

# Correlation of Peripheral Vascular Status with Quality of Life Type 2 Diabetes Mellitus Patients (Measured By Ankle Brachial Value Index)

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**Abstract**---One of the complications of Type 2 diabetes, which affects the peripheral nervous system, is the Peripheral Artery Disease (PAD). It is often associated with reduced physical abilities and functional decline. This condition can lead to decreased quality of life (Health Related Quality Of Life). This study design was cross-sectional. The sample size in this study was 44 people who were recruited by purposive sampling technique. Independent variable is the value of ABI and the dependent variable is the quality of life. The collection of data were used for the value of ABI by measuring the systolic blood pressure foot (ankle: A) with systolic blood pressure arm (brachial: B), then compared by using the formula:  $TSA / TSB$  whereas the quality of life using instruments DQLCTQ-R (Diabetes Quality of Life Questionnaire-Related Clinical Trial). Data were analyzed using Chi Square test. The results showed no significant association ABI values and quality of life with diabetes mellitus type 2. The value of the ABI can be linked to the quality of life of patients with Type 2 diabetes.

**Keywords:** vascular status, ABI values, quality of life and diabetes mellitus type 2

## I. INTRODUCTION

Diabetes is a metabolic disorder that is most common in the world. The prevalence of diabetes in adults has increased in recent decades[1][2]. Urbanization has encouraged people to lifestyle changes are dramatic, especially in developing countries[3]. Long-term complications of diabetes are diabetic nephropathy, neuropathy, retinopathy, diabetic foot, Charcot joints and sexual dysfunction[4][5]. People with diabetes can increase the risk of cardiovascular disease, peripheral vascular and cerebrovascular[6].

One of the complications of Type 2 diabetes that affects the peripheral nervous system is the Peripheral Artery Disease (PAD). Peripheral Artery Disease is a condition where there are lesions in blood vessels, causing blood flow in the arteries that supply blood to the extremities is limited and is also greatly feared disease because it affects the quality of life and

social functioning of patients[7]. The involvement vascular of here a little bit unique, because it is most often in the veins below the knee and is almost always accompanied by neuropathy. Therefore, it is often asymptomatic or only feels the complaint is unclear. Unlike the classic symptoms of PAD is as intermittent claudication. As a consequence of their neuropathy, patients with PAD and diabetes often come too late and already with symptoms rest pain, ulcers to gangrene[8].

Ankle-brachial index (ABI) is a screening tool for PAD major diagnostics and reflects the ratio of systolic blood pressure at the ankle and brachial[9]. The research result Escobedo[10] reported that people with diabetes more than 20 years can affect the value of ABI of  $<0.9$  with  $OR = 1.54$  which means the longer a person suffering from diabetes mellitus can affect the value of ABI of 1.54 times, The lower the value ABI will improve the high risk of vascular disease[11]. In these conditions, the patients often complain of claudication. Meanwhile, if the index has reached  $<0.5$ , sufferers usually experience claudication at rest[7].

Peripheral artery disease has symptoms such as asymptomatic or with symptoms of ischemic pain, wound with a long healing process and tissue loss and tissue loss. If there was the absence of symptoms, PAD is often associated with reduced physical abilities and functional decline. This condition can lead to decreased quality of life (Health Related Quality Of Life). PAD diagnostic test with ABI values that accurately reflect changes in quality of life (HRQOL). This relates to the conditions experienced by the patient[12]. The problem is what encourages researchers to conduct research on the correlation of peripheral vascular status (measured by the value of ABI) Ankle Brachial Index (ABI) with the quality of life of patients with diabetes mellitus type 2.

## II. METHODS

This study design was cross-sectional. The population in this study were all patients with type 2 diabetes mellitus in PERSADIA Branch of Surakarta. The sample size in the study was 44 people by using purposive sampling technique. Criteria for the sample in this study were: (1) the inclusion criteria: Patients with type 2 diabetes mellitus, age  $\geq 50$  who have a history of DM, diabetes mellitus  $\geq 5$  years old, willing to be responders and patients who can read and write; (2) the exclusion criteria: suffered DM  $<5$  years, severe pain associated with injuries to the lower extremities. Independent variable in this study is the value of ABI. The dependent variable in this study is the quality of life. Data collection methods used to value the ABI by measuring the systolic blood pressure foot (ankle: A) with systolic blood pressure arm (brachial: B), then compared by using the formula:  $TSA / TSB$ . Whereas the quality of life using instruments DQLCTQ-R (Diabetes Quality of Life Questionnaire-Related Clinical Trial) of Nagpal et al., (2010) which has been modified by the researcher. Analysis of the data used is Chi Square test. Ethical clearance was obtained from the Research Ethics Committee of Health and Medical Research Hospital Dr. Moewardi Surakarta / Medical Faculty of Sebelas Maret University of Surakarta.

## III. RESULTS

TABLE I. RELATIONSHIP BETWEEN ANKLE BRACHIAL INDEX (ABI) VALUE AND THE QUALITY OF LIFE IN PERSADIA SURAKARTA ON FEBRUARY 2017.

ABI's Score	Quality of Life					
	Poor		Good		Total	
	f	%	f	%	f	%
Normal	6	13.6	16	36.4	22	50
Light ischemic	6	13.6	11	25	17	38.6
Medium vascular obstruction	5	11.4	0	0	5	11.4
<b>Total</b>	<b>17</b>	<b>38.6</b>	<b>27</b>	<b>61.4</b>	<b>44</b>	<b>100</b>
<b>P = 0.000</b>						
<b>p = 0.010</b>						

Based on the above table, 16 people (36.4%) had normal ABI values with good quality of life, 11 (25%) had mild ischemia with good quality of life, and 5 (11.4%) had moderate vascular obstruction with the poor quality of life. Statistical analysis chi-square test with a significance level of  $\alpha < 0.05$  is obtained  $p = 0.010$ , which means no significant association ABI values and quality of life of patients with Type 2 DM.

## IV. DISCUSSION

Peripheral Artery Disease by DM happened 4 times more often than non-DM patients. In addition to diabetes, the risk factors that facilitate the occurrence of peripheral arterial occlusive disease are smoking, hypertension, and hyperlipidemia. The peripheral artery that is often compromised tibial artery and peroneal artery, especially the area between the knee and ankle joints. Ischemia causes disruption of the distribution of oxygen and nutrients so difficult to heal ulcers[13].

Peripheral Disease Artery have damaging effects of functional status and quality of life. The severity of disease faced by patients with PAD is functional impairment and decreased health-related quality of life. Many patients with PAD who have been classified as asymptomatic actually have a significant functional impairment even without symptoms of claudication. Although patients receive effective treatment will not change "claudication" which is very limited and functional effects[14]. Research Sonter and Chuter (2016), reported that the value of ABI with the quality of life have a meaningful relationship. In the lower extremities, peripheral arterial disease (PAD) had asymptomatic symptoms or with symptoms of ischemic pain, wound with a long healing process and tissue loss. Even in the absence of symptoms, PAD is associated with reduced physical abilities and functional decline. This condition can lead to decreased quality of life (Health Related Quality Of Life). PAD diagnostic test with ABI greater accuracy may reflect changes in quality of life (HRQOL), it is associated with conditions experienced[12].

The quality of life can be defined as the degree to which a person enjoys the possibilities in his life. Enjoyment has two components, namely the experience and satisfaction. Owners or achievement of some of the characteristics and possibilities are the results of chance and limitations of each person in his life that reflect personal interaction environmental factors[15]. The quality of life is considered as a subjective perception of a multidimensional set up by individuals against physical, emotional, and social skills including cognitive ability (satisfaction) and emotional components / happiness[16].

Patients who have suffered DM  $\geq 11$  years have a better self-efficacy compared with patients who suffer from diabetes  $<10$  years. This is because the patient has experienced in managing the disease and have good coping[17]. This is in line with the opinion of Donald et al., (2012) a long duration of diabetes mellitus accompanied with compliance and proper blood sugar control in spite of complications will certainly make the patient have a good quality of life and well-maintained.

## V. CONCLUSION AND RECOMMENDATION

ABI value showed a significant relationship with quality of life of patients with diabetes mellitus type 2.

It is necessary to conduct further research to determine the development pathogenesis ABI value on quality of life of patients with Type 2 diabetes mellitus.

Health education in patients with diabetes mellitus in the prevention (early detection of complications) as well as the treatment of complications of diabetes mellitus DM For patients further improved.

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