



Warmmie Onesie – Thermal protection for Peruvian infants

Belinda T. Orzada, Patience Ankomah, Sheiron Crawford, ChaCha Hudson, Leah Jackson, Stephanie Joseph, Kelsey Kosinski, Ashley Paintsil, Cheyenne Smith, and Natalie DiPopolo

University of Delaware, USA

Keywords: hypothermia, infant clothing, Q'eros Nation, Peru

Introduction. Infant mortality rates due to hypothermia are extremely high in the Q'eros nation of Peru. The purpose of this design research was to develop a garment/wrapping system that will help the infants maintain adequate body temperature to prevent cold related illness/death and at the same time be compatible with Q'eros cultural traditions.

Significance of the problem. The remote villages of the Q'eros are located at an altitude of over 4,400 meters above sea level in the snowcapped Vilcanota mountain range of Peru. The Q'ero people are widely known as the most traditional people in the entire region. Strict traditions and deeply instilled practices restrict the nation from adapting modern day practices of the “western world.” This adherence to ancestral practices provides a barrier between tradition and more modern methods of childcare.

Q'ero infants and toddlers are carried in mantas pouches (large shawls) tied on their mothers' backs, and while they are dressed in layers, they are still affected detrimentally by the cold (Tronick, Thomas & Daltabuit, 1994). This issue is due to multiple factors. Infants are unable to regulate their own body temperature effectively due to increased surface area, causing quicker heat loss. Babies also have less insulating body fat than adults, resulting in lower energy reserves. Thus, babies who are sick may take longer to get better because they are using their energy for producing heat, rather than curing themselves.

The First Step Grand Challenges Program invites undergraduate students from all disciplines to identify an important health related, societal and/or environmental problem and develop a novel solution that addresses it. Students in the nursing program at our university identified the aforementioned issue based on research during a pediatrics course and the experiences of their professor who regularly travels to this region of Peru. The nursing faculty then reached out to our department to assist in developing wearable solutions based on the nursing students' research. This research led to the recommendation of alpaca for its warmth, breatheability, and regional availability, and swaddling methods of wrapping infants to retain heat.

Methods. After meeting with a nursing professor and student to learn of the issues, graduate students in a design research course independently researched Peruvian culture, traditional

References

Lamb, J. M. & Kallal, M. J. (1992). A conceptual framework for apparel design. *Clothing and Textiles Research Journal*, 10(2), 42-47

Tronick, E. Z., Thomas, R. B. & Daltabuit, M. (1994). The Quechua manta pouch: A caretaking practice for buffering the Peruvian infant against the multiple stressors of high altitude. *Child Development*, 65(4), 1005-1013.