P-0886-The Association between Anthropometric, and Demographic Characteristics with Hypertension in Non-diabetic Saudi Adults-Preliminary Findings

Ghada Ajabnoor^{1,7}, Hanan Jambi^{2,7}, Suhad Bahijri^{1,7}, Jawaher Al- Ahmadi^{3,7}, Rajaa Al Raddadi^{4,7}, Anwar Boraie^{5,7}, Jaakko Toumillehto^{6,7}

¹Dept. Clin. Biochem- Faculty of Medicine- King Abdulaziz University, Jeddah, Saudi Arabia.
²Dept. Food and Nutrition, Faculty of Home Economics- King Abdulaziz University, Jeddah, Saudi Arabia.
³Dept. Family Medicine - Faculty of Medicine- King Abdulaziz University, Jeddah, Saudi Arabia
⁴Research Dept.- Ministry of Health, Jeddah, Saudi Arabia
⁵King Abdullah International Medical Research Center, King Saud bin Abdulaziz University for Health Sciences, Pathology Dept., King Abdulaziz Medical City, Jeddah
⁶Chronic Disease Prevention Unit- National Institute for Health and Welfare, Helsinki, Finland
⁷Saudi Diabetes Research Group – King Abdulaziz University, Jeddah, Saudi Arabia.

Introduction

Increased blood pressure is often a consequence of obesity [1]. However, other disease states, as well as some lifestyle practices may lead to hypertension [2,3]. Even though measurement of blood pressure is a simple routinely conducted procedure, hypertension may remain undetected in a large percentage of the population [4]. Hypertension is a risk factor for the metabolic syndrome, thus increasing the risk of type 2 diabetes and cardiovascular disease [5]. The relationship between lifestyle practices, measures of obesity and hypertension has not been fully investigated in the Kingdom of Saudi Arabia.

Subjects and Methods

Results

470 adults (mean age $\pm$ SD = 30.23 $\pm$ 10.83) were found to have normal glucose tolerance with hypertension detected in 51 of them (10.9%) , and 164 (mean age $\pm$ SD = 37.5 $\pm$ 12.98) had IGT, with 36 (or 22.0%) of them being hypertensive (Fig. 1). Age, percentage of Smoking, and shorter sleep duration were both non-significantly higher in hypertensive adults group, but percentage of high WC was significantly higher. However, following multiple logistic regression analysis only BMI and age showed significant association with hypertension (P=0.000, and 0.001 respectively).

Table 1: Lifestyle and anthropometric characteristics in the hypertensive and non-hypertensive study groups

Variable	Non-Hypertensive (N=547)	Hypertensive (N=87)	P-Value
Gender			
Male	240(44%)	44(51%)	0.243
Female	307(56%)	43(49%)	
Age			
<30	281(51%)	36 (41%)	0.083
≥ 30	266(49%)	51(59%)	
BMI			
Underweight	19 (3.4%)	6 (6.9%)	0.224
Normal	175 (32%)	20 (22.9%)	
Overweight	164 (30%)	28 (32.1%)	
Obese	166 (305)	27 (31%)	
Waist Circumference			
Level 1 (cut-off point for male >94& female >80)			0.365
Male	118 (21.6%)	29 (33.3%)	
Female	183 (33.5%)	35 (40.2%)	0.006
Level 2 (cut-off point for male >102& female >88)			
Male	70 (12.9%)	27 (31%)	
Female	137 (25%)	22 (25.2%)	
Physical activity (30 minutes/ day- 5 days/week)			
No	286(52%)	46(53%)	0.919
Yes	261(48%)	41(47%)	
Sleep duration (hr)			
<5	51 (9%)	5 (6%)	0.373
5-6	139(25%)	28(32%)	
>6-7	144(26%)	27(31%)	
>7-8	133 (24%)	17(20%)	
>8	80 (15%)	10(11%)	
Sitting hours/ day			
<4	119(22%)	15 (17%)	0.513
4-5	162(30%)	32(37%)	
6-8	156(29%)	25(29%)	
>8	110(20%)	15(17%)	
Smoking Habits			
Non smoker	414(75.7%)	63(72.4%)	0.511
Smoker	133(24.3%)	24(27.6%)	

Discussion

These preliminary findings show the strong association of obesity; reflected on BMI; and hypertension. This has been noted in previous studies on other populations [7-10], and our findings provide evidence for the association in the Saudi population. Not finding an association between hypertension and smoking habits has been reported earlier [11] However, it was surprising that no association was found with other investigated lifestyle characteristics, namely physical activity or sedentary behavior and sleeping pattern, was surprising since they were noted in other populations previously [12- 15]. This might be due to incomplete sample collection. Data will be reanalyzed at a later stage once sample collection is complete.

References

1. Rahmouni, K., Correia, M. L., Haynes, W. G., & Mark, A. L. (2004). Obesity-Associated Hypertension: New Insights Into Mechanisms. *Hypertension*, 43(1), 9-14. doi:10.1161/01.hyp.0000151325.83008.b4

2. Forman, J. P. (2009). Diet and Lifestyle Risk Factors Associated With Incident Hypertension in Women. *Jama*, 302(4), 401. doi:10.1001/jama.2009.1060

3. Mayega, R. W., Makumbi, F., Rutebemberwa, E., Peterson, S., Ostenson, C., Tomson, G., & Guwatudde, D. (2012). Modifiable Socio-Behavioural Factors Associated with Overweight and Hypertension among Persons Aged 35 to 60 Years in Eastern Uganda. *PLoS ONE*, 7(10). doi:10.1371/journal.pone.0047632

4. Duprez, D., Helshoect, P. V., Eynde, W. V., & Leeman, M. (2002). Prevalence of hypertension in the adult population of Belgium: report of a worksite study. Attention Hypertension. *Journal of Human Hypertension*, 16(1), 47-52. doi:10.1038/sj.jhh.1001293

5. Alshehri, A. (2010). Metabolic syndrome and cardiovascular risk. *Journal of Family and Community Medicine*, 17(2), 73. doi:10.4103/1319-1683.71987

6. Phillips, L. S., Ziemer, D. C., Kolm, P., Weintraub, W. S., Vaccarino, V., Rhee, M. K., . . . Koch, D. D. (2009). Glucose challenge test screening for prediabetes and undiagnosed diabetes. *Diabetologia*, 52(9), 1798-1807. doi:10.1007/s00125-009-1407-7

7. Prevalence of Overweight, Obesity and Underweight among School Going Children in Rural and Urban areas of Thiruvananthapuram Educational District, Kerala State (India). (2008). *The Internet Journal of Nutrition and Wellness*, 6(2). doi:10.5580/ief

8. Richard N. (2009) Obesity-Related Hypertension. *Ochsner J* Fall; 9(3): 133–136.

9. Jiang, S.-Z., Lu, W., Zong, X.-F., Ruan, H.-Y., & Liu, Y. (2016). Obesity and hypertension. *Experimental and Therapeutic Medicine*, 12(4), 2395–2399. http://doi.org/10.3892/etm.2016.3667

10. Narkiewicz, K. (2005). Obesity and hypertension—the issue is more complex than we thought. *Nephrology Dialysis Transplantation*, 21(2), 264-267. doi:10.1093/ndt/gfi290

11. Virdis A, Giannarelli C, Neves MF, Taddei S, Ghiadoni L. (2010) Cigarette smoking and hypertension. *Curr Pharm Des*. ;16(23):2518-25.

12. Ford, E. S., Kohl, H. W., Mokdad, A. H. and Ajani, U. A. (2005). Sedentary Behavior, Physical Activity, and the Metabolic Syndrome among U.S. Adults. *Obesity Research*, 13: 608–614. doi:10.1038/oby.2005.65

13. Guedes, N. G., De Oliveira Lopes, M. V., Moreira, R. P., Cavalcante, T. F. and De Araujo, T. L. (2010). Prevalence of Sedentary Lifestyle in Individuals With High Blood Pressure. *International Journal of Nursing Terminologies and Classifications*, 21: 50–56. doi:10.1111/j.1744-618X.2010.01146.x

14. Calhoun, D. A., & Harding, S. M. (2010). Sleep and Hypertension. *Chest*, 138(2), 434–443. http://doi.org/10.1378/chest.09-2954

15. Ramos, A. R., Weng, J., Wallace, D. M., Petrov, M. R., Wohlgemuth, W. K., Sotres-Alvarez, D., . . . Patel, S. R. (2017). Sleep Patterns and Hypertension Using Actigraphy in the Hispanic Community Health Study/Study of Latinos. *Chest*. doi:10.1016/j.chest.2017.09.028