Original Article

The Demographic Characteristics and Level of Physical Activity in Patients Presenting with Heart Diseases at a Tertiary Care Center

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ABSTRACT

Objective: To determine the demographic characteristics and level of physical activity in patients presenting with heart-related complaints and heart diseases at a tertiary care hospital in Karachi.

Study Design: Cross-Sectional Study

Place and Duration of Study: This study was conducted at the PNS Shifa Hospital, Karachi from January 2021 to July 2021.

Materials and Methods: The participants were in-patients enrolled after informed consent. The data was acquired using patient evaluation proforma. The continuous variables were expressed as mean and standard deviation, and the categorical variables were expressed as frequency and percentages. Physical activity level was categorized as a daily walk of more than 30 minutes, 30 minutes or less and infrequent.

Results: Out of 79 adult patients, 44 (55.7%) were males and 35 (44.3%) females. There were 35 (44.3%) participants who had comorbidities, the most common being diabetes mellitus and hypertension. Of the 23 (29.1%) participants who had an addiction, 11 (13.9%) took smokeless tobacco and 06 (7.6%) were smokers. Most participants had no formal education [47 (59.5%)]. The occupation profile showed that 36 (45.6%) participants were housewives and 17 (21.5%) retired persons. A large number of participants had infrequent physical activity [48 (60.8%)], which was observed more in females [28 (35.4%)].

Conclusion: Females are more at risk of developing heart diseases due to sedentary life styles and low education, developing disease at an earlier mean age compared to males.

Key Words: Body mass index (BMI), Body surface area (BSA), Cardiovascular disease, Demographic characteristics, Physical activity level, Sedentary lifestyle

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INTRODUCTION

Heart diseases are considered an epidemic of the late 20th century that has persisted into the 21stcentury.[1,2] It has been predicted in the past that people dying from cardiovascular diseases will reach pandemic proportion by the year 2020.[3]

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Cardiovascular diseases are a spectrum of disorders that refer collectively to diseases of the heart and blood vessels. Heart diseases may be congenital in origin or acquired later in life. The latter category has gained focus due to its high prevalence and morbidity, and the treatment costs associated with it. Despite advances in early diagnosis and better treatment options available today, cardiovascular diseases remain the leading cause of death worldwide and a major cause of disability.[4] Focusing on modifiable risk factors will allow prevention of developing cardiovascular diseases through therapeutic and preventive measures.[5]

Modifiable risk factors are subject to vary regionally, due to differences that are pertinent to geography and life styles influenced by local cultures. Even within a country, the geographical profiles of cardiovascular disease risk factors vary.[6] This necessitates local studies investigating the demographic characteristics of indigenous and non-indigenous populations to determine the factors that render them susceptible to developing these diseases.

When gender is considered, females are generally thought to be protected from developing cardiovascular diseases. They develop disease 7-10 years later compared to males but have a higher prevalence, which makes it a major cause of death in females.[7] A trend of decreasing age at diagnosis for cardiovascular diseases and their risk factors has been observed among females in the United States (US), which highlights the need for prevention earlier in life and mandates gender-specific interventions.[8] Comorbidities further increase the problem, as they differ based on gender and the geographical region. The risk factors for some conditions are similar, e.g. diabetes mellitus and hypertension, and there is a substantial overlap in the cardiovascular complications that follow.[9] Moreover, both genders respond to risk factors differently.

Community-based awareness programs focus on the avoidance of risk factors and to promote physical activities.[10] Sparing time for regular physical activity is not a priority especially in the developing countries, which can be attributed to poverty, occupation, stress, lack of knowledge and facilities e.g. public parks, gymnasiums and fitness clubs. The physical activity guidelines for Americans[11] recommend that adults should get at least 150 minutes per week of moderate-intensity aerobic activity (e.g. walking), or 75 minutes per week of vigorous-intensity aerobic activity (e.g. jogging), or a combination of both. Muscle strength training activities are also recommended on two or more days per week.[12]

Educational institutions play an important role in the awareness about preventable diseases at an early age.[13] Countries with poor education set up, or low school-going population, are deprived of such merits. Although access to education and information is more available today, the aged population presenting with cardiovascular diseases did not have such luxury 30 years ago.

MATERIALS AND METHODS

It was a cross-sectional study, conducted in the Department of Cardiology at PNS Shifa Hospital, Karachi from January to July 2021, after approval by the ethical review committee (ERC) of Bahria University Medical and Dental College (BUMDC), Karachi. The sample size was calculated using the OpenEpi open-source calculator. All participants were in-patients admitted with signs and symptoms or complaints related to heart diseases. Those who met the inclusion criteria were selected through consecutive nonprobability sampling and enrolled after informed consent. The data was acquired using patient evaluation proforma and analyzed using SPSS (version 23). The height and weight of the participants were measured using a column scale with an integrated stadiometer. The BMI was calculated using the equation: Weight (kg)/ [Height (m)] ^{2}. The BSA was calculated using the DuBois & DuBois formula: 0.007184 x Weight (kg) $^{0.425}$ x Height (cm) $^{0.725}$. Physical activity level was analyzed using chi-square test and categorized as a daily walk of more than 30 minutes, 30 minutes or less and infrequent. For analysis, the participants were categorized in different age groups, based on age range with a class interval of 10 years. The continuous variables (ages, height, weight, BMI and BSA) were expressed as mean and standard deviation, and the categorical variables (gender, ethnicity, education, occupation, addictions and physical activity) were expressed as frequency and percentages. A probability (p) value of < 0.05 was considered statistically significant (and < 0.01, highly significant).

RESULTS

Of the total 79 patients with a mean age of 52.71±14.54 years (ranging from 19 to 75 years), 44 (55.7%) were males with a mean age of 55.11±14.34, and 35 (44.3%) females with a mean age of 49.69±14.42. The mean weight, height and BMI of the total study population were 65.54 kg, 1.61 m (161 cm) and 25.54 kg/m^2 respectively. The mean values for the same in males were 69.27 kg, 1.67 m (167 cm), and 24.98 kg/m^2 respectively, and in females were 60.86 kg, 1.54 m (154 cm), and 26.03 kg/m^2 respectively. The BSA was 1.69 m^2 for the total study population, 1.77 m^2 for males and 1.58 m^2 for females. The mean values of height, weight, BMI and BSA were compared between male and female participants using one-way ANOVA, and the results showed a highly significant difference (p-value < 0.001).

According to age, most participants belonged to the 61 to 70 years (29.1%) age group, followed by 51 to 60 years (25.3%) age group, and the least number were observed in the 21 to 30 years (3.8%) age group. The gender distribution in each of the age groups is shown in Table-1. The ethnic groups included 26 (32.9%) Urdu Speaking, 22 (27.9%) Pashtun, 18 (22.8%) Sindhi, 09 (11.4%) Baloch, 02 (2.5%) Punjabi and 02 (2.5%) Saraiki participants. The gender distribution in each ethnic group is shown in Figure-1.

The education level of the male and female participants is shown in Figure-2. Of the total participants, 47 (59.5%) had no formal education, 16 (20.3%) had matriculated, 11 (13.9%) primary education, 02 (2.5%) had intermediate or higher secondary education, 02 (2.5%) had madrasah education, and 01 (1.3%) had graduation. The occupation profile of the participants is shown in Figure-3, and the addiction profile is shown in Figure-4. The addictions in male and female participants are shown in Figure-5.

The physical activity level in both male and female participants, along with level of significance, is shown in Table-2. The comorbidities observed in the participants are shown in Figure-6. Diabetes mellitus and hypertension was observed in 12 (15.2%) males and 10 (12.7%) females. Hypertension was observed in 03 (3.8%) males and 06 (7.6%) females.

Table-1: Physical characteristics of the total study participants

Age Groups	Gender (n (%))		Weight (kg)		Height (cm)		BMI (kg/m^2)		BSA (m^2)	
	Males	Females	Males	Females	Males	Females	Males	Females	Males	Females
≤ 20	3(6.8%)	1(2.9%)	68.00	55.00	170.18	152.40	23.45	23.68	1.77	1.90
21 - 30	0(0.0%)	3(8.5%)	-	56.00	-	157.48	-	22.60	-	1.63
31 - 40	4(9.1%)	6(17.1%)	64.00	62.67	161.92	151.55	24.29	27.29	1.61	1.71
41 - 50	7(15.9%)	7(20.0%)	67.86	62.71	161.47	155.66	26.00	25.95	1.64	1.67
51 - 60	11(25.0%)	9(25.7%)	69.82	63.67	163.02	156.97	26.28	25.88	1.72	1.74
61 - 70	15(34.1%)	8(22.9%)	71.00	61.75	168.14	152.72	25.21	26.55	1.67	1.70
≥ 71	4(9.1%)	1(2.9%)	63.00	53.00	172.08	142.22	21.37	26.20	1.65	1.59

Table No.2: Physical activity level and its significance

		Gender		Total	p-value
		Male	Female		
Activity Level	Walk > 30 min	08 (10.1%)	03 (3.8%)	11 (13.9%)	0.007*
	Walk ≤ 30 min	16 (20.3%)	04 (5.1%)	20 (25.3%)	
	Infrequent	20 (25.3%)	28 (35.4%)	48 (60.8%)	
Total		44 (55.7%)	35 (44.3%)	79 (100.0%)	

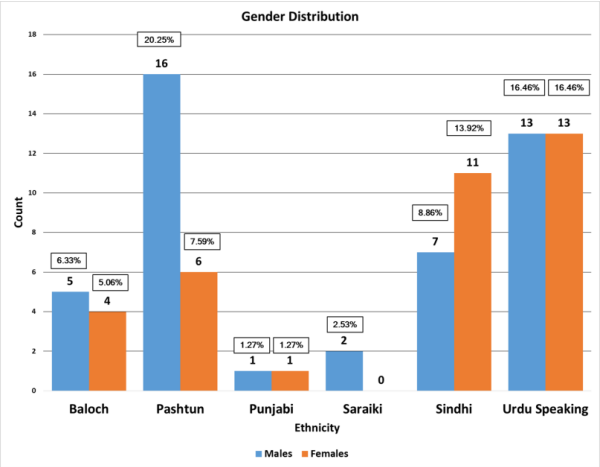

Figure No.1: Ethnic profile and gender distribution of the total study participants

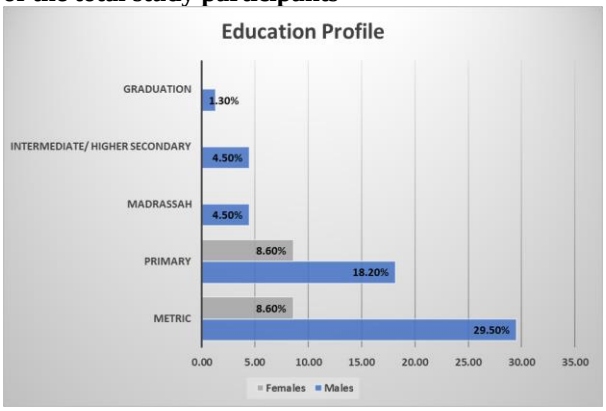

Figure No.2: Education profile of the male and female participants

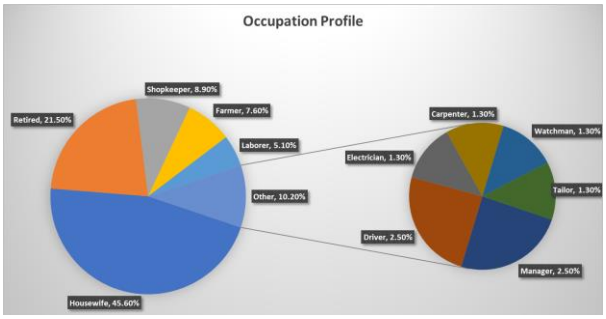

Figure No.3: Occupation profile of the total study participants

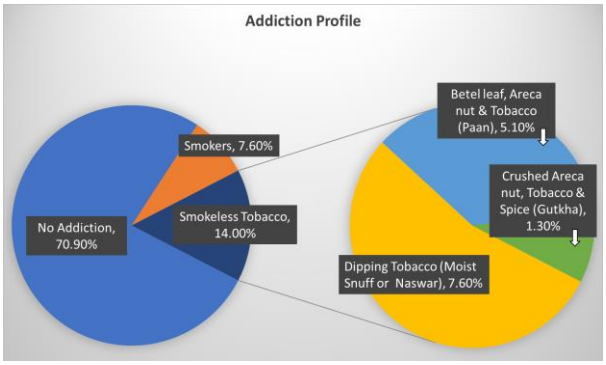

Figure No.4: Addiction profile of the total study participants

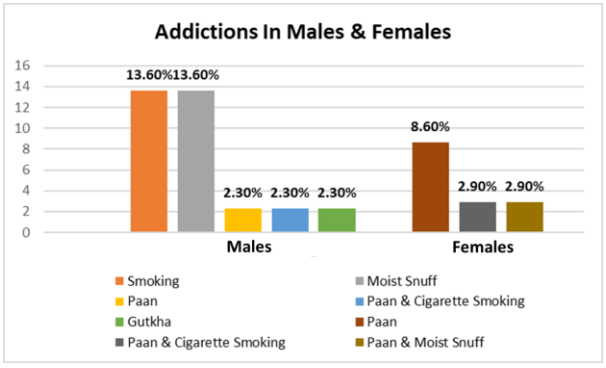

Figure No.5: Addiction profile of the male and female participants

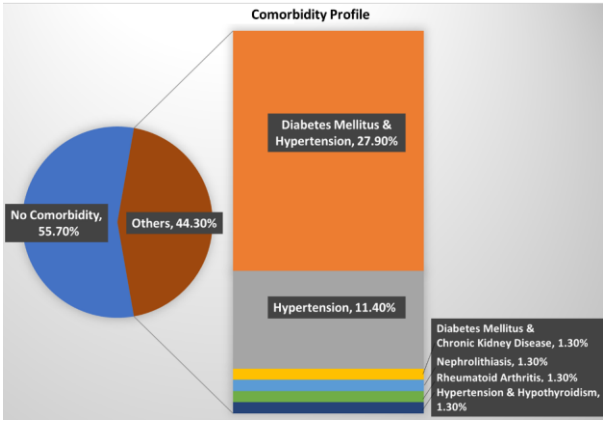

Figure No.6: Comorbidity profile of the total study participants

DISCUSSION

The demographic characteristics in our study were comparable to the findings of other studies conducted in our geographical region. When compared to an Indian study,[14] the mean heights of male and female participants were similar but the mean weights in our study were significantly higher for both genders. In an Iranian study,[15] the mean height of males and the weights of males and females were similar to our observation, but the mean height of females in our study was smaller. The maximum age of participants in the Indian study was smaller than the Iranian study, and smaller in both when compared to our study.

The BMI of both genders in our study were greater than the Indian study but similar to the values observed in the Iranian study. These differences are most probably due to our study comprising of diseased persons, most of them being overweight, while the Indian study included healthy participants and the Iranian study included both healthy and overweight. In all these studies, the females had a higher BMI compared to males. In our study, this difference can be attributed to the greater mean height of male participants. Compared to our study, a study[16] in Multan, Pakistan with a mean age of the participants half that observed in our study, reported smaller mean BSA values for both genders. Another study[17] in Karachi, Pakistan with a mean age of the participants smaller than that observed in our study, reported higher mean values for BSA, height and weight but similar BMI values for the total study participants. These differences reflect the influence of age on BSA, which is known to depend on more than just weight and height.

The male participants dominated older age groups in our study, which compares favourably to a study[8] that reported males in the US had an increased incidence of cardiovascular disease with increasing age while females had an increased incidence of stroke. A study[18] has reported an increased prevalence of cardiovascular disease in middle-aged females, although the age at which they present was reported to be older compared to males.

A study[19] has reported an ethnic distribution similar to our study, in which the most numerous study participants in descending order were Urdu Speaking, Pashtuns, and Sindhis. The study also reported Sindhis to have the least risk of 10 years atherosclerotic cardiovascular events, while the Urdu Speaking had the highest risk. Another study[20] also reported a higher risk of atherosclerotic cardiovascular disease in the Urdu Speaking, followed by Punjabis and Pashtuns. We observed a significantly large number of males belonged to the Pashtun ethnicity. A study[21] investigating gender and ethnic differences regarding prevalence of obesity and the risk factors for cardiovascular disease among indigenous and migrant communities reported a high prevalence of obesity in females and a higher prevalence of risk factors for cardiovascular disease in Urdu Speaking and Balochs.

We observed a lower education level to be associated with an increased incidence in heart diseases, which compares favourably to a study[22] that reported a reduced incidence of cardiovascular diseases in subjects with university education when compared to those with primary or lower education. In contrast, a study[8] in the US reported most participants with cardiovascular disease had a high school education, followed by a college or higher education.

Occupation contributes in the development of cardiovascular disease, and it is influenced profoundly by the cultural norms and education level. Most participants in our study were housewives, followed by retired persons, shopkeepers and farmers. Unique ageing physiology with hormonal changes and as housewives with infrequent physical activity, predisposes females to developing cardiovascular disease.[23] Findings reported by previous studies[24,25] state that physical activity level of retired persons influence the outcome for developing cardiovascular disease. Our study also identified farmers to be a vulnerable population for developing heart diseases, who are generally expected to have a healthier diet and physically active lifestyle, and thus protected from cardiovascular disease. It is attributed to abandoning traditional methods of farming and adapting urban diets.[26] The physical activity level in our study showed that females had a less physically active lifestyle compared to males, who had a moderate physical activity. The findings of our study are consistent with a study[27] that reported sedentary behavior increased the risk of cardiovascular disease.

Both diabetes mellitus and hypertension share common underlying risk factors and complications, comparing favourably to our observation[28]. Since the study population comprised of diseased persons, most participants did not have any addictions. The total number of smokeless tobacco users was higher

compared to cigarette smokers. A study[29] reported that although all tobacco products are hazardous and have a risk for serious disease, smokeless tobacco users in the US had a significantly lower mortality risk compared to exclusive cigarette smokers. But the types of smokeless tobacco available in subcontinent are different and include substances derived from areca nut, known to be responsible for a high frequency of oral cancers among users.[30]

CONCLUSION

The demographic characteristics of patients can help identify the vulnerable among the population and serve as a surveillance tool for risk factors of non-communicable diseases. Females are more at risk of developing heart diseases due to a sedentary lifestyle and low education. They develop the disease at an earlier age compared to males. Having a moderate physical activity level, males developed heart diseases at a later age. Urdu Speaking ethnic group exhibit a high prevalence of heart diseases.

Recommendation: Multicenter studies at the provincial level, with a larger sample size, are required to investigate the true magnitude of the effect resulting from demographic differences, including ethnicity.

Author's Contribution:

Concept & Design of Study:	Ahmed Ali Khan, Aisha Qamar
Drafting:	Syed Muhammad Ishaque, Abdullah Jan Panezai
Data Analysis:	Samia Khalid, Nasim Marvi
Revisiting Critically:	Ahmed Ali Khan, Aisha Qamar
Final Approval of version:	Ahmed Ali Khan, Aisha Qamar

Conflict of Interest: The study has no conflict of interest to declare by any author.

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