no significant publication bias detected (Egger's test $p = 0.27$). These findings indicate that oral HPV infection is present in a meaningful proportion of pediatric patients, supporting the role of pediatric dental providers in early detection, patient education, and prevention efforts.

CONCLUSION

The goal of this meta-analysis was to examine the prevalence of HPV in pediatric and combined adult/pediatric populations. The pooled prevalence of HPV in the pediatric population was 13%, while prevalence in the combined population ranged from 9% to 15%, demonstrating a meaningful disease burden.

These findings support the role of healthcare practitioners, including pediatric dentists, in screening patients and providing evidence-based education. This, in turn, may help reduce the risk of HPV transmission through preventive measures such as vaccination.

Limitations of this study include a smaller pediatric sample size and high heterogeneity among studies. Future research evaluating the impact of HPV vaccination on oral HPV prevalence and transmission rates would be beneficial for both provider and patient education.

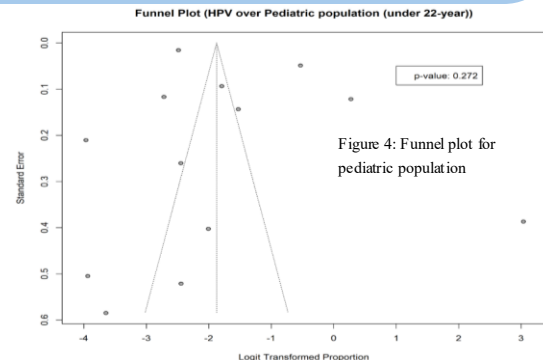


Figure 4: Funnel plot for pediatric population