Research Article

Association of physical activity, nature of job, and exercise with the prevalence of essential hypertension in the Tharparkar desert

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Abstract

Background: The prevalence of essential hypertension (EHTN) is quite low in individuals who perform more body activities and exercise as opposed to those who spend a sedentary lifestyle. Regular physical activity reduces the risk of obesity, adverse lipid profile, hypertension, and type 2 diabetes mellitus. Many studies are carried out globally to assess the prevalence of EHTN related to grades of physical activity and lifestyle patterns but fewer studies are been conducted for the desert areas. The present study was conducted at the Tharparkar desert characterized by shortness of rainfall and dry weather, which might affect sodium and water balance in the body and eventually blood pressure.

Objectives: To study the association of physical activity, nature of job, and exercise with prevalence of EHTN in the people living in the Tharparkar desert.

Materials and Methods: A randomized, descriptive population-based study was carried out in the Tharparkar desert, Pakistan. After getting approval from ethics review committee of the Aga Khan University, a total of 563 participants were selected randomly (295 males, 268 females) in 2012 from the Tharparkar desert, Pakistan. We recorded demographic and anthropometric data, levels of blood pressure, levels of daytime and on job physical activities, and exercise. Statistical analysis of the prevalence of EHTN and its association with various grades of physical activity in relation to the sedentary and active occupation and with exercise was carried out. Data were analyzed descriptively and categorically by using SPSS-21 for comparing the prevalence of EHTN with increased and decreased physical activities, exercise, and job with sedentary versus active lifestyle. The *p*-values of < 0.05 were considered statistically significant.

Results: After getting approval from the ethics review committee, the mean age and prevalence of EHTN among the studied 563 participants from Tharparkar desert were assessed and found to be 37 (±16.4 years, range 10–82 years) and 81 (14.4%), respectively. Participants leading a sedentary lifestyle showed higher prevalence of EHTN (19.2%) than those leading an active lifestyle (1.9%). Participants having job with mild physical activity had higher prevalence of EHTN (19.4%) than those having jobs with active lifestyle (2.9%); *p*-values were <0.001 in both cases. The analysis of data for participants not doing exercise and prevalence of EHTN did not show statistically significant *p*-value (i.e., 0.57).

Conclusion: It is concluded that in the Tharparkar desert, mild physical activity and jobs with sedentary lifestyle were significantly associated with the prevalence of EHTN. The comparison of participants doing versus not-doing exercise showed nonsignificant results because of the small sample size of those responding positive for exercise.

KEY WORDS: Essential hypertension, physical activity, occupation, exercise, Tharparkar desert

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Introduction

Cardiovascular disease (CVD) is the leading cause of death and disability-adjusted life years worldwide, with increasing incidence and prevalence in low- and middle-income countries.[1] By 2020, more than 80% of the global CVDs will be in these countries, with the largest burden occurring in the two largest countries, China and India, as they rapidly urbanize.[2] One-third fewer heart attacks, strokes, and instances of angina pectoris and other minor cardiovascular problems occurred in people

who took any one of five antihypertensive drugs, and the individuals also lost weight, increased their physical activity, and/or cut their sodium chloride and alcohol intake than those who made changes in the lifestyle but did not take the drugs.[3]

Essential hypertension (EHTN) is a multifactorial disease wherein both the genetic and environmental factors play a role in its etiopathogenesis. The prevalence of EHTN is appreciably lower in case of individuals who perform more body activities and exercise as compared to those who spend a sedentary lifestyle. Primary hypertension was found to affect one individual among five in the case of Canadian population.[4]

Regular physical activity reduces the risk of obesity, blood lipid abnormalities, hypertension, and noninsulin-dependent diabetes mellitus.[5] In studies, it is found that the physical activity reduces the risk of coronary heart disease (CHD) substantially.[6] Although an increase in leisure-time activity has been reported in some industrialized countries to reduce the risk of CHD, work-related activity trend is found to be decreased elsewhere. This potentially leads to an overall decrease in total physical activity, adding risk to develop CVDs.[7] This is a matter of concern because physical inactivity and sedentary lifestyle are also associated with obesity, which further contributes to CVDs.[8,9]

Many studies have found an association between physical activity during leisure time and CVDs.[10] Particularly, in many developing countries in recent years, a sedentary lifestyle has become increasingly common and with it, the incidence of metabolic syndrome, diabetes, and CVDs has also increased.[11] This increase in the sedentary lifestyle may be explained by many factors such as increasing urbanization, a higher level of mechanization at work, motorized transportation, a societal structure that does not encourage walking but instead encourage the use of physical activity-limiting means (e.g., cars, escalators, and elevators), and the widespread availability of appliances that promote sedentary behavior such as increased number of the available television channels, computers, cell phone and mobile media, and many household apparatuses.

Most data on activity are based on studies conducted in the Western countries, with few data from China. This is particularly relevant as the patterns of activities may differ in different settings, for example, leisure-time activity may be higher in high-income countries and work-related activity may be higher in low- and middle-income countries.[1] It is estimated that the direct costs of lack of physical activity are 24 billion US dollars, which is 2.4% of the United States health-care expenditure.[12]

In postoperative hematopoietic cell transplantation (HCT) follow-up of 3833 patients for 1 year it was found that the lower physical activity level was associated with greater risk of hypertension and diabetes mellitus (odds ratios, 1.4–1.5; $p < 0.05$). Healthier lifestyle characteristics among HCT survivors attenuated risk of all assessed cardiovascular conditions. This calls for the attention of clinicians to conventional cardiovascular risk factors and modifiable lifestyle factors to be managed in order to offer hope of reducing serious cardiovascular morbidity after these kinds of operations.[13]

Studies about the total span of sitting time accumulated in a day and the risk of developing diseases were also carried out. It was found that the long, uninterrupted bouts of sedentary behaviors are most detrimental to health.[14,15] Combined medications and lifestyle therapies do more than lifestyle changes alone to reduce blood pressure in people with hypertension.

The emphasis has now broadened from encouraging to include advice to sit less and to break up sitting time with short spans of light activity (i.e., moving around or standing), and also to perform moderate-to-vigorous-intensity physical activity.[16] The health benefits of light activity are also increasingly recognized.[17]

In some randomized trials carried out on 223 participants (127 who underwent exercise and 96 controls), the effect of exercise on blood pressure was observed. Isometric resistance exercise lowers systolic, diastolic, and mean arterial pressures. The magnitude of effect is larger than that previously reported in dynamic aerobic or resistance exercise. These observations suggest that this form of exercise training has the potential to produce significant and clinically meaningful blood pressure reductions.[18]

Aging, even in otherwise healthy participants, is associated with declines in muscle mass, strength, and aerobic capacity. Older individuals respond favorably to exercise, suggesting that physical inactivity plays an important role in age-related functional decline. Conversely, physical activity and improved exercise capacity are associated with lower mortality risk in hypertensive individuals. The effects of routine exercise tolerance testing on 2153 men with hypertension, aged ≥70 years (mean 75±4) from the Washington, DC, and from Palo Alto Veterans Affairs Medical Centers were studied. The observed results suggested that exercise capacity is associated with lower mortality risk in elderly men with hypertension.[19] However, the effect of exercise capacity in older hypertensive individuals was not investigated extensively.[19]

The impacts of whole-body vibration (WBV) exercise on the arterial stiffness, pulse wave velocity, blood pressure, and leg muscle function in postmenopausal women were studied in a recent meta-analysis. WBV exercise was found to exert a beneficial effect on blood pressure and cardiovascular events in the postmenopausal women. The mechanisms responsible for the reduced arterial stiffness after WBV exercise training are presently unknown.[20]

Tai Chi exercise also shows beneficial effects on blood pressure and gaseous signaling molecules in patients with hypertension. However, further investigation is required to understand the exact mechanisms underlying these observations, and to confirm these results in the larger populations.[21]

Hypertension is a chronic inflammatory state, and cardiac dysfunction and hypertrophy are found to be prevalent in hypertensive patients and animals. Hypertensive rats might have an imbalance between excitatory and inhibitory neurotransmitters within the paraventricular nucleus (PVN) of the brain. There was an imbalance between pro- and anti-inflammatory cytokines in the PVN, accompanied by oxidative stress in the PVN, causing sympathoexcitation, hypertensive

response, and cardiac hypertrophy. The exercise training attenuates hypertension and cardiac hypertrophy by restoring the balance between the excitatory and inhibitory neurotransmitters and the balance between pro- and anti-inflammatory cytokines, and attenuating oxidative stress in the PVN.[22]

An American Heart Association study for assessing the effects of moderate-intensity exercise (walking) was carried out on 72,488 female nurses for 8 years. It showed a substantial reduction in the risk of incident total stroke and ischemic stroke in a dose–response relation.[23]

Many studies have been carried out at multiple places around the world to assess the relationship of the EHTN and various grades of physical activity and pattern of lifestyle, but few studies have been carried out with the same aim in the desert areas. We carried out this kind of study in the Tharparkar desert. The lifestyle of the people in the Tharparkar desert is similar to that of the rest of the people around the world, for example, people may be either sedentary or active (doing walking or other exercise), but the geographical status and environment of this area are quite different. Being a desert, this area witnesses shortness of rainfall and dry weather. These conditions affect the water and electrolyte status of the body. In the dry and deserted areas, mostly sodium and water contents are affected in the people. They are also important in regulating and maintaining the blood pressure of the body. So, we were interested in studying the effects of body activity on blood pressure in the presence of exposure of population to the dry and arid climate. We therefore, carried out this study at the said area and performed a comparative analysis of association of various grades of physical activity with the EHTN.

Materials and Methods

This study was undertaken after getting approval from the ethics review committee (ERC) of the Aga Khan University. This was a population-based, random, descriptive, and analytical study carried out at Tharparkar, Sindh, Pakistan, in 2012. Written consent was taken from the participants, but if the participant was found illiterate the consent form was read and a thumb impression was obtained. In case of children, a parent or guardian's signature or thumb impression was also obtained in addition to that of the participant.

A total of 563 participants (295 males (52.4%), 268 females (47.6%)) aged 10–82 years were recruited. Sample size was calculated statistically with confidence level of 95% (95% CI) by assuming 20% prevalence of hypertension among our study population; and we also incorporated 10% design effect in sample size. Inclusion and exclusion criteria were set. We included participants from both genders. Patients with confirmed diagnosis of hypertension, those on antihypertensive medication, and those recently diagnosed with hypertension were treated as cases, and normotensive participants were treated as controls. We included participants above 10 years of age because nowadays younger age group has more tendency to spend a sedentary lifestyle. Children prefer computer games rather than actual games involving physical exercise. The participants who were not cooperating were excluded from the study.

Anthropometric and demographic data and blood pressure readings were recorded. A positive history of EHTN was recorded. Three blood pressure measurements were obtained from the left arm at 15 min intervals in the resting state. Individuals with systolic blood pressure >140 mmHg or diastolic blood pressure >90 mmHg on all three readings were considered hypertensive. Data about the individual's occupation were recorded. Various individuals were grouped to separate them as having a job involving sedentary style as one cohort, for example, table clerks, housewives (because most of the time they stay at home and the society lacks culture of physical exercise for women), managers doing table jobs, teachers, professionals (with job involving sitting as noted in the questionnaire), and retired persons. The other cohort included participants with job involving an active lifestyle, for example, farmers and laborers, as the job of these people involved doing active physical labor or strenuous walking. Participants were also grouped according to two types of physical activity: mild and severe. Those who either remained home ridden or became active only for fulfilling basic daily needs, for example, taking bath, going to take diet, and moving within workplace or home to take daily usage items, put in "mild activity" type. Sometimes, they practiced slow walking as well. Those who used to do active exercise or brisk walking, or perform farmer's or laborer's job put in "severe activity" type. Data were analyzed statistically.

Statistical Analysis

For each of the indicated strategies, data were analyzed descriptively and categorically by statistical software SPSS, version 21. Similar variables were grouped to facilitate the outputs and to ease out correlation with respect to the status of hypertension. Categorical variables were represented as percentage and were tested by Pearson's c2-analysis and Fisher's exact test wherever necessary. A p-value of < 0.05 was considered as statistically significant.

Results

After obtaining the approval from the ERC of the Aga Khan University, the mean age of the participants was assess and found to be 37±16.4 years (minimum 10 years, maximum 82 years) [Table 1]. In the studied population, the prevalence of EHTN was found to be 81 (14.4%). The number of individuals involved in low level of physical activities was higher than those leading an active lifestyle [e.g., the number of participants with sedentary occupation was higher (69.2%) as opposed to that leading an active lifestyle (30.8%); that of individuals with mild physical activity was higher (71%) compared to individuals with severe activity (29.0%); and that of individuals not doing exercise was also higher (96.4%) as opposed to those doing exercise (3.6% only)] [Table 1].

Table 1: Descriptive statistical analysis of the studied population (*N* = 563)

Variables	Participants, *n*	Percentages	Mean ± SD
Total participants	563		
Age (years)	–	–	37.0 ± 16.4 (range 10–82)
Sedentary and active occupation participants	552*	–	
Sedentary participants	382	69.2	
Active participants	170	30.8	
Mild and severe physical activity participants	542*	–	
Mild activity participants	385	71.0	
Severe activity participants	157	29.0	
Participants not-doing and doing exercise	554*	–	
Not-doing exercise	534	96.4	
Doing exercise	20	3.6	
Males	295	52.4	
Females	268	47.6	
Participants with EHTN	81	14.4	

Max, maximum; SD, standard deviation; EHTN, essential hypertension
*Disparity with total participants due to missing values.

Table 2: Gender-wise characterization of the population based on physical activity, occupation, and exercise

Categories	Males	Females	*p*-Value
Physical activity**	(*n* = 288*)	(*n* = 254*)	<0.001
Mild	150 (52.1%)	235 (92.5%)	
Severe	138 (47.9%)	19 (7.5%)	
Occupation**	(*n* = 289*)	(*n* = 263*)	<0.001
Sedentary	163 (56.4%)	219 (83.3%)	
Active	126 (43.6%)	44 (16.7%)	
Exercise**	(*n* = 289*)	(*n* = 265*)	0.04
Not-doing	274 (94.8%)	260 (98.1%)	
Doing	15 (5.2%)	5 (1.9%)	

*Missing values; **percentage is calculated within category.

Gender-wise analysis of physical activity showed that more females were leading a sedentary lifestyle than males (83.3% and 56.4%, respectively, p < 0.001); more females were also found to have mild daytime physical activities than males (92.5% and 52.1%, respectively, p < 0.001), but not much sex difference was found on analysis of the participants not doing exercise (98.1% and 94.8%, respectively, p = 0.04) [Table 2]. It was found that less number of males and females had work involving high physical activity or increased mobility [Table 2].

Individuals doing mild daytime physical activities showed higher prevalence of EHTN (19.2%) as opposed to those doing severe physical activity (1.9%) [Table 3]. Similar findings were observed in the case of sedentary jobs, which had higher prevalence of EHTN (19.4%) as compared to the jobs with active lifestyle (2.9%); *p*-values were <0.001 in both the cases [Table 3]. The analysis of participants not doing exercise and prevalence of EHTN did not show significance (p = 0.57) [Table 3].

Gender-wise analysis of EHTN showed that the males doing mild daytime activity had higher prevalence (25.3%) compared to those doing severe physical activity, which showed prevalence of only 1.4% ($p < 0.001$). This analysis was associated with higher odds ratio of 23.07 with 95% CI (5.44–97.74) [Table 4]. The prevalence of EHTN in such type of analysis carried out for females did not show significance (p 0.23) [Table 4]. Occupation involving sedentary versus active lifestyle in case of both males and females showed a significant prevalence of EHTN (p <0.001 and 0.002, respectively) [Table 4]. The analysis with regard to prevalence of EHTN in males and females doing exercise and not doing exercise showed nonsignificant results ($p = 0.41$ and 0.76, respectively) with lower odds ratios [Table 4].

Discussion

Lifestyles fundamentally influence the health–disease process, so their knowledge should be on priority for all healthcare persons, especially for those working in primary care centers. However, its measurement is not easy because they are influenced by many psychological, social and environmental factors, and can vary from one geographic region to another or from one culture to another. EHTN is a known complex multifactorial disorder in which genetic and environmental risk factors play a part in determining its etiopathogenesis.[24–26]

Recently, there have been sharp increases in the number of cases of hypertension in Korea due to lack of exercise and effect of westernized diet. In Korean population, individuals over 70 years have a 42.4% risk of developing EHTN.[27] EHTN is characterized by increased thrombotic tendency and impaired fibrinolytic activity. Studies have indicated that in naive patients with a recent diagnosis of EHTN, acute

Table 3: Comparative analysis of variables with the prevalence of essential hypertension in the studied population

Variables	*N*	Hypertensives, *n* (%)**	Normotensives, *n* (%)**	*p*-Value	Odds ratio
Physical activity					
Mild	385	74 (19.2)	311 (80.8)		
Severe	157	03 (1.90)	154 (98.1)	< 0.001	12.2 (3.7–39.3)
Total	542	77 (14.2)	465 (85.8)		
Occupation					
Sedentary	382	74 (19.4)	308 (80.6)		
Active	170	05 (2.90)	165 (97.1)	< 0.001	00.12 (0.05–0.31)
Total	552	79 (14.3)	473 (85.7)		
Exercise					
Not-doing	534	78 (14.6)	456 (85.4)		
Doing	020	02 (10.0)	018 (90.0)	0.57*	1.5 (0.35 – 6.76)
Total	554	80 (14.4)	474 (85.6)		

N, number
*Fisher's exact test; **Percentage is calculated within category.

Table 4: Comparative analysis of variables with the prevalence of essential hypertension based on gender

Variables	N (%)	Hypertensives, *n* (%)**	Normotensives, *n* (%)**	*p*-Value	Odds ratio
Physical activity					
Males					
Mild	150	38 (25.3)	112 (74.7)	<0.001	23.07 (5.44–97.74)
Severe	138	2 (1.4)	136 (98.6)		
Total	288	40 (13.9)	248 (86.1)		
Females					
Mild	235	36 (15.3)	199 (84.7)	0.23	03.25 (0.42–25.16)
Severe	19	1 (5.3)	18 (94.7)		
Total	254	37 (14.6)	217 (85.4)		
Occupation					
Males					
Sedentary	163	33 (20.2)	130 (79.8)	<0.001	00.16 (0.06–0.43)
Active	126	5 (4.0)	121 (96.0)		
Total	289	38 (13.1)	251 (86.9)		
Females					
Sedentary	219	41 (18.7)	178 (81.3)	0.002	01.23 (1.15–01.31)
Active	44	0 (0)	44 (100)		
Total	263	41 (15.6)	222 (84.4)		
Exercise					
Males					
Not-doing	274	39 (14.2)	235 (85.8)	0.41*	2.32 (0.29–18.17)
Doing	15	1 (6.7)	14 (93.3)		
Total	289	40 (13.8)	249 (86.2)		
Females					
Not-doing	260	39 (15.0)	221 (85.0)	0.76*	0.70 (0.07–6.48)
Doing	5	1 (20.0)	4 (80.0)		
Total	265	40 (15.1)	225 (84.9)		

*Fisher's exact test; **percentage is calculated within category.

high-intensity exercise results in increased coagulant and impaired fibrinolytic activity. It is reported for the first time that antihypertensive treatment with an angiotensin receptor blocker neutralizes these exercise-induced effects, resulting in responses similar to those seen in normotensive individuals. The acute high-intensity exercise leads to an impaired fibrinolytic response in sedentary and never-treated hypertensive participants, whereas treatment with an angiotensin receptor blocker reduces hypercoagulability and enhances fibrinolysis.[28] The prothrombotic state in EHTN is sustained by a number of factors, including hypercoagulability and impaired fibrinolytic activity.[29,30] This means that taking the indicated medication and simultaneously doing exercise will certainly yield beneficial effects.

In 2010, the American Heart Association introduced a definition of ideal cardiovascular health based on seven health factors and behaviors, viz. smoking, body mass index, diet, physical activity, blood pressure, glucose, and cholesterol levels.[31] This set of recommendations, like those of the United States Preventive Services Task Force 2013, advises intensive interventions for weight management and additionally offers much more detail on recommended diet and exercise.

In the present studied population from Tharparkar desert, the results have shown that there is a negligible number of individuals (at all age range) who do exercise. We have selected a very large age range in this study (i.e., 10–82 years). Although it is known that the advanced age has more confounding factors to develop EHTN, and in the females the post-menopausal age is an additional factor. Owing to these factors, different EHTN strata could be obtained for various decades of life. But it is proved from the studies carried out elsewhere (as indicated above) that even in very advanced age if the participants are indulged in some kind of physical activity and perform some suitable exercise, they reduce the occurrence of cardiovascular problems remarkably. We, therefore, considered including the individuals of higher age as well. It is also noted from the clinical, general examination, and the phenotypic characters that these individuals are also in a routine habit of eating extra calories. They consumed lot of fried items, fast food, and baked items. There is an overwhelming usage of curd with fats as well. Most of the occupations of these individuals involved a sedentary kind of lifestyle. Therefore, the risk factors to be taken care of, as indicated by the American Heart Association, were found to be quite prevalent in this population. Therefore, the main recommendations of the United States Preventive Services Task Force 2013 must be practiced by the people of the Tharparkar region. There is a tremendous role to be played by the general physicians, cardiologists, and the primary health-care workers of this area to advise the related preventive measures to these participants to achieve a healthy lifestyle and to avoid cardiovascular morbidity and mortality.

In the treatment method of the EHTN, the diastolic blood pressure values are more important clinically. The longer the durations of the raised diastolic blood pressure, the more are the chances of hazardous effects and damage to the target organs of body. This is proved by the studies conducted for the assessment of critical diastolic blood pressure value that if the values sustained for prolonged periods, there is a higher risk of developing myocardial infarction and stroke.[32] Statistically significant increased risk of stroke (45%) and myocardial infarction (30%) is associated with a prolonged 6 mmHg rise in the diastolic blood pressure.[32] This signifies the importance of early antihypertensive measures to keep critical blood pressure values under control to prevent vascular complications.

Various causes for the cardiovascular mortality are known. Approximately 43% chances are due to an unhealthy lifestyle, 27% are due to genetic factors, 19% are due to medical factors, and 11% are due to environmental factors. Because some of the risk factors such as genetic factors are difficult to control artificially, the environmental and medical factors can be modified so the brain and/or CVDs related to hypertension can be referred to as diseases caused by unhealthy lifestyle.[33]]

Many studies supporting such ideas have been carried out globally. Inadequate exercise, overintake of food or alcohol, metabolic imbalance, and genetic abnormalities could result in high waist circumference, which could influence the known risk factors, such as dyslipidemia, hypertension, glucose intolerance, and inflammatory markers, associated with developing heart problems.[34]

The adverse health effects produced by some of the risk factors are quite modifiable. It was found that work-related physical activity was associated with a slightly higher all-cause mortality risk among a cohort of Swedish men, but the association did not remain after further control for smoking, occupational class, physical activity, and alcohol abuse.[35] Physical activity may also be influenced by other kinds of unhealthy environment, for example, serious psychological stress during work.[1] Long-term heavy physical activity and excessive fatigue increased the risk of acute myocardial infarction.[1] So it is highly important that the exercise must be done in a properly and adequately to achieve the beneficial effects on health. The people exercising 4–6 h of leisure-time sports per week have less risk than the non-exercisers. The equivalent of 4–6 h/week of exercise in the form of sports, such as running and swimming, was associated with nearly a 35% decrease in the risk after adjustment for sociodemographic and other traditional risk factors. Interestingly, similar benefits have been found to be obtained with exercise ≥7 h/week and exercise with 4–6 h/week.[1]

Various types of exercise were also studied in detail in context to their relation with CVDs. It was observed that mild and moderate exercise could not reduce the risk of acute myocardial infarction. The effect of leisure-time physical activity was stronger in women than in men. Also, data from the Israeli Ischemic Heart Disease Study indicated that among middle-aged men leisure-time exercise, but not work-related activity, was associated with a significant reduction in the risk of CHD and all-cause mortality.[1] Moreover, recent findings from a cohort of postmenopausal women in the USA indicate that the reduction in CVDs risk associated with vigorous exercise is similar to walking.[36] Centers for Disease Control and Prevention and the American College of Sports Medicine recommendations also

state that "individuals should accumulate at least 30 minutes or more of moderate-intensity physical activity on most, preferably all, days of the week."[5] Several biological mechanisms could explain the beneficial effects of physical activity on CVD risk, including lowering of blood pressure, elevation in high-density lipoprotein levels, increased insulin sensitivity, improved endothelial function, and reduced atherogenic cytokine production.[5,37,38]

The question, regarding the limitation of the present study, that the selected population may not be representative of the general Tharparkar population is ruled out. It is a fact that the selected area is not a confounding geographic factor as it matches with the rest of Tharparkar area due to similar weather and environment conditions. Moreover, the inhabitants share exposure to the similar cardiovascular risk factors.

It was noted in the studied population that more number of females were spending a sedentary lifestyle as most of the women of this area are housewives and due to cultural reasons the females mostly stay at home. The Tharparkar desert has a male-dominant society. Because of this, women avoid doing jobs outside home and have less chances of going out for recreation. The culture of playing the physical games for the females is completely nonexistent. Because of restrictions at home, the physical activity is tremendously affected adding to the risk developing EHTN and others. But, in case of our study, the prevalence of EHTN was almost equal among males and females.

Findings of this study match with those reported elsewhere in two ways: the participants with less daytime physical activity and those with job involving sedentary style are associated with the pathologic phenotype but the findings with participants not doing exercise did not show significance. In this way, our findings differ from the globally prevalent results. This problem could be overcome by including increased number of participants in the study for this variable. As we had appreciably less number of participants available who responded positive for exercise, the findings for this variable did not match with the results of studies from other parts of the world.

In this study, the females doing mild as opposed to severe physical activity to develop EHTN, did not show a significant *p*-value despite the overall number of females with low activity was appreciably higher than males. One would ponder and question as to why the females are left as protected from EHTN in this population? There is a general physiological notion that the females are more protected by nature from developing CVDs than males. Although the overall gender analysis for EHTN shows a matching incidence in our study, but for this particular risk factor (i.e., mild physical activity), it is quite evident that the females were protected. The reasons for this are not known, but it is clear that in future further research targeting this aspect as well as all the loops involved in the regulation of blood pressure, viz. physiological mechanisms that control the blood pressure and the hormonal, immunological, genetic as well as environmental aspects, is required.

Conclusion

It is concluded that mild daytime physical activity and the occupation involving a sedentary lifestyle were highly associated with increased prevalence of EHTN. Participants doing exercise as opposed to not-doing exercise from EHTN perspective showed nonsignificant results. This was due to fewer individuals responding positive for exercise.

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