

# Improvement of Psychological Responses, Spiritual Responses, and Cortisol Levels after Receiving Modification Psychoeducation in Lepers

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**Keywords:** Anxiety, Cortisol, Lepers, Spiritual, Stigma.

**Abstract:** Prevention of Leprosy Stigma Based on the Stigma Reduction Guidelines of the International Federation of Anti-Leprosy Associations (ILEP) has not been fully implemented into the Government's program efforts. Several previous studies have not had interventions that aim to increase anxiety and spiritual impact due to the stigma of leprosy. This study aims to increase spirituality, stigma, anxiety, and cortisol in leprosy patients. Modification of psychoeducation is a development of psychoeducational intervention with intervention topics consisting of knowledge management, relaxation, and prayer. The intervention was given in 5 sessions. This study used a quasi-experimental design. The number of samples is 35 respondents. To see if there is a difference in the mean before and after the intervention between the MP (modified psychoeducation), P (psychoeducational), and K (control) groups, data analysis used the dependent T-test and time-series test. Based on the research results obtained p-values in the MP group for spiritual response (0.0005), stigma (0.002), anxiety (0.0005), and cortisol (0.374). Spiritual response, stigma, and anxiety scores in the MP group experienced continuous improvement, and cortisol levels in the MP group decreased more gently than in the P and K groups. Psychoeducational modifications increased spiritual response, perception of stigma, anxiety levels, and cortisol levels compared with psychoeducational intervention. Psychoeducational modification can encourage the proliferation of T lymphocytes, especially cytotoxic T (Tc) which is needed for the body's resistance to leprosy to destroy cells infected with intracellular bacteria that can affect the leprosy healing process.

## 1 INTRODUCTION

In addition to causing mental health problems, leprosy stigma can cause delays in treatment, care, healing and increase the risk of disability among patients. (Wong, 2004) Based on a study conducted in Indonesia, it was found that 931 (35.5%) of 1,358 leprosy patients experienced a perceived stigma among patients, and 18-50% found stigma in the community. (B.L Ajibade, Okunlade, J.O, Olawale, 2013) 60% of lepers were found to experience a limitation in their life activities. (Lusli et al., 2016)

Based on the Cirebon District Health Office, 233 new cases of leprosy were found in 2016, 230 new cases were found in 2017, and 217 new cases were found in 2018. Based on the Cirebon District Health Office, 233 new cases of leprosy were found in 2016, 230 new cases were found in 2017, and 217 new cases were found in 2018. (Dinkes Kabupaten Cirebon, 2018)

Based on Guidelines to Reduce Stigma of the International Federation of Anti Leprosy Associations (ILEP), Leprosy stigma prevention has not all been carried out in the efforts of the Government program. Two resources that are widely

used by people suffering from mental and physical diseases are psychotherapy and spirituality. (Pearce et al., 2015) The cause of leprosy stigma is an error in various perceptions about leprosy, education, and knowledge. (Stuart, GW, and Sundeen, 2005) Then the intervention can be done with psychoeducation. Psychoeducation therapy can improve psychomotor attitudes and abilities in caring for clients of social isolation. (Wiyati, 2007) Some groups believe that leprosy is a judgment from God or the gods, as the fault or sin of that lepers. (Rafferty, 2005) Respondents refer to religion and spirituality as ways of seeking health and protection in a sincere way to leprosy stigma. (Peters et al., 2013) Some previous studies showed no intervention aimed at solving emotional problems such as anxiety due to the impact of leprosy stigma, and there was no attempt to manage the spiritual impact of leprosy stigma. *Cirebon* is a palace area still attached to a distinctive religious tradition and culture and endemic leprosy area. The novelty in this study is that there are psychoeducational intervention modifications that have an impact on improving spiritual responses, perceptions of stigma, anxiety levels, and decreasing cortisol levels, which can encourage the proliferation of T lymphocytes, especially T cytotoxic (Tc), which is needed for the body's resistance to leprosy to destroy infected cells intracellular bacteria that cause leprosy. The research question is whether psychoeducational modification can improve spiritual response, perceived stigma, anxiety levels, and cortisol levels in patients with leprosy. Thus, this study aims to improve spiritual response, perceived stigma, anxiety level, and cortisol levels among lepers after psychoeducation modification.

## 2 METHOD

This research is quantitative research with a Quasi-Experimental type of research with a pretest-posttest design with a control group. The study began with identifying the population, namely people with leprosy who were receiving treatment (MDT); based on the latest report at the time of the research, in 2018, there were 217 cases. The comparison of cases and controls in this study was 1:1, so the number of samples for the treatment group was 12 respondents, and the control group was 12 respondents. The number of samples from 3 groups was 35 leprosy patients who completed the entire series of studies. The sampling technique used is cluster sampling and simple random sampling. Data were obtained through

interviews through questionnaires and examinations in the laboratory.

The questionnaires used in this study include the perceived stigma questionnaire using the explanatory model interview catalogue (EMIC), the EMIC consists of 15 question items with 4 answer options. According to the Hamilton Rating Scale For Anxiety (HRS-A), the anxiety level questionnaire consists of 14 symptoms, each group being further detailed with more specific symptoms. Moreover, a spiritual response questionnaire consists of 3 components of spiritual response components: patience, gratitude, and sincerity. The spiritual response questionnaire consists of 13 question items with 4 answer options.

Psychoeducational modification is the development of the psychoeducational intervention, which is one of group psychotherapy, with the aim not only to increase knowledge and manage emotions but also to increase the spiritual response of lepers, with the intervention topics consisting of knowledge management, relaxation, and prayer. At the same time, the psychoeducational intervention provided was only knowledge management and relaxation. The intervention was given in 5 sessions and each session for 60-90 minutes. Those who provide intervention are leprosy programmers, psychologists, and experts in the field of Sufism. The variables in this study were psychological responses, namely levels of anxiety and stigma, spiritual responses, and cortisol levels. Statistical test using dependent T-test and time-series test. This study was registered in the Health Research Ethics Commission of the Faculty of Medicine, Diponegoro University, Dr. Kariadi Hospital Semarang with Ethical Clearance number: 525/EC/FK-RSDK/VII/2018.

## 3 RESULT

Based on the characteristics of study subjects (n=35), the mean age of the respondents was 37.03 years, and the mean treatment duration was 7.77 months. Most of the respondents had elementary school education (37.1%), had married (48.6%), and had an income of < UMR (77.1), had a type of leprosy of MB (94.3), and were not disabled (60%).

Table 1 showed that based on the paired T-test results, the spiritual response score before and after the intervention in post-test 2 was obtained p-value in group MP of 0.0005, and the p-value in group P was 0.043. It can be concluded that there was a significant difference in the spiritual response score between before and after the intervention. While group K was obtained a p-value of 0.084, it can be concluded that

Table 1: Difference Test of Spiritual Response and Perceived Stigma Scores (Pre and Post) among the 3 Groups of Lepers.

Time of Assessment	MP=12	P=11	K=12	P-Value
<b>Spiritual Response</b>				
P value (pre-test and post-test 1)	0.0005*	0.180*	0.010*	
P value (pre-test and post-test 2)	0.0005*	0.043*	0.084*	
P-value (time series)				
MP				0.003**
P				0.003**
K				0.003**
<b>Perceived Stigma</b>				
P value (pre-test and post-test 1)	0.062*	0.451*	0.137*	
P value (pre-test and post-test 2)	0.002*	0.009*	0.054*	
P-value (time series)				
MP				0.0005**
P				0.013**
K				0.190**

\* Paired T-test \*\* Uji Friedman (seriestime)

MP= Psychoeducation Modification

P= Psychoeducation

K= Control

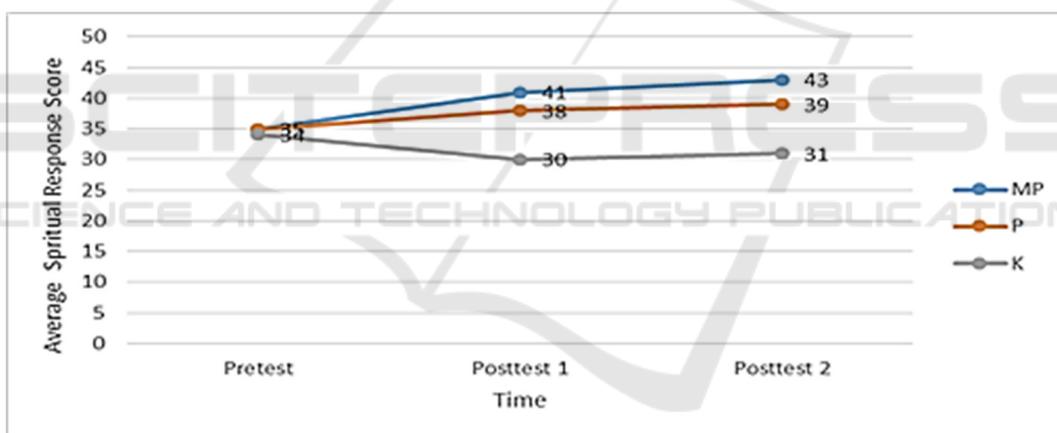


Figure 1: Graph of the mean scores of spiritual response before and after the intervention in the three groups.

response score between before and after the intervention. Based on the paired T-test results, the perceived stigma score before and after the intervention in post-test 2 was obtained p-value in group MP of 0.002, and the p-value in group.

Figure 1 shows the mean scores of spiritual response before and after the intervention in group MP which continued to increase. The mean score of spiritual response in group P showed an increase, but the increase was still below the mean score of spiritual response in group MP, whereas a mean score of spiritual response in group K in post-test 2 showed an increase although it only showed a slight increase.

Figure 2 shows the mean scores in group MP the mean score of perceived stigma decreased steeper than group P. In group P, the mean score of perceived stigma decreased. However, the decrease was not as sharp as in group MP, whereas the mean score of perceived stigma in group K continued to increase.

Table 2 showed, based on the paired T-test results, anxiety level score before and after the intervention in post-test 2, was obtained p-value in group MP of 0.0005, and the p-value in group P was 0.043. It can be concluded that there was a significant difference in the anxiety level score between before and after the intervention, while in group K was obtained p-value of 0.084, it can be concluded that there was no

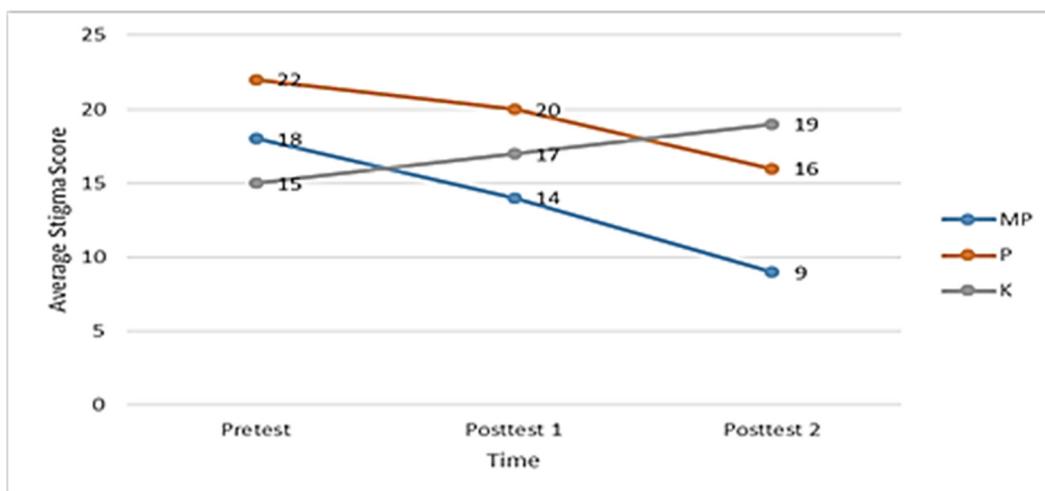


Figure 2: Graph of the mean scores of perceived stigma before and after the intervention in the three groups.

Table 2: Difference Test Results of Anxiety Levels Scores and Cortisol Levels (Pre and Post) among the 3 Groups of Lepers.

Time of Assessment	MP=12	P=11	K=12
<b>Anxiety Levels</b>			
P value (pre-test and post-test 1)	0.0005*	0.180*	0.010*
P value (pre-test and post-test 2)	0.0005*	0.043*	0.084*
<b>P-value (series time)</b>			
Pre-test and post-test 1	0.0005**	0.180**	0,010**
Pre-test and post-test 2	0.0005**	0.043**	0.084**
<b>Cortisol Levels</b>			
P value (pre-test and post-test 2)	0,374*	0,174*	0,103*

\* Paired T-test      \*\*Paired T-test (seriestime)  
 MP= Psychoeducation Modification      P= Psychoeducation      K= Control

difference in anxiety level score between before and after the intervention. Based on the paired T-test results, cortisol levels score before and after the intervention in post-test 2, p-value in group MP of 0.374, p-value in group P was 0.174, and p-value in group K was 0.103. Thus, it can be concluded that there was no significant difference in the cortisol levels score between before and after the intervention.

Figure 3 showed the mean scores of anxiety levels before and after the intervention in group MP which continued to decrease. The mean score of anxiety level in group P showed a decrease, although the

decrease was still above the mean score of anxiety level in group MP.

Figure 4 shows the mean score of cortisol levels before and after the intervention, wherein the cortisol levels in group MP, group P, and group K showed a decrease. The decrease in cortisol levels in group MP was slighter compared to group P and group K.

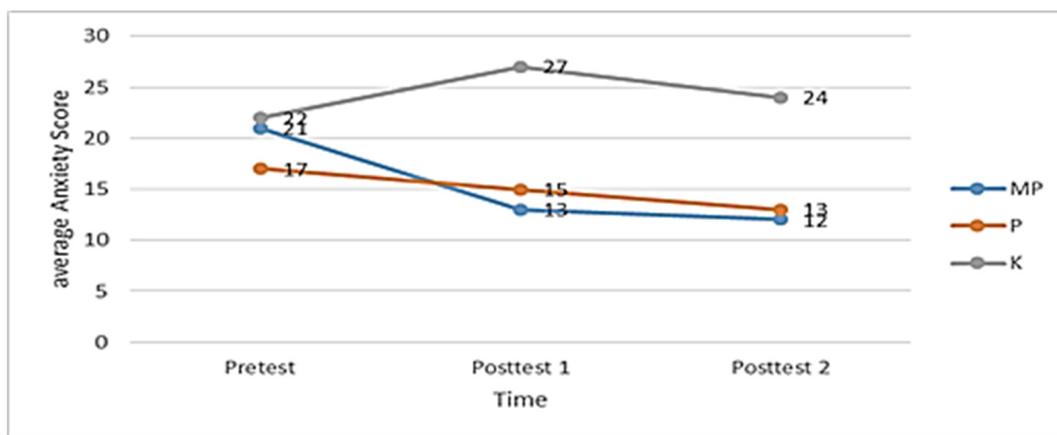


Figure 3: Graph of the mean scores of anxiety level before and after the intervention in the three groups.

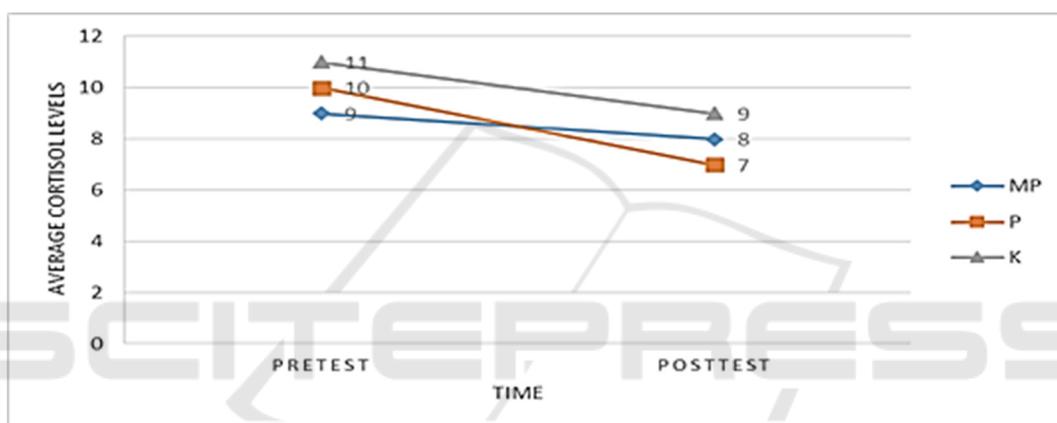


Figure 4: Graph of the mean scores of cortisol levels before and after the intervention in the three groups.

## 4 DISCUSSION

### 4.1 Spiritual Response

In group MP, there was a significant difference in the score of spiritual response between before and after the intervention, while in group K there was no difference between before and after the intervention. Figure 1 shows the graph of spiritual response scores before and after the intervention in group MP, which increased steeper than in group P; it means that lepers in group MP were able to adapt more quickly to increase their spiritual response than group P received psychoeducation only. At the same time, group K increased post-test 2 because religious people can learn from life experiences, even though it takes longer. According to Maramis (2011), humans can cope with the effects of stressors, called adaptability. However, if this ability fails, there will be a disorder,

so individuals need help to bring homeostasis back in this situation (Putra ST, 2011).

Relaxation of remembrance and prayer can widen the walls of blood vessels that shrink due to anxiety or stress. When remembrance occurs, a short shrink of the brain blood vessels due to chemical response, the supply of blood flow to the brain tissue decreases, the brain immediately responds to this condition by entering oxygen through the lungs to the brain accompanied by a widening of the diameter of blood vessels. Consequently, the supply of oxygen and glucose into the brain tissue increased rapidly (Anggraieni, Psikologi, Islam, & Mada, n.d.). The results of this study are in line with previous studies, which stated that evaluation of prayer interventions after 1 month showed a decrease in anxiety and depression, and spiritual states increased compared to baseline measures among depressed and anxious patients (Boelens, Reeves, Replogle, & Koenig, 2012) Various studies proved that one's level of faith

was closely related to good immunity, physical or mental (Hawari, 2016).

When someone always says positive sentences, positive sentences are believed to generate positive thoughts and emotions. Positive emotions can stimulate limbic work to produce endorphins, resulting in feelings of happiness and comfort and improving one's mood to energize a person (Patimah, S, & Nuraeni, 2015) Prayer and dhikr enhance personalities such as optimism, toughness, independence, and prominent personalities (Utami, 2017) Studies show that many patients believe spirituality plays an essential role in their lives. There is a positive correlation between the patient's spirituality and health, meaning that if the patient's spiritual state improves, his health will also get better (Jamshidi, Seif, & Vazinigheysar, 2014) Psychoeducation modification should be integrated into the leprosy prevention program as a holistic service that includes spiritual biopsychosocial aspects. Psychoeducation modification can increase intelligence and spiritual feelings, which impact the suffering of the leprosy patient's body so that it is very supportive of the leprosy healing process. (Cucu Herawati, 2019).

Figure 2 shows the mean scores of perceived stigma before and after the intervention in group MP and group P, decreasing. However, in group P, the decrease was not as steep as in group MP. Thus, it indicated that group MP could adapt to the perceived stigma better than those given only psychoeducation, while group K, which only received MDT therapy alone, tended to experience an increase in perceived stigma. Group MP and group P obtained a p-value of <0.005. It was concluded that there was a significant difference in the score of perceived stigma between before and after the intervention, while in group K the p-value was 0.054.

According to Susanto (2006), the knowledge of lepers is highly dependent on the level of education, where the higher the level of education will affect the process or pattern of thinking about something. (Putri & Utomo, 2016) Psychoeducation can increase knowledge about diseases to reduce the associated stigma. Higher knowledge about the disease can change the inherently perceived stigma. (Shin & Lukens, 2002) The results of this study are in line with several previous studies which stated that respondents in the psychoeducation group had lower values of an internal stigma than the control group among patients with schizophrenia (Ivezic, 2017) and spirituality significantly mediated the negative relationship between HIV stigma and psychological health. (Burr, Brennan-Ing, Karpiak, Dugan, &

Porter, 2015) The effect of psychological stigma on people can feel fear or shame, which can cause anxiety and depression (van Brakel, Voorend, Ebenso, Cross, & Augustine, 2011).

## 4.2 Anxiety Level

The results showed significant differences in anxiety level scores between before and after the intervention in group

MP and group P, whereas in group K there was no difference in anxiety level scores between before and after the intervention. Figure 3 shows a graph of the mean level of anxiety before and after the intervention in group MP which received psychoeducation plus prayer that continued to decrease. The mean score of anxiety level in group K in post-test 2 showed a decrease. However, the decrease was still above the mean score of group MP and group P. This is because religious people can finally take lessons from life experiences; patients can slowly adapt to decrease the anxiety level. However, if anxiety is left alone, no intervention will interfere with the body's immunity. According to the theory that anxiety is a response to affect disorders' emotions, individuals who experience anxiety to the level of panic can experience increased heart work and become easily exhausted. These conditions will worsen the immune response. (Nursalam, 2011).

Psychoeducation modification intervention in this study was a relaxation technique, where a relaxation technique helps regulate the emotional and physical of individuals regarding stress, anxiety, and depression. Physiologically relaxation provides a relaxed response, can reduce blood pressure, promote regular pulse and breathing, and loosen the muscles, make the mind calm so that someone can think more rationally. Remembrance and prayer to God can be the heart energy, motivate the heart, and become methods of realizing mental health (Rajab, 2013). Psychoeducation reduces anxiety, depression, and stress in pulmonary tuberculosis patients (Suryani, Hernawati, & Sriati, 2016); prayer interventions can reduce anxiety levels in preoperative patients (Rahmayati El, 2018). The relationship between religious coping and anxiety shows the importance of spiritual and religious elements in managing anxiety in HIV-positive patients (Tarakeshwar N, Hansen N, Kochman A, 2005; Tapper L, Rogers SA, Coleman EM, 2001).

### 4.3 Cortisol Levels

This study proved that psychoeducation modification could reduce cortisol levels among lepers. Figure 4 shows the graph of the mean score of cortisol levels before and after the intervention, the decrease in cortisol levels in group P was steeper compared to group MP. If it is continued, it has the potential to pass faster than the lower limit of the normal range of cortisol levels, so that it had a faster suppression effect compared to group MP; thus the MP effect was better. Cortisol has a normal range of a lower and an upper limit; if cortisol rises within the normal limit, an increase can lead to proliferation. If cortisol falls within the normal limit, there is still proliferation but slower. However, if cortisol is outside or below normal values, it will suppress the proliferation of lymphocytes, resulting in suppressed body endurance. According to Purba (2011), stress causes a decrease in unicellular function, and leukocyte proliferation and activation of the natural killer cell (NK) cytotoxic will be disrupted. The presence of high cortisol levels in serum can result in decreased quality and quantity of lymphocytes and the reduction of the thymus and the lymphoid system functions. (Putra, 2011).

Cortisol levels before and after the intervention in the three groups were in the normal category; this tendency was due to several factors, including the length of treatment related to the length of knowing the status of the disease. The mean duration of treatment among lepers in this study was 8 months, then the emotional reaction to stressors or leprosy they had was in the depression or receiving categories. The treatment duration will affect patients' understanding and perception factors with the consequences of the disease they suffer, thus causing the cortisol levels of the three groups to be within normal limits. The results of this study are in line with the results of previous studies, which stated that cortisol levels could be an indicator of the occurrence of deviant behavior. Based on the results of the study, it was found that all subjects had normal cortisol levels. (Kartika Rita, 2015).

Women who received psychoeducation had reduced cortisol levels at 12 months compared with a control group of breast cancer patients. After psychoeducational intervention with relaxation techniques, there was no significant difference between the cortisol levels in breast cancer patients groups. (Phillips, K. MS, et al. 1, 2008) Cortisol responses to stress and anxiety varied because cortisol may increase in response to acute stress or decrease with chronic stress. (Carvalho et al., 2014)

Spirituality interventions are not related to cortisol levels and symptoms of depression in HIV patients. (Carrico et al., 2006) An abnormal cortisol condition provides information that a person's psychological abnormalities occur, allowing destructive behavior changes (Shirtcliff & Essex, 2008).

The main finding in this study is that there is a psychoeducational modification intervention that has an impact on improving spiritual responses, perceptions of stigma, anxiety levels, and decreasing cortisol levels, which can encourage the proliferation of T lymphocytes, especially T cytotoxic (Tc), which is necessary for the body's resistance to leprosy to destroy cells infected with intracellular bacteria that cause leprosy so that it can affect the accelerated healing process of leprosy he suffers. So it is considered necessary to apply psychoeducational modification interventions into the leprosy control service program as a holistic service that includes spiritual biopsychosocial.

## 5 CONCLUSION

There was a significant difference in spiritual response scores ( $p = 0.0005$ ), perceived stigma scores ( $p = 0.002$ ), anxiety level scores ( $p = 0.0005$ ) between before and after the intervention in the MP group. There was no difference in cortisol levels before and after the intervention in the MP group; the value of  $p = 0.374$  was obtained. The decrease in cortisol levels in the MP group was slighter than in the P and K groups. Psychoeducational modification is more effective in improving spiritual response, perception of stigma, anxiety levels, and cortisol levels compared to psychoeducational interventions so that it can encourage the proliferation of T lymphocytes, especially cytotoxic T (Tc), which is needed for the body's resistance to leprosy to destroy cells infected with intracellular bacteria. The cause of leprosy, so that it can affect the healing process of leprosy he suffers.

The benefits of the results of this research are for the development of science as material for the development of holistic services that include biopsychosocial spirituality from the results of previous research so that it can enrich Hashanah regarding overcoming the stigma of leprosy in the community. Moreover, the practical benefits of the results of this study are expected to improve the quality of health service efforts comprehensively by adding psychoeducational modifications to the leprosy control program.

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