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Comparison of the Effects of Video-Based and Audio-Based Self-Care Education on Health-Related Quality of Life and Satisfaction in Hemodialysis Patients: A Quasi-Experimental Study

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Abstract

Background: Self-care education plays a pivotal role in managing complications and improving treatment outcomes in patients undergoing hemodialysis.

Objectives: This study aimed to compare the effects of two remote educational modalities, video-based and audio-based instruction, on health-related quality of life (HRQoL) and treatment satisfaction among patients undergoing hemodialysis. Given the paucity of comparative studies on remote educational modalities in this population, this study addresses an important gap in evidence-based patient education.

Methods: This quasi-experimental study was conducted in 2021. Ninety hemodialysis patients from three medical centers in Mashhad, Iran (Montasariyeh Hospital, Kidney Patients Association, and 17-Shahrivar Hospital) were recruited using convenience sampling and assigned to two intervention groups: video-based education (n = 45) and audio-based education (n = 45). The intervention comprised a 4-week self-care educational program delivered in 8 sessions. Data were collected using the Kidney Disease Quality of Life Short Form, version 1.3 (KDQOL-SF™ 1.3), and a researcher-developed satisfaction questionnaire. Statistical analyses were performed using SPSS version 19 and included descriptive and inferential statistics, paired t-tests, independent t-tests, Mann-Whitney U tests, and Wilcoxon tests.

Results: Before the intervention, no significant difference was observed between the two groups in total HRQoL scores ($P = 0.666$). After the intervention, mean HRQoL scores increased significantly in both the video-based and audio-based groups ($P = 0.001$). However, no statistically significant difference was observed between the two groups in mean post-intervention HRQoL scores ($P = 0.634$). Notably, the mean satisfaction score was significantly higher in the video-based group than in the audio-based group ($P < 0.001$).

Conclusions: Both educational modalities effectively improved the quality of life of patients undergoing hemodialysis. However, video-based instruction was more acceptable and may be a more effective tool for patient empowerment, as it generated higher satisfaction levels. Therefore, integrating visual educational aids into routine care programs in dialysis units is recommended.

Keywords: Self-care, Hemodialysis, Quality Of Life, Patient Satisfaction, Multimedia Education

1. Background

Chronic kidney disease (CKD) remains a major global public health challenge and is projected to become the fifth leading cause of death worldwide by 2040 (1, 2). The advanced stage of this disease, defined by a glomerular filtration rate of less than 15 mL/min, is becoming increasingly common because of the rising prevalence of comorbidities such as diabetes, hypertension, obesity, and population aging (3-5). It is estimated that 4.902 to 7.083 million patients with end-stage renal disease (ESRD) worldwide require renal replacement therapy (4). Statistics on kidney disease in Iran are similarly concerning. The growth rate of kidney disease in Iran

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exceeds the global average and has been reported to be approximately 22.6% annually (6). By the end of 2015, nearly 58,000 patients with ESRD had been registered in Iran, 29,200 of whom were receiving hemodialysis (7).

Hemodialysis, although the most common treatment modality for extending life expectancy, is a maintenance therapy that does not fundamentally alter disease progression. This treatment regimen imposes major challenges, including complex dietary requirements, fluid intake restrictions, and sustained dependence on medical equipment. Beyond physical symptoms, hemodialysis has numerous psychosocial consequences. Occupational, social, and recreational limitations, together with chronic fatigue, depression, and uncertainty about the future, severely affect patients' daily lives (6, 8, 9). Consequently, improving health-related quality of life (HRQoL) and patient satisfaction remains a major priority in healthcare systems.

Quality of life is a multifaceted construct that encompasses physical, psychological, social, and functional dimensions and is shaped by clinical status, social conditions, and individuals' perceptions of their lives (6, 9). Because of the inherent constraints of the disease and its treatment, patients receiving hemodialysis often report significantly lower quality of life than the general population (10, 11). Therefore, educational interventions aimed at promoting self-care and improving quality of life are of high importance. Self-care behaviors, including adherence to dietary and medication regimens, fluid management, and active participation in the treatment process, can substantially improve quality of life and reduce complications (12).

Traditional educational methods, such as face-to-face instruction, allow direct interaction between nurses and patients. However, they present challenges, including being time-consuming and difficult to implement in overcrowded clinical settings. In addition, coordinating patient gatherings between dialysis sessions or during busy clinical hours remains logistically challenging (5).

Significant advances in information and communication technology, particularly in educational content development, have introduced new modalities for patient education (13). Video-based and audio-based education have emerged as viable alternatives to traditional in-person methods. These modalities offer several advantages, including the ability to store information and review it repeatedly, ease of use, and cost-effectiveness (14). Video-based instruction provides visual and practical demonstrations that can help patients better understand complex concepts, such as dietary management. Conversely, audio files are accessible to patients with lower educational attainment or visual impairments because they do not rely on visual literacy. These tools can serve as effective adjuncts to face-to-face education, particularly during hemodialysis sessions, when patients spend prolonged periods in treatment centers (15, 16).

2. Objectives

Despite the importance of education for patients undergoing hemodialysis, the literature on the comparative effectiveness of different educational methods, particularly audio-based versus video-based modalities, remains limited. Most previous studies have examined a single method or compared one method with traditional in-person instruction. Consequently, it remains unclear which modality is more effective in improving HRQoL and satisfaction among patients undergoing hemodialysis. This study is important because selecting the optimal educational method can improve resource allocation, enhance patient engagement, and ultimately lead to better clinical outcomes in dialysis centers. To address this research gap, the present study aimed to compare the effects of self-care education delivered through video and audio files on HRQoL and satisfaction among patients undergoing hemodialysis. The findings may inform an evidence-based educational strategy that enables nurses and healthcare providers to use technological tools more effectively to improve clinical outcomes and patient well-being.

3. Methods

This quasi-experimental study used a pretest–posttest design to compare the effectiveness of two self-care educational modalities, video-based education and audio-based education, on HRQoL and treatment satisfaction among patients undergoing hemodialysis. The study was conducted from July 2021 to November 2021. The protocol was approved by the Ethics Committee of Mashhad University of Medical Sciences (IR.MUMS.NURSE.REC.1398.030) and conducted in accordance with the Declaration of Helsinki. All participants provided written informed consent and were assured of their right to withdraw from the study at any time and of the confidentiality of their personal data.

The study population consisted of patients undergoing hemodialysis at three medical centers in Mashhad, Iran: Montasarieh Hospital, the Kidney Patients Association, and 17 Shahrivar Hospital. The inclusion criteria were age under 60 years, at least 6 months of hemodialysis history, undergoing three 4-

hour hemodialysis sessions per week, literacy, and the absence of cognitive, visual, or auditory impairment. The exclusion criteria were kidney transplantation, death, or withdrawal of consent during the study.

Based on a study by Narimani et al. (17), with a type I error of 5% and a power of 80%, the sample size was estimated to be 44 patients per group. After accounting for a possible attrition rate of 10%, 98 participants were initially recruited. After the withdrawal of 8 patients, statistical analyses were performed on 90 participants (n = 45 per group).

Because of practical considerations in the dialysis units and to avoid disruption of clinical routines, random allocation was not feasible. Therefore, a quasi-experimental design with non-random allocation was used. Patients were assigned according to their referral schedule: those attending on even days were allocated to the video-based group, and those attending on odd days were allocated to the audio-based group. To minimize selection bias, the intervention type for each day was determined by lottery before the start of the study.

A demographic and medical questionnaire was developed to collect data on age, gender, marital status, education, employment, dialysis history, and sleep/activity patterns. Content validity was established by a panel of 8 experts from the School of Nursing and Midwifery, Mashhad.

The Kidney Disease Quality of Life Short Form, version 1.3 (KDQOL-SF™ 1.3), includes 80 items in two sections: General Health (SF-36) and Kidney Disease-Targeted Areas, including symptoms and the effects and burden of kidney disease. Scores range from 0 to 100, with higher scores indicating better HRQoL. The validity and reliability of the Persian version have previously been reported, with Cronbach's alpha values ranging from 0.74 to 0.93.

The Educational Satisfaction Questionnaire was a researcher-developed 14-item tool using a 5-point Likert scale ranging from “completely dissatisfied” to “completely satisfied.” Total scores ranged from 0 to 56 and were categorized as poor (0 - 14), moderate (15 - 28), good (29 - 42), and excellent (43 - 56). Content validity was established by a panel of 8 experts from the School of Nursing and Midwifery, Mashhad, yielding a Content Validity Index of 0.88 and a Content Validity Ratio of 0.82. The questionnaire was then pilot-tested on 20 patients undergoing hemodialysis, who were not included in the main study, at Montasariyeh Hospital. Internal consistency was confirmed with a Cronbach's alpha of 0.86.

The educational content covered intra-dialytic care, diet, medication adherence, and vascular access care. The content was validated by nursing experts and produced in video and audio formats in collaboration with the university's Virtual Education Center.

All training sessions were conducted remotely without in-person meetings, and no group training sessions were held. To prevent information leakage and contamination, education was provided individually using mobile devices and headphones. Educational content, either videos or audio files, was transferred to patients' personal mobile devices or provided via Bluetooth/USB at the dialysis center before the start of a session. Each patient received two 15-minute educational files per week for 4 consecutive weeks, for a total of 8 sessions, and was instructed to review the materials at home on non-dialysis days. A researcher was also available by phone to answer questions.

The intervention lasted 4 weeks, with two 15-minute sessions per week. Patients were monitored through in-person visits and telephone follow-ups. Post-test data were collected 2 weeks after the final session.

Data were analyzed using SPSS version 19. Normality was assessed using the Shapiro-Wilk test. Baseline homogeneity between groups was evaluated using independent t-tests and chi-square tests. For intra-group and inter-group comparisons, parametric tests, including paired and independent t-tests, or non-parametric tests, including Wilcoxon and Mann-Whitney U tests, were used based on data distribution. The significance level was set at $P < 0.05$.

4. Results

To determine the appropriate statistical tests, the normality of the data distribution was first assessed using the Shapiro-Wilk test, with the significance level set at 0.05.

Analysis of demographic data showed that 68.9% of patients in the video-based group and 46.7% in the audio-based group were male ($P = 0.056$). The mean age was 47.1 ± 10.8 years in the video-based group and 42.9 ± 13 years in the audio-based group ($P = 0.171$). In addition, the distributions of occupation, marital status, and educational attainment were comparable between the two groups, with no statistically significant differences ($P > 0.05$). Specifically, 62.2% of the video-based group and 68.9% of the audio-based group were unemployed; 80% of participants in both groups were married; and 26.7% of the video-based group and 28.9% of the audio-based group held university degrees.

Regarding clinical history, the primary etiology of hemodialysis in both groups was hypertension, affecting 37.8% of the video-based group and 42.2% of the audio-based group (P = 0.466). The mean duration of hemodialysis was 3.4 ± 2.7 years in the video-based group and 3.5 ± 1.8 years in the audio-based group. The Mann-Whitney U test showed no significant difference between the groups (P = 0.206). In addition, medical history (video-based group: 86.7%; audio-based group: 77.8%) and medication history (video-based group: 91.1%; audio-based group: 86.7%) showed no significant intergroup differences (P > 0.05).

Lifestyle assessment also indicated baseline comparability. Good sleep quality was reported by 75.6% of patients in the video-based group and 64.4% in the audio-based group (P = 0.061). Low physical activity was reported by 35.6% and 33.3% of the video-based and audio-based groups, respectively. The chi-square test confirmed that these differences were not statistically significant (P = 0.081). Overall, the two groups were homogeneous across all baseline variables, including age, gender, occupation, marital status, education, dialysis etiology, treatment duration, medical history, sleep quality, and physical activity (Table 1).

Before the intervention, the mean ± SD quality-of-life score was 58.7 ± 7.5 in the video-based group and 59.3 ± 8.1 in the audio-based group. The independent t-test showed no significant difference at baseline (P = 0.666), confirming group homogeneity.

After the intervention, the paired t-test showed a significant improvement in quality-of-life scores within the video-based group, from 58.7 ± 7.5 to 62.6 ± 6.8, with a mean change of 3.9 ± 3.0 (P < 0.001). Similarly, the audio-based group showed a statistically significant improvement, from 59.3 ± 8.1 to 62.4 ± 6.2, with a mean change of 3.1 ± 3.6 (P = 0.001).

However, intergroup comparison using the independent t-test showed no significant difference between the two groups in post-intervention mean scores (62.6 ± 6.8 vs. 62.4 ± 6.2; P = 0.634). Likewise, the mean change in scores from pre-intervention to post-intervention did not differ significantly between the two methods (3.9 ± 3.0 vs. 3.1 ± 3.6; P = 0.704) (Table 2).

After the intervention, the mean ± SD total satisfaction score was 49.44 ± 3.12 in the video-based education group and 44.34 ± 4.65 in the audio-based education group. This difference was statistically significant (P < 0.001), indicating significantly higher satisfaction in the video-based education group than in the audio-based education group.

5. Discussion

This study aimed to compare the effects of two self-care educational modalities, video-based and audio-based education, on HRQoL and satisfaction among patients undergoing hemodialysis. The findings showed that both interventions significantly improved patients' quality of life, whereas the video-based group reported higher satisfaction than the audio-based group.

The observed improvement in HRQoL after the educational interventions is consistent with the findings of Abbasi Abianeh et al. (2020) and Taskin Duman et al. (2024), who demonstrated that self-care education positively affects various dimensions of life among hemodialysis patients (6, 18). Furthermore, Yasari et al. (2024) reported that long-term use of educational videos can improve metabolic control and general health status, thereby directly affecting quality of life (19). This may be explained by the fact that education enhances knowledge and self-efficacy, thereby reducing disease complications and improving daily functioning. This point was also emphasized by Ibrahim et al. (2024), who reported a positive effect of educational guidelines on quality of life (20).

Despite significant improvements in both groups, no statistically significant intergroup difference was observed in total quality-of-life scores. This finding may be explained by the broad and relatively stable nature of quality of life, which may require a longer follow-up period than 4 weeks to detect differential effects between two active interventions. In contrast, satisfaction represents a more immediate affective response to the educational tool. It is also possible that the KDQOL-SF™ 1.3 is less sensitive to short-term, modality-specific changes than the satisfaction measure. Because both interventions delivered identical core content, the comparable improvements in quality of life reinforce the value of structured self-care education in any format. This consistency aligns with the findings of Torabikhah et al. (2023), who reported that different educational methods can be equally effective when the content is rich (21).

The superiority of the video-based group in terms of satisfaction is a noteworthy finding. Rademan et al. (2025) argued that video-based education, through visual representation, establishes a better connection with patients and facilitates comprehension of complex dietary and therapeutic concepts (1). The higher satisfaction in the video-based group may be attributed to the visual appeal and ease of learning associated with audiovisual tools. Hemodialysis patients often experience treatment-related fatigue and, as noted by Ren et al. (2021), show a stronger preference for short, engaging visual media (22). In addition, Sarmadi et al.

Table 1. Comparison of the Demographic Characteristics Between the Educational Video and Audio File Groups

Variables	Video-Based; No. (%)	Audio-Based; No. (%)	P-Value	Test Value
Gender			0.056	3.7 [a]
Female	14 (31.1)	25 (53.3)		
Male	31 (68.9)	21 (46.7)		
Marital status			0.469	2.3 [a]
Single	7 (15.6)	9 (20.0)		
Married	36 (80.0)	36 (80.0)		
Divorced	2 (4.4)	0 (0.0)		
Education level			0.430	-0.8 [b]
Primary	8 (17.8)	9 (20.0)		
Middle school	9 (20.0)	16 (35.6)		
High school	16 (35.6)	7 (15.6)		
University	12 (26.7)	13 (28.9)		
Occupation			0.223	3.0 [a]
Unemployed	28 (62.2)	31 (68.9)		
Employed	11 (24.4)	5 (11.1)		
Self-employed	6 (13.3)	9 (20.0)		
Etiology of hemodialysis			0.466	2.6 [a]
Hypertension	17 (37.8)	19 (42.2)		
Diabetes	17 (37.8)	14 (31.1)		
Congenital	7 (15.6)	4 (8.9)		
Others	4 (8.9)	8 (17.8)		

[a] Chi-square value.
[b] Z value.

Table 2. Comparison of the Total QoL Scores Between the Educational Video and Audio File Groups

Total QoL score	Video (Mean ± SD)	Audio (Mean ± SD)	P-Value [a]
Pre- intervention	58.7 ± 7.5	59.3 ± 8.1	0.666
Post- intervention	62.6 ± 6.8	62.4 ± 6.2	0.634
Mean change (post-pre)	3.9 ± 3.0	3.1 ± 3.6	0.704
P-value [b]	< 0.001	0.001	

[a] Independent *t*-test.
[b] Paired *t*-test.

(2025) emphasized that interactive videos may have greater potential for patient engagement than conventional methods, which can directly influence satisfaction levels (23). Thus, although both educational modalities effectively improved quality of life, the added visual component enhanced patient acceptance and adherence without necessarily producing differential short-term quality-of-life outcomes.

The results also showed that audio files, despite their structural simplicity, remain an effective tool for patient education. This finding is consistent with Tarverdizade et al. (2018), who highlighted that even simple technological tools, such as text messaging, can help bridge educational gaps (24). Nevertheless, the integration of image and sound in a video format, as noted by Liu et al. (2024), promotes better health literacy and self-management, which likely explains the higher satisfaction observed in the present study (25).

One key strength of this study is its comparative design, which examined two distinct remote educational modalities in a real-world clinical setting. The use of a validated disease-specific quality-of-life instrument, KDQOL-SF™ 1.3, and an acceptable sample size of 90 patients further enhance the internal validity

of the findings. However, several limitations should be acknowledged when interpreting these findings. The absence of a true control group limits causal inference regarding the net effects of the interventions. The non-randomized allocation method, based on dialysis days, may have introduced selection bias. The 4-week follow-up period was relatively short for assessing long-term changes in quality of life or sustained satisfaction. Reliance on self-report questionnaires may have introduced recall and social desirability biases. Variations in health literacy and cognitive abilities may have affected response accuracy. Uncontrolled environmental and psychological factors in dialysis centers may also have acted as confounders. Finally, the researcher-developed satisfaction questionnaire, although validated in this sample, lacks cross-validation in other populations, limiting comparability.

The non-random allocation method, based on even and odd days, is a major limitation that prevents the establishment of a causal relationship between educational modality and the observed outcomes. Although baseline characteristics were statistically comparable between the groups, unmeasured confounding variables, such as motivation level, family support, or socioeconomic status, may have differed systematically. Therefore, the results should be interpreted with caution. Future studies should use a fully randomized controlled trial design with concealed allocation to confirm these findings.

This study concluded that both video-based and audio-based self-care education improved HRQoL and patient satisfaction in hemodialysis settings. Because satisfaction was higher in the video-based group, dialysis centers are advised to facilitate access to visual content through video-sharing platforms or QR codes on educational materials. Future interventions could integrate these media with smart reminders to further enhance self-care outcomes.

Footnotes

AI Use Disclosure: For the purpose of Translation, the Gemini was used Moderate in the Introduction section.

Authors' Contribution: Study concept and design: Somayeh Javan and Mohaddeseh Mohsenpour; Analysis and interpretation of data: Somayeh Javan; Drafting of the manuscript: Fatemeh Araghi and Mahshad Langari; Critical revision of the manuscript for important intellectual content: Mohaddeseh Mohsenpour; Statistical analysis: Somayeh Javan and Mohaddeseh Mohsenpour.

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Data Availability: The data are not publicly available due to privacy concerns, as some datasets contain identifiable information that could compromise participant confidentiality.

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