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Evaluation of Changes in the Quality of Life of Patients with Peripheral Arterial Disease (PAD) Following Successful Revascularization Using Endovascular Techniques with the Vascular Quality of Life Questionnaire-6 (Vascuqol-6) at Dr. Cipto Mangunkusumo National General Hospital

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ABSTRACT

Background: Peripheral arterial disease (PAD) is a chronic vascular disease that significantly affects physical function and quality of life. Endovascular revascularization is a primary treatment modality for symptomatic PAD; however, evaluation of its success should include patient-reported outcomes, such as quality of life. This study aimed to evaluate changes in quality of life among patients with PAD after endovascular revascularization using the VascuQoL-6 instrument. Methods: This was an analytic observational study with a pre–post design involving patients with PAD who underwent endovascular revascularization at Dr. Cipto Mangunkusumo National General Hospital. Quality of life was assessed using the VascuQoL-6 before and one month after the procedure. Changes in scores were analyzed using paired comparative tests. Results: A total of 32 patients were enrolled in this study. The mean ankle-brachial index (ABI) increased after endovascular revascularization compared with before the procedure. The median total VascuQoL-6 score increased significantly after the procedure, with all patients showing improvements in quality of life. Improvements occurred across all quality-of-life domains, with the greatest improvements observed in the activity and pain domains. Conclusion: Endovascular revascularization effectively improved the quality of life of patients with PAD based on the VascuQoL-6 instrument, particularly in the activity and pain domains.

INTRODUCTION

Peripheral arterial disease (PAD) is a manifestation of systemic atherosclerosis characterized by narrowing or occlusion of the lower-extremity arteries, which can cause a spectrum of symptoms ranging from intermittent claudication to chronic limb-threatening ischemia (CLTI) (Fowkes et al., 2013). Globally, PAD affected approximately 236 million people in 2015, a sharp increase from 202 million in 2010 (Fowkes et al., 2013). The prevalence of PAD is estimated at 3–12% in the general population and increases to >20% in individuals older than 80 years (Aboyans et al., 2018). CLTI, the most severe form of PAD, occurs in approximately 1–2% of patients with PAD (Sidawy & Perler, 2018). Once CLTI has

progressed, the prognosis is very poor if left untreated: approximately 20% of patients require major amputation within 1 year, and the 1-year mortality rate reaches 25% (Aboyans et al., 2018; Richard et al., 2025). Even with revascularization therapy, patients still have a high 5-year mortality rate, reportedly between 50% and 60%, which is comparable to that of lung cancer or congestive heart failure (Sidawy & Perler, 2018).

PAD is not only associated with an increased risk of major adverse cardiovascular events (MACE) but also significantly affects physical function, mobility, independence, and quality of life. Patients with PAD often experience walking limitations, leg pain, reduced social activity, and psychological distress due to progressive functional limitations (Abaraogu et al., 2018; Fowkes et al., 2017; Rezvani et al., 2022). Even in the non-CLTI stage, PAD has been shown to significantly reduce health-related quality of life (HRQoL), comparable to other chronic diseases such as heart failure or chronic obstructive pulmonary disease (Korosoglou, 2025). According to global clinical guidelines, including Rutherford's Vascular Surgery and Endovascular Therapy, PAD can be managed with revascularization interventions to reduce symptoms, salvage the limb, and improve patients' quality of life, either through open surgery or endovascular therapy. The development of endovascular revascularization techniques has made endovascular therapy a preferred option because of its minimally invasive nature, lower complication rates, and shorter recovery time (Sidawy & Perler, 2018).

Although the success of revascularization has traditionally been measured using clinical outcomes such as vascular patency, limb salvage rate, and wound healing, comprehensive evaluation should also include patient-centered outcomes, namely patient-reported outcomes (PROs). PROs provide unique insights into the impact of disease and intervention on patients' quality of life, including physical function, emotional status, and social well-being (Black et al., 2016; Cella & Stone, 2015; Fayers & Machin, 2015). This is crucial because favorable clinical outcomes, such as improved perfusion and wound healing, do not always correlate perfectly with improved patient experience. One important parameter in evaluating the success of therapy in PAD is patients' quality of life ("Guidance for Industry," 2006).

A widely used instrument for assessing quality of life in patients with PAD is the Vascular Quality of Life Questionnaire-6 (VascuQoL-6). The VascuQoL-6 is a concise instrument specifically designed for vascular disease and is widely used to assess quality of life in patients with PAD (Larsen et al., 2017, 2020; Nordanstig et al., 2017). It consists of six questions covering pain, physical activity, symptoms, social limitations, and overall well-being. The VascuQoL-6 has been shown to be valid and reliable globally in detecting changes in patients' quality of life and is more practical for use in clinical research and daily practice (Morgan et al., 2001).

The use of the VascuQoL-6 to evaluate patient satisfaction after revascularization has been widely validated in various countries. A Swedish study by Nordanstig et al. (2014), through the Invasive Revascularization or Not in Intermittent Claudication (IRONIC) Trial, showed that patients undergoing invasive interventions, both endovascular and open surgery, experienced significant improvement in health-related quality of life (HRQoL) after 1 year compared with the noninvasive therapy group. This improvement was particularly evident in the total Vascular Quality of Life Questionnaire (VascuQoL) score and in three of its five domains, with a p-value of <0.01, as well as a significant increase in intermittent walking distance in the intervention group (Nordanstig et al., 2014). Furthermore, a study by Larsen et

al. (2017) in Norway confirmed the validity and sensitivity of the VascuQoL-6 as a disease-specific measurement instrument that can be used in clinical practice and vascular registries. This study involved patients with intermittent claudication and critical limb ischemia who were followed for 1 year after conservative and invasive therapy. The results showed a significant improvement in the total VascuQoL-6 score in both groups, with a mean increase of +2.20 points in the conservative group and +4.68 points in the group undergoing endovascular or surgical procedures. Fifty-six percent of patients in the intervention group experienced a score increase of more than four points, compared with 36% in the conservative group, confirming the ability of the VascuQoL-6 to capture meaningful clinical changes after revascularization (Larsen et al., 2017). Meanwhile, a study in Indonesia used the Indonesian-translated VascuQoL-6 questionnaire, and its validity has been tested.

In the context of this study, the VascuQoL-6 was used to evaluate changes in quality of life before and after a rehabilitative intervention consisting of walking exercise and a combination of walking exercise and kinesiology taping for 4 weeks. The results showed that among subjects who received walking exercise alone, there was an increase in the VascuQoL-6 score, reflecting improvements in walking function and daily activities, although walking pain did not decrease significantly. Among subjects who received a combination of kinesiology taping and walking exercise, the increase in the VascuQoL-6 score was more optimal, in line with decreased walking pain and increased activity tolerance, allowing patients to perform walking activities more comfortably and independently. These findings confirm that the VascuQoL-6 score is strongly influenced by pain and walking ability; therefore, this instrument is sensitive to interventions that not only improve functional capacity but also reduce pain symptoms. Thus, the use of the VascuQoL-6 in this study is relevant, responsive, and clinically meaningful for assessing the success of rehabilitative interventions in patients with PAD (Puteri et al., 2024).

Assessment of quality of life in patients with PAD is not limited to the total score but should also be analyzed based on each of its constituent domains. Previous studies have shown that improvements in quality of life after revascularization do not occur evenly across all domains but are more prominent in physical aspects, such as pain and activity ability, than in social or emotional aspects. Therefore, domain-specific analysis of the VascuQoL-6 instrument is important to identify the aspects of quality of life that are most responsive to intervention and to provide a more comprehensive picture of the clinical impact of endovascular revascularization in patients with PAD (Shermatov & Zufarov, 2025).

Although the use of the VascuQoL-6 has been widely validated in various countries, data on changes in quality of life among patients with PAD after endovascular revascularization in Indonesia remain very limited. Furthermore, differences in sociodemographic characteristics, education levels, and variations in access to endovascular technology due to limitations in healthcare financing may result in less comprehensive endovascular management and potentially influence patients' perceptions of the benefits of therapy. Therefore, research is needed to evaluate changes in quality of life among patients with PAD after successful endovascular revascularization using the VascuQoL-6 instrument in the context of healthcare services in Indonesia, particularly at national referral centers such as Dr. Cipto Mangunkusumo National General Hospital.

METHOD

Research Design

This study was a prospective observational study conducted among patients with peripheral arterial disease (PAD) who underwent endovascular revascularization at Dr. Cipto Mangunkusumo National General Hospital.

Place and Time of Research

This study was conducted at the Department of Vascular and Endovascular Surgery, Dr. Cipto Mangunkusumo National General Hospital, Jakarta, Indonesia, over a four-month period from January to April 2026.

Population, Sample, and Sampling Techniques

The target population in this study was all PAD patients undergoing endovascular revascularization. The accessible population in this study was PAD patients undergoing endovascular revascularization at Dr. Cipto Mangunkusumo National Hospital during the study period.

The sample size in this study was determined based on the calculation formula for the paired t-test, because this study compared quality of life scores (VascuQoL-6) before and after endovascular revascularization in the same patient group. The calculation formula used is: n=((Z1-α/2+Z1-β)×SDd/Δ)^2 with the following conditions: - α = 0.05 ($Z_{1-a/2}$ = 1.96) - Power = 80% ($Z_{1-\beta}$ = 0.84) - Δ = expected mean change in VascuQoL-6 score = 3 points - SDd = standard deviation of score difference = 5 points (based on the study of Fakhry et al., 2018; Patel et al., 2020)

Thus, a minimum sample size of 22 patients was obtained. Considering the possibility of drop-out of 15%, the minimum sample size to be recruited in this study was **26 patients.**

Inclusion Criteria they are :

1. Patients with a diagnosis of lower extremity PAD established based on a combination of clinical manifestations and objective evidence of ischemia as recommended by the Global Vascular Guidelines (GVG), include:
    a. Clinical symptoms of PAD (intermittent claudication, rest pain, ischemic ulcers, or gangrene), and/or
    b. Objective evidence includes ABI <0.90, toe pressure <60 mmHg, decreased $TcPO_2$, or findings of arterial stenosis/occlusion on vascular imaging.
2. PAD patients with clinical severity Rutherford category 2–6 or Fontaine stage II–IV, who clinically and anatomically require revascularization.
3. Patients undergoing primary endovascular revascularization of the lower extremities (inflow and/or outflow segments) at Dr. Cipto Mangunkusumo National General Hospital.
4. Patients with successful endovascular revascularization, defined as:
    a. residual stenosis <30% on final angiography;
    b. there are no major complications (flow-limiting dissection, acute thrombosis, or perforation); and
    c. achievement of continuous inline flow distally, at least to one tibial or pedal artery with adequate distal filling.

5. Adult patients aged ≥18 years.
6. Patients who are willing to participate in the entire series of studies and sign the *informed consent form* .

Exclusion Criteria:

1. Patients with severe cognitive impairment, visual impairment, or hearing impairment that hinders understanding and valid completion of the VascuQoL-6 questionnaire.
2. Patients with terminal comorbidities (e.g., end-stage malignancy or terminal organ failure) that predominantly affect quality of life and are not directly related to peripheral arterial disease.
3. Patients with severe systemic infections (active sepsis) or other acute medical conditions that cause unstable quality of life and do not allow for a representative evaluation.
4. Patients who underwent major amputation within ≤14 days after revascularization, as it was not possible to perform longitudinal assessment of changes in quality of life post-intervention.
5. Patients who refuse or are unable to undergo follow-up will be required for at least 1 month post-procedure.

Sampling Techniques

This study used a consecutive sampling method, in which all patients who met the inclusion and exclusion criteria during the study period were recruited sequentially until the required sample size was achieved.

Research Variables

- **Independent variables** : VascuQoL-6 scores pre and post action
- **Dependent variable** : change in quality of life score based on VascuQoL-6

Research Procedures

This research began with the proposal development process and the development of the background, problem formulation, and research methodology. After receiving approval from the supervisor, the proposal was submitted for ethical review. to the Health Research Ethics Committee of the Faculty of Medicine, University of Indonesia/Dr. Cipto Mangunkusumo National General Hospital **.** After ethical clearance was obtained, the research was carried out with the following steps:

1. Selection of research subjects according to inclusion and exclusion criteria
2. Explanation of research and *informed consent*
3. **Baseline Stage (Pre-intervention)**
    - Completion of **the VascuQoL-6 questionnaire** before revascularization.
    - Recording of demographic data and risk factors
4. **Endovascular Revascularization Procedures**
    - Performed by the Vascular and Endovascular Surgery team of Dr. Cipto Mangunkusumo National Hospital.
    - Technical success was determined based on final angiographic findings: residual stenosis <30% and presence of *inline flow* distal to the leg.

5. **Follow-up and Questionnaire Completion**
    - T1 (1 month post-procedure): clinical evaluation and refilling of the VascuQoL-6 questionnaire.

Procedures for Data Collection and Management and Statistical Analysis

SPSS software version 26.0 (IBM Corp., Armonk, NY, USA).

1. **Descriptive Analysis**
    - Numerical data (age, VascuQoL-6 score) are presented as mean ± SD when normally distributed, or median (interquartile range) when not normally distributed.
    - Categorical data (gender, revascularization success, comorbidities) are presented in the form of frequencies and percentages.
2. **Normality Test**
    - The distribution of VascuQoL-6 scores was tested with the Shapiro–Wilk test **.**
3. **Bivariate Analysis**
    - To assess changes in VascuQoL-6 scores between pre- and post-revascularization:
        - If the data is normally distributed → Paired t-test **.**
        - If not normally distributed → Wilcoxon signed-rank test **.**
4. **Significance Level**
    - p value < 0.05 was considered statistically significant.

RESULTS AND DISCUSSION

Characteristics of Research Subjects

The minimum sample size for this study was calculated using the paired mean difference test formula, resulting in a minimum requirement of 30 subjects after accounting for the possibility of dropout. Consecutive sampling was used, with all PAD patients who met the inclusion and exclusion criteria during the study period being enrolled sequentially until the minimum sample size was reached.

From January to April, a total of 43 patients with PAD underwent endovascular revascularization at Dr. Cipto Mangunkusumo National Hospital. Of these, 11 patients were excluded due to not meeting the study criteria, including patients undergoing major amputations, patients with failed revascularization, and patients requiring readmission within ≤1 month after revascularization. Thus, the final number of subjects who met the criteria and were analyzed in this study was 32 patients.

The average age of the subjects was 65.53 ± 11.35 years, with an age range of 43 to 87 years. Based on gender, the majority of subjects were female, 17 people (53.1%), while 15 were male (46.9%).

Based on education level, most patients had a high school education of 15 people (46.9%), followed by college of 13 people (40.6%), and junior high school of 4 people (12.5%).

Most patients had comorbid diabetes mellitus (26 patients) (81.3%). Twenty-five patients (78.1%) had a history of hypertension. Dyslipidemia was found in 13 patients (40.6%), while 19 patients (59.4%) did not have dyslipidemia. A history of smoking was found in 14 patients

(43.8%). Based on the Rutherford classification, the majority of patients were in category 5 (25 patients) (78.1%), while 7 patients (21.9%) were in category 4.

The distribution of lesion locations showed that most patients had lesions in the femoropopliteal segment as many as 28 patients (87.5%), followed by below-the-knee (BTK) lesions as many as 22 patients (68.8%), and iliac lesions as many as 3 patients (9.4%).

The most common procedure performed was percutaneous transluminal angioplasty (PTA) in 22 patients (68.8%), while combination procedures were performed in 10 patients (31.3%). All procedures demonstrated technical success and adequate runoff in all patients (100%).

Table 1. Characteristics of Research Subjects

Variables	n (%) / Mean ± SD
Age (years)	65.53 ± 11.35
Gender	
Woman	17 (53.1%)
Man	15 (46.9%)
Education	
JUNIOR HIGH SCHOOL	4 (12.5%)
SENIOR HIGH SCHOOL	15 (46.9%)
College	13 (40.6%)
Diabetes Mellitus	
Yes	26 (81.3%)
No	6 (18.8%)
Hypertension	
Yes	25 (78.1%)
No	7 (21.9%)
Dyslipidemia	
Yes	13 (40.6%)
No	19 (59.4%)
Smoke	
Yes	14 (43.8%)
No	18 (56.3%)
Rutherford	
Category 4	7 (21.9%)
Category 5	25 (78.1%)
Lesion Location	
Iliac	3 (9.4%)
Femoropopliteal	28 (87.5%)
Below-the-knee (BTK)	22 (68.8%)
Type of Action	
PTA	22 (68.8%)
Combination	10 (31.3%)
Technical Success	
Yes	32 (100%)
No	0 (0%)
Adequate Runoff	
Yes	32 (100%)
No	0 (0%)

These findings align with a study by Bączyk et al. in 2025, which showed that patients with chronic lower limb ischemia generally have a high comorbidity burden and a low quality of life due to chronic symptoms such as pain and activity limitations (Bączyk et al., 2025). Furthermore, a meta-analysis by Leelathanalerk et al. in 2024 showed that quality of life in PAD patients progressively declines with increasing disease severity, with the lowest scores in the advanced Rutherford category (Leelathanalerk et al., 2024).

The distribution of lesion locations in this study was dominated by the femoropopliteal and below-the-knee (BTK) segments, reflecting multilevel involvement. This condition is common in patients with diabetes mellitus, where atherosclerosis tends to affect distal blood vessels. This multilevel involvement is also associated with procedural complexity and the potential for worse outcomes if not adequately treated. Therefore, the characteristics of the subjects in this study reflect a population with severe PAD, making the findings of this study highly clinically relevant, especially in real-world settings in developing countries.

Changes in Hemodynamic Parameters

Table 2. ABI Changes Before and After Revascularization

Variables	Mean ± SD	p-value
ABI pre-action	0.751 ± 0.053	
ABI post action	0.848 ± 0.043	<0.001*

The ankle-brachial index (ABI) increased after endovascular revascularization. The mean ABI before the procedure was 0.751 ± 0.053, while after the procedure it increased to 0.848 ± 0.043. Normality test results showed that the ABI data were normally distributed, thus concluding that there was an increase in lower extremity arterial perfusion after endovascular revascularization.

These findings are consistent with a 2020 study by Khalil et al., which showed that revascularization, both surgical and endovascular, resulted in significant improvements in ABI values and functional capacity (Khalil et al., 2020). Similarly, a 2022 study by Banaś et al. showed that improved perfusion after revascularization was associated with improved quality of life in patients over the follow-up period (Banaś et al., 2022).

However, the relationship between hemodynamic improvement and quality of life is not always linear. A 2017 study by Larsen et al. emphasized that patient-reported outcome-based instruments like VascuQoL have higher sensitivity in capturing clinical changes than physiological parameters like ABI. This suggests that improved perfusion does not necessarily directly reflect patient perceptions of quality of life (Larsen et al., 2017).

Although this study demonstrated an increase in ABI values accompanied by improvements in patient quality of life after endovascular revascularization, the relationship is not always linear. Technical success of revascularization, demonstrated by improvements in macrovascular blood flow, does not necessarily result in equal clinical benefits in all patients. In patients with PAD, particularly those with diabetes mellitus and CLTI, factors such as microcirculatory impairment, peripheral neuropathy, and chronic tissue damage can continue to impact symptoms and limb function even after improved perfusion of the main artery. Therefore, evaluation of therapeutic success should consider not only objective parameters

such as ABI, but also patient-centered outcomes, including quality of life as measured by the VascuQoL-6.

Changes in Quality of Life Based on VascuQoL-6

Table 3. Comparison of VascuQoL-6 Scores Before and After Revascularization

Variables	Median (Min–Max)	p-value
Pre VascuQoL-6	14 (12–16)	
Post VascuQoL-6 (1 month)	18 (17–21)	<0.001*
Δ VascuQoL-6	5 (2–7)	

*Wilcoxon Signed Rank Test

The analysis showed a significant improvement in quality of life after revascularization. The median VascuQoL-6 score before the procedure was 14 (range 12–16), while after 1 month it increased to 18 (range 17–21).

The mean VascuQoL-6 score increased from 13.78 ± 1.29 before the procedure to 18.41 ± 1.13 after the procedure. The mean improvement (Δ VascuQoL-6) was 4.63 ± 1.29 with a median improvement of 5 points.

The Wilcoxon Signed Rank test results showed that the difference was statistically significant ($Z = -4.965$; $p < 0.001$). All patients in this study experienced an increase in their quality of life scores, with no decline or plateau. These findings indicate that endovascular revascularization provides significant and clinically meaningful improvements in the quality of life of PAD patients.

These findings align with the results of the 2024 BEST-CLI study by Menard et al., which demonstrated that revascularization, both endovascular and surgical, significantly improved quality of life in patients with CLTI across multiple assessment parameters. In that study, the improvements in quality of life were consistent throughout the follow-up period, indicating that the benefits of the intervention were sustained (Menard et al., 2024).

Additionally, a 2022 study by Banaś et al. also reported that patients who underwent revascularization experienced greater improvements in quality of life compared to patients who received only conservative therapy (Banaś et al., 2022).

Interestingly, all patients in this study experienced an improvement in their quality of life without any decline or stagnation in scores. This finding demonstrates a very strong intervention effect, although it should be interpreted with caution due to potential selection bias, as only patients with successful revascularization were analyzed. Overall, these results confirm that endovascular revascularization is an effective intervention not only in improving perfusion but also in significantly improving patients' quality of life.

In the context of Indonesia as a developing country, access to vascular services and delays in referrals likely contribute to patients' clinical conditions upon initial presentation. The majority of patients in this study were in the advanced Rutherford category, indicating that patients often present with advanced ischemia. This condition may be influenced by limited access to vascular healthcare facilities, low awareness of PAD, and delays in diagnosis and referral from primary healthcare facilities. Compared with populations in studies in developed countries, patients in this study likely had a higher disease burden at the time of intervention. Nevertheless, the results still showed a significant improvement in quality of life after

revascularization, confirming that endovascular procedures continue to provide significant clinical benefits even in populations with advanced.

Changes in Quality of Life Based on VascuQoL-6 Domains

Table 4. Comparison of VascuQoL-6 Domain Scores Before and After Revascularization

Domain	Pre (Median; Min–Max)	Post (Median; Min–Max)	Δ Median (Min–Max)	Δ Mean ± SD	p-value
Activity	2 (2–3)	3 (3–4)	1 (1–2)	1.19 ± 0.40	<0.001*
Painful	2 (2–3)	3 (3–4)	1 (0–2)	1.06 ± 0.35	<0.001*
Mobility	2 (2–3)	3 (2–4)	1 (0–1)	0.69 ± 0.47	<0.001*
Social	2.5 (2–3)	3 (2–4)	0 (0–1)	0.44 ± 0.50	<0.001*
Emotional	2.5 (2–3)	3 (2–4)	1 (0–1)	0.59 ± 0.50	<0.001*
Health Perception	2 (2–3)	3 (2–4)	1 (0–1)	0.66 ± 0.48	<0.001*

*Wilcoxon Signed Rank Test

Analysis of each VascuQoL-6 domain showed that all domains experienced a statistically significant increase after revascularization ($p < 0.001$).

In the activity domain, the median score increased from 2 to 3 with a mean change of 1.19 ± 0.40. The pain domain also showed a significant increase from a median of 2 to 3, with a mean change of 1.06 ± 0.35.

The mobility domain increased from a median of 2 to 3, with a mean change of 0.69 ± 0.47. Meanwhile, the social domain showed a smaller increase, with a median change of 0 and a mean change of 0.44 ± 0.50.

The emotional domain increased from a median of 2.5 to 3, with a mean change of 0.59 ± 0.50. Similarly, the health perception domain increased from a median of 2 to 3, with a mean change of 0.66 ± 0.48.

The greatest improvements were found in the activity and pain domains. This can be explained physiologically, as increased perfusion after revascularization directly reduces ischemic pain and improves patients' walking ability. A 2025 study by Bączyk et al. also confirmed that pain is a major factor affecting the quality of life of PAD patients, and its reduction significantly improves quality of life (Bączyk et al., 2025).

Furthermore, a 2014 study by Nordanstig et al. showed that the VascuQoL-6 was highly sensitive in capturing changes in functional domains such as activity and mobility, which are the primary outcomes of PAD therapy. Conversely, the social domain showed the least improvement. This suggests that although patients' physical condition improves, social and psychosocial adaptation takes longer. Factors such as previous long-term activity limitations, changes in social roles, and environmental support can influence the social recovery process (Nordanstig et al., 2014).

In this study, the pain and activity domains showed the greatest improvement compared to other domains. This finding is consistent with the physiological mechanisms of revascularization, where improved lower extremity perfusion rapidly reduces ischemic pain and improves patient mobility. Improvement in the pain domain is generally the earliest change patients experience after revascularization. Conversely, the social and emotional domains tend to require a longer recovery time due to the patient's psychological adaptation process, lifestyle changes, and reintegration into social activities after experiencing chronic limitations due to

PAD. Therefore, analyzing each domain provides a more comprehensive clinical picture than solely looking at changes in the total quality of life score.

An analysis of the relationship between sociodemographic factors and cardiovascular risk factors on changes in quality of life was conducted to reduce the influence of confounding factors on the interpretation of the study results. However, the relatively limited sample size reduced the statistical analysis' ability to detect weak to moderate associations. Therefore , the lack of a significant association in this study should be interpreted cautiously and should not be taken to directly rule out the possibility of these factors influencing the quality of life of PAD patients.

Clinical Implications

Research result This own implications clinically important. Revascularization endovascular proven not only repair perfusion, but also increases quality life patient in a way meaningful. Improvement the biggest occurs in aspects physical, especially pain and activity, which are complaint main PAD patients.

However, improvements in aspects relative social limited show that intervention medical just not enough for return quality life in a way comprehensive. Therefore, is necessary approach multidisciplinary involving rehabilitation, education patients, and support psychosocial.

In addition, the use of instrument such as VascuQoL-6 in practice clinical can help in more outcome evaluation comprehensive and supportive taking decision more clinical appropriate.

Research Limitations

This study had several limitations that should be noted. First, the relatively small sample size may have limited the statistical power and generalizability of the findings. Second, the single-center study design may have limited the representativeness of the findings for the broader patient population.

Third, this study used a relatively homogeneous population, as it only included patients who underwent successful endovascular revascularization. There was no comparator group, such as patients who received conservative therapy or patients with failed revascularization. This may have limited the study’s ability to evaluate the magnitude of the benefits of revascularization compared with other therapeutic strategies and may have led to an overestimation of the intervention’s effect on patients’ quality of life.

This study also did not evaluate several risk factors and other potential clinical factors that may have influenced patients’ quality of life after revascularization, such as residual pain, treatment adherence, psychological status, social support, economic status, post-procedural rehabilitation, and vessel patency during follow-up. The relatively small sample size may also have limited the ability of the analysis to detect meaningful associations among these factors.

In addition, this study did not evaluate several post-procedural vascular parameters that may have influenced patients’ quality of life, such as residual stenosis, vessel patency, the incidence of restenosis, and microcirculatory quality during the follow-up period. These factors may affect the sustainability of clinical improvement and quality-of-life outcomes after revascularization.

CONCLUSION

Based on the findings of this study evaluating changes in the quality of life of patients with peripheral arterial disease (PAD) after endovascular revascularization using the VascuQoL-6 instrument, it can be concluded that there was a statistically and clinically significant improvement in quality-of-life scores among patients with PAD after undergoing endovascular revascularization at Dr. Cipto Mangunkusumo National General Hospital. In addition to improving hemodynamic parameters, revascularization also provided significant benefits to patients' overall quality of life.

All quality-of-life domains improved after endovascular revascularization, with the greatest improvements observed in the activity and pain domains. These findings suggest that improved peripheral perfusion directly contributed to the reduction of ischemic symptoms and increased functional capacity in patients with PAD.

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