

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

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Abstract: Living with hemodialysis is associated with anxiety. Mandala coloring is a form of art therapy that fosters self-expression by allowing individuals to explore their anxiety, is a good and applicable choice. This study aims to explore the effect of mandala coloring nurse-led intervention program on anxiety among hemodialysis patients. **Research design:** Experimental design was used. **Setting:** The study was conducted at Hemodialysis Unit affiliated to Suez Canal University Hospital and the international 30 July center, Ismailia governorate. **Subject:** A sample of 64 Hemodialysis patients with chronic hemodialysis, shunt in non-dominant hands, and without antianxiety or antidepressant medications. **Tools of data collection:** Two tools were used: Tool(I): Demographic characteristics and clinical characteristics. Tool (II): Spielberger State-Trait Anxiety Inventory for Adults, Form. **Results:** It was found that hemodialysis patients had a moderate level of state anxiety before the intervention. Regarding post and follow-up phases, the levels of anxiety decreased increased among the intervention group compared with the control group. **Conclusion:** The mandala coloring nurse-led intervention program significantly reduced anxiety among hemodialysis patients in the post-follow-up study phases compared with the pre-program phase. **Recommendation:** Mandala coloring nurse-led intervention programs can be combined with care programs of hospitals as a complementary intervention.

Keywords: Anxiety, Hemodialysis patients, Mandala coloring.

I. INTRODUCTION

Hemodialysis is the most common modality used for patients End-Stage Renal Disease (ESRD), which is time-consuming, expensive, invasive, and requires fluid and dietary restrictions. In addition, hemodialysis is associated with different psychosocial consequences such as loss of freedom, the burden of coping with a debilitating disease, dependence on caregivers, disruption of marital, family, and social life, and reduced or complete loss of financial income. Long-term hemodialysis is associated with several psychological disturbances and even mental health problems (Afshar, Mohsenzadeh et al. 2018, Şahin, Tokgöz et al. 2021, Kamel, Fouad et al. 2022).

Anxiety is one of hemodialysis patients' most common mental health problems, with an estimated prevalence of about three times that of the general population. The psychological aspect of anxiety is observable in the behavior, emotions, and cognitive functioning of the person experiencing it. The degree of anxiety is associated with the severity of the threat or challenge, past experiences, learning, age, and emotional resources, and it becomes pathological when it is not appropriate for the situation, or its intensity is too high (Tammadon, Nobahar et al. 2021, Abu Maloh, Soh et al. 2022).

Distinguishing between state anxiety and trait anxiety provides a better understanding of the patient's reactions. State anxiety is a situational arousal that accompanies conscious feelings of tension, agitation, and emotions related to environmental stressors, such as alarm sounds going off in the dialysis machine. On the other hand, Trait anxiety is defined as an individual predisposition to manifest a specific reaction which is theorized to predispose clinical anxiety that results in disordered self-care and disordered efficiency. Accordingly, improving patients' psychological resilience should be a priority (Rahman and Pradido 2020, Şahin, Tokgöz et al. 2021, Ojilong, Kanyike et al. 2022).

Many cultures have confirmed mandala coloring as a mindfulness-based antianxiety coloring activity. Mandala coloring is a brief and easy-to-apply mindfulness art activity that has emerged recently in mental health research and throughout popular media is mindful art making. The use of the mandala as a therapeutic tool was first introduced by Carl Jung, who showed that it has a calming and healing effect on its creator while promoting both psychological integration and the meaning of individual life, which are fundamental to the work of using them for traumatic information disclosure (Liu, Liu et al. 2018, Stankov, Filimonau et al. 2020, Nassim, Park et al. 2021, Kim and Lor 2022).

II. SUBJECTS AND METHOD

2.1. The aim of the study: The present study aimed to evaluate the effect of mandala coloring nurse-led intervention program on among hemodialysis patients

2.2. Research hypothesis: The study hypothesis was that, hemodialysis patients who receive mandala coloring nurse-led intervention program will show significant improvement over the control group by reducing levels of anxiety.

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

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

2.5. Study setting: The study conducted in the following hospitals at Ismailia city/ Egypt: Suez Canal University Hospital includes: (non-hepatitis section, which contains about 11 beds, and a Hepatitis C section, which contains 12 beds) and General Hospital (The International 30 June center for hemodialysis, recently named) includes three sections as follows (Male, female and mixed section). The Male section contains 23 beds, the female section contains 22 beds, and the mixed section contains 20 beds).

2.6. Tools of data collection:

Data were collected using the two following tools:

Tool I: Demographic and Clinical characteristics:

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

Tool (II): Spielberger State-Trait Anxiety Inventory for Adults," (STAI), "Form Y: (Appendix II):

It was developed by [Spielberger \(2019\)](#) and translated into Arabic by [Abdel-Khalek \(2000\)](#) to measure anxiety symptoms and levels. It included two sections with (20items) in each. The first section, (Y-1), measures "state" anxiety, and (Y-2) section measures "Trait" anxiety.

Scoring system:

Each question was rated on a four-point Likert scale from "Not at All" to "Very Much So," and summing up individual item scores in each section produces a possible score range from 20 (low anxiety) to 80 (high anxiety). Three levels of anxiety are formulated as follows: mild anxiety, which ranges from (20 to 39) for each section; moderate anxiety, from (40 to 59) and severe anxiety, from (60 to 80).

2.7. 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.

2.8. Ethical consideration:

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.

2.9. Field of Work:

The study conducted through four phases: Assessment (pre-test), program planning, program implementation, and evaluation (post-test).

Phase (I): Assessment (Pre-test): Before starting up program planning, the researcher met the patients, introduce himself, and explained to them the aim and the benefits of the study to obtain their consent, establish trust relationship, gain their cooperation and confidence. After obtaining their written consent to participate on the study, the researcher started to fill-in study questionnaires form through personal interviewing.

Phase (II): Program planning: Mandala coloring nurse-led intervention program based on “Mindfulness-based art therapy“ developed by **Peterson and Rappaport (2014)**.

The objectives of the Mandala coloring nurse-led intervention program:

At the end of the mandala coloring nurse-led intervention program, the patients will able be to:

1. Express their inner feelings and negative emotions using the "here and now" approach.
2. Discover their future and anxious feelings and express them freely.
3. Overcome boredom and fears associated with hemodialysis by engaging as an active participant in coloring pre-designed mandalas.

Duration: The program consisted of 6 sessions in the form of two sessions per week, each lasting 45- 60 minutes. It covered a period of 24 weeks, from February 2021 to July 2021.

Content: The eligible hemodialysis patients were randomly assigned to the control and intervention groups. Each patient had been met individually. The researcher explained to the patients the aim of the study and encouraged them to participate. The researcher assured them of confidentiality to gain their trust, cooperation, and confidence. During the sessions, patients are encouraged to ask questions, interject their own experiences through active and reflective listening, and receive feedback from them. In addition, (10) minutes of discussion were provided at the end of each session for questions or clarification.

The program provided an integration of the Jungian theory of mandala and the Mindfulness-based art therapy (MBAT) Model (Peterson and Rappaport 2014) main guidelines and applied through the following:

- O Rapport and Reflective listening (one session).
- O Focusing on the present moment, anxious feeling. (Two sessions).
- O Mindful expressive guided practice of future anxiety through mandala coloring (Two sessions).
- O Termination of the intervention program and closing the therapeutic relationship (one session).

▪ Phase (III): Program implementation:

The program was implemented in form of sessions as follows:

Sessions one: Rapport and Reflective listening (R):

This session focused on establishing rapport and employing reflective listening with the patient as follow it included developing a trusting relationship with the patients, explaining what will be done, utilize active and reflective listening techniques to establish some degree of empathy (perceived understanding) through listening to the patient's story to

facilitate discovering the meaning of hemodialysis for him/her. Also, it included a description of a high prevalence of hemodialysis, mandala coloring, anxiety feelings, and psychological resilience. In addition, it included answering all patients' questions regarding hemodialysis and all that they want to know regarding their diagnosis.

Sessions two & three: Focusing on the present moment anxious feeling:

Session two: included guiding the patient to let his/her body relax and direct attention on the mandala drawing and the colors, trying to consciously observe the color transferring on the pre-designed mandala, guiding the patient to be aware of his/her emotions that happens moment to moment, while remind patient to avoid judging or describing his/her emotions as good or bad as it's the mind trying of wondering out the present moment, gently being present to the present sensation and colors.

Session Three: Focusing on here-and-now feelings (during the session) associated with hemodialysis and using the colors to express his/her feelings in the pre-designed mandala.

Sessions Four & Five: Discover their future and anxious feelings and express them freely:

Session Four focused on guiding the patient to express the two most perceived anxious experiences that might happen due to hemodialysis by asking the patient to "Close his/her eyes, think about it" and express it through coloring without judging. Then, the patient was guided to act on the calm closing of the coloring session through gently refocusing the eyes and allowing the self to return to the environment around him/her slowly.

Session Five included mindful acceptance of future anxiety by allowing the patient to express his/her unacceptable feelings and express these feelings and future scenarios through coloring a pre-designed mandala. Then, the patient asked to gently refocus his eyes and allow himself to slowly come back to the environment around.

Session eight: Termination of the intervention program and closing the therapeutic relationship: This session involved summarizing the main points of the intervention program, discussing future coping, consolidating gains made, and expressing pride in the patient's progress and mutual relationship.

Phase IV: Evaluation (post-test):

After program implementation, the post-test was done immediately using the same pre-test tools to assess anxiety levels.

Follow-up: Two follow-ups were held for the enrolled hemodialysis patients. The first follow-up was done immediately after each session for the intervention group only by assessing the level of state anxiety. The second follow-up was done one month after program implementation for both the intervention and control group by assessing state anxiety, trait anxiety levels. Considerably, the patients were telephoned before each meeting.

D. 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.

III. RESULTS

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:						0.1326
20-30 years	10	32.26	8	24.80	5.60	
> 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 1 shows no statistically significant difference between the study and control hemodialysis patients concerning demographic data. Most of 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, the majority of the study group were secondary educated 58.06% compared with 48.39 of the control group. Concerning the duration of hemodialysis, the majority 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: Comparison of mean scores among study and control groups according to state anxiety (preprogram, one month after the program) (n=62)

Items	Study Group (n= 31)	Control Group (n=31)	t* (delta)
	Mean±SD	Mean±SD	
State anxiety			
Before intervention	48.29±2.19	47.16±4.88	.894 (.03)
I month after	40.00±6.76	47.48±15.57	.038* (.54)
t, df (P value) (d)	3.13(.004*)(1.3)	.189(.851)(.03)	

t test is Paired t test, t* is independent t test; delta is Glass's delta effect size; d is Cohen's d effect size; P value is significant < .05

Table 2: clarifies that there was a statistically significant difference between before the intervention and group regarding state anxiety among the study and control group with F, df, P values 3.13.004* 1.3 & .189.851.03 . Post hoc comparisons indicated that there was no difference between the two groups at before intervention program. There was a significant difference between the two groups regarding one month after the intervention with p-value (.038* (.54)) and mean 41.00±6.76 & 47.48±15.57 at the study group and control group, respectively.

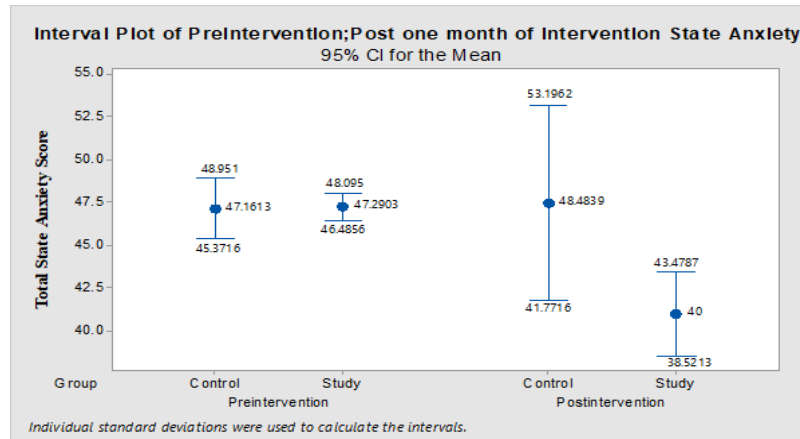


Figure 1: Total state-anxiety levels of study and control group.

Figure 1 reveals that before the intervention phase, the mean score of state anxiety was 47.29 with a confidence interval 46.48-48.05 among the study group, and the mean score of state anxiety was 47.16 with a confidence interval 45.37-48.95 among the control group. After one month of the intervention, the mean score of state anxiety was 40 with a confidence interval 38.52-43.47, and the mean score of state anxiety was 48.48 with a confidence interval 41.77-53.19 among the control group.

Table 3: Levels of state anxiety score among study and control group pre and post-intervention program (n=31).

Items	Control group n= 31						Study group n=31						(P value) ^{mc}
	Mild		Moderate		Severe		Mild		Moderate		Severe		
	N	%	N	%	N	%	N	%	N	%	N	%	
Before the intervention	1	3.2	30	96.8	0	0	13	41.9	12	38.7	6	19.4	.000 ^a
After one month of the intervention	1	3.2	30	96.8	0	0	18	58.1	11	35.4	2	6.5	.001*

MC is Monte Carlo for the Chi-square test; .000a is no test results & Significant at p < 0.05

Table 3 clarifies that nearly half of the study group 41.9% had a mild level of anxiety levels, and the majority of the control group 96.8% had moderate state anxiety before the intervention program. After one month of the intervention program, more than half of the study group (58.1%) had a mild level of state anxiety with a significant decrease in state anxiety whereas p (.001*) and the majority of the control group (96.8%) had a moderate level of state anxiety.

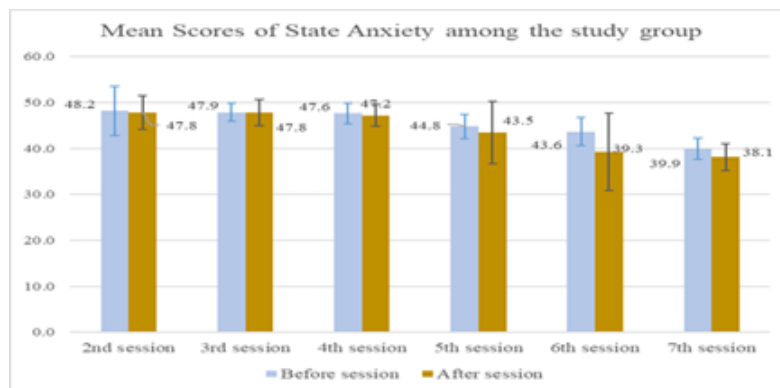


Figure 2: Mean Scores of state anxiety before and after each coloring session among the study group (n=31).

As clarified in figure 2, Session seven had the most reduced level of state-anxiety score after applying the intervention program 38.1, followed by the mean score of session six which was ± 39.3 and then followed by session five in which the mean score of state anxiety levels after applying the intervention program was 43.5. While sessions two and three had a minor reduction level ± 47.8 after applying for the intervention program.

Table 4: Comparison of mean scores among the study and control group according to their trait anxiety before, immediately after, and after one month of the intervention program (n=62).

Items	Study Group (n= 31)	Control Group (n=31)	Sig. ^b (delta)
	Mean \pm SD	Mean \pm SD	
Trait anxiety			
Before intervention	46.13 \pm 5.32	45.62 \pm 2.77	.634
Immediately after	40.26 \pm 2.35	48.97 \pm 2.29	<.001* (1.74)
I month after	40.74 \pm 3.49	48.10 \pm 1.92	<.001*(2.62)
F, df (P value) (η^2)	49.76,1.47 (<.001), η^2(.45)		

F test is repeated measures ANOVA, η^2 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.

Table 4 clarifies that there was a statistically significant difference between time and group regarding trait anxiety with F, df, and P values 49.76,1.47 <.001, η^2 .45. Post hoc comparisons indicated that there was no difference between the two groups before the intervention. There was a significant difference between the two groups immediately after the intervention and after one month with p-value <.001* and the effect size 40.26 \pm 2.35&40.74 \pm 3.49 at two times, respectively.

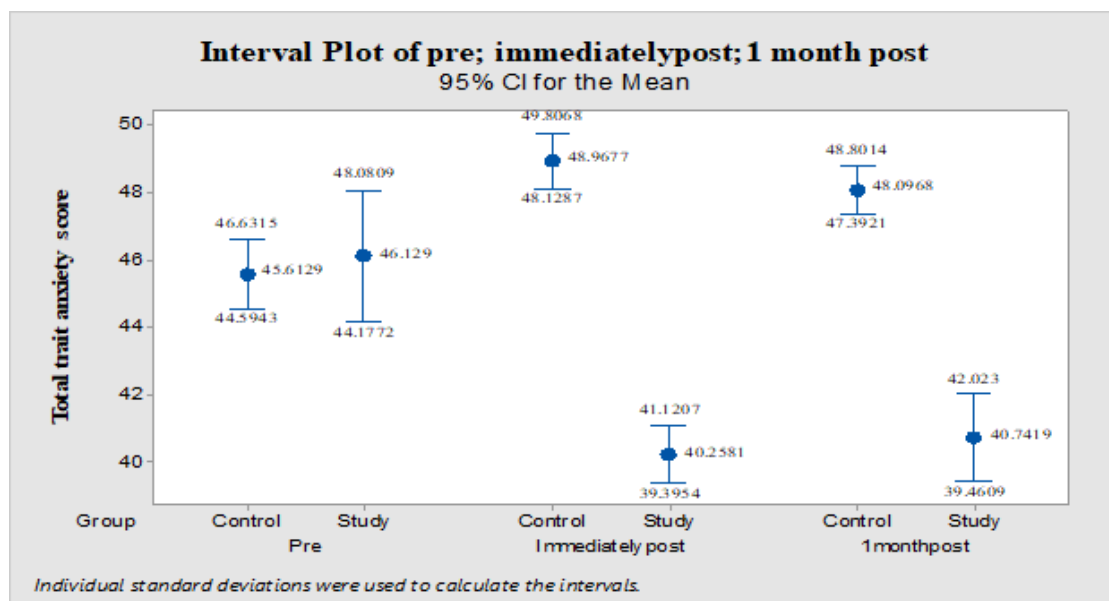


Figure 3: Interval plot of 95% Confidence interval of mean scores of total trait anxiety levels among two groups (before, immediately, and after one month of the intervention program).

Figure 3 reveals that the mean score of trait anxiety before the intervention phase was 45,61 with a confidence interval 44.9-46.63 among the control group, and the mean score of trait anxiety was 46,12 among the intervention group, with a confidence interval 44.17-48.08. Immediately after the intervention, the mean trait anxiety score was 48,96 among the control group with a confidence interval 48.12-49.80. Meanwhile, the mean trait anxiety score among the study group was 40,25 with a confidence interval 39.93-41.12. Lastly, after one month of the intervention, the mean score of trait anxiety was 48,09 among the control group with a confidence interval 47.39-48.80, and the mean score among the study group was 40,74 with a confidence interval 39.46-42.02.

Table 5: Levels of trait anxiety among the study and control group before and immediately after one month after the intervention program (n=62).

Items	Control group n=31						Study group n=31						P value ^{mc}
	Mild		Moderate		Severe		Mild		Moderate		Severe		
	N	%	N	%	N	%	N	%	N	%	N	%	
Before the intervention	2	6.5	29	93.5	0	0	3	9.7	27	87.1	1	3.2	.530
Immediately after the intervention	0	0	31	100	0	0	13	41.9	18	58.1	0	0	<.001*
After one month of the intervention	0	0	31	100	0	0	12	38.7	19	61.3	0	0	<.001*

^{MC} is Monte Carlo for the Chi-square test & Significant at p < 0.05

Table 5 shows that, before the intervention phase, the majority of the study and control group had a moderate level of trait anxiety 87.1%&93.5, respectively. Regarding immediately after the intervention phase, nearly two-thirds of the study group 58.1% had a moderate level of trait anxiety, and nearly half of them had a mild level of anxiety 41.9% with a significant reduction in the levels of trait anxiety <.001* among the study group while the majority of the control group 100% had a moderate level of trait anxiety. After one month of the intervention program, more than two-thirds 61.3% of the study group had a moderate level of trait anxiety, and 38.7% had a mild level of trait anxiety with a significant reduction in the levels of trait anxiety whereas the p-value <.001* and the majority of the control group 100% had a moderate level of trait anxiety.

IV. DISCUSSION

The prevalence of anxiety among hemodialysis patients is 31%–51%, which can negatively affect the quality of life, reduce engagement in self-care activities, alter cognitive and physical functions. It can also increase the severity of cardiovascular disease and mortality rate (Afshar, Mohsenzadeh et al. 2018, Kusuma, Rahmawati et al. 2020).

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 (Shella 2018, Nassim, Park et al. 2021, Ramirez and Haen 2021).

The present study revealed that nearly half of the study group had a mild level of anxiety, and the majority of the control group had moderate state anxiety before the intervention phase. This result may be due to the presence of many actual physiological stressors such as feeling tired, loss of body functioning, muscle cramps or soreness, itching and stiffening of joints, in addition to psychosocial stressors such as dialysis machines and/or equipment, cost of transportation, limits of time, transportation to and from the unit, limitations of food. As well as feelings related to treatment such as coldness, interference with job times and limited clothing style. Therefore, serious problems occur among patients with anxiety, are crucial to consider this issue which impacts the patient’s quality of life. In this respect, Tammadon, Nobahar et al. (2021) and Keskin (2022) viewed that most of the hemodialysis patients had moderate state anxiety, affecting their sleep quality and drug adherence. This study result is not congruent with Şahin, Tokgöz et al. (2021), who mentioned that the majority of hemodialysis patients had extreme levels of state anxiety which might be due to different sample sizes and methodological methods.

Concerning trait anxiety before the intervention phase, the present study revealed that both the study and control group had a moderate level of trait anxiety. This result may be due to ineffective coping with psychosocial stressors and cumulative unresolved state anxious feelings, which may be secondary to a moderate level of education and the feelings of long hours spent during hemodialysis in addition to the triple weekly frequency of hemodialysis, which increases their exposure to treatment-related fears. In addition, one of the important reasons that may be associated with trait anxiety levels in the current study was the presence of the pandemic of (COVID 19) during the period of study implementation, as the fear of infection alone without any physical problem is usually associated with a high level of stress especially that, patients undergoing hemodialysis were considered from the high-risk groups for infection.

Consistent with prior results, **Davaridolatabadi and Abdeyazdan (2016)** and **Gerogianni, Lianos et al. (2018)** reported that most hemodialysis patients had a moderate level of trait anxiety and demonstrated that it was associated with financial problems that resulted as a consequence of disease process. From another point of view, **Şahin, Tokgöz et al. (2021)** reported that hemodialysis patients have a severe level of trait anxiety mainly related to emotional upset and lack of social relationships.

Regarding the effect of the mandala coloring nurse-led intervention program, the present study revealed that the study group had a statistically significant reduction in anxiety level and a significant increase in resilience level scores after applying mandala coloring nursing-led intervention program through the post and follow-up phases compared with pre-program phase. These improvements indicate that the intervention program achieved its goal of reducing anxiety and ameliorating the patient's psychological resilience, which may be due to the appropriate time which provides a chance to overcome boredom associated with too long hours of hemodialysis sessions, in addition, direct interaction with the patient in the stressing environment of hemodialysis help patients to feel accepted and understood. The preceding result is congruent with the current study hypothesis in which the study group who receive mandala coloring nurse-led intervention program will show a significant decrease in anxiety levels and resilience improvement than the control group.

Regarding state- anxiety after one month of the intervention program, in the current study, there was a statistically significant reduction in state anxiety levels among the study group compared to the control group. This improvement indicates that the mandala-coloring nurse-led intervention program achieved its goal of discovering, accepting, and positively expressing anxious feelings as a provision of mindfulness awareness of moment-to-moment emotions and transferring it freely on the pre-designed mandala without judging, resulting in new insights regarding the disease process. Psychological resilience, lower education level, and higher cognitive distortions are associated with depression and anxiety in ESRD patients.

In the current study, there was a significant improvement in state-anxiety levels as state anxiety reduced to a mild level compared to the control group, which had a moderate level. This improvement indicates that the mandala-coloring intervention program success of discovering and positively expressing their anxious feelings. Post-program improvement could be attributed to the provision of mindful awareness of moment-to-moment emotions and transferring it freely on the pre-designed mandala without judging.

The preceding result goes along with **Schultz (2017)** and **Jakobsson Støre and Jakobsson (2022)** who added that mandala coloring was an effective non-pharmacological therapeutic technique to achieve state-anxiety reduction. Mandala coloring and free drawing were equally effective in reducing anxiety levels.

Concerning trait anxiety after the intervention program, the present study confirmed that the mandal coloring intervention program significantly reduced trait anxiety levels among the study group compared with its level among the control group. This result is certainly attributed to the intervention program, which provided patients in the study group with alertness, nonpainful insight, and expression of personal fears through the mindful coloring of the pre-designed mandalas. Meanwhile, sustained elevation in trait anxiety levels among the control group after the intervention phase might because it has been difficult for many patients to understand and manage their fears, negatively affecting their family roles and the absence of a formal support system. Thus, mindful mandala coloring significantly reduced the trait anxiety level. This finding is in congruence with previous studies (**Carsley, Heath et al. 2015, Koo, Chen et al. 2020, Akbulak and Can 2022**).

V. CONCLUSION

Based on the findings of the present study, it can be concluded that, that hemodialysis patients had a moderate level of both state and trait anxiety and a mild level of resilience before the intervention program.

VI. RECOMMENDATION

1- A structured training program should be conducted through periodical workshops for nurses dealing with hemodialysis patients focusing on associated psycho-social problems that may occur and how to use guided coloring mandala

REFERENCES

- [1] **Abdel-Khalek, A. M. (2000)**. "The Kuwait university anxiety scale: psychometric properties." *Psychological Reports* **87**(2): 478-492.
- [2] **Abe, M., I. Masakane, A. Wada, S. Nakai, E. Kanda, K. Nitta and H. Nakamoto (2021)**. "High-performance dialyzers and mortality in maintenance hemodialysis patients." *Sci Rep* **11**(1): 12272.
- [3] **Abolhassani, F., M. Khayamzadeh, A. Jamali, R. Salmanian and M. Naghavi (2007)**. "Estimation of breast cancer burden in Iran in 2003 and its comparison with Eastern Mediterranean region and the World in 2002." *Payesh (Health Monitor)* **6**(3): 0-0.
- [4] **Abu Maloh, H. I. A., K. L. Soh, M. E. AbuRuz, S. C. Chong, S. I. F. Ismail, K. G. Soh and D. I. Abu Maloh (2022)**. "Efficacy of Benson's Relaxation Technique on Anxiety and Depression among Patients Undergoing Hemodialysis: A Systematic Review." *Clinical Nursing Research* **31**(1): 122-135.
- [5] **Afshar, M., A. Mohsenzadeh, H. Gilasi and H. Sadeghi-Gandomani (2018)**. "The effects of guided imagery on state and trait anxiety and sleep quality among patients receiving hemodialysis: A randomized controlled trial." *Complementary therapies in medicine* **40**: 37-41.
- [6] **González-Flores, C. J., G. García-García, A. Lerma, H. Pérez-Grovas, R. M. Meda-Lara, R. M. Guzmán-Saldaña and C. Lerma (2021)**. "Resilience: A Protective Factor from Depression and Anxiety in Mexican Dialysis Patients." *International journal of environmental research and public health* **18**(22): 11957.
- [7] **Good, B. J. and A. M. Kleinman (2019)**. *Culture and anxiety: Cross-cultural evidence for the patterning of anxiety disorders*. *Anxiety and the anxiety disorders*, Routledge: 297-324.
- [8] **Gray, J. A. (1982)**. "Précis of The neuropsychology of anxiety: An enquiry into the functions of the septo-hippocampal system." *Behavioral and brain sciences* **5**(3): 469-484.
- [9] **Grellier, J., M. P. White, M. Albin, S. Bell, L. R. Elliott, M. Gascón, S. Gualdi, L. Mancini, M. J. Nieuwenhuijsen and D. A. Sarigiannis (2017)**. "BlueHealth: a study programme protocol for mapping and quantifying the potential benefits to public health and well-being from Europe's blue spaces." *BMJ open* **7**(6): e016188.
- [10] **Guidry, L. S. and D. L. Randolph (1974)**. "Covert reinforcement in the treatment of test anxiety." *Journal of Counseling Psychology* **21**(4): 260.
- [11] **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).
- [12] **Kalantar-Zadeh, K., T. H. Jafar, D. Nitsch, B. L. Neuen and V. Perkovic (2021)**. "Chronic kidney disease." *The lancet* **398**(10302): 786-802.
- [13] **Kamel, R. A. E., M. Fouad and T. M. Goda (2022)**. "Anxiety and depression among hemodialysis patients in Egypt." *Zagazig University Medical Journal* **28**(3): 594-604.
- [14] **Kao, T. W., M. S. Lai, T. J. Tsai, C. F. Jan, W. C. Chie and W. Y. Chen (2009)**. "Economic, social, and psychological factors associated with health-related quality of life of chronic hemodialysis patients in Northern Taiwan: a multicenter study." *Artificial Organs* **33**(1): 61-68.
- [15] **Karan, N. B. (2019)**. "Influence of lavender oil inhalation on vital signs and anxiety: A randomized clinical trial." *Physiology & behavior* **211**: 112676.
- [16] **Kashefinshabouri, J., Z. Eftekhar Saadi, R. Pasha, A. Heidari and B. Makvandi (2021)**. "The effect of mindfulness-based cognitive therapy and emotion-regulation training on rumination and social anxiety in teenagers prone to addiction." *Journal of Occupational Health and Epidemiology* **10**(1): 1-11.

International Journal of Novel Research in Healthcare and Nursing

 Vol. 10, Issue 1, pp: (71-83), Month: January - April 2023, Available at: www.noveltyjournals.com

- [17] **Kavak, F., A. Özdemir and G. Dural (2021)**. "The Relation between spiritual wellbeing and psychological resilience among patients diagnosed with advanced gastrointestinal cancer." *Current Psychology* **40**(4): 1788-1794.
- [18] **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.
- [19] **Keskin, G. (2022)**. "Resilience in patients with dialysis-dependent renal failure: Evaluation in terms of depression, anxiety, traumatic growths." *Applied Nursing Research* **65**: 151575.
- [20] **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.
- [21] **Kim, E. Y., Y.-N. Lee and S. O. Chang (2019)**. "How do patients on hemodialysis perceive and overcome hemodialysis?: Concept development of the resilience of patients on hemodialysis." *Nephrology Nursing Journal* **46**(5): 521-531.
- [22] **Kim, K. S. and M. Lor (2022)**. "Art Making as a Health Intervention: Concept Analysis and Implications for Nursing Interventions." *Advances in Nursing Science* **45**(2): 155-169.
- [23] **King, A., J. Bartley, D. L. Johanson and E. Broadbent (2019)**. "Components of preoperative anxiety: a qualitative study." *Journal of health psychology* **24**(13): 1897-1908.
- [24] **Knowles, K. A. and B. O. Olatunji (2020)**. "Specificity of trait anxiety in anxiety and depression: Meta-analysis of the State-Trait Anxiety Inventory." *Clinical Psychology Review* **82**: 101928.
- [25] **Koo, M., H.-P. Chen and Y.-C. Yeh (2020)**. "Coloring activities for anxiety reduction and mood improvement in Taiwanese community-dwelling older adults: A randomized controlled study." *Evidence-Based Complementary and Alternative Medicine* **2020**.
- [26] **Kumar, N. (2018)**. "The Impact of Coloring on Social Anxiety in Graduate Students."
- [27] **Kusuma, A. N., D. Rahmawati and R. Dede (2020)**. "The effect of Dhikr therapy on anxiety levels in chronic kidney failure patients that have done hemodialysis therapy in Indonesia." *Enfermería Clínica* **30**: 175-178.
- [28] **Labrague, L. J. (2021)**. "Psychological resilience, coping behaviours and social support among health care workers during the COVID-19 pandemic: A systematic review of quantitative studies." *Journal of nursing management* **29**(7): 1893-1905.
- [29] **Lakh, E., L. Shamri-Zeevi and D. Kalmanowitz (2021)**. "Art in the time of corona: A thematic analysis." *The Arts in Psychotherapy* **75**: 101824.
- [30] **Lavin, P., R. Nazar, M. Nassim, H. Noble, E. Solomonova, E. Dikaos, M. Novak, I. Mucsi, E. Trinh and A. Potes (2021)**. "Do Brief Mindfulness Interventions (BMI) and Health Enhancement Programs (HEP) Improve Sleep in Patients in Hemodialysis with Depression and Anxiety? Healthcare, MDPI.
- [31] **Liang, Y.-C., M.-L. Lin, D.-H. Huang and W.-K. Chiou (2020)**. "Flow and interflow: The design principles of Cooperative Mandala Coloring (CMC)." *International Conference on Human-Computer Interaction*, Springer.
- [32] **Lindsay, G. M. and J. K. Schwind (2015)**. "Arts-informed narrative inquiry as a practice development methodology in mental health." *International Practice Development Journal* **5**(1).
- [33] **Lipnevich, A. A., D. Murano, M. Krannich and T. Goetz (2021)**. "Should I grade or should I comment: Links among feedback, emotions, and performance." *Learning and Individual Differences* **89**: 102020.
- [34] **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.
- [35] **Ma, X., Y. Wang, H. Hu, X. G. Tao, Y. Zhang and H. Shi (2019)**. "The impact of resilience on prenatal anxiety and depression among pregnant women in Shanghai." *Journal of affective disorders* **250**: 57-64.

International Journal of Novel Research in Healthcare and Nursing

 Vol. 10, Issue 1, pp: (71-83), Month: January - April 2023, Available at: www.noveltyjournals.com

- [36] **Maguen, S., D. M. Turcotte, A. L. Peterson, T. L. Dremsa, H. N. Garb, R. J. McNally and B. T. Litz (2008).** "Description of risk and resilience factors among military medical personnel before deployment to Iraq." *Military medicine* **173**(1): 1-9.
- [37] **Mahoney, M. J. and A. W. Meyers (2021).** Anxiety and athletic performance: Traditional and cognitive-developmental perspectives. *Anxiety in sports*, Taylor & Francis: 77-94.
- [38] **Mailliez, M., M. D. Griffiths and A. Carre (2022).** "Validation of the french version of the fear of covid-19 scale and its associations with depression, anxiety, and differential emotions." *International journal of mental health and addiction* **20**(4): 2057-2071.
- [39] **Malboeuf-Hurtubise, C., T. Léger-Goodes, G. A. Mageau, G. Taylor, C. M. Herba, N. Chadi and D. Lefrançois (2021).** "Online art therapy in elementary schools during COVID-19: results from a randomized cluster pilot and feasibility study and impact on mental health." *Child and Adolescent Psychiatry and Mental Health* **15**(1): 1-11.
- [40] **Malchiodi, C. A. (2012).** "Introduction to art therapy in health care settings." *Art therapy and health care*: 1-12.
- [41] **Mandler, G. (1984).** *Mind and body: Psychology of emotion and stress*, WW Norton & Company Incorporated.
- [42] **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.
- [43] **Mariño García, L. and J. S. Potash (2019).** "Art Therapy as Psychosocial Support for FARC Reincorporation." *Journal of Peacebuilding & Development* **14**(2): 109-124.
- [44] **Martin, A. J., E. C. Burns, R. J. Collie, M. Cutmore, S. MacLeod and V. Donlevy (2022).** "The role of engagement in immigrant students' academic resilience." *Learning and Instruction* **82**: 101650.
- [45] **McDougall, O. (2020).** "The Mystery of Mandalas: Effects of Coloring on Stress Reduction and Mood."
- [46] **Megahed, A. F. and N. Ahmed (2021).** "Characteristics of ESRD Patients who have been on Long-term Hemodialysis Therapy in Egypt: A Clinical Approach." *Recent Developments in Medicine and Medical Research* **8**: 30-41.
- [47] **Megahed, A. F., G. El-Kannishy and N. Sayed-Ahmed (2019).** "Status of fasting in Ramadan of chronic hemodialysis patients all over Egypt: A multicenter observational study." *Saudi Journal of Kidney Diseases and Transplantation* **30**(2): 339.
- [48] **Megahed, A. F., G. El-Said, M. M. T. Abdelhady and N. Sayed-Ahmed (2020).** "Differences between the Incident and Prevalent Hemodialysis Patients in Egypt." *Asian Journal of Medicine and Health*: 42-54.
- [49] **Meng, Y., H.-t. Wu, J.-l. Niu, Y. Zhang, H. Qin, L.-l. Huang, X.-j. Zhang, L. Yu, H.-y. Yu and T. Yan (2022).** "Prevalence of depression and anxiety and their predictors among patients undergoing maintenance hemodialysis in Northern China: a cross-sectional study." *Renal Failure* **44**(1): 933-944.
- [50] **Musa, A. S., D. J. Pevalin and M. A. Al Khalailah (2018).** "Spiritual well-being, depression, and stress among hemodialysis patients in Jordan." *Journal of Holistic Nursing* **36**(4): 354-365.
- [51] **Nassim, M., H. Park, E. Dikaios, A. Potes, S. Elbaz, C. Mc Veigh, M. Lipman, M. Novak, E. Trinh and A. Alam (2021).** Brief mindfulness intervention vs. health enhancement program for patients undergoing dialysis: a randomized controlled trial. *Healthcare*, MDPI.
- [52] **Nipa, N. (2021).** "Evaluation of the initial construct validity for the Symptom Assessment Questionnaire (SAQ) in primary care."
- [53] **Noh, S. B., H. Lim, M. H. Lee and D. R. Kim (2019).** "The effect of social support and resilience on sick role behavior of hemodialysis patients." *Journal of the Korea Convergence Society* **10**(5): 385-395.

International Journal of Novel Research in Healthcare and Nursing

Vol. 10, Issue 1, pp: (71-83), Month: January - April 2023, Available at: www.noveltyjournals.com

- [54] **Nugraha, B., S. L. Anwar, C. Gutenbrunner and C. Korallus (2020).** "Polymorphisms of brain-derived neurotrophic factor genes are associated with anxiety and body mass index in fibromyalgia syndrome patients." *BMC research notes* **13**(1): 1-7.
- [55] **O'NEILL, A. (2021).** "Narrative, Positive, and Mindfulness-based Art Therapy." *Pediatric Medical Art Therapy*: 197.
- [56] **Öhman, A. (1993).** "Fear and anxiety as emotional phenomena: clinical phenomenology, evolutionary perspectives, and information-processing mechanisms."
- [57] **Ojilong, D., A. M. Kanyike, A. W. Nakawuki, D. M. Lutwama, D. Nakanwagi and R. Nekaka (2022).** "Anxiety and Coping Strategies during the Covid-19 Pandemic among Students at a Multi-Campus University in Uganda." *Research Square*.