# RESPIRATORY MONITORING AND FEEDBACK FOR CHRONIC PAIN IN ADULT SURVIVORS OF CHILDHOOD CANCER: A MOBILE HEALTH PILOT STUDY FROM THE CHILDHOOD CANCER SURVIVOR STUDY

Nicole M. Alberts,[1] Wendy M. Leisenring,[3] Jillian Whitton,[3] Kevin R. Krull,[1,2] Jessica S. Flynn,[1] Neema Moraveji,[4] Lindsay Jibb,[5] Blake F. Dear,[6] Leslie L. Robison,[2] Jennifer N. Stinson,[5] Gregory T. Armstrong[2,7]

Departments of [1]Psychology, [2]Epidemiology and Cancer Control, and [7]Oncology, St. Jude Children's Research Hospital, Memphis, USA; [3]Fred Hutchinson Cancer Research Center, Seattle, USA; [4]Spire Health, San Francisco, USA; [5]Anesthesia and Pain Medicine, The Hospital or Sick Children, Toronto, Canada; [6]Department of Psychology, Macquarie University, Sydney, Australia

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**Background and aims:** Approximately 40% of adult survivors of childhood cancer experience chronic pain, with 33% of these survivors also experiencing clinically significant anxiety. As respiration, anxiety, and pain are inter-related, continuously tracking respiration may help survivors manage physiological responses to pain. The aim of the present study was to examine the feasibility, acceptability, and preliminary efficacy of wearable respiratory monitoring/feedback among survivors of childhood cancer with chronic pain.

**Methods:** Survivors reporting ≥3 months with chronic pain (n=76) were recruited from the Childhood Cancer Survivor Study, a cohort of ≥5-year survivors of childhood cancer. Sixty-five survivors (85.5%; median age=44.0 [range=25–62] years) consented and were randomized to the intervention (*Stone device, Spire Health*; n=32) or control (n=33). The intervention group was instructed to wear the device for 30 days and complete daily breathing exercises via an app. The control group did not receive a device and did not complete breathing exercises. Both groups completed a set of valid and reliable self-report measures of pain-related disability, average pain, anxiety, sleep, depression, and negative affect at pre- and post-treatment.

**Results:** Ninety-seven percent of survivors completed the study. Among the intervention, 29 (93.5%) participants wore the device ≥50% of the required days and 74.2% were satisfied/very satisfied with the device. Total cost associated with device delivery/use/return was $528 USD, with 93.8% of devices returned. Post-treatment improvement was significantly greater in the intervention group compared to control group for negative affect (Cohen's $d$=0.59, p=0.02). Effect sizes indicated some improvement on measures of pain-related disability (Cohen's $d$=0.36), average pain (Cohen's $d$=0.29) and depression (Cohen's $d$=0.40), but they were nonsignificant.

**Conclusions:** Study findings support feasibility, acceptability, and potential efficacy of wearable respiratory monitoring/feedback. Larger scale trials are needed to assess efficacy and maintenance of this intervention for chronic pain among survivors of childhood cancer.