**TITLE PAGE**

**Title: The Association between Abdominal Waist Circumference and Renal Insufficiency among Hypertensive Patients**

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เรียนอาจารย์บัณฑิต ที่เคารพ

เนื่องจากหนูได้เปลี่ยนเรื่องใหม่ จากเดิม คือ **The Association between Abdominal Waist Circumference and Cerebrovascular Accident among Hypertensive Patients** เป็น **The Association between Abdominal Waist Circumference and Renal Insufficiency among Hypertensive Patients**

ในการนี้จึงขออนุญาตส่งข้อมูลบางส่วนที่ได้ทำการวิเคราะห์ตามตารางที่ 1 ,2 และ 3 ค่ะ ส่วนเนื้อหาในส่วนอื่นๆขออนุญาตส่งตามมาภายหลัง ค่ะ

วัชระษา พิทักษ์

**ABSTRACT**

**Background**: Hypertension is a global epidermis over 1.5 billion people worldwide suffer from high blood pressure. Renal insufficiency constitutes one of the main causes of morbidity, disability and mortality worldwide. Obesity, a major health problem reaching global epidermic proportions, is also associated with morbidity and mortality. The relationship of waist cercumference and renal insufficiency is somewhat controversial. While it is established that obesity increases the risk of hypertension, diabetes and dyslipidemia, it is not clear if excess weight influences renal insufficiency risk independently.

**Objective:** To investigate the association between abdominal waist circumference and Renal insufficiency among hypertensive patients

**Methods**: A analytic study was conducted all information were collected from medical records of all patients diagnosed with Hypertension during 2012. The type of hypertension complications was based on Renal insufficiency was the main outcome of this study.

**Results:** In this study, xx.x% (95%CI: xx.x to xx.x) of hypertension patients had been renal insufficiency. The associated with abdominal waist circumference and renal insufficiency presented as odds ratio (OR) and 95%CI, included age (OR = xx.x; 95%CI: xx.x to xxx; *p* = 0.0xx), sex (OR = xx.x; 95%CI: x.xx to x.xx; *p* = 0.0xx), smoking (OR = x.xx; 95%CI: x.xx to x.xx; *p* = 0.0xx), and systolic blood pressure (OR = x.xx; 95%CI: x.xx to x.xx; *p* = 0.0xx).

**Conclusions**: The study found statistically significant association between abdominal waist circumference and renal insufficiency. Therefore, the abdominal waist circumference is one of factor that recognizing the early signs of hypertension with renal insufficiency and can help prevent this condition.

**Key words:** Renal insufficiency, abdominal waist circumference, cohort study

**INTRODUCTION**

Hypertension is a global epidermic over 1.5 billion people worldwide suffer from high blood pressure[ ]. Renal insufficiency constitutes one of the main causes of morbidity, disability and mortality worldwide[ ].Thailand, like some developed countries, is gradually entering and era of an aging society [ ], and hence the prevalence rates of chronic diseases such as cardiovascular disease, cerebrovascular accident and so on are also gradually increasing, especially in the elderly [ ]. Obesity is a major health problem reaching global epidermic proportions and also associated with morbidity and mortality[ ]. The relationship of obesity to Renal insufficiency is somewhat controversial. While it is established that obesity increases the risk of hypertension, diabetes and dyslipidemia, it is not clear if excess abdominal waist circumference influences Renal insufficiency independently[ ].

**MATERIALS AND METHODS**

***Study design***

***Study outcome***

***Statistical analysis***

**RESULTS**

A total of 32,768 hypertensive patients who were listed in DMHT database in 2012 were the population of this study. From the 18,756 hypertensive patients who randomly selected, responded to the survey, and agreed to participated as members of the DMHT, x,xxx were excluded for this paper due to being unemployed in the previous 12 months, hence xx,xxx RNs were included in the analysis (Fig. 1).

Total number of registered hypertensive patients

(N = 32,766)

Sampled and mailed the questionnaires

 (n = 32,768)

18,200 could not be contacted due to wrong addresses

Contactable (n= 30,209)

Returned questionnaires and enrolled

(n= 18,756)

x,xxx excluded due to being unemployed
in the previous 12 months

Study participants

(n=xx,xxx)

**Fig. 1.** The inclusion flow chart

***Demographic Characteristics***

**Table 1.** Basic characteristic of the individual included in the study

|  |  |
| --- | --- |
| Characteristic | Total |
|
| n | % |
| Hypertensive patients | 32766 | 100.00 |
|  | Age (year) |  |  |
|  | <40 | 629 | 1.09 |
|  | 40-59 | 12255 | 37.40 |
|  | 60-79 | 17422 | 53.17 |
|  | >80 | 2460 | 7.51 |
|  | Mean ( standard deviation) | 62.92 (11.52) |  |
|  | Median (Min:Max) | 63(20:107) |  |
|  | Gender |  |  |
|  | Male | 20426 | 62.37 |
|  | Female | 12342 | 37.66 |
| History of Kidney insufficiency  |  |  |
|  | No group  | 31700 | 96.74 |
|  | Yes group  | 1068 | 3.26 |
| Waist Circumference (WC)  |  |  |
|  | normal | 7291 | 32.89 |
|  | high | 14876 | 67.11 |
|  | Mean ( standard deviation) | 85.14(10.67) |  |
|  | Median (Min:Max) | 85(30.120) |  |
| BMI (kg/m2) (n=30279) |  |  |
|  | <18.5 | 2051 | 6.77 |
|  | 18.5-22.9 | 8549 | 28.23 |
|  | >23.0 | 19679 | 64.99 |
|  | Missing =2489 |  |  |
|  | Mean ( standard deviation) | 24.84(4.58) |  |
|  | Median (Min:Max) | 24.49(10.28:59.64) |  |
| Smoking status (n=27560) |  |  |
|  | Non-smoker | 23380 | 84.83 |
|  | Smoker | 4180 | 15.17 |
|  | Missing =5208 |  |  |
| Fasting Plasma Glucose  |  |  |
|  | <100 | 13,608 | 54.08 |
|  | 100-125 | 10,338 | 41.09 |
|  | ≥126 | 1,216 | 4.83 |
|  | Missing=7,606 |  |  |
|  | Mean (standard deviation) | 100.26(16.27) |  |
|  | Median (Min:Max) | 98(14:338) |  |
| Total cholesterol(mg/dl) (n=25705) |  |  |
|  | <170 | 7227 | 28.12 |
|  | ≥170 | 18478 | 71.88 |
|  | Missing = 7063 |  |  |
|  | Mean (standard deviation) | 195.19(42.60) |  |
|  | Median (Min:Max) | 191 (53:697) |  |
| Triglyceride (mg/dl) (n=27066) |  |  |
|  | <150 | 16304 | 60.24 |
|  | ≥150 | 10762 | 39.76 |
|  | Missing = 8613 |  |  |
|  | Mean (standard deviation) | 151.50(83.04) |  |
|  | Median (Min:Max) | 131(35:954) |  |
| HDL cholesterol (mg/dl) (n=24155) |  |  |
|  | <40 | 5551 | 24.08 |
|  | ≥40 | 17836 | 75.92 |
|  | Missing = 8,613 |  |  |
|  | Mean (standard deviation) | 49.26(13.81) |  |
|  | Median (Min:Max) | 47(10:150) |  |
| LDL cholesterol (mg/dl) (n=25881) |  |  |
|  | <100 | 8570 | 33.11 |
|  | ≥100 | 17311 | 66.89 |
|  | Missing = 6887 |  |  |
|  | Mean (standard deviation)  | 117.14(36.31) |  |
|  | Median (Min:Max)  | 114(11:299) |  |

**Table 2.** Crude odds ratios of having Renal Insufficiency and their 95%confidence intervals for each factor

| Characteristics | number | % Kidney insufficiency | Crude OR | 95%CI | p-value |
| --- | --- | --- | --- | --- | --- |
| Ages (years) |  |  |  |  | 0.000 |
|  | <40 | 629 | 1.75 | 1 |  |  |
|  | 40-59 | 12255 | 1.38 | 0.79 | 0.42 to 1.45 |  |
|  | 60-79 | 17422 | 4.18 | 2.45 | 1.34 to 4.47 |  |
|  | >80 | 2460 | 6.50 | 3.91 | 2.11 to 7.25 |  |
| Gender |  |  |  |  | 0.000 |
|  | Female | 20426 | 2.08 | 1 |  |  |
|  | Male | 12342 | 5.22 | 2.60 | 2.29 to 2.94 |  |
| Waist Circumference  |  |  |  |  | 0.877 |
|  | Normal (maleWC ≤ 90;female WC≤ 80) | 7291 | 3.85 | 1 |  |  |
|  | High (maleWC > 90; femaleWC > 80) | 14876 | 3.81 | 0.99 | 0.85 to 1.14 |  |
|  | Mean ( standard deviation) |  |  |  |  |  |
|  | Median (Min:Max) |  |  |  |  |  |
| BMI (kg/m2) |  |  |  |  | 0.000 |
|  | 18.5-22.9 | 8549 | 4.29 | 1 |  |  |
|  | <18.5 | 2051 | 5.66 | 1.34 | 1.08 to 1.66 |  |
|  | >23.0 | 19679 | 2.58 | 0.59 | 0.51 to 0.68 |  |
| Smoking status |  |  |  |  | 0.000 |
|  | Non-smoker | 23380 | 3.02 | 1 |  |  |
|  | Smoker | 4280 | 5.29 | 1.80 | 1.54 to 2.10 |  |
| Fasting Plasma Glucose |  |  |  |  |  |
|  | <100 | 13608 | 3.22 | 1 |  |  |
|  | 100-125 | 10338 | 3.33 | 1.03 | 0.89 to 1.19 |  |
|  | ≥126 | 1216 | 3.62 | 1.13 | 0.82 to 1.55 |  |
| Total cholesterol(mg/dl) |  |  |  |  | 0.000 |
|  | <170 | 7227 | 4.16 | 1 |  |  |
|  | ≥170 | 18478 | 2.68 | 0.63 | 0.55 to 0.73 |  |
| Triglyceride (mg/dl) |  |  |  |  | 0.002 |
|  | <150 | 16304 | 2.86 | 1 |  |  |
|  | ≥150 | 10762 | 3.53 | 1.24 | 1.08 to 1.42 |  |
| HDL cholesterol (mg/dl)  |  |  |  |  | 0.000 |
|  | ≥40 | 18339 | 2.74 | 1 |  |  |
|  | <40 | 5816 | 4.56 | 0.56 | 0.51 to 0.69 |  |
| LDL cholesterol (mg/dl) |  |  |  |  | 0.000 |
|  | <100 | 8570 | 3.99 | 1 |  |  |
|  | ≥100 | 17311 | 2.85 | 0.71 | 0.61 to 0.81 |  |

**Table. 3.** Odds ratios (ORs) of having Renal Insufficiency and their 95% confidence intervals for each factor adjusted for all other factors presented in the table using logistic regression (n=13151)

| **Characteristics** | **number** | % Kidney insufficiency | **Crude odds ratio** | **Adjusted odds ratio** | **95%CI** | **p-value** |
| --- | --- | --- | --- | --- | --- | --- |
| Waist Circumference |  |  |  |  |  | 0.938 |
|  | Normal | 7291 | 3.85 | 1 | 1 |  |  |
|  | High | 14876 | 3.81 | 0.99 | 1.01 | 0.82 to 1.24 |  |
| Ages (years) |  |  |  |  |  | 0.000 |
|  | <40 | 629 | 1.75 | 1 | 1 |  |  |
|  | 40-59 | 12255 | 1.38 | 0.79 | 1.19 | 0.37 to 3.80 |  |
|  | 60-79 | 17422 | 4.18 | 2.45 | 3.10 | 0.98 to 9.79 |  |
|  | >80 | 2460 | 6.50 | 3.91 | 3.82 | 1.18 to 12.43 |  |
| Gender |  |  |  |  |  | 0.000 |
|  | Male | 20426 | 2.08 | 1 | 1 |  |  |
|  | Female | 12342 | 5.22 | 2.60 | 2.17 | 0.37 to 3.80 |  |
| BMI (kg/m2) |  |  |  |  |  | 0.000 |
|  | 18.5-22.9 | 8549 | 4.29 | 1 | 1 |  |  |
|  | <18.5 | 2051 | 5.66 | 1.34 | 1.04 | 0.73 to 1.46 |  |
|  | >23.0 | 19679 | 2.58 | 0.59 | 0.75 | 0.61 to 0.94 |  |
| Smoking status |  |  |  |  |  | 0.278 |
|  | Non-smoker | 23380 | 3.02 | 1 | 1 |  |  |
|  | Smoker | 4280 | 5.29 | 1.80 | 1.13 | 0.91 to 1.42 |  |
| Fasting Plasma Glucose |  |  |  |  |  | 0.000 |
|  | <100 | 13608 | 3.22 | 1 | 1 |  |  |
|  | 100-125 | 10338 | 3.33 | 1.03 | 1.00 | 0.82 to 1.22 |  |
|  | ≥126 | 1216 | 3.62 | 1.13 | 1.27 | 0.81 to 2.00 |  |
| Total cholesterol(mg/dl) |  |  |  |  |  | 0.361 |
|  | <170 | 7227 | 4.16 | 1 | 1 |  |  |
|  | ≥170 | 18478 | 2.68 | 0.63 | 0.88 | 0.67 to 1.16 |  |
| Triglyceride (mg/dl) |  |  |  |  |  | 0.020 |
|  | <150 | 16304 | 2.86 | 1 | 1 |  |  |
|  | ≥150 | 10762 | 3.53 | 1.24 | 1.27 | 1.04 to 1.56 |  |
| HDL cholesterol (mg/dl)  |  |  |  |  |  | 0.000 |
|  | ≥40 | 18339 | 2.74 | 1 | 1 |  |  |
|  | <40 | 5816 | 4.56 | 0.56 | 0.68 | 0.55 to 0.84 |  |
| LDL cholesterol (mg/dl) |  |  |  |  |  | 0.332 |
|  | <100 | 8570 | 3.99 | 1 | 1 |  |  |
|  | ≥100 | 17311 | 2.85 | 0.71 | 0.88 | 0.00 to 0.05 |  |

**DISCUSSIONS**

***Explaining the findings***

<copy narrative parts of the Results followed by explaining each important findings in turn , 5-10 references needed here in this section where about half of them are the same as the one cited in the Introduction section of the manuscript>

***Strength of the study***

<to be written>

***Limitation of the study***

***Conclusions***

***Recommendations***

**REFERENCES**