

# Effects of high altitude in pregnancy: an opportunity of research in KAHS

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## INTRODUCTION

Pregnancy is a special condition in a women's life with unique physiological changes. There has been some research on physiological changes in human body in high altitude; however, there are many things still unknown about pregnancy at high altitude. It is an estimation that about 140 million people worldwide live in high altitude of above 2500 m, and it is believed that the hypobaric hypoxia of pregnancy at high altitude is the most common cause for maternofetal hypoxia.<sup>1</sup> It has been seen that the babies born at high altitude are smaller, and the degree of smallness is inversely correlated with the number of generations of ancestors of high-altitude residence. Some studies show that women in populations with high-altitude ancestry, such as the Aymaras or Quechuas in South America and Tibetans in Asia, deliver heavier babies than women from European ancestry in South America or Han women in China living at high altitude.<sup>2</sup> A study by Jensen and Moore<sup>3</sup> shows that in Colorado, altitude acts as an independent factor in determining birth weight, with a reduction in birth weight of 100 g per 1000 m elevation gain.

Studies have shown that low birth weight at high altitude has no association with socioeconomic status.<sup>4,5</sup> hence, it may reflect either hypoxia-induced intrauterine growth restriction or genetic adaptation. The latter implies a strong fetomaternal interaction involving adaptation to hypoxia on several levels. It also reflects the importance of interaction between the

mother and the fetus which is stressed by the fact that better maternal ventilator response to hypoxic stress at high altitude correlates positively with birth weight.<sup>6</sup> Another study shows that people living at altitudes of 4000 m and above have an arterial partial pressure of oxygen of 50 mmHg and an arterial oxygen saturation of just above 80%.<sup>7</sup>

There has been many studies on populations living in high-altitude regions for many generations, like Quechuas and Tibetans, which show many functional and structural adaptations in high altitude. This adaptation helps to allow for a way out for the main metabolic problem they face: maintaining an acceptably high scope for sustained aerobic metabolism despite reduced availability of oxygen in the inspired air.<sup>8</sup> The functional adaptation to high altitude is measured indirectly by determining aerobic capacity, which reflects not only the maximum work performance but also the success of the individual's biological oxygen transport system.<sup>8</sup>

## CONCLUSION

Karnali Academy of Health Sciences is situated at an altitude of around 2500m and is potentially the site where research on high-altitude physiology in various health conditions including pregnancy can be conducted, such as whether low birth weight is due to fetal growth restriction or physiological adaptation and related changes and adaption in placenta can

be studied. Likewise, the role of growth factors and changes in body system to get adequate oxygen to the baby is also a potential area of research.

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