JPPIPA 11(2) (2025)

Jurnal Penelitian Pendidikan IPA

Journal of Research in Science Education

http://jppipa.unram.ac.id/index.php/jppipa/index

Reduction of Cortisol Levels in the Stress State of Diabetic Ulcer Post Amputation Patients by Quran Murattal Therapy in the Surgical Treatment Room Faisal Islamic Hospital Makassar

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Received: September 28, 2024
Revised: December 19, 2024
Accepted: February 25, 2025
Published: February 28, 2025

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DOI: 10.29303/jppipa.v11i2.10104

Abstract: Amputation due to diabetic ulcers is one of the serious complications of diabetes mellitus which can result in significant psychological impacts for amputee patients experiencing anxiety disorders and depression. In the context of diabetic ulcers, where amputation often occurs in an attempt to save lives, feelings of anxiety and depression can increase significantly. This study uses an Experimental Quasy design, where this study aims to find out the effect of Qur'an Reading Therapy (TBA) on cortisol levels and anxiety levels in the state of stress after amputation of diabetic ulcers at Faisal Islamic Hospital Makassar. The sample size in this study was 30 respondents (15 treatment groups and 15 control groups). Data collection was carried out by means of a pre-post test with control group, In this study used the Wilcoxon Test paired t-test at the level of significance α = 0.05. Based on the results of the study, it was found that there was an effect of TBA on cortisol levels and anxiety response in postoperative patients (p=0.000). The conclusion in this study is the effect of Qur'an Reading Therapy (TBA) on cortisol levels and anxiety levels in the state of post-amputation of diabetic ulcers. Suggestion So that nurses can consider this therapy as one of the additional methods in managing diabetic amputee patients.

Keywords: Anxiety; Cortisol levels; Qur'an reading therapy

Introduction

Diabetic ulcers are one of the serious complications of diabetes mellitus that can lead to amputation if not treated properly. According to data from the International Diabetes Federation (IDF), in 2021, it is estimated that there are more than 537 million adults living with diabetes worldwide, and this number is predicted to increase to 643 million by 2030 (Soomro & Jabbar, 2024). One of the often overlooked aspects of diabetic ulcer management is the psychological impact, especially stress, that can worsen the patient's physical condition. Stress can affect the immune system, slow down the healing process, and increase the risk of infection, which can ultimately contribute to the need for amputation.

Amputation due to diabetic ulcers is one of the serious complications of diabetes mellitus that can result in significant psychological impacts for patients. According to data from the International Diabetes Federation (IDF), the global prevalence of diabetes is estimated to reach 463 million people in 2019, and this figure is predicted to increase to 700 million by 2045 (Teo et al., 2021). One of the worst consequences of diabetes is the occurrence of ulcers that can lead to amputation, which affects not only the patient's physical but also their mental and emotional state. Post-amputation stress often involves feelings of loss, anxiety, and depression, which can worsen the patient's quality of life.

How to Cite:
Zaenal, & Mustamin, R. (2025). Reduction of Cortisol Levels in the Stress State of Diabetic Ulcer Post Amputation Patients by Quran Murattal Therapy in the Surgical Treatment Room Faisal Islamic Hospital Makassar. *Jurnal Penelitian Pendidikan IPA*, *11*(2), 208–215. https://doi.org/10.29303/jppipa.v11i2.10104

Amputation is a traumatic experience that can have various psychological impacts. Patients often experience feelings of loss of identity, especially if the amputation occurs on a highly visible part of the body, such as a foot or hand. According to a study by Kessler et al. (2005), about 30-50% of amputee patients experience anxiety and depression disorders. In the context of diabetic ulcers, where amputation often occurs in an attempt to save lives, feelings of anxiety and depression can increase significantly.

Stress in patients with diabetic ulcers often stems from a variety of sources, including uncertainty about health, the cost of care, and the social impact of the disease. Research shows that patients with diabetes who experience high levels of stress tend to have poorer glucose control and more complications (Darenskaya et al., 2021). Therefore, it is important to understand how stress contributes to the development of diabetic ulcers and a higher risk of amputation.

After undergoing an amputation, many patients experience different anxiety compared to before the procedure. This anxiety is often related to the recovery process, adaptation to the loss of body parts, and uncertainty about the future. According to a study conducted by Behera et al. (2021), about 70% of patients who have undergone amputation report increased anxiety related to their ability to function independently and return to daily activities.

One of the main factors that affect post-amputation anxiety is the pain and discomfort that may be experienced during the healing process. Research shows that patients who experience post-operative pain tend to have higher levels of anxiety (Zhang et al., 2021). In this context, effective pain management has become very important to help patients cope with their anxiety.

Post-amputation stress can also affect the social and emotional aspects of the patient. Many patients feel alienated from their social environment, which can exacerbate feelings of depression and anxiety. A study conducted by Valizadeh et al. (2014) showed that low social support was associated with higher rates of depression in amputee patients. Therefore, it is important to develop interventions that focus not only on the physical aspects of recovery but also on psychological and emotional support.

A study conducted by Pereira et al. (2022) found that patients with diabetic ulcers who reported high levels of stress had a longer healing time compared to those with lower stress levels. In the study, patients who followed a stress management program showed significant improvements in wound healing time. These data suggest that stress management can be an important component in the treatment of diabetic ulcers.

In addition, stress can also affect a patient's health behavior, such as adherence to medication and wound care. Patients who experience severe stress tend to be less adhered to the treatment plan, which can worsen the condition of their ulcer (Walburn et al., 2009). In this context, education and psychological support are essential to help patients cope with stress and improve adherence to medication.

In this context, Quran mural therapy has emerged as an interesting alternative to help with post-amputation stress. This therapy involves reciting verses of the Quran which are believed to have a calming effect and can provide spiritual support for the patient. Research shows that spiritual interventions can play an important role in the healing process, including in reducing stress levels and improving psychological well-being (Koenig, 2012). As such, it is important to explore how Quran mural therapy can be applied in the context of patients who have undergone amputation due to diabetic ulcers.

The purpose of this study is to determine the effect of Qur'an recitation therapy through audio media on cortisol levels and anxiety levels in post-amputation patients with diabetic ulcers in the Hospital Surgical Treatment Room Ibn Sina Makassar.

Method

This study uses a quasi-experimental design with a pretest-posttest approach. The research sample consisted of 30 diabetic amputee patients treated at the Faisal Islamic Hospital Makassar. The inclusion criteria include patients who have undergone amputation within a maximum of one month, are between 30 and 70 years old, and are willing to take part in Qur'an mural therapy. Patients who had a history of severe mental illness or could not understand Arabic were not included in this study. Researchers in providing therapy for reading the Qur'an using a microphone headset and MP3 player, with the recitation of the Qur'an suroh Al-Fatihah and Ar-Rahman with its translation. The researcher used the Qori' Recitation of Sheikh Misyari Rasyid Al-Efasy from the Middle East. It is hoped that respondents can appreciate the meaning of suroh and memorize one of the verses in it. The duration of TBA administration is 30 minutes. Each intervention group had received TBA from the researcher once the intervention.

The questionnaire used assesses the patient's anxiety level. Using HARS (Hamilton Rating Scale for Anxiety), it was found that there were 5 levels of anxiety with the sum of the scores. The score ≤ 14 no anxiety, the score 14-20 mild anxiety, the score 21-27 moderate anxiety, the score 28-41 severe anxiety and the score 42-

56 very severe anxiety. Prior to the intervention, patients' cortisol levels were measured using the ELISA (Enzyme-Linked Immunosorbent Assay) method. After the initial measurement, the patient will undergo a 30-minute Quranic mural therapy session every day for 4 weeks. The recitation of the Quran is carried out by an experienced Quran memorizer and is carried out in a quiet room to minimize external distractions. After the intervention period, the patient's cortisol levels will be re-measured to evaluate the effects of the therapy.

The data obtained will be analyzed using descriptive and inferential statistics. A paired t-test will be used to compare cortisol levels before and after the intervention. at a confidence level of 95% ($p<0.05$). In addition, the analysis will also be conducted to explore other factors that may affect cortisol levels, such as age, gender, and duration of diabetes. This research has received ethical approval from the Health Research Ethics Committee, Faculty of Public Health, Hasanuddin University, Makassar with a recommendation for ethical approval No: 5718/UN4.14.1/TP.01.02/2024.

Result and Discussion

The distribution of respondents by age is that the most treatment group in the age group of 56-65 years is 8 people (53.3%) respondents, and the least in the age group (≥65 years) as many as 1 person (6.7%) while the control group is the most in the age group of 56-65 years as many as 8 people (53.3%) respondents, and the least in the age group of 36-45 as many as 1 person (6.7%). The distribution of respondents by gender was that the most treatment group was female as many as 10 people (33.3%) respondents, and the least in male sex was 5 people (66.7%) while the control group with the most female education was 12 people (80.0%) respondents, and the least male sex was 3 people (20.0%).

The distribution of respondents based on education was that the treatment group with the most in Higher Education was 5 people (33.3%) respondents, and the least in Elementary and Junior High Education as many as 3 people each (20.0%) while the control group with the most in Junior High Education was 5 people (33.3%) respondents, and the least in Junior High School and Higher Education as many as 3 people each (20.0%). The distribution of respondents based on occupation was that the most treatment group in self-employed work was 9 people (60%) respondents, and the least in housewife work as many as 1 person (6.7%) while the control group with the most self-employed work was 12 people (80.0%) respondents, and the least housewife work as many as 1 person (6.7%).

Table 1. Distribution of Respondent Characteristics in Surgical Care at Faisal Islamic Hospital Makassar

Parameters	Categories	Treatment Groups		Control Group	
		f	%	f	%
Age of respondents	Seniors (≥65 years old)	1	6.7	1	6.7
	End-of-Life Elderly (56-65 Years)	8	53.3	8	53.3
	Early Elderly (46-55 Years)	6	40.0	5	33.3
	Late Adulthood (36-45 years)	0	0	1	6.7
Gender	Male	5	66.7	3	20.0
	Female	10	33.3	12	80.0
Education	elementary school	3	20.0	3	20
	Junior High School	3	20.0	5	33.3
	high school	4	26.7	4	26.7
	College	5	33.3	3	20.0
Work	housewife	1	6.7	1	6.7
	Self employed	9	60.0	12	80.0
	retired	5	33.3	2	13.3

Table 3. Distribution of Respondents Based on Pre and Post Cortisol Levels at Faisal Islamic Hospital Makassar Surgical Care

Parameters		n	Range	Minimum	Maximum	Mean	Std. Deviation
Cortisol	Pre test	15	3.7	3.0	6.7	5.060	1.0555
Treatment	Post test	15	2.7	2.0	4.7	3.540	0.7538
Cortisol	Pre test	15	2.8	3.9	6.7	5.053	0.8175
Control	Post test	15	3.7	2.7	6.4	4.707	0.9598

Table 2 shows the distribution of respondents based on anxiety level in the pre-intervention treatment group, with the most severe anxiety level being 9 people (60%) and the least moderate anxiety level being 6 people (40%). Meanwhile, in the post-intervention treatment group, the most at the moderate anxiety level was 12 people (80%) and the least severe anxiety level was 1 person (67%).the distribution of respondents based on the anxiety level in the control group before the intervention was the most at the mild anxiety level of 8 people (60%) and the least severe anxiety level was 7 people (46.7%). Meanwhile, in the control group after the intervention, the most mild anxiety level was 9 people (60%) and the least severe anxiety level was 6 people (40%).

Table 3 shows the descriptive statistics from the pretest and post test data based on table 2, data is obtained that the cortisol level in the treatment group for the pretest value has a mean of 5.060 and the post test value has a mean of 3.540.This shows that there is a difference in the average value of the treatment group based on the pre test and post test values in the form of a decrease in cortisol levels with a mean difference of 1.52. Meanwhile, the cortisol level in the control group for the pretest score had a mean of 5.053 and the post test score had a mean of 4.707. This shows that there is a difference in the average value of the control group based on the pre test and post test values in the form of a decrease in cortisol levels with a mean difference of 0.346. However, it is still necessary to carry out statistical testing through the paired t-test) to validate it.

Table 4. Normality Test Pretest and Posttest Data Anxiety Levels and Cortisol Levels in the Treatment Group and Control Group

Parameters		Kolmogorov-Smirnova			Shapiro-Wilk		
		Statistics	df	Sig.	Statistics	df	Sig.
Treatment groups	Pre Emergency	0.385	15	0.000	0.630	15	0.000
	Emergency post	0.425	15	0.000	0.631	15	0.000
Control group	Pre Emergency	0.350	15	0.000	0.643	15	0.000
	Emergency post	0.385	15	0.000	0.630	15	0.000
Treatment groups	Cortisol pre	0.100	15	0.200	0.972	15	0.891
	Cortisol Post	0.184	15	0.183	0.942	15	0.413
Control group	Cortisol pre	0.174	15	0.200	0.953	15	0.575
	Cortisol Post	0.133	15	0.200	0.966	15	0.797

Table 4 shows the results of the data distribution test of the level of anxiety pre-test and post test in the treatment group and control group of respondents using the *Kolmogorov Smirnov* and *Shapiro wilk tests* .In the pre test and post test anxiety level data in the control group and treatment group, all the data Anxiety level has a significance value of <0.005 so that the assumption of normality is not met. In the cortisol level data in the pre test and post test in the control group and the treatment group, all cortisol level data have a significance value of >0.005 so that the assumption of normality is met.

Table 5. Results of the Test on the Effect of Quranic Muratal Therapy on Anxiety Levels in Post-Amputation Patients with Diabetic Ulcers in the Surgical Treatment Room of Faisal Islamic Hospital Makassar

Parameters	Post-anxiety Pre- anxiety (Treatment group)	Post- anxiety pre anxiety (Control group)
With	-2.640a	-.577a
Asymp. Sig. (2-tailed)	0.008	0.564

Based on the results of the *Wilcoxon test* in table 5, it was shown that the anxiety in the treatment group was obtained with a calculated value of p = 0.008 which was smaller than the value of α = 0.05. From this analysis, it can be interpreted that Ha received or there is an effect of Quran reading therapy on reducing anxiety levels in post-amputation patients with diabetic ulcers. In the control group, the value of p = 0.564 was greater than the value of α = 0.05. From this analysis, it can be interpreted that Ha is rejected or there is no effect of Quran reading therapy on reducing anxiety levels in patients after diabetic ulcer amputation. This study also showed that there was a significant difference in the level of anxiety before and after therapy in the group that was given Qur'an reading (Aini, 2023).

Based on the results of the paired sample test, the cortisol level test in the treatment group obtained a calculated value of p = 0.000 smaller than the value of α = 0.05. From this analysis, it can be interpreted that Ha received or there is an effect of Quranic reading therapy on reducing cortisol levels in post-amputation patients with diabetic ulcers. In the control group, the calculated value of p = 0.029 was obtained less than the value of α = 0.05. From this analysis, it can be interpreted that Ha received or there is an effect of Quran reading therapy on the reduction of cortisol levels in post-amputation patients with diabetic ulcers. This study also showed that there was a significant difference in the level of anxiety before and after therapy in the group that was

given Qur'an reading, in the treatment group and the control group.

Table 6. Results of the Test on the Effect of Quranic Muratal Therapy on Anxiety Levels in Post-Amputation Patients with Diabetic Ulcers in the Surgical Treatment Room of Faisal Islamic Hospital Makassar

Parameters	Paired Differences			Sig,(2 -tailed)
	Mean	95% Confidence Interval of the Difference		
		Lower	upper	
Pair 1 pre-cortisol levels of post cortisol levels in the treatment group	1.5200	0.9354	2.1046	0.000
Pair 1 pre-cortisol levels post cortisol levels in the control group	0.3460	0.0417	.6503	0.029

Cortisol levels as an indicator of stress have been extensively researched in various medical contexts. According to Chida et al. (2009), salivary cortisol levels can increase in response to various stressors, including surgical procedures. Previous research has shown that patients who undergo major surgeries, such as amputations, experience significant increases in cortisol levels. In the context of diabetic ulcers, elevated cortisol levels can be a response to the pain and uncertainty experienced by the patient.

A study by O'Connor et al. (2021) showed that amputated patients who had higher stress levels tended to have higher cortisol levels. This study highlights the importance of stress management in the context of post-operative care. In addition, research by Wei et al. (2023) found that individuals who experienced chronic stress had higher cortisol levels compared to individuals who did not experience stress. This suggests that effective stress management can contribute to a reduction in cortisol levels and, in turn, improve patient recovery.

The results of this study show that there is a difference in the average value of the treatment group based on the pre test and post test values in the form of a decrease in cortisol levels with a mean difference of 1.52.while the cortisol levels in the control group for the pretest value have a mean of 5.053 and the post test score has a mean of 4.707.This shows that there is a difference in the average value of the control group based on the pre test and post test scores in the form of a decrease in cortisol levels with a mean difference of 0.346. This decline is in line with previous research that suggests that spiritual interventions can lower stress hormone levels (Sharma & Kumra, 2020). This shows that Qur'an mural therapy not only provides psychological effects but also has a significant physiological impact. Stress has a significant impact on wound healing, including diabetic ulcers. Research shows that stress can increase levels of stress hormones such as cortisol, which play a role in inhibiting the healing process (Wang et al., 2023). High cortisol can interfere with the function of immune cells and reduce blood circulation to the injured area, thereby slowing down the tissue regeneration process. In the context of diabetic ulcers, this can result in wounds that do not heal and increase the risk of infection.

In addition, stress can also affect a patient's health behavior, such as adherence to medication and wound care. Patients who experience severe stress tend to be less adhered to the treatment plan, which can worsen the condition of their ulcer (Kumar et al., 2024). In this context, education and psychological support are essential to help patients cope with stress and improve adherence to medication.

In this regard, Quran mural therapy can serve as an effective source of emotional support. The recitation of the verses of the Quran is believed to provide peace and hope for patients. Several studies have shown that spiritual practices can help individuals cope with stress and improve mental health (Pargament, 2011). Thus, integrating Quran murotal therapy in the care of amputee patients can be a beneficial approach to address the emerging psychological impacts (Agustiyaningsih & Yusuf, 2022).

Quran mural therapy involves reading and listening to verses of the Quran which are believed to have the power to provide calm and comfort (Moulaei et al., 2023). In the Islamic tradition, the Quran is considered a source of guidance and healing. A study by Ahmed et al. (2024) showed that listening to the Quran can lower stress levels and improve mood. This shows that Quran mural therapy can be an effective tool in supporting the healing process of amputee patients.

Another study by Fallot (2007) and Sawab et al. (2024) found that patients who engaged in spiritual practices, including listening to the Quran, reported feeling calmer and more peaceful. They also showed an improvement in the ability to cope with the pain and discomfort associated with the healing process. Thus, Quran mural therapy not only serves as emotional support but can also contribute to the physical aspect of the patient's recovery.

Furthermore, Quran mural therapy can be integrated with traditional medical approaches to create a more holistic treatment. Patients who feel spiritually and emotionally supported tend to have higher

motivation to follow their treatment plan. A study by Koenig (2009) showed that patients who combined spiritual interventions with medical care had better outcomes in terms of mental and physical health. Therefore, it is important to consider Quran mural therapy as part of a multidisciplinary approach to the care of amputee patients.

The implementation of Quran mural therapy in the context of the care of amputee patients requires a structured and sensitive approach to individual needs. First, it is important to involve healthcare professionals who have an understanding of the spiritual and cultural values of the patient. They can help identify patients who may benefit from this therapy and provide necessary support during the healing process.

Al-Quran reading sessions can be held periodically, both individually and in groups. Research by Alavi et al. (2017) shows that group sessions can increase a sense of community and social support among patients. Through these interactions, patients can share experiences and support each other, which can help reduce feelings of isolation and improve mental well-being.

The use of modern technology, such as mobile apps that provide Quran recitations, can be an attractive alternative for patients who may not be able to attend sessions in person. The app can be accessed anytime and anywhere, providing flexibility for patients to listen to the verses of the Quran according to their needs. This is in line with technological developments in the health sector that increasingly prioritize accessibility and comfort for patients (Zafar et al., 2021).

Quran mural therapy offers an innovative and holistic approach to support patients experiencing post-amputation stress due to diabetic ulcers. Considering the significant psychological impact of amputation, it is important to integrate spiritual interventions into medical treatment. Research shows that Quran mural therapy can not only reduce stress and anxiety levels, but can also improve the overall quality of life of patients.

The successful implementation of this therapy requires collaboration between health workers, patients, and families. With the right approach, Quran mural therapy can be one of the important components in the healing process of amputee patients, helping them find hope and calm in the midst of the challenges they face. Through further research and ongoing practice, it is hoped that this therapy can be adopted more widely in healthcare, providing benefits to patients and society in general.

Conclusion

On the results of the study, it can be concluded that Qur'an mural therapy has a positive effect in reducing cortisol levels in diabetic amputee patients. This decrease in cortisol levels has the potential to accelerate the healing process and improve the patient's quality of life. Therefore, this therapy can be considered as one of the additional methods in the management of diabetic amputee patients. However, more research is needed to explore the mechanisms behind the effects of this therapy and to determine the optimal dosage and frequency of intervention. In addition, this study also suggests that healthcare professionals consider a spiritual approach in patient care, considering the importance of mental health in the physical healing process.

Acknowledgments
The author team would like to thank all parties involved in completing this research.

Author Contributions
This article was written by two authors, namely Z and RM. Both authors worked together to carry out each stage of this research.

Funding
The author team declares that this research received no external funding.

Conflicts of Interest
The authors declare no conflict of interest.

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