



**THE EFFECTIVENESS OF DIGITAL STORYTELLING IN IMPROVING SELF-EFFICACY OF CHRONIC KIDNEY FAILURE PATIENTS UNDERGOING HEMODIALYSIS**

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**ABSTRACT**

Chronic Kidney Disease (CKD) is a widespread health concern that greatly affects the physical and mental well-being of individuals, particularly those who undergo hemodialysis (HD). Managing this condition poses significant challenges for patients, often leading to reduced self-efficacy. Digital storytelling has been identified as a potentially effective method for improving self-efficacy in patients with chronic illnesses; however, its impact on CKD patients receiving HD has not been thoroughly examined. This research aims to assess the impact of a digital storytelling intervention on boosting self-efficacy in CKD patients undergoing HD. A quasi-experimental design with a non-equivalent control group was employed to examine the intervention's effects. The study involved 40 CKD patients from Bhayangkara Hospital Makassar, selected using purposive sampling. Of these, 27 patients were allocated to the intervention group, and 13 to the control group. The intervention group participated in digital storytelling sessions twice weekly for four weeks, with each session lasting 15-20 minutes. The Chronic Kidney Disease Self-Efficacy (CKD-SE) questionnaire was administered pre- and post-intervention to measure self-efficacy. Data were analyzed using paired t-tests for within-group changes and ANOVA to compare results between the groups. After the digital storytelling intervention, 85.2% of participants in the intervention group showed improvement in self-efficacy, though the change did not reach statistical significance ( $p = 0.215$ ). Meanwhile, the control group experienced a decrease in self-efficacy over the same period. Despite the encouraging results, the brief duration of the intervention may have limited its full effectiveness. Digital storytelling appears to be a useful method for enhancing self-efficacy in CKD patients undergoing HD. Although the improvements were not statistically significant, the positive trends suggest potential benefits. Future studies should consider extending the duration of the intervention and increasing the sample size to better evaluate its efficacy.

**Keywords:** chronic kidney disease; digital storytelling; hemodialysis; psychosocial intervention; self-efficacy

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**INTRODUCTION**

Chronic Kidney Disease (CKD) is a growing global health concern, reflected by an increasing number of cases and high costs associated with its treatment (Giles-Corti et al., 2016). From 2007 to 2019, the occurrence of CKD surged by 27%, elevating it to the 12th leading cause of death worldwide, up from 14th a decade earlier (Metrics, 2019; Ying et al., 2024). Projections from research models suggest that the burden of CKD will continue to rise, with the number of annual deaths expected to grow from 26 million in 2016 to 52.5 million by 2040 (Foreman et al., 2018). CKD frequently progresses to chronic kidney failure, necessitating interventions such as dialysis or transplantation (Baykan & Yargic, 2012). Hemodialysis (HD) is one of the primary treatments used to manage patients with end-stage renal disease, wherein the blood is

circulated outside the body through an artificial kidney to filter out metabolic waste (Ronco & Clark, 2018). However, HD comes with its own complications, as the prolonged exposure of blood to external surfaces can trigger inflammation and the depletion of essential blood components, such as platelets, potentially accelerating kidney function decline and causing vascular damage (KDOQI, United Kingdom 2015). This issue is prevalent both locally and globally. Data from the 2013 United States Renal Data System (USRDS) reported that in 2011, the incidence of end-stage CKD in the U.S. reached 1,924 cases per 1 million people, with an annual growth rate of 7% (Partridge & Robertson, 2011). Other nations have reported similar trends, with CKD prevalence reaching 20.4% in Singapore, 13% in China, 28.8% in Japan, and significant rates in countries such as Mongolia, Korea, Iran, and Thailand (Yusra Habib Khan, Tauqueer Hussain Mallhi, Azmi Sarriiff, 2018).

In Indonesia, the Indonesian Nephrology Association estimates that around 12.5% of the population has experienced kidney function decline, which is indicated by persistent proteinuria or a decrease in glomerular filtration rate. Considering Indonesia's population of approximately 240 million, this translates to roughly 30 million individuals affected by impaired kidney function (PERNEFRI, 2013). Specifically, in South Sulawesi, CKD prevalence is around 0.3%, making it one of the regions with the highest rates in Indonesia (Kemenkes, 2013). The global trend is reflected in the U.S., where 113,136 new patients began HD treatment in 2011 (CDC, 2014). CKD patients on hemodialysis often face a variety of challenges, including both physical and psychological stressors. Physiological issues such as itching, sleep disturbances, dry mouth, muscle weakness, nausea, vomiting, abdominal pain, and fatigue are commonly reported (Tu, Shao, Wu, Chen, & Chuang, 2014). Psychosocial factors like dietary restrictions, uncertainty about the future, and reduced quality of social life also play a significant role (Hu, Chen, Hung, Chen, & Chen, 2012). Moreover, these patients are at an increased risk for psychological disorders, including fear, anxiety, and depression (Baykan & Yargic, 2012; A. Sulfikar & Rajab, 2024).

Interviews with HD patients reveal that many express uncertainty about their treatment and a lack of confidence in managing their disease. This is supported by studies that show CKD patients often have low confidence in managing their condition, which makes adhering to treatment protocols challenging (Bağ & Mollaoğlu, 2010). This reduced self-efficacy negatively impacts patient adherence to necessary self-care routines, which is essential for successful therapy outcomes (Sulistyaningsih & Setyawati, 2016). Numerous studies have shown that CKD patients receiving HD often exhibit low self-efficacy. For example, research conducted at Imam Khomeini Hospital in Iran revealed that most HD patients had low self-efficacy (Jafari, Mannani, & Zarea, 2015). Similar findings were observed in a Turkish study, where only 6.4% of HD patients reported high levels of self-efficacy (Bağ & Mollaoğlu, 2010). A study in Indonesia also found that 87.8% of HD patients at Sint Carolus Hospital in Jakarta exhibited low self-efficacy (Ismoyowati, 2016).

Low levels of self-efficacy in HD patients have been associated with suboptimal treatment outcomes (Kim et al., 2010). Consequently, effective strategies are needed to enhance self-efficacy in CKD patients undergoing HD. One promising approach is digital storytelling, which has been shown to boost self-efficacy in individuals with other chronic illnesses such as diabetes and cancer (Sari et al, 2019; Wieland et al., 2017; Sulfikar, Rachmawaty, & Kadar, 2021). Although digital storytelling has been studied in patients with various chronic conditions, there is limited research on its effectiveness for CKD patients undergoing HD. Given the psychological and health challenges these patients face, this study seeks to evaluate

the impact of digital storytelling on improving self-efficacy in CKD patients receiving HD at Bhayangkara Hospital, Makassar.

## **METHOD**

This research utilized a quasi-experimental approach with a control group that was not equivalent. This methodology enabled the researchers to assess the impact of a digital storytelling intervention on self-efficacy levels in CKD patients undergoing hemodialysis, while the control group received only standard care without any supplementary intervention (Campbell & Stanley, 2015). The research was conducted in the Hemodialysis Unit of Bhayangkara Hospital, Makassar, Indonesia, from June to August 2024. This location was chosen based on the high prevalence of CKD in the region and the availability of facilities to support the study (Kemenkes, 2017). The target population in this study consisted of all CKD patients undergoing hemodialysis at Bhayangkara Hospital, Makassar. This population selection was based on epidemiological data showing a high incidence of CKD in this region (Indonesia Nephrology Association (Perhimpunan Nefrologi Indonesia (PERNEFRI), 2013). The purposive sampling technique was used to select participants who met the inclusion criteria, namely patients aged 18 to 65 years, who had been undergoing hemodialysis for at least three months, and were willing to participate in the study. Exclusion criteria included patients with cognitive impairments or medical conditions that hindered participation in the intervention (Bryman, 2016). Of these, 27 patients were allocated to the intervention group and 13 to the control group. The experimental group received a digital storytelling intervention for four weeks. Digital storytelling was used due to its potential to increase self-efficacy through narratives focusing on the life experiences of CKD patients who successfully managed their condition (Sari et al, 2019; Wieland et al., 2017). The videos were shown twice a week, with each session lasting 15-20 minutes.

Self-efficacy was assessed using the validated Chronic Kidney Disease Self-Efficacy (CKD-SE) tool (Lin et al., 2012). This questionnaire comprises various items aimed at evaluating the confidence of individuals in managing CKD and following associated treatments. It is structured into four key components: autonomy, self-integration, problem-solving, and seeking social support. Assessments were conducted both prior to the intervention (pre-test) and afterward (post-test) to monitor any changes in self-efficacy. The tool displayed excellent validity, with a high Cronbach's alpha score, confirming its reliability for use in this research. The research was conducted in four stages: 1) Preparation Stage: Development and validation of the instruments and preparation of digital storytelling materials. 2) Pre-Test: Initial self-efficacy measurements were conducted in both groups prior to the intervention using the Self-Efficacy Scale questionnaire (Shana M. Green, Elizabeth Lockhart, 2018). 3) Intervention: The experimental group received the digital storytelling intervention, while the control group received standard care. 4) Post-Test: Self-efficacy was measured again in both groups after the intervention to assess the effects of digital storytelling.

The data were examined using descriptive statistics to summarize the demographic characteristics of the participants. To assess changes in self-efficacy within each group, paired t-tests were applied, while ANOVA was utilized to compare the differences between the groups (Field, 2024). A significance threshold of  $p < 0.05$  was established for all statistical tests. This study received approval from the Research Ethics Committee at Nani Hasanuddin College of Health Sciences (STIKES), as indicated by recommendation number 177/STIKES-NH/KEPK/VI/2024. Prior to the start of the research, informed consent was secured from all participants, ensuring them that their personal data would remain confidential and their

privacy would be protected, in full compliance with relevant ethical standards for research (Association, 2013).

## RESULT

### Socio-Demographic Characteristics of Respondents

This study included 40 participants, with 27 assigned to the intervention group and 13 to the control group. Participants differed in age, gender, and education levels. The largest portion of the intervention group (29.6%) fell within the 46-55 age range, while 38.5% of the control group was between 56-65 years old. Gender-wise, women were the majority in both groups; the intervention group consisted of 14 women (51.9%) and 13 men (48.1%), while the control group had 53.8% women and 46.2% men. In terms of education, the majority of participants in both groups had completed high school, with 59.3% in the intervention group and 38.5% in the control group (Table.1). These findings suggest that most respondents were middle-aged or older and had a secondary education background. The higher proportion of women may indicate a greater vulnerability or involvement in managing chronic conditions like CKD, which necessitates hemodialysis (HD).

Table 1  
Demographic Characteristics of Respondents

Characteristic	Intervention Groups (n=27)	Control Group (n=13)
Age		
17-25 years old	1 (3,7%)	0 (0,0%)
26-35 years old	4 (14,8%)	0 (0,0%)
36-45 years old	6 (22,2%)	1 (7,7%)
46-55 years old	8 (29,6%)	4 (30,8%)
56-65 years old	6 (22,2%)	5 (38,5%)
>65 years	2 (7,4%)	3 (23,1%)
Gender		
Man	13 (48,1%)	6 (46,2%)
Woman	14 (51,9%)	7 (53,8%)
Education		
Primary School	2 (7,4%)	4 (30,8%)
Junior High School	3 (11,1%)	2 (15,4%)
Senior High School	16 (59,3%)	5 (38,5%)
College	6 (22,2%)	2 (15,4%)

### Changes in Self-Efficacy in Intervention and Control Groups

The results showed a significant change in the level of self-efficacy before and after the intervention in the group that received the digital storytelling intervention. Prior to the intervention, 77.8% of the respondents in the intervention group reported having high self-efficacy, while the remaining 22.2% were at a moderate level of self-efficacy. After the four-week digital storytelling intervention, the percentage of respondents with high self-efficacy increased to 85.2%, while 14.8% remained at a moderate level of self-efficacy (Fig. 1). This indicates that digital storytelling interventions have a positive impact on increasing patients' confidence in managing their health conditions. In contrast, the control group, which received no additional intervention and only standard care, experienced a decrease in self-efficacy levels. Before the observation period, 76.9% of respondents in the control group had high self-efficacy, but by the end of the study period, this percentage had dropped to 69.2% (Table.2). This suggests that without additional support, such as digital interventions, patients'

self-efficacy tends to decline, potentially due to factors such as stress from the hemodialysis process or uncertainty about their future health condition.

Table 2  
Pre and Post Self-Efficacy Scores in the Intervention and Control Groups

Self-Efficacy Score	Intervention Group (n = 27)	Control Group (n=13)
Pre Self-Efficacy		
Keep	6 (22,2%)	3 (23,1%)
Tall	21 (77,8%)	10 (76,9%)
Post Self-Efficacy		
Low	0 (0,0%)	1 (7,7%)
Keep	4 (14,8%)	3 (23,1%)
Tall	23 (85,2%)	9 (69,2%)

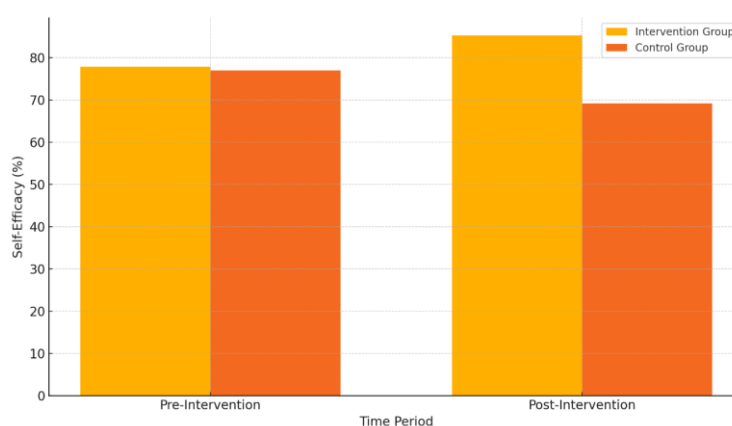


Fig.1. Self-efficacy Comparison Between Intervention and Control Groups

### Statistical Analysis of Self-Efficacy Differences

To further analyze the differences in self-efficacy levels before and after the intervention in the two groups, statistical tests were conducted using a paired t-test. The analysis results showed that in the intervention group, there was an average increase in self-efficacy score of 0.93 after the intervention, although this change was not statistically significant with a p-value of 0.787. This indicates that, although there was a descriptive increase in self-efficacy, the change was not statistically strong enough to be considered significant. On the other hand, in the control group, the average self-efficacy score decreased by 3.46 after the study period, but this decrease was also not statistically significant with a p-value of 0.566 (Table.3). This suggests that, although self-efficacy decreased in the control group, the difference was not large enough to be considered statistically significant. These findings highlight that while digital storytelling may improve self-efficacy, stronger outcomes may require longer intervention durations or more intensive methods.

Table 3  
Test for the Difference Between Pre and Post Self-Efficacy in the Intervention and Control Groups

Variable	Intervention Group (n = 27)	Control Group (n=13)
Mean (Pre)	100.33 ± 11.82	97.46 ± 6.94
Mean (Post)	99.41 ± 9.05	94.00 ± 18.25
Average Difference	0,93	3,46
P-Value (Paired T-Test)	0,787	0,566

### Comparison of Post Self-Efficacy Score between the Intervention and Control Groups

After the intervention period was completed, a comparison of self-efficacy scores between the intervention group and the control group was conducted using an independent t-test (Fig.2). The average self-efficacy score in the intervention group was 99.41, while in the control group it was 94.00. Although the intervention group had a higher score after the intervention, the results of the statistical test indicated that this difference was not statistically significant, with a p-value of 0.215 (Table.4). This means that the difference in scores between the two groups, although seemingly descriptive, is not sufficient to be considered statistically significant. This suggests that while digital storytelling may improve self-efficacy, it did not result in a significant difference compared to standard care within the context of this study.

Table 4

Comparative Test of Post Self-Efficacy Score between Intervention and Control Groups  
(Independent t-test)

(Independent t test)					
Group	N		Mean		Std. Deviation
Intervention Groups	27		99,41		9,05
Control Group	13		94,00		18,25
Test	F	Sig.	t	Df	Sig. (2-tailed)
Post Self-Efficacy	7.94	0.008	1.261	38	0.215

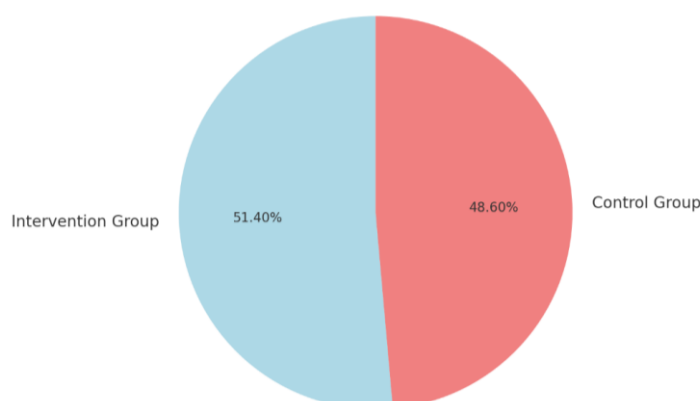


Figure.2. Post-Intervention Self-efficacy Score Distribution

## DISCUSSION

This study provides valuable insights into the effectiveness of digital storytelling as an intervention method to improve self-efficacy in patients with chronic kidney disease (CKD) undergoing hemodialysis (HD). The results of this study showed an increase in self-efficacy in the intervention group after receiving the digital storytelling intervention. Although the change was not statistically significant, the findings remain relevant as they indicate a descriptively positive influence on patients' confidence in managing their disease (Veilleux, Skinner, Baker, & Chamberlain, 2021).

### Increasing Self-Efficacy Through Digital Storytelling

The increase in self-efficacy in the intervention group can be attributed to the basic mechanism of digital storytelling, which allows patients to gain a better understanding of how to manage their disease through the success stories of others who have experienced similar situations. This aligns with (Bandura, 1997) theory of self-efficacy, which emphasizes the importance of vicarious experience in building one's confidence to overcome challenges. Patients who observe others successfully dealing with the same problem can feel more

optimistic and confident in facing their own challenges, such as undergoing hemodialysis procedures.

Furthermore, this intervention may be particularly beneficial for patients with CKD who have just been diagnosed and are about to start hemodialysis therapy. In some cases, many patients newly diagnosed with CKD tend to refuse HD therapy despite their diagnosis. This is often due to fear, uncertainty, and denial of their newly recognized condition. In this context, digital storytelling can serve as an effective strategy to help new patients understand and accept their condition, as well as improve their mental readiness to begin the necessary therapy. While CKD patients who have already undergone HD tend to become more adaptable and accept their condition over time, newly diagnosed patients often require additional support to overcome the denial phase (van Eenbergen et al., 2019). These findings are consistent with previous research showing that story-based interventions, such as digital storytelling, are effective in improving self-efficacy in patients with other chronic diseases, such as diabetes and cancer (Sari et al, 2019; Wieland et al., 2017). The use of stories that highlight real-life experiences helps patients feel more connected and motivated to manage their health, despite the psychosocial burdens they face during HD therapy.

### **Challenges in Achieving Statistical Significance**

Although there was a descriptive increase in self-efficacy in the intervention group, this difference was not statistically significant ( $p = 0.215$ ). This suggests that the digital storytelling intervention in this study did not result in a strong enough difference compared to the control group. Several factors may have contributed to this outcome, including the duration of the intervention, which may have been too short to produce a statistically significant impact. The study lasted only four weeks, which may not have been long enough to bring about significant changes in the self-efficacy of patients dealing with long-term chronic conditions such as CKD (Taylor et al., 2022). Additionally, the limited sample size, particularly in the control group ( $n = 13$ ), may have also contributed to the lack of statistical significance. Further research with a longer duration and a larger sample size may be necessary to better understand the long-term effects of digital storytelling on the self-efficacy of CKD patients undergoing HD (Santonen et al., 2022).

### **Clinical Implications and Potential Developments**

Although no statistically significant differences were found, these findings remain clinically important. An increase in self-efficacy in HD patients is crucial as it is closely linked to treatment adherence, self-management, and improved quality of life (Meng et al., 2024). Digital storytelling interventions offer an easily implemented approach and have the potential to positively impact self-efficacy, which could ultimately enhance overall clinical outcomes (Howren et al., 2016). Digital storytelling also offers high flexibility in its application. The use of this technology allows for continuous intervention that can be accessed from various locations, even in areas with limited access to quality healthcare. This is highly relevant in Indonesia, where the prevalence of CKD and hemodialysis is steadily increasing, yet access to quality care facilities remains uneven across regions (PERNEFRI, 2013). Future research could explore more personalized applications of digital storytelling, with content tailored to patients' conditions, age, and social background. This approach is expected to yield more statistically significant results and provide deeper insights into the effectiveness of digital interventions in enhancing self-efficacy across different patient populations.

## CONCLUSION

This study demonstrates that digital storytelling interventions have the potential to improve self-efficacy in patients with chronic kidney disease (CKD) undergoing hemodialysis (HD). Although the results were not statistically significant, there was a descriptive improvement in self-efficacy among patients who received the intervention. Digital storytelling appears particularly beneficial for newly diagnosed patients undergoing HD who often face psychological challenges, such as fear and denial. Future research should focus on increasing the intervention duration and sample size to better understand its long-term benefits. Personalizing digital storytelling content based on individual patient profiles may further enhance its effectiveness in boosting self-efficacy.

The findings from this study suggest that integrating digital storytelling interventions into nursing care plans for CKD patients undergoing HD may have a positive impact on their self-efficacy. Nurses can utilize digital storytelling as a psychosocial support tool to help patients build confidence in managing their condition, potentially leading to better adherence to treatment and improved overall quality of life. It is recommended that healthcare providers consider adopting digital interventions as part of holistic care approaches, particularly for patients experiencing low self-efficacy. This strategy can be especially useful in regions with limited access to comprehensive healthcare resources, offering a scalable and flexible method of support.

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