A Comparative Study to Assess the Degree of Ankle Brachial Index among Smokers and Nonsmokers

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ABSTRACT

The most common bad habit in Indians are smoking. Smoking causes many problems in our body. The diseases and complications in smokers are progressive in nature. One of the late complications is peripheral vascular disease. The present study was aimed to assess the ankle brachial index among smokers and nonsmokers in S S N M M Hospital, Varkala. The objectives of the study were to compare the degree of ankle brachial index among smokers and non smokers, to find out the association between selected demographic variables with ankle brachial index and to find out the association between heavy smoking index among smokers with ankle brachial index. The study was conducted among 50 smokers and 50 non smokers in medical OP of S S N M M Hospital Varkala. After obtaining the consent from the samples of the study, Ankle brachial index was assessed by standardized digital sphygmomanometer. After data collection the data were analyzed using descriptive and inferential statistics. There is significant association between duration of smoking, smoking in the past 30 days and co morbid illness with ankle brachial index.

Key words: Comparison, Ankle-brachial index, Smokers, Non smokers

INTRODUCTION

Timely action can prevent a great loss in future. This proverb can be better applied in the health care settings. Smoking is a practice which is most common in our country. There are approximately 120 billion smokers in India. In 2015 our 1.1 billion people smoked tobacco. More over WHO has identified tobacco as the greatest killer substance worldwide. The smoking causes lot of deleterious effects in our body likes heart disease, lung disease and peripheral arterial disease etc. Among this, one of the common diseases is peripheral arterial disease. It causes many symptoms in our extremities like delayed wound healing, pain, and numbness. Ankle brachial index is an available straight forward and reproducible method for the early detection of peripheral vascular disease and for improving the risk stratification in the population. The deleterious nature of peripheral vascular disease is increased due to under diagnosis and under treatment. So the recent development suggests re-examination of traditional methods used to diagnose and manage peripheral vascular disease. The epidemiologic evidence shows that ankle brachial index is an effective risk assessment tool. The complications that develop due to smoking pose a multitude of problems in patients. The smoking habits are increased in our country. According to WHO, India is home of 12% of the world's smokers, more than 1 million death each year due to tobacco in India. There are approximately 120 billion smokers in India. 30 % of male in India are smokers. Among adult females, the figure is much lower at between 3-5%. Developing nation generally lag behind the prevention of smoking because of lack of knowledge regarding complications of smoking. A prompt and aggressive stoppage of smoking is very important to prevent late complications of smoking. A proper screening and assessment criteria help in diagnosing the peripheral vascular disease at the earliest

and this help the patients to preserve their limbs. The presentation of peripheral vascular disease in general population and smokers is well known and has been much studied in past few years. The epidemiological evidence shows that ankle brachial index is an effective risk assessment tool. Ankle brachial index is an available, straight forward and reproducible method for the detection of peripheral vascular disease and for improving the risk stratification in the population. Ankle brachial index is a simple method to screen peripheral vascular disease and to evaluate cardiovascular prognosis. The number of elderly peoples with peripheral vascular disease has progressively increased in the last decades and is expected to reach 20% of world population by 2025.

MATERIALS AND METHODS

Research approach- In the present study quantitative approach was adopted.

Research design- The research design is the master plan specifying methods and procedure for collecting and analyzing the needed information in a research. In this study, non -experimental comparative descriptive design is used to achieve the objectives.

Variables- The factors which changes during the course of the study. In this study ankle brachial index is the study variable.

Extraneous variables- Extraneous variables exist in all studies and can influence the variable under study and the relationship between variables. In this study extraneous variables are the anticoagulant drugs, habits, activities and exercises performed by the samples.

Setting of the study- The study is conducted in the S S N M M Hospital Varkala.

Population- Male Patients who have been smoking for at least 1 year and is in the age between 18 to 59 years who attend the medical outpatient units of the S S N M M Hospital Varkala.

Sample- samples contains 55 smokers and 55 non smokers in Sivagiri Sree Narayana Medical Mission Hospital Varkala

Sampling techniques- In this study non probability purposive sampling was used to select samples.

Sampling criteria

Inclusion criteria

• Persons who are smoking for more than 1 year.

• Persons who are conscious, alert and well oriented to time, place & person and can speak.

• Persons who are between age group of 18 to 59years.

Exclusion criteria

• Persons who are not smoking.

Tools & techniques

The tool used for the present study constitutes 3 sections.

Part A: Questionnaire to collect socio-demographic data.

Part B: Heavy smoking index interview schedule.

Part C: Ankle brachial index observation schedule

Part A is the questionnaire to collect the baseline data of the persons with smoking an interview was made with the patients to collect the data age , gender, duration of smoking number of cigarettes, any co-morbid illness , bad habits & any evidence of peripheral arterial obstructive disease were collected.

Part B is the heavy smoking index interview schedule. This tool measures the intensity and severity of the smoking an individual performs.

Part C is the ankle brachial index observation schedule and this assesses the systolic blood pressure of the upper & lower limbs of both side of the patient. The blood pressure of both upper & lower extremities was assessed by digital sphygmomanometer. The ABI assessment was done on both sides separately.

The scoring

0.9 – 1.3 – Normal.

0.7 – 0.89 – Mild peripheral arterial disease.

0.4 – 0.69 – Moderate peripheral arterial disease.

0 – 0.39 - Severe peripheral arterial disease.

Data collection process

A request letter for the conduct of the study in S S N M M Hospital varkala was forwarded through the principal S S N M M College of nursing to the medical superindent of S S N M M Hospital Varkala was obtained. The data collection period was from 23-7-2018 to 26-7-2018.

Those subjects satisfying the inclusion criteria were selected for the study. Then the investigators introduced him to the sample. An informed consent was obtained from the samples after explaining the study and ascertaining the willingness of the participant. The samples were assured anonymity and confidentiality of the information provided by them.

The individual was made to lie on the bed for 5 minutes. During this time, baseline data was collected from the samples by interview technique.

The brachial systolic blood pressure was assessed in the upper extremity using a digital sphygmomanometer. The blood pressure cuff was digital 2 inch above the ante-cubital fossa and the systolic pressure was determined. The same was performed in the other arm .Then the paediatric cuff was placed 3-4 inches above the medial malleolus of the leg and the systolic pressure was determined, the same was performed in the other leg. Then the ankle brachial pressure was assessed by dividing systolic blood pressure of ankle by systolic blood pressure of upper arm.

A total of 110 samples were included from the S S N M M Hospital Varkala, which had 55 smokers & 55 nonsmokers.

Statistical Methods

The collected data were appropriately coded & analyzed using descriptive and inferential statistics.

The data were entered in the master sheet.

Frequency distribution of the persons with smoking based on baseline characteristics.

The ankle brachial index of both sides of the samples was analyzed using the frequency table.

The association of selected demographic variables and ankle brachial index was analyzed by chi-square.

 Check the analysis part.

 Association of ABI among smoker and nonsmokers.

 Association of ABI and heavy smoking index among analysis.

RESULTS

Section 1: Frequency distribution and percentage of samples based on selected demographic Variables.

1. Among smokers 16 (32%)were 19-28 years old , 7(14%)were 29-38 years of age, 13(26%)were 39-48years old and remaining 14(28%)were about 48-59 years.

2. Among nonsmokers 9(18%)were 19-28 years old , 19(38%) were 29-38years of age ,8(16%)were 39-48years of age, and remaining 14(28%)were 48-59 of age.

3. Regarding duration of smoking 28% belongs to last 5 year category, 20 % belongs to 1-5 year category , 22% belongs to about 10 year category and the remaining 30 % belongs to more than 10 years category.

4. Regarding the past 30 days of smoking 22% smokes less than 5 days, 8 % had 5- 10 days of duration, 14% had 11-20 days and 28 % had smokes more than 20 days.

5. Regarding co-morbid illness in smokers 28% have hypertension, 2% have heart disease, 6% have vascular disease, 24% have other disease and 40 % does not have any diseases.

6. Regarding co-morbid illness in nonsmokers 40 % have hypertension, 4% have heart disease, 4% have vascular disease, 6% have other disease and 46 % does not have any diseases.

7. Regarding bad habits in smokers 52% use alcohol 12% have chewing 10 % use snuff and 26 % does not have any bad habits.

8. Regarding bad habits in nonsmokers 44% use alcohol 4% have chewing 2% use snuff and 50 % does not have any bad habits.

Section 2: Ankle brachial index assessment of smokers and nonsmokers

Regarding right ankle brachial index in smokers 30% had normal ankle brachial index, 48% had mild peripheral artery disease, 16% had moderate peripheral artery disease 6% had sever peripheral artery disease. Regarding right ankle brachial index in nonsmokers 90% had normal ankle brachial index and remaining 10% had mild peripheral artery disease. Regarding left ankle brachial index in smokers 28% had normal ankle brachial index, 44% had mild peripheral artery disease, 18% had moderate peripheral artery disease, 10% had severe peripheral artery disease. In left ankle brachial index of nonsmokers 92% had normal ankle brachial index, 8% had mild peripheral artery disease.

Section 3: Association between selected demographic variables and ankle brachial index among smokers and nonsmokers

1. There was significant association between duration of smoking and right ankle brachial index in smokers.
2. There was significant association between smoking in the past 30 days and right ankle brachial index in smokers.
3. There was significant association between co-morbid illness and right ankle brachial index.
4. There was no significant association between age and bad habits in smokers regarding right ankle brachial index.
5. There was significant association between smoking in the past 30 days and left ankle brachial index.
6. There was significant association between co-morbid illness and left ankle brachial index.
7. There was no significant association between age, duration of smoking and bad habits in left ankle brachial index.
8. There was association between age and right ankle brachial index among nonsmokers.
9. There was no significant association between co-morbid illness and bad habits in right ankle brachial index.

10. There was no significant association between age, co-morbid illness, bad habits in left ankle brachial index.

Section 4: Association between heavy smoking index among smokers with right and left ankle brachial index

1. There was significant association between right ankle brachial index and heavy smoking index.
2. There was significant association between left ankle brachial index and heavy smoking index.

Distribution of sample according to age

Table 1a

Age	Frequency	Percentage
19-28	16	32%
29-38	9	14%
39-48	14	26%
49-58	16	28%

The above table shows that 16 peoples belongs to age group of 19-28, 9 belongs to 29-38, 14 belongs to 39-48, 16 belongs to 49-59.

Table1b

Age	Frequency	Percentage
19-28	11	18%
29-38	19	38%
39-48	10	16%
49-58	15	28%

The above table shows that 11 peoples belongs to age group of 19-28, 19 belongs to 29-38, 10 peoples belongs to 39-48, 15 belongs to 48-59.

Table 2a: Distribution of smokers according to bad habits

Bad habits	Frequency	Percentage
Alcoholism	26	52%
Betel Chewing	8	12%
Snuff	7	10%
Nil	14	26%

The above table shows that 26 peoples are alcoholics, 7 peoples use snuff

Table 2b: Distribution of nonsmokers according to bad habits

| Bad habits	Frequency	Percentage
Alcoholism	23	44%
Betel Chewing	4	4%
Snuff	2	2%
Nil	26	50%

The above figure shows that 26 peoples do not have any bad habits and3 person use snuff.

Table 3- Comparison of right ankle brachial index among smokers and nonsmokers.

Ankle brachial index	Smokers		Non smokers	
	Right	%	Right	%
Normal	17	30%	16	90%
Mild	26	48%	22	10%
Moderate	10	16%	9	0%
Severe	4	6%	6	0%

Table 4: Comparison of left ankle brachial index among smokers and nonsmokers. (n=110)

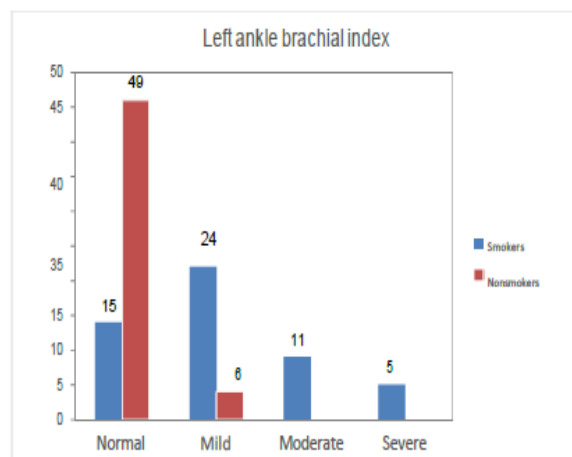| Ankle brachial index	Left	Smokers %	Left	Non smokers %
Normal	15	28%	49	92%
Mild	24	44%	6	8%
Moderate	11	18%	0	0%
Severe	5	10%	0	0%

Figure 1 shows that 26 smokers had mild peripheral artery disease in right leg and 4 had severe peripheral artery disease. 5 nonsmokers had mild peripheral artery disease in the right leg and no one had severe peripheral artery disease.
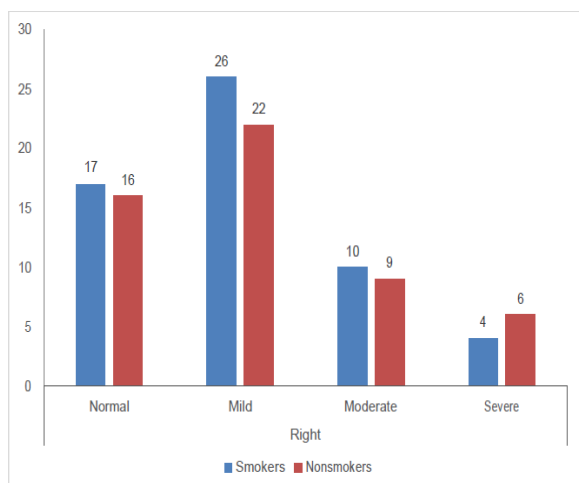
Figure1- Comparison of degree of right ankle brachial index among smokers and non-smokers

Figure 2: Comparison of left ankle brachial index among smokers and Nonsmokers

The above figure shows that 24smokers had mild peripheral artery disease in left leg and 5 had severe peripheral artery disease. 49 nonsmokers had normal ankle brachial index and 6 had mild peripheral artery disease

Table 5: Association between Right ankle brachial index among smokers with socio demographic data.

Variables	Normal(f)	%	Mild(f)	right %	Moderate(f)	%	Severe(f)	%	Chi square	df
Age										
19-28	9	16%	8	16%	0	0%	0	0%	11.92	9
29-38	2	2%	6	10%	1	2%	0	0%		
39-48	3	6%	7	12%	3	6%	1	2%		
49-59	4	6%	5	10%	4	8%	2	2%		
Duration of smoking										
Last 5 years	6	10%	9	18%	0	0%	0	0%	**18.01***	9
1-5 years	6	12%	6	8%	0	0%	0	0%		
About 10 years	2	2%	5	10%	4	6%	2	4%		
>10 years	3	6%	6	12%	5	10%	1	2%		
Past 30 days										
<5 days	10	18%	2	4%	0	0%	0	0%	**23.04***	9
5-10 days	2	4%	2	4%	0	0%	0	0%		
11-20 days	2	2%	5	8%	3	4%	0	0%		
>20 days	3	6%	17	32%	6	12%	3	6%		
Co-morbid illness										
Hypertension	4	6%	9	18%	2	2%	1	2%	**32.38**	12
Heart disease	0	0%	1	2%	0	0%	0	0%		
Vascular disease	0	0%	0	0%	1	2%	2	4%		
Others	8	12%	7	12%	0	0%	0	0%		
Nil	6	12%	8	16%	6	12%	0	0%		
Bad habits										
Alcoholism	8	16%	10	20%	8	12%	2	4%	7.26	9
Chewing	3	2%	3	6%	1	2%	1	2%		
Snuff	1	2%	3	6%	1	2%	0	0%		
Nil	5	10%	8	16%	0	0%	0	0%		

Table- 5 shows that there is significant association between duration of smoking with right ankle brachial index (chi square- 18.01), smoking in the past 30 days (chi square -23.04) and co morbid illness (chi square-32.38). There is no significant association between age and bad habits with right ankle brachial index.

Table 6: Association between left ankle brachial index among smokers with socio demographic data. (N=55)

Variables	Normal(f)	%	Left Mild(f)	%	Moderate(f)	%	Severe (f)	%	Chi square	df
Age										
19-28	7	12%	10	20%	0	0%	0	0%		
29-38	4	6%	4	6%	1	2%	0	0%	15.32	9
39-48	4	8%	5	8%	3	6%	1	4%		
49-59	2	2%	5	10%	6	10%	3	6%		
Duration of smoking										
Last 5 years	6	12%	9	16%	0	0%	0	0%	15.09	9
1-5 years	4	4%	6	12%	2	4%	0	0%		
About 10 years	2	4%	5	10%	4	6%	1	2%		
>10 years	4	8%	4	6%	4	8%	4	8%		
Past 30 days										
<5 days	3	6%	8	16%	0	0%	0	0%	**16.92***	9
5-10 days	2	2%	3	4%	1	2%	0	0%		
11-20 days	4	2%	1	2%	3	4%	3	6%		
>20 days	9	18%	11	22%	6	12%	2	4%		
Co-morbid illness										
Hypertension	2	4%	3	6%	5	10%	4	8%	**32.46***	12
Heart disease	0	0%	0	0%	2	2%	0	0%		
Vascular disease	0	0%	0	0%	3	4%	1	2%		
Others	6	8%	8	16%	0	0%	0	0%		
Nil	9	16%	11	22%	1	2%	0	0%		
Bad habits										
Alcoholism	5	10%	12	24%	5	10%	4	8%	7.39	9
Chewing	2	2%	3	4%	2	4%	1	2%		
Snuff	3	4%	2	4%	3	2%	0	0%		
Nil	6	12%	6	12%	1	2%	0	0%		

Table 6- shows that there is significant association between smoking in the past 30 days(chi square-16.92) and co morbid illness (chi square-32.46) with left ankle brachial index in smokers. There is no significant association between age, duration of smoking and bad habits.

Table7- Association between right ankl;e brachial index among non smoker. (N=55)

Variables	Normal	Right %	Mild	%	Chi square	df
Age 19-28	9	18%	0	0%		
29-38	20	28%	0	0%		
39-48	9	14%	3	2%		
49-59	10	20%	4	8%	**8.53***	3
Co-morbid illness Hypertension	16	32%	4	8%		
Heart disease	3	2%	2	2%		
Vascular disease	2	4%	0	0%		
Others	4	6%	0	0%		
Nil	24	46%	0	0%	8.8	4
Bad habits Alcoholism	19	36%	5	8%		
Chewing	3	4%	0	0%		
Snuff	1	1%	0	0%		
Nil	25	48%	2	2%	2.96	3

Table 7 shows; there is significant association between age (chi square- 8.53) with right ankle brachial index among non smokers. There is no significant association between co-morbid illness and bad habit

Table 8:-Association between left ankle brachial index among nonsmokers with socio demographic data. (N=55)

Variables	Left Normal	%	Mild	%	Chi square	d f
Age						
19-28	9	18%	0	0%		
29-38	19	38%	0	0%		
39-48	8	12%	4	4%		
49-59	13	24%	2	4%	**6.32**	3
Co-morbid illness						
Hypertension	18	34%	3	6%		
Heart disease	3	4%	0	0%		
Vascular disease	1	2%	3	2%		
Others	3	6%	0	0%		
Nil	24	46%	0	0%	8.55	4
Bad habits						
Alcoholism	19	36%	4	8%		
Chewing	4	4%	0	0%		
Snuff	2	2%	0	0%		
Nil	26	50%	0	0%	5.53	3

Table 8 shows that there is no significant association between age, co morbid illness and bad habits.

Table 9-Association between Heavy smoking index among smokers with right ankle brachial index. (n=55)

	Right ABI									
Heavy smoking index	Normal	%	Mild	%	Moderate	%	Severe	%	Chi sqaure	df
Light smoker	9	18	4	8	0	0	0	0		
Moderate smoker	6	8	13	24	8	12	1	1	16.22*	6
Severe smoker	2	4	8	16	2	4	2	4		

Table 9-There is significant association between heavy smoking index among smokers with right ankle brachial index (chi square-16.22).

Table10-Association between heavy smoking index among smokers with left ABI (n=55)

	Left ABI									
Heavy smoking index	Normal	%	Mild	%	Moderate	%	Severe	%	Chi sqaure	df
Light smoker	10	20	3	6	0	0	0	0		
Moderate smoker	3	4	16	32	6	8	1	2	33.09*	6
Severe smoker	2	4	5	6	5	10	4	8		

Table-10 shows that there is significant association between heavy smoking index among smokers with left ankle brachial index (chi square-33.09).

DISCUSSION

This chapter gives a brief of the major findings of the study which is intended to assess the ankle brachial index among smokers and nonsmokers. The major findings of the study were discussed in relation to the findings of other research studies. The present study showed that among 110 samples 50% were smokers and 50% were nonsmokers. There is significant association between right ankle brachial index with duration of smoking , smoking in the past 30 days and co morbid illness there is also significant association between left ankle brachial index with smoking in the past 30 days and co morbid illness. There is significant association between age and right ankle brachial index among nonsmokers and there is no significant association between left ankle brachial index among non smokers. There is also significant association between heavy smoking index among smokers with right and left ankle brachial index. This is contradictory with the findings of the study conducted by Rijo. G. Varghese, to assess the risk for ineffective peripheral tissue perfusion among diabetes mellitus patients using ankle brachial index. The study included 360 samples. The study shows that

there is highly significant association (p<0.001) between age and peripheral tissue perfusion.

CONCLUSION

Based on the findings of the present study the following conclusions were drawn.

• There is significant association between duration of smoking with right ankle brachial index (chi square- 18.01), smoking in the past 30 days (chi square - 23.04) and co morbid illness (chi square-32.38). There is no significant association between age and bad habits with right ankle brachial index.

• There is significant association between smoking in the past 30 days (chi square-16.92) and co morbid illness (chi square-32.46) with left ankle brachial index in smokers. There is no significant association between age, duration of smoking and bad habits.

• There is significant association between age (chi square-8.53) with right ankle brachial index among non smokers. There is no significant association between co-morbid illness and bad habits.

• There is significant association between heavy smoking index among smokers with right ankle brachial index (chi square-16.22) and also there is significant association between heavy smoking index among smokers with left ankle brachial index (chi square-33.09).

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