Effectiveness of Interactive Multimedia CD on Self-Care and Powerlessness in Hemodialysis Patients

Lu-Mei Wang¹ • Chou-Ping Chiou²*

¹RN, MSN, Instructor, School of Nursing, I-Shou University • ²RN, PhD, Associate Professor, School of Nursing, I-Shou University.

ABSTRACT

Background: Hemodialysis (HD) patients have low self-care knowledge, poor self-care behavior, and powerlessness.

Purpose: The authors designed this study to, first, understand the current state of first-year HD patients’ self-care knowledge, self-care behavior, and powerlessness and, second, assess the effectiveness of an interactive multimedia CD educational intervention.

Method: A quasi-experimental, repeated measures design, with intervention and comparison groups, was used. All subjects for this study were recruited from six dialysis centers in southern Taiwan. The three points for outcome testing included baseline, 4 weeks, and 8 weeks. Research tools included an HD self-care knowledge questionnaire, an HD self-care behavioral questionnaire, a powerlessness questionnaire, and an interactive multimedia CD.

Results: Results found that participants possessed insufficient knowledge, were incapable of completely achieving or comprehending routine self-care, and were affected by powerlessness. The interactive multimedia CD intervention effectively enhanced self-care knowledge \( (p < .000) \) and self-care behavior \( (p < .000) \) and improved powerlessness \( (p < .000) \). Positive results persisted well after the conclusion of the intervention.

Conclusions/Implications for Practice: Participants in the intervention group had better self-care knowledge and behaviors and feeling of control over their lives than those in the control group. This illustrates the positive effects of the interactive multimedia CD. Results demonstrate the potential benefits of using the interactive multimedia CD with elderly patients in HD and nursing practice education.

Key Words:
interactive multimedia CD, hemodialysis, self-care, powerlessness.

Introduction

Chronic kidney disease is a major worldwide public health problem. Incidence of end-stage renal disease (ESRD) has dramatically increased over the past decade, increasing from 261.3 per million population in 1994 to 348.6 per million in 2004 (Centers for Disease Control and Prevention, 2007) and placing a significant financial burden on the healthcare system. According to the U.S. Renal Data System (2008) statistics, Taiwan ranks first globally in both prevalence and incidence of ESRD. Hemodialysis is the treatment of choice for most patients with ESRD. There has been increasing interest in assessing psychosocial factors in ESRD patients treated with hemodialysis (HD). Findings show that patients are predominantly members of groups susceptible to powerlessness. Therefore, it cannot be too emphatic to promote the self-care knowledge and behavior to decrease the onset of feeling powerless among HD patients. According to the literature, HD patients represent a vulnerable group. Other research indicates that using interactive multimedia CDs in nursing instruction can effectively enhance learner cognition and satisfaction level (Chung & Huang, 1999; Tai, Wang, Hsieh, & Huang, 2008). The authors designed this study to illustrate how such interactive multimedia CD with distinctions of voices, characters, pictures, and real illustrations could facilitate HD patients to learn the knowledge of daily self-care to engage in self-care behavior to alleviate feelings of powerlessness. It was hypothesized that the interactive multimedia CD would improve self-care knowledge and self-care behaviors and decrease feelings of powerlessness.

Literature Review

ESRD is also known as “uremia,” the result of low glomerular filtration rate induced by irreversible harm to nephrons that reduce the ability of the kidneys to drain internal water and maintain homeostasis. Only a long-term dialysis or a kidney transplant can save a patient’s life (Holechek, 2004;
Ma, Sun, & Hsieh, 2010). Because of the scarcity of available kidneys for transplant, most uremic patients undergo long-term HD. Galland and Traeger (2004) mentioned malnutrition as a frequent complication in HD patients. Some articles indicate that many long-term dialysis patients do not adhere to correct dietary principles or take prescribed medicines daily. Accumulated metabolic wastes and anemia make HD patients very weak, which impacts further on their quality of life. Therefore, it is imperative to provide health education to patients to follow remedial plans and cultivate exercise habits while undergoing dialysis (Chen, 2006; Ko, Lee, & Shih, 2007; Qunibi et al., 2004; Sun et al., 2007; Wu, Liou, & Liao, 2008). Thus, in caring for HD patients, caregivers may help promote patient quality of life by providing health education that promotes self-care. Due to confronting the multiple stressors of physiology, psychology, and role and life changes, patients of chronic kidney failure experience physiological syndromes such as fatigue, poor appetite, nausea, vomiting, and peripheral neuropathy. In terms of psychological syndromes, patients tend to exhibit symptoms such as denial, sadness, depression, and lack of autonomic and independent abilities. Therefore, HD patients are prone to powerlessness (Stapleton, 2000; Weng, Dai, Wang, Huang, & Chiang, 2008). Previous research has suggested that such patients may reduce feelings of powerlessness by increasing relevant knowledge (Korniewicz & O’Brien, 1994; Stapleton, 2000). Patient empowerment integrates multiple concepts that allow a patient to self-manage his or her disease effectively. Empowerment was described as having the knowledge, skills, attitude, and self-awareness required to influence a person’s own behavior (Brown, 1997). Allgot (2001) defined empowerment as a process by which the individual increased the authority to make decisions about his or her own life. McCarley (2009) also emphasized that patient perceptions of control over their own illnesses may be fostered by empowering their involvement in their personal care management. Patient empowerment and self-management are, therefore, crucial in ensuring patients recognize that they remain in control of their lives. In their research on the sources of feelings of powerlessness among nursing center residents, Nystrom and Segesten (1994) indicated that increasing patient choices for remedial timing and letting patients achieve self-care in daily life may be used to increase patient autonomy and reduce feelings of powerlessness. Benjamin (1996) also indicated in his exploration of feelings of powerlessness of chronic patients that increased disease knowledge may alleviate such feelings.

Simmons (2009) and Orem (2001) emphasized that people have a natural ability for self-care and that self-care means the individual can actually act to maintain and promote personal health in terms of their own body and life. The patient becomes proactive in personal care and learns it through communicating and interacting with others. The patient then can act upon healthy behaviors to attain health as well as accommodate physical functions on his or her own to promote health and prevent lesions while confronting internal and external impacts. Huang, Li, and Wang (2008) showed that patients who received individualized education had higher self-care behavior. Huang and Chan (2006) mentioned that health education is relevant to self-care for HD patients, including dietary control, timely prescription adherence, and fistula care, can promote the self-care abilities of HD patients, and improve their quality of life. Nozaki, Oka, and Chaboyer (2005) studied the effects of a cognitive behavioral therapy program on self-care on HD patients and found that decreases in daily weight and daily salt intake increased patient awareness of their behavior. Badzek, Hines, and Moss (1998) researched factors of influence on 142 HD patients over 65 years old and found the best index for HD patients to be cultivating self-care abilities. Those researchers also indicated that, if patients understood the severe consequences of noncompliance with dietary control principles, they would be more obedient to follow self-care guidelines. Huang, Chen, and Yeh (2009) mentioned that interactive multimedia CD can increase knowledge of diabetes in diabetes patients. Bayliss, Steiner, Fernald, Crane, and Main (2003) mentioned that patient-revealed barriers to self-care included physical limitations and lack of knowledge. Their research further revealed that adequate self-care interventions could realize improvements.

Health educational interactive multimedia CDs instruct through the integration of characters, video, voice, and images and teach patients in their own environment to learn healthcare concepts and methods by themselves. This approach is significantly more convenient and less expensive than teaching patients in a formal medical care or educational setting. Research indicates that interactive multimedia CD learning can reinforce learning impact and effect on learners. Using interactive multimedia CDs in nursing instruction can improve patient’s self-care ability and obedience (Lo, Hsu, Lee, & Lin, 2005; Manns et al., 2005; Tai et al., 2008). Korniewicz and O’Brien (1994) spent 4 weeks using one-on-one weekly nursing instruction on 50 patients on HD for 6 months. Their results indicated such an approach as effective in influencing patient self-care behavior and social function learning. Klang, Bjorvell, Sundstedt, and Clyne (1998) provided uremia-related health education to 28 uremic patients not receiving HD and found the physiological functions and comfortable status of those patients better than those who did not receive health education. Functions as well as comfort status were found to last for 6 months after viewing. In addition, Shaw, Beebe, Tomshine, Adlis, and Cass (2001) used an interactive multimedia CD to explore the situation of health educational understanding and satisfaction among patients before undergoing a large intestine scope examination. They found that viewing the CD improved patients’ healthcare status and satisfaction in comparison with the control group.
Methods
This research was divided into two stages: a pilot study and a formal study.

Pilot Study
During the pilot study, the authors used a quasi-experimental design and used a convenience sampling method to select HD patients who were currently being treated at several Taiwan medical centers. To prevent contamination between control and experimental groups through discussion, the authors grouped the participants based on their dialysis treatment time. Each pilot study group consisted of 10 patients. The pilot study found the interactive multimedia CD to be generally acceptable to subjects. No difficulties were experienced in operating the computer. The main advantages of the interactive multimedia CD education from the perspective of subjects were that it allowed learning at one’s own pace and permitted private review of information. According to the formula of sample size calculation (Rosner, 2010), 40 subjects (20 per group) were adequate for the formal research group based on pilot results. Because Roscoe (1979) suggests that, among others, a sample size larger than 30 is appropriate for most research, with a minimum number of subsample size of 30 for each category being necessary, the sample size for this study was determined as 60 subjects (30 per group) based on Roscoe’s rule of thumb.

Formal Research
All subjects for this study were collected from six dialysis centers in southern Taiwan that expressed willingness to join the research. After explaining research purpose and process to potential participants, investigators asked all to sign consent forms and asked that they fill in a personal demographic datasheet, scale of dialysis self-care knowledge, scale of dialysis self-care behaviors, and powerless assessment tool. The experimental group was instructed using an interactive health educational multimedia DVD. After being taught how to operate the interactive multimedia CD, they received a tailored instruction through the CD for 4 weeks. Participants were posttested immediately after completion and again after 1 month posttest. Health educational assessment measurements were timed to coincide with the time that patients received dialysis. Nursing instruction took place at bedside, and the researcher also used self-care behaviors and feelings of powerlessness as dependent variables to explore the effects of the CD. The control group received only regularly scheduled unitary nursing instruction. This group received an immediate pretest, a first posttest after 4 weeks, and a second posttest after 8 weeks.

Participants
Study participants were ESRD patients who had received HD for less than 1 year and were undergoing three HD sessions every week. All participants were over 20 years old and without visual or hearing disabilities, which would have prevented their watching the CD. Participants were all able to communicate in Mandarin or Taiwanese, willing to join in the study, and willing to sign informed consent. Patients not in a clear state of mind and those unwilling to receive the CD were excluded from the study sample.

To minimize spatial factor interference, researchers used a one-on-one approach to accompany each subject to prevent interference from discussions between the patient and his or her family while receiving the nursing instruction. To prevent research results from being impacted by conversations or interactions between participants, the authors segregated patients into experimental and control groups based on their dialysis time. Thus, those who took dialysis on Monday, Wednesday, and Friday were assigned to the experimental group, and those who did so on Tuesday, Thursday, and Saturday were assigned to the control group. Every recruitment location included patients from both groups to prevent them from receiving significantly different health education.

Instruments
Study research instruments included a demographic datasheet, questionnaires covering dialysis self-care knowledge and behaviors, a powerlessness assessment tool (PAT), and an interactive multimedia CD. Investigators developed the questionnaires and the interactive multimedia CD based on articles in the literature, clinical experiences, and research objectives. Investigators used the PAT with the approval of Kubsch and Wichowski (1997). All the instruments are detailed as follows:

1. Personal demographic datasheet: Variables included age, gender, educational degree, occupation, income, marriage status, whether the respondent had a computer at home, and whether the respondent had previously received relevant health education.
2. Questionnaire of dialysis self-care knowledge: This questionnaire evaluated respondent’s disease-related dietary, exercise, and daily self-care knowledge. Investigators developed content after reviewing relevant literature. There were 24 questions with 2-point scales. The gross score for the questionnaire was 24, with a minimum score of 0. Higher scores correlated with better self-care knowledge.
3. Questionnaire of dialysis self-care behaviors: This questionnaire evaluated behaviors related to respondents’ going on a special renal disease diet, exercise, and daily self-care among dialysis patients. Investigators developed content based on relevant literature. The questionnaire incorporated 22 questions scored using 5-point scales. The gross score was 88, with a minimum score of 0. Higher scores correlated with better self-care behavior.
4. PAT: This scale was used by the approval of Kubsch and Wichowski (1997) to evaluate respondents’
feelings of powerlessness and the source of their strength. The first part of this tool included five questions scored using 5-point scales. Higher scores correlated with reduced feelings of powerlessness. The second part of this tool incorporated seven questions scored using 5-point scales. Higher scores correlated with increased numbers of patient strength sources.

5. Interactive multimedia CD: Researchers developed this CD based on recommendations and insights derived from the literature, clinical experience, and research objectives. Contents were reviewed and deemed valid by two kidney doctors, a head nurse, and a nutritionist. A teacher experienced in producing interactive multimedia software participated in the final production of the CD. The interactive multimedia CD was formatted to run on the Windows operating system. Instructional content covered normal kidney functions, definitions, and reasons of renal failure, chronic renal failure signs and symptoms, an introduction to HD, proper HD diet, proper exercises to improve HD efficacy, HD daily self-care, and HD complications and their prevention. Participants could choose the content of specific interest and could watch at their leisure without time restrictions. Subjects could watch the interactive multimedia CD anytime during the HD process.

Reliability and Validity
The authors used SPSS (SPSS Inc., Chicago, IL, USA) for Windows 14.0 software program to analyze internal consistency reliability and intraclass correlation coefficient 1 month after treatment. The KR-20 coefficient of the self-care knowledge scale was .78, and test–retest reliability was .90. The Cronbach’s alpha coefficient of self-care behaviors scale was .74, and test–retest reliability was .80. The Cronbach’s alpha coefficient of the PAT was .77. Test–retest reliability was .93.

Five kidney specialists and one statistics educator evaluated the self-developed scales to address HD self-care knowledge and self-care behaviors and rate scale importance, feasibility, and accuracy and recommend changes. The content validity index (CVI) was .89 and .91, respectively, for the self-care knowledge for HD scale and self-care behaviors for HD scale. The PAT exhibited a high test–retest reliability (r = .93), and its Cronbach’s alpha coefficient was .77. A panel of two nursing faculty and one clinical specialist determined PAT content validity. PAT construct validity was examined using the “known groups” procedure (Kubsch and Wichowski, 1997). The authors translated the PAT to Chinese, did back translation confirmation, and examined its expert validity. Its CVI value was .88–.94.

Ethical Considerations
The authors obtained ethical approval from the university and study hospitals. This research did not physically or psychologically harm participants in any way. Before completion, the authors explained to participants and their families the purpose, process, and steps of the research. Research investigations began only after participants had signed informed consent with their family. Before study completion, any participant could suspend their participation or drop out at any time. The study followed research ethic principles to protect patient privacy. In the interests of treatment equality, all participants received the health educational interactive multimedia CD after the end of the research as an appreciation gift.

Data Analysis
After being coded and input into a computer, data were analyzed using SPSS for Windows 14.0 (SPSS, Inc., Chicago, IL). During data analysis, the authors used the chi-square test and t test to compare homogeneity between the groups in terms of basic data. Repeated measures analysis of variance (ANOVA) was used to test for significant differences between both groups before and after the intervention. Specifically, a series of one between-subject variable (treatment vs. control) and one within-subject variable (pretest, posttest, and follow-up) repeated measures ANOVA was performed. Level of significance was set at .05.

Results

Participant Demographic Characteristics
Both groups had 30 patients in total (60 participants in the total study). Demographic data collected included age, gender, educational level, occupation, income, marital status, and months on dialysis (Table 1).

There was a significant difference in patient ages between experimental and control groups. The average age of the control group participants was 62, whereas that of the experimental group was 50 (t = −3.833, p = .001). There was no significant difference in gender (χ² = 1.086, p = .297), educational level (t = −0.030, p = .976), occupation (χ² = 0.000, p = 1.0), income (χ² = 0.000, p = 1.0), marital status (χ² = 0.3, p = .584), or number of months on dialysis (t = 0.260, p = .796) between the two groups.

Scores for Self-Care Knowledge, Self-Care Behaviors, and Feelings of Powerlessness at Baseline
Scores for self-care knowledge at baseline in the experimental and control groups were 13.07 and 13.83, respectively, as shown in Table 1. This illustrates no significant difference between the groups in self-care knowledge (t(58) = −0.861, p = .393). In terms of self-care behavior scores, experimental group and control group earned an average of 65.2 and 67.6, respectively. This indicated no significant difference
Average feelings of powerlessness scores were 30.5 and 32.33 for the experimental and control groups, respectively. This indicated no significant difference ($t(58) = 1.025, p = .310$) between the groups at pretest. Thus, although the control group earned slightly higher pretest scores, they were not significant.

### Self-Care Knowledge After Start of Intervention

Results showed a linear trend for the intervention group. This indicated that self-care knowledge continued to increase from baseline through Week 8 (Figure 1). A repeated measures ANOVA was used to certify the discrepancy in the scores of self-care knowledge between the groups. Although there was a significant difference ($F = 13.708, p < .000$) in self-care knowledge, scores between the two groups, controlling and using age as covariance, showed that such covariance did not influence test results ($F = 0.932, p = .371$) and that the average pretest and posttest scores for the two groups were also significantly different ($F = 48.697, p < .000$). Average scores for both groups rose significantly in the posttest (Table 2). The average difference ($F = 218.816, p < .000$) for the experimental group between pretest and posttest was significantly higher than that of the control group (Table 3). To understand the lasting effect of using health educational interactive multimedia CD on patient self-care knowledge, the authors compared and analyzed the effects before and after the experimental group received the CD. They found participants' self-care knowledge had increased significantly after watching and that their knowledge remained at effectively the same heightened level 1 month after the intervention had ended. This indicates that the interactive multimedia CD significantly promoted patient self-care knowledge and engendered knowledge that...

**TABLE 1.**

**Participants' Demographic Characteristics, Self-Care Knowledge, Self-Care Behavior, and Powerlessness at Baseline (N = 60)**

<table>
<thead>
<tr>
<th>Variable</th>
<th>Experimental Group (n = 30)</th>
<th>Control Group (n = 30)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>$M$</td>
<td>$SD$</td>
</tr>
<tr>
<td>Age</td>
<td>50.13</td>
<td>14.75</td>
</tr>
<tr>
<td>Gender</td>
<td></td>
<td></td>
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<tr>
<td>Male</td>
<td>11</td>
<td>36.7</td>
</tr>
<tr>
<td>Female</td>
<td>19</td>
<td>63.3</td>
</tr>
<tr>
<td>Educational level</td>
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<td>4.02</td>
</tr>
<tr>
<td>Employed</td>
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<td></td>
</tr>
<tr>
<td>Yes</td>
<td>27</td>
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</tr>
<tr>
<td>No</td>
<td>3</td>
<td>10.0</td>
</tr>
<tr>
<td>Salary</td>
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<td></td>
</tr>
<tr>
<td>Yes</td>
<td>29</td>
<td>96.7</td>
</tr>
<tr>
<td>No</td>
<td>1</td>
<td>3.3</td>
</tr>
<tr>
<td>Marital status</td>
<td></td>
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</tr>
<tr>
<td>Married</td>
<td>21</td>
<td>70.0</td>
</tr>
<tr>
<td>Others</td>
<td>9</td>
<td>30.0</td>
</tr>
<tr>
<td>Months on dialysis</td>
<td>7.43</td>
<td>3.28</td>
</tr>
<tr>
<td>Self-care knowledge</td>
<td>13.07</td>
<td>3.12</td>
</tr>
<tr>
<td>Self-care behavior</td>
<td>65.20</td>
<td>8.49</td>
</tr>
<tr>
<td>Powerlessness</td>
<td>30.50</td>
<td>6.56</td>
</tr>
</tbody>
</table>

*Note. $^a$ t test. $^b$ x² Test.*

Figure 1. Self-care knowledge test: Group and time interactions.  - - - - - , experimental group; ----- , control group.
significantly remained with patients long after viewing (Table 3).

The Effects of the Intervention on Reducing Feelings of Powerlessness

Results showed a linear trend for the intervention group, indicating that self-care behavior continued to increase from baseline to Week 8 (Figure 2). The authors used repeated measures ANOVA to certify the discrepancy in self-care behavior scores between the two groups. There was a significant difference \((F = 6.894, p = .011)\) in self-care behavior scores between both groups. When age was controlled and used as the covariance, results showed that such covariance did not influence test results \((F = 3.070, p = .05)\). There was also a significant difference between average scores of the groups in pretest and posttest \((F = 11.578, p < .000)\). The average scores for both groups increased significantly

### TABLE 2.
Self-Care Knowledge, Self-Care Behavior, and Powerlessness for Experimental and Control Groups at Baseline, Week 4, and Week 8

<table>
<thead>
<tr>
<th>Variable</th>
<th>Times</th>
<th>Mean</th>
<th>SD</th>
<th>95% Confidence Interval</th>
</tr>
</thead>
<tbody>
<tr>
<td>Self-care knowledge</td>
<td>EG</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Baseline</td>
<td>13.07</td>
<td>3.12</td>
<td>13.07 ± 1.12</td>
</tr>
<tr>
<td></td>
<td>Week 4</td>
<td>21.60</td>
<td>2.19</td>
<td>21.60 ± 0.78</td>
</tr>
<tr>
<td></td>
<td>Week 8</td>
<td>21.47</td>
<td>2.18</td>
<td>21.47 ± 0.78</td>
</tr>
<tr>
<td></td>
<td>CG</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Baseline</td>
<td>13.83</td>
<td>3.75</td>
<td>13.83 ± 1.34</td>
</tr>
<tr>
<td></td>
<td>Week 4</td>
<td>15.13</td>
<td>3.95</td>
<td>15.13 ± 1.41</td>
</tr>
<tr>
<td></td>
<td>Week 8</td>
<td>17.00</td>
<td>3.83</td>
<td>17.00 ± 1.37</td>
</tr>
<tr>
<td>Self-care behavior</td>
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<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Baseline</td>
<td>65.20</td>
<td>8.49</td>
<td>65.20 ± 3.04</td>
</tr>
<tr>
<td></td>
<td>Week 4</td>
<td>67.00</td>
<td>1.34</td>
<td>67.00 ± 0.48</td>
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<tr>
<td></td>
<td>Week 8</td>
<td>66.80</td>
<td>1.34</td>
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<td></td>
<td>CG</td>
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<tr>
<td></td>
<td>Baseline</td>
<td>67.60</td>
<td>9.16</td>
<td>67.60 ± 3.28</td>
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<tr>
<td></td>
<td>Week 4</td>
<td>59.60</td>
<td>1.64</td>
<td>59.60 ± 0.59</td>
</tr>
<tr>
<td></td>
<td>Week 8</td>
<td>61.00</td>
<td>1.54</td>
<td>61.00 ± 0.55</td>
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<tr>
<td>Powerlessness</td>
<td>EG</td>
<td></td>
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</tr>
<tr>
<td></td>
<td>Baseline</td>
<td>30.50</td>
<td>6.56</td>
<td>30.50 ± 2.35</td>
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<tr>
<td></td>
<td>Week 4</td>
<td>38.83</td>
<td>5.97</td>
<td>38.83 ± 2.14</td>
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<td></td>
<td>Week 8</td>
<td>40.33</td>
<td>6.04</td>
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<td>32.33</td>
<td>7.27</td>
<td>32.33 ± 2.60</td>
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<tr>
<td></td>
<td>Week 4</td>
<td>33.10</td>
<td>7.41</td>
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<td></td>
<td>Week 8</td>
<td>33.73</td>
<td>7.40</td>
<td>33.73 ± 0.65</td>
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</table>

Note. EG = experimental group; CG = control group.

### TABLE 3.
Repeated Measures ANOVA of Experimental Group Pretest, Posttest, and Follow-Up Among Self-Care Knowledge, Self-Care Behavior, and Powerlessness

<table>
<thead>
<tr>
<th>Source</th>
<th>Type III Sum of Squares</th>
<th>df</th>
<th>Mean Square</th>
<th>(F)</th>
<th>(p)</th>
<th>Least Significant Difference</th>
</tr>
</thead>
<tbody>
<tr>
<td>Self-care knowledge</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Time</td>
<td>1433.956</td>
<td>1.050</td>
<td>1365.553</td>
<td>218.816</td>
<td>.000</td>
<td>2 &gt; 1*, 3 &gt; 1*</td>
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<tr>
<td>Error</td>
<td>190.044</td>
<td>30.453</td>
<td>6.241</td>
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<tr>
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<tr>
<td>Time</td>
<td>2347.822</td>
<td>2</td>
<td>1173.911</td>
<td>28.595</td>
<td>.000</td>
<td>2 &gt; 1*, 3 &gt; 1*</td>
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<tr>
<td>Error</td>
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<td>58</td>
<td>41.049</td>
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<tr>
<td>Powerlessness</td>
<td></td>
<td></td>
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<tr>
<td>Time</td>
<td>1683.889</td>
<td>1.173</td>
<td>1435.530</td>
<td>60.880</td>
<td>.000</td>
<td>3 &gt; 2* &gt; 1*</td>
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<td>Error</td>
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<td>58</td>
<td>13.830</td>
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</table>

Note. 1. pretest; 2. posttest; 3. follow-up.

*p < .001.
between pretest and posttest (Table 2). The average pretest–posttest difference ($F = 28.595$, $p < .000$) for the experimental group was significantly higher than for the control group (Table 3). To understand the effects on self-care behavior of continuing to use the CD, the authors compared and analyzed the effects before and after the experimental group received the tool and found that their self-care behavior had not deteriorated 1 month after receiving and watching the CD. This indicated that the intervention had both immediate and significant lasting benefits (Table 3).

**Improved Feelings of Powerlessness After Intervention**

Results showed a linear trend for the intervention group, indicating that powerlessness continued to increase from baseline through Week 8 (Figure 3). The authors also used repeated measures ANOVA to certify discrepancies in intergroup feelings of powerlessness scores. There was no significant difference ($F = 3.968$, $p = .051$) in feelings of powerlessness scores between the two groups. When age was controlled and made the covariance, it did not influence test result ($F = 1.963$, $p = .163$). However, average pretest and posttest scores were significantly different between the groups ($F = 23.387$, $p < .000$). Average scores for both groups in the pretest had increased significantly in the posttest (Table 2). The experimental group registered a significantly higher average difference ($F = 60.880$, $p < .000$) than the control group (Table 3). To understand the effect of continuing to receive the CD intervention on feelings of powerlessness, the authors compared and analyzed the effects before and after the experimental group received the health educational interactive multimedia CD. They found the participants’ feelings of powerlessness alleviated significantly both soon after watching and 1 month after the intervention ended. This illustrates that the interactive multimedia CD was significantly effective in relieving the participants’ feelings of powerlessness and in achieving an enduring effect (Table 3).

**Discussion**

This study found that the developed CD intervention effectively improved self-care knowledge and behaviors and alleviated feelings of powerlessness in experimental group participants. Improvements were significantly better than that achieved by the control (nonintervention) group.

Reasons for intervention effectiveness included the one-on-one approach of the CD format; the use of multimedia elements (sound, images, videos, and text) to facilitate the teaching of proper diet, exercise, and daily self-care; and discussions with investigators to clarify and account for some questions. This conclusion concurred with the results of other studies conducted on health educational interactive multimedia CDs designed to improve patient compliance on self-care for other diseases (Lau, 2002; Manns et al., 2005; Yeh et al., 2004). These other studies also concurred with the long-term effects of using interactive multimedia CDs as intervention tools. On the basis of these findings, delivering health education to patients using appropriately designed interactive multimedia CDs can be an effective approach to promoting patient knowledge about their disease.

Research results indicated a long-term positive effect of watching the CD on self-care behavior. This conclusion is similar to the research results of many scholars who found that interactive multimedia CD can effectively promote patient self-care behaviors (Kuo, Tsai, & Yang, 2002; Wydra, 2001).

Research results further indicated the effectiveness of the intervention in alleviating the patients’ feelings of powerlessness both in the short term and the long term. Reasons for such included the effectiveness of enhanced patient self-care in effectively promoting willingness to pursue and sustain positive behaviors. Continuance produced perceptible improvements in discomfort and symptoms and further alleviated feelings of powerlessness. Such a result supports the position of some scholars who suggest that health education can indirectly promote patient relevant learning and the adoption of healthful behaviors. The effect of such would be to reinforce patient autonomic rights for self-care and alleviate feelings
of powerlessness. (Huang, & Chan, 2006; Korniewicz & O’Brien, 1994; Lin, Sun, & Hsieh, 2007; Miller, 2000; Nystrom & Segesten, 1994; Simmons, 2009; Stapleton, 2000).

Limitations
This study faced a number of limitations that must be considered when assessing the generalizability of results. Self-care behavior measurements relied on self-reported data that were not validated objectively. This may have a negative impact on the accuracy of self-care behavior variables. Also, research subjects were recruited from southern Taiwan only, which limits their representativeness and the deductive value of research data. Future research should seek the support of broad-based research institutions and extend the scope of sampled locations to enhance participant representativeness and generalizability of research results.

To control differences among dialysis centers, this study assigned participants from each research location into both experimental and control groups. However, out of consideration for patients’ right to choose, researchers were unable to assign an equal amount of subjects to each group. Also, research ethics and limitations only permitted distributing participants according to gender. Therefore, the fact that the average age of the control group was older than that of the experimental group could only be controlled statistically. Further study is required to identify whether such impacted on statistical results.

Conclusions and Implications
Research results indicated the effectiveness of using the interactive multimedia CD to improve self-care knowledge and behavior among patients and alleviate feelings of powerlessness. Furthermore, results were found to continue for a period of at least 1 month. The sustained effect of the developed health educational interactive multimedia CD for at least 1 month after completion of the intervention indicated an efficacy significantly better than traditional health education.

In conclusion, using the developed interactive multimedia CD can effectively promote patient self-care knowledge and behaviors and alleviate feelings of powerlessness. However, the tool must still be evaluated by nursing professionals with regard to its ability to improve individual patient conditions and provide distinctive nursing instructions appropriate to the situation. The questionnaires developed to elicit data on self-care knowledge and behavior exhibited high internal consistency and test–retest reliability. Their results may be referenced in future studies.

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References


運用多媒體互動式光碟改善血液透析患者自我照顧及無力感之成效

王魯梅1 丘周萍2*

1義守大學護理學系講師  2義守大學護理學系副教授

背景
血液透析病人大多缺乏血液透析自我照顧知識、不遵從血液透析自我照顧行為、以及存在著無力感。

目的
本研究目的在瞭解接受血液透析一年內患者的自我照顧知識、自我照顧行為及無力感現況，以及多媒體互動式光碟介入後之成效。

方法
採類實驗法雙組前後測之研究設計，收案地點為高雄縣市願意參與此研究的透析中心，包括地區醫院及區域醫院共六家醫院。經研究者說明研究目的及過程，同意者即開始接受問卷資料收集，研究工具包括：血液透析自我照顧知識、血液透析自我照顧行為及無力感三個問卷，以及多媒體互動式光碟。之後實驗組接受每週一次，連續四週的血液透析自我照顧衛教光碟指導，並於四次衛教後進行立即後測，間隔四週後再進行第二次後測，控制組則只接受常規性護理指導，並且於徵求個案同意後進行前測，第四週及第八週進行後測及第二次後測。

結果
結果顯示，個案存有知識不足、無法完全達成透析日常自我照顧並存有中等程度的無力感，而多媒體互動式光碟不但具有可以有效提升自我照顧知識（p < .000）、自我照顧行為（p < .000）、改善無力感（p < .000）之成效，且效果是持續性的。

結論／實務應用
本研究發現，實驗組個案在接受光碟衛教後，較控制組於自我照顧知識、行為及無力感皆有顯著之成效，顯示光碟衛教具有良好成效。而且根據結果顯示此光碟可適用於大多仍為中老年人群為主的血液透析患者，本研究的研究結果及工具亦可作為日後相關研究的參考依據和護理教材。

關鍵詞：多媒體互動式光碟、血液透析、自我照顧、無力感。