International Journal of Allied Medical Sciences and Clinical Research (IJAMSCR)

ISSN:2347-6567

*IJAMSCR |Volume 8 | Issue 2 | Apr - Jun - 2020*
**www.ijamscr.com**

*Research article* *Medical research*

# Allen exercise buerger combinations and SPA against brachial index ankle in DM type II patients outreach in poly disease in RSUD Dr. R. Goeteng Taroenadibrata Purbalingga

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## ABSTRACT

### Background

Uncontrolled blood sugar levels in diabetes mellitus can cause vascular complications. The peripheral vascular disease causes a decrease in blood flow to the lower extremity which is characterized by a decrease in the ankle-brachial index (ABI).

### Objectives

This study aims to determine the effect of the combination of Allen exercise Buerger and SPA on the ankle-brachial index value in type II DM patients.

### Research methods

This study used a quasi-experimental design with a non-equivalent pre-test post-test design with a control group with a sample of 38 diabetics with purposive sampling, divided into 2 treatment and control groups. Respondents in the treatment group were given intervention Buerger Allen exercise and SPA 6 times 2 times every week for 3 weeks. ABI measurements were performed 4 times.

### Result

Data from the measurement of ABI values are in the form of ratios. Tested statistically by the Friedman test with the Wilcoxon test. Based on statistical tests obtained p-value brachial ankle index 0,000 ($p<0.05$). This shows that there is a significant effect of statistically significant changes in the value of the ankle-brachial index after the intervention in the control group. Wilcoxon results for each comparison are less than 0.05 ($p <0.05$). It can be concluded that differences are found in all measurements.

### Conclusion

There is an increase in the ABI after being given a combination of allen exercise and spa buerger action duration 2 times per week for a period of 3 weeks.

**Keywords:** *Ankle-brachial index, Buerger Allen Exercise, SPA, Type II diabetes mellitus*

## INTRODUCTION

Diabetes mellitus is now a national health problem which is increasing every year. Diabetes mellitus (DM) or diabetes is a disease caused by a lack of insulin production by beta cells or the body cannot actively use the insulin that has been produced by the pancreas [1-2]. Chronic complications of DM become an important and complex event process [3]. Nurses as health service providers have the responsibility for the prevention and early diagnosis of diabetes and its complications [4]. Long-term diabetes mellitus complications associated with vascular disease can be classified into microvascular diseases such as retinopathy, nephropathy, neuropathy and macrovascular diseases involving large blood vessels such as heart, brain, and peripheral blood vessels [5]. Type 2 diabetes mellitus is a type of diabetes mellitus that is not insulin-dependent and is caused by a decrease in insulin sensitivity (insulin resistance) and impaired insulin secretion [6]. The hyperglycemia will cause blood clots due to disruption of blood platelet function so that people with diabetes mellitus will be at risk of developing the peripheral arterial disease and often occur in the lower extremities ie the leg organs [7].

The impact of viscosity due to the accumulation of blood sugar causes blood viscosity so that blood flow is disrupted and can cause decreased perfusion to body tissues, especially in the leg area [1]. The atherosclerotic process in peripheral vascular disease causes a decrease in blood flow (perfusion) to the lower extremity which is characterized by a decrease in the ankle-brachial index (ABI). The atherosclerotic process in peripheral vascular disease causes a decrease in blood flow (perfusion) to the lower extremity which is characterized by a decrease in the ankle-brachial index (ABI). The simplest investigation is one indicator to see a decrease in perfusion of blood flow to the limbs or lower extremities and impaired peripheral circulation is the measurement of the Ankle Brachial Index (ABI) [1, 8, 9].

In people with diabetes mellitus, physical activity has an important role to control fasting blood sugar if done correctly and regularly [10, 11]. Physical exercise is an effort to prevent peripheral arterial disease as a basic principle in preventing complications in patients with diabetes mellitus [11]. The exercise that can be done is Buerger Allen Exercise [12]. This exercise is an exercise system for lower limb arterial insufficiency with variations in active movement in the plantar area by applying gravity and regular movements at each stage [13]. Exercise this activity through active movements of the ankle to smooth the muscles of blood vessels and can stimulate the endothelium to release or release nitric oxide so that it will give a signal to the vascular smooth muscle for relaxation. Aruna and Thenmozhi (2015) said that the Buerger Allen exercise can help prevent peripheral arterial disease [14].

Other non-pharmacological nursing actions in the management of diabetes mellitus that is new at this time is with warm water therapy. Giving SPA is a therapy with a system of treatment or treatment of feet with water and foot massage that aims to improve peripheral blood circulation [15]. In addition, soaking in warm water will reduce inflammation and increase the body's ability to process sugar in conditions that are not excessive [16]. SPA is an act of soaking the feet using water with a temperature of 380C to 400C which can increase glutathione metabolism, cell antioxidants to prevent oxidative damage that results in increased blood flow to the arteries so that glucose metabolism is maintained or prevent hyperglycemia.

The combined action of physical exercise Buerger Allen Exercise and SPA is an ideal and non-invasive and economical exercise in patients with diabetes mellitus to prevent chronic vascular complications, namely impaired blood vessel flow to the legs. The beneficial effect of this combination is that one can be done at home at a low cost and has a low-risk activity [17]. The combined foot care measures of the two interventions are carried out to increase and improve blood circulation in the leg area, as well as stimulate the use of glucose by the active muscles. Buerger Allen Exercise as one of the foot care measures and is expected to be one of the exercises in the implementation of independent nursing in patients [18].

The combination of Allen exercise Buerger and SPA can increase peripheral circulation and increase vasodilation which has an effect on increasing nitric oxide and inhibiting Aldose Reductase activity and increasing glutathione metabolism [18]. As mentioned, one of the vascular damage in patients with type 2 DM is the disruption of blood flow to the lower extremities or decreased

perfusion of blood flow to the lower extremity region which is characterized by a decrease in the value of the ankle brachial index (ABI) and disruption in glucose metabolism due to the effects of chronic hyperglycemi [17]. Various attempts were made to prevent and control the complications in the management of DM. Foot care is one of the factors that can affect the value of ABI.

## MATERIALS AND METHODS

The data collection of this research was carried out by identifying respondents in the Outpatient Outpatient Clinic who were treated and re-controlled at Dr. R. Goeteng Taroenadibrata Purbalingga. This research provides intervention to respondents conducted at the home of each respondent. The researcher made a schedule and a visit to the respondents in the research process for 3 weeks with direct activities in each place of the respondent's house. Research design quasi experimental design with non equivalent pre test post test design with control group, 38 respondents in this study were selected by purposive sampling. The instruments used to measure the ankle brachial index (ABI) are 8 MHz Doppler Ultrasound and spygmomanometer and stethoscope, questionnaire sheets, SPO combination buerger allen exercise and SPA. The intervention group was given a combination of Buerger allen exercise and SPA duration of 38 minutes once a day 2 times per week for 3 weeks and oral antidiabetic as obtained by respondents. Whereas the control group only received oral antidiabetic as obtained by respondents. Before the intervention of both groups were observed, after the intervention both groups would be observed again.

Measurements were made on the condition of the fasting respondents according to inclusion criteria. Measurement of ankle brachial index (ABI) was done 4 times, pre-test was done once in the first week and post 3 times for 3 weeks. Post test measurement is done every 1 week after being given an intervention 2 (two) times a week. Whereas the control group only took drugs and the measurements were in accordance with the intervention group.

## RESULTS AND DISCUSSION

Analysis of the variables in this study was conducted univariate, bivariate. Univariate analysis is used to describe the results of research of each variable studied. Bivariate analysis was used to determine the relationship between the dependent variable and the independent variable namely the Friedman test, Anova and Friedman's advanced test namely Wilcoxon. Characteristics of respondents consisted of age, sex, duration of DM, physical activity undertaken, education, occupation, pharmacological therapy.

Based on the results of the study Gender in the intervention group was mostly (57.90%) women (and most controls (63.20%) were women, based on physical activity the intervention group was mostly yes (68.40%) and the control group was mostly yes (68.40%), based on education in the intervention group was mostly (47.40%) high school and the control group was mostly (42.10%) high school, based on occupation the intervention group was mostly (52.60%) IRT and in the control group was mostly (47.40%) IRT, the average age of respondents in the group the intervention was 59.31 with a standard deviation of 7165 while in the control group it was 53.84 with a standard deviation of 8,506, based on the length of suffering from DM the intervention group averaged 5.47 years and the control group 5.89 years.

### Univariat Analysis

**Table 1: Average Ankle Brachial Index measurement results before and after the intervention in both groups**

| Variable | Intervention | | | | Control | | | |
|---|---|---|---|---|---|---|---|---|
| | Mean | Elementary school | Min | Max | Mean | Elementary school | Min | Max |
| ABI_Pre | 0.8626 | 0.034 | 81 | 0.90 | 0.8605 | 0.035 | 0.80 | 0.92 |
| ABI_Post1 | 0.9332 | 0.042 | 87 | 1.07 | 0.9011 | 0.038 | .81 | 0.96 |
| ABI_Post2 | 1,0105 | 0.062 | 0.93 | 1.10 | 0.9247 | 0.037 | 0.85 | .97 |
| ABI_Post3 | 1,096 | 0.079 | 1,00 | 1.20 | 0.9521 | 0.414 | 0.88 | 1.04 |
| Difference in average | 0.2342 | | | | 0.0916 | | | |

Based on table 2 the results of the study show that the average Ankle Brachial Index in the intervention group increased by 0.2342, while that in the control group increased by 0.0916. Changes in the average Ankle Brachial Index measurement from before the intervention to 3 times the measurements in both groups.

## Bivariate Analysis

**Table 2: Analysis of the average difference in the Ankle Brachial Index on each measurement of the two groups**

| Variable | Intervention group | | | Control group | | |
|---|---|---|---|---|---|---|
| | *mean difference* | P * | P ** | mean difference | P * | P ** |
| ABI_Post1ABI_Pre | -0,071 | 0,000 | 0,000 | -0,041 | 0,000 | 0,000 |
| ABI_Post2ABI_Pre | -0,148 | 0,000 | | -0,064 | 0,000 | |
| ABI_Post3ABI_Pre | -0,234 | 0,000 | | -0,092 | 0,000 | |

Based on the Friedman test above in the intervention group, the significance value obtained was 0,000 (p <0.05), which means that there were differences in the mean ABI values. Thus the conclusion can be drawn there is a significant effect of the combined action of Buerger Allen Exercise and SPA duration of 38 minutes per day 2 times per week for a period of 3 weeks on increasing the ABI value. Wilcoxon results for each comparison are less than 0.05 (p <0.05). Thus it can be concluded that differences are obtained in all measurements. While the repeated ANOVA test in the control group, the significance value obtained was 0,000 (p <0.05). Thus it can be concluded that there are differences in the average value of ABI. The post hoc test results of the comparison of ABI pretest with the next three measurements with a significance value of less than 0.05 (p <0.05), that differences were found in all measurements.

**Table 3: Average description of Ankle Brachial Index before and after between intervention and control groups**

| *Ankle Brachial Index* | Intervention Group | | Control group | *P velue* |
|---|---|---|---|---|
| | The mean | Elementary school | The mean | Elementary school |
| *ABI Pre* | 0.863 | 0.034 | 0.861 | 0.035.852 |
| ABI Post 3 | 1,097 | 0.079 | .952 | 0.0410,000 |
| Δ mean (difference) | 0.234 | 0.065 | 0.091 | 0.0370,000 |

The table above shows the results of the difference between the pretest and posttest values between the intervention and control groups. Different test results for ABI Pretest value, p value: 0.852 (p> 0.05) which means that there is no difference in the average ABI Pretest value between the intervention and control groups. The results of the 3rd ABI Postest test differ, the value of p: 0,000 (p <0.05) which means there is a difference in the average of the 3rd ABI Postest between the intervention and control groups.

P-value in the intervention group showing an increase in Ankle Brachial Index of 0.234, while in the control group of 0.091 for 3 weeks of the study. This is also indicated by the difference (delta mean) between the intervention group and the control group showing a difference (p = 0,000).

The results of this study indicate the number of female respondents more than men in both the control and intervention groups.Men and women have an equal risk for suffering from diabetes until early adulthood. But after the age of 30 years, women have a higher risk of developing diabetes than men, especially women who have been exposed to diabetes during pregnancy at high risk of developing type 2 diabetes mellitus in old age [19]. Based on the relevant theory that women who have entered menopause will experience a decrease in the hormone estrogen which affects the elasticity of blood vessels which can cause atherosclerosis

which will increase blood pressure. The effect of increased blood pressure will cause endothelial cell damage that can reduce peripheral circulation [15].

In the physical activity characteristic variable, most respondents conducted physical activity in both groups. Activities in cases of type 2 diabetes mellitus play a role in regulating blood glucose levels. Physical activity or exercise can improve blood circulation, improve insulin sensitivity, reduce body weight so that blood glucose levels can be maintained and controlled.

The majority of respondents' education in the treatment and control group was high school. Researchers assume education is very influential on the occurrence of an illness because educated people will more easily obtain information so that knowledge about the disease they suffer is more adequate [20]. In this study, almost half of the respondents in the treatment and control group worked as housewives. Supriyadi (2017) revealed that respondents who act as housewives and work as entrepreneurs have an irregular eating schedule every day [1]. In Anani's research, there was a relationship between respondent's eating habits and the condition of the respondent's blood glucose [21].

Based on the results of the study showed that the average age of respondents in the intervention group was 59.31 years, while the average age of respondents in the control group was 53.84 years. Age is one of the factors that can affect peripheral blood circulation. Normally peripheral vascular disease is experienced in older people [6]. Based on the results of the study showed that the average duration of diabetes mellitus of the intervention group respondents was 5.47 years, while the average length of suffering from diabetes mellitus in the control group was 5.89 years. Based on the results of the study showed that the average duration of diabetes mellitus of the intervention group respondents was 5.47 years, while the average length of suffering from diabetes mellitus in the control group was 5.89 years. Suyanto's research states that hyperglycemia and the length of diabetes mellitus can affect changes in blood vessel walls and blood pressure [15]. Blood vessels consist of endothelial cells that line the inside of the lumen of all blood vessels and act as a link between blood circulation and vascular smooth muscle cells.

The results showed a change after a combination of allle exercise and SPA buerger action, the difference in the average increase in the value of the Ankle Brachial Index in the treatment group and the control group that only received drug therapy with a statistically significant p value. In the treatment group the difference increased by 0.234 and the control experienced an increase in the average value of the Ankle Brachial Index of 0.0916 after measuring 3 times in 3 weeks. Some things that can affect the changes in the value of the Ankle Brachial Index include physical activity or sports carried out by respondents.

Based on general data in this study regarding the duration of suffering from diabetes mellitus and the frequency of routine activities or sports in the treatment and control groups showed almost the same percentage. Atherosclerosis in diabetes mellitus is caused by disturbances in the form of accumulation of sorbitol in the vascular intima, hyperlipoproteinemia, and blood clotting abnormalities [22]. Research Sanchez et al states that activity or sport is an exercise or activity carried out by patients with diabetes mellitus to prevent injury and help improve blood circulation in the legs. Activities or sports activities can strengthen the small muscles of the foot and improve blood circulation and prevent the appearance of kelianan foot shape.

The combination of allergen buerger exercise and Spa with warm foot soak techniques and massage as one of the foot care measures that are beneficial to improve blood circulation, relaxes leg muscles. Buerger allen exercise is proven to be able to increase the value of ankle brachial index in people with type 2 diabetes mellitus by combining muscle pump technique and gravity where changes in grativitation affect the distribution of fluids in the body by helping the blood vessels alternately to empty and fill the blood column, which can ultimately improve blood transportation through blood vessels [23].

The results of this study show the p value in the treatment group and the control group is statistically significant, this is likely due to respondents in the control group also doing physical activities such as walking in the morning and gymnastics activities in existing health centers and other activities in their health. Physical exercise and routine exercise in patients with DM will occur leg movements that result in tense leg muscles and pressing the veins will decrease, which helps blood circulation in the legs and improve

blood circulation [24]. Also in this study the average length of suffering from diabetes mellitus in the control group with the intervention group was not much different.

Average value Ankle brachial index before the treatment period in the treatment group was 0.863 and the control group 0.861 mg/dL. The results of the independent t-test treatment and control groups in table 3Based on the results of different pretest tests Ankle brachial in dexp values were obtained: 0.852 (p> 0.05). This shows that there is no significant difference in pretest scores Ankle brachial index between the treatment group and the control group. The initial or equivalent pretest value in this study is important to know to ascertain the difference in improvement Ankle brachial index the treatment and control groups were not caused by differences Ankle brachial index since the beginning. Equivalent initial conditions between the two groups will support and reinforce the results of that improvement Ankle brachial index which occurs due to the intervention given.

Analysis of mean differences Ankle brachial index before the intervention until the third measurement in the intervention and control group was carried out to determine the average difference Ankle brachial index before and after the treatment period in the treatment group and control group. The results of the study in the treatment group using Friedman's further test is Wilcoxon, further tests are used to measure the comparison of two variables. Wilcoxon results for each comparison are less than 0.05 (p <0.05). Thus it can be concluded that differences are obtained in all measurements. There are some that can affect the presence of ankle brachial index values in people with diabetes mellitus, namely smoking, a history of hypertension and not maintaining their diet to foods that are sweet and fatty. One step in handling to minimize complications of type 2 diabetes mellitus can be done by controlling the four main pillars in the form of education, food planning, physical exercise / physical activity and pharmacological interventions (Suyono, 2009).

Test repeated ANOVA in the control group, the significance value obtained was 0,000 (p<0.05). Thus it can be concluded that there are at least two different measurements. The post hoc test results of the comparison of ABI pretest with the next three measurements were significantly less than 0.05 (p <0.05). Thus it can be concluded that there are differences in initial values (ABI pretest) each with the first, second, and third measurements. The control group also experienced changes in ABI values at the start of measurement with a third measurement. The increase in the value of ABI is influenced by daily physical activity or exercise. Most respondents did the physical activity in the control group, which were 13 respondents (68.40%).

Based on the comparison test mean ankle-brachial index between the intervention and control groups, the intervention group showed an increase in the Ankle-brachial index of 0.234, while in the control group of 0.091 for 3 weeks of the study. This was also shown by the difference (delta mean) between the intervention groups and the control group showing differences (p=0,000). Administration of a combination of allergy exercise Buerger and SPA in the treatment group obtained a mean difference of greater mean can increase the value of the ankle-brachial index that is 0.234 while compared with the control group of 0.091 for 3 weeks. Judging from each measurement every week 3 times for 3 weeks also showed the average value of the brachial-ankle index of the intervention group was higher than the control group, statistically different levels of ABI increase. This shows from this research is that by providing a combination of Allen exercise Buerger and SPA that is routinely done, peripheral blood circulation will be better, so as to prevent complications from diabetes mellitus. Lower extremity joint movement exercises can increase the value of the ankle-brachial index if done regularly and continuously.

Chang (2016) concluded that the Buerger Allen exercise is an ideal and non-invasive activity exercise for diabetics with peripheral arterial disease. Buerger Allen exercise can improve peripheral circulation in the feet of diabetics. In addition, the Buerger Allen exercise is considered as an exercise activity that is cheap and easy to learn and has a very low risk for people with diabetes mellitus. Another nursing action in the management of diabetes mellitus is a diabetes foot SPA. Giving SPA is a therapy with a system of treatment or treatment of feet with warm water and foot massage that aims to improve peripheral blood circulation [25].

This research by combining the Allen exercise Buerger and SPA can be a nurse's action as an effort to prevent and rehabilitate type 2 DM

patients who are at risk of suffering from lower limb peripheral vascularity disorders. The same research states that by soaking warm water can reduce the occurrence of atherosclerosis. Relevant research also explains that soaking warm water throughout the body can increase serum adiponectin and leptin in healthy people. The provision of a SPA can increase serum leptin and adiponectin levels in osteoarthritis. Adiponectin and leptin are adipoxit-derivate hormones that play an important role between obesity and inflammatory disorders. Adiponectin reduces both the production and activity of inflammatory cytokines and helps protect against obesity.

## CONCLUSIONS

There was a significant effect on the increase in an ankle-brachial index (ABI) after being given a combination of Buerger Allen Exercise and SPA duration of 38 minutes per day 2 times per week for a period of 3 weeks. Evidenced by the comparison mean) ankle-brachial index between the intervention and control groups, in the intervention group showed an increase in the Ankle-brachial index of 0.234, while in the control group of 0.091 for 3 weeks of the study. This proves that the combined action of Buerger Allen Exercise and SPA duration of 38 minutes per day 2 times per week over a period of 3 weeks has more effect on increasing the value of the Ankle-brachial index (ABI)

Nurses are expected to be able to apply the results of this study as one of the independent nursing interventions in handling and preventing complications of type II DM patients, to increase the Ankle-brachial index. The results of this study can be done in the application of nursing care in cases of DM in a preventive effort to risk factors for further complications through foot care.

Respondents or patients are expected to be able to apply the action of allergen Allen exercises dam SPA in daily life, with the hope that blood sugar is maintained or decreased and the value of the ankle-brachial index can increase, so that complications of type 2 diabetes mellitus such as ulcers, gangrene can be prevented.

## REFERENCES

[1]. Supriyadi Sri Nabawiyati NM, Novita KS. The Effect of Buerger Allen Exercise on Ankle Brachiale Index and Blood Sugar Levels when Type 2 Diabetes Mellitus sufferers in the Nganjuk District Health Center. repositoryumyacid. 2017 MKep UMY

[2]. Yunita S. Treatment of Diabetes Wounds. Yogyakarta: Graha Science; 2015

[3]. Tabatabaei-Malazy O, Fakhrzadeh H, Sharifi F, Mirarefin M, Arzaghi SM, Badamchizadeh Z, et al. Effects of metabolic control on oxidative stress, subclinical atherosclerosis and peripheral artery disease in diabetes patients. Journal of Diabetes & Metabolic Disorders. 14(1), 2015, 84.

[4]. Thakur P, Sharma K. A Study to Assess the Effectiveness of Buerger Allen Exercise in Improving the Peripheral Circulation among Patients with Diabetes Mellitus Admitted in Sharda Hospital, Greater Noida. International Journal of Nursing Education. 11(2), 2019.

[5]. Li X, Hirokawa M, Inoue Y, Sugano N, Qian S, Iwai T. Effects of acupressure on lower limb blood flow for the treatment of peripheral arterial occlusive diseases. Surgery Today. 37(2), 2007, 103-8

[6]. Black JMH, JH Surgical Medical Nursing: Clinical Management for the expected results. Jakarta: Salemba Medika; 2014.

[7]. Kohlman-Trigoboff D. Management of lower extremity peripheral arterial disease: interpreting the latest guidelines for nurse practitioners. The Journal for Nurse Practitioners. 9(10), 2013, 653-60.

[8]. Sari A, Sofiani Y. Effectiveness Comparison of Buerger Allen Exercise and Foot Gymnastics against ABI Values in Type II DM Patients. Journal of Telenursing (Joting). 1(1), 2019, 1-16

[9]. Sari A, Sofiani Y. Efektifitas Perbandingan Buerger Allen Exercise dan Senam Kaki terhadap Nilai ABI pada Penderita DM Tipe II. Journal of Telenursing (Joting). 1(1), 2019, 1-16.

[10]. Indriyani P, Supriyatno H, Santoso A. Effect of physical exercise; aerobic exercise on reducing blood sugar levels in patients with type 2 diabetes in the Bukateja Purbalingga health center. Nurse Media Journal of Nursing. 1(2), 2010.

[11]. Fitri Y, Mulyani NS, Fitrianingsih E, Suryana S. The Effect of Giving Physical Activity (Aerobic Exercise) on Blood Pressure, BMI and RLPP in Obese Women. Actions: Aceh Nutrition Journal. 1(2), 2016, 105-10.
[12]. Aalaa M, Malazy OT, Sanjari M, Peimani M, Mohajeri-Tehrani M. Nurses' role in diabetes foot prevention and care; a review. Journal of Diabetes & Metabolic Disorders. 11(1), 2012, 24
[13]. Chang CF, Chang CC, Hwang, SL, & Chen, MY Effects of burger exercise combined health promoting programs on peripheral neurovascular stimulation among community residents at high risk for diabetic foot ulceration. Worddviews on Evidence-Based Nursing. 12(3), 2015, 145-53
[14]. Aruna S, Thenmozhi P. Effectiveness of allen buerger exercise in preventing peripheral arterial disease among people with type ii diabetes mellitus. International Journal of Pharma and Bio Sciences. 6(2), 2015, 966-70
[15]. Suyanto S. The Influence Of Spa Therapy And Diabetic Foot Exercise On Diabetic Peripheral Neuropathy Patients. Nurscope: Journal of Nursing Scientific Research and Thought. 3(2), 2017, 29-37.
[16]. Hoekstra SP, Bishop NC, Faulkner SH, Bailey SJ, Leicht CA. Acute and chronic effects of hot water immersion on inflammation and metabolism in sedentary, overweight adults. Journal of Applied Physiology. 125(12), 2018, 2008-18
[17]. Chang CF, Chang CC, MY Chen. Effect of Buerger's exercises on improving peripheral circulation: A systematic review. Open journal of nursing. 5(02), 2015, 120.
[18]. Pebrianti S. Buerger allen exercise and ankle brachial index (abi) in patients with diabetic foot ulcers in RSU DR. Slamet Garut. Indonesian Journal of Nursing Sciences and Practice. 1(1), 2018.
[19]. Yahya N. Healthy Living with Diabetes. Solo: PT Tiga Serangkai Pustaka Mandiri; 2018
[20]. Taharuddin T. Effectiveness of the Implementation of a Structured Discharge Planning Conservation Model against Changes in Wound Degrees and Blood Glucose Levels in Diabetic Ulcer Patients. Care: Scientific Journal of Health Sciences. 5(3), 2017, 403-17.
[21]. Anani S. Relationship between Diabetes Control Behavior and Blood Glucose Levels in Diabetes Mellitus Outpatients (Case Study in Arjawinangun District Hospital Cirebon District). Journal of Public Health, Diponegoro University. 1(2), 2012, 18753.
[22]. Affiani R, Astuti P. Effectiveness of diabetic foot spa on peripheral blood circulation in patients with type 2 diabetes mellitus in the working area of the Wonokromo Health Center in Surabaya. Journal of Health Sciences. 10(1), 2017.
[23]. Guanopatin Freire SK. Ejercicios de buerguer allen en pacientes de 40 a 70 años que present venas varicosas grado 1 y 2 que acuden al centro eco-laser de varices y úlceras e Instituto de Trombosis Benalcázar en la ciudad de Latacunga: Universidad Técnica de Ambato-Facultad de Ciencias He Salud-Carrera de.; 2015
[24]. Djafar RH, Nur BM, Azzam R. Effectiveness of Diabetic Foot Spa on Ankle Brachial Index Values in Type II Diabetes Mellitus Patients. Silampari Nursing Journal. 3(1), 2019, 312-21.
[25]. Suandika M. The effect of warm foot baths on increasing peripheral blood circulation is seen from the value of the ankle brachial index (ABI) in patients with diabetes mellitus in Purwojati village, Purwojati sub-district. Medisains. 14(1), 2016.

**How to cite this article:** Dwi Agus Yulianto, Sudirman and Djamaluddin Ramlan. Allen exercise buerger combinations and SPA against brachial index ankle in DM type II patients outreach in poly disease in RSUD Dr. R. Goeteng Taroenadibrata Purbalingga. Int J of Allied Med Sci and Clin Res 2020; 8(2): 351-358.
**Source of Support:** Nil. **Conflict of Interest:** None declared.