

## TIME OF DIABETIC ULCER FOOT SUFFERING AND DEPRESSION SYMPTOMS IN ULIN GENERAL HOSPITAL BANJARMASIN

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**Abstract:** *Diabetic foot ulcers are one kind of chronic complication of diabetes mellitus in the form of an open wound on the skin's surface and may be accompanied by local tissue death. Long term suffering of diabetic foot ulcers with physical and psychological changes may cause symptoms of depression. The aim of this study was to determine the correlation between long term suffering of diabetic foot ulcers and symptoms of depression in RSUD Ulin Banjarmasin. This was an analytic observational study with a cross sectional method. The samples were taken from systematic random sampling which resulted in 50 samples. Data was collected by interviewing samples with basic data questions to determine long term suffering of diabetic foot ulcers and Beck Depression Inventory-II (BDI-II) questionnaire to determine symptoms of depression. The data was analyzed by using chi square with 95% significance level. The results were 36 samples suffered for  $\leq 8$  weeks and 14 samples suffered for  $> 8$  weeks, meanwhile 31 samples with symptoms of depression and 19 samples without symptoms of depression. The result of statistic test found p value = 0,002. In conclusion, there is a correlation between long term suffering diabetic foot ulcers and symptoms of depression in RSUD Ulin Banjarmasin.*

**Keywords:** *long term suffering, diabetic foot ulcers, symptoms of depression, Beck Depression Inventory-II (BDI-II), RSUD Ulin Banjarmasin*

## **INTRODUCTION**

Diabetic foot ulcers are a complication of diabetes mellitus (DM) characterized by infection, tissue damage (ulceration) associated with neurologic and vascular disorders of the limb that may occur within a period of approximately 10 years if the hyperglycemic condition is uncontrolled.<sup>1,2</sup> Increased DM patient population in Indonesia is predicted there are 21.3 million people in 2030 that will have an impact on the increased incidence of diabetic foot ulcers as chronic complications of diabetes, where as many as 15-25% of people with diabetes will experience diabetic foot ulcers in life they.<sup>3,4,5</sup> In patients with type 2 diabetes, there will be risk 29 times the case of diabetic foot ulcers and risk of the old age of a 50% occurrence of diabetic foot ulcers.<sup>6,7,8</sup>

The prevalence of diabetic ulcer foot in Indonesia is about 15%, 30% amputation rate, 32% mortality rate and diabetic ulcer is the cause of hospital treatment which is 80% for DM.<sup>9</sup> The number of visits to the clinic for diabetic foot Ulin General Hospital Ulin 2014 a number of 3,608 patients, while in 2015 a total of 4,553 patients with visitors on average per month is 76 patients. It is seen that there is a trend of increasing number of cases of diabetic foot ulcers in Ulin General Hospital Banjarmasin.<sup>10</sup>

The time of suffering from diabetic ulcers foot along with the course of the disease has a risk of limb amputation, 3 times mortality and worse quality of life, tend to experience psychological burden, fear, frustration, and depression.<sup>11,12</sup> World Health Organization (WHO) states that depression within anguish and lost interest in life, is a health problem with the No. 4 spot in the world's largest resulting disability, physical limitations and personal skills as well as a social burden. By 2020 it is estimated that depression will become the first global burden of disease in developing countries.<sup>13</sup> In Indonesia, the mentally disturbed emotional nationally

was 6,0% (37.728 people from the subject being analyzed).<sup>3</sup>

Depression is a common in a population of disorders or medical illness. The incidence of depression disorder by 7-36%, in outpatients and 40% of inpatients.<sup>14,15</sup> Approximately 50-60% of cases of depression are not detected by a doctor, even though the morbidity and mortality associated with depression can be prevented approximately 70% with good handling.<sup>15</sup>

Diabetic foot ulcers significantly affect the lives of everyday patients and may have an impact on psychosocial disorders, which is diagnosed with a generalized depression disorder by 22,06% and an anxiety disorder by 7,58%.<sup>16,17</sup> Diabetic foot ulcer patient diagnosed with major depression by 25% and minor depression by 8%.<sup>18</sup> Previous research on the relationship between the degree of diabetic ulcers with the level of depression in patients with diabetes mellitus ulcers shows significant results. There are correlations between patients with diabetic foot ulcers and various levels of depressive symptoms.<sup>19</sup> In addition, the correlations of time of diabetic suffering and depressed levels of diabetes mellitus show that longer suffering from diabetes the symptoms of depression will decrease.<sup>20</sup>

Based on the above exposure, there is still limited research on the duration of diabetic foot ulcers as independent variables and symptoms of depression as a dependent variable. In addition, some of the existing research does not control confounding variables as done in this study, among other things: the time-suffering type 2 diabetes mellitus, diabetic foot ulcers grade, time suffering from type 2 diabetes, age, education level, socioeconomic level, drugs consumption associated with depressive symptoms and honesty sample. Therefore, this research needs to be investigated because Ulin General Hospital Banjarmasin as related institution and referral center of diabetic

ulcers foot treatment in South Kalimantan experienced the increasing trend of cases of diabetic ulcers foot and has not done research about the old relationship suffered diabetic ulcers foot and symptoms of depression in Ulin General Hospital Banjarmasin theoretically.

## RESEARCH METHODS

This study was observational analytic with cross-sectional approach. The population in this study were all patients with diabetes mellitus (DM) type 2 with diabetic ulcer foot complications that come to Diabetic Foot Clinic of Ulin General Hospital Banjarmasin from July until September 2016 which have the following criteria:

1. Patients suffering from type 2 diabetes disease for  $\geq 10$  years with complications of diabetic ulcers foot in stage II and III in the Diabetic Foot Clinic of Ulin General Hospital Banjarmasin.
2. Age 46-65 years.
3. Family economic status  $\leq$  PMW (Provincial Minimum Wage) South Kalimantan in 2016 amounted to  $\leq$  IDR. 2.085.050, -
4. Elementary education level (SD) - Junior High School or equivalent.
5. Does not consume drugs that related to depression case, which is interferon (IFN)-alpha, corticosteroid doses  $> 80$  mg/day, and digitalis or digoxin.
6. Willing to be a sample by filling out informed consent. L-MMPI scores with the number of "no"  $< 10$

indicating that the sample, to be honest.

Samples were taken by systematic random sampling with a sample of a correlational study by Fraenkel and Wallen, which is got 50 people.

The instrument used was the data form (stuffing baseline) samples, questionnaires scale and Lie lie Minnesota Multiphasic Personality Inventory (LMMPI) questionnaire scale and Beck Depression Inventory-II (BDI-II) questionnaire scale, a scale used to determine the symptoms of depression.

In this study, the time of suffering diabetic ulcers foot were classified into two types:  $\leq 8$  weeks and  $> 8$  weeks. While the symptoms of depression were measured by a BDI-II questionnaire with the categorizes: the score 0-13 means without depression and 14-63 means with depression.

The data obtained will be analyzed statistically by computerized test using computer statistics program. Because the independent variables and the dependent variable in the form of categorical data, then they were analyzed using Chi Square test statistic with 95%, followed by calculating the odds ratio (OR).

## RESULTS AND DISCUSSION

Research data on a sample of patients with diabetic ulcers foot with basic data fields for filling, L-MMPI questionnaire and BDI-II in Diabetic Foot Clinic Ulin General Hospital Banjarmasin.

Table 1 Distribution of Research Subject Characteristics by Sex

Gender	n	%
Men	16	32
Women	34	68
<i>Total</i>	<i>50</i>	<i>100</i>

Table 1 shows that the characteristics of research subjects based on gender have more women than men. The data above

show that diabetic ulcers foot are more common in female patients than men. This is because the hormones estrogen and

progesterone affect cells in response to insulin. At the time of or before the occurrence of *menopause*, changes in hormone levels will trigger fluctuations in blood sugar levels of diabetic foot ulcer incidence is higher in women than men.<sup>21,22</sup>

Data analysis in this research was by using univariate and bivariate analysis.

This analysis is used to describe the distribution of the number of each variable in this study. The free variable is long suffered diabetic foot ulcers and the dependent variable is a symptom of depression.

Table 2 Distribution of Research Subjects Based on the time of Suffered Diabetic Ulcers Foot in Ulin General Hospital Banjarmasin

The Time of Suffered Diabetic Ulcers Foot	Frekuensi (n)	Percentage (%)
≤ 8 weeks	36	72
> 8 weeks	14	28
Total	50	100

Table 2 shows that the study subjects with prolonged suffering from diabetic

ulcers foot had more frequency than the length of suffering > 8 weeks.

Table 3 Distribution of Research Subjects Based on Symptoms of Depression in Diabetic Foot Clinic Ulin General Hospital Banjarmasin

Depression Symptoms	Frekuensi (n)	Percentage (%)
With depression	36	72
Without depression	14	28
Total	50	100

Table 3 shows that there were more subjects with depression symptoms than those who did not have depressive symptoms. The state of illness in patients with diabetic ulcers foot will make changes in their psychological, physical, economic and psychosocial lives. These

things are the stressors that can lead to the occurrence of depressive symptoms in patients with diabetic ulcers foot.<sup>23</sup> This is went as well as Ratna's research which use BDI-II instruments in diabetic ulcers foot patients with depression symptoms by 62.1%.<sup>24</sup>

Table 4 Old Relationship Suffered Diabetic Foot Ulcers with Depression Symptoms at RSUD Ulin Banjarmasin

Time of Suffering from Diabetic Ulcer Foot	Depression Symptoms				Total	
	Depression		Without Depression			
	n	%	n	%	n	%
≤8 Sunday	27	75	9	25	36	100
> 8 Weeks	4	28.6	10	71.4	14	100

$p = 0.002$  ( $p < 0.05$ )

OR = 7.5

Based on data from table 4, it is known that the study sample with long

suffering diabetic foot ulcer ≤8 weeks more experienced symptoms of depression

while in the sample with long diabetic foot ulcers > 8 weeks more who do not experience symptoms of depression. The results were analyzed with *chi square* and generating  $p = 0.002$  where  $p < \alpha$  (0.05) which means there is a relationship between long-suffering diabetic foot ulcers with symptoms of depression. The *odds ratio* of 7.5 means that the patient's acute diabetic foot ulcers ( $\leq 8$  week) have a tendency to suffer from symptoms of depression by 7.5 times greater than the patients of chronic diabetic foot ulcers (> 8 weeks).

Time of suffering from diabetic ulcers foot along with the course of his illness who has a risk of limb amputation, three times of mortality and poorer quality of life, tend to experience psychological burden, fear, frustration, and depression.<sup>11,12</sup> The relationship between the time of suffering from physical illnesses such as hypertension and diabetes mellitus type 2, is correlated with depressive symptoms. In Amalia research showed that there is a relationship between long-term diabetes mellitus type 2 with the level of depression in dr. Soebandi Regional Hospital Jember.<sup>20</sup> In the Wulandari's study, it was also showed a correlation between the time of suffering hypertension and the level of depression in dr. Soebandi Regional Hospital Jember.<sup>25</sup>

A person who have been diagnosed with chronic diabetic ulcers foot will inevitably lead to an different emotional situation from their emotional situation at the beginning of a diabetic ulcer foot diagnosed. Diabetic ulcer foot disease that was suffered by these people can cause stress, and then lead to symptoms of depression.<sup>12</sup>

According to Hans Selye theory, when stressors such as physical illness in patients with chronic diabetic ulcers foot, the person will be able to handle it with good adaptation mechanisms. If people consider life events and problems that happened is a challenge that must be faced

and will strengthen the personality is called eustress.<sup>26</sup>

The results of the study show that in the time of suffering samples in  $\leq 8$  weeks had more experienced depression symptoms than the long suffering until > 8 weeks. This result had same result with Pearson's study explaining the length of chronic disease such as chronic diabetic ulcers foot correlates with depression levels. However, the longer the diabetic ulcer foot has been suffered, it becomes less depressed. It indicates that patients with diabetic ulcers foot can adapt to their present life and diabetic foot ulcers do not dramatically affect their lives.<sup>12</sup>

When the stressor that the causes of stress in patients with diabetic ulcers foot is a disease, then patients with diabetic ulcers foot should be able to eliminate the conditions imposed on them, so they need a way of adaptation mechanisms to make their manageable condition.<sup>27</sup> The ability of a coping mechanism that has not happened on their stressors in the form of physical illness on patients with acute diabetic ulcer foot for achieving adaptation mechanism occurs within 3 months.<sup>28</sup> The state of stress in patients with diabetic ulcers foot is because they deny or do not receive when he learned he was diagnosed with diabetic ulcers foot, and it is difficult for people with life as people with diabetic ulcers foot that can lead to symptoms of depression.<sup>29,30</sup> This is what happens to the sample with the time of suffering from diabetic ulcers foot for  $\leq 8$  weeks who had many symptoms of depression.<sup>28,29,30</sup>

In  $\leq 8$  weeks diabetic ulcer foot patients with potentially depressed symptoms of psychiatric disorders that can be diagnosed according to PPDGJ-III, but this potential psychiatric disorders is less occurred than in patients with diabetic foot ulcers who are > 8 weeks old.<sup>11</sup> While the sample suffering from diabetic ulcers foot  $\leq 8$  weeks did not experience symptoms of depression can accept the situation (fight) and adapt better when diagnosed patients with diabetic ulcers foot.<sup>11,12</sup>

At samples with suffering from chronic diabetic ulcers foot for > 8 weeks that did not get many depression symptoms, because many patients can adapt to the current situation and can reduce the perceived stress. Therefore, some of them can recover from symptoms of depression.<sup>23,31</sup> According to Rusli, the length of suffering from diabetic ulcers foot would affect experience, knowledge of individuals in treatment, and wound treatment of diabetic ulcers foot, which means that patients with the longer time having diabetic ulcers foot will be more experienced and most of them can adapt to the current situation that they feel.<sup>32</sup> It is seen in this study that showed the sample who suffered from diabetic ulcers foot for > 8 did not experience any depression symptoms. While in samples who suffered from diabetic ulcers foot for > 8 weeks, they experienced depression symptoms with greater potential for psychiatric disorders that could be diagnosed according to PPDGJ-III than those suffering from diabetic ulcers foot for ≤ 8 weeks.<sup>11,12</sup>

In biological terms, the pathophysiology of depression involves the interaction of a decrease in monoamines (serotonin and noradrenaline), neurotransmitters, decreased BDNF (brain-derived neurotrophic growth factor), dysregulation of the HPA axis and changes in the function and structure of the prefrontal cortex and hippocampus. Structural changes in the prefrontal and hippocampal cortexes are more due to abnormalities in neuroplasticity than neurodegeneration. Dysregulation of the HPA axis is widely responsible for this abnormality.<sup>33</sup> Increased activity of the HPA is a clear connection between depression and biology of chronic stress.<sup>34</sup> Increasing levels of circulating cortisol will activate receptors in the brain to stimulate gene transcription and protein synthesis. However, the persistent hypercortisolemia chronic stress will affect the opening of

ion channels that allow the inflow of calcium for neurons activation and can cause damage to the neurons. A decreasing in BDNF concentration may decrease the neuronal tissue in the hippocampus as well as the direct effects of hypercortisolemia and decreased activity of monoamine neurotransmitters.<sup>33</sup>

The formation of the hippocampus is an area that rich for mineralocorticoid receptors and glucocorticoid receptors. The function of these receptors is a maintenance of basal HPA alignment and setting negative feedback from the release of glucocorticoids during the stress response. Therefore, especially in the hippocampus is more susceptible to the effects of stress and depression.<sup>35</sup> In addition, the hippocampus is one of two areas of the brain where neurogenesis takes place in the neo-brain maturation so high role in neuroplasticity.<sup>33</sup> In the chronic stress of impending changes in the structure of the hippocampus, a decrease of neuroplasticity and neurogenesis, deficiency of a protein associated with the neuroplasticity that PSA-NCAM. Suffered brain plasticity and ability to adjust to changes in brain volume so that the body can homeostasis although not as usual, especially in chronic stress.<sup>35</sup> Adaptive neuroplasticity process is including the formation of new neurons, glial cells, and changes to one of several processes (synapse formation and elimination, dendrites remodeling, axon growth and neuron shortening).<sup>36</sup> This function of process is the brain can adaptively optimize their function beside of its limitation.<sup>37</sup>

From the results of the study, it was found that diabetic ulcer foot patients were more likely to experience depressive symptoms at the beginning of illness (≤8 weeks) than those at > 8 weeks. It may be related to brain plasticity that has homeostasis under conditions of chronic stress, though not as usual, but this requires further study. In addition, this may be due to bias population, where

chronic diabetic ulcer foot patients who did not get treatment at Ulin General Hospital Banjarmasin were not investigated.

It takes early action of early psychiatric diagnosis and interventions treatment if psychiatric disorders such as depression are occurred. This is in accordance with Nita's (2010) study which suggests that early intervention in depressive disorder shows a decrease in BDI-II score and a faster improvement than slow intervention.<sup>38</sup>

Limitations of this study are researchers were difficult to control confounding variables, those were gender, psychological vulnerability, and other stressors which patients got diabetic ulcers foot, are a risk factor for depressive symptoms in patients suffering from diabetic ulcers foot. Gender is one of the confounding variables which are difficult to control, considering the research conducted in cross-sectional method and limitations of the research samples. Psychological vulnerabilities related to how individuals deal with life stressors such as illness in patients with diabetic ulcers foot. Limitations of the study with cross sectional method during the research that the distribution of a sample of patients with diabetic ulcers foot is unevenly distributed between time of suffered for  $\leq 8$  weeks and  $> 8$  weeks.

In addition, the limitation of this study is the search for samples in the public indirectly so that the data obtained may be biased due to did not get to examine the overall population suffered from symptoms of depression in patients who suffered from diabetic ulcers foot but did not get treatment at Diabetic Foot Clinic in Ulin General Hospital Banjarmasin as a comparison of data with patients suffering from diabetic ulcers foot. The obstacle of this research is that the researcher have to wait for the patient after the diabetic ulcer foot treatment to be used as the research sample and sometimes could be have clash at the time of the lecture schedule. In addition, some

respondents who entered the research criteria refused to participate in this research.

## CONCLUSIONS

Based on this research, it can be concluded that there is a significant relationship between the time of suffering for diabetic ulcers foot with symptoms of depression in Ulin General Hospital Banjarmasin.

There are some suggestions based on this research. For the related institution, the health workers, in general, is expected to increase education about prevention of diabetic ulcer foot complication in type 2 DM patient. For health officer should give motivation, improve standard information in care and more complication continued about the dangers of diabetic ulcers foot to accelerate the process of acceptance and adaptation to the state of illness, and may increase alertness in recognizing depression in patients from early onset of diabetic ulcers foot through depression screening in order to advise patients to be referred to a psychiatrist for diagnosis and treatment if interference from psychiatry. For future research is expected to develop further research, especially regarding other risk factors that can cause symptoms of depression in ulcers foot patients. For people especially patients who suffer diabetic foot ulcers to try to improve their ability to adapt from the beginning suffered diabetic foot ulcers by closer to God and more positive thinking. Their family and community support in patients with diabetic foot ulcers can help patients to express their feelings, emotional and financial support to help the better outcome.

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