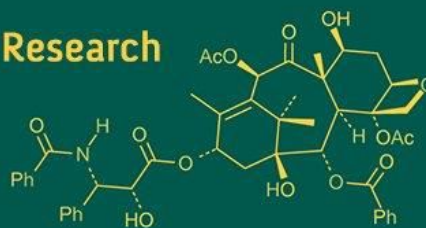
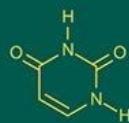
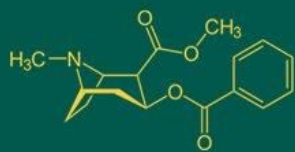


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A case study of polymelia in chicken at Peren district of Nagaland

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Abstract

The present case study is the first ever reported case of polymelia in a domestic chicken from Jalukie, Peren district, Nagaland. Out of 26 healthy hatched chicks, a chick exhibited severe limb deformities characterized by the presence of extra limbs. These extra limbs, measuring 4 cm in length were structurally abnormal, lacking a clear femur, tibia, or fibula, and were fused at the upper part of the normal limb but separated at the intratarsal joint. In contrast, the unaffected left limb measured 5 cm in length. Despite normal feeding behavior and responsiveness, the chick was unable to stand and survived for few days and death. Highlighting such unusual cases contributes to the documentation of congenital anomalies in poultry and offers valuable insights into potential influencing factors.

Keywords: Polymelia, chicken, congenital anomalies, Nagaland

Introduction

Polymelia is a rare congenital condition characterized by the presence of extra limbs in an individual. This anomaly occurs due to genetic mutations, environmental factors, or disruptions during embryonic development, leading to limb duplication. The condition has been documented in various species, including humans, cattle, and birds.

Congenital abnormalities in avian species are diverse, ranging from skeletal deformities to organ malformations. Polymelia, although rare, is a significant congenital limb defect characterized by chromosomal abnormalities in developing embryos, leading to the presence of extra limbs (Azeez & Oyagbemi, 2013) [4]. The term "polymelia" originates from Greek word, referring to limb duplication in animals and birds. Documented cases of polymelia have been reported in various poultry species, including broiler chickens in Nigeria (Ajayi & Mailafia, 2011) and the Shakini breed in Nepal (Amatya, 2015) [2, 3]. Additionally, partial polymelia involving posterior limb malformations has been observed in chicks (Abu-Seida, 2014) [1].

Case study

The present case study reports the occurrence of polymelia in a crossbred BV380-Srinidhi chick in Jalukie, Peren district, Nagaland. This region predominantly practices backyard poultry farming, with households maintaining between 10 to 50 chickens for consumption and income generation. Locally available breeds include Vanaraja, Kurioler, Naked Neck, Kadaknath, BV380, Srinidhi, and their crosses, with a preference for non-descript native chickens. Most chicks are hatched through natural incubation using broody hens, feeding on a variety of grains, insects, and household food scraps (Rajkumar, *et al.*, 2021) [7].

The reported case involves a chick hatched from an artificial incubator with a capacity of 105 eggs, supplied to local farmers. Among 500 successfully hatched chicks, this was the first documented instance of polymelia observed by the farmer. As congenital defects such as polymelia remain underexplored, further research is necessary to investigate its underlying genetic and environmental causes.

A polymelia chick hatched from a batch of 30 eggs incubated in a self-made incubator after 21 days of incubation. While 26 chicks hatched normally, one exhibited severe limb deformities. The affected chick had one normal left limb and a right limb fused with two supernumerary

limbs attached at the caudo-lateral aspect (Figure 1). These extra limbs, measuring 4 cm in length (Figure 2), were structurally abnormal, lacking a clear femur, tibia, or fibula, and were fused at the upper part of the normal limb but separated at the intratarsal joint. In contrast, the unaffected left limb measured 5 cm in length. Despite normal feeding behaviour and responsiveness, the chick was unable to stand and remained lying down throughout its short lifespan. It survived for three days before succumbing, likely due to

physical stress and energy exhaustion caused by its inability to efficiently utilize the additional limbs.

Polymelia has been documented across various species, including cattle, birds, and humans, and is often linked to chromosomal aberrations leading to congenital limb malformations (Azeez and Oyagbemi, 2013) [4]. This rare disorder manifests as the duplication or triplication of limbs, resulting in severe anatomical anomalies that can

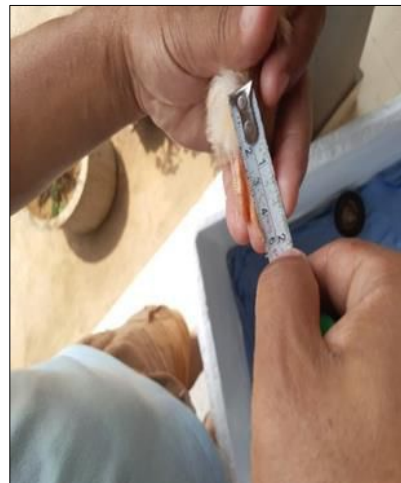


Fig 1: Polymelia chick **Fig 2:** (Extra anomaly limbs)

Fig 3: Measurement of extra anomaly limb

impact mobility and survival. In poultry, polymelia has been reported in different breeds, including broiler chickens from Nigeria (Ajayi and Mailafia, 2011) [2] and Shakini chickens from Nepal (Amatya, 2015) [3]. Recent reports have also documented the first occurrence of polymelia in passerine birds, further expanding the range of affected species (Fuentes-Recuero *et al.*, 2023) [5].

The precise etiology of polymelia remains poorly understood, but genetic mutations and environmental influences such as exposure to toxins or nutritional deficiencies are suspected contributors to abnormal embryonic development (Nandu, 2025) [6]. Poultry farming practices, particularly the scavenging behavior of backyard chickens, expose them to a variety of feed sources, including surplus grains, soil-dwelling insects, and household waste. Such diverse dietary patterns may introduce external factors that affect embryogenesis, warranting further investigation into their potential role in congenital anomalies (Rajkumar, *et al.*, 2021) [7].

In the present case, the chick exhibited polymelia with fused right limbs, leading to compromised mobility and survival challenges. This condition resulted in an inability to stand, exhaustion due to energy inefficiency, and premature death within three days of hatching. Similar cases of polymelia often show survival incompatibility, emphasizing the severity of anatomical deformities associated with limb duplication. Additional studies focusing on genetic analysis, environmental conditions, and incubation practices could provide deeper insights into the causative factors and prevalence of polymelia in poultry.

The occurrence of polymelia in this case provides a valuable opportunity to explore the genetic and developmental factors underlying such anomalies in chickens. The chick's inability to stand due to fused limbs highlights the severe anatomical challenges associated with this condition, ultimately leading to survival incompatibility. While environmental factors and

genetic mutations are potential contributors, further studies are necessary to understand the precise mechanisms behind such congenital limb deformities. Documenting rare cases like this can help deepen scientific knowledge and inform future research on poultry health and genetics.

Conflict of interest: The authors have no conflict of interest in this study.

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Highlights

- Newly hatched chick exhibited severe limb deformities characterized by the presence of extra limbs.
- Right limb was fused with two supernumerary limbs attached at the caudo-lateral aspect.
- Extra limbs had no distinct femur, tibia- fibula, and fused at upper part of normal limb but separated at intratarsal joint.
- Despite normal feeding and responsiveness, chick was unable to stand and died within few days.
- Stress and energy exhaustion trying to move might be the cause of death of chick.

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