

**IMPACT OF ENVIRONMENTAL CHANGES ON PRESCHOOL CHILDREN IN  
PURANDAR TEHSIL, M/S, INDIA**

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**Abstract:**

This article reported the effect of environmental changes on high prevalence of vitamin A deficiency (VAD) diseases such as Bitot's spot, conjunctival xerosis, night blindness, and xerophthalmia. A pre-school survey was carried out in rural areas of Purandar Tehsil. The aim of study was to assess the impact of the environment on health related problems among the rural preschool children. Clinical examinations were carried out on 582 preschool children for various health issues. The survey revealed 10.3% prevalence of VAD with 1.9% Night blindness, 2.7% xerophthalmia, 2.8% Bitot's spots and 2.9% conjunctival xerosis. Bitot's spots were noted in the conjunctiva of eyes located in the temporal portion of cornea. These Bitot's spots were typically triangular keratinized spots. The lesions of Bitot's spots were dry patches not wetted by tears. The other health issues observed were 5.8% of preschool children were affected by skin infections and 3.7% scleral melanocytosis with blackish blue-gray colored pigmentation in the white portion of the eyes with normal vision was recorded in the present study.

**Key Words:** Environment, Preschool children, vitamin D deficiency, Bitot's spots, Scleral melanocytosis, skin diseases.

**Introduction:**

Climate change is the major issue in India and it causes effects on the health of preschool children. The children with age group of one to seven are suffering from vitamin A deficiency including symptoms of Night blindness, xerophthalmia, Bitot's spots and conjunctival xerosis along with other diseases such as scleral melanocytosis, skin disease etc. Vitamin A deficiency is a major problem in public health nutrition in India. The prevalence of Bitot's spot recommended by the WHO in rural preschool children of India is 0.5% (NNMB 2003). VAD is required in adequate amounts for normal vision and immunity and it also helps in cellular growth and development (Amare Tariku et.al. 2016). VAD is a major nutritional problem in lower income countries. Deficiency of VAD causes xerophthalmia ranging from milder stages of night blindness and Bitot's spots to severe corneal xerosis or sometimes complete blindness (Zekariyas Sahile et.al. 2020). In Urban Central India it was found that 6.5% of children were suffering from xerophthalmia (Dr. Sinha et al., 2011). Appearance of patchy gray, bluish black discoloration in the sclera of the eye indicates scleral melanocytosis (Bang P., 2015). Most preschool children suffer from skin diseases and most of the common skin diseases were infections (Kabir Sardana et. al., 2019). So, it was an urgent need to carry out a health survey of children in rural areas in Maharashtra.

**Rationale of the study:**

Study area is located in the southern portion of Pune city with air pollution and fluctuation of rainfall. This area is a hill region with high humidity with poor sanitation. There was an urgent need to carry out a health survey of children.

**Objectives:**

The main objective of study was to assess the impact of the environment on health related problems among the rural preschool children.

**Hypothesis:** As this area is located in the southern portion of Pune city with air pollution, fluctuation of rainfall and high humidity with poor sanitation. It was expected to affect preschool children with skin diseases as well as VAD.

**Materials and Methods:**

A preschool health survey was conducted from February 2019 to January 2020. Survey was carried out in and around a 15 km hilly region (18°15'08.9"N 74°00'05.0"E) of Purandar Tehsil, M/S, India. Survey was conducted with the aim to assess the impact of environment on health related problems among the rural preschool children of age group 3 to 6 years. Sub-clinical examinations of 582 preschool children were carried out by trained surveyors. Parameters considered for the survey were presence of vitamin A deficiency (xerophthalmia, Bitot spot, night blindness, conjunctival xerosis etc.), scleral melanocytosis, skin infections etc. Photographs are taken with Sony cyber-shot DSC-W230 12 MP Digital Camera with 4x Optical Zoom. WHO guidelines were followed during the study. Data was collected and analyzed with Microsoft Excel 2007.

**Results:**

Clinical examination was carried out on 582 preschool children of age group 3 to 6 years. Vitamin A deficiency (xerophthalmia, night blindness, Bitot's spot, conjunctival xerosis), sclera melanocytosis, tooth decay and skin diseases were examined during the study.

1. Vitamin A deficiency (VAD): The survey revealed 10.3% prevalence of VAD with 1.9% Night blindness, 2.7% xerophthalmia, 2.8% Bitot's spots and 2.9% conjunctival xerosis.

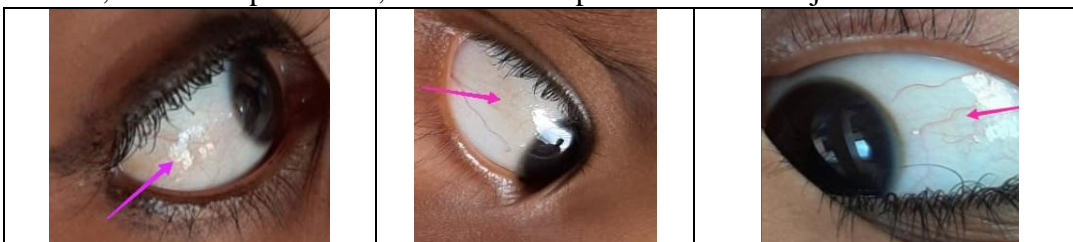


Plate-1: Pink arrows in above images indicate Bitot spots observed during survey.

2. Scleral melanocytosis (3.7%):



Plate-2: Pink arrows in images 1 to 3 indicate scleral melanocytosis observed during survey.

3. Skin diseases (5.8%):



Plate-3: Pink arrows in images indicate skin diseases observed on foot and legs.

**Discussion:**

This article reported the effect of environmental changes on high prevalence of vitamin A deficiency (VAD) diseases such as Bitot's spot, conjunctival xerosis, night blindness, and xerophthalmia. These symptoms are the sign of VAD (D.W. Khandait et.al.1999 and NNMB 2003). It is an alarm that many

nutritional deficiencies may be found in the studied area. Many nutritionists believe that VAD has declined considerably in India (N. Arlappa 2011), but the present study also indicates that there is a prevalence of vitamin A deficiency. Vitamin A is required for epithelial development. Deficiency of vitamin A causes Bitot's spots (Plate-1) which may be a replacement of conjunctival epithelium to the keratin layer. If VAD is removed, tissues return to their normal pattern (Ranjeeta Chatterjee 2014). Bitot's spots were observed in 2.8% of preschool children. It was noted that in the conjunctiva of eyes Bitot's spots were located to temporal portion of cornea. These Bitot's spots were typically triangular keratinized spots. The lesions of Bitot's spots were dry patches not wetted by tears. Few Bitot's spots were appeared foamy. Bitot's spots are localized areas of xerosis its appearance might be depends accumulation of bacteria on a site of bulbar portion of conjunctiva of eyes (William J. Darby et. al. 1960). Presence of Bitot's spots indicates vitamin A deficiency in population (D.W. Khandait et.al.1999; NMB 2003).

A blackish blue-gray colored pigmentation in the white portion of the eyes with normal vision was recorded in the present study. The grayish areas of pigmentation were determined to be scleral melanocytosis. Scleral melanocytosis is a common pediatric condition characterized by development of gray-blue pigmentation in the scleral tissues of the eyes (Sharad Giramkar 2020). Histologically, bipolar and multipolar dendritic melanocytes were found in the sclera of the eye, it may be associated with benign conditions (Leung AKC 1999 and Nilendu Sarma 2019).

Present study revealed that 5.8% of preschool children were affected by skin infections. Fungal skin infections were the most common in the studied area followed by bacterial and viral infections. It may be due to the presence of higher average humidity (86%) in the area. The humid environment allows the microbial growth on walls of school and houses. These microbes may cause severe skin infections. Vaccination is an excellent option for protection from these microbe (Paller AS et. al. 2011). It was also observed that children below ten years of age were the prime target of the Hand, Foot and Mouth diseases (HFMD) in the study area. It was noted that children were regularly suffering from mild fever with skin problems.

### **Conclusion and Recommendations for future research:**

The present study revealed the environmental change as well as vitamin A deficiency was prevalent in the study area. Environmental changes cause skin infection among preschool children. Vitamin A deficiency symptoms were night blindness, xerophthalmia, Bitot's spots and conjunctival xerosis. The other health issues observed were Scleral melanocytosis among the preschool children. We brought parents attention to these health issues and created awareness about climate change, skin diseases and importance of vitamin A in diet. There is an urgent need for further investigation and treatment on these health issues.

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