



THE QUEST FOR A SUSTAINABLE WOUND MANAGEMENT SOLUTION FOR RURAL AREAS OF TROPICAL DEVELOPING COUNTRIES

Richard Benskin¹ And Linda Benskin, PhD, RN, SRN (Ghana), CWCN, CWS, DAPWCA, WOCNF^{1,2} 1. Benskin Research Group; 2. Ferris Mfg. Corp. LindaBenskin@utexas.edu

The Benskins' independent research provides the evidence needed to educate village health care workers so that they can improve healthcare, with an emphasis on wound care, in remote areas of tropical developing countries. It is funded by individual donations, supplemented by occasional small grants or scholarships.

BACKGROUND: THE PROBLEM

Unrelenting heat, poor sanitation, lack of knowledge, and poverty contribute to a disabling wound prevalence that often exceeds 20% in rural areas of tropical developing countries.¹ Rather than chronic wounds usually being related to a chronic illness, in developing countries most chronic wounds are the result of an ineffectively managed acute wound.^{1,2} In villages, traditional health practitioners (THPs) and village health workers (VHWs), rather than health professionals, often provide health care when self-care fails.^{1,3} The scant published research about wounds in this setting shows that outcomes are poor and costs are high; wound management strategies of all three groups of lay healthcare providers are often ineffective.^{1,4}

Wound management *education* for these nonprofessional health providers should include only sustainable practices which have proven safe and effective in the tropical village setting (they must have ecological validity).¹ An extensive literature review found few moist improvised dressing solutions; just one (plastic wrap) was potentially modifiable to be sustainable in a tropical village setting.⁴ *The literature search also revealed that usual practice data, essential for designing a comparison study, was completely absent from the published literature.*⁴

METHOD

This pilot study introduced an innovative Story Completion data collection method to overcome cultural obstacles which have prevented researchers from obtaining meaningful data in this challenging setting.⁵ The investigator interviewed a VHW, a traditional health practitioner, and an untrained villager who performs wound care in every one of the 25 diverse villages throughout Ghana which met study criteria to elicit detailed descriptions of current usual wound management methods.^{1,5} The 75 participants were asked to complete the stories of seven real patients, each representing a common wound problem found in this setting (abscess, burn, infected acute leg ulcer, chronic ulcers, trauma, osteomyelitis, and cancer), *without prompts*.^{1,5} The seven wound types and cases were chosen in a qualitative pre-study with Ghanaian village wound experts.¹

The results from throughout Ghana were validated, using the Story Completion data collection method and the same seven patients, with community nurses and wound patients in rural Zambia, and traditional health practitioners in two ecosystems in Cambodia: floating villages, and farming areas.

The choice to limit the study to descriptions of *topical* wound interventions avoided confusion regarding supernatural verses physical *systemic* treatments.⁵ The stated *goals* of the participants' choices were compared with modern wound management principles because it was not possible to judge the *effectiveness* of their choices using only conversations.⁵

Asking carefully worded open-ended questions allowed the researcher to avoid inferring that any particular aspect of wound management, such as cleansing, is expected.^{1,5} Responses were tabulated and categorized as congruent (or not) with modern topical wound management principles within three domains and six subcategories (see table in Results).^{1,5} Discrete responses for each aspect of wound management for each wound type were coded onto a spreadsheet and analyzed using standard quantitative statistics with SPSS.¹ Four research questions were addressed with descriptive statistics and ANOVA.¹ UTMB's IRB approved the pilot study.¹

STUDY SETTINGS

The authors' improvised dressings research is focused on the locations that combine the highest microbial challenges (the tropics) with the fewest resources (rural areas of the world's lowest income countries). (Map on right) The targeted nations are highlighted in green. It is assumed that dressings proven safe and effective here will work well in less challenging settings, too.

Ghana, about the size of the UK, is between the Equator and the Sahara Desert and has no mountains. The temperature in Northern Region rarely falls below 60°F, and can soar to 135°F.

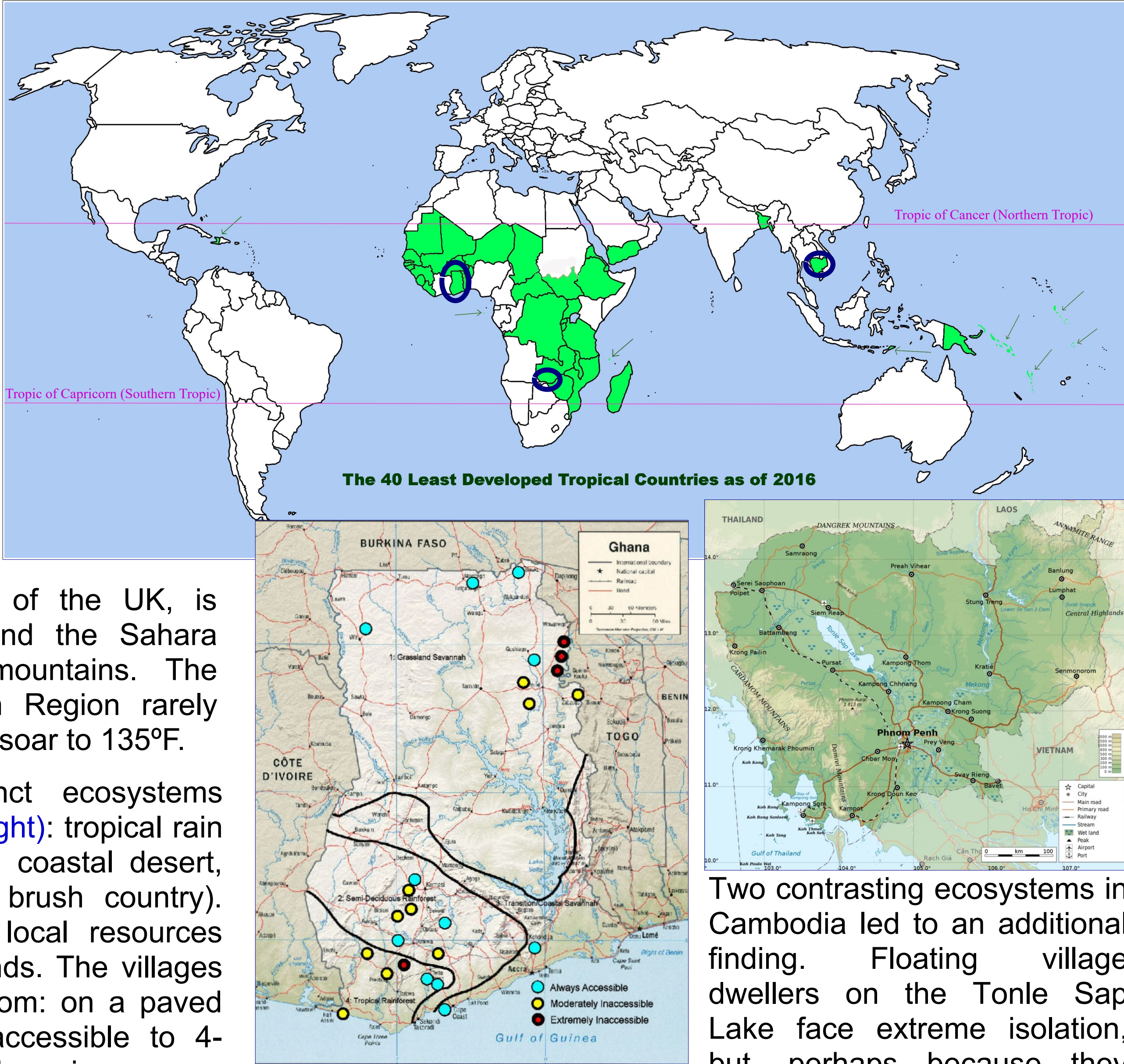
Ghana has four distinct ecosystems (black lines on map on right): tropical rain forest, hilly forest area, coastal desert, and the Sahel (sparse brush country). Each area has unique local resources which are used for wounds. The villages ranged in accessibility from: on a paved road (blue dots), to inaccessible to 4-wheel-drive vehicles in the rainy season (red dots), with yellow in between. Surprisingly, ecosystem and accessibility did not influence the likelihood of referral to a hospital.¹

Traditional health practitioners ranged from herbalists with Red Cross training to self-proclaimed "witch doctors."

LOGISTICS



Conducting the pilot study in Ghana simplified logistics. The researcher taught VHWs while working with a Christian clinic while living for five years in the Northern Region. She retained friendships and speaks the main trade language, Ghanaian English. This clinic (above) provided a 4WD pickup for the entire 3 months, plus housing and interpreters for their area. A sister clinic provided an interpreter for the forest area. Several Ghanaian friends opened their homes. Preachers from across Ghana who had attended health courses while the researcher lived in Ghana volunteered to interpret, even insisting upon paying their own bus fares. Friends assisted with logistics in Zambia and Cambodia as well.



Zambia, in SE Africa, is more culturally and geographically homogeneous. Temperatures are cooler. Remote villages are, however, still served primarily by traditional health practitioners.

STUDY LIMITATIONS

1) The story completion method prohibits asking questions. This prevents clarifications, as well. Although anecdotally boiling water poured onto wounds injures patients in villages, this could not be verified because the temperature of water for cleansing was never described.^{1,2}

2) Participants stated only what they considered significant. A traditionalist removed bandages to



show the researcher how effective his poultice was, revealing a plastic bag holding the herbal remedy together. Although healing could have been enhanced by the moisture-retentive plastic, to him it was merely a convenience.¹

Modifying the Story Completion study design to encourage observations and questions *after* the interviews would address both of these limitations without decreasing the accuracy of the responses.

The authors thank Ferris Mfg. Corp. for printing this poster

RESULTS OF THE PILOT STUDY IN GHANA

Wound management practices of nonprofessional health care providers in tropical villages were identified and described in detail for the first time. More than 50% of the time, the study participants' goals were compatible with modern wound management principles.¹ While safe wound cleansing and debridement were not described consistently, most of the providers described moist wound

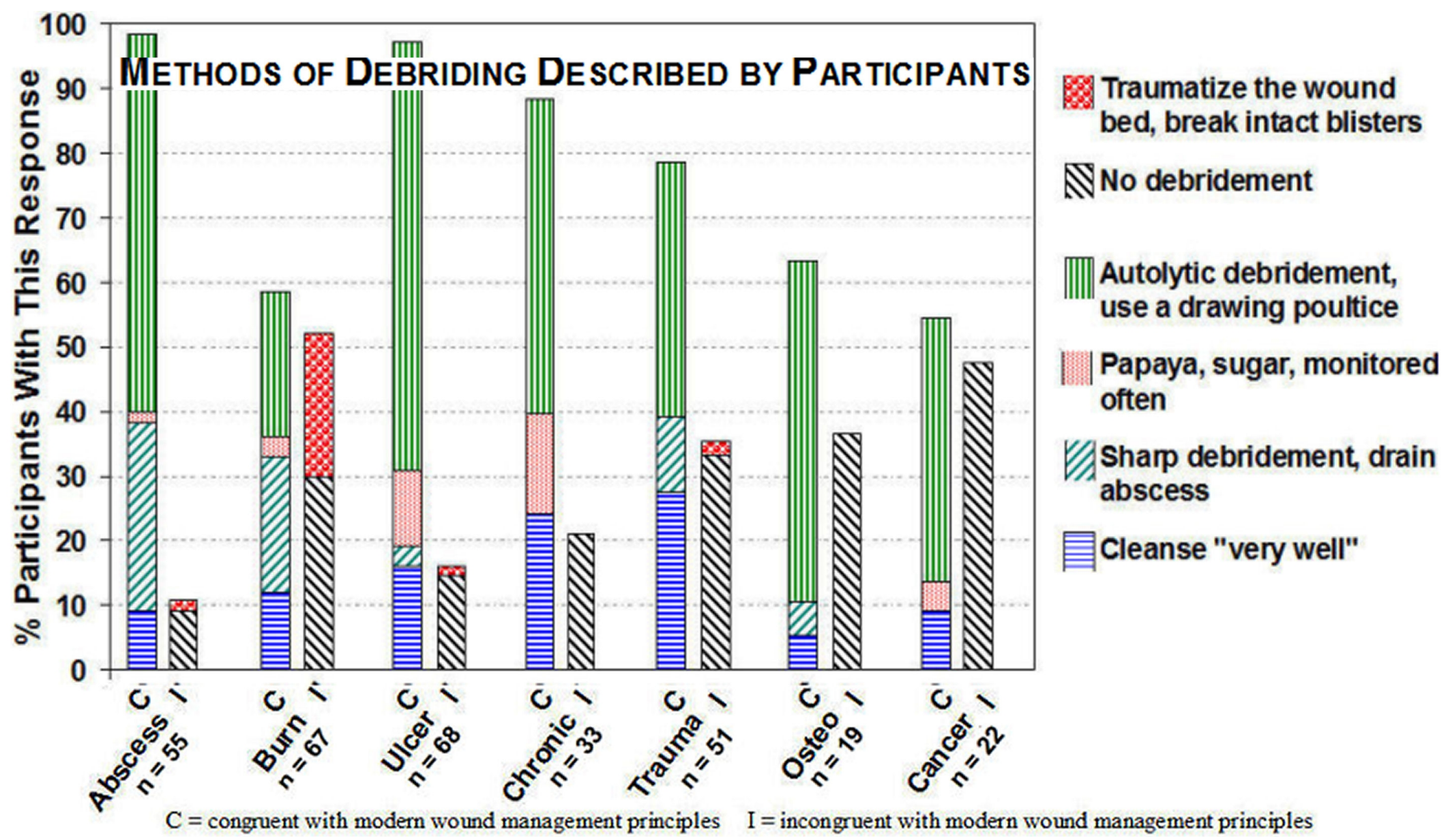
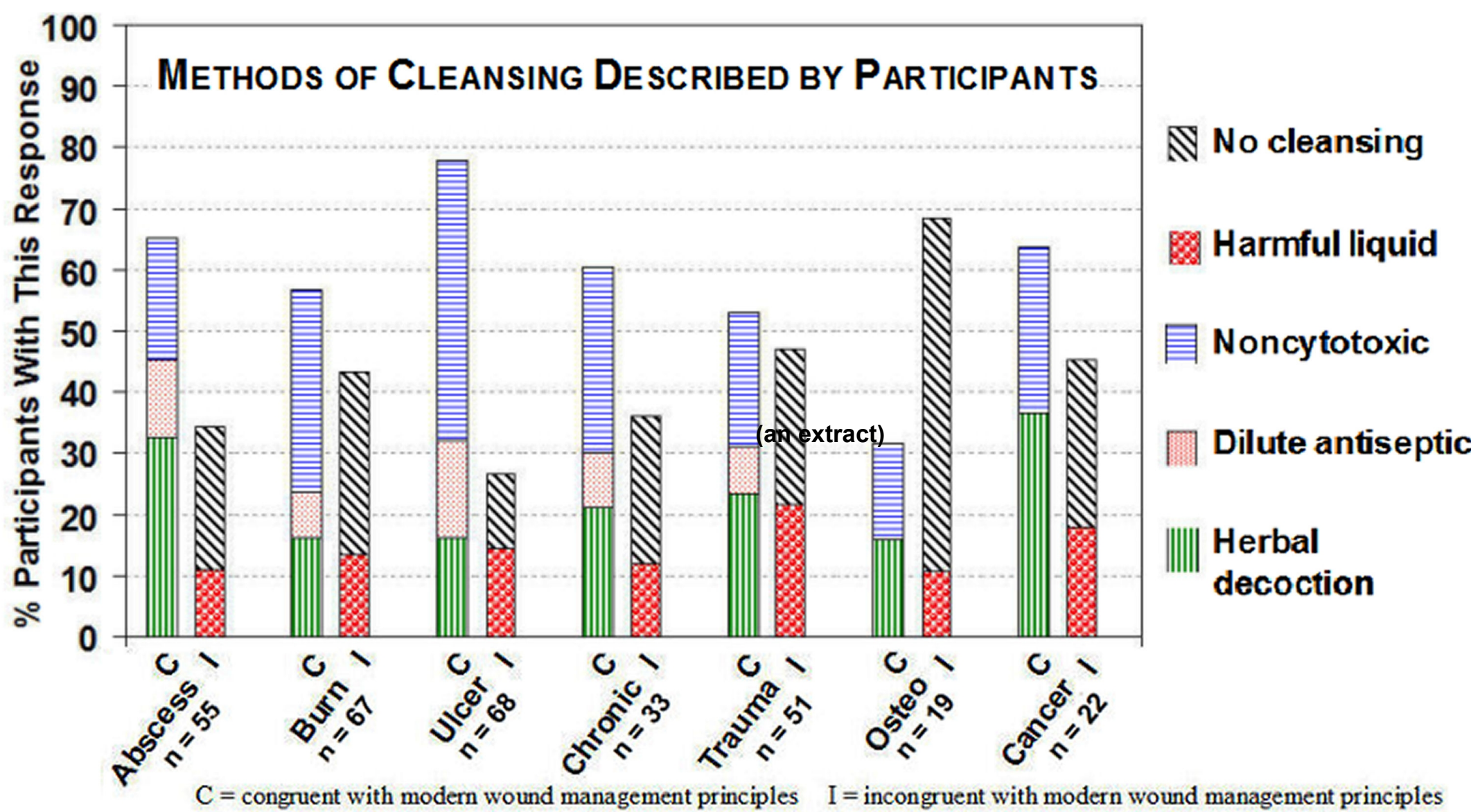
ORGANIZATION OF DATA (FOR EACH WOUND TYPE)		
	Congruent with modern wound principles?	
	Yes	No
I. Wound Bed Preparation		
A. Cleansing		
B. Debridement		
II. Wound Treatments		
A. Infection/Moisture Control		
B. Inflammation/Edema Control		
III. Wound Dressings		
A. Commercial Materials		
B. Indigenous Materials		

treatments, regardless of the wound type.¹ Most participants cover wounds with either a bandage of cloth strips or an occlusive herbal poultice.¹ Although their intent is to keep the wounds moist, these coverings clearly cannot always adequately accomplish this goal.

The responses included many unanticipated choices, confirming the expectation that a conventional survey would not have captured accurate descriptions.¹ No participant mentioned honey. This was expected, because the honey sold in villages in the tropics is dark and watery.¹ Maggots, when mentioned, were universally described as harmful.¹ Traditional health providers were the lay providers most likely to attempt to manage, rather than refer, patients with osteomyelitis or cancer.¹

A SNAPSHOT OF THE DETAILED RESULTS

(Complete results available at: www.hdl.handle.net/10755/299522)



CAPTURING USUAL PRACTICE

Many participants provided demonstrations and pantomime when local languages were inadequate to describe what they would do in a given situation, e.g., making a sling with a head scarf, or crushing a leaf to make a poultice. Some even brought patients to display their work. Some traditional health providers gave general answers but were secretive about the specific plants they use, while others brought the researcher samples, or even showed off their talismans (below).



Throughout Ghana, participants would use powder from burnt shells of black-fleshed snails on intact burn blisters to "deflate them quickly, healing the burn" (above).

CONCLUSION

The 75-participant pilot study and subsequent smaller studies in Zambia and Cambodia provided usual practice data needed to design a comparison study to help ensure the ecological validity (safety and effectiveness) of wound management recommendations for villagers. In contrast with non-experts world-wide, moist wound management was preferred by the lay wound experts (VHWs and THPs) in each tropical ecosystem, just as it is by wound specialist health care professionals in temperate climates.

This information was foundational to the process of developing a culturally and environmentally appropriate method of wound management for indigenous wound care providers in rural areas of tropical developing countries. The resultant technique is based on improvised dressings used in Japan, the USA, and India, but modifications make it far more suitable for the tropical village setting.^{6,7,8} The RCT was conducted in 2021.^{6,9}

REFERENCES

- Benskin LLL. Discovering the Current Wound Management Practices of Rural Africans [Dissertation]. 2013. www.hdl.handle.net/10755/299522. QR.
- Oluwatosin OM. Wound Care Practices and Challenges in Nigeria: Advances in Skin & Wound Care. 2007 Jul;20(7):375-8.
- Benskin LLL. A Concept Development of the Village Health Worker. Nursing Forum. 2012;47(3):173-82.
- Benskin LLL. A review of the literature informing affordable, available wound management choices for rural areas of tropical developing countries. Ostomy Wound Manage. 2013;59(10):20-41.
- Benskin LLL. A unique "story completion" research method for obtaining accurate survey data. Poster RS14-022 presented at: The 46th Annual Meeting of the Wound Ostomy Continence Nurses Society; 2008 Jun 24; Nashville, TN.
- Benskin, L. (2021). A Test of the Safety, Effectiveness, and Acceptability of an Improvised Dressing for Sickle Cell Leg Ulcers in a Tropical Climate (Clinical Trial Registration No. NCT04479618). clinicaltrials.gov.
- Takahashi J, Nakae K, Yokota O, Nakata R, Hasegawa H, Miyagawa M. Comparison of "Semioclusive Dressing" Treatment Using Plastic Wrap or Low-Adherent Absorbent Wound Dressings Versus Occlusive Dressing Treatment for Stage III/IV Pressure Injuries in the Inflammatory Phase: A Randomized Controlled Trial. Adv Wound Care (New Rochelle). 2024 Jul 11.
- Gore MA, Umakumar K, Iyer SP. Polyethylene Surgical Drape Dressing for Split Thickness Skin Graft Donor Areas. In: Gore MA, editor. Skin Grafts [Internet]. InTech; 2013.
- Benskin R, Benskin L. Development of the available technology dressing: an evidence-based, sustainable solution for wound management in low-resource settings. Wounds. 2024 May;36(5):137-47.

