

RESEARCH REPORT

PREVALENCE OF PERIPHERAL ARTERIAL DISEASE (PAD) ASSOCIATED WITH FAST FOOD CONSUMPTION, USING ANKLE- BRACHIAL INDEX IN UNIVERSITY STUDENTS

ABSTRACT

OBJECTIVE

The objective of this study is to find out the prevalence of PAD associated with fast food consumptions in university students under the age of 18-25 years.

STUDY DESIGN

Observational study

SAMPLING TECHNIQUE

Convenience random sampling

SAMPLE SIZE

57 students with age range of 18-25 years

OUTCOME MEASURE

Ankle Brachial Index (ABI)

METHODOLOGY

The subjects were recruited from first year to final year students for the study. A one month dietary questionnaire was given to the students. We instructed the students to fill questionnaire on daily basis. The dietary questionnaire contained list of 46 fast food items. After a month, a portable Doppler Ultrasound was used to measure their ABI values.

RESULTS

Fast food consumption highly impacts on peripheral arterial disease ($p < 0.00$) so the association of fast food with PAD predicts the upcoming cardiovascular events in university students. There is no significant relationship of gender with peripheral arterial diseases ($p < 0.335$). Also, there is no significance relation between fast food and gender ($p < 0.153$).

CONCLUSION

In this territory, the PAD is increasing particularly in the ages of 18-25 years and all individuals with an ABI < 1.0 demonstrates as a minimum one classical cardiovascular risk factor, which needs sufficient concentration and an aggressive risk management.

Keywords

Ankle Brachial Pressure Index, Peripheral Arterial Diseases, Fast Food Consumption, University Students, Cardiovascular Disease, Coronary Heart Disease, Atherosclerosis.

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INTRODUCTION

Cardiovascular illness also known as coronary heart disease (CHD) is the most¹ recurrent and major reason for death of adult population globally^{1,2}. The conjecture is that by the year 2020, there is a chance to become a primary reason for mortality and morbidity in all developing countries^{1,3}. The conventional risk factors associated with the degree and seriousness of the atherosclerotic lesions. Similarly, subclinical identification about hardening of great vessels is significantly relevant in observing the modernization of prediction of cardiovascular hazard^{1,4}. Peripheral arterial disease is viewed likely as increase peril for creating coronary heart diseases. People having the illness are treated in the same way regarding secondary prevention^{1,5,6}, as well as to the related mortality developed by CHD⁷, morbidity and mortality transformed toward cardiovascular^{1,8} illness and all-cause mortality^{1,4,9,10}. The recognition of peripheral arterial disease is of individual importance from the time when atherosclerosis is observed as a comprehensive illness, and detection of peripheral arterial diseases commonly signifies hardening in other vessels also^{1,4}. Poor endothelial function is a standout amongst the practically huge precursors for atherosclerosis. The level of expanded arteries is directly connected with their hardening, known as atherosclerosis.

Ankle-Brachial Index is a substitute indicator of hardening of vessels and latest research signifies its efficacy as an interpreter of upcoming cardiovascular illness and mortality. Still, this important test is underutilized. The Ankle brachial index is an easy, non-invasive clinical test that must be appropriate to detect PAD, other than this, it also give significant predictive information about upcoming cardiovascular incidents¹¹. This non-invasive investigation has demonstrated that a value of <1.0 can be considered as confirmation of peripheral arterial diseases^{1,4}.

Coronary artery disease, is the widely preponderance recognized structure of coronary illness. It arises as construct atheroma in vessels, which pieces the oxygenated blood arriving from heart, expanding your possibility of a heart attack then ultimately leading to death. Consuming fast food that hold Trans or saturated fats might cause its increment in the total amount of blood and low density lipoprotein (bad cholesterol) and decreases high density lipoprotein (good cholesterol). Consuming large quantity of fats furnishes to the vulnerability of cardiovascular illness, as stated by researchers in the Netherlands Furthermore distributed in "Lancet" in 2001¹¹.

Atherosclerosis is solidifying the great vessels which is generated by accumulation of atheroma. Atheroma can split and result in blood clots that can cause impediment in the similar vessels, and alternately

clot can trek and get lodged in different areas of our body, where it can obstruct the blood from surging and result into heart attack. Solidification of the vessels start with raised blood cholesterol, Trans and saturated fats and high blood pressure. Eventually, cells lined the inner part of our arteries turns swollen and can cause a stroke or heart attack¹¹.

Accidentally, numerous people develop heart disease by poor eating habits, when undiagnosed heart conditions can be lethal. Relinquishing from fast foods is the best way to keep cholesterol levels low and forestall clogged arteries, which can overturn the symptoms of heart disease.

BACKGROUND

Fast food is a worldwide trend for the world economy^{12,13}. The accessibility of fast food and snacks at stumpy costs and advertising schemes alterations by the producers has prompted a worldly evolution, because who needs to prepare a formal meal when buying fast food is so convenient. It seems to have deluged every age; every race, because there is no exemption that concepts, interaction, lifestyle all are transformed to harmonize this new jet age and consumption behavior as well^{13,14}. The latest additions on period are school, college and university going in fastidious¹³.

The four very important factors for a food sale, manufacturing, processing, arrangements and utilization have been highly impacted by globalization and with emergent connotation of pizzas, burgers, snacks and carbonated drinks, individuals are snacking in a modern style. Exploitation of western fashion, food raised as the income level of developing countries is elevated^{15,16,17}. As it has been acknowledged that prerequisite for food is related with the standard living of city areas^{15,16}, flourishing urbanization has consequently led to altered lifestyle and augmented incomes with domination of young people.

According to a literature review, latest researches show that there are numerous elements that contribute to fast food consumption. In 2009, a researcher Wood, executed a study in Houston¹⁸; exemplified that only 3% of children offered foods at a variety of fast food eating places complied nutritional principles explained by National School Lunch Program^{15,18}. Another research in 2009, by MacFarlane et al, figured out that those who ate fast food at home were more likely to be weighty^{15,19}. Similarly, in 2009, a research was carried out by Davis and Carpenter, published in the American Journal of Public Health; to determine the vicinity of fast food eating places to colleges and youngster obesity. Hence, it suggested that those students who go to college located near to fast food eating places were more obese than their neighboring students who go to college not next to a fast food

restaurant^{15, 20}. An additional, Howard et al study supervised in California, inquired about the relationship between school situated close to fast food eating places, expedience shops, supermarkets and the amounts of overweight ninth grade learners^{15, 21}. In conformity to a review by the Institute of Food Technologists, research into fast food has established that there is a direct association between the numbers of fast food restaurant situated inside the locality¹³. Accounted 75% of children are eating their dinners at home, almost half of children meals are fast foods, delivered, or taken out from restaurants or grocery delis¹³.

Consequently, studies provide evidence that marked fundamental is proximity of fast food restaurants to the school or university, because of this rationale; students do not want to prepare a formal food when buying fast food is so simple. Intemperance and prolonged use of fast food can have lots of poor repercussions.

Longitudinal researches have also given confirmation that fast food positively influence on weight and resulting increase in weight among university students^{22, 23}. Previous studies indicate significant relationship between the frequency of fast food consumption and overweight, obesity, gain in body fatness, weight gain^{22, 24-31}, and total energy consumption^{22, 23, 27, 32} among both youngsters and adults.

In University, the majority of students regularly consume fast foods such as, pizza, sandwiches and burgers. They are also accessible in café shops, school canteens and college cafeteria. Shawarma is publically a very well-known fast food amongst young people. Furthermore, chinese, chicken nuggets, chicken fried rice and crispy fried chicken, all types of fast food are being used for the young generation both girls and boys.

Students are usually affectionate of eating fast food not merely for its flavor but also for the university lifestyle. Salted snack foods, candy, desserts, fried food and soft drinks are few of the chief fast foods. Nowadays, era of expediency, fast food requires no introduction. It is tasty, heavy, reasonable, and eagerly obtainable at any time of the day. But it has detrimental effects on health for instance, hypertension, obesity, cardiac problems, cancer, hypercholesteremia, dental caries and various other intimidating health hazards³³.

Internationally fast food trade produced by 4.8% and accomplished a cost of 102.4 billion and a volume of 80.3 billion business deals. In America, young people aged 11-18, visit fast food restaurants probably around two days a week and by 14 years of age, 32% of young girls, 52% of boys drink three or more servings of sugared soft drinks every day. In India fast food business is increasing by 41% a year³⁴.

A research carried out by the All India Institute of Medical Sciences, Department of Science and Technology established that the consumption of fast food is rising among youngsters. The similar review had revealed that this trend and connected lifestyle aspects in the urban youngsters and young adult population in the rise of non-communicable diseases³⁵ for instance, cancer, diabetes, cardiovascular disease and chronic heart diseases.

Unexpectedly, the predicted causes of cancer and cardiovascular mortality and morbidity in the US confirmed that, about 25% can produce cancer and CVD because of fried food and high fat diet^{15, 35}. Numerous people get happiness in consuming fast food every day, even though they might have never endorsed regarding its dreadful outcomes to their health.

In Los Angeles, a research was carried out to identify the association between utilization of fast food and cholesterol levels among 200 students. More than 80% of students consumed higher than suggested values of total and saturated fats. Investigators used ultrasound to determine the thickness of neck artery and compared high risk students with their healthy corresponding. They suggested that thickest artery walls were expected to those, who were obese, and had increased cholesterol and blood pressure levels. A study illustrated that 1/3rd of the students had abnormally high cholesterol levels for their age³⁶.

Another exploratory descriptive study was conducted in India, to find out the non-modifiable and modifiable risk factors of coronary artery disease present among adolescents. 591 students aged between 12-18 years were enrolled by convenient sampling. Data was collected through structured questionnaire regarding modifiable and non-modifiable risk factors. Hence, results proved that 71% students ate fast food daily, 67% students had 3 or more risk factors, while 22% students were found with 2 risk factors and 11% of them had 1 risk factor for coronary artery disease³⁷.

Particularly, students are greatly excited towards fast food and similar to have it regularly at food outlets or arranging on delivery. Besides Pakistani food; Western, Chinese, Italian and Continental cuisines have also increased the Pakistani appetite leading towards passion³⁸. There are various international chains serving fast food in Pakistan such as KFC, Burger King, Domino's Pizza, Dunkin Donuts, Subway, Nandos, McDonalds, Pizza Hut, Hardees, Steak Escape and Gloria Jean's Coffees. Additionally, to the international chains, local cuisine in Pakistan like to have Biryani, Kebab rolls, Bun kebab, Nihari etc as fast food.

The fast food trade, primarily considered in Southern California during the 1940s³⁹, not merely altered the

eating behavior of Americans, but also other numerous countries through worldwide, including Asian countries^{15,39}. Furthermore, fast food exploitation elevated drastically in Pakistan, and characteristics having influence on customers food preferences being; socialization, urbanization, attraction for eating out, convenience for dual-income families in Pakistan, taste for college and university students and many other^{15,40}.

A famous quote by La Rochefoucauld states: "To eat is a necessity, but to eat intelligently is an art"⁴¹. The way in which we eat, and what we eat, is of imperative significance to our health. Through universal increase of sustenance standardization, speedy growth is happening in the developing world. It has completely altered the route people eat all over the globe.

SIGNIFICANCE

There are several studies that have investigated fast food consumption with relationship and comparison of many other factors show positive relationship with fast food. The objective of our research is to identify the peripheral arterial disease in university students under the age of 18-25 years with relation to the fast food consumption. In this research, existence of PAD will be verified by means of Ankle-Brachial Index (ABI). ABI is a substitute indicator of atherosclerosis and lesser than less studies have been used as a forecaster of upcoming cardiovascular illness.

MATERIAL AND METHOD

Study Population

Physiotherapy University students were enrolled in our study between the ages of 18-25 year.

Sample Size

57 students

Inclusion Criteria/ Exclusion Criteria

1. All physiotherapy students under 18-25 years of age.
2. Normal lower extremity pulse (value 3+)
3. No evidence of claudication and ischemic rest pain
4. No history of smoking and diabetes
5. No risk factors of atherosclerosis present for instance, hyperhomocysteinemia, dyslipidemia and hypertension.
6. No Coronary, carotid and renal artery diseases,
7. Except physiotherapy students under the age of 18-25 years
8. Abnormal lower extremity pulse (0 no palpable pulse, +1 faint pulse)
9. Claudication and ischemic rest pain present,
10. Known atherosclerosis risk factors present such as, dyslipidemia, hypertension, hyperhomocysteinemia.
11. Known Coronary, carotid and renal artery diseases,

Study Design

Observational study

Sampling Technique

Convenience sampling.

Study Settings

The study was carried out in reputed Institute of Physical Therapy in Karachi

Outcome Measure

Ankle Brachial Index (ABI).

Ethical Consideration

According to ethical consideration written notified consent was taken from the students and the purpose of the study, objectives and protocols explained before starting the research and assured that data will be kept confidential.

Data Collection

The subjects were recruited from first year to final year students for the study. A one month dietary questionnaire, in which we added almost all type of food that prefers by individual, was given to the students. We instructed the students that they filled a questionnaire on a daily basis whatever they eat. The dietary questionnaire contained list of 46 fast food including, salty snacks (potato chips, corn chips, popcorn, and crackers), sweets (biscuits, cookies, cakes, chocolate, candies, brownies, pastries, ice cream), sweetened beverages (Pepsi, coke, mountain dew, 7up, energy drinks), fast foods (fried meat, burgers, Chinese, steak, fried chicken, rice, pizza) and others food (whole milk, cheese, yogurt, fried egg, pasta). Additionally, vegetables, boiled rice and fruits were also included as healthy food. After one month, students reported how many times they had consumed each item daily. At last, we collected dietary information and recorded the arterial measurements in lower extremity.

Measurement Techniques

The measurement of Ankle Brachial Index involves the pressure in the right ankle of Posterior Tibial or Dorsalis pedis arteries and pressures in the both elbow of brachial artery.

ABI values were recorded by qualified physiotherapist at reputed Institute of Physical Therapy. With the students sitting and feet exposed, upper arm and lower leg pressure was detected with a portable Doppler Ultrasound. Wrap the cuff around leg above ankle for posterior tibial artery, below ankle for dorsalis pedis artery and over arm for brachial artery. Applying gel and placed Doppler knob in the direction of blood flow below, medial malleolus for posterior tibial artery, over metatarsal on medial side for dorsalis pedis and at medial side of cubital fossa for brachial artery. The cuff of the equipment was compressed quickly in each ankle and arm about 150 mmHg of blood pressure followed by a sluggish decline sound until the first echo of the blood pressure became clear. Note the blood pressure by deflating the cuff.

The outcome is recorded as the value of the both arm systolic pressure in the denominator, over the ankle pressure in the numerator; see in the formula. Peripheral arterial disease was suspected if the recorded ABI was <1.0.

ABI = Right ankle systolic pressure/ Both Arm systolic pressures

Interpretation of ABI Results

An ABI value higher than 1.3 is also considered abnormal, indicative of non-compressible or calcified arteries. The ABI value of 1.1-1.2 is considered as normal and healthy individual, if the ABI is between >0.5 - <1.0 is marked as mild to moderate PAD, and an ABI less than 0.5 is suggestive of severe PAD

ABI VALUES	INTERPRETATION
>1.3	Rigid or calcified arteries
1.1-1.2	Normal arteries
>0.5-<1.0	Mild-moderate PAD
>0.25-<0.5	Severe PAD

Figure 1: interpretation of ABI.

RESULTS

Numbers of participants in the study were 57. Table 1a summarizes the ABI measurements explicated as Standard Deviation=1.56 and mean=20.89, with respect to age decade. In table 1b, 57 students in which, 33 detected with mild-moderate PAD=57.9% (between>0.5-<1.0), whereas 21 students considered as normal and healthy=36.8% (ABI value 1.1) and remaining 3 students suggestive (higher than 1.3) abnormal or non-compressible arteries 5.3%.

	AGE
Total no. of students	57
Mean	20.89
Std. Deviation	1.56

Table 1a: Mean and SD with respect to age.

	Frequency	Percent
Clacified Arteries	3	5.3
Normal	21	36.8
Mil-to-Moderate PAD	33	57.9
Total	57	100.0

Table 1b: Prevalence of peripheral arterial diseases in university students.

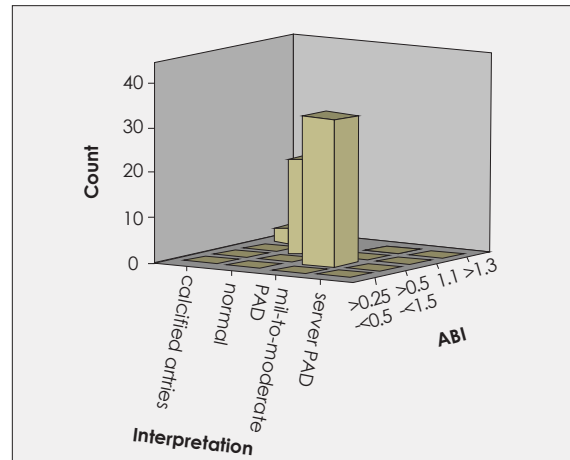


Figure 2: Graphical presentation of ABI values in university students.

Effects of food on gender shows in table 2, out of 57 students, 11 were males and 46 were female. Total 21 students who ate healthy food in which 19 were female and 2 were male while average 36 students consumed fast food wherein 27 were female and 9 were male. Pearson Chi-square tests were used to explore differences in proportions by gender. No significant difference (p0.153) was seen between fast food consumption and gender.

	Male	Female	Total
healthy food	2	19	21
fast food	9	27	36
Total	11	46	57
P-value			0.15

Table 2: Gender association with food.

Effect of food and peripheral arterial disease are presented in table 3, Average 36 students who ate fast food in which 33 were diagnosed with mil-moderate PAD and 3 were considered abnormal or calcified arteries (ABI >1.3). In contrast, 21 students who ate healthy food all were suggested healthy and normal individual (ABI 1.1-1.2). Significant difference (p0.00) was seen between fast food consumption and PAD.

	ABI			Total
	>1.3	1.1-1.2	>0.5-<1.0	
Healthy food	0	21	0	21
Fast food	3	0	33	36
Total	3	21	33	57
P-value				0.000

Table 3: Association between ABI and food

Table 4 summarizes the relation between ABI and gender, Average 57 students, out of 33 students, 8 were male and 25 were female detected with mild-moderate PAD (between $>0.5- <1.0$), whereas 21 students considered as normal and healthy (ABI value 1.1-1.2) individual in which 2 were male and 19 were female and remaining 3 students suggestive (higher than 1.3) abnormal or non-compressible arteries wherein 1 was male and 2 were female.

ABI	Gender		Total
	Male	Female	
>1.3	1	2	
1.1 - 1.2	2	19	21
>0.5 - <1.0	8	25	33
Total	11	46	57
P- value			0.33

Table 4: Relationship between ABI and gender.

Prevalence of PAD is seen in table 4, associated with gender are females their value of ABI $>0.5- <1.0$ comes under the category of mil-moderate PAD. No significant difference of gender was observed with peripheral arterial diseases ($p0.335$).

DISCUSSION

We calculated the prevalence of peripheral arterial diseases in university students in table 1a. Total 57 students 33 are detected with mild-moderate PAD, 21 students considered as normal and healthy individual while remaining 3 students' suggestive abnormal or non-compressible arteries. Hence, it is suggested that prevalence of PAD is seen in the student their value of ABI $>0.5- <1.0$ comes under the category of mil-moderate PAD.

Effect of Food on Gender

Pearson Chi-square tests were used to explore differences in proportions by gender. No significant difference ($p0.153$) was seen between fast food consumption and gender. This result is related to the research by Donald C in 2013, conducted at the University of Central Florida, the purpose of the research is to identify the relationship of fast food consumption within the perspective of gender and correlation with BMI. Data concerning about fast food consumption were collected via survey ($n=49$ males, $n=116$ females). Through data analysis, no gender based food preference is established, while significance relation with Body Mass Index has been proved⁴². But in our research, Body Mass Index was not included. Similarly, another study was carried out at Grand Valley State University, showed same results to investigate the variations in fast food between males and females between the ages of 18-24. It is proved that no significance difference was seen between genders as relation to the fast

food⁴³.

According to evidence, it indicates that effect of food does not highly impact on gender; students have been enthusiastic for going fast food outlets for enjoyment and transform.

Effect of Food on Peripheral Arterial Disease

Effects of fast food highly impact on peripheral arterial disease and association with fast food in university students aged 18-25 years that predicts the upcoming cardiovascular events in university students.

A sufficient, balanced and healthy diet is important to sustain health for individual's life time. To attain such a high level of healthy intake, fast food consumption should be restricted. Therefore, nutritional education sessions are essential to improve the nutritional patterns and food preferences of university going students. A survey conducted in India in which they revealed that overabundant eating of fast food would lead to increase large variety of health disorders. The intent of the survey was to identify the nutritive value and their impact on human health, their ingredients and eating habits of students. Results concluded that severe health consequences might occur upon continuous consumption of fast food⁴⁴.

According to Farzan Yahya et al, a research was carried out at Lahore, Pakistan, illustrated the trend of fast food consumption and its effect on Pakistani society. Researchers evaluated that the poor outcome of fast food and the possible risk that it possess by its usually inappropriate eating. Rise in cholesterol, nutritional deficiencies, stroke, hypertension, sexual dysfunction, respiratory diseases, type II diabetes mellitus, cancer (breast, oesophagus, colon, kidney uterus/prostrate), coronary artery disease, and liver diseases can all be caused by eating fast food on a regular basis¹⁵.

Interestingly, in our research we have figure out that there are 6 students who ate vegetables, boiled rice and fruits on daily basis come under the mild-moderate PAD. It might be possible that relationship with heredity and physical inactivity or may be that students were not willing to fill the dietary information and inconsistency in follow-up.

Effect of Peripheral Arterial Disease on Gender

In table 4, 25 female detected with mild-moderate PAD. Hence, it is revealed that prevalence of PAD is seen but not associated with gender though more females have their values of ABI $>0.5- <1.0$ so they comes under the category of mil-moderate PAD as compared to male. Therefore, no significance relation of PAD with gender was observed ($p0.335$). Amazingly, a previous study^{1, 45} shows that mean value of ABI decline in males as compared to females in relation with age. Some studies show

there is normal relationship in both males and females. In future, Prevalence of PAD is doubled up to the age of 60-70 in both genders.

There are three main factors in our research contributing for increased eating behaviour of fast food such as, first and foremost, students approved the reality of getting addicted towards fast food. Secondly, there are many commercials which play a major role to fascinate the college and university students towards fast food and thirdly, a defiant need for the youngster to recognize that the nutrient facts and different chemical additives are included to boost fast food behaviour because the knowledge of individuals about restricting nutrient levels in junk foods has to be dispersed.

The above data exposed that prevalence of peripheral arterial diseases highly impact on university students, so there is an immediate attention to teach the students concerning health perils of fast food. Therefore, researcher felt the need to provide information and give awareness regarding health hazards of fast food among university students.

CONCLUSION

There are numerous health hazards of fast food eating and individuals are unacquainted of its sick effects. It can be predisposed to many injurious illnesses. Significance of fast food consumption highly impact on peripheral arterial disease and associated risk factor that predicts the upcoming cardiovascular events in university students.

In this territory, the PAD is increasing particularly in the ages 18-25 years and of all individuals with an ABI <1.0 demonstrates as a minimum one standard risk factor of coronary heart diseases, which needs to adequate concentration and an aggressive risk management

RECOMMENDATION

Excessive eating of fast food can have many ill effects so; it is recommended that media should disseminate knowledge among young generation about the detrimental effects of fast food. Strategy manufacturers should restrict or ban the unhealthy fast food restaurants. Additionally, fast food restaurants ought to utilize healthy nutrients in making of food.

We are so much busy in our lives that nobody actually believe what we are eating is right. It must be keep in minded that infatuation to fast food is great for industries. It is all in our hands to decide fast food or healthy food.

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