



Guided Imagery Intervention for Stress and Pain in Adults with Sickle Cell Disease

*Miriam O. Ezenwa, PhD, RN
Associate Professor
University of Florida*

Problem

- **Pain**, the hallmark symptom of sickle cell disease (SCD) affects the QOL and productivity
- Stress is a known **trigger** for the acute pain crisis of SCD.
 - Little is known about the **effects** or mechanisms of stress-reduction treatment in adults with SCD
- Adding Guided imagery (GI): Cognitive-behavioral strategies for controlling SCD pain

Purpose

- Guided by the hypothalamic-pituitary-adrenal **(HPA)** axis theory, the purpose of this pilot study was to **test** the **feasibility** of a GI stress reduction intervention protocol in adults with SCD.



Conceptual Framework

- The HPA theory posits that stress is associated with **over-activation** of neurotransmitters and hormones (e.g., **cortisol**, norepinephrine, and epinephrine) that cause flight-or-fight responses and intensify responses to pain.
 - Therefore, GI is expected to **reduce** self-reported stress and pain
 - Cortisol will serve as a **biomarker** of the physiological response underpinning the self reports

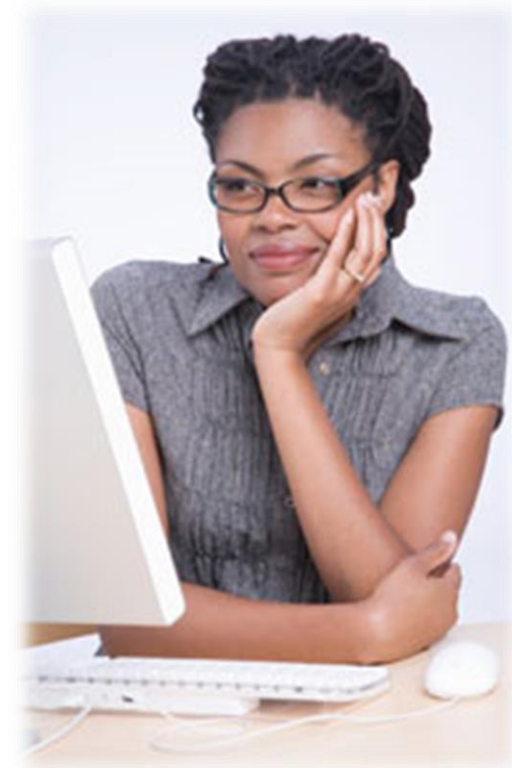
Study Design

- **2**-phase, attention control pre-post **randomized** clinical trial
 - Focus today: **Phase 1**



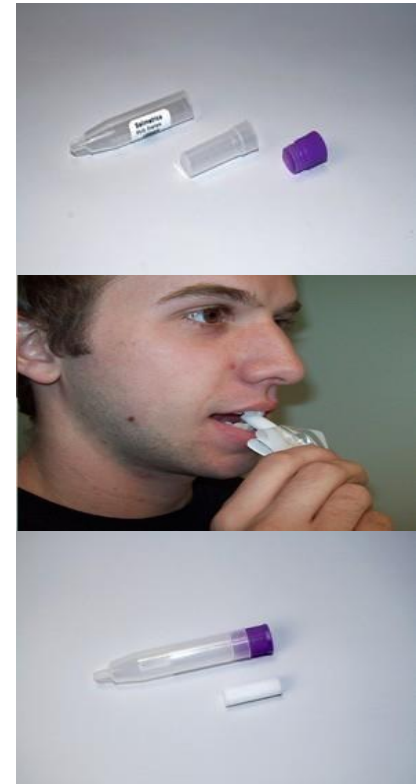
Sample Characteristics

- Sample: **27** adults with SCD
- Median age: **32 years ± 10**
 - [Range: 21-59 years]
- **85%** African Americans
- **70%** women



Measures

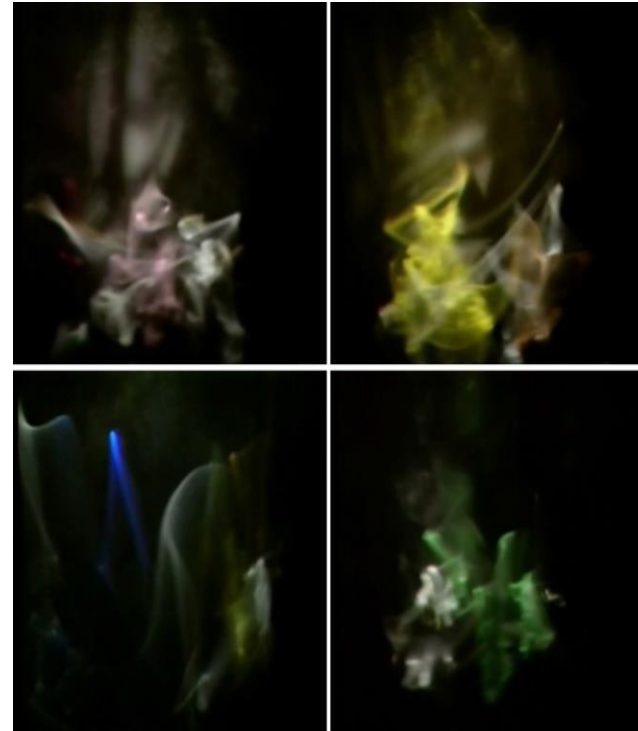
- Patients completed PAINReportIt® questions regarding:
 - **Pain** and **Stress** measures:
 - Current pain
 - Current stress
 - Patients provided swab derived **saliva** samples for cortisol measurements at **0 min** and **30 mins**



Salimetrics© Salivettes

Measures

- **Experimental Condition:**
 - **Six** video clips (2-min, 5-min, 8-min, 10-min, 15-min, and 20-min length)
- Demographics



Analysis

- Linear regression along with bootstrapping
 - Determine the **effects** of GI on current stress, current pain, and cortisol concentrations
- Salivary **cortisol**: Measured in duplicate by enzyme-linked immunosorbent assay (**ELISA**)

Results

- **Feasibility of Guided Imagery Protocol**
 - **96%:** Consented patients participated and completed the study
 - **96%:** Study was acceptable to them
 - **100%:** Questionnaire items were completed

Results

- **Potential Efficacy of Guided Imagery Protocol**
 - Statistically **significant** effects of GI on:
 - Current stress ($t = -2.18, p = .03$)
 - Current pain ($t = -2.65, p = .01$)
 - Stress and pain were **lower** for the GI group than the control group

Results

- The effects of GI on **cortisol** concentrations **not** significant
 - GI group scores **improved** more than the control group following the intervention compared to the control group
 - Cortisol concentrations **varied** considerably in this small sample
 - Despite random assignment to groups, the GI group had considerably **higher** concentrations at **baseline**

Conclusions

- Study protocol was **feasible** in this vulnerable population
- Based on results:
 - Determined the **effect size** for the GI intervention and calculated the **sample size** needed to conduct an efficacy trial of GI intervention using this protocol in adults with SCD; and
 - To extend it to a **longer-term** study with patient using the mobile GI anywhere and anytime they encounter stressful situations

Conclusions

- Findings from this promising feasibility study show that:
 - Patients **kept** the scheduled study appointments
 - Completed a **simple** and **cost-effective** trial of GI intervention on the mobile tablet device
 - The GI intervention reduced the impact of stress on SCD pain

Conclusions

- Findings thus far **consistent** with the HPA axis theory and support our **hypothesis** that a single 12-min GI intervention session is sufficient to reduce current stress and pain
 - GI could be used to **control** pain during emergency department and acute care center visits **while** patients are **waiting** to be evaluated for further pain management

Conclusions

- Findings have **potential** to inform cognitive-behavioral strategies for stress and pain reduction in this **vulnerable** population



References

1. De D. Sickle cell anaemia 1: background, causes and incidence in the UK. *Br J Nurs*. 2005 Apr 28-May 11;14(8):447-50.
2. Serjeant GR, Ceulaer CD, Lethbridge R, Morris J, Singhal A, Thomas PW. The painful crisis of homozygous sickle cell disease: clinical features. *Br J Haematol*. 1994 Jul;87(3):586-91.
3. Wilkie DJ, Judge MK, Berry DL, Dell J, Zong S, Gillespie R. Usability of a computerized PAINReportIt in the general public with pain and people with cancer pain. *J Pain Symptom Manage*. 2003 Mar;25(3):213-24.
4. Wilkie DJ, Molokie R, Boyd-Seal D, Suarez ML, Kim YO, Zong S, et al. Patient-reported outcomes: descriptors of nociceptive and neuropathic pain and barriers to effective pain management in adult outpatients with sickle cell disease. *J Natl Med Assoc*. 2010 Jan;102(1):18-27.
5. Melzack R. The McGill Pain Questionnaire: major properties and scoring methods. *Pain*. 1975 Sep;1(3):277-99.
6. Enzyme-linked immunosorbent assay (ELISA) Salimetrics, State College, PA.

Acknowledgments

- We thank the **patients** and **staff** members at the UIC Adult Sickle Cell Clinic for their dedication to this study.
- This presentation was made possible by **seed** grants from the UIC College of Nursing and the Campus Research Board sponsored by the UIC Office of Vice Chancellor for Research. Its contents are solely the responsibility of the authors and do not necessarily represent the official views of the College of Nursing or the Campus Research Board.

Investigators & Research Team:

Investigators

Yingwei Yao, PhD

Robert E. Molokie, MD

Christopher G. Engeland, PhD

Zaijie Jim Wang, PhD

Diana J. Wilkie, PhD, RN, FAAN

Current Team

Marie L. Suarez, PhD

ZhongSheng Zhao, PhD

Riggo Angulo, BA

Jesus Carrasco, BS

Veronica Angulo, BA