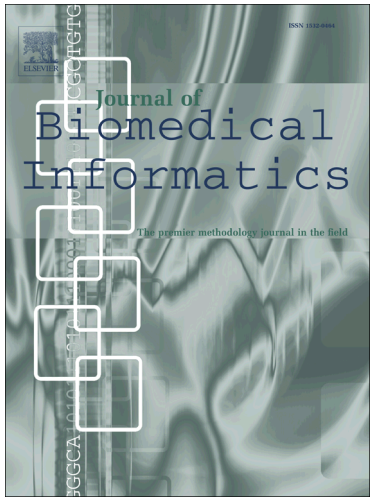

Application of Human Augmentics: A Persuasive Asthma Inhaler

Brent Grossman, Steve Conner, Giselle Mosnaim, Joshua Albers, Jason Leigh, Steve Jones, Robert Kenyon

PII: S1532-0464(17)30024-2
DOI: http://dx.doi.org/10.1016/j.jbi.2017.02.003
Reference: YJBIN 2721

To appear in: *Journal of Biomedical Informatics*

Received Date: 15 July 2016
Revised Date: 3 February 2017
Accepted Date: 7 February 2017

Please cite this article as: Grossman, B., Conner, S., Mosnaim, G., Albers, J., Leigh, J., Jones, S., Kenyon, R., Application of Human Augmentics: A Persuasive Asthma Inhaler, *Journal of Biomedical Informatics* (2017), doi: http://dx.doi.org/10.1016/j.jbi.2017.02.003

Application of Human Augmentics: A Persuasive Asthma Inhaler

Brent Grossman[a], Steve Conner[a],

Giselle Mosnaim[b], Joshua Albers[a], Jason Leigh[a], Steve Jones[c], Robert Kenyon[a]

[a]Department of Computer Science, University of Illinois at Chicago; [b]North Shore University HealthSystem; [c]Department of Communication, University of Illinois at Chicago

Abstract

This article describes a tailored health intervention delivered on a mobile phone platform, integrating low-literacy design strategies and basic principles of behavior change, to promote increased adherence and asthma control among underserved minority adolescents. We based the intervention and design principles on theories of Human Augmentics and the Elaboration Likelihood Model. We tested the efficacy of using electronic monitoring devices that incorporate informative and persuasive elements to improve adherence to a prescribed daily medication regimen intended to reduce use of asthma rescue medications. We describe the theoretical framework, hardware and software systems, and results of user testing for design purposes and a clinical pilot study incorporating use of the device and software by the targeted population. The results of the clinical pilot study showed an 83% completion rate for the treatment as well as improved adherence. Of note, 8% and 58% of participants achieved clinically significant adherence targets at baseline and last week of the study, respectively. Rescue asthma medication use decreased from a median of 3 puffs per week at baseline to 0 puffs per week during the last week of the study.

1. Introduction

Today's exponential advances in technology miniaturization are laying the groundwork for the development of transformational technologies that can augment human abilities – enabling people to perform beyond their natural sensory, cognitive and motor abilities; monitor their own health; and, understand possible health outcomes based on their lifestyles and choices. In other words, these technologies are enabling people to see and hear better; to absorb, interpret, and change behavior in response to timely information; and, to increase physical endurance. This has the potential to result in dramatic improvements to sustaining health and wellbeing – an area of study termed Human Augmentics (HA) [1]. As Novak, *et. al*., explained, "the point of Human Augmentics is to develop communication between the human, machine, and