

Tibetan Diary: From Birth To Death And Beyond In A Himalayan Valley Of Nepal

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Ethnically Tibetan women in Nepal with low hemoglobin concentration have better reproductive outcomes

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ABSTRACT

Background and objectives: Tibetans have distinctively low hemoglobin concentrations at high altitudes compared with visitors and Andean highlanders. This study hypothesized that natural selection favors an unelevated hemoglobin concentration among Tibetans. It considered nonheritable sociocultural factors affecting reproductive success and tested the hypotheses that a higher percent of oxygen saturation of hemoglobin (indicating less stress) or lower hemoglobin concentration (indicating dampened response) associated with higher lifetime reproductive success.

Methodology: We sampled 1006 post-reproductive ethnically Tibetan women residing at 3000–4100 m in Nepal. We collected reproductive histories by interviews in native dialects and noninvasive physiological measurements. Regression analyses selected influential covariates of measures of reproductive success: the numbers of pregnancies, live births and children surviving to age 15.

Results: Taking factors such as marriage status, age of first birth and access to health care into account, we found a higher percent of oxygen saturation associated weakly and an unelevated hemoglobin concentration associated strongly with better reproductive success. Women who lost all their pregnancies or all their live births had hemoglobin concentrations significantly higher than the sample mean. Elevated hemoglobin concentration associated with a lower probability a pregnancy progressed to a live birth.

Conclusions and implications: These findings are consistent with the hypothesis that unelevated hemoglobin concentration is an adaptation shaped by natural selection resulting in the relatively low hemoglobin concentration of Tibetans compared with visitors and Andean highlanders.

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