Virtual Reality Intervention for Chemotherapy Symptoms

Article

5 authors, including:

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20 PUBLICATIONS   **656** CITATIONS

Some of the authors of this publication are also working on these related projects:

Project   Oncology Nursing View project

Virtual Reality Intervention for Chemotherapy Symptoms

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Purpose

- The aim of this study is to explore the use of virtual reality as a distraction intervention to relieve symptom distress in 123 adults receiving chemotherapy treatments for cancer.

Problem Statement

- Treatments for cancer are intensive and difficult to endure
- Chances of survival are enhanced if patients receive all of the recommended chemotherapy treatments
- Distraction interventions provide effective relief for a variety of symptoms
- By decreasing chemotherapy related symptom distress, virtual reality has the potential to increase compliance with treatments, impact survival, and enhance quality of life

Review of Literature: Virtual Reality

- "Experience of presence in an environment by means of a communication medium"
- Most literature to date describes applications for surgery, physical therapy, education, or anxiety disorders
- Lack of consistent information regarding "Cybersickness" or side effects
- One of the first researchers nationally to explore the recreational or distraction qualities of virtual reality as a possible therapeutic intervention

Organizing Framework

- Stress and Coping Model
  Lazarus and Folkman (1984)
  - Stress
  - Appraisal
  - Coping
    - Problem-focused coping
    - Emotion-focused coping

Research Questions

- 1)) Is virtual reality an effective <u>distraction</u> intervention for reducing chemotherapy-related <u>symptom distress</u> levels in individuals with cancer?

- 2) Does virtual reality have a lasting effect?

Study Variables

- Explanatory Variable:
  Virtual Reality
- Response Variable:
  Symptom Distress
  (General symptom distress, fatigue & anxiety)

Background Studies

- Rowe K. & **Schneider, S.** (2005). Profile of Cancer-Related Symptoms Prior to Chemotherapy. The Journal of Supportive Oncology 3 (6, Suppl.4) 32-33.
- **Schneider, S.M.,** Prince-Paul, M., Allen, M., Silverman, P., & Talaba, D. (2004) Virtual reality as a distraction intervention for women receiving chemotherapy. Oncology Nursing Forum 31(1) 81-88.
- **Schneider, S.M.,** Ellis, M., Coombs, W.T., Shonkwiler, E.L., and Folsom, L.C. (2003) Virtual reality intervention for older women with breast cancer. Cyberpsychology and Behavior 6 (3).
- **Schneider, S. M.,** & Workman, M. L. (2000). Virtual reality as a distraction intervention for children receiving chemotherapy. Pediatric Nursing 26(6), 593-597.
- **Schneider, S. M.** (1999). I look funny and I feel bad: Measurement of symptom distress. Journal of Child and Family Nursing, 2(5), 380-384.
- **Schneider, S. M.,** & Workman, M. L. (1999). Effects of virtual reality on symptom distress in children receiving cancer chemotherapy. Cyberpsychology & Behavior, 2(2), 125-134.

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Symptom Distress Scale: Immediately Following Chemotherapy
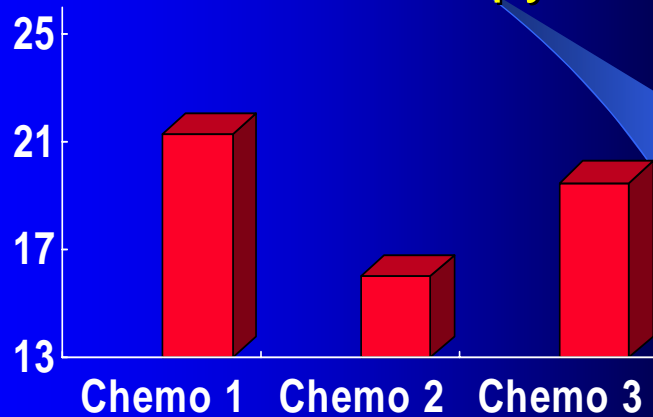
Qualitative Evaluation of Virtual Reality Intervention

Evaluation of Overall Experience

- 82% indicated that this treatment was better than previous treatments
- No subjects indicated that the virtual reality experience made them feel worse
- 100% liked the virtual reality intervention
- 100% indicated that they would like to use the virtual reality again during another chemotherapy treatment

Using Virtual Reality to Help Women Cope with Breast Cancer Treatment

Purpose

- To determine if using virtual reality makes chemotherapy more tolerable for younger women with breast cancer

Design

	Chemo 1			Chemo 2		
	Pre	Post	48hr	Pre	Post	48hr
Group 1		X				
Group 2					X	
	O_1	O_2	O_3	O_4	O_5	O_6

O_1 Demographic Data, SDS, SA, & Piper Fatigue Scale
O_2-O_6 SDS, SA, & Piper Fatigue Scale
X   Virtual Reality Distraction Intervention
O_2 or O_5 Evaluation of Intervention Questionnaire

Demographics of Sample (n=20)

- Age   27-55   M = 42.6   SD=7.9
- Stage   1-3   M = 2
- Diagnosis
    - Adenocarcinoma   15 (75%)
    - Ductal Carcinoma insitu   3 (15%)
    - Metastatic   1 (5%)
- Ethnic Identification
    - Caucasian   16 (80%)
    - African American   3 (15%)
    - Other   1 (5%)

88% participation rate

hoe Broadcasting, 2000

Data Analysis: Research Question 1

Paired T-test Immediately Following Chemotherapy

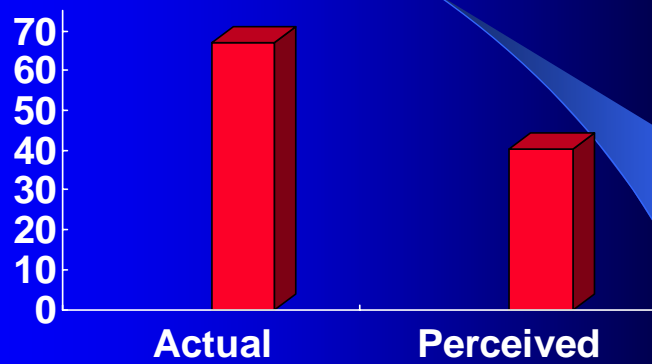| Instrument	t	p-value
Symptom Distress Scale	-1.36	.095*
Piper Fatigue	-1.82	.04*
State Anxiety	-.77	.23

*p < .10

Data Analysis: Research Question 2

Paired t-test 48 hours Following Chemotherapy

Instrument	t	p-value
Symptom Distress Scale	-.90	.19
Piper Fatigue	-.466	.32
State Anxiety	-.71	.24

Effect Size

- Symptom Distress   .30
- Fatigue   .41
- Anxiety   .17

Perception of Time

- $t = 3.69$ $p < .001$

Fox News, 2000

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Sample

- Convenience N=120-144
- Inclusion Criteria
  - **Diagnosis of breast, colon or lung cancer**
  - **first diagnosis of cancer**
  - **age 18 years or older**
  - **treatment regimen that includes at least two matched cycles of intravenous chemotherapy**
  - **Both treatments at DCCC**
  - **Not receiving concurrent radiation therapy**
  - **ability to read and write English**
  - **No clinical evidence of primary or metastatic disease to the brain**
  - **No history of seizures**
  - **No history of motion sickness**
  - **Able to give informed consent.**

Demographics of Sample (n=123)

- Age: 32-78 (m = 53.97   SD=10.89)

- Diagnosis: Gender:
  Breast 64 (52%)   Female: 77%
  Colon 19 (15.5%)   Male: 23%
  Lung 40 (32.5%)

- Race: Participation Rate: 64%
  White 91%
  Other: 9%

VR INTERVENTION

- Participants chose from four CD-ROM based scenarios;
  - *Oceans Below ®*
  - *A World of Art ®*
  - *Titanic: Adventure Out of Time ®*
  - *Timelapse PC CD Game ®*
- Subjects used the Virtual Reality for an average of 58 minutes (range 15-202 minutes SD 31.97)
- Participants wore i-glasses® SGVA head mounted display during their intravenous chemotherapy treatment.

Design

	Chemo 1			Chemo 2		
	Pre	Post	48hr	Pre	Post	48hr
Group 1		X				
Group 2					X	
	O_1	O_2	O_3	O_4	O_5	O_6

O_1 Demographic Data, ASDS, SA, & Piper Fatigue Scale
O_2-O_6 ASDS, SA, & Piper Fatigue Scale
X   Virtual Reality Distraction Intervention
O_2 or O_5 Evaluation of Intervention Questionnaire

Instruments

- **Adapted Symptom Distress Scale**
  (Rhodes et al., 2000)
- **State-Trait Anxiety Inventory for Adults**
  (Speilberger, 1983)
- **The Revised Piper Fatigue Scale**
  (Piper et al., 1988)
- **Presence Questionnaire (PQ)**
  (Witmer & Singer, 1998)
- The Immersive Tendency Questionnaire (IQT)
  (Witmer & Singer, 1998)

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Data Analysis

◆ **Descriptive Statistics**
◆ **Inferential Statistics**
  ◆ **sequence group equivalency**
 ◆ **VR-Control group differences**

Results

Significance Tests: intervention vs control

- **No Significant Differences any of the outcomes (Symptom Distress Scale, State Anxiety, or Piper Fatigue Scale) between the control condition and VR condition immediately following and 48 hours following chemotherapy.**

- **An cross over effect was noted in that individuals who received the VR intervention during the first chemotherapy treatment had significantly (p<.01) less anxiety immediately following chemotherapy as compared with the second treatment.**

Perception of Time
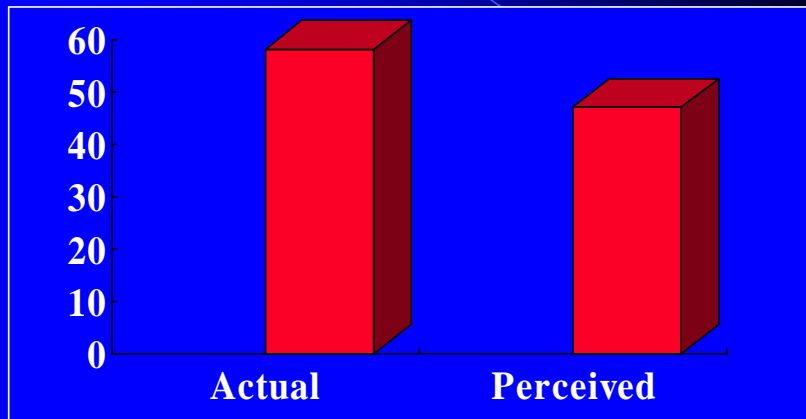
t = 4.722   p < .0001

Evaluation of Virtual Reality Intervention

Overall Experience

- 100% indicated that this treatment was better than the previous treatments
- No subjects indicated that the virtual reality experience made them feel worse
- 86% liked the virtual reality intervention
- 82% indicated that they would like to use the virtual reality again

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Secondary Analysis

- Correlations between Symptom measures immediately following chemotherapy and score on Presence Questionnaire (Witmer & Singer, 1998)

  – State Anxiety   -.308**
  – Fatigue   -.296**
  – Symptom Distress   -.141

Correlation is significant at $p \leq .01$

Effect of VR on Symptoms following Chemotherapy

	Kids 10-17	Women 26-55	Women >50	Adults M/F
Sample size	N=11	N=20	N=16	N=123
Symptom Distress	.06*	.095*	.63	.43
Anxiety	.11	.23	.10*	.14 (.01)*+
Fatigue	------	.04*	.91	.52
Altered time perception	------	.001*	.001*	.001*

* Significant outcomes
+ Subjects who used VR during first chemotherapy treatment

Evaluation of VR Intervention

	Kids 10-17	Women 27-55	Women >55	Adults M/F	Total
Sample size	N=11	N=20	N=16	N=123	N=170
Better than previous Chemotherapy treatment	82%	100%	100%	100%	99%
Made me feel worse	0%	0%	0%	0%	0%
Liked using the VR	100%	95%	100%	86%	89%
Would use VR again during chemotherapy	100%	95%	100%	82%	86%

Results and Recommendations for Clinical Practice

- Results of these studies support the use of virtual reality with older children and adults receiving chemotherapy
- The virtual reality intervention was well received
- The virtual reality intervention did not require practice to be effective
- In some cases, symptom distress, fatigue, and anxiety levels improved when using the intervention
- Use of virtual reality significantly altered time perception
- Monitor patients using the virtual reality and discontinue if any untoward reactions (headache)
- In all studies, measures of symptom distress demonstrated that this population did not experience any signs of cybersickness

Recommendations for Research and Future Plans

- Explore the effect of repeated use of the VR distraction intervention
- Test intervention with different samples and different response variables
- Compare virtual reality to other distractors
- Explore how coping style or immersive tendency effects the use of distraction interventions
- Examine how age or gender influence outcomes following use of VR.