Sys Rev Pharm 2020;11(7):212-218
A multifaceted review journal in the field of pharmacy

Influence of Self Ruqyah Treatment on Cortisol Content, Depression, and Quality of Life, Spiritual Life Quality of Cancer Patients Undergoing Radiotherapy in Makassar City, Indonesia

M. Fais Satrianegara[1*], Anwar Mallongi[2]

[1]Faculty of Medicine and Health Sciences, Alauddin State Islamic University, Makassar, Indonesia
[2]Department of Environmental Health, Faculty of Public Health, Hasanuddin University, Makassar, Indonesia

***Corresponding author email**: mfaissatrianegara@gmail.com

ABSTRACT

AIM: The research aimed is to analyze Influence of self ruqyah treatment on cortisol content, depression, and quality of life, spiritual life quality of cancer patients undergoing radiotherapy.

METHODS: The research used the analytical observation studies with 20 repondents who were selected using the purposive sampling technique. In the research the depression was measured with the Beck Depression Inventory (BDI) and the quality of lifewas measured with (FACT-G) and the spiritual life quality with FACIT Sp.12 (The Functional Assessment of the Chronic Illness Therapy Spiritual) on the case (experimental). Namely, 10 cancer patients undergoing the radiotherapy who participated in the self ruqyah treatment program and the control group namely 10 patients who did not participate in program. After 25 days, the cancer patients of both groups were examined their cortisol saliva and were measured their levels of the depression, life quality, spiritual life quality.

RESULTS: Result found that respondents whose duration of diagnosis is <1 year (40%) and are in stage III (60%), followed by respondents who are in stage II (35%), stage IV (5%). Then, respondents who had radiotherapy 45% who had been previously operated on, while patients who had been chemotherapy that had been operated on were 30% and 30% who immediately underwent radiation therapy after going through chemical therapy. In addition, there were differences in the mean pretest and posttest in the treatment group of 8.35 while in the control group there was a mean difference of 15.3. These results prove that there is a difference in the average level of cortisol before cancer patients follow the independent ruqyah program after joining the program.

CONCLUSION: to conclude, there are differences in the average value of quality of life in cancer patients who do independent ruqyah therapy and who do not do ruqyah independently.

Keywords: Self ruqyah, Cortisol Content, radiotherapy, depression, quality of life, quality of spiritual life.

Correspondence:
M. Fais Satrianegara
[1]Faculty of Medicine and Health Sciences, Alauddin State Islamic University, Makassar, Indonesia
***Corresponding author email**: mfaissatrianegara@gmail.com

INTRODUCTION

Cancer is a disease that arises due to abnormal growth of body tissue cells that turn into cancer cells. Cancer is caused by an irregularity in the travel of hormones that causes the growth of meat in normal body tissue[1,2]. At an advanced stage, the cancer cells spread to vital organs such as the brain or lung and then take the nutrients needed by these organs so that these organs can be damaged and die. Cancer can weaken the sufferer, even the effects of cancer treatment can reduce the passion of life and the body's ability to fight disease[3,4].

Cancer can strike all levels of society without knowing social status, age, and gender. Children, adolescents, and adults are not spared from cancer. Similarly, men and women can be stricken with this most feared disease. This disease actually arises due to abnormal physical conditions and eating patterns and unhealthy lifestyles, even though cancer is known to be passed down from parents to their children.

MATERIALS AND METHODS

Identification of research variables

1. Independent Variable: The type of religious psychotherapy treatment in the form of the Independent ruqyah method
2. Dependent Variable: Quality of life, quality of spiritual life, and level of depression. Self ruqyah is an independent healing method by reciting ruqyah verses and prayers or dzikir that are in accordance with the Qur'an and the Sunnah of the Prophet Muhammad SAW which contain requests for help and protection to Allah Subhana wa Ta'ala to prevent or treat bala 'and sickness and sticking the palm of the hand where it hurts or reading it in drinking water or ingredients blessed by Allah are mentioned and exemplified by the Prophet in the Nabib Nabawi, such as olive oil, habbatsauda oil, etc. The independent ruqyah stage:

a). Preparation before ruqyah

1) Ablution
2)Giving Counseling
3) Listen to religious advice and ruqyah instructions
4) Lie down or sit in a relaxed position

b) Implementation of ruqyah Therapy

1) Listening and Reading the Verses of the Holy Qur'an with Solemnity
2) Reciting ruqyah in water and drinking it

3) Carry out the technique of the entire body rubbing
c) The intensity of the implementation of an independent ruqyah carried out with full confidence will be healed and do so according to the instructions given.
d) The frequency of independent ruqyah is done 5 times a day after the dzikir prayer obligatory.
e) The time is done after each prayer and every time if needed for 25 days. The choice of 25 days of observation is based on Stephen Stahl's opinion that it takes approximately 10 days for the molecular changes in the synapse to activate the enzymes that are in it. The activated enzyme will re-start a series of post-synapse activities if repetitive stimuli occur and will affect structural changes in neurons[5,6].

Ethical Clearance
Ethical Clearance from the biomedical research ethics commission in humans, Hasanuddin University Medical School Number: 2453 / H4.8.4.5.31 / PP36-KOMETIK / 2015 dated 29 December 2015. Followed by a research permit from the Director of Hasanuddin University Hospital.

Data Processing, Analysis and Presentation
Data collected from the results of interviews and sampling results are then subjected to laboratory examinations which are then processed with the help of SPSS.

Test for normality and homogeneity of data
Data were tested for normality first with the Shapiro Wilk normality test. This test is one of the normality tests recommended by many experts if the number of samples is small ie less than or equal to 50 samples. This test is very sensitive to detect any abnormal distribution of data.
The Levene test is also a method of testing the variance homogeneity of the data. The tested data do not have to be normally distributed as in small samples.

Data analysis
Analysis of the data in this study uses the following tests:
1. Analyze the data using the then paired-sample t test. This t test is to compare the average of two variables and calculate the difference between the values of the two variables for each case and test whether the average difference is zero.
2. Independent Sample T Test or comparative test or different test to find out whether there is a meaningful difference in mean or mean between the two free groups.

Data Presentation
Presentation of the data is done after the data is processed and presented in the form of line graphs, frequency distribution tables and analysis tables of influence between variables accompanied by narration.

RESULTS AND DISCUSSION

Table 1. Cross Tabulation Analysis of Cancer on Long-Time Diagnosed Respondents in the Radiotherapy Unit at the Hospital. Hasanuddin University Makassar Period February-March 2016

Stadium	Diagnoses period						Total	%
	< 1 year	%	1-2 year	%	>3 year	%		
II	3	37,5	4	66,7	0	0	7	35
III	5	62,5	2	33,3	5	83,3	12	60
IV	0	0	0	0	1	16,7	1	5
Total	8	100	6	100	6	100	20	100

Radiotherapy is a treatment aimed at the possibility of survival after adequate treatment. In general, patients who are at an advanced stage are highly recommended to follow the stages of treatment and management of cancer therapy in the Hospital. The table above shows that the most respondents are respondents whose duration of diagnosis is <1 year (40%) and are in stage III (60%), followed by respondents who are in stage II (35%), stage IV (5%). This is because cancer patients who receive radiation therapy are generally in stages III and IV according to cancer treatment referrals[7-9].

Table 2. Distribution of Cancer Patients by Type of Cancer Patient Therapy who nderwent Radiotherapy at the Hospital. Hasanuddin University Makassar Period February-March 2016

Therapy	Group				Total	%
	Intervention	%	Control	%		
Radiotherapi and Operation	1	10	2	20	8	40
Radiotherapi and Chemoterapi	4	40	7	70	6	30
Operation,Chemo, and Radiotherapi	5	50	1	10	6	30
Total	10	100	10	100	20	100

Types of therapy that have been obtained by cancer patients can provide predictions of the severity of cancer suffered. The table above shows all of the respondents who had radiotherapy 45% who had been previously operated on, while patients who had been chemotherapy that had been operated on were 30% and 30% who immediately underwent radiation therapy after going through chemical therapy (chemotherapy).

Table 3. Age Group Crosstab Analysis of Respondent Cancer Types in Radiotherapy Unit of RS. Makassar Hasanuddin University Period February-March 2016

Age group	Cancer Types										Total	%
	KNF	%	Cervix	%	mam mae	%	SCC	%	Lung	%		
30 -39	1	20	1	14,3	0	0	2	66,7	0	0	4	20
40-49	4	80	3	42,9	3	75	1	33,3	0	0	11	55
50-59	0	0	3	42,9	1	25	0	0	1	100	5	25
Total	5	100	7	100	4	100	3	100	1	100	20	100

The table above shows that patients with the most types of cancer diagnoses are in the age group 40-49 years who suffer from KNF (Nasopharink) cancer, which is 80% of all respondents who have KNF cancer, as well as respondents who have breast cancer (Mammae) by 75% from this case. The results of this study are in line with studies that have been conducted previously which have the highest number of cancer sufferers in the age range of 40-49 years[10,11]. This is thought to be related to the latent period from the pre-invasive phase to being invasive to take 10 years.

Paired T Sample Test (Pre-Posttest)

Hasil penelitian terhadap pengukuran variabel dependent pada kelompok pretest dan posttest

Tabel 4. Distribusi Perbedaan Mean, Standard Deviasi, dan Nilai P Kelompok Pretest dan Posttest Berdasarkan Variabel Penelitian di Unit Radioterapi RS. Universitas Hasanuddin Makassar Periode Bulan Februari –Maret Tahun 2016

Variables	Mean ± SD		P value	Δ
	Pretest	Posttest		
Cortisol Treatment Control	 28,20 ± 19,85 16,10 ± 16,19	 9,50 ± 9,61 31,40 ± 24,63	 0,001 0,003	 -18,7 15,3
Depression Treatment Control	 19,00 ± 8,21 20,90 ± 6,40	 11,40 ± 5,29 25,80 ± 5,05	 0,03 0.01	 -7,6 4,9
Life quality Treatment Control	 58,50 ± 11,40 46,60 ± 9,94	 80,30 ± 16,77 37,70 ± 12,47	 0,000 0.024	 21.8 -8,9
Spiritual life quality Treatment Control	 27,30 ± 5,05 27,30 ± 2,49	 40,20 ± 4,91 25,70 ± 4,11	 0,000 0.091	 12.9 -1,6

The table above shows the differences in mean cortisol, depression, quality of life, and quality of spiritual life in the pretest and posttest groups of respondents. The difference obtained between the pretest and posttest scores is an illustration that the implementation of independent ruqyah in cancer patients shows a decrease in cortisol and depression scores in the treatment group and an increase in the quality of life / quality of spiritual life whereas patients who do not follow the ruqyah program independently for 25 days of radiotherapy actually increase cortisol and depression scores and decreased quality of life / spiritual quality of life scores.

Differences in Mean and Independent Test Samples (Treatment & Control)

Table 5 shows the differences in the mean of cortisol dependent variables, depression, quality of life, and quality of spiritual life in the treatment and control group of respondents. The difference obtained is an illustration that the implementation of independent ruqyah in cancer patients gives a better effect on decreasing cortisol, depression and improving quality of life / quality of spiritual life.

Table 5. Preliminary Data on Cortisol Levels, Depression, Quality of Life, and Spiritual Quality of Life of Cancer Patients in the Treatment and Control Groups

Variables	Mean + SD		P Value
	Treatment	Control	
Cortisol	28,20 + 19,85	16,10 + 16,19	0,153
Depression	19,00 + 8,21	20,90 + 6,40	0,572
Life quality	58,50 + 11,40	46,60 + 9,94	0,023
Spiritual life quality	27,30 + 5,05	27,30 + 2,49	1,000

Cortisol Level Variable

a. Differences in cortisol in the Treatment and Control Groups

Differences in the results of examination of cortisol levels in the pretest and posttest group respondents can be seen in figure1.

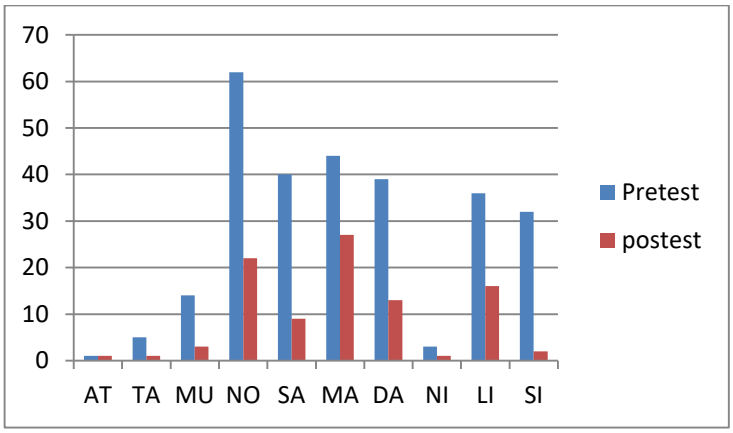

Figure 1. Overview of Cortisol Levels in Cancer Patients in the pre-test-posttest hospital group. Hasanuddin University in 2016

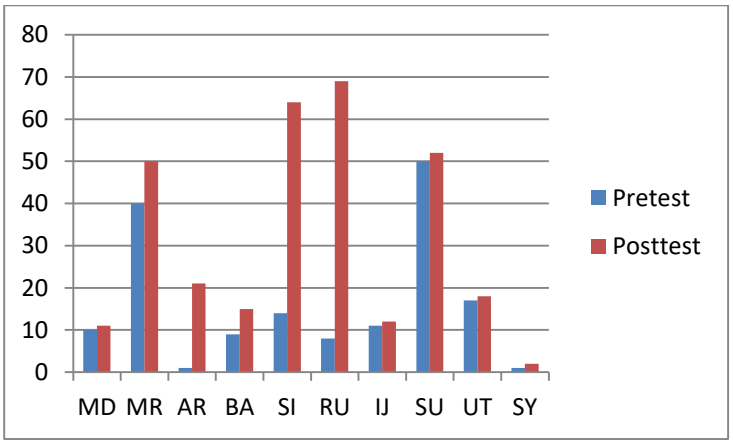

Figure 2. Overview of Cortisol Cancer Patients in the Control group pre-test posttest Hospital. Hasanuddin University in 2016

b. Statistical tests to determine differences in average cortisol levels in the Treatment and Control Group.

The test results above are also known to have differences in the mean pretest and posttest in the treatment group of 8.35 while in the control group there is a mean difference of 15.3. These results prove that there is a difference in average cortisol levels before cancer patients follow the independent ruqyah program after joining the program.

So based on paired sample t test at 95% confidence level, it can be concluded that cancer patients who do ruqyah show significantly lower cortisol levels, which is an average of 9.50 when compared to before the independent ruqyah where the average cortisol level is higher, namely the average 28.20 and obtained a significant value of P: 0.001 <0.05 then Ho is rejected or Ha accepted, which means the average cortisol levels before cancer patients do ruqyah independently differ significantly from the average cortisol levels of cancer patients after doing independent ruqyah[11,12].

The results of data analysis of the cortisol levels of cancer patients between the treatment group or the group of cancer patients who participated in the independent ruqyah program and in the control group or group of cancer patients who did not participate in the independent ruqyah program while they underwent radiotherapy treatment for 25 days using the independent T test sample obtained values P is 0.023 <0.05 which means that Ho is rejected, so that the consequences Ha is accepted or the effect of the independent ruqyah program in cancer patients undergoing radiotherapy on cortisol levels is significantly different or it can be concluded that the implementation of independent ruqyah has a better effect on reducing cortisol levels in patients cancer in the treatment group was significant at an average of 9.5 when compared with the control group at 31.4.

Variabel Depresi

a. Differences in Depression in the Treatment and Control Groups

The description of the results of the measurement of depression levels of cancer patients before and after the intervention of independent ruqyah in the Case Group (Experiment) can be seen in figures above. significant in the treatment group and vice versa has increased in the control group, meaning that descriptively there is a visible difference in the level of depression of cancer patients before and after the Independent ruqyah intervention, which shows the level of depression of cancer patients has decreased significantly.

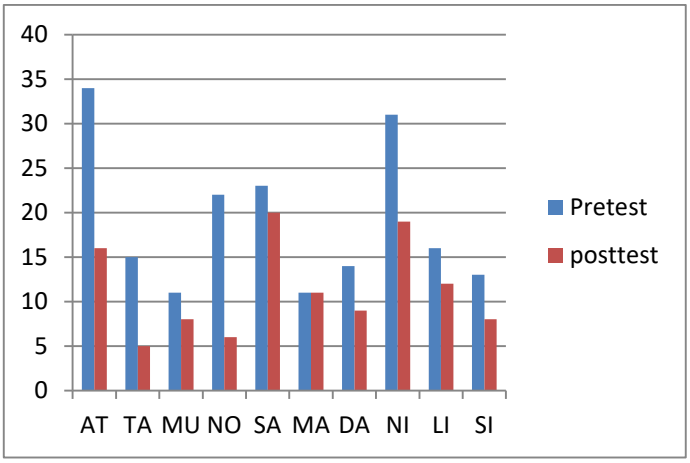

Figure 3. Differences in the Depression Rates of Cancer Patients in the Pre-Test and Posttest Treatment Group at the Radiotherapy Unit of the Hospital. Hasanuddin University February-March 2016 Period

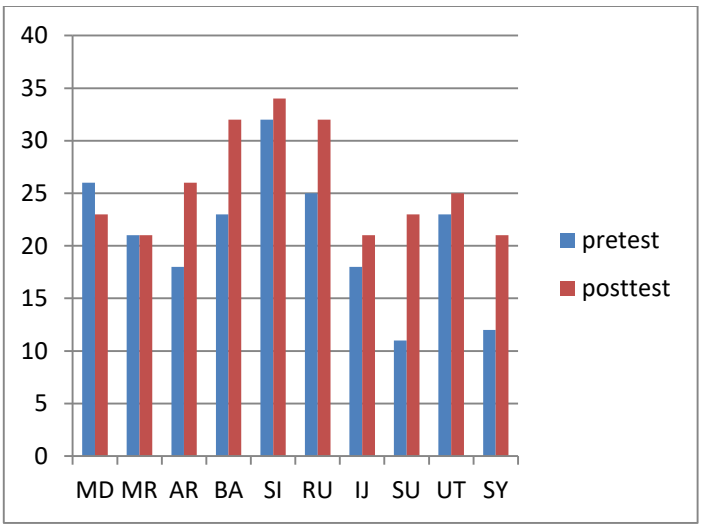

Figure 4. Differences in the Depression Rates of Cancer Patients in the Pre-Test and Posttest Control Groups in the Radiotherapy Unit of the Hospital. Hasanuddin University February-March 2016 Period.

Statistical tests to determine differences in the average value of depression in the Treatment and Control Group
After t-test paired samples (paired sample t test) with SPSS in the treatment group obtained a value of P: 0.03 <0.05 which means that Ho is rejected or Ha is accepted, meaning that the average level of depression before cancer patients do ruqyah independently during in radiotherapy differs significantly from the average depression of cancer patients after doing ruqyah independently. Based on paired sample t test at a 95% confidence level, it can be concluded that cancer patients who performed independent ruqyah during radiotherapy showed a significant decrease in the level of depression, an average of 11.4 when compared to before the independent ruqyah, the average level of depression was higher, namely the average 19.0. It is also known that there is a mean difference of 8.35, which is the difference between the average level of depression before cancer patients take part in an independent ruqyah program and after taking an independent ruqyah program even though the patient experiences side effects from radiotherapy. The results of the analysis above, it can be concluded that there is a significant relationship before and after ruqyah independently,
The result of paired sample t test analysis in the control group is known that the Ho hypothesis is accepted if the probability value or sig> 0.05 and H0 are rejected if the sign value <0.05 and the SPSS analysis results above found that the value of P = 0.01 <0.05 so that Ho is rejected or Ha is accepted, which means that the average level of depression before cancer patients get radiotherapy therapy that does not follow the independent ruqyah program is significantly different from the average level of depression of cancer patients after radiotherapy, so it is concluded that cancer patients who do not perform independent ruqyah showed a significant increase in the value of depression by an average of 25.8 when compared to before radiotherapy which averaged 20.9 or in other words an increase of 4.9 for 25 days on radiotherapy.
The results of data analysis using the independent sample T test in the pretest group showed P values of 0.572> 0.05, which means that Ho was accepted, so that the consequences Ha was rejected or there was no difference in the average value of depression of patients in the treatment group with the control group
The results of data analysis using the independent sample T test in the posttest group showed that the P value was 0.00 <0.05, which means that Ho was rejected, so the consequences Ha was accepted or there was a difference between the average depression scores of cancer patients in the treatment group with the control group so based on the test it can be concluded that the implementation of independent ruqyah gives a better influence on the level of depression of cancer patients in the treatment group, which is an average of 11.4 or in a mild depressed condition when compared to the control group of 25.8 or in the condition moderate depression.

Quality of Life Variable

a. Description of the difference in value (score) quality of life in the Treatment and Control Group.
The results of the measurement of the quality of life of cancer patients before and after the independent ruqyah intervention in the treatment group.

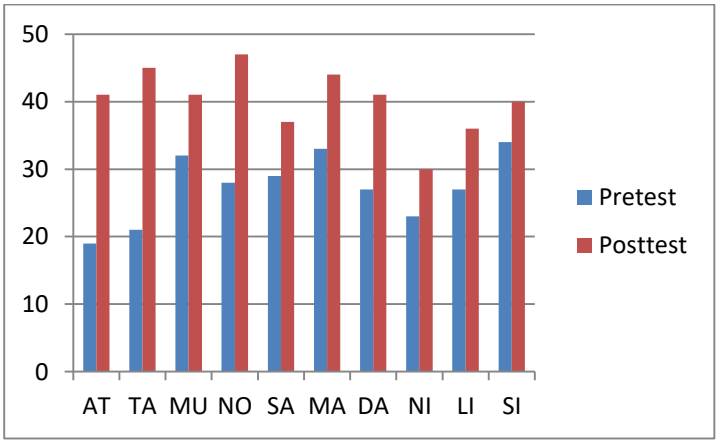

Figure 5. Differences in the Quality of Life of Cancer Patients in the Pre-Test and Posttest Treatment Group at the Radiotherapy Unit of the Hospital. Hasanuddin University February-March 2016 Period

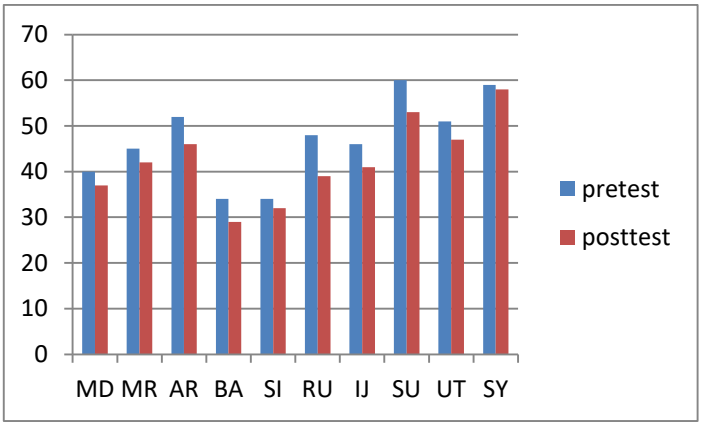

Figure 6. Description of Quality of Life of Cancer Patients in the Control group pretest and posttest in the Radiotherapy Unit of the Hospital. Hasanuddin University February-March 2016 Period

b. Statistical tests to determine differences in the average value of Quality of Life in the Treatment and Control Group

The hypothesis is known that Ho is accepted if the probability value or sig> 0.05 and H0 are rejected if the sign value <0.05 and the SPSS analysis results above show that the value of P = 0.000 <0.05 so that Ho is rejected or Ha is accepted, meaning that the average the average level of quality of life before cancer patients undergoing ruqyah independently during radiotherapy is significantly different from the average quality of cancer patients after doing ruqyah independently.

So based on the paired sample t test at a 95% confidence level it can be concluded that cancer patients who performed independent ruqyah during radiotherapy showed a significantly improved quality of life that was an average of 80.3 when compared to before the independent ruqyah which had an average level of quality of life an average of 58.5. It is also known that there is a mean difference of 21.8 difference in the average level of quality of life before cancer patients take part in an independent ruqyah program and after an independent ruqyah program. From the results of the above analysis it can be concluded that there is a relationship between the independent ruqyah program to improve the quality of life of cancer patients undergoing radiotherapy treatment or the independent ruqyah program can be said to be successful in improving the quality of life in cancer patients undergoing radiotherapy[13-18].

Statistical analysis results from the paired sample test in the control group found that the value of P = 0.024 <0.05 then Ho was rejected or Ha accepted, or the average quality of life before radiotherapy cancer patients who did not perform independent ruqyah differed significantly from the average quality of cancer patients after 25 days of therapy. The results of the analysis with paired sample t test also showed a decrease in quality of life to an average of 37.7 when compared before radiotherapy, which was an average of 46.6 for 25 days with a mean difference of 8.9.

After the data in the normality test using Shapiro-Wilk (n<50) obtained a significance value of more than 0.05 so that the quality of life data in the treatment patient group (sig = 0.055> 0.05) and control (sig = 0.798> 0, 05) assumed to be normally distributed so that this data meets the requirements to be tested independent of t samples.

The results of the independent T sample test in the pretest group showed that the P value was 0.023 <0.05, which means that Ho was rejected, or Ha was accepted or there was a difference between the average quality of life of cancer patients in the treatment group with the control group, so based on statistical tests with levels 95% confidence in the 2 sample groups can be concluded that the implementation of ruqyah independently gave a better effect on the quality of life of cancer patients in the treatment group, which was a mean of 80.3 or was in a better quality of life when compared to the control group as many as 37.7.

The results of the independent T sample test in the pretest group showed that the P value was 0.023 <0.05, which means that Ho was rejected, or Ha was accepted or there was a difference between the average quality of life of cancer patients in the treatment group with the control group, so based on statistical tests with levels 95% confidence in the 2 sample groups can be concluded that the implementation of ruqyah independently gave a better influence on the quality of life of cancer patients in the treatment group, which was a mean of 40.3 or was in a better quality of life when compared to the control group as many as 37.7 or are in a poor quality of life condition

Spiritual Quality of Life Variable

a. Picture of Difference in score (score) of Spiritual quality of life in the Treatment and Control Groups

A description of the results of the measurement of the quality of life of cancer patients before and after the independent ruqyah intervention in the treatment group can be seen in graph 7. can be seen independently ruqyah program, where seen the quality of spiritual life of cancer patients has increased, seen some cancer patients in the control group have a decreased quality of spiritual life of patients.

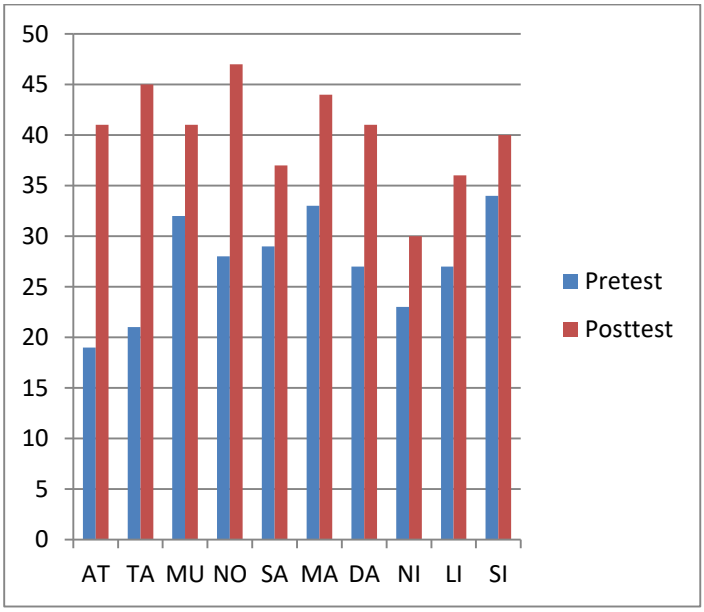

Figure 7. Differences in the Spiritual Quality of Life of Cancer Patients in the Treatment group pre-test and posttest in the Radiotherapy Unit of the Hospital. Hasanuddin University February-March 2016 Period

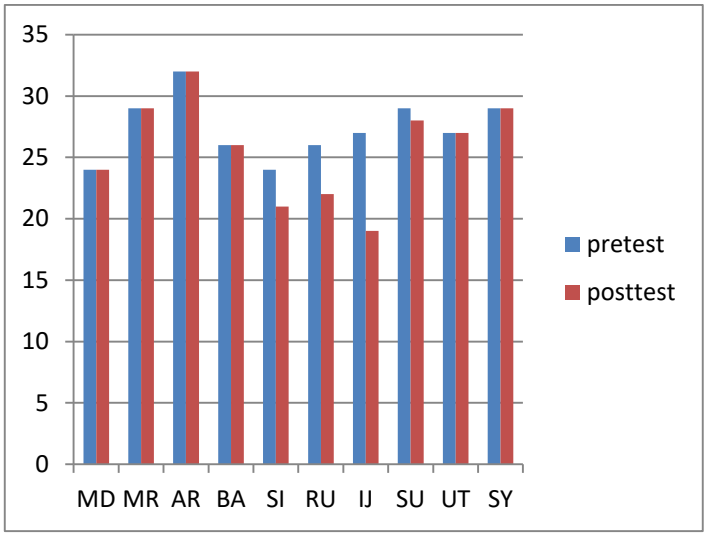

Figure 8. Overview of the Spiritual Quality of Life of Cancer Patients in the Control group pretest and posttest in the Radiotherapy Unit of the Hospital. Hasanuddin University February-March 2016 Period

CONCLUSION

1. There are differences in the mean cortisol levels in cancer patients who do independent ruqyah therapy and who don't do independent ruqyah
2. There are differences in the mean value of depression in cancer patients who do independent ruqyah therapy and who do not do ruqyah independently
3. There are differences in the average value of quality of life in cancer patients who do independent ruqyah therapy and who do not do independent ruqyah
4. There are differences in the average value of the quality of spiritual life in cancer patients who do independent ruqyah therapy and who do not do independent ruqyah
5. The role of Independent ruqyah is very important as part of palliative care in cancer, especially in the period of treatment or radiation therapy to maintain the quality of life of patients so that life expectancy for cancer patients can be increased.

REFERENCES

1. Woodruff, R. (2004). *Palliative medicine: evidence-based symptomatic and supportive care for patients with advanced cancer*. Oxford University Press, USA.
2. Savitri, A., Alina, L., & Utami, E. D. R. (2015). Kupas Tuntas Kanker Payudara, Leher Rahim dan Rahim.
3. Lubis, N. L. (2009). *Dukungan Sosial pada Pasien Kanker, Perlukah?* USUpress.
4. Luckett, T., King, M. T., Butow, P. N., Oguchi, M., Rankin, N., Price, M. A., & Heading, G. (2011). Choosing between the EORTC QLQ-C30 and FACT-G for measuring health-related quality of life in cancer clinical research: issues, evidence and recommendations. *Annals of Oncology*, *22*(10), 2179-2190. http://doi.org/10.1093/annonc/mdq721
5. Sommers-Flanagan, J., & Sommers-Flanagan, R. (2012). *Clinical interviewing: 2012-2013 update*. John Wiley & Sons.
6. Rule, S. (2007). Religiosity and quality of life in South Africa. *Social Indicators Research*, *81*(2), 417-434. https://doi.org/10.1007/s11205-006-9005-2
7. Wardhana, W. A. (2011). Strategi mengatasi & bangkit dari stroke. *Yogyakarta: Penerbit Pustaka Pelajar*.
8. Wasner, M., Longaker, C., Fegg, M. J., & Borasio, G. D. (2005). Effects of spiritual care training for palliative care professionals. *Palliative medicine*, *19*(2), 99-104. https://doi.org/10.1191%2F0269216305pm995oa
9. Azizah, A., Sofian, A., & Suyanto, S. (2014). *Gambaran Kualitas Hidup Pasien Kanker Serviks Yang Menjalani Radioerapi Di RSUD Arifin Achmad Provinsi Riau Periode 2011–2013* (Doctoral dissertation, Riau University).
10. Muhith, A., Winarti, E., Perdana, S. I., Haryuni, S., Rahayu, K. I. N., & Mallongi, A. (2020). Internal Locus of Control as a Driving Factor of Early Detaction Behavior of Servical Cancer by Inspection Visual of Acetic Acid Method. *Open Access Macedonian Journal of Medical Sciences*, *8*(E), 113-116. https://doi.org/10.3889/oamjms.2020.4341
11. Mahmud, A. (2007). *Dzikir Bersama Nabi Hakikat,Praktik, Ragam, Etika, dan Pengaruh Dzikir bagi seorang Muslim*. (F. Abdurrahman, Ed.). Jakarta: Pustaka At-Tazkia.
12. Soliman, H., & Mohamed, S. (2013). Effects of zikr meditation and jaw relaxation on postoperative pain, anxiety and physiologic response of patients undergoing abdominal surgery. *Journal of Biology, Agriculture and Healthcare*, *3*(2), 23-38.
13. Livneh, H. (2000). Psychosocial Adaptation to Cancer: The Role of Coping Strategies. *Journal of rehabilitation*, *66*(2).
14. Ashari, A. E., Muslimin, I., & Mallongi, A. (2020). The Strategy of Directly Observed Treatment Shortcourse (DOTS) Towards Compliance with Treatment of Tb Lung Patients in Tb Lung Mamuju District Hospital, Indonesia. *Systematic Reviews in Pharmacy*, *11*(6), 1185-1187. http://dx.doi.org/10.31838/srp.2020.6.172
15. Handayanya, G. N., Mulatb, T. C., & Ekac, A. M. (2020). Resistance Test of Some Bacterial Synthetic Calcular Cycinaris Invitro Amoxicillin and Ciprofloxacin Antibiotics in TK II Pelamonia Hospital Makassar, Indonesia. *Systematic Reviews in Pharmacy*, *11*(6), 1181-1184.
16. Amqam, H., Thalib, D., Anwar, D., Sirajuddin, S., Mallongi, A. (2020). Human health risk assessment of heavy metals via consumption of fish from Kao Bay. Reviews on Environmental Health. https://doi.org/10.1515/reveh-2020-0023
17. Agus Erwin Ashari , Irma Muslimin , Anwar Mallongi, The Strategy of Directly Observed Treatment Shortcourse (DOTS) Towards Compliance with Treatment of Tb Lung Patients in Tb Lung Mamuju District Hospital, Indonesia. Sys Rev Pharm 2020;11(1):1185-1187.
18. Gemy Nastity Handayany, Trimaya Cahya Mulat, Eka, Anwar Mallongi. Resistance Test of Some Bacterial Synthetic Calcular Cycinaris Invitro Amoxicillin and Ciprofloxacin Antibiotics in TK II Pelamonia Hospital Makassar, Indonesia. Sys Rev Pharm 2020;11(6):1181-1184,