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Functional Status and Quality of Life among Elderly Patients with Chronic Lower Limb Ischemia at Assiut University Hospital

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Abstract
Background: Chronic lower limb ischemia is a serious form of peripheral artery disease that affects older adults, significantly impacting their quality of life and functional abilities and causing morbidity. **Aim:** To assess functional status and quality of life among elderly patients with chronic lower limb ischemia. **Design:** A descriptive research design was utilized to conduct this study. **Settings:** Inpatient ward and outpatient clinic of the vascular surgery department at Assiut University Hospital. **Sample:** A purposive sample of 258 elderly patients with chronic lower limb ischemia. **Tools:** Three tools were utilized, tool (I) structured interview questionnaire, tool (II) functional status questionnaire and tool (III) vascular quality of life. **Results:** The present study revealed that functional status mean score showed that lowest mean score was 42.29 at social activity and highest mean score was 70.71 at basic activities of daily living and vascular quality of life mean score was 2.99. There was a positively significant correlation between function status and quality of life. **Conclusion:** Chronic lower limb ischemia has negatively significant implications on functional status and quality of life among geriatric patients with chronic lower limb ischemia. **Recommendation:** Provide educational programs about chronic lower limb ischemia designed for geriatric patients focusing on enhancing their function status and quality of life.

Keywords: Chronic lower limb ischemia, Elderly, Functional status & Quality of life.

Introduction
Aging is a complex process that affects individuals in multiple ways including physical, psychological and social change. The global population aged 65 and older is projected to reach 2.2 billion by the late 2070s. By the mid-2030s, the number of people aged 80 and older is expected to reach 265 million **(World population prospects, 2024).** Egypt's elderly population (60 or older) has reached 9.3 million, comprising 8.8% of all residents **(Central Agency for Public Mobilization & Statistics, 2024).**

Chronic lower limb ischemia is common among the elderly, who may be frail and have a high prevalence of multiple severe comorbidities **(Takei et al., 2024)**. Age related changes in arterial system; mechanical, functional and structural properties, including arterial walls stiffening, the ability of arteries to dilate and constrict is impaired, intimal and medial thickening leading to reduced blood flow regulation and loss of elasticity in the blood vessels **(Castelli et al., 2023 & Li et al., 2023).**

Chronic lower limb ischemia (CLLI) is a blockage or narrowing in the arteries of the lower extremities that reduces blood supply to lower limbs. Clinical presentation of CLLI depends on its severity; classification of CLLI severity according to Fontaine grades: grade I asymptomatic, no symptoms of ischemia; grade II claudication, which is characterized by limb pain associated with walking and relieved by rest; grade III rest pain, characterized by a burning sensation in distal foot arch that worsens at rest, particularly at night, and grade IV necrosis, gangrene or both. In the current study of the studied sample in grades II and III **(Jakubiak et al., 2020).**

The risk factors for CLLI are stress factors, such as free radicals, infections, or inflammation, that interfere with endothelial homeostasis and cause endothelial dysfunction. These factors are strongly associated with an increased risk of cardiovascular disease including hereditary, older age, diabetic, atherosclerosis, high blood pressure, overweight, smoking and a sedentary lifestyle **(Ying et al., 2022).**

The presence of CLLI has two major consequences, the first is a decrease in function status and quality of life due to reduced blood flow and leg pain; this often leads to patients becoming sedentary due to pain. The second consequence is increased risk of cardiovascular morbidity and burden on healthcare resources **(Perlander et al., 2023).**

Elderly patients with CLLI have greater functional impairment such as lower physical activity levels, reduced walking activity and rest pain and pain associated with walking are likely to lose the ability to walk and adequately perform activities**.** Function status (FS) is patients' capacity to take part in community-based daily activities, including physical,

psychological health, social activity and work performance **(Kim et al., 2021).**

Quality of life (QOL) is a comprehensive measure that encompasses physical, mental, and social well-being. It's not just about the absence of illness, but the positive aspects of life that contribute to overall satisfaction. CLLI has negative effects on quality of life, daily functioning, have high readmission rates and high costs for millions of patients **(Perlander et al., 2023 & Cai et al., 2021).**

Complications of CLLI include severe limb pain, walking difficulties, activities limitations, sepsis is secondary to infected gangrene and amputation. CLLI represents a large economic burden for elderly patients and society in health care costs; hospitalization for CLLI patients is common and up to 60% are readmitted within 6 months and mortality exceeds 50% by 5 years **(Castro & Shishehbor, 2022 & Jakubiak et al., 2020).**

Diagnosis of CLLI based on symptoms and severity of condition, which include ankle-brachial index (ABI), peripheral angiogram, doppler ultrasound, computed tomography angiography, transcutaneous oxygen pressure, pulse volume recording and magnetic resonance imaging angiography **(Chuter et al., 2024).**

The gerontological nurse and multidisciplinary teams play crucial role in enhancing the functional status and quality of life for geriatric patients with CLLI through comprehensive assessment, individualized care plans that address the specific needs of each patient, considering their comorbidities, functional limitations, and preferences, instructing geriatric patients on lifestyle guidelines, conserving a healthy weight, exercising regularly, taking care of feet, quitting smoking, controlling blood pressure, maintaining good glycemic control and reducing lipid levels **(Castro & Shishehbor, 2022).**

Significance of the study:

Globally, an estimated ~236.62 million people elderly than adult live with peripheral artery disease, about ~25% of these patients diagnosed with CLLI, making it one of the most common causes of presentation to the vascular surgeon **(kim et al., 2021)**. The total number of elderly patients suffering from CLLI was around 600 every year who were admitted to the inpatient ward and outpatient clinic of the vascular surgery department at Assiut University Hospital.

Chronic lower limb ischemia is a global health problem with far reaching consequences that affects older adults, significantly impacting their quality of life and functional abilities and associated with high level of morbidity and burden on healthcare resources **(takei et al., 2024).** Limited researchers have been conducted in Egypt to assess the functional status and quality of life among geriatric patients with CLLI. Therefore, it highlights the importance of assessing functional status and quality of life for geriatric patients with CLLI.

Aim of the study:

Assess functional status and quality of life among elderly patients with chronic lower limb ischemia at Assiut university hospital.

Research questions:

What are functional status and quality of life among elderly patients with chronic lower limb ischemia?

Research design:

A descriptive research design will be utilized to conduct this study.

Study setting:

Inpatient ward and outpatient clinic of the vascular surgery department (male & female) at Assiut University Hospital.

Sample:

A purposive sample of elderly patients diagnosed with CLLI who were admitted to the inpatient ward and outpatient clinic of the vascular surgery department at Assiut University hospital and the total number of elderly patients suffering from chronic lower limb ischemia was around 600 every year. The sample size of the study was calculated using EPI/Info version 3 with a 95% confidence interval (CI). The initial sample size estimate was 235 patients; after adding a 10% non-response rate, the final sample size was increased to 258 patients.

Equation:

$$N = [DEFF*Np(1-p)]/[(d2/Z21-a/2*(N-1)+p*(1-p)]$$

Inclusion criteria:

- Geriatric patients (≥60 years) of both genders,
- Elderly patients with chronic lower limb ischemia in grade II and III.
- Elderly patients must be alert and able to communicate with researcher.

Exclusion criteria:

- Amputation.
- Physical disability such as (paralysis, fracture, stroke and post-surgical in lower limbs).
- Gangrene in lower limbs.

Study tools:

Tool I: Structured Interview Questionnaire:

Researchers developed the structured interview questionnaire and involved two parts as the following.

Part I: Demographic characteristics, which includes age, gender, occupation, education level, marital status, residence and smoking.

Part II: Medical history, which includes past medical history such as (cardiovascular disease, cerebrovascular disease, kidney function, hypercholesterolemia, pulmonary disease, diabetes and hypertension), past vascular surgical history (revascularization), family history of chronic lower limb ischemia, duration of chronic lower limb

ischemia, used of walking assistive device, body mass index and ankle brachial index.

Tool II: Functional Status Questionnaire (FSQ) (Jette et al.,1986):

Functional status questionnaire was utilized to assess functional status. It included 34 items: basic activities of daily living (3 items), intermediate activities of daily living (6 items), mental health (5 items), work performance (6 items), social activity (3 items), quality of interaction (5 items) and 6 single items.

Scoring system:

- Scale Score = (added scores per question) - (number of questions in the section) / (number of questions in the section).
- Scale Score x 100 / (number of questions in the section) = (the total score for the section)

Score ranges (0 to 100):

Category	Warning zone	Good
Basic ADLs	0 - 87	88-100
Intermediate ADLs	0 -77	78 -100
Mental health	0 -70	71-100
Work performance	0 -78	79 -100
Social activities	0 – 78	79 -100
Quality of interactions	0 - 69	70 -100

A warning zone helps clinicians interpret functional status questionnaire scores. Scale scores within the warning zone represent important functional disabilities.

Validity and reliability: The validity of the scale was found by construct and criterion validity through several studies**.** The reliability coefficient by Cronbach's alpha = 0.64 to 0.82 **(Jette et al.,1986).**

Tool III: Vascular Quality of Life (Vascular QOL) (Morgan et al.,2001):

It was utilized to assess quality of life in patients with chronic lower limb ischemia. It consists of 25 items: activity items (8), symptom items (4), pain items (4), emotional items (7) and social items (2).

Scoring system: Each domain was scored 1-7: the total of domain item scores divided by the number of questions in the domain. The total King's College Hospital's Vascular QOL score was also scored 1-7= the total of all the item scores divided by 25. Response options range from 1 (the worst) to 7 (the best possible).

Validity and Reliability: The validity of the scale was found by construct and criterion validity through several studies. The reliability coefficient by Cronbach's alpha = 0.93 **(Morgan et al., 2001).**

Pilot study:

The pilot study was performed on 25 elderly patients with chronic lower limb ischemia, to assess the feasibility, applicability and clarity of the research tools and time needed for data acquisition. Following data analysis, no modifications were made and the pilot group was subsequently integrated into the main study subjects.

Data collection phase (Field work):

Data collection, which began in early January 2024 and concluded in late June 2024, spanned six months, two days a week after receiving necessary approvals. Afterward, the researcher introduced herself, explained the purpose of the study and obtained the patient's formal consent to participate in the study on a voluntary basis. Each elderly patient who participated in the study was interviewed individually in the inpatient ward and outpatient clinic of the vascular surgery department (male & female). The questionnaire was filled out by the researcher, who asked elderly patients and documented their answer, which was filled out and completed in 20 and 30 minutes. Five to six interviews are conducted daily in the morning and afternoon shifts.

Ethical considerations

Ethical approval for this study was obtained from the Faculty of Nursing Ethics Committee on October 2023, with ID approval (1120240682), and patients' oral agreement was obtained after they had been informed of the study's nature and objectives. Formal permission to collect data was granted by the head of the department of vascular surgery. The study adhered to rigorous ethical standards in clinical research, ensuring participant safety, confidentiality, and anonymity. Participants were advised of their right to discontinue participation in the study at any time without explanation.

Statistical analysis:

The data was entered and analyzed using SPSS version 22. Descriptive statistics such as frequency, percentage, mean and standard deviation were utilized to present the data. Independent samples t-test was utilized to compare quantitative variables between two groups and ANOVA test was used for comparisons among more than two groups. Pearson correlation was calculated to assess the correlation between quantitative variables. P-value less than 0.05 was considered statistically significant.

Results:

Table (1): Distribution of demographic characteristics of elderly patients with chronic lower limb ischemia (No=258).

Demographic characteristics	No. (258)	%
Age: (years).		
60 - < 70.	140	54.3
≥ 70.	118	45.7
Mean ± SD (Range).	70.64 ± 5.17 (61.0-89.0)	
Gender.		
Male.	188	72.9
Female.	70	27.1
Occupation.		
Farmer.	58	22.5
Manual work.	102	39.5
Housewife.	52	20.2
Retired.	46	17.8
Level of education.		
Illiterate.	150	58.1
Reads and writes.	15	5.8
Basic education.	40	15.5
Secondary.	11	4.3
University.	42	16.3
Marital status.		
Married.	100	38.8
Widow.	158	61.2
Residence.		
Urban.	89	34.5
Rural.	169	65.5
Smoking status.		
Current smoker.	108	41.9
Previous smoker.	41	15.9
Never smoker.	109	42.2

Table (2): Distribution of medical history of elderly patients with chronic lower limb ischemia (No=258).

Medical history	No. (258)	%
Past vascular surgical history of lower limb.		
No.	115	44.6
Yes , if yes.	143	55.4
Family history of chronic lower limb ischemia.		
Yes.	103	39.9
No.	155	60.1
Duration of chronic lower limb ischemia.		
1 – 3 years.	157	60.9
> 3 years.	101	39.1
Using walking assistive device.		
Yes.	154	59.7
No.	104	40.3

Medical history	No. (258)	%
Type of assistive device.		
Cane.	126	81.9
Crutches.	27	17.5
Walker.	1	0.6
Body mass index.		
Normal.	49	19.0
Overweight.	124	48.1
Obese.	85	32.9
Mean ± SD.	27.41 ± 3.48	
Ankle brachial index.		
ABI (0.9 - 1.2).	7	2.7
ABI (0.7 - < 0.9).	58	22.5
ABI (0.4 - < 0.7).	161	62.4
ABI (< 0.4).	32	12.4
Mean ± SD.	0.55 ± 0.16	
Range.	0.3-0.9	

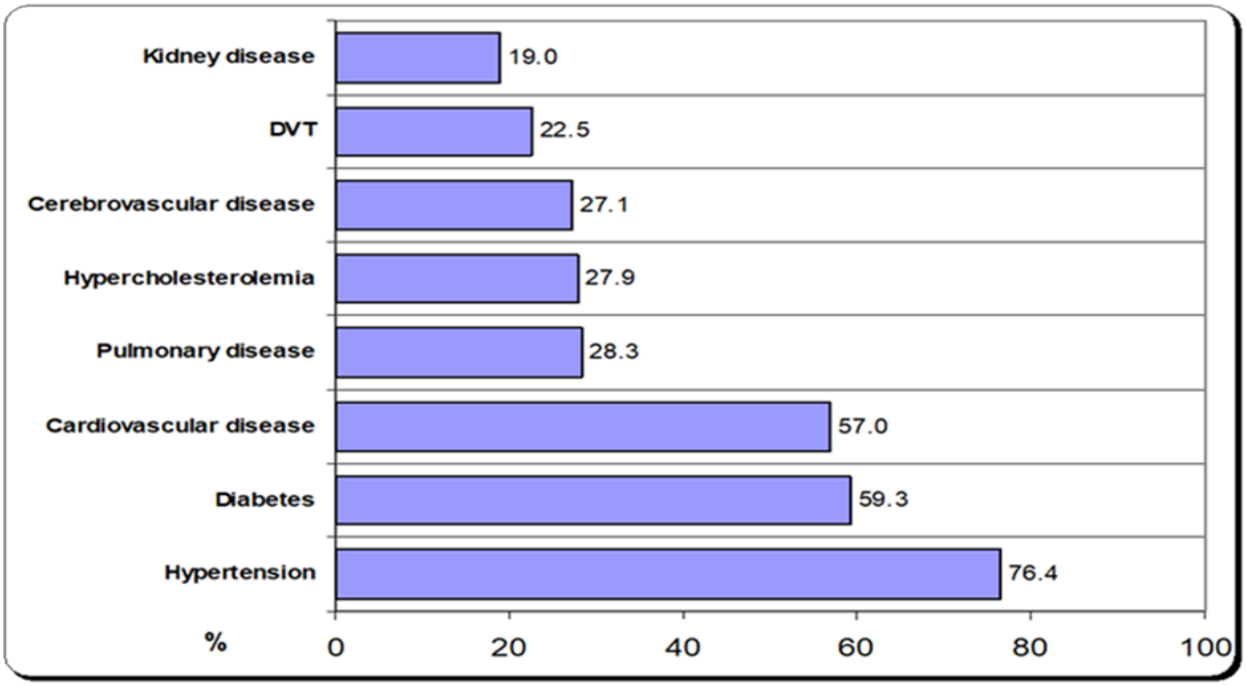

Figure (1): Past medical history of elderly patients with chronic lower limb ischemia.

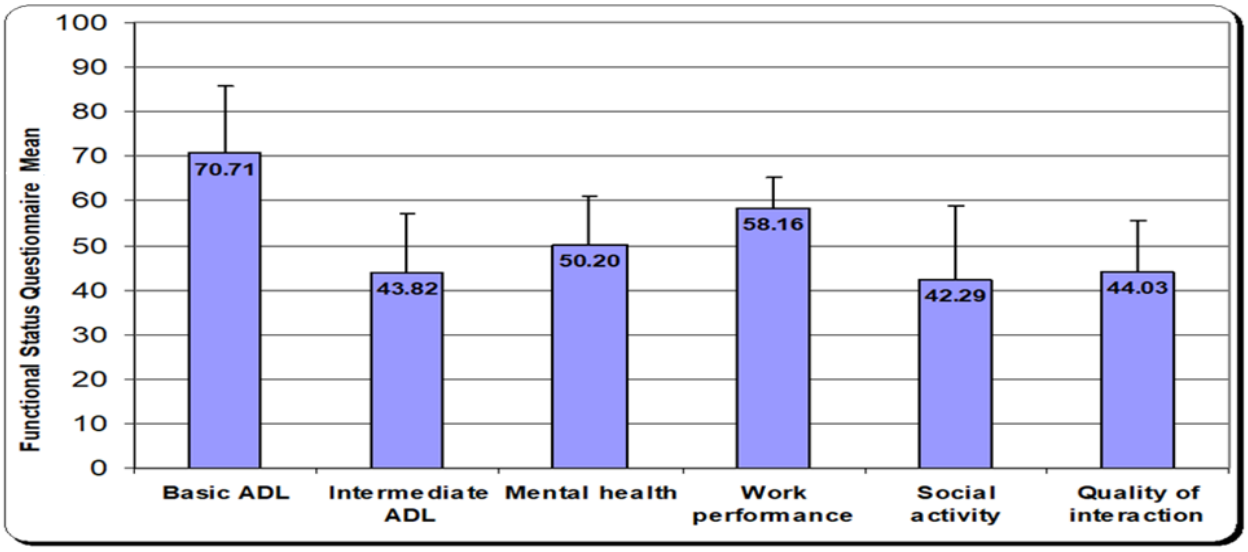

Figure (2): Functional status mean score of elderly patients with chronic lower limb ischemia.

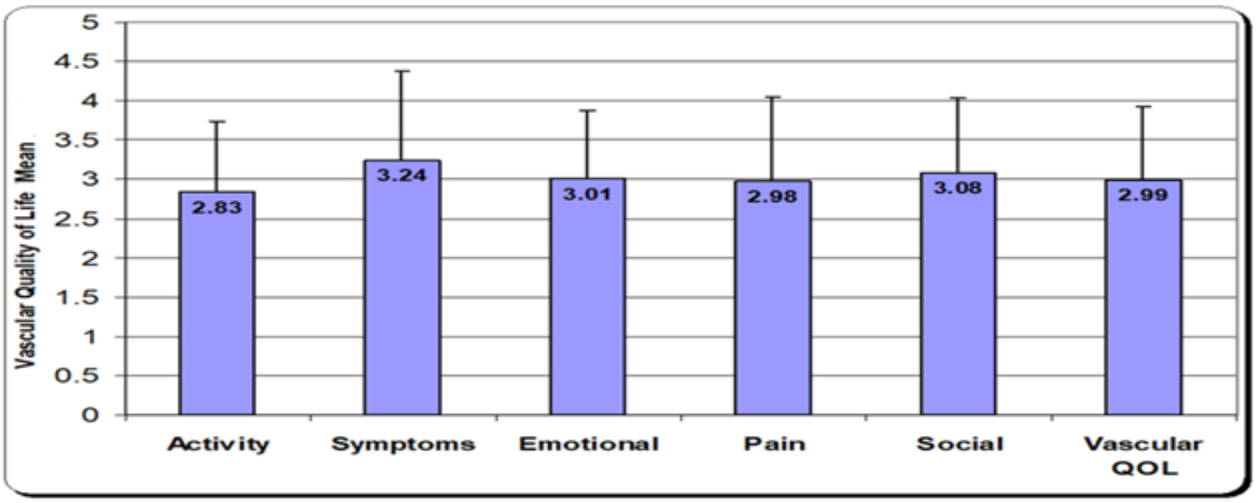

Figure (3): Vascular quality of life mean score of elderly patients with chronic lower limb ischemia.

Table (3): Correlation between vascular quality of life and function status among elderly patients with chronic lower limb ischemia.

Vascular quality of life		Function status					
		Basic ADL	Intermediate ADL	Mental health	Work performance	Social activity	Quality of interaction
Activity.	r-value	0.466	0.513	0.255	0.343	0.096	0.429
	P-value	**0.000***	**0.000***	**0.000***	**0.000***	0.123	**0.000***
Symptoms.	r-value	0.409	0.489	0.228	0.266	0.081	0.479
	P-value	**0.000***	**0.000***	**0.000***	**0.000***	0.195	**0.000***
Emotional.	r-value	0.429	0.480	0.215	0.278	0.088	0.440
	P-value	**0.000***	**0.000***	**0.000***	**0.000***	0.160	**0.000***
Pain.	r-value	0.463	0.475	0.226	0.349	0.068	0.463
	P-value	**0.000***	**0.000***	**0.000***	**0.000***	0.277	**0.000***
Social.	r-value	0.342	0.513	0.283	0.366	0.311	0.459
	P-value	**0.000***	**0.000***	**0.000***	**0.000***	**0.015***	**0.000***
Vascular QOL.	r-value	0.449	0.508	0.244	0.325	0.090	0.463
	P-value	**0.000***	**0.000***	**0.000***	**0.000***	0.149	**0.000***

Pearson correlation test ** Statistical significance at **P-value < 0.05.***

Table (4): Relation between demographic characteristics, medical history and function status among elderly patients with chronic lower limb ischemia.

Items	Functional Status					
	Basic ADL	**Intermediate ADL**	**Mental health**	**Work performance**	**Social activity**	**Quality of Interaction**
Age:(years).						
60 - < 70 .	73.17 ± 13.79	46.39 ± 12.30	48.06 ± 10.81	60.31 ± 5.91	44.05 ± 15.91	45.63 ± 10.63
≥ 70 .	67.80 ± 16.01	40.77 ± 13.55	52.75 ± 10.37	56.35 ± 7.53	40.21 ± 17.18	42.69 ± 11.98
P-value.	**0.004***	**0.001***	**0.000***	**0.000***	**0.034***	**0.040***
Gender .						
Male.	73.76 ± 11.59	45.21 ± 13.25	50.15 ± 11.51	57.71 ± 7.99	46.28 ± 16.04	45.26 ± 11.91
Female.	62.54 ± 19.67	40.08 ± 12.26	50.34 ± 8.89	59.37 ± 3.61	31.59 ± 12.92	40.74 ± 9.47
P-value	**0.000***	**0.005***	0.899	0.097	**0.000***	**0.005***
Occupation.						
Farmer.	75.86 ± 10.84	45.21 ± 13.59	51.24 ± 12.73	57.85 ± 6.58	44.25 ± 15.22	45.38 ± 13.58
Manual work.	73.97 ± 12.46	44.72 ± 13.04	49.69 ± 10.61	57.68 ± 7.54	45.97 ± 16.70	45.18 ± 11.49
Housewife.	63.03 ± 19.27	40.60 ± 12.33	49.85 ± 8.17	59.51 ± 3.86	33.12 ± 12.73	40.31 ± 8.82
Retired.	65.70 ± 14.97	43.72 ± 13.64	50.43 ± 11.67	58.09 ± 9.27	42.03 ± 18.28	44.00 ± 10.50
P-value	**0.000***	0.238	0.841	0.486	**0.000***	0.062
Marital status.						
Married.	72.73 ± 13.99	46.87 ± 14.65	47.64 ± 11.78	56.57±10.43	44.24 ± 16.35	48.51 ± 12.22
Widow.	70.17 ± 15.32	42.99 ± 12.65	50.90 ± 10.50	58.59 ± 5.85	41.76 ± 16.64	42.82 ± 10.96
P-value	0.265	0.053	**0.048***	0.060	0.326	**0.001***
Smoking status.						
Current smoker.	66.16 ± 17.46	43.26±13.71	50.70±11.50	56.89 ± 8.95	36.09 ± 14.12	44.22 ± 12.35
Previous smoker.	73.98 ± 11.28	45.66±13.29	49.27±12.44	58.54 ± 8.16	47.15 ± 17.17	46.34 ± 10.12
Never smoker.	74.07 ± 12.34	43.68±12.62	50.06 ± 9.55	59.28 ± 3.63	46.71 ± 16.76	42.97 ± 10.96
P-value.	**0.000***	0.605	0.759	**0.044***	**0.000***	0.270
Cardiovascular disease						
Yes.	69.09 ± 14.04	40.29±15.78	51.67±11.93	56.26 ± 6.23	41.12 ± 18.50	38.20 ± 9.87
No.	72.87 ± 16.11	48.50 ± 5.99	48.25 ± 8.90	59.60 ± 7.40	43.84 ± 13.55	48.44 ± 10.59
P-value.	**0.045***	**0.000***	**0.012***	**0.000***	0.192	**0.000***
Hypertension.						
Yes.	70.22 ± 14.65	42.75±13.28	51.01±11.23	58.21 ± 7.26	43.03 ± 16.68	44.75 ± 11.54
No.	72.31 ± 16.31	47.27±12.28	47.61 ± 9.11	58.01 ± 6.61	39.89 ± 16.15	41.70 ± 10.94
P-value.	0.344	**0.019***	**0.032***	0.854	0.196	0.069
Diabetes.						
Yes.	70.66 ± 14.95	44.23 ± 13.96	50.35 ± 11.58	58.10 ± 6.98	40.38 ± 17.28	44.86 ± 11.53
No.	70.79 ± 15.27	43.23 ± 11.96	49.98 ± 9.74	58.25 ± 7.31	45.08 ± 15.16	42.82 ± 11.30
P-value.	0.945	0.550	0.787	0.862	**0.025***	0.160
Duration of chronic lower limb ischemia.						
1 – 3 years.	73.39 ± 13.30	46.82 ± 11.99	53.90 ± 10.65	59.74 ± 5.18	46.43 ± 16.23	45.98 ± 11.34
> 3 years.	66.56 ± 16.67	39.16 ± 13.62	47.82 ± 10.32	57.15 ± 7.96	35.86 ± 15.06	42.78 ± 11.39
P-value.	**0.000***	**0.000***	**0.000***	**0.004***	**0.000***	**0.028***
Body mass index.						
Normal.	77.55 ± 14.07	45.43 ± 11.83	55.02 ± 11.71	59.54 ± 6.67	45.25 ± 16.89	41.96 ± 12.31
Overweight.	67.74 ± 15.48	39.12 ± 14.91	48.35 ± 10.84	57.37 ± 3.65	37.64 ± 9.02	45.35 ± 10.16
Obese.	71.11 ± 13.74	44.18 ± 13.47	50.12 ± 9.53	56.60 ± 8.72	40.65 ± 18.67	43.29 ± 12.58
P-value.	**0.000***	**0.016***	**0.001***	**0.009***	**0.013***	0.165
Ankle brachial index.						
ABI (0.9 - 1.2).	87.30 ± 7.67	52.38 ± 10.57	59.50 ± 9.07	60.94 ± 4.35	46.03 ± 11.88	57.37 ± 7.30
ABI (0.7-<0.9).	79.50 ± 11.92	51.05 ± 5.35	47.93 ± 8.26	54.41 ± 7.56	42.72 ± 10.15	43.73 ± 10.19
ABI (0.4-<0.7).	67.22 ± 14.37	44.41 ± 12.07	49.42 ± 11.14	59.42 ± 6.02	43.89 ± 17.56	45.71 ± 12.83
ABI (< 0.4).	68.75 ± 16.32	25.87 ± 12.75	44.57 ± 9.64	47.62 ±14.29	32.64 ± 18.92	37.31 ± 10.37
P-value.	**0.000***	**0.000***	**0.000***	**0.000***	**0.000***	0.000*

Independent samples t-test *ANOVA test* ** Statistical significance at **P-value < 0.05.***

Table (5): Relation between demographic characteristics, medical history and vascular quality of life among elderly patients with chronic lower limb ischemia.

Items	Vascular Quality of life (Vascular QOL)					
	Activity	**Symptoms**	**Emotional**	**Pain**	**Social**	**Vascular QOL**
Age						
< 70	2.96 ± 0.91	3.38 ± 1.16	3.15 ± 0.84	3.11 ± 1.08	3.21 ± 0.98	3.12 ± 0.93
≥ 70	2.67 ± 0.90	3.08 ± 1.09	2.85 ± 0.87	2.83 ± 1.05	2.92 ± 0.92	2.83 ± 0.92
P-value	**0.011***	**0.040***	**0.006***	**0.037***	**0.012***	**0.013***
Gender						
Male	2.84 ± 0.91	3.30 ± 1.14	3.09 ± 0.87	3.00 ± 1.08	3.07 ± 0.99	3.11 ± 0.94
Female	2.79 ± 0.91	3.25 ± 1.12	2.95 ± 0.85	2.90 ± 1.05	2.81 ± 0.88	2.84 ± 0.92
P-value	0.736	0.825	0.768	0.705	**0.016***	**0.013***
Occupation						
Farmer	2.84 ± 0.92	3.24 ± 1.14	3.05 ± 0.90	2.97 ± 1.07	3.04 ± 0.97	3.00 ± 0.95
Manual work	2.83 ± 0.97	3.24 ± 1.19	3.01 ± 0.92	3.01 ± 1.15	3.06 ± 1.03	2.99 ± 1.00
Housewife	2.83 ± 0.92	3.31 ± 1.12	3.06 ± 0.86	2.99 ± 1.04	3.14 ± 0.86	3.02 ± 0.92
Retired	2.80 ± 0.78	3.17 ± 1.01	2.93 ± 0.72	2.95 ± 0.96	3.09 ± 0.90	2.94 ± 0.80
P-value	0.998	0.942	0.871	0.990	0.947	0.981
Marital status						
Married	2.95 ± 0.95	3.22 ± 1.20	3.04 ± 0.96	3.05 ± 1.11	3.18 ± 1.08	3.05 ± 1.00
Widow	2.79 ± 0.90	3.25 ± 1.12	3.01 ± 0.84	2.97 ± 1.07	3.05 ± 0.92	2.97 ± 0.92
P-value	0.257	0.886	0.809	0.611	0.364	0.578
Smoking status						
Current smoker	2.74 ± 0.90	3.28 ± 1.14	3.03 ± 0.87	2.78 ± 0.93	2.94 ± 0.96	2.87 ± 0.85
Previous smoker	2.78 ± 0.85	3.11 ± 1.08	2.95 ± 0.75	2.97 ± 1.05	3.06 ± 1.01	3.00 ± 0.98
Never smoker	2.83 ± 0.95	3.26 ± 1.14	3.02 ± 0.91	3.24 ± 1.15	3.22 ± 0.92	3.11 ± 0.93
P-value	0.924	0.711	0.867	**0.023***	**0.037***	**0.014***
Cardiovascular disease						
Yes	2.47 ± 0.72	2.79 ± 0.92	2.67 ± 0.69	2.56 ± 0.83	2.69 ± 0.80	2.61 ± 0.74
No	3.29 ± 0.93	3.84 ± 1.12	3.47 ± 0.86	3.55 ± 1.09	3.59 ± 0.91	3.50 ± 0.93
P-value	**0.000***	**0.000***	**0.000***	**0.000***	**0.000***	**0.000***
Hypertension						
Yes	2.77 ± 0.90	3.16 ± 1.11	2.95 ± 0.84	2.93 ± 1.05	3.01 ± 0.95	2.93 ± 0.92
No	3.02 ± 0.95	3.50 ± 1.18	3.22 ± 0.91	3.16 ± 1.14	3.30 ± 0.98	3.20 ± 0.98
P-value	0.059	**0.041***	**0.035***	0.154	**0.035***	**0.050***
Diabetes						
Yes	2.81 ± 0.90	3.16 ± 1.10	3.00 ± 0.86	2.94 ± 1.08	3.02 ± 0.96	2.96 ± 0.93
No	2.85 ± 0.94	3.37 ± 1.17	3.04 ± 0.87	3.05 ± 1.07	3.16 ± 0.95	3.04 ± 0.95
P-value	0.702	0.136	0.694	0.452	0.270	0.461
Duration of chronic lower limb ischemia						
1 – 3 years	2.99 ± 0.94	3.44 ± 1.19	3.17 ± 0.87	3.17 ± 1.12	3.27 ± 1.01	3.16 ± 0.97
> 3 years	2.57 ± 0.80	2.93 ± 0.96	2.77 ± 0.80	2.70 ± 0.93	2.78 ± 0.79	2.72 ± 0.82
P-value	**0.000***	**0.000***	**0.000***	**0.001***	**0.000***	**0.000***
Body mass index						
Normal	3.18 ± 1.11	3.58 ± 1.35	3.28 ± 1.05	3.39 ± 1.24	3.24 ± 1.11	3.31 ± 1.13
Overweight	2.62 ± 0.72	3.02 ± 0.88	2.86 ± 0.68	2.68 ± 0.79	2.91 ± 0.81	2.78 ± 0.72
Obese	2.92 ± 0.97	3.36 ± 1.26	3.08 ± 0.95	3.20 ± 1.21	3.23 ± 1.03	3.11 ± 1.02
P-value	**0.001***	**0.006***	**0.010***	**0.000***	**0.023***	**0.001***
Ankle brachial index						
ABI (0.9 - 1.2)	4.14 ± 0.33	4.71 ± 0.73	4.14 ± 0.85	4.68 ± 0.67	4.36 ± 0.38	4.34 ± 0.53
ABI (0.7-<0.9)	3.85 ± 0.81	4.50 ± 1.03	3.96 ± 0.78	4.25 ± 0.91	4.06 ± 0.80	4.06 ± 0.81
ABI (0.4-<0.7)	2.59 ± 0.63	2.96 ± 0.78	2.81 ± 0.60	2.66 ± 0.71	2.88 ± 0.74	2.74 ± 0.63
ABI (< 0.4)	1.88 ± 0.15	2.07 ± 0.33	2.10 ± 0.21	1.97 ± 0.27	2.03 ± 0.33	2.00 ± 0.17
P-value	**0.000***	**0.000***	**0.000***	**0.000***	**0.000***	**0.000***

Independent samples t-test *ANOVA test* ** Statistical significance at **P-value < 0.05.***

Table (1): This table demonstrated the distribution of demographic characteristics of elderly patients with chronic lower limb ischemia. It was observed that 54.3% of the elderly patients were aged from 60- < 70 years with a mean age was 70.64 ± 5.17 years, 72.9% were males, 39.5% of the elderly patients were manual workers, 58.1% of them were illiterate, 61.2% were widows, 65.5% of them resided in rural regions and 41.9% of them were current smokers.

Table (2): This table showed the distribution of medical history of elderly patients with CLLI. It was observed that 39.9% of older adult patients had a family history of CLLI. Also, 48.1% of the elderly patients were overweight, 62.4% of them were ankle brachial index (ABI 0.4 < 0.7 mmHg) and with a mean ABI of elderly patients was 0.55 ± 0.16 mmHg.

Figure (1): This figure clarified that 76.4% of them had hypertension, 59.3% had diabetes, and 57.0% had cardiovascular disease.

Figure (2): This figure illustrated that functional status mean score of the geriatric patients with CLLI. It showed that the mean scores of basic activities of daily living, intermediate activities of daily living, mental health, work performance, social activity and quality of interaction were 70.71, 43.82, 50.20, 58.16, 42.29 and 44.03, respectively. These mean scores within the warning zone represented functional disabilities.

Figure (3): This figure illustrated that vascular quality of life mean score of the elderly patients with chronic lower limb ischemia was 2.99.

Table (3): This table demonstrated that function status was positively correlated with vascular quality of life.

Table (4): This table presented a relation between demographic characteristics, medical history and function status among elderly patients with CLLI. It was noticed that age, gender and smoking status were significantly associated with functional status among geriatric patients.

Table (5): This table presented a relation between demographic characteristics, medical history and vascular quality of life. It was noticed that age, gender and smoking status were significantly associated with QOL among geriatric patients.

Discussion

Chronic lower limb ischemia is a condition characterized by reduced blood flow to lower limbs and leg pain, results in significant morbidity including functional impairment and diminished QOL **(Perlander et al., 2023).**

Regarding the demographic characteristics of elderly patients with CLLI, the current study demonstrated that the mean age of the older adult patients was 70.64 ± 5.17 years. The result accepted with **Ferreira et al., (2024)**, who found mean age of the studied patients was 67.58 ± 9.60 years and matched with **Takei et al., (2024)**, who found mean age of the studied patients was 74.7 ± 1.6 years.

Also, the result was compatible with **Abdelmonem et al., (2022)**, who found mean age of the studied patients was 64.1 ± 7.5 years. This may be demonstrated by the fact that age-related vascular deterioration can reduce blood flow and conductance in the lower limbs, potentially impacting overall health **(Castelli et al., 2023).**

The present study illustrated that chronic lower limb ischemia is more common in males than females, more than three fifths of elderly patients with CLLI were males. This matched with **Ferreira et al., (2024)**, who found 79.80% of patients were male and agreed with **Haga et al., (2024)**, who found 71.8% of patients were male. From the investigator's perspective, these results might be due to lifestyle bad habits, such as smoking in males more than females and most males are manual workers who stand for long periods and sit for long periods.

The present study illustrated that two fifths of the elderly patients were manual workers. This result was compatible with **Liu et al., (2022)**, who found 48.0% of the studied patients were manual workers. This may be illustrated by the reality that manual workers stand for long periods and sit for long periods leading to decreased blood flow in limbs **(Kai et al., 2021).**

The results of the present study illustrated that more than half of the elderly patients were illiterate; This matched with **Ying et al., (2022)**, who found 40.7% of the studied patients were illiterate. While this result was contrary with **Paskiewicz et al., (2021)**, who found most of the studied patients were high school graduates. This may be illustrated by the reality that illiterate patients have less health information and low health literacy **(Obaremi & Olatokun, 2022).**

The present study illustrated that three fifths of the elderly patients were widows. The result agreed with **Akpan et al., (2020)**, who found most of patients were widows. While this result was contrary with **Abo El-Ata & Gamal (2022)**, who found that most of patients were married.

The current study found over three fifths of elderly patients with CLLI lived in rural areas. This matched with **Dogbe et al., (2024)**, who found most patients resided in rural regions and agreed with **Hassan et al., (2020).** This may be explained by the fact that rural areas have fewer health services, lack of preventive care and disease management **(Dogbe et al., 2024).**

The current findings found over two fifths of older adult patients with chronic lower limb ischemia were current smokers. This matched with **Alrabadi et al., (2024)**, who found 42.9% of the studied patients were current smokers and agreed with **Santos et al., (2023)**,

who found 52,50% of patients were current smokers. This may be explained by the fact that smoking damaged blood vessels, increased risk of aortoiliac classification which contributes to plaque buildup and reduced blood flow to the legs **(Santos et al., 2023)**.

Regarding the medical history of the elderly patients with chronic lower limb ischemia, the present study found elderly patients had hypertension, diabetes mellitus and cardiovascular disease (76.4%, 59.3% and 57.0%, respectively). This matched with **Nomura et al., (2024)**, who found patients had hypertension, diabetes mellitus and cardiovascular disease (73.3%,45.8% and 46.6%, respectively).

This may be illustrated by the reality that hypertension promotes plaque formation and can harm arteries, when there is too much plaque, arteries can become narrowed and restrict blood flow **(Piechocki et al., 2024)**. Diabetes can indeed affect the lining of blood vessels, leading to reduced flexibility and impaired blood flow **(Ying et al., 2022).**

The present study found two fifths of elderly patients had a positive family history of chronic lower limb ischemia. This result was supported by **Abo El-Ata & Gamal (2022)**, who reported that 40% of patients had a family history of CLLI.

The present study found three fifths of elderly patients had chronic lower limb ischemia from 1-3 years ago. This matched with **Abo El-Ata & Gamal (2022)**, who reported that most patients had CLLI from 1-3 years ago.

The present study found over half of the older adult patients were overweight. This result was compatible with **Dogbe et al., (2024)**, who found

71.3% of studied samples were overweight and this matched with **Kim et al., (2021)**, who found 50% of studied samples were overweight. This may be illustrated by the reality that obese people are three to five times higher risk of developing lower limb ischemia, obesity is a serious health condition linked to a higher risk of metabolic and cardiovascular diseases **(Takahara et al., 2021)**.

The present study found three fifths of geriatric patients were ankle brachial index (0.4 < 0.7 mmHg) and the mean ankle brachial index of the elderly patients was 0.55 ± 0.16 mmHg. This matched with **Ferreira et al., (2024)**, who found ankle brachial index of the studied samples was 0.57 ± 0.30 mmHg and also, this agreed with **Haga et al., (2024),** who found the mean ankle brachial index of the studied samples was 0.53 ± 0.19 mmHg.

This result was compatible with **Hassan et al., (2020)**, who reported that 40.0% of the studied samples were ankle brachial index 0.4 - < 0.7 mmHg. This may be explained by the fact that ankle brachial index (0.9 or lower) is abnormal indicate blockage of the arteries in the lower limbs **(Sotoda et al., 2023).**

The current study found that the mean score of the vascular QOL of the elderly patients was 2.99. This matched with **Menard et al., (2024)**, who found mean score of the vascular QOL of the patients was 3.0. and agreed with **Perlander et al., (2023)**, who found the mean score of the vascular QOL was 2.68. This may be illustrated by the reality that elderly patients with chronic lower limb ischemia have poor QOL and limited daily activities **(Peters et al., 2020)**.

Regarding correlation between function status and vascular quality of life, the current study demonstrated that function status was positively correlated with QOL. This matched with **Kim et al., (2021) & Sharma, (2020**), who discovered that function status was positively correlated with quality of life. This may be illustrated by the reality that CLLI patients often experience reduced QOL and functional limitations, impacting daily activities. **(Kodama et al., 2021).**

Regarding the relation between demographic characteristics, medical history and function status, the current research indicated a significant association between age and functional status. These results were supported by **Kim et al., (2021) & Cunningham et al., (2020),** who discovered that there was a statistical significance to the relationship between age and functional status.

This result was incompatible with **Dogbe et al., (2024),** who discovered not a significant association between age and function status. This may be explained by the fact that arterial walls thicken, lumens dilate, and elastic tissue degenerates with age **(Yan et al., 2023).**

Present research found a significant association between gender and functional status among geriatric patients. This matched with **Segheto et al., (2024)**, who discovered that there was a statistical significance to the relationship between gender and function status and discovered women with CLLI had lower absolute functional capacity compared to men.

These findings disagreed with **Dogbe et al., (2024)**, who discovered not a significant association between function status and gender. This may be illustrated by the reality that women have more functional limitation and sedentary lifestyle compared to men **(Patel et al., 2020)**.

Present research found a significant association between smoking status and function status. This matched with **Hahad et al.,(2023)**, who discovered that there was a statistical significance to the relationship between smoking status and function status. This may be illustrated by the reality that smoking is linked to multiple comorbidities, may increase vascular and pulmonary complications that can affect function status **(Yakut et al., 2024).**

Present research illustrated that there was a significant association between cardiovascular disease and

function status. This result was compatible with **Silva et al.,(2023) & Rymer et al.,(2020)**, who discovered a statistical significance to the relationship between between cardiovascular disease and function status. This may be illustrated by the reality that cardiovascular diseases can present with symptoms like angina and dyspnea, which may compromise functional status **(Silva et al., 2023).**

The current study showed a significant association between hypertension disease and function status. This agreed with **Hijriana et al.,(2024)**, who discovered that there was a statistical significance to the relationship between hypertension disease and function status. This may be illustrated by reality that high blood pressure, if left untreated, can negatively impact cognitive abilities such as thinking, memory, and learning and can cause headaches, blurred vision that can affect function status **(Zhou et al., 2021).**

The present study concluded a significant association between ankle brachial index and function status. This result was compatible with **Chiu et al.,(2024) & Poredos et al.,(2022),** who discovered that there was a statistical significance to the relationship between ankle brachial index and function capacity. This may be illustrated by the reality that a decrease in ankle-brachial index signals atherosclerosis, a condition that can impair blood flow and reduce functional capacity **(Poredos et al., 2024).**

Regarding the relation between demographic characteristics, medical history and QOL, the present study demonstrated a significant association between age and QOL. This result was compatible with **Younis et al., (2024) & Kim et al., (2021),** who discovered that there was a statistical significance to the relationship between age and QOL.

This result was incompatible with **Powell et al., (2022)**, who discovered not significant association between age and QOL. This may be explained by the fact that aging diminishes both physical and cognitive function, affecting overall well-being **(Yan et al., 2023).**

Present research found a significant association between gender and QOL. These finding were confirmed by **Bakhtiyorova & Komila (2024) & Alqahtani et al., (2024)** who discovered that there was a statistical significance to the relationship between gender and QOL and mentioned female sex had lower QOL than male in patients with CLLI.

This result was incompatible with **Powell et al., (2022)**, who discovered not significant association between gender and QOL. This may be illustrated by the reality that elderly females have more functional limitations, and a sedentary lifestyle compared to men **(Patel et al., 2020)**.

The current study showed a significant association between smoking status of the elderly patients and QOL. These findings were confirmed by **Cheraghi et al.,(2024), Liu et al.,(2024), Yakut et al.,(2024) & Powell et al.,(2022)**, who discovered that there was a statistical significance to the relationship between smoking status and QOL. This may be illustrated by the reality that smoking is linked to multiple comorbidities, may increase vascular and pulmonary complications that can affect quality of life **(Yakut et al., 2024).**

The current study illustrated a significant association between cardiovascular disease and QOL. This matched with **Alqahtani et al., (2024) & Kontoangelos et al.,(2024),** who discovered that there was a statistical significance to the relationship between cardiovascular disease and QOL. This may be explained by the fact that patients with cardiovascular disease can cause excessive fatigue, leading to confusion, irritability, and decreased stamina, impacting QOL **(Hiriscau et al., 2022)**.

The current study showed a significant association between hypertension disease and QOL. This matched with **Alqahtani et al.,(2024) & Chen et al., (2021)**, who discovered that there was a statistical significance to the relationship between hypertension disease and QOL. This may be illustrated by the reality that high blood pressure, if left untreated, can negatively impact cognitive abilities such as thinking, memory, and learning and can cause headaches, blurred vision and chest pain that can affect function status **(Zhou et al., 2021).**

Also, the current study showed a significant association body mass index and QOL. This matched with **Kodama et al.,(2021),** who discovered that there was a statistical significance to the relationship between body mass index and QOL. This may be illustrated by the reality that high fat mass is linked to metabolic disease, leads to microvascular complication and declining of the ambulatory status that can affect quality of life **(Takahara et al., 2021)**.

The current study concluded a significant association between ankle brachial index and QOL. This result was compatible with **Meena & Alabi (2022) & Gardner et al., (2020)**, who discovered that there was a statistical significance to the relationship between ankle brachial index and QOL.

This result was incompatible with **Otoni et al., (2021)**, who mentioned patients with chronic lower limb ischemia present significant impairment of QOL without association with ankle brachial index. This may be explained by the fact that a decrease in ankle-brachial index signals atherosclerosis, a condition that can impair blood flow and reduce quality of life. **(Poredos et al., 2024).**

Conclusion:

In light of the results obtained in this study, it was concluded that chronic lower limb ischemia has negatively significant implications on functional status and quality of life among geriatric patients with chronic lower limb ischemia.

Recommendations:

In light of the results obtained, the following recommendations are proposed:

1. Evaluate risk factors for chronic lower limb ischemia to optimize long-term care, risk factor modification, medical management and regular monitoring.
2. Provide educational programs about chronic lower limb ischemia designed for geriatric patients focusing on enhancing their function status and quality of life.
3. Integrating physical programs to improve mobility and independence.
4. Rehabilitative intervention should be implemented for elderly patients with chronic lower limb ischemia to prevent complications and amputation.

References

- **Abdelmonem, M., Shahat, M., Elashry, M. & Ali, H. (2022):** Retrograde Tibiopedal Access for Chronic Limb-Threatening Ischemia: A Real-World Experience Report of 178 Consecutive Patients. Indian Journal of Vascular and Endovascular Surgery, 9(1), 3-10.
- **Abo El-Ata, A. & Gamal, E. (2022):** health needs of patients with chronic lower limbs ischemia in general port said hospitals. Port Said Scientific Journal of Nursing, 9(1), 240-260.
- **Akpan, I., Enabulele, O. & Adewole, A. (2020):** An overview of peripheral artery disease in the elderly: a study in a tertiary hospital southern Nigeria. Nigerian Medical Journal, 61(1), 1-5.
- **Alqahtani, S., Aljaber, F., Alharbi, B., Masoud, R., Aljaber, F., Alharbi, B. & Masoud, R. (2024):** Quality of Life Outcomes Following Aortofemoral and Iliofemoral Bypass Surgery in Patients With Peripheral Arterial Disease: A Two-Year Follow-Up Study. Cureus, 16(6).
- **Alrabadi, N., Aljarrah, Q., Alzoubi, O., Al-Jarrah, H., Elayyan, Y., Alnabulsi, Z. & Haddad, R. (2024):** Clinical recurrence and antiplatelet drug resistance among patients with lower limb ischemia. Medicine, 103(2), e36915.
- **Bakhtiyorova, U. & Komila, N. (2024):** quality of life and work performance in peripheral artery disease of the lower extremities. pedagogical reforms and their solutions, 2(2), 191-196.
- **Cai, T., Verze, P. & Bjerklund Johansen, T. (2021):** The quality of life definition: where are we going?. Uro, 1(1), 14-22.
- **Castelli R., Gidaro A., Casu, G., Merella, P., Profili, N., Donadoni, M. , Maioli, M. & Delitala, A. (2023):** aging of the arterial system" international journal of molecular sciences 24, no. 8: 6910.
- **Castro, Y. & Shishehbor, M. (2022):** Team-Based Care in Patients with Chronic Limb-Threatening Ischemia. Current Cardiology Reports, 24(3), 217-223.
- **Central Agency for Public Mobilization and Statistics (2024):** Number of elderly people in Egypt at: https://mena.org.eg/en/news/dbcall/table/textnews/id/9806598
- **Chen, Q., Ran, L., Li, M. & Tan, X. (2021):** Health-related quality of life of middle-aged and elderly people with hypertension: A cross-sectional survey from a rural area in China. Plos one, 16(2), e0246409.
- **Cheraghi, L., Niknam, M., Masihay-Akbar, H., Azizi, F. & Amiri, P. (2024):** How Do Active and Passive Cigarette Smokers in Iran Evaluate Their Health? A Sex-Specific Analysis on the Full-Spectrum of Quality of Life. Nicotine and Tobacco Research, 26(7), 913-921.
- **Chiu, V., Urbanek, J., Wanigatunga, A., Allison, M., Ballew, S., Mossavar-Rahmani, Y. & Schrack, J. (2024):** The Association Between Ankle–Brachial Index and Daily Patterns of Physical Activity: Results From the Hispanic Community Health Study/Study of Latinos. The Journals of Gerontology: Series A, 79(2), glad200.
- **Chuter, V., Schaper, N., Mills, J., Hinchliffe, R., Russell, D., Azuma, N. & Fitridge, R. (2024):** Effectiveness of bedside investigations to diagnose peripheral artery disease among people with diabetes mellitus: a systematic review. Diabetes/metabolism research and reviews, 40(3), e3683.
- **Cunningham, C., O'Sullivan, R., Caserotti, P. & Tully, M. (2020):** Consequences of physical inactivity in older adults: A systematic review of reviews and meta-analyses. Scandinavian journal of medicine & science in sports, 30(5), 816-827.
- **Dogbe, L., Zil-E-Ali, A., Samaan, F., Aziz, F., Sardesai, S. & Aziz, F. (2024):** Patients living farther from a tertiary care center are more likely to undergo peripheral arterial bypass for acute and chronic limb-threatening ischemia. Journal of Vascular Surgery, 79(1), 120-127.

- **Ferreira, J., Roque, S., Longatto-Filho, A., Afonso, J., Carneiro, A., Vila, I. & Cunha, P. (2024):** Higher Levels of Cytokines in Patients with Chronic Limb-Threatening Ischemia. Annals of Vascular Surgery, 106, 255-263.
- **Gardner, A., Montgomery, P., Wang, M. & Shen, B. (2020):** Association between calf muscle oxygen saturation with ambulatory function and quality of life in symptomatic patients with peripheral artery disease. Journal of vascular surgery, 72(2), 632-642.
- **Haga, M., Shindo, S., Nitta, J., Kimura, M., Motohashi, S., Inoue, H. & Akasaka, J. (2024):** Anatomical and clinical factors associated with infrapopliteal arterial bypass outcomes in patients with chronic limb-threatening ischemia. Heart and Vessels, 1-11.
- **Hahad, O., Kuntic, M., Kuntic, I., Daiber, A. & Münzel, T. (2023):** Tobacco smoking and vascular biology and function: evidence from human studies. Pflügers Archiv-European Journal of Physiology, 475(7), 797-805.
- **Hassan, Z., Bader, S., Mohammed, A., & Mohammed, I. (2020):** Assessment of Peripheral Vascular Disease Degree among Diabetic Patient Who Attend in Out-Patient Clinics, Minia Scientific Nursing Journal Article 11, Volume 007, Issue 1, June 2020, Page 87-93.
- **Hijriana, I., Ismail, I. & Mardhiah, A. (2024):** The Impact of Functional Status to the Risk of Depression in Elderly with Hypertension. Indonesian Journal of Global Health Research, 6(2), 607-614.
- **Hiriscau, E., Buzdugan, E., Hui, L. & Bodolea, C. (2022):** Exploring the relationship between frailty, functional status, polypharmacy, and quality of life in elderly and middle-aged patients with cardiovascular diseases: a one-year follow-up study. International journal of environmental research and public health, 19(4), 2286.
- **Jakubiak, G., Pawlas, N., Cieślar, G. & Stanek, A. (2020).** Chronic lower extremity ischemia and its association with the frailty syndrome in patients with diabetes. International Journal of Environmental Research and Public Health, 17(24), 9339.
- **Jette, A., Davies, A., Cleary, P., Calkins, D., Rubenstein, L., Fink, A. & Delbanco, T. (1986):** The Functional Status Questionnaire: reliability and validity when used in primary care. Journal of general internal medicine, 1(3), 143-149.
- **Kai, S., Ferrières, J., Carles, C., Turpin, M., Lapébie, F., Dutheil, F. & Esquirol, Y. (2021):** Lower limb venous and arterial peripheral diseases and work conditions: systematic review. Occupational and Environmental Medicine, 78(1), 4-14.
- **Kim, M., Kim, Y., Ryu, G. & Choi, M. (2021):** Functional status and health-related quality of life in patients with peripheral artery disease: a cross-sectional study. International journal of environmental research and public health, 18(20), 10941.
- **Kodama, A., Takahara, M., Iida, O., Soga, Y., Mii, S., Kitano, I. & Azuma, N. (2021):** Health related quality of life over time after revascularisation in patients with chronic limb threatening ischaemia. European Journal of Vascular and Endovascular Surgery, 62(5), 777-785.
- **Kontoangelos, K., Soulis, D., Soulaidopoulos, S., Antoniou, C. K., Tsiori, S., Papageorgiou, C. & Katsi, V. (2024).** Health related quality of life and cardiovascular risk factors. Behavioral Medicine, 50(3), 186-194.
- **Li, A., Yan, J., Zhao, Y., Yu, Z., Tian, S., Khan, A. & Tian, X. (2023):** Vascular aging: assessment and intervention. Clinical Interventions in Aging, 18, 1373-1395.
- **Liu, Y., Okamura, T., Hirata, A., Sato, Y., Hayakawa, T., Kadota, A. & Ueshima, H. (2024):** Smoking is associated with impaired long-term quality of life in elderly people: a 22-year cohort study in NIPPON-DATA 90. Journal of Epidemiology, 34(6), 265-269.
- **Liu, H., Liu, Y., Pan, T., Fang, Y., Fang, G., Jiang, X. & Dong, Z. (2022):** Return to work after cell transplantation in patients with angiitis-induced critical limb ischaemia and factors related: a single-centre retrospective cohort study. Stem Cell Research & Therapy, 13(1), 139.
- **Meena, R. & Alabi, O. (2022):** Infrapopliteal Arteries (Classical and Percutaneous). In Patient Reported Outcomes and Quality of Life in Cardiovascular Interventions (pp. 407-414). Cham: Springer International Publishing.
- **Menard, M., Farber, A., Powell, R. , Rosenfield, K., Conte, M. , Hamza, T. & Choudhry, N. (2024):** Quality of life in patients with chronic limb-threatening ischemia treated with revascularization. Circulation, 149(16), 1241-1253.
- **Morgan, M., Crayford, T., Murrin, B. & Fraser, S. (2001):** Developing the Vascular Quality of Life Questionnaire: a new disease-specific quality of life measure for use in lower limb ischemia. Journal of vascular surgery, 33(4), 679-687.
- **Nomura T, Shoji K & Kitamura M. (2024):** Impact of Controlling Nutritional Status Score on Comprehensive Clinical Outcomes in Patients with Chronic Limb-Threatening Ischemia in a Local

Area of Super-Aged Society. Journal of Endovascular Therapy. 0(0).

- **Obaremi, O. & Olatokun, W. (2022):** A survey of health information source use in rural communities identifies complex health literacy barriers. Health Information & Libraries Journal, 39(1), 59-67.
- **Otoni, C., Couret, A., Storino, J., Pinto, D. & Machado, M. (2021):** Quality of life and arterial stiffness indices in patients with chronic limb threatening ischemia,31: e-31119. DOI: 10.5935/2238-3182.2021e31119
- **Paskiewicz, A., Wang, F., Yang, C., Ballew, S., Kalbaugh, C., Selvin, E. & Matsushita, K. (2021):** Ankle-brachial index and subsequent risk of severe ischemic leg outcomes: the ARIC study. Journal of the American Heart Association, 10(22), e021801.
- **Patel, T., Baydoun, H., Patel, N. K., Tripathi, B., Nanavaty, S., Savani, S. & Pancholy, S. (2020):** Peripheral arterial disease in women: the gender effect. Cardiovascular Revascularization Medicine, 21(3), 404-408.
- **Perlander, A., Broeren, M., Österberg, K., Svensson, M. & Nordanstig, J. (2023):** Disease specific health related quality of life in patients with chronic limb threatening ischemia undergoing revascularization of femoropopliteal lesions. European Journal of Vascular and Endovascular Surgery, 66(2), 245-251.
- **Peters, C., Lodder, P., de Vries, J., Steunenberg, S., Veen, E., de Groot, H. & van der Laan, L. (2020):** Two-year Outcome of Quality of Life and Health Status for the Elderly with Chronic Limb-threatening Ischemia. Clinical Interventions in Aging, 15, 2383-2395.
- **Piechocki, M., Przewłocki, T., Pieniążek, P., Trystuła, M., Podolec, J. & Kabłak-Ziembicka, A. (2024):** A non-coronary, peripheral arterial atherosclerotic disease (carotid, renal, lower limb) in elderly patients—A review: Part I—Epidemiology, risk factors, and atherosclerosis-related diversities in elderly patients. Journal of Clinical Medicine, 13(5), 1471.
- **Poredos, P., Stanek, A., Catalano, M. & Boc, V.(2024):** Ankle-Brachial Index: Diagnostic Tool of Peripheral Arterial Disease and Predictor of Cardiovascular Risk-An Update of Current Knowledge. Angiology.;0(0).
- **Poredos, P., Boc, V., Zlajpah, U. &Mangaroska, A. (2022):** Walking Impairment Questionnaire and Walking Tests are Reliable Indicators of Success of Treatment of Peripheral Artery Disease. Angiology.;73(4): p.p331-337. doi:10.1177/00033197211045281.
- **Powell, R., Choudhry, N., Conte, M., Cziraky, M., Giles, K., Hamza, T. & Farber, A. (2022):** Factors associated with lower preoperative quality of life in patients with chronic limb-threatening ischemia in the BEST-CLI trial. Journal of Vascular Surgery, 76(6), 1642-1650.
- **Rymer, J., Mulder, H., Smolderen, K., Hiatt, W., Conte, M., Berger, J. & Patel, M. (2020):** Association of health status scores with cardiovascular and limb outcomes in patients with symptomatic peripheral artery disease: insights from the EUCLID (Examining Use of Ticagrelor in Symptomatic Peripheral Artery Disease) trial. Journal of the American Heart Association, 9(19), e016573.
- **Santos, V., Cerutti, C., Alencar, M., Queiroz, A., Ferreira, L., Fidelis, C., & Alves, C. (2023):** Influence of atherosclerosis risk factors on the anatomical distribution of peripheral arterial disease in patients with chronic limb-threatening ischemia: a cross-sectional study. Jornal Vascular Brasileiro, 22, e20230014.
- **Segheto, W., Kanegusuku, H., de Oliveira, M., Wolosker, N., Correia, M. & Ritti-Dias, R. (2024):** Do Sociodemographic, Behavioral, Clinical, and Anthropometric Factors Influence the Association Between Sex and Functional Capacity in Patients with Peripheral Arterial Disease?. Annals of Vascular Surgery, 98, 18-25.
- **Sharma, R. (2020):** Functional status, social support and quality of life as determinants of successful aging. Gerontology & Geriatrics, 6(1), 1041.
- **Silva, G., Braghieri, H. , Oliveira, M., Farah, B. , Kanegusuku, H. & Cucato, G.(2023):** Objective assessment of functional capacity in patients with peripheral artery disease: a narrative review. Expert Review of Cardiovascular Therapy, 21(11), 867-875.
- **Sotoda, Y., Hirooka, S., Orita, H. & Wakabayashi, I. (2023):** Paradox of the Relationship between Cardio-Ankle Vascular Index and Ankle-Brachial Index in Patients with Lower Extremity Artery Disease. Annals of Vascular Diseases, 16(4), 253-260.
- **Takahara, M., Iida, O., Soga, Y., Kodama, A., Terashi, H. & Azuma, N., (2021):** Current and past obesity in Japanese patients with critical limb ischemia undergoing revascularization. Journal of Atherosclerosis and Thrombosis, 28(1), 44-51.
- **Takei, T., Kajiya, T. & Ohura, N. (2024):** Poor short-term outcomes for prognostic high-risk patients with chronic limb-threatening ischemia undergoing endovascular therapy. CVIR Endovasc, 7, 31.
- **World Population Prospects, (2024):** Ageing Available at:https://reliefweb.int/report/world/world-population-prospects-2024-summary-results

- **Yakut, H., Ozalevli, S., Aktan, R., Erez, Y. & Birlik, M. (2024):** Comparison of pulmonary function, respiratory symptoms, functional level, and health-related quality of life in patients with systemic sclerosis according to smoking status. Physiotherapy Theory and Practice, 40(5), 919-928.
- **Yan, J., Li, A., Zhao, Y., Yu, Z., Tian, S., Khan, A. & Tian, X. (2023):** Vascular aging: assessment and intervention. Clinical Interventions in Aging, 18, 1373–1395. https://doi.org/10.2147/CIA.S423373.
- **Ying, A., Tang, T., Jin, A., Chong, T., Hausenloy, D. & Koh, W. (2022):** Diabetes and other vascular risk factors in association with the risk of lower extremity amputation in chronic limb-threatening ischemia: a prospective cohort study. Cardiovascular Diabetology, 21(1), 7.
- **Younis, N., Ibrahim, R. & Ahmed, M. (2024):** Health Problems Related to Quality of Life among Aging in Iraq. Journal of Current Medical Research and Opinion, 7(06), 3015-24
- **Zhou, B., Perel, P., Mensah, G., & Ezzati, M. (2021):** Global epidemiology, health burden and effective interventions for elevated blood pressure and hypertension. Nature Reviews Cardiology, 18(11), 785-802.