An Ecology of High-Altitude Infancy

Andrea Wiley investigates the ecological, historical, and sociocultural factors that contribute to the peculiar pattern of infant mortality in Ladakh, a high-altitude region in the western Himalaya of India. Ladakhi newborns are extremely small at birth, smaller than those in other high-altitude populations, smaller still than those in sea-level regions. Factors such as hypoxia, dietary patterns, the burden of women's work, gender, infectious diseases, seasonality, and use of local health resources all affect a newborn's birthweight and raise the likelihood of infant mortality. *An Ecology of High-Altitude Infancy* is unique in that it makes use of the methods of human biology but strongly emphasizes the ethnographic context that gives human biological measures their meaning. It is an example of a new genre of anthropological work: "ethnographic human biology."

Andrea S. Wiley is Associate Professor of Anthropology at James Madison University. She has published in *Medical Anthropology Quarterly*, *Social Science & Medicine*, *American Journal of Human Biology*, *Journal of Biosocial Science*, and *High Altitude Medicine and Biology*, among others. Dr. Wiley has traveled extensively in South and Southeast Asia, Europe, and North America.

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An Ecology of High-Altitude Infancy

A Biocultural Perspective

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For Aidan and Emil

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Acknowledgments

The research on which this book is based and the actual writing of the manuscript collectively span more than a decade. Inevitably, there have been changes in my perspective and substantial contributions to the relevant literature that have forced me to abandon previously held assertions and working hypotheses. At the same time, there have been some enduring themes and motivations for remaining engaged in this project. One result is that the list of those who have influenced and facilitated this work has grown ever longer. It is a pleasure to acknowledge the intellectual, financial, and personal inspirations of this work.

I was initially drawn to anthropology because of its commitment to holism. Caught between interests in the social and biological sciences, but not sufficiently compelled by any of the existing disciplines I explored in college, I chose an interdisciplinary major that required an introductory course in biological anthropology. I was hooked in short order; this was exactly what I was after – a venue for exploring humans as both social and biological without having to sacrifice one for the other. Ultimately I chose to pursue what was then the "emerging" field of medical anthropology, as it held the promise of an approach that was intrinsically biocultural – how could one not think of health as both biologically based and socially situated?

Though anthropology's uniqueness is holism, in reality the field's commitment to this foundation waxes and wanes, and even its most ardent supporters realize that while easy enough to hold up as an ideal, it is difficult to put into practice. The subdisciplines require specialization in theory, research methods, and data, and within the context of fieldwork not all relevant questions can be asked or answered. Further, although the term "holism" implies consideration of the "whole," it also refers to the interdependence and relationships among different facets of culture and biology. Thus, although some of the research questions and methods described in this work are quite focused (measuring fatfolds on newborns certainly seems to represent a pretty narrow slice of reality), I have always

tried to frame the specific by linking it to the larger socio- and natural ecological context.

This book is intended as a celebration of my initial discovery of anthropological holism. I consider it to be a new genre, what I term "ethnographic human biology" or "biocultural ethnography." While some human biologists and probably more ethnographers are likely to take issue with these labels and each may find gaps in the biological or ethnographic details, I want to emphasize that both have contexts that are often not fully appreciated. Ethnography, especially one that deals with health issues, might profit from considering the details and evolutionary history of human biological makeup. Likewise, human biology can never be fully understood without considering the myriad social and cultural forces that ultimately impinge on biological function. To some, these statements may seem tired and worn at this point, but I hope that this book represents an effort to put them into practice, to reaffirm that holism is neither empty rhetoric nor an impossible ideal.

My commitment to biocultural work has endured, but the nature of my relationship to the topic of maternal and infant health and the data presented in this book has changed a great deal as a result of my own experiences with reproductive health. When the research was done I had no children of my own; while writing the book, I gave birth to two sons, now aged two and five years. What had been a population-based study, focused on average birthweight and the rates and probabilities of infant mortality in a remote mountainous area of India (Ladakh), became a more emotionally laden topic that was difficult to engage in sometimes while writing. I can no longer think about birth, nursing, infant health, and infant death with the same kind of purely intellectual interest coupled with emotional detachment that I was able to maintain throughout the research and early analysis. Although the data are primarily quantitative, I found myself forced to consider each hard labor, each tiny infant, and each early death a unique and deeply painful experience for these mothers, their babies, and their families. As I note in the text, emotional responses to infants and infant deaths are quite different in Ladakh than in the American cultural context, but I cannot help feeling anxious and depressed when I think about the fragility of Ladakhi newborns and the precariousness of their early lives as well as their mothers' anxiety over their survival.

This changed emotional responsiveness is undoubtedly recognizable by other parents, especially those with small children, but it also relates to a more specific experience with my second son, who was hospitalized at aged three months for a prolonged period with RSV, respiratory syncitial virus. RSV, which I discuss in more detail in Chapter 6, is a particularly

insidious, and life-threatening viral infection for infants, as their bronchioles are small. RSV damages these tissues and causes inflammation sufficient to dramatically impede their oxygen uptake. My son had either a particularly severe form or an underlying propensity for inflammation of the airways, probably both, as he was rehospitalized a month later with non-RSV bronchiolitis, and again with RSV when he was just over one year old. The symptoms associated with RSV include respiratory distress (rapid breathing, gasping for air, wheezing) and may require exogenous oxygen for the infant to maintain adequate oxygen saturation. While the experience of watching my child struggle with breathing has been difficult enough, when I think of this in the context of Ladakh, it is even more horrifying, as there it occurs against the backdrop of an environment deficient in oxygen (hypoxia) and in a context in which health care resources are not adequate to provide infants with supplemental oxygen while they fight off the disease. Even a minor lower respiratory tract infection in this context can precipitate respiratory distress; in the hospital in Ladakh where I worked, respiratory distress and bronchial pneumonia were the most common diagnoses for infant admission to the hospital as well as the most common causes of infant mortality. In light of my work in Ladakh I am ever more profoundly grateful to have had ready access to the health care resources that kept my son alive. At the same time, I am nothing short of outraged by the comparison. My son needed supplemental oxygen, some generic inhaled medicines, and basic monitoring while he slowly recovered; these my local community hospital easily provided and insurance, thankfully, covered. And yet this is well beyond what any Ladakhi baby could hope for in the best of the local public biomedical facilities. As I think back to the young infants who died in the hospital in Ladakh, I now see my son among them. Sadly, although the chronicity of his condition remains to be seen, his pulmonary problems preclude a return to Ladakh with my family for the foreseeable future.

On a lighter note, my own experience has also been quite at odds with that of Ladakhi mothers and infants. My first son weighed in at nine pounds, ten ounces, a weight unheard of among Ladakhi newborns, none of whom weighed more than eight pounds, five ounces in my study of 168 newborns! At over the 90th percentile, he was large by American standards, but monstrous by Ladakhi standards, which I had come to adopt by the end of the research. It further indicates that anthropology requires not only the appreciation of cultural relativism, but biological relativism as well.

So, first I must acknowledge my great fortune in having these wondrous children who have provided me with profound insights into reproduction and its risks and rewards, which have enriched this work

tremendously. Likewise my husband, Richard Lippke, has steadfastly supported this project in part by helping me balance parenting, scholarship, and subsistence.

My sister, Marcia Wiley, visited Ladakh three times while I was there, and her own research on water quality issues in Leh enhanced the analysis of child morbidity patterns. Her perennial enthusiasm and adventurous zeal kept my spirits up when they began to flag. With her I ventured well beyond the Indus valley where I was able to learn more about women and children who lived far from the hospital and experience some of the dangers and beauty of foot travel among villages. Although my parents never made it to Ladakh, their love of the outdoors and quest for challenging experiences introduced me to mountains at a young age, and they never questioned my decision to become an anthropologist or to strike out on my own to the farthest reaches of the Himalaya. And although our paths diverged many years ago, I must thank Brian Holmes for introducing me to South Asia and its many pleasures.

E. A. Hammel, in the department of demography at the University of California, Berkeley, was an attentive advisor and mentor and provided me with a congenial environment in which to complete my dissertation. The other readers of my dissertation – Fred Dunn, Janet King, and James Anderson – are also to be credited with helping me refine my ideas and analysis. I am indebted to a long line of scholars in human adaptability studies and biocultural approaches to human biology; of them I would like to specifically thank Mike Little, whom I was fortunate to work with at Binghamton University (SUNY), and also Brooke Thomas and Rebecca Huss-Ashmore, with whom I have not worked, but whose work I have always admired and which has profoundly influenced mine. Sol Katz was my original mentor at the University of Pennsylvania. His creative spark, particularly his ideas about food and biocultural evolution, continue to inspire my own research. Colleagues Ivy Pike, Nancy Winterbauer, Leslie Carlin, Alex Brewis, Catherine Panter-Brick, Debbie Blackwell, and many others have encouraged me and engaged in insightful discussion about some of the issues raised in this book.

I have been inspired by the work of Helena Norberg-Hodge and others at LEDeG and by their dedication to the well-being of Ladakhis and a sustainable future for Ladakh. They have encouraged me to think beyond the narrow scope of this research project to the social and biological health of Ladakhis and their unique environment.

Alan Harwood and three anonymous and conscientious reviewers provided an incredibly constructive set of comments and suggestions, which have improved the book greatly. Lapses, inaccuracies, or other shortcomings, while I hope they are minimal, are entirely attributable to me.

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In Ladakh, I am grateful to the Lden family, especially both Aches Tsewang Drolma and their children, for their hospitality, care, and support. They were truly a second family to me, enduring my faltering spoken Ladakhi and poor gardening skills. I feel lucky to have been included in their lives. My sincerest thanks and appreciation go to Dr. Tsering Ladhol, who allowed me to undertake this project in her department and taught me the basics of obstetrics. I have a profound admiration of and respect for her humility and dedication to the well-being of women and children in Ladakh. Without her, this project would not only have been impossible, but her interest in it continued to stimulate my research efforts. I would also like to acknowledge the help of Dr. Stanzin Thundup and other doctors at the Sonam Narboo Memorial Hospital for sharing their knowledge and materials with me. Likewise, this project would not have gone so well without enthusiastic assistance of the labor room nurses and the students in training there who went out of their way to help.

And finally, most humble thanks and boundless appreciation to the women of Ladakh who participated in this study. They patiently endured my questions during a particularly intimate, draining, and critical moment in their lives. And of course to their fragile newborns, who endured my seemingly endless measurements, some with placidity, some with fury. I mourn those who died and celebrate those who survived and are now teenagers! The depth and complexity of their experiences are so much more profound than is portrayed in this account; I only hope that I have not done them any injustice.

As I write these final words, conflict between India and Pakistan over the status of Kashmir continues, with both countries amassing troops along their borders, which extend along the northern and western ends of Ladakh. The scale of this threat is potentially quite profound because both nations have nuclear capability. Ladakh is not part of the disputed area, so its largely Buddhist population is not at the heart of the conflict, but, nonetheless, the large military presence there means that it is involved in these hostilities. Fortunately, massive offensives have been

avoided to date, but fighting between anti-government forces and the Indian military within Kashmir contributes to internal dangers, as well as to political and economic instability. Many countries have warned their citizens not to travel to this region, and tourism, which had become one of the mainstays of the Ladakhi economy, is plummeting. Predicated in part on the outcome of these ongoing conflicts, the future of Ladakh is unpredictable and may very well be quite different from the situation described in this book.

Abbreviations

ANM	Auxiliary nurse midwife – a biomedically trained nurse assistant
EGA	Estimated gestational age – the age of the newborn, in this study estimated from the mother's fundal height at admission for labor; also measured from date of last menstrual period
IMR	Infant mortality rate (birth–1 year) – calculated from the number of infant deaths, usually expressed per 1000 births or infants at risk
LBW	Low birthweight – birthweights <2500 grams
NMR	Neonatal mortality rate (birth–28 days) – calculated from the number of deaths of infants less than one month old, usually expressed per 1000 births or infants at risk
PEM	Protein-energy malnutrition
PI	Ponderal Index (weight (g)$*$100/length^3)
PIH	Pregnancy-induced hypertension – blood pressure readings above 140/90 during pregnancy
PNMR	Postneonatal mortality rate (1–12 months) – calculated from the number of deaths to infants one month to twelve months of age, usually expressed per 1000 births or infants at risk
RSV	Respiratory syncitial virus – a lower respiratory tract infection of the bronchioles that is extremely dangerous for young, especially premature, infants insofar as it reduces oxygen uptake
SGA	Small for gestational age – usually <2500 grams, or <10th percentile in weight
TBA	Traditional birth attendant

Glossary of Ladakhi Words

When possible, spellings of Ladakhi words were taken from Norberg-Hodge and Palden (1991) or follow conventions in wide usage for Ladakhi terms.

amchi	practitioner of Tibetan medicine
ane	respected female Buddhist nun
balang	Ladakhi cow
chang	local beer brewed from barley
chodkhang	household temple
chomo	Buddhist nun
dzo	yak-cow hybrid (*dzomo* if female)
gonpa	Buddhist monastery
gos	a heavy woolen or velvet coat worn over underclothes by Ladakhi women
gur-gur cha	Ladakhi tea, with salt and butter
khambir	homemade flat bread made of barley or wheat flour
khang-chen	"big house"; main house within an extended household compound
khang-chung	"small house"; one of the smaller houses within a household compound
kolak	a common preparation of *tsampa* mixed with *gur-gur cha*
lama	Tibetan Buddhist monk
lhaba	Ladakhi shaman or oracle (*lhamo* if female)

lhu	underground spirit, especially related to water sources
marzan	barley flour mixed with butter and sometimes sugar
mik-ya	evil eye
nyingka	heart; "heart-stomach"
oma	milk
onpo	astrologer
phaspun	household mutual-aid network
rdun	seven; also a celebration of the birth of a child (held ~1–2 months after birth)
tsampa	ground roasted barley flour
tukpa	a thick soup made of vegetables and or meat and barley or wheat noodles
yak	large Himalayan bovine species (*dimo* if female)
zhing	field

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