Interactive Computer Imagining to Facilitate Coping with Chemotherapy-Related Distress: Hair Loss

Elizabeth L. McGarvey, EdD[1], Adrienne Keller, PhD[1], Lora Baum, PhD[1], David Brenin, MD[2], Scott Acton, PhD[3], Brian Clark[4], & B. Eugene Parker, Jr. PhD[4]

[1] rel8s@virginia.edu P.O. Box 800623, Dept. Psychiatric Medicine, University of Virginia (UVA), Charlottesville, VA 22908, [2] Dept. Surgery, UVA, [3]Software Engineering, UVA, [4]Barron Associates, SBIR Grant, clark@barron-associates.com, Charlottesville, VA

BACKGROUND

Chemotherapy-related hair loss (alopecia) can cause clinically significant distress in those affected, particularly among women. Hair loss often occurs in women with breast cancer receiving chemotherapy. As many as 47% to 58% of women with cancer report alopecia as the most disturbing anticipated aspect of receiving chemotherapy. It has been reported that up to 8% of women in one study have reported that they considered refusing treatment because of the threat of hair loss (Munstedt et al., 1997; Tierney et al., 1992; de Boer-Dennert et al., 1997).

Interventions are needed to improve the quality of life for women in and following treatment to survive cancer. Decktop Virtual Reality (VR), or Non-Immersive VR has excellent potential for use by cancer patients to faciliate coping and adjustment to this side effect of treatment.

PURPOSE

To develop a Non-immersive VR computer imagining system that will present female cancer patients the opportunity to: a) participate in the experience of virtual hair loss, hair re-growth and options for wigs to wear during recovery prior to receiving chemotherapy as part of an experience to facilitate education and prevent distress, and b) to provide women who have lost their hair following chemotherapy an opportunity to use the system to facilitate coping and adjustment.

To disseminate the product to Cancer Centers and organizations serving women in treatment for cancer worldwide.

Phase I, Methods

FOCUS GROUPS WITH PATIENTS

"I felt naked [without hair]. I had been in good health. It was a real shock." (White female, age 30s)

- *"I felt like my face had been erased." (Black female, age 40s)*
- *"Can't say that I was prepared for hair loss. First, saw it on my pillow. My husband later just shaved it all off. Preparing …makes all the difference." (White female, over age 50)*

THEMES IDENTIFIED:
- Shock, Embarrassment at hair loss
- Feeling not being adequately prepared
- Anxiety about how others/family would react

DEVELOPMENT OF SYSTEM: Barron Associates begins development of the imaging system named: *Help for Alopecia through Image Representations (HAIR).*

Construction of "hair templates" begins.

DEVELOPMENT OF SYSTEM (Cont.):

Image processing techniques were verified on a diverse set of volunteer subjects. (Figures 1-3) Software algorithms were identified. Image processing images were implemented in MATLAB[1] programming environment. (Figure 4)[1] (a mathematical tool: www.mathworks.com)

Figure 1 Prototype image of woman who has completely lost her hair and eyebrows following chemo-therapy treatment for cancer.

Figure 2

Prototype image of woman showing hair and eyebrow re-growth at about 3-6 months following chemotherapy.

Figure 3

Prototype image of woman showing hair and eyebrow re-growth at about 12 – 14 months following chemotherapy.

Figure 4

Phase I Prototype screen to facilitate a user-friendly interface

Sample hair that can be positioned on bald image

On-going Evaluation

Image Realism Evaluation: Health care professionals working in oncology assessed the realism of the images on African American, Caucasian, and Asian women in states of hair loss/re-growth similar to Figures 1-3.

Using a 1 = not realistic at all to 10= extremely realistic, The lowest score that any image received was an 8.94 mean score (SD.93)

Phase II 2004 - 2006

This phase involves the development of a Second generation, HAIR system in follow-on R & D to the first generation device developed under Phase I. This includes selecting or developing the environment, refining the Imaging system and conducting a Clinical Trial using actual patients.

Imaging Booth

Study of Alopecia Distress

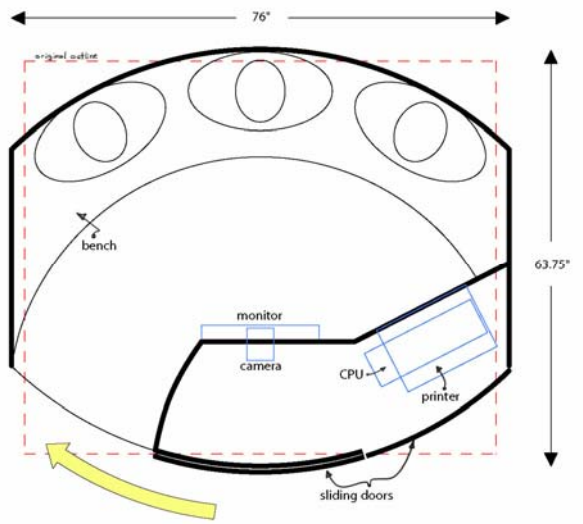
Preliminary study: Predictors and Outcomes Associated with Alopecia Distress in Female Patients with Cancer
Laura Rogers, MA, PL Llewellyn, PhD, EL McGarvey,EdD

Alopecia Distress Methods

- IRB approval obtained. Recruitment via newspaper.
- Sample: 74 women- 65% (n=48) with no cancer or history of cancer and 35% (n=26) with current cancer (20 with breast cancer, 3 with gynecological cancer, 3 with cancers of difference cell types).

- Quality of Life: Functional Analysis of Cancer Therapy (FACT-G) Cella et al, 1993.
- Alopecia Distress: Importance of Hair Questionnaire (IHQ) Baum & McGarvey, 2000. 20 items, 6 point scale. Four factors: 1) anticipated alopecia distress, 2) hair identity involvement, 3) perceived social
- Coping style: The Brief COPE (Carver, 1997) 24-item measure coping strategies. Recoded active styles or avoidance styles.
- Appraisal of Loss, Threat, or Challenge: Appraisal B: (Lazarus & Folkman,1984)

Interior Diagram of Imaging Booth



Alopecia Distress Study Results

- Endorsement of the experience of alopecia as a LOSS was significantly associated with HIGH alopecia distress ($r = .76$, $p < 0.01$) [Pearson product correlations].
- Endorsement of the experience of alopecia as a Challenge was significantly associated with ACTIVE COPING ($r = .57$, $p < 0.01$). However, use of active coping was NOT significantly related to alopecia distress.

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