

Master of Science in Public Health



*Risk Assessment of Varicose Veins Among Traffic
Police Officers in Rawalpindi City*

By

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***Risk Assessment of Varicose Veins Among Traffic Police
Officers in Rawalpindi City***

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Declaration

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This dissertation is the result of an independent investigation. Where my work is indebted to others, I have made acknowledgments.

I declare that this work has not been accepted in substance for any other degree, nor is it currently being submitted in candidature for any other degree.

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**Dedicated to my son Mohammad Zaroon Adil and
to my lovely wife without her constant support and
encouragement this thesis would have not been
possible**

Abstract

Background: Varicose veins are tortuous veins that tend to get swollen and can become very painful. These veins are filled with abnormal collection of blood. These are tend to be more common in professions who have work to do with standing mostly for example traffic police officers. In Pakistan very few studies have been conducted regarding this. This can be particularly dangerous if left untreated and can lead to several complications like ulcers, bleeding and thromboembolism.

Objectives : To assess the risk of varicose veins development in traffic wardens of Rawalpindi City and to an association between different sociodemographic variables with development of varicose veins.

Methodology: A cross sectional study was carried out in different parts of the Rawalpindi city. Different signal areas were observed and traffic policemen were randomly selected. Total of 246 policemen were selected and questionnaire was distributed. Chi-square test of association was applied to examine the association between different variables with development of varicose veins. Sociodemographic variables and information about risk factors related to leg pain, tingling, skin discoloration and other risk factors related to health issues including diabetes, angina, lung disease, heart condition and DVT.

Results:

Out of 246 male participants majority were 67(27.2%) were below 30 years of age. 90 (36.6%) were Police Constable, 77 (31.3%) were Head Constable, 90(36.6%) were ASI, 2 (1.30%) 26(10.6%) were sub inspector. 6(2.4%) were Inspectors . It was also observed that respondents whose duration of standing was 5-10 years were 2.76 times more likely to develop varicose veins as compared to respondents with less than 5 years of standing. Similarly, respondents with standing duration of more than 10 years were 2.98 times more

likely to develop varicose veins as compared to respondents with less than 5 years of standing (p value= 0.026).

Conclusion :

Based on the major conclusions of this study, it is recommended that the police department in Pakistan need to create awareness among its workers about the risk of varicose veins disease. So, they can take precautionary measures such as exercise and intermittent breaks during long duty hours to avoid long duration of standing. Furthermore, the police department should also hire occupational health and safety workers who monitor the occupational health-related matters of the policemen and develop guidelines to reduce occupational health-related problems.

Keywords

Health status, Occupational hazard, Police personnel, Prevalence, Risk assessment, Varicose veins,

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Table of Contents

Contents

Dissertation submitted in partial fulfilment of the requirement for the degree of:	5
Declaration	7
Abstract	9
Background:	9
Objectives :	9
Methodology:	9
Results:	10
Conclusion :	10
Keywords	11
ACKNOWLEDGEMENTS	12
LIST OF ABBREVIATIONS	17
CHAPTER I:Introduction	18
CHAPTER II : Literature Review	23
CHAPTER: III Methodology	27
3.1 Operational definitions	27
3.1.1 VARICOSE VEINS :	27
3.2 STUDY SETTING :	27
3.3 STUDY DESIGN	27
3.4 STUDY DURATION	27
3.5 STUDY POPULATION	27
3.6 STUDY DESIGN	27
3.7 SAMPLING TECHNIQUE	28
3.8 SAMPLE SIZE DETERMINATION	28
3.9 RESEARCH PARTICIPANTS	28
3.9.1 Eligibility criteria	28
3.10 STUDY VARIABLES	29
INDEPENDENT VARIABLE	29
DEPENDENT VARIABLE:	29
3.11 DATA COLLECTION PROCEDURE	29
Data Collection Tool	29
3.12 RELIABILITY	30

3.13 Data Analysis Procedure:.....	30
Figure: 3.13 Data Analysis Plan	31
3.14 Descriptive Analysis:.....	32
3.15 Data Transformation:	32
The questions related to symptoms related to leg were all computed and was transformed into a variable that was later categorised.....	32
3.16 Inferential Analysis:	32
3.17 Ethical Considerations:	32
CHAPTER IV: RESULTS	33
4.1 Demographic characteristics	33
Figure 4.0 : Tables from descriptive analysis showing socio-demographic characteristics of the participants	34
Figure 4.1: A pie chart showing designation of police officers	35
Figure 4.2 A bar chart showing age distribution.....	36
4.2 Inferential Analysis	37
4.2.1 A summary of association of sociodemographic characters and prevalence is given in the table below.....	38
Figure 4.2.2: Association with different variables	40
4.3 Binary Logistic Regression:	43
Table 4.3.1: Determinants of Varicose veins using Multivariate Binary Logistic Regression model.....	43
CHAPTER V :Discussion	46
References.....	52
ANNEXURE 1.....	54
Data Collection Tool	54
ANNEXURE 2.....	60
Informed Consent Form	60
ANNEXURE 3.....	62
IRB LETTER	62
ANNEXURE 4 Gaint Chart	63

LIST OF ABBREVIATIONS

Abbreviation	Name
CVD	Chronic venous disease
CVI	Chronic Venous Insufficiency
DVT	Deep Venous Thrombosis
DM	Diabetes Mellitus
HTN	Hypertension
VV	Varicose Veins

CHAPTER I: Introduction

The word varicose originated from the Latin word 'varix' which means twisted(Lim and Davies, 2009). Varicose veins are the condition of the legs' veins in which they become visible but are also convoluted and expanded in the subcutaneous tissues of the legs (London and Nash, 2000). Varicose veins are broadly categorised as a common manifestation of chronic venous disease(CVD) (Ortega et al., 2021)and may lead to spider telangiectasias, reticular veins, and true varicosities, edema, hyperpigmentation and ulceration(Hamdan, 2012; Piazza, 2014). Predominately, varicose veins occur in the lower limbs(Hamdan, 2012).The symptoms of varicose veins can vary from asymptomatic to significant and may include issues as severe as deep vein thrombosis (DVT) or discomfort, throbbing, pain, or eczema(Ren and Liu, 2005). Other effects of varicose veins include deterioration of veins which results in swollen ankles, damage to the skin, ulcers in the leg, bleeding of veins and superficial venous thrombosis(Whiteley, 2022).

While the common understanding of the varicose veins is based on the clinical observation of 'swollen veins',especially in the legs. However, over the years, it has become evident that only a limited number of people have visible dilated veins on the surface. In the rest of the cases, venous duplex ultrasound may be required to diagnose the pathological superficial venous reflux as in this case bulging veins are not visible despite them being damaged clinically(Whiteley, 2022).

In terms of the pathophysiology of varicose veins, the details of the mechanisms are not clear. The key focus to fully understanding the mechanisms causing varicose veins is on understanding if venous hypertension and valvular incompetencelead to changes in the vein's walls or if it is the other way around. Therefore, keeping in view the complexity and multifaceted nature of thepathogenesis of the disease, a conclusive understanding of the underlying factors is not yet feasible(Jacobs et al., 2017).

For treatment of the disease, there are multiple options available including stripping, saphenous ligation through surgery, radiofrequency ablation, endovenous laser therapy, conservative therapy, sclerotherapy and phlebectomy. Among all these treatment options, sclerotherapy and endovenous treatments have short term advantages, however, surgical procedures are effective in the long term. Similarly, for the treatment of saphenous veins, the safety and effectiveness of endovenous laser therapy and radiofrequency ablation are the same as the surgical procedure (Leopardi et al., 2009). It is recommended that there should be a focus on the treatment of varicose veins instead of relying on temporary solutions such as wearing compression stockings. Lack of formal treatment may lead to deterioration and worsening of symptoms such as skin damage, ulceration of the leg, swollen ankles and venous bleeds (Whiteley, 2022).

Broadly, risk factors associated with varicose veins can be categorized into four major groups: hormonal, lifestyle, acquired and inherited. Hormonal type is related to high estrogenic levels; therefore, it is more common in females. Lifestyle-related type is linked to smoking and prolonged standing. Acquired type is linked with age, obesity, pregnancy, and deep vein thrombosis. Lastly, inherited type is linked to family history, height, or congenital syndromes (Piazza, 2014).

Contrary to the common understanding that mainly women are at greater risk of developing varicose veins, it is now increasingly proven that this finding was because of selection bias. Since women are more concerned about their health as compared to men, so they were reporting the cases of disease to practitioners. Similarly, the association of varicose veins with pregnancy is also challenged. As dilations of veins are followed by contraction after the delivery, hence negating the understanding that dilation leads to varicose veins (Whiteley, 2022).

In general, CVD is prevalent in the developed western countries requiring at least 2% of the health budget. It is expected that as the global population is ageing, the severe forms of CVD, such as varicose veins will increase and will also require increased financial allocations and resources (Davies, 2019).

A study measured the prevalence of CVD in 23 countries through the involvement of 99 359 patients by general practitioners. It was found that Asia has the lowest prevalence of CVD with 51.9% cases, Easter Europe has 70.18%, Latin America with 68.11% and western Europe has 61.65% prevalence (Vuylsteke et al., 2018). Despite being a major cause of morbidity at the global level, there is a limited understanding and epidemiological data for CVD. There is a strong need for a detailed assessment and characterisation of CVD for an improved provision of medical services and prevention (Salim et al., 2021).

In the case of Pakistan, the prevalence of chronic veinous diseases is approximately 34.8% with 36.4% prevalence among men while 33% among women. In a study involving examinations of 3000 patients by primary care physicians, it was found that common symptom was pain in the les while the common risk factors were family history, blood clots in veins and lack of exercise(Khan et al., 2013).

Keeping in view the limited availability of the epidemiolocal data at the lobal level and in Pakistan, this study aims to investigate the prevalence of varicose veins with particular focus on lifestyle related risk factors in general and occupational aspects. With the increasing changes in the lifestyle and reduction of physical activity in Pakistan, it is expected that incidence rate of the varicose veins will tend to increase. Therefore, it is crucial that data related to this disease is gathered as it will be helpful for future planning.

While the focus of this thesis is to investigate the prevalence of varicose veins in the traffic police work force in the city of Rawalpindi, the specific objectives are as follow:

Rationale:

1. Varicose veins are the malfunctioning valves that prevent backflow of the blood, thus causing pooling of blood in the legs and feet
2. Traffic police officers have long duty hours which require standing for atleast 8-10 hours which predisposes them to develop varicose veins
3. It has been regonised internationally that work place and environment plays a major role in persons well-being thus must be assessed for the risk factors

Objectives

1. To assess the risk of varicose veins development in traffic wardens of Rawalpindi City
2. To develop an association between different sociodemographic variables with development of varicose veins.

CHAPTER II : Literature Review

To better understand the role of multiple risk factors in varicose veins, a wide array of studies has been conducted over the last three to four decades. Risk factors related to lifestyles, particularly those related to certain occupations that require prolonged standing are significant. In a research study conducted by Laurikka et al. (2002), 284 men and 3590 women belonging to three different age groups 40, 50 and 60 years were involved in the assessment of varicose veins. They found that standing for a longer duration at work was among the major causes of the disease. In the particular case of women, ageing, family history and childbirths were three important factors for varicose veins (Laurikka et al., 2002). A similar study was conducted in the City of Edinburgh where 1566 participants were examined to study the prevalence of varicose veins and chronic venous in the general population. This study was the first largest one in the UK to assess the occurrence of varicose veins keeping in view the changing lifestyles since the 1960s and 1970s. The findings of the study contrasted with most other studies such that it concluded that men were at higher risk of developing varicose veins which the study associated with changes in work, lifestyle and environment (Evans et al., 1999).

A study of risk factors for varicose veins in Duesseldorf/Essex civil servants of the German population was conducted. A total of 9 935 employees were part of this study. The study concluded that family history together with age and gender are key risk factors (Kroeger et al., 2004). Similarly, Ismail et al. (2016) in their study related to risk factors concluded that there is a significant and strong relation between varicose veins and a history of pregnancy.

Keeping in view the limited understanding related to pathogenesis based on genetic and environmental factors, a machine learning method was used to look for risk factors in 493

519 individuals in the UK Biobank for varicose veins. In addition to the confirmation of the existing risk factors such as age, sex, obesity, pregnancy and deep vein thrombosis, a new risk factor, height was identified (Fukaya et al., 2018).

While quite a few studies related to risk factors of varicose veins have focused on the identification of aspects such as family history, gender, ageing, pregnancy or hormonal changes, there is a dearth of understanding related to lifestyle aspects particularly those related to occupations requiring prolonged standing. Chen and Guo (2014) have addressed this aspect by investigating the effect of prolonged hours of standings in hairdressers in Taiwan. Out of 182 hairdressers, 44 had varicose veins in lower limbs. Among these, hairdressers older than 45 years are mainly affected due to their occupation while those who are 45 years old or younger were mainly affected due to their family history. A similar study conducted by Yun et al. (2018) investigated the prevalence of lower-limb varicose veins in the nurses working at a university hospital in South Korea. The purpose to focus on nurses was to investigate the impact of longer working hours. The study confirmed that occupations that required a longer duration of standing, together with ageing led to a higher risk of lower-limb varicose veins.

Dalboh et al. (2020) investigated the impact of a longer duration of standing on 391 school teachers of the Aseer region in the Kingdom of Saudi Arabia. Their findings confirmed that 42% of surveyed teachers were affected by varicose veins, the majority of whom were females. Similarly, 62% of the teachers who were affected by varicose veins were aged between 36 and 45 years. A similar study in Saudi Arabia was conducted to investigate the prevalence of varicose veins in nurses working in the National Guard Health Affairs (NGHA), Riyadh, Saudi Arabia. Out of 366 nurses, 40 which formed 11% of the total participants were diagnosed with varicose veins. Among these participants, the prevalent factors were the number of childbirths among women, family history, lifting of heavy

objects, social status and hours spent while standing played a key role in causing the impact (AlBader et al., 2020).

To investigate the prevalence of chronic venous disease in 66 health workers in the USA, a research study was conducted. The findings of the study showed a high prevalence of chronic venous insufficiency CVI and venous reflux (Cires-Drouet et al., 2020). In another longitudinal study conducted from 1993 to 2004 at the Danish Ramazzini Centre, 38, 036 participants aged between 18 and 66 years were examined. The study concluded that more than 60% of the participants were at an increased risk of surgery due to varicose veins associated with long-standing periods and heavy weight lifting (Tabatabaeifar et al., 2015).

A recent study conducted in Egypt found that even major factors contribute to lower limb varicose veins. Among these, the risk is 59.8 times more for those who are involved in lifting heavy weights. Similarly, the risk is 3.6 times higher for those who spend more than four hours standing (Elamrawy et al., 2021). A cross-sectional study conducted for 203 nurses working in a hospital in Iran showed that non-interventional risk variables such as years of service are correlated with varicose veins. Similar, women were found to be at higher risk than men (Sharif Nia et al., 2015).

To investigate the risk of varicose veins among policemen in the Karnataka state of India, a study was conducted by Timilsina et al. (2021). They found that 14.7% of the policemen were affected by the varicose veins while 20% were at the risk of contracting the disease. The total number of policemen that were part of the study was 150. Among other aspects, the study concluded that duration of standing was one of the major aspects that led to an increased risk of varicose veins diseases in the policemen. A similar study for traffic policemen was conducted in Kathmandu Metropolitan City, Nepal by Karmacharya et al. (2019). They found that out of 200 respondents, 24 were at the risk of being affected by

varicose veins. However, they associated the higher risk of the diseases with the family history and smoking.

To avoid the risks and contraction of the varicose veins disease, the population at the risk must have better knowledge and understanding of the factors so they can take the precautionary measures to prevent the disease. To investigate the level the knowledge among the affected people, Shrestha et al. (2021) conducted a study in the surgery ward where patients were admitted for surgery of varicose veins disease. They found that 52.5% of the patients had less than 50% understanding of the disease. Therefore, they have recommended that awareness and educational measures need to be taken so people at risk of contracting the diseases can take preventive measures.

The extensive research and review of the literature from various parts of the world and among various respondents revealed that there is a dearth of knowledge regarding the occurrence of varicose veins in the case of Pakistan. It is expected that this study will help in understanding and identifying risks related to occupational aspects among the traffic police wardens in Rawalpindi, Pakistan.

CHAPTER: III Methodology

3.1 Operational definitions

3.1.1 Varicose Veins :

Varicose veins are the enlarged, dilated and mostly twisted veins and are commonly found in the lower extremities. The exact pathophysiology is not known but has genetic relation. The valves are in competent and the walls get weak and there is increased intravascular pressure. (NHS, 2020)

3.2 STUDY SETTING :

The study was conducted in different parts of Rawalpindi city. Different signal areas were observed and traffic policemen were located and randomly selected.

3.3 STUDY DESIGN

The design of the study was cross sectional and it was quantitative in nature.

3.4 STUDY DURATION

Study was conducted from Sept to March 2022.

3.5 STUDY POPULATION

Local traffic policemen in different parts of Rawalpindi City

3.6 STUDY DESIGN

The design of the study was cross sectional and it was quantitative in nature.

3.7 SAMPLING TECHNIQUE

The study population consisted of 246 policemen, who were randomly recruited from 10 different police stations in Rawalpindi, City. Sample size was calculated using $n = Z^2pq/d^2$ formula and taking 20% prevalence from Belagavi, India study. Those

who had underwent lower limb surgery and had previous history of DVT were excluded from the study.

3.8 SAMPLE SIZE DETERMINATION

Sample size was calculated using proportion formula for sample size calculation in OpenEpi menu, Version 3 software. Previous prevalence 20% was used from a recent research paper (Timilsina, 2021)

3.9 RESEARCH PARTICIPANTS

3.9.1 Eligibility criteria

Inclusion criteria

Male traffic wardens

Age 25 to 60 years

Those who are working for more than one year

Exclusion criteria

Any injury in the leg or arthritis

Those who are not willing to participate

3.10 STUDY VARIABLES

Independent variables

Age, marital status, designation, exercise hours, average standing duration, leg symptoms, lifestyle, health issues

Dependent variable:

Varicose veins

3.11 DATA COLLECTION PROCEDURE

Data Collection Tool

Data collection was started after getting ethical approval from institutional Review Board (IRB) committee of Al-Shifa School of Public Health, Al-Shifa Trust Eye Hospital Rawalpindi. The formal IRB letter was used to get permission. The letter included the required information e.g name of researcher, institute, topic name etc. Once the permission was granted, visits were made for data collection. After explaining the need of the study, official permission to conduct study was obtained from the commissioner of police. The study population consisted of 246 policemen including only male who were randomly recruited from ten different police station of Rawalpindi city. Participants who gave informed written consent were interviewed. Data collection procedure included interview by questionnaire and observational checklist to assess signs and symptoms. Height, weight was measured to calculate BMI. Questionnaire included demographic variables, health related information and past history of health. Demographic variables included age, marital status. Health related variables included height, weight, yoga practice, current medical illness, lifestyle, average standing duration per day and years of standing. Past history of health included suffering from DM, HTN, cardiac infract, angina, lungs problems, kidney problem and DVT.

The questionnaire was pretested on 10% of the total sample to assess acceptability, feasibility and validity. On the basis of response of pilot testing minor amendments were made to the text and questions. After that the questionnaire was finally modified and ready for collecting data.

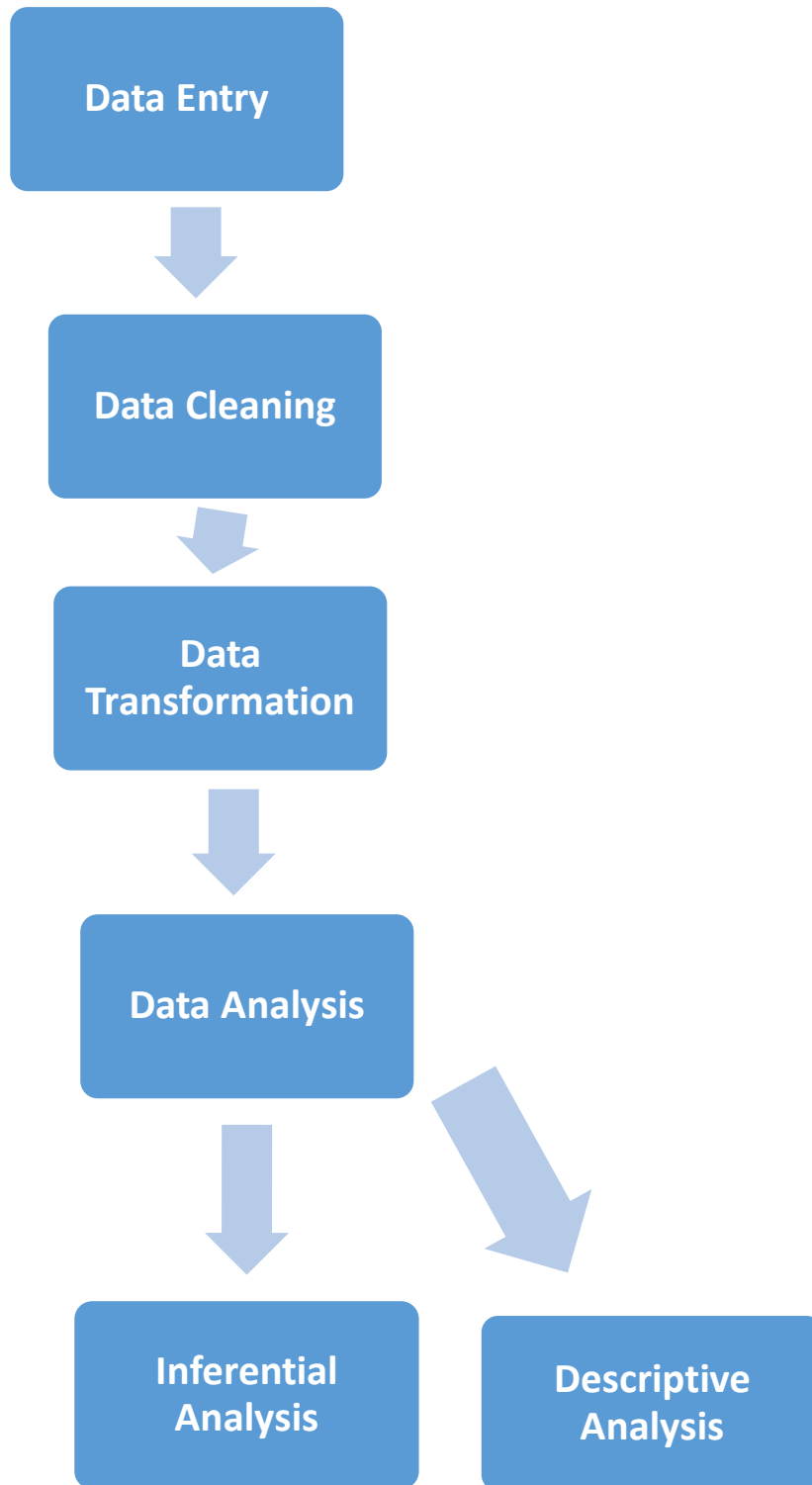
3.12 RELIABILITY

The questionnaire was obtained through the study conducted in Belgavi city, India. (Timilsina, 2021). The reliability was checked after entering data in the SPSS. The value of cronbach alpha was 0.52

3.13 Data Analysis Procedure:

The data was entered in MS excel and was analyzed using SPSS version 22. Chi square test was used to see the association between dependent and independent variable. Logistic regression and odds ratio was calculated to see the risk of varicose veins. P value < 0.05 was considered as significant. Data were expressed in graphs, tables and charts wherever necessary.

Figure: 3.13 Data Analysis Plan



3.14 Descriptive Analysis:

Descriptive statistics were generated for sociodemographic characteristics and outcome variables for varicose veins. For categorical variables, data was summarized in the form of frequencies and percentages and presented in table form, bar charts and pie chart.

3.15 Data Transformation:

The questions related to symptoms related to leg were all computed and was transformed into a variable that was later categorised.

3.16 Inferential Analysis:

Association of varicose veins was determined with socio-demographic variables using Pearson Chi Square test of Independence. Furthermore, Binary logistic regression was used to identify main predictors of varicose veins.

3.17 Ethical Considerations:

Before starting formal data collection, approval from Institution; Review Board (IRB) of Al-Shifa School of Public Health Rawalpindi, Pakistan has been taken. Permission from the Department Alshifa School of Public Health was obtained regarding access to various police stations. After explaining the need of the study, official permission to conduct study was obtained from the commissioner of police. Traffic wardens were explained the purpose of the research. The Participants were assured of the confidentiality of the data. Data collected from the respondents was kept anonymous and was not shared with anyone. Data was entered in SPSS anonymously. After data entry, hard copies of collected were kept at safe place.

CHAPTER IV: RESULTS

Total of 246 responses were recorded. Questionnaire was structured. A summary of descriptive and inferential analysis is given below.

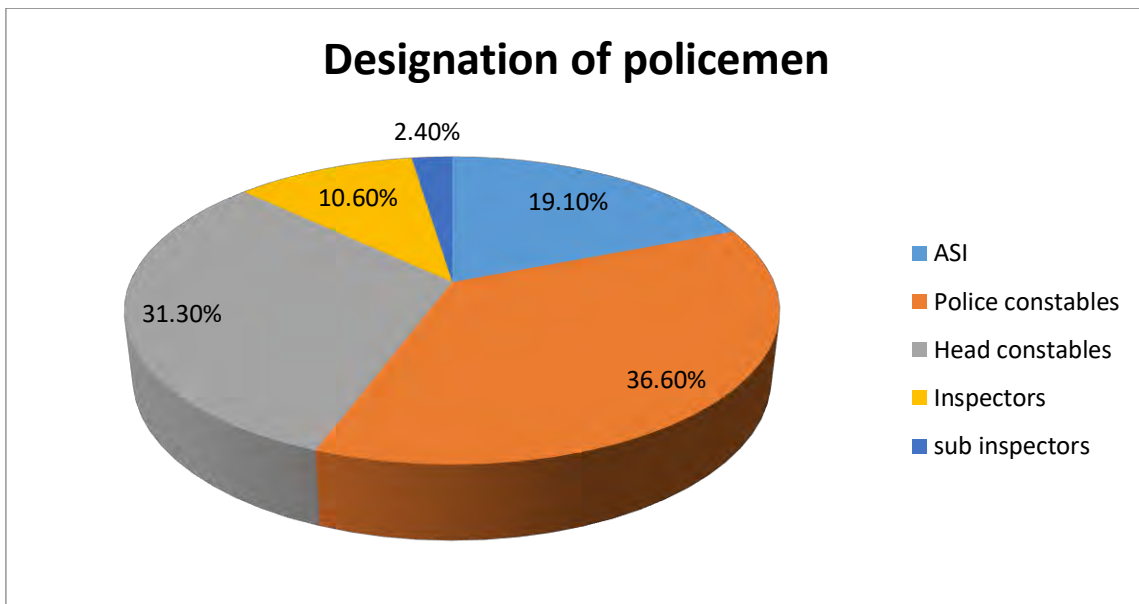
4.1 Demographic characteristics

Out of 246 participants who were all male, among them 67(27.2) were below 30 years of age. 35(14.2%) were between 30-40 years of age, 93(37.8%) were between 40-50 years of age, 51(20.7%) were in between 50-60. 61(24.8%) were unmarried and 177 (72.0) were married. Among 26 policemen, 47(19.1%) were Asst.sub Inspector. 90(36.6%) were Police constables. Head constables were about 77(31.3%). 26(10.6%) were sub inspector. 6(2.4%) were Inspectors. Out of 246 policemen, majority of them had to 99(40.2%) had to stand for more than 8 hours. 61(24.8) had to stand for 2-4 and 86(35.0%) had standing duration of 4-8 hours. Considering their year of service, majority 106(43.1%) had service less than 5 years, 47(19.1%) had service between 5-10 years and 93(36.9%) had 10 years of service.

Figure 4.0 : Tables from descriptive analysis showing socio-demographic characteristics of the participants

S.no	Variable	Frequency (f)	Percentage (%)
1.	Age		
	<30	67	27.2
	30-40	35	14.2
	40-50	93	37.8
	50-60	51	20.7
2.	Marital Status		
	Married	177	70.2
	Unmarried	61	24.8
3.	Designation		
	Asst. Sub inspector	47	19.1
	Police constable	90	36.6
	Head constable	77	31.3
	Sub inspector	26	10.6
	Inspector	6	2.4
4.	Years of service		
	5-10	147	59.8
	>10	95	38.6

Figure 4.1: A pie chart showing designation of police officers



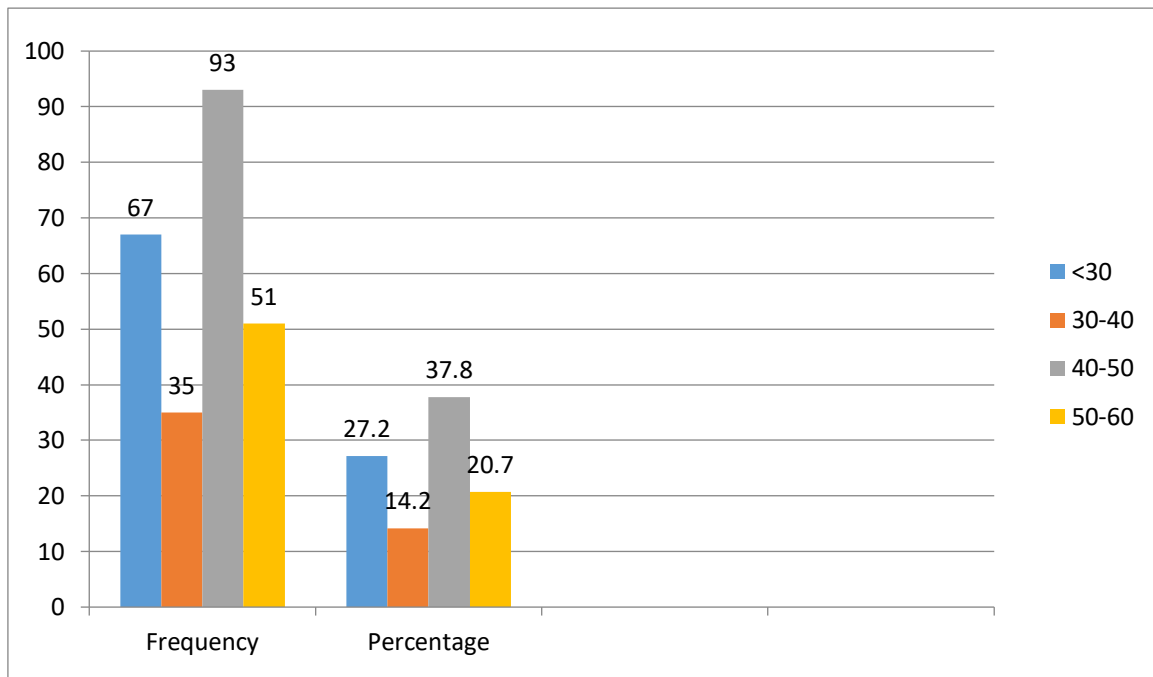


Figure 4.2 A bar chart showing age distribution

On measuring BMI of the policemen it was found that 125(50.8%) were overweight, 75(30.5%) were of normal weight and 42(17.1%) were obese. Out of 246 participants 147(59.8%) had 5-10 years of service and 97(38.6%) had more than 10 years of service. It was noted that out of 246 participants 111(45.1%) practiced exercise for 1 hr for 2-3 days a week and there were 129(51.2%) who did not practice exercise.

4.2 Inferential Analysis

Pearson Chi Square Results:

Association of prevalence with demographic variables was determined using Pearson Chi Square Test of Independence after confirming the assumptions of the test. Association of demographic variables was tested independently with Prevalence of varicose veins using Chi Square test of Independence. All p-values below 0.05 were considered statistically significant.

4.2.1 A summary of association of sociodemographic characters and prevalence is given in the table below

S.No	Variables	Absent N (%)	Present (N%)	Total count	P value
1.	Age <30 30-40 40-50 50-60	 65(97.0) 23(65.7) 20(21.5) 0(0.0)	 2(3.0) 12(34.3) 73(78.5) 51(100.0)	 67(100.0) 35(100.0) 93(100.0) 51(100.0)	 0.0001
2.	Marital status Unmarried Married	 61(100.0) 47(26.6)	 0.0(0.0) 130(73.4)	 61(100.0) 177(100.0)	 0.07
3.	Designation Asst.sub inspector Police constable Head constable Sub inspector Inspector	 46(97.9) 62(68.9) 0(0.0) 0(0.0) 0(0.0)	 1(2.1) 28(31.1) 77(100.0) 26(100.0) 6(100.0)	 47(100.0) 90(100.0) 77(100.0) 26(100.0) 6(100.0)	 0.34

After using Chi square for association between the demographic variables it was found that there was significant association between prevalence and age ($p=0.000$), but there was no significant association found between prevalence and designation of the policemen ($p=0.07$). and no significant association found between prevalence and marital status ($p=0.34$)

Figure 4.2.2: Association with different variables

S.No	Variables	Absent N (%)	Present (N%)	Total count	P value
1.	Do you practice exercise 1hr/day for 2-3 days/week? No Yes	77(69.4) 37(28.7)	34(30.6) 92(71.3)	111(100.0) 129(100.0)	0.0001
2.	What is duration of standing (in years) <5 years 5-10 >10 years	69(65.1) 30(63.8) 18(19.4)	37(34.9) 17(36.2) 75(80.6)	106(100.0) 47(100.0) 93(100.0)	0.011
5.	Are you suffering from diabetes that require medical care? Yes No	64(62.7) 53(36.8)	38(37.3) 91(63.2)	102(100.0) 144(100.0)	0.04
6.	Are you suffering from heart condition that requires medical care? Yes No	85(72.0) 32(25.0)	33(28.0) 96(75.0)	128(100.0) 128(100.0)	0.098

7.	Are you suffering from angina that requires medical care? Yes No	28(87.5) 89(41.6)	4(12.5) 125(58.4)	32(100.0) 214(100.0)	0.03
8.	Are you suffering from lung problem that requires medical care? Yes No	53(41.1) 64(54.7)	76(58.9) 53(45.3)	129(100.0) 117(100.0)	0.022
9	Do you suffer from DVT that requires medical care? Yes No	69(51.5) 48(42.9)	65(48.5) 64(57.1)	112(100.0) 246(100.0)	0.111

There was significant association found between prevalence and practicing exercise for 1hr for 3-3 days / week ($p=0.000$). There was also association found between standing in duration(in years) and prevalence to be ($p=0.011$). Significant association was found between diabetes that require medical care and prevalence ($p=0.04$). A significant association was found between prevalence and lung disease that requires medical care ($p=0.022$). There was significant association seen between prevalence and angina that requires medical care ($p=0.03$)

However, it was noted that Between prevalence and suffering from heart disease that requires medical care there was no significant association found ($p=0.098$). No association was found between suffering from DVT and prevalence ($p=0.111$)

It was found out in the study that total 48.8% experienced worsening of leg pain during work. 20.7% experienced burning and itching in the legs. Total 42.3% experienced swelling in the ankle and leg. It was also noted in our study that 43.8% experienced heaviness in the legs. 45.9% sometimes felt and noticed discoloration in the legs. 29.3% were the people who suffered pain in the leg that was not relieved by medications. 47.2% experienced itching in the leg around one or more veins. 54.9% sometime felt tingling sensations in the legs. 67.9% experienced pain at night.

4.3 Binary Logistic Regression:

Multivariate binary logistic regression was carried out to identify potential risk factors of different types of Varicose Veins among the traffic policemen. Result summary of these predictors is given in the following table.

Table 4: Determinants of Varicose veins using Multivariate Binary Logistic Regression model

S. No	Variables	AOR	P Value	95% CI	
				Lower	Upper
01	Age	1	0.04	0.275 1.33 0.89	2.953 10.45 9.78
	<30	1.23			
	30-40	3.44			
	40-50	3.41			
	50-60				
02	Do you practice exercise 1hr/day for 2-3 days/week?	1	0.158	0.179	4.345
	No	0.26			
	Yes				
03	What is duration of standing (in years)	1	0.026	0.269 1.789 1.98	1.790 7.987 9.79
	<5 years	2.76			
	5-10	2.98			
	>10 years				
04	Are you suffering from diabetes that require medical care?	1	0.144	0.194	1.943
	Yes	0.614			
	No				
05	Are you suffering from angina that requires medical care?	1	0.18	0.976	3.987
	Yes	0.98			
	No				
06	Are you suffering from lung problem that requires medical care?	1	0.03	0.569	7.905
	Yes	0.65			
	No				

Results showed that full model containing all predictors was statistically significant ($p = 0.0001$) indicating that the model was able to distinguish between respondents who reported varicose veins symptoms and who did not report. Model summary showed that it can cause a deviation in the prevalence of varicose veins in the range of 71%-95%. It was observed that odds of respondents with age group 30-40 years for having varicose veins were 1.23 as compared to odds of people with age group less than 30 years while odds of respondents with age 41-50 years and 50-60 years for developing varicose veins were 3.44 and 3.41 respectively as compared to the odds of respondents with age group less than 30 years (p value= 0.04). Similarly, respondents with standing duration of more than 10 years were 2.98 times more likely to develop varicose veins as compared to respondents with less than 5 years of standing (p value= 0.026). Furthermore, respondents who were not suffering from any lung disease, their odds of developing varicose veins were 0.65 as compared to those who have some lung related issues (p value=0.03).

CHAPTER V : Discussion

In our study, we found majority 93(37.8%) of policeman belong to age group between 40-50 years, 67(27.2%) participants belong to age group of <30 years, 35(14.2%) participants belong to age group of (30–40) years and 51 (20.7%) participants belong to the age group of (50–60) years. In our study, 61(24.2%) married and 177 (70.2%) unmarried were enrolled.

According to the study conducted in Malaysia among traffic personnel, found that the mean age for both study location are 35 years old (*SD* 10.1). (Anis, 2020) Another study conducted in India where policemen were divided into two groups the mean age of group A 44 ± 3.34 and group B 45.13 ± 3.6 (SANCINI, 2010).

In Our study, 61(24.2%) were married and according to a study conducted in Solapur City in Maharashtra to find out socio-demographic factors and morbidity profile of traffic policemen it was noted that majority(89.47%) of the traffic policemen were married.

In our study majority of the policemen were between 5-10 years of service 147(59.8%)

In our study it was found that policemen who suffered from DM were 45.1% that required medical care and it had significant association with prevalence of varicose veins. According to a study done in Japan , 74 policemen had incident DM (5.9, 5.7, and 9.6 per 1,000 person-years, respectively; $P=0.001$ by chi(2)-test). Policemen/firefighters had significantly increased risk for incident DM against clerical workers (age-adjusted HR (95% CI): 1.65 (1.25, 2.18) (Nagaya, 2006).

In our study, it was noted that 48.8% of policemen suffered from a heart condition that required medical care and had a significant association with the prevalence of varicose veins ($p=0.000$). A study conducted to analyse the association between varicose veins and Coronary Heart Disease (CHD) in men found that out of a total of 569 subjects, 363 (21.2%) without varicose veins developed symptomatic CHD while 98 (17.2%) with varicose vein developed symptomatic CHD (Scott et al., 2004).

In our study, it was studied that the majority of the participants suffered from lung problems that required medical care 52.4% and had a significant association with the prevalence of varicose veins ($p\text{-value} = 0.022$). Furthermore, for respondents who were not suffering from any lung disease, their odds of developing varicose veins were 0.65 as compared to those who have some lung-related issues ($p\text{-value} = 0.03$).

The majority of the participants in our study were found to be overweight 30.5%. It was noted that 30.5% had normal weight. 17.1% were noted to be obese. A study conducted in Japan concluded that long working hours in a standing position and being overweight are key risk factors for varicose vein disease (Kohno et al., 2014).

Results showed that the full model containing all predictions was statistically significant ($p\text{-value} = 0.0001$) indicating that the model was able to distinguish between respondents who reported varicose vein symptoms and who did not report them. The model summary showed that it can cause a deviation in the prevalence of varicose veins in the range of 71% - 95%. It was observed that odds of respondents with age groups 30-40 years for having varicose veins were 1.23 as compared to odds of people with age group less than 30 years while the odds of respondents with age 40 – 50 years and 50 – 60 years for developing varicose veins were 3.44 and 3.41 respectively as compared to the odds of respondents with age group less than 30 years ($p\text{-value} = 0.04$). This finding confirms the conclusion of past studies that

ageing is a key risk factor for varicose veins disease (Kroeger et al., 2004; Bihari et al., 2012).

It was also observed that respondents whose duration of standing was 5 – 10 years were 2.76 times more likely to develop varicose veins as compared to respondents with less than 5 years of standing. Similarly, respondents with a standing duration of more than 10 years were 2.98 times more likely to develop varicose veins as compared to respondents with less than 5 years of standing (p values = 0.026). This finding conforms with the conclusion of a similar study concluded in 2021, which states that the risk of developing varicose vein is significantly associated with the duration of the standing of policemen in Belagavi city, Karnataka, India (Timilsina et al., 2021).

5.1 Strengths

This thesis brings to the fore the knowledge and understanding of risk factors of varicose veins from a major urban area of Pakistan. While there is a wide array of research about the risk factors associated with the varicose vein disease at the global level but in the context of Pakistan, no significant research work has been conducted yet. Although research published from different countries related to this issue is applicable at the global level, there is always a need to understand specific contextual and cultural factors that may be unique to a specific context. Thus, through this study, we highlight the context of Pakistan and specific health conditions in the study population that may contribute to a detailed and better understanding of the risk factors. Another key strength of this study is that it highlights the need for focusing on health and safety requirements for various occupations in Pakistan. One of the major findings of the study is the longer the duration of service of policemen, the higher the risk of developing the varicose disease. Therefore, this calls for attention from the government as well as the department of the policemen, so that they take necessary measures to reduce the risk of developing the varicose veins diseases in their employees. Hence, the findings of this study have a strong applied level of significance and if considered by concerned authorities, the study may help in preventing the diseases in the police workforce.

5.2 Limitations

In terms of limitations

1. The study could not involve women participants as it is crucial to have both men and women represented in such studies. However, the lack of women participants was not intentional and was mainly due to almost non-existent female staff in the police department. There are female staff employed in the department, but they are not assigned regular duties on the road. Hence, they are not involved in this study.

2. |Another limitation of the study was the lack of performance of Venous Doppler ultrasonography. This is due to multiple constraints including time and cost, hesitancy from the respondents and the COVID related restrictions.

5.3 Conclusion and Way Forward

This thesis focused on determining the prevalence of varicose vein disease among the policemen of the Rawalpindi City of Pakistan. The aim was to investigate how occupational risk factors such as duration of service, designation, and duration of duty hours that require standing to affect the risk of developing the varicose disease. Furthermore, morbidity profiles of the participants such as those suffering from DM, HTN, cardiac infarct, angina, lung problems, kidney problem and DVT were also gathered. The findings of the study show that duration of service is a key risk factor as policemen who have been in service for more than 10 years are more likely to develop varicose veins as compared to respondents with less than 5 years of standing. This is further related to the designation of the policemen as well. Similarly, the findings show that ageing is another key risk factor as policemen in the age bracket of 40 -50 years are more likely to develop the disease as compared to those who are below 30 years of age. Thus, in addition to ageing, both occupational factors i.e., duration of service and designation contribute to the increased risk of varicose diseases. In terms of comorbidity factors, the study concludes that most of the participants were suffering from DM, heart condition, lung problems and were also overweight. All these factors are co-related to the increased risk of varicose vein diseases.

Based on the major conclusions of this study, it is recommended that the police department in Pakistan need to create awareness among its workers about the risk of varicose veins disease. So, they can take precautionary measures such as exercise and intermittent breaks during long duty hours to avoid long duration of standing. Furthermore, the police

department should also hire occupational health and safety workers who monitor the occupational health-related matters of the policemen and develop guidelines to reduce occupational health-related problems.

For future studies, it is recommended that in addition to data through questionnaires and surveys, Venous Doppler ultrasonography is also performed to gather clear evidence.

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ANNEXURE 1

Data Collection Tool

Risk Assessment of Varicose Veins Among Traffic Police Officers in Rawalpindi City

(Please answer the following questions after reading them carefully)

Sociodemographic details

1. Age in years

<30

30-40

40-50

50-60

2. Marital status

Married

Unmarried

3. Designation

Asst. sub Inspector

Police constable

Head constable

Sub inspector

Inspector

4. 5. Years of service (years)

5-10 years

> 10years

5. How much do you weigh according to BMI? (BMI = weight(kg)/[Height(m)]²)

< 18.5

18.5 - 24.9

25-29.9

> 31

6. What is your annual household income?

<25000rs

25000-50000rs

50000-75000rs

>75000rs

Section B

1. Do you practice exercise 1hr/day for 2-3 days/week?

Yes

No

2. Whats your average standing duration? (hour/day)

< 2 hours

2-4 hours

4-8 hours

> 8 hours

3. Whats your duration of standing (in years)

< 5 years

5-10 years

> 10 years

4. Did you experience leg pain worsening during work?

Never

Sometimes

Always

5. Do you experience burning or itching sensation in your legs?

Never

Sometimes

Always

6. 6. Do you experience leg or ankle swelling more often?

Never

Sometimes

Always

7. 7. Do you experience feeling heavy in your legs?

Never

Sometimes

Always

8. 8. Have you experienced skin discolouration in legs?

Never

Sometimes

Always

9. 9. Do you experience pain in legs that is not relieved by medications?

Never

Sometimes

Always

10. 10. Do you experience itching around one or more leg veins?

Never

Sometimes

Always

11. 11. Do you experience tingling sensation in legs?

Never

Sometimes

Always

12. 12. Do you experience pain in legs during night time?

Never

Sometimes

Always

13. Are you suffering from diabetes that require medical care?

Yes

No

14. Are you suffering from any heart condition that requires medical care?

Yes

No

15. Are you suffering from Angina that requires medical care?

Yes

No

16. Are you suffering from lung problem that requires medical care? Yes No
17. Do you suffer from DVT that requires medical care?

Yes

No

ANNEXURE 2

Informed Consent Form

I am Adil Ayub, student of MSPH- Final Semester, Alshifa School of Public Health, Alshifa Eye Hospital, Rawalpindi. I am doing research on Risk Assessment of varicose veins among traffic police officers **PURPOSE**

OF THE RESEARCH

The purpose of this study is to assess the risk of varicose veins among traffic police officers

PARTICIPATION

I do not anticipate that taking this study will contain any risk or inconvenience to you. Your participation is strictly voluntary and you may withdraw your participation at any time without penalty. I request you to answer the questions as honestly as possible. It will take no longer than 20 minutes to complete a questionnaire. All information collected will be used only for research purpose and will be kept highly confidential. Your identity and your responses will not be identifiable; all data will be stored anonymously. As this is solely a student project no incentive will be provided. Once study is completed, I would be happy to share the results with you if you desire.

Thank you for agreeing to participate in this study. Your feedback is important. **Consent**

I have read and understand the information sheet and agree to take part in the study.

Signature _____ Date _____

ANNEXURE 3

IRB LETTER



ANNEXURE 4

GANTT CHART

Activities	September 2021	October 2021	November 2021	December 2021	January 2022	February 2022	March 2022
Literature search	■						
Synopsis writing and IRB approval	■						
Pilot testing		■					
Data collection and entry			■				
Data analysis					■		
Writeup					■		
Thesis submission							■

ANNEXURE 5

Budget

Budget item	Transport	Stationery and internet	Printing	Publishing
Pilot testing	500 Rs/-	5000Rs/-	5000Rs/-	-
Data collection	10,000Rs/-	7,000Rs/-	-	-
Thesis writeup	1,000Rs/-	5,000Rs/-	8,000Rs/-	25,000 Rs/-
Total expenditure	16,000Rs/-	17,000Rs/-	13,000Rs/-	25.000 Rs/-
Grand total	71,000 Rs/-			