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THE ASSOCIATION BETWEEN LACK OF MATERNAL FOLIC ACID SUPPLEMENTATION AND OROFACIAL CLEFTS: CASE REPORT
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SUMMARY

Orofacial clefts, including cleft lip and/or palate, are common congenital anomalies that pose significant feeding, speech, dental, hearing, and psychosocial challenges. Folic acid supplementation before and during early pregnancy is increasingly recognized as a preventive measure for these defects. This case series study investigates the association between the absence of maternal folic acid supplementation and orofacial clefts in nine infants at Guardian Hospital, Meru, Kenya, from April 13–16, 2025. Eight mothers were interviewed, with only three reporting folic acid use, and none taking it during the critical peri-conceptional period when craniofacial structures form. Infants of mothers who did not take folic acid or started supplementation late were more likely to present with clefts. Barriers to supplementation included delayed antenatal care, lack of awareness, intolerance to supplement taste, and vomiting. The clinical presentations included unilateral and bilateral clefts, cleft palate, and clefts with fistulas across both male and female infants, with six out of nine being male. The finding align with global evidence indicating that folic acid supplementation reduces the risk of cleft lip and palate. This study highlights the urgent need for strengthened public health education, improved ANC attendance, formulations that minimize side effects, and consideration of folic acid fortification initiatives. These measures may significantly lower the burden of cleft anomalies in Kenya. The results emphasize that folic acid intake must begin before conception and continue through early pregnancy to maximize its impact on craniofacial development. The study further underscores the importance of addressing cultural, systemic, and individual barriers to supplementation.

INTRODUCTION

Orofacial clefts occur when the tissues of the lip and/or roof of the mouth fail to fuse properly during the fourth to twelfth weeks of pregnancy. They may affect one or both sides of the lip or palate and can significantly impact feeding, speech, dentition, hearing, and emotional well-being. These anomalies often require long-term multidisciplinary care, including multiple surgeries and follow-up appointments (1,2).

While the causes of cleft lip and palate include both genetic and environmental factors, there is increasing scientific consensus that folic acid plays a preventive role in reducing these anomalies. Folic acid is essential for DNA synthesis, cell division, and early embryonic development. Its deficiency is an established risk factor for neural tube defects, and research increasingly links inadequate folate levels to orofacial clefts as well (3).

Despite global awareness of the importance of folic acid, utilization remains low in Sub-Saharan Africa due to late ANC attendance, lack of awareness, inconsistent supplement availability, and intolerance to supplement taste (4). The embryological development of facial structures such as the fusion of the medial nasal and maxillary processes depends heavily on folate-dependent cellular processes. This reinforces the importance of folic acid intake during the peri-conceptional window.

Multiple studies demonstrate the protective effect of folic acid. Zhou *et al.* found that folic acid taken near conception reduces the risk of clefts (3). Wilcox *et al.* reported a 40% risk reduction when supplementation began early (5). Kelly *et al.* showed similar findings in an Irish cohort (6). De-Regil *et al.* (2015) emphasized that folic acid before pregnancy prevents a range of congenital anomalies and recommended broad public health approaches(7). Locally, Kamau *et al.* observed associations between cleft anomalies and

environmental factors such as infections, teratogens, and inadequate folic acid intake (8). These findings provide context for the Guardian Hospital cases examined in this study.

CASE PRESENTATION

This case series included eight mothers and nine infants (including one set of fraternal twins) diagnosed with cleft lip and/or palate at Guardian Hospital, Meru, Kenya, between April 13–16, 2025. Ethical consent was obtained from all participating mothers. Interviews were conducted to determine folic acid use, timing of initiation, duration, adherence, side effects, and reasons for non-use. Additional information on ANC attendance, awareness of folic acid benefits, and barriers such as intolerance to taste or vomiting was collected. Clinical data on infants included type of cleft (unilateral/bilateral), involvement of lip and/or palate, and presence of fistulas. This descriptive presentation provides a foundation for analyzing the association between lack of early folic acid supplementation and the resulting craniofacial outcomes.

RESULTS

All nine infants had cleft lip and/or palate, with six males and three females. The following summarizes each case exactly as observed:

Case	Infant Sex	Cleft Type / Clinical Findings	Maternal Folic Acid Use	Timing & Duration	Notes / Barriers
1	Male	Left cleft lip and palate + fistula	Yes	Started in 3rd month; stopped in 7th month	Late initiation; likely folate deficiency during critical period
2	Male	Bilateral cleft lip and palate	No	—	No supplementation during early pregnancy
3 A (Twin)	Female	Left cleft lip	No	—	Both twins affected □ strong indication of folate deficiency
3B (Twin)	Male	Right cleft lip	No	—	No folic acid taken during pregnancy
4	Female	Left cleft lip and palate + fistula	Yes	Started in 3rd month; continued for 10 weeks	Missed periconceptional window
5	Male	Bilateral cleft lip and palate	Yes	Used for 7 months;initiated late	Long duration but missed early critical period
6	Female	Bilateral cleft lip and palate	No	—	No folic acid supplementation
7	Male	Left cleft lip and palate	Partial (1 day only)	Took only 1 day; discontinued	Intolerance to taste
8	Male	Bilateral cleft lip and palate	Partial	Discontinued after vomiting	Nausea/vomiting prevented adherence

Across all cases, none of the mothers used folic acid during the peri-conceptional period, the most critical phase of craniofacial development. Across all cases, none of the mothers used folic acid during the peri-conceptional period (before and in the first 4 weeks after conception), the most critical phase of craniofacial development. Of the nine mothers, three (33.3%) received no folic acid supplementation at any point during pregnancy, four (44.4%) initiated supplementation only after the peri-conceptional period (starting in the 3rd month or later), and two (22.2%) had partial supplementation that was discontinued early. Among those who discontinued, one stopped because of intolerance to the taste (took only 1 day) and one stopped due to nausea and vomiting.

DISCUSSION

This case series illustrates a clear association between lack of folic acid supplementation and orofacial clefts, consistent with global evidence (3, 6). Although the sample size is small, the findings replicate the patterns seen in larger studies. All infants with clefts were born to mothers who did not take folic acid at all or began supplementation after the critical developmental window. These findings are further supported by local nutritional research showing similar patterns among Kenyan children with clefts (9)

The study also highlights barriers common in Kenyan settings. Delayed ANC attendance contributes significantly, as seen in Ayodo *et al.* (4). Cultural beliefs such as attributing birth defects to spiritual factors or curses have been noted to limit ANC engagement (8, 10). Supplement intolerance, especially nausea and taste aversion, appeared frequently among participants. This suggests a need for alternative formulations such as coated tablets, flavored chewables, or fortified foods.

International experience demonstrates that folic acid fortification of staple foods significantly decreases congenital anomalies (7). Given the barriers noted in this study, fortification could be an effective strategy in Kenya. Preconception care programs, culturally tailored educational campaigns, and community involvement may further enhance early folate uptake.

CONCLUSION

This case series demonstrates that lack of maternal folic acid supplementation before and during early pregnancy is strongly associated with orofacial clefts. Although the study is limited to a small sample from Guardian Hospital, the findings mirror global evidence. Addressing late ANC attendance, awareness gaps, and intolerance to supplements is essential. Strengthening public health strategies, enhancing supplement formulations, and integrating folic acid education into community health programs could substantially reduce cleft anomalies in Kenya.

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