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PREVALENCE OF INTERMITTENT CLAUDICATION AND ITS ASSOCIATION WITH PHYSICAL ACTIVITY AMONG THE STAFF OF ALLIED HEALTH SCIENCES SARHAD UNIVERSITY PESHAWAR

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Abstract

The aim of the study was to investigate the prevalence of intermittent claudication (IC) and its association with physical activity among the staff of Allied Health Sciences Sarhad University of Science and Information Technology, Peshawar. An analytical cross-sectional study was conducted and the sample size was 70 through census. Data were collected from the staff aged between 25 to 60 years. The Edinburgh Claudication Questionnaire (ECQ), Ankle-Brachial Index (ABI), and International Physical Activity Questionnaire (IPAQ) were used as assessment tools. Among the participants majority were male (71.4%) and aged 25 to 35 years (65.7%). According to ECQ responses, 14.3% reported symptoms of IC (in which 7.1% typical and 7.1% atypical), while ABI results showed 14.3% with mild PAD, 15.7% with moderate PAD and 7.1% with borderline values. Physical activity assessment revealed that 42.9% of staff was lightly active and 17.1% were inactive. When the association between physical activity and IC were analyzed there were no significant association found as the P-value (0.287) was greater than 0.05. Reduced physical activity and sedentary job routines were found to be major contributing factors. The study concludes that a considerable number of participants experienced symptoms of intermittent claudication and along with abnormal ABI readings. Strategies such as regular physical activity, routine screening, workplace health promotion programs and awareness are essential to improve vascular health and reduce the PAD and IC risks.

INTRODUCTION

Peripheral arterial disease (PAD) occurs when arteries become narrowed or blocked due to arteriosclerosis, which reduces blood supply to the limbs. In many cases, PAD develops slowly. At first, people may not notice any symptoms, but over time it can cause intermittent claudication (IC), a condition where pain or cramping appears in the legs during activity. If the disease is not treated, it may progress to critical limb ischemia, where blood flow is severely limited and in the worst cases, may even result in amputation (Hageman *et al* 2018). For patients with IC, the health risks are significant. The superficial femoral artery (SFA) is the most

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commonly affected site and the pain is usually felt in the calf as calf muscle lies just below the blocked artery (Budge, Patterson *et al* 2016). The link between leg artery blockages and claudication was first recognized in 1858. In 1906, researchers noted that some cases were due to reduced blood flow to the leg muscles, while others were related to poor blood supply in the spinal cord. A key distinction was that, in spinal cord cases, pulses in the legs remained intact, pain often felt more like tingling or burning and neurological symptoms were more noticeable, especially after physical exertion. In 1961, another form of neurogenic claudication was described, this time linked to compression or reduced blood flow in the cauda equine which are the bundle of nerves at the base of the spine. This usually resulted from narrowing of the spinal canal, either present at birth or developing with age. Although it shared similarities with spinal cord ischemia but it had clear differences like the pain followed a nerve-like (radicular) pattern, worsened with standing or walking upright and eased when bending forward, cycling, or sitting. Unlike spinal cord-related claudication, signs of spinal dysfunction such as Babinski reflexes, were not present (Aminoff, Ralph *et al* 2024). The prevalence of IC and PAD tends to be higher in low- and middle-income countries, such as Pakistan, due to factors such as limited healthcare access, smoking, and physical inactivity. Common risk factors include smoking, diabetes mellitus, dyslipidemia, hypertension, and obesity (Gerhard-Herman, *et al* 2017). Occupational influences, such as prolonged sedentary behavior, have also been increasingly recognized as contributing to PAD related symptoms (Song *et al* 2021). People with IC are 3 to 6 times more likely to have a serious cardiovascular events like a stroke, heart attack, angina or even death as compared to those without it.(Brown, Forster *et al* 2021). A patient's medical history can offer important insights for diagnosing PAD. The first steps in diagnosing IC usually include checking the pulses in the legs, measuring the ankle-brachial index (ABI) and using color-coded ultrasound (duplex sonography) to look at blood flow. For understanding of how well the blood is reaching the tissues, doctors may employ non-invasive techniques such as skin perfusion pressure, laser-doppler flowmetry, transcutaneous oxygen pressure ($tcPO_2$) or fluorescence angiography if more detailed testing is required, particularly in later stages(Bradbury *et al* 2019). People with intermittent claudication (IC) which is a typical symptom of peripheral artery disease (PAD), are expected to benefit considerably from aerobic activity especially walking. It has been demonstrated that regular exercise considerably promotes quality of life and mobility (Aboyans, Ricco *et al* 2017). Lifestyle modifications are also important as physical activity. For instance, smoking cessation can significantly lower the chance of limb amputation and quadruple the distance a person with PAD can walk pain-free (Harken and Moore *et al* 2017). For every PAD patient with IC, supervised exercise training (SET) is highly recommended which can be implemented in training sessions with a PAD focus people and are normally conducted under medical supervision, frequently with the support of physiotherapists. The session is for about 30 to 60 minutes and is advised three times a week for three to six months (Lawall, Huppert *et al* 2016).

Methodology

The study conducted at Sarhad University Peshawar was an analytical cross-sectional design involving all 70 staff members of the Sarhad Institute of Allied Health Sciences. Using a non-probability convenience sampling technique, participants aged 25 and above were included, while pregnant women and individuals with cardiovascular, neurological, or musculoskeletal disorders were excluded. Data collection occurred over six months and involved informed consent. Questionnaires (ECQ and IPAQ SF) were used, with additional measurements taken through a stethoscope and sphygmomanometer. The data were analyzed using SPSS Version 25, and findings were presented through graphs and charts, utilizing the Chi Square test to evaluate the relationship between physical activity and intermittent claudication.

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RESULTS

Demographics of Participant

The table show that most participants (65.7%) were aged 25-35 years(n=46) followed by (22.9%) aged 36-45years(n=16) and 10.0%aged 46-55 years (n=7). A single participant (1.4%) was aged 56-60 years old. Overall, most participants were early to mid –adolescents and the majority of respondents (71.0%) are male, while 29.0%are female

Table 1: Demographics

Age	Frequency	Percent
25-35	46	65.7
36-45	16	22.9
46-55	7	10
56-60	1	1.4
Gender	Frequency	Percent
Male	50	71.0
Female	20	29.0

The physical activity status of participants was assessed based on their level of activity during the past 7 days as shown in Table 4.1. The analysis revealed that 12 participants (17.1%) were inactive and did not engage in any physical activity, 30 participants (42.9%) were lightly active, 21 participants (30%) were moderately active and only 7 participants (10%) were highly active during the last week.

Physical Activity Status

Physical activity status	Frequency	Percent
Inactive	12	17.1
Light active	30	42.9
Moderate active	21	30.0
Highly active	7	10.0
Total	70	100.0

Below Figure shows the participants response to the Edinburgh Claudication Questionnaire (ECQ) regarding pain in different situations. The findings show that 20% of participants experienced pain while walking and 80% reported no pain. When standing or sitting, 24.3% had pain and 75.7% did not. Similarly, 11.4% of participants experienced pain when walking uphill, while 88.6% reported no pain. Pain that disappeared within 10 minutes of standing still was reported by 12.9% of participants, while 87.1% had no such pain. Overall, 85.7% of participants did not have intermittent claudication whereas 14.3% were identified with intermittent claudication according to ECQ, among these 7.1% reported pain in the calves, which is the typical symptom of intermittent claudication and another 7.1% reported pain in the thighs or buttocks, which is considered an atypical symptoms of intermittent claudication.

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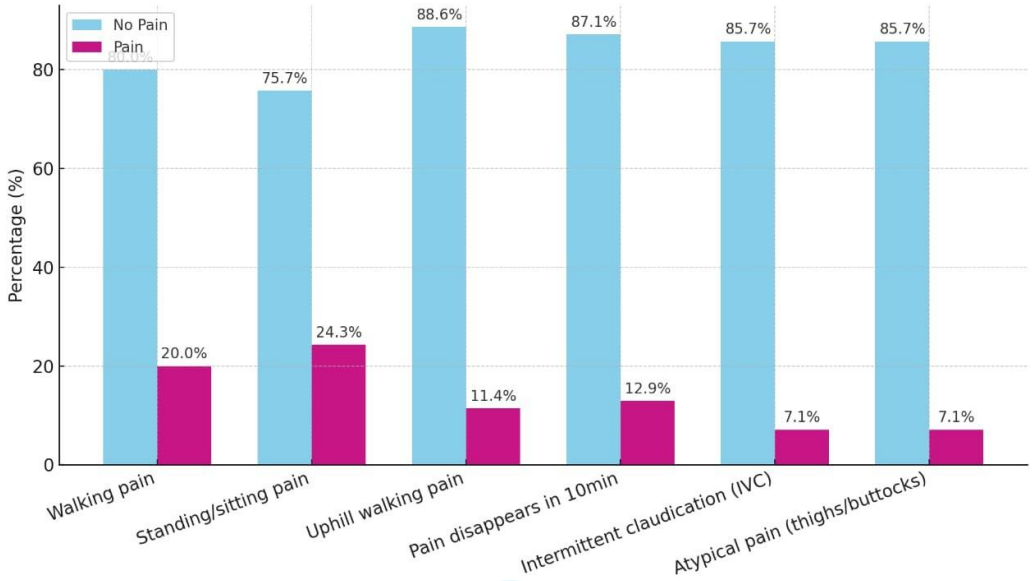


Figure Edinburgh claudication questionnaire (ECQ)

Below Table presents the ABI values for each participant. Majority of the participants had normal ABI values between 1.0 to 1.4 and is observed in 44 participants (62.9%) and the least number of participants had borderline ABI values between 0.90 and 0.99 were found in 5 participants (7.1%). While the participants with mild ABI values between 0.70 to 0.90 were 10 participants (14.3%) and participants with moderate ABI values between 0.40 and 0.70 were 11 participants (15.7%). Overall, most participants had normal ABI values, while the rest showed signs of arterial narrowing or borderline conditions.

ABI-Index on both left and right side

ABI Index	Frequency	Percent
Moderate PAD (0.40-0.70)	11	15.7
Mild PAD (0.70-0.90)	10	14.3
Normal (1.0-1.4)	44	62.9
Borderline (0.90-0.99)	5	7.1
Total	70	100

Association between Physical activity and IC

The Chi Square Test showed that there were no significant association between Physical activity and IC, as the P-value was greater than 0.05.

Association between Physical activity and ABI

Physical Activity and IC	Value	df	Asymptomatic significance (2-sided)
Person Chi Square	10.836[a]	9	0.287
N of valid cases	70		

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DISCUSSION

A cross sectional study was conducted among a total of 70 staff members of Allied Health Sciences Sarhad University, Peshawar and were assessed for intermittent claudication (IC). Most participants were males (71.4%) and age between 25–35 years (65.7%). The ECQ findings showed 14.3% had IC symptoms, while ABI revealed 30% had some degree of PAD and statistical analysis revealed no significant association between physical activity and IC ($p = 0.287$).

In 2023 a study was conducted by Zhou *et al* at Taiwan in which he accessed the prevalence of intermittent claudication among 180 university members. The results showed that 25.3% participants had abnormal ABI values while 20.1% participants experienced pain while walking and. The study also emphasized that office bound work and lack of screening contributed to undetected PAD. These findings are very close to our results in which 20% of participants reported pain while walking and 30% had mild to moderate PAD, indicating a silent burden of disease among seemingly healthy individuals. The similarity in the findings may be because people in both regions spend long hours in sitting or standing and have busy work routines and do less physical exercise.

A study was conducted by Vega *et al* at Spain in 2023 which assessed the prevalence of intermittent claudication among 486 urban residents aged between thirty to sixty years and the results of the study showed that 21.3% of the participants had experienced leg pain during walking and 12.9% reported pain relief after few minutes of rest, these findings strongly supported our study in which 20.0% participants reported walking-related pain and 12.9% participants experienced relief after rest within 10 minutes.

In 2024 a study was conducted by Tanaka *et al* in Japan which evaluated ABI and PAD symptoms among 280 university lecturers which shows that only 8.5% of participants had abnormal ABI values and only 6% experienced walking-related leg pain. This study strongly contradicts our findings, which show that about 30% participants had abnormal ABI and 20% reported walking pain, the difference in findings maybe because of the reason that Japan has better healthcare system, regular checkups and healthier lifestyles, one reason could be that in our study we did not check for risk factors like smoking, diabetes or high blood pressure, which can cause PAD even in active people.

A study was conducted by Rahman *et al* in Malaysia in 2023 which examined PAD among 400 university employees. It found that 22% of participants had low physical activity levels but their ABI scores were mostly within the normal range in which only 5.8% had signs of mild PAD and less than 5% reported leg pain while walking. This study contradicts our study findings which have a greater prevalence of mild to moderate PAD of about 30% and a higher rate of leg pain symptoms which is 20.0%. The difference may be because Malaysia has better healthcare systems, workplaces often have better wellness programs and people of Malaysia have healthier eating habits than compare to our setting.

CONCLUSION

The study concluded that a considerable number of participants experienced symptoms of IC such as leg pain while walking, standing or climbing along with abnormal ABI readings indicating mild to moderate intermittent claudication. But when association between Physical Activity and IC were analyzed there were no significant association found, so it fails to reject the null hypothesis.

Recommendations

- Health promotion programs and awareness regarding PAD and IC should introduced at university settings
- Workplace wellness policies need to encourage daily movements and routine cardiovascular assessments to reduce the risk of PAD and IC
- Use of Doppler ultrasound to measure more accurate ABI readings is recommended.
- Future research should include larger sample size.
- It was a single setup study and need

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to conduct such studies on multiple setups.

- It was a cross sectional study and need of longitudinal or experimental studies on such topic to identify the temporal relationship.

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