

Effect of Mandala Coloring Nurse-Led Intervention Program on Resilience among Hemodialysis Patients

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Abstract

Background: Resilience affect the coping with adversities faced by hemodialysis patients. Accordingly, diverse methods of non-pharmacological interventions, such as (mandala coloring) that foster self-expression and bear down emotional conflict is so important to increase resilience and flow among hemodialysis patients. **Study aim:** this study aimed to assess levels of resilience among hemodialysis patients. **Design:** A quasi-experimental design was used in this study. **Setting:** The present study was conducted at Hemodialysis Unit affiliated to Suez Canal University Hospital and the international 30 July center, Ismailia city. **Sample:** A sample of 64 Hemodialysis patients with chronic hemodialysis and without antianxiety or antidepressant medications **Tools:** Three tools were used in this study. *First tool:* Demographic characteristics and Clinical characteristics, *Second tool:* structured interviewing questionnaire and the third tool: The Connor-Davidson Resilience scale (CD-RISC). **Results:** the results in this study revealed that: 100% had a mild level of resilience before the intervention. Regarding post and follow-up phases, resilience levels increased among the intervention group compared with the control group. **Conclusion:** the study concluded that; the mandala coloring nurse-led intervention program significantly improved psychological resilience among hemodialysis patients in the post-follow-up study phases compared with the pre-program phase. **Recommendation:** Research into the impact of mandala coloring and chronically ill patients' resilience and quality of life will be useful for future research reference.

Key words: Hemodialysis patients, Mandala coloring, Resilience.

1. Introduction

End Stage Renal Disease (ESRD) is one of the most outgrowing diseases globally, affecting about 10%-15% of the world's population. According to the latest statistics from the Egyptian Ministry of Health registry, there are 56,000 HD patients per million population all over the country. Despite the importance of hemodialysis for patient survival, it's associated with long-

term stress as a strict dietary regimen and invasive treatments; moreover, the hemodialysis itself can cause pain and itching, which are often challenging to adjust to, thus increasing the risk for psychological problems (Megahed, El-Kannishy et al. 2019, Tammadon, Nobahar et al. 2021, Vaidya and Aeddula 2021). Thus, a liaison psychiatric nurse is vital in improving patients coping with long-term stress

associated with hemodialysis. Resilient coping refers to cognitive, behavioral, and emotional strategies implemented by an individual to deal with and manage stressful situations. Consequently, improving patients' quality of life and playing the role of protective factors with possible psychopathological complications. Many studies have been conducted on mandalas coloring and its effectiveness across the general population, traumatized patients as both an assessment and therapeutic method of self-expression, conflict resolution, self-awareness, healing, and stress reduction (Barberis, Cernaro et al. 2017, Southwick and Charney 2018, Rose and Lomas 2020, Verhoeven 2020).

Thus, Investigating the effect of coloring mandala as a nurse-led intervention on resilience among hemodialysis patients seems justified.

The aim of the study: The current study aims to evaluate the effect of mandala coloring nurse-led intervention program on resilience among hemodialysis patients.

Research Objectives:

1. Assess resilience levels among hemodialysis patients before and after mandala coloring nurse-led intervention

program .

2. Subject and Methods

Study design: A quasi-experimental design was utilized in this study .

Study setting: The present study was conducted at hemodialysis units in the following hospitals: Suez Canal University Hospital and General Hospital (The International 30 June center for hemodialysis, recently named)

The sample of the study: A purposive sample of 64 chronic hemodialysis patients were randomly assigned to two groups, each with 32 subjects

Target population

Hemodialysis patients who met the inclusion criteria volunteered to participate in the study.

Inclusion criteria:

1. Adults patients with chronic hemodialysis.
2. Patients are free of Psychotropic medications.
3. Patients with dominant hands are free from shunts, thus being able to color without

hazards.

Sampling technique :

A purposive sample of (64) chronic hemodialysis patients were randomly assigned to two groups, each with 32 subjects. Pieces of paper numbered 1 and 2 were drawn blindly, one at a time, to determine the order of group assignment of subjects. Subjects were then assigned to the groups in the order indicated by the drawing. The order was repeated until 64 subjects were obtained. Group 1 was the controls who received routine care. While group 2 was the intervention group (in which mandala coloring was applied).

The following formula for the sample size was used:

$$(Z_{\alpha/2} + Z_{\beta})^2 \cdot 2^{\alpha/2/d^2}$$

$$(1.96+0.84)^2 \times 2 \times 2^{1/1}$$

$$n = (1.96+0.84)^2 \times 2 \times 2^{1/1}$$

n= sample size

$$Z = 1.96$$

$$\alpha = 0.05$$

$$\beta = 0.2$$

$$d = 1$$

So, according to the calculations, the sample size = 64 subjects

Tools of data collection:

Tool (1): Demographic and Clinical characteristics

Demographic characteristics included age, gender, marital status, level of education, place of residence, ..etc.. While the clinical characteristics included: frequency of hemodialysis, duration of hemodialysis, ...etc.

Tool (2) The Connor-Davidson Resilience scale (CD-RISC):

It was developed by Connor and Davidson (2003) and translated into Arabic by ALaseme and Badrea (2018) to measure psychological resilience, focusing on the individual's coping ability with stressors. It comprised 25 items, each rated on a 5-point scale from 0 "not true at all" to 4 "true nearly all the time".

Scoring system :

According to Connor and Davidson (2003), the scale's median and quartile scores are as follows: the median score describes the

midpoint of the frequency distribution. While quartiles describe four groups of an equal number taken from the observed distribution of scores, with the first quartile (Q1) describing the score range for the lowest group (lowest 25% of the population), i.e., the least resilient, the second (Q2) and third (Q3) the intermediate resilient, and the fourth (Q4) describing the highest or most resilient, i.e., above 75% of the population. Therefore, the scoring of CD-RISC-25 in the present study is as follows: the median score is 62, considered the cut-off point of the scale, with Q1= 0-53, which indicates low resilience, Q2 & Q3 = 54-62 & 63-71, that indicate intermediate (moderate) resilience and Q4= 72-100 that indicate high resilience.

Scale reliability :

The reliability of scores on the CD-RISC estimated using Cronbach's α ranged from .89 to .94 (Maguen, Turcotte et al. 2008, Hourani, Bender et al. 2012)

Field work:

The program consisted of 6 sessions in the form of two sessions weekly, each lasting 45- 60 minutes. It covered a period from February 2021 to July 2021. Patients were divided into a randomized clinical trial that

assigned eligible patients undergoing hemodialysis by the simple randomization method to receive either only usual care (control,) or usual care and mandala coloring(experimental). The researcher explained to the patients the aim and procedures of the study and will encourage them to participate. The researcher assured them about confidentiality to gain their trust, cooperation, and confidence. During the sessions, patients were encouraged to ask questions, interject their own experiences, and receive feedback from them. Also, the 10-minute discussion provided at the end of each session. The researcher provided coloring pencils, pre-designed mandala, and eraser material to help patients during sessions.

Administrative design:

An official approval letters explaining the aim of the study were directed from the Dean of the faculty of Nursing, Suez Canal University to the directors of selected settings (Suez Canal University hospitals and Ismailia general hospital) to obtain their permission and cooperation to conduct the study

Ethical considerations:

The study proposal approved by the

Research Ethics Committee at Faculty of Nursing, Suez Canal University code number ((12/6-2019)). Each patient was asked to give written consent to participate in the study after full explanation of the nature and the main aim of the study and its expected outcomes. The patient had the right to withdraw from the study at any time without any rationale, also they were informed that data not included in any further researches without another new consent from them. The gathered data were assured through coding of all data for confidentiality.

Statistical design

After data collection, variables included in each data collection sheet were organized and tabulated, then coded before computerized data entry according to the three phases of the study (pre, post, and follow-up). The data were then imported into Statistical Package for the Social Sciences (SPSS version 20.0) software for statistical analysis. Mean, stander deviation, t-test, ANOVA F-test, and Bonferroni multiple comparison post hoc tests for comparing each two-time point within each group were used for statistical data analysis.

3. Results

Table (1): shows no statistically significant difference between the study and control hemodialysis patients concerning demographic data. More than half the study and control group subjects were more than 40 years old 51.61% vs. 59.18%, respectively, with a mean age of 45.5 ± 11 for both groups. Regarding gender, most study and control groups were females 51.61% and 64.52%, respectively. Furthermore, more than half of the study group (58.06%) and nearly half of the control group 45.16% were married. Concerning educational level, Near two thirds of the study group were secondary educated 58.06% compared with 48.39 of the control group. Concerning the duration of hemodialysis, More than half of the study and control group had less than 10 years of initiating hemodialysis 74.19% and 58.07%, respectively. In addition, more than half of the study and the control group received hemodialysis sessions 3 times weekly 51.61 and 54.84, respectively.

Table (2) clarifies that there was a statistically significant interaction between 1 month after the intervention and immediately after the intervention and groups regarding resilience with F, df, and P values 166.13,1.349 <.001, η^2 .74. Post hoc comparisons indicated that there was no

difference between the two groups at baseline regarding resilience before the intervention. There was a significant difference between the two groups immediately after the intervention and after one month, with the effect size 44.77 ± 2.47 & 43.23 ± 2.96 , respectively, at two times. **Figure (1)** shows that the mean score of resilience before the intervention phase was 30,51 with a confidence interval 27.93-31.63 among the study group, and the mean score was 28.35 among the control group with a confidence interval 27,30-29,40. Immediately after the intervention, the mean score of resilience was 44,77 among the study group with a confidence interval 43.86-45.68, and the mean score was 29.12 among the control group with a confidence interval 27.93-30.31. Lastly, after one month of the intervention, the mean score of resilience was 43,22 among the study group with a confidence interval 42.13-44.31, and the mean score was 29,54 among the control group with a confidence interval 28.60-30.49.

Table (3) illustrates that before-the intervention phase, the majority of the study group and the control group 100% had a low level of resilience. Regarding immediately after the intervention program phase, there

was a statistically significant increase in resilience level among the study group whereas ,p-value $<.001^*$, 38.7% of the study group had a moderate resilience level, and all of the control group 100% had low resilience level. After one month of the intervention program, there was a statistically significant improvement in resilience level as the p-value $<.001^*$, where 32.3% of the study group had a moderate resilience level, and all of them of a control group 100% had a low level of resilience

4.Discussion

Increasing resilience, as a mechanism of positive adaptation to common stressful scenarios associated with hemodialysis using an inexpensive collateral treatment for trauma or chronic diseases such as End Stage Renal Disease (ESRD), has received significant attention in recent years (**Pepperell 2017, El-Majzoub, Mucsi et al. 2019**).

Art therapy has been employed as collateral treatment for trauma or chronic diseases. Coloring the moderately complex, symmetrical, and repeating patterns of the mandala helps individuals under severe stress as hemodialysis patients to solve conflicts and problems, develop interpersonal skills,

reduce stress and anxiety, regulate their behavior, and increase their resilience (**Shella 2018, Nassim, Park et al. 2021, Ramirez and Haen 2021**). Concerning resilience before the intervention phase, finding of the present study revealed that both the study and control group had a mild level of psychological resilience. This may be due to too many unresolved cumulative feelings secondary to the absence of knowledge and learned skills of positive ways of ventilation. Also, most of the study subjects are married and females, which is associated with many responsibilities in our society and culture that are difficult to cope with due to too long hours spent during hemodialysis. Accordingly, **Martin, Burns et al. (2022)** mentioned that this might be due to resilience having served as a mediator in the relationship between coping and psychological distress in chronically ill patients. On the same line, **Kavak, Özdemir et al. (2021)** stated that psychological resilience was less among women .

From another point of view, (**Keskin 2022**) stated that hemodialysis patients had a moderate level of psychological resilience, moderate anxiety, and post-traumatic growth scores, and age was found to be an effective variable on resilience.

Concerning resilience after applying for the mandal coloring intervention program, the present study found a statistically significant improvement in the resilience level to a moderate instead of a mild level before the intervention program among the study group, while the resilience level remained mild among the control group. This result is certainly attributed to the intervention program, which provided a mindful portrayal of resilient coping with discovered anxious feelings. Hence, guided coloring pre-designed mandala provided a conscious method of coping and adaptation to boredom, fears, stress, and anxious feelings associated with hemodialysis.

The preceding result goes along with **Khodabakhshi-Koolae and Darestani-Farahani (2020) and ÖZSAVRAN and SEVAL (2020)**, who found that mandala coloring improves emotional flexibility by helping the participants to strengthen their psychological resilience and is also effective in improving social skills and psychological resilience as it motivates emotional expression and improves the mood.

5. Conclusion:

In the light of the current study findings, it

can be concluded that, that hemodialysis patients had a mild level of resilience before the intervention program. Also, hemodialysis patients' resilience significantly improved after implementing the intervention

6. Recommendations:

Based on the results of the present study, the following recommendations were suggested:

1- Dissemination of this intervention program to other hemodialysis units in Egypt

and elsewhere for further confirmation of the findings and improvement on the program.

2- Ongoing training of all hemodialysis nurses should be encouraged to improve patients' resilience

3- Research into the impact of mandala coloring and chronically ill patients' resilience and quality of life will be useful for future research reference.

Table (1): Demographic data and clinical characteristics of the hemodialysis patients (n=62)

Items	Study Group n=31		Control Group n=31		X ²	P - value
	Frequency	%	Frequency	%		
Age:						
20-30 years	10	32.26	8	24.80	5.60	0.1326
> 30-40 years.	16	16.13	19	16.02		
> 40 years.	5	51.61	5	59.18		
Mean ± SD	45.5± 11		45.5± 11			0.7180
Range	20-63		20-64 t=0.36			
Gender:						
-Male	15	48.39	11	35.48	1.06	0.3033
- Female	16	51.61	20	64.52		
Marital Status:						
-Single	4	12.90	7	22.58	1.90	0.5931
-Married	18	58.06	14	45.16		
- (Divorced, widow)	9	29.03	10	32.26		
Level of education:						
-Basic education	7	22.58	9	29.03	8.98	0.0295*
- Secondary	18	58.06	7	48.39		
-University	6	19.35	15	22.58		
Duration of hemodialysis						
-Less than 10 years.	23	74.19	18	58.07	7.93	0.0475*
10 years or more.	8	25.81	13	41.39		
Frequency of Dialysis:						
Three times per week	16	51.61	17	54.84	0.06	0.7991
-Twice per week	15	48.39	14	45.16		

Table (2): Comparison of mean scores among study and control groups regarding their resilience (before, immediately after, and after one month) (n=62).

Items	Study Group. (n= 31)	Control Group.(n=31)	Sig. ^b (delta)
	Mean±SD	Mean±SD	
Resilience			
Before intervention	30.52±3.05	28.35±2.87	.006 (.8)
Immediately after	44.77±2.47	29.13±3.24	<.001*(4.83)
I month after	43.23±2.96	29.55±2.57	<.001*(5.32)
F, df (P value) (η²)	166.13,1.349 (<.001), η²(.74)		

F test is repeated measures ANOVA, η² is Partial Eta Squared, b. Adjustment for multiple comparisons: Least Significant Difference (equivalent to no adjustments); the delta is Glass's delta effect size; d is Cohen's d effect size; P value is significant <.05

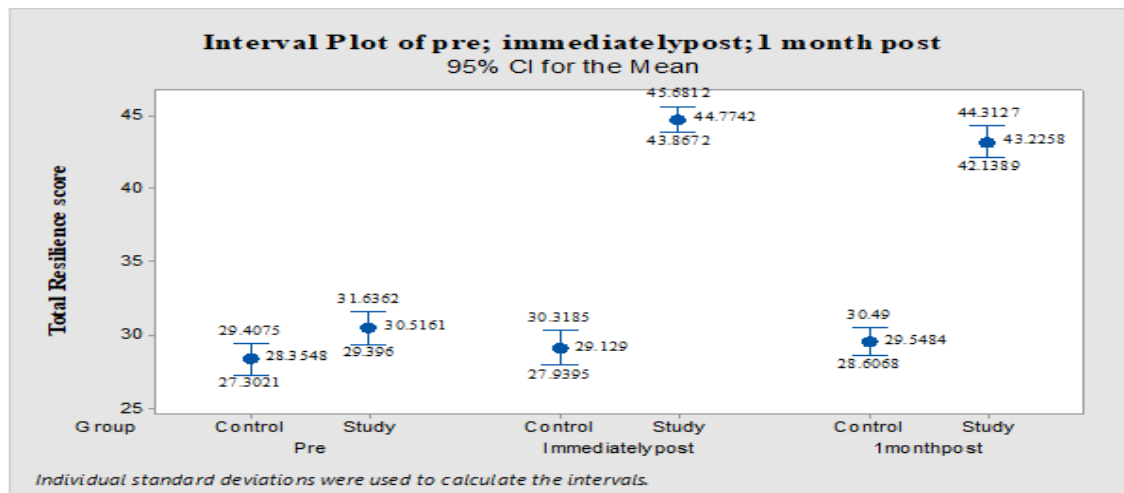


Figure 1: Interval plot of 95% Confidence interval of mean scores of resilience levels among two groups (before, immediately, and after one month of the intervention program).

Table (3): Levels of resilience score among study and control groups before, immediately after, and one month after the intervention program (n=62).

Items	Control group n=31						Study group n=31						X ² (P value)
	low		Moderate		High		low		Moderate		High		
	N	%	N	%	N	%	N	%	N	%	N	%	
Before the intervention	31	100	0	0	0	0	31	100	0	0	0	0	.000 ^a
Immediately after the intervention	31	100	0	0	0	0	14	45.2	12	38.7	0	0	(18.92)<.001*
One month after the intervention	31	100	0	0	0	0	21	67.7	10	32.3	0	0	(11.08)<.001*

X² is Chi square test; .000a is no test results & Significant at p < 0.05

References:

Ahmed, H. A., A. M. Zahran and R. A. Issawi (2020). "Prevalence and etiology of end-stage renal disease patients on maintenance hemodialysis." Menoufia Medical Journal 33(3): 766.

ALaseme, R. and O. Badrea (2018). "Emotional Regulation and Its Relationship with Resilience in a Sample of Secondary School Students in Sweidaa Governorate."

Tishreen University Journal-Arts and Humanities Sciences Series 40(3).

Alwethenani, M. J. Alsahil and H. A. Fadhul (2020). "Psychosocial predictors of quality of life among chronic hemodialysis patients." Saudi Medical Journal 41(9): 990.

Blumrosen, C., R. Desta, K. L. Cavanaugh, H. E. Laferriere, M. A. Bruce, K. C. Norris, D. M. Griffith and E. M. Umeukeje

(2020). "Interventions incorporating therapeutic alliance to improve hemodialysis treatment adherence in Black patients with end-stage kidney disease (ESKD) in the United States: A systematic review." *Patient preference and adherence* 14: 1435.

Campenni, C. E. and A. Hartman (2020). "The effects of completing mandalas on mood, anxiety, and state mindfulness." *Art Therapy* 37(1): 25-33.

Chiang, M., W. B. Reid-Varley and X. Fan (2019). "Creative art therapy for mental illness." *Psychiatry research* 275: 129-136.

Connor, K. M. and J. R. Davidson (2003). "Development of a new resilience scale: The Connor- Davidson resilience scale (CD- RISC)." *Depression and anxiety* 18(2): 76-82.

Czerwinski, N., H. Egan, A. Cook and M. Mantzios (2021). "Teachers and mindful colouring to tackle burnout and increase mindfulness, resiliency and wellbeing." *Contemporary School Psychology* 25(4): 535-545.

Duran, S., D. Avci and F. Esim (2020). "Association between spiritual well-being and resilience among Turkish hemodialysis patients." *Journal of Religion and Health*

59(6): 3097-3109.

García-Martínez, P., R. Ballester-Arnal, K. Gandhi-Morar, J. Castro-Calvo, V. Gea-Caballero, R. Juárez-Vela, C. Saus-Ortega, R. Montejano-Lozoya, E. M. Sosa-Palanca and M. d. R. Gómez-Romero (2021). "Perceived stress in relation to quality of life and resilience in patients with advanced chronic kidney disease undergoing hemodialysis." *International Journal of Environmental Research and Public Health* 18(2): 536.

Gunarathne, T. G. N. S., K. L. Abdullah, T. L. Yoong, N. Nanayakkara, L. S. Kun and S. Mohajer (2022). "Factors Influencing Stress Perception among Hemodialysis Patients: A Systematic Review." *Iranian Red Crescent Medical Journal* 24.(6)

Hosseini, M. and Z. Borzabadi Farahani (2022). "Evaluating the Effectiveness of Mandala Coloring on Mental Health in Iran: A Systematic Review." *Journal of Health Sciences & Surveillance System* 10(2): 144-149.

Jaworski, E. (2020). "Creating a Space to Externalize: Mindfulness Based Art Therapy for Childhood Trauma, A Literature Review".

Keskin, G. (2022). "Resilience in patients

with dialysis-dependent renal failure: Evaluation in terms of depression, anxiety, traumatic growths." *Applied nursing research* : ANR 65: 151575-151575.

Khodabakhshi-Koolae, A. and F. Darestani-Farahani (2020). "Mandala Coloring as Jungian Art to Reduce Bullying and Increase Social Skills." *Journal of Client-Centered Nursing Care* 6(3): 193-202.

Liu, N., S. Liu, N. Yu, Y. Peng, Y. Wen, J. Tang and L. Kong (2018). "Correlations

among psychological resilience, self-efficacy, and negative emotion in acute myocardial infarction patients after percutaneous coronary intervention." *Frontiers in psychiatry* 9: 1.

Mantzios, M. and K. Giannou (2018). "When did coloring books become mindful? Exploring the effectiveness of a novel method of mindfulness-guided instructions for coloring books to increase mindfulness and decrease anxiety." *Frontiers in psychology* 9: 56.