Campus Asia Program in Osaka University

2018.04.13-2018.06.18

Jae Won Yang

Department of Public Health, Yonsei University Graduate School, Seoul, Korea.

The motive for attending program

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- **Aging Society**
- Korea is rapidly changing into an aging society → burden of disease is increasing
- Japan entered an aging society earlier than Korea → Many of previous studies were conducted earlier and more widely
- Japanese disease distribution: Cardiovascular disease (CVD), Chronic disease, Metabolic Syndrome (MetS), risk factors
- A field of study: Cardiovascular disease, Chronic disease and their risk factors

What I did

- **Attending period: 2018.04.13-2018.06.18**

- **Department of public health, Osaka University**

- **Research activities**
  - 16th, Apr Interview with Iso professor
  - 26th, Apr Smile treatment study
  - 27th, Apr Japan Collaborative Cohort for Evaluation of Cancer Risk (JACC) study Tokyo meeting
  - mid of May Submission of study proposal
  - June Data cleaning with statistical program, arranged statistical analysis

  - Participation study meeting
  - Every Monday OUSSEP class

Proposal

- **Thesis**: **Association between maternal depression and infant's sleep period**

- **Data**: **Environmental influences on Child Health Outcomes**

- Infants spend over half of day, by the end of their first year and sleep is known as a major factor affecting infants' development such as cognitive, learning, and physical development.

- Infant sleep patterns develop rapidly over the first year of life, characterized by inconsistency during the first half of the year but stabilizing by the second half.

- It has been reported that infants' sleep pattern may be associated with parental mental health as it significantly impacts their baby's sleep behaviors.

Proposal

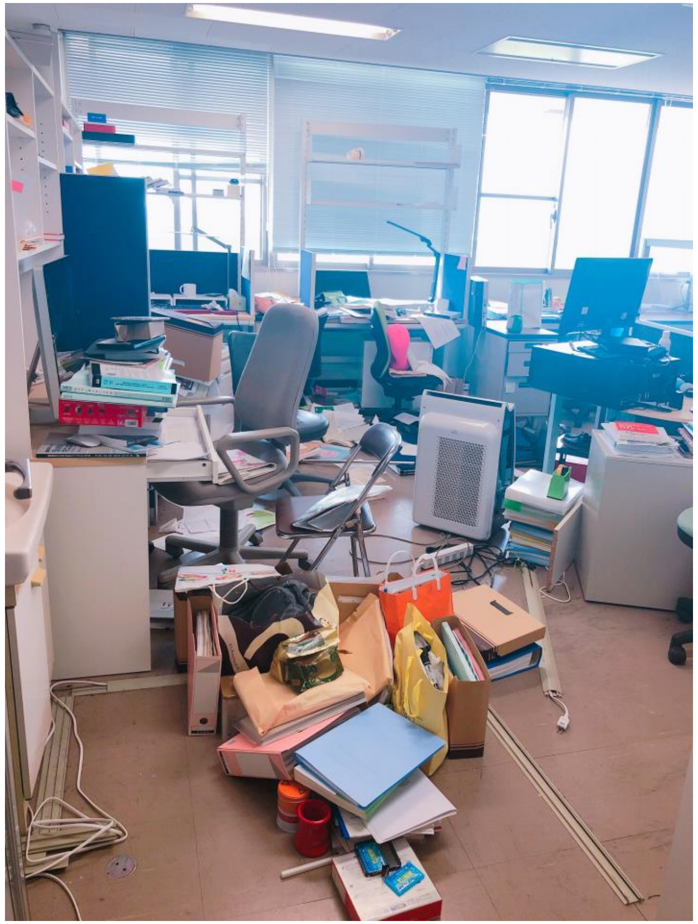
- Furthermore, greater maternal stress has been associated with infants' sleep problems and, among mothers on maternity leave, with longer night wakefulness and shorter day sleep duration.

- Altogether, the above studies suggest both infant characteristics and maternal characteristics can significantly affect the development of infant sleep patterns.

- However, the factors that contribute to sleep period in early neonatal period have not been fully investigated, and the relationships between these factors remain poorly understood.

- The aim of this study was to investigate the association between maternal depression and infants' sleep period.

Osaka life



Osaka life

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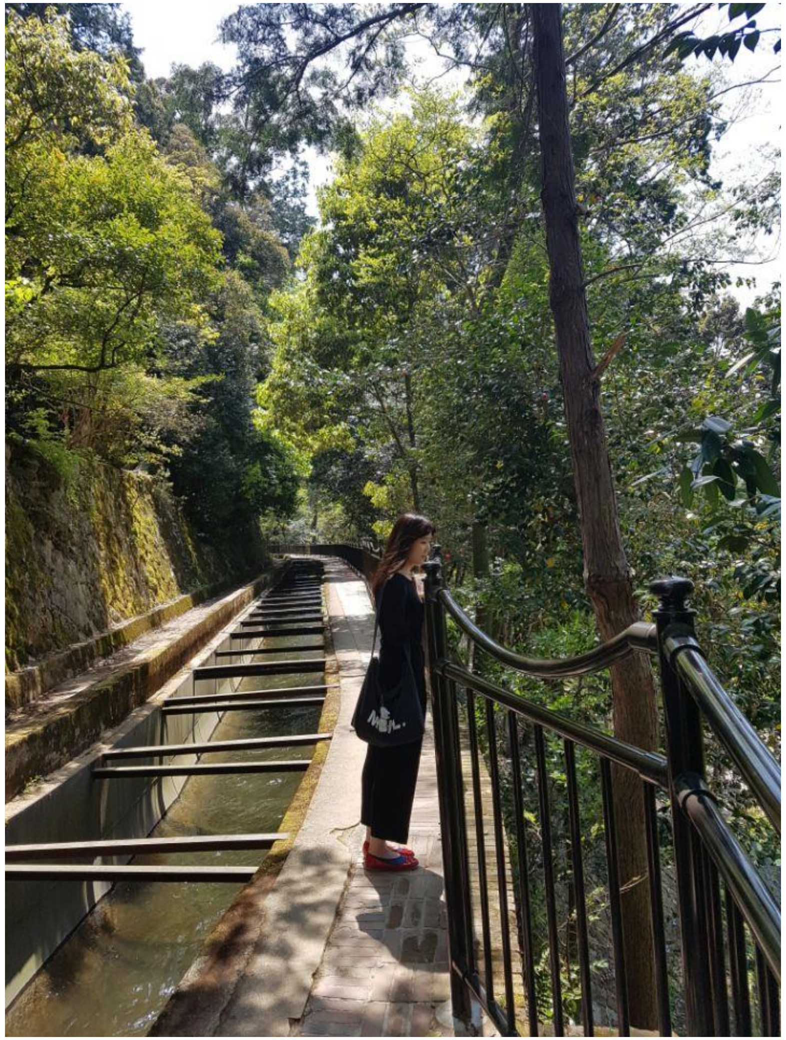
- Kyoto



Osaka life

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- Osaka city

Osaka life

- Dormitory

Osaka life

- Osaka



Osaka life

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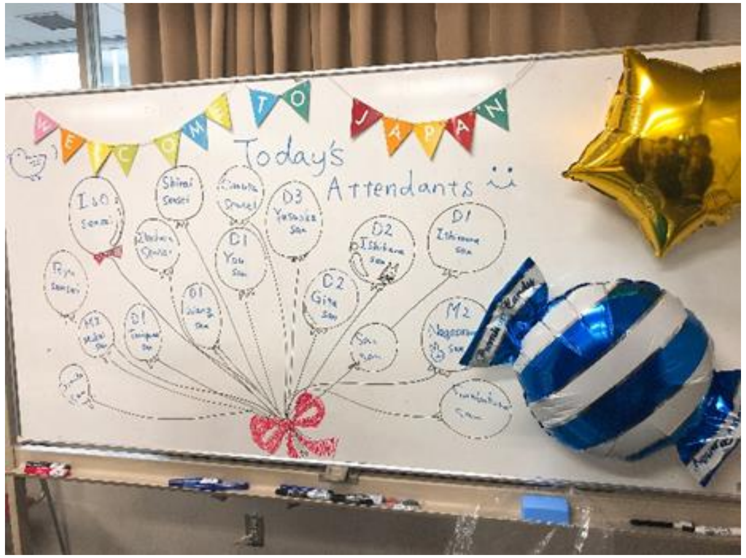
- Welcome party



Association between bone mineral density of femur neck and augmentation index in Korean general population
: the Cardiovascular and Metabolic Disease Etiology Research Center (CMERC) cohort study

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Introduction

- Low bone mineral density (BMD) and arterial stiffness are major public health problems.

- Previous studies have reported negative association between BMD and arterial stiffness.

  Low bone mineral density is associated with increased arterial stiffness in participants of a health records based study
  (J Thorac Dis. 2015 May; 7(5): 790–798. Ya-Qin Wang et al.)

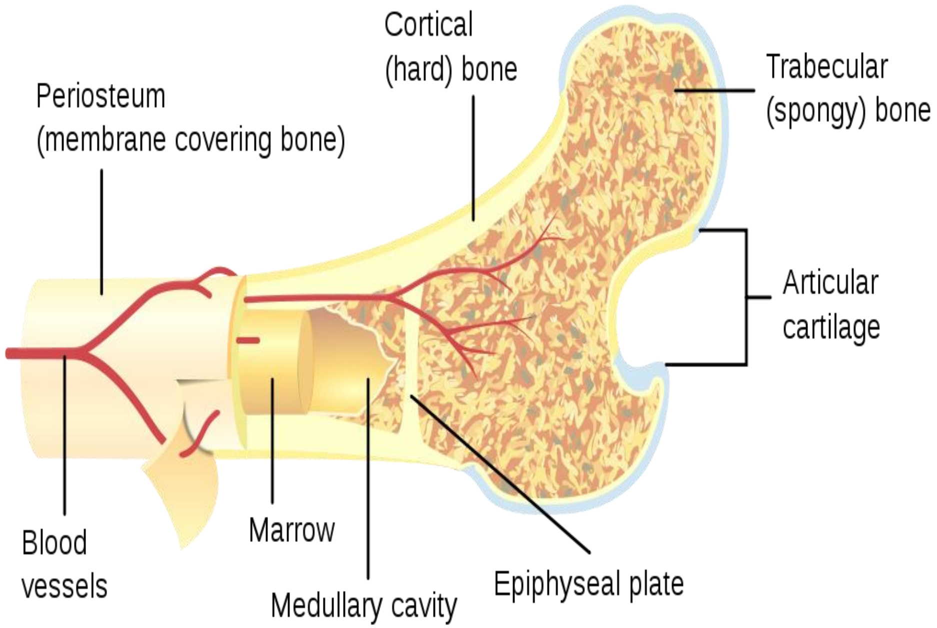
  Association of age-dependent height and bone mineral density decline with increased arterial stiffness and rate of fractures in hypertensive individuals
  (Journal of Hypertension: April 2015 - Volume 33 - Issue 4 - p 727–735. EL-Bikai, Rana et al.)

- However, links between these conditions have not been fully clarified.

- The aim of this study was to evaluate the association between BMD and Augmentation index (AIx) in a middle-aged Korean population.

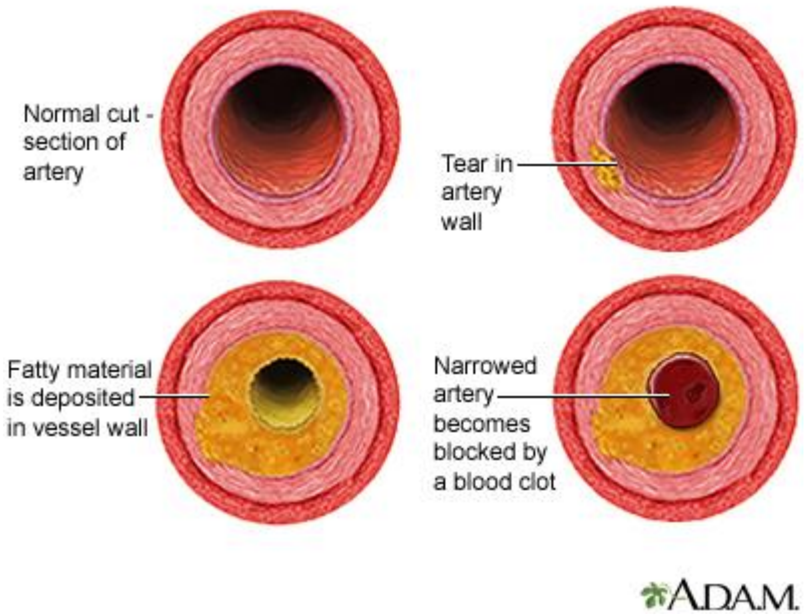
Introduction

✓ Bone mineral density



- The amount of bone mineral in bone tissue.
- T-score/Z-score
- Cortical bone: facilitates bone's main function
- Trabecular bone: suitable for metabolic activity

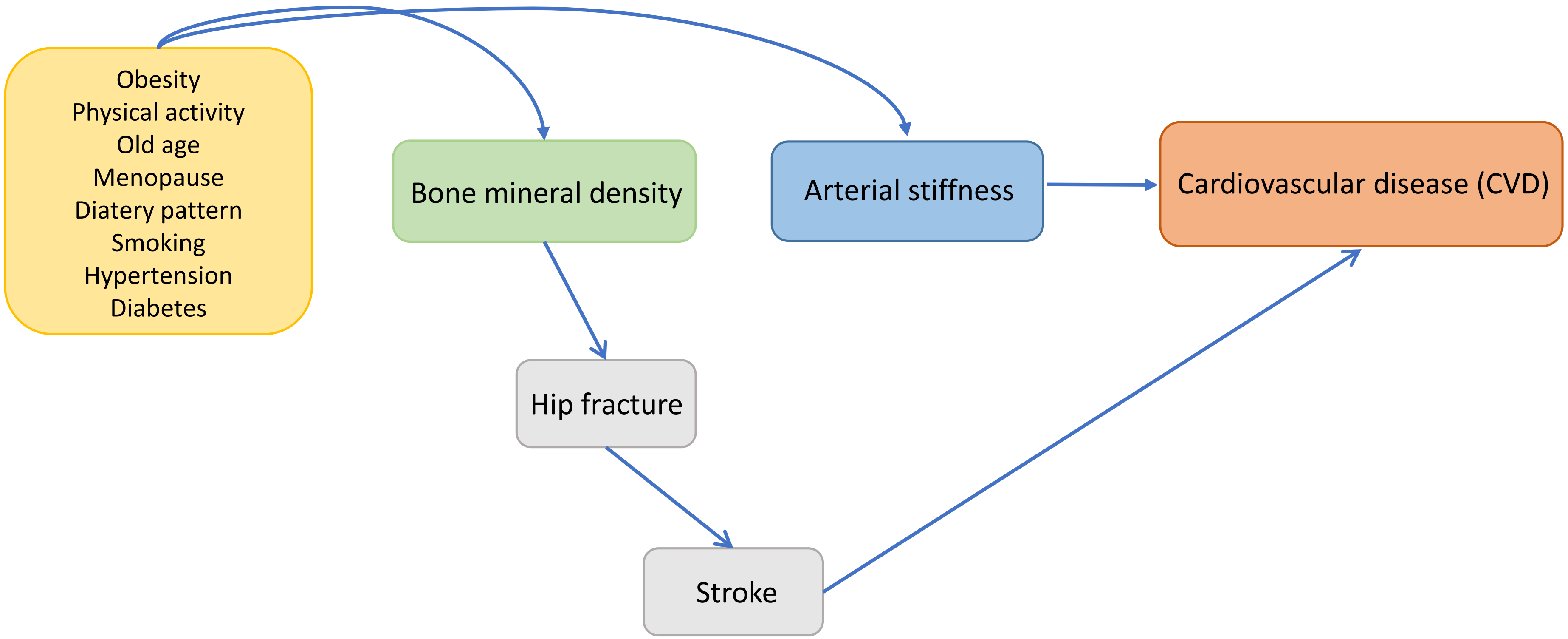
✓ Arterial stiffness



- Arteries are blood vessels that carry blood from the heart to other places in your body.
- Any condition that slows or stops the flow of blood through your arteries.
- Fatty material → walls of arteries
  → hardening of the arteries

Introduction

- ✓ **DAG (Directed acyclic graph)**



Methods

- **Study design**

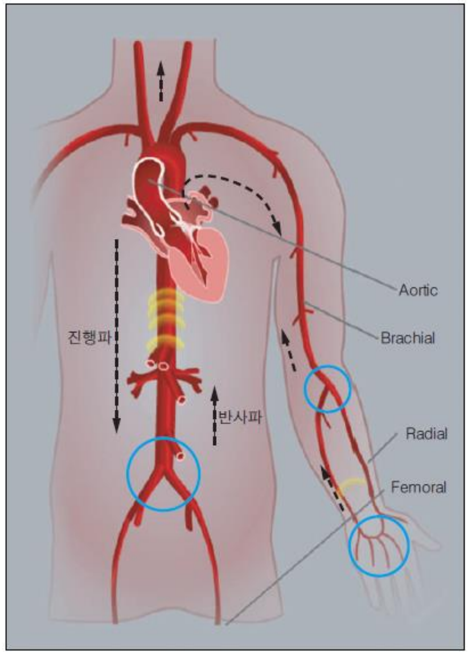
  Cross-sectional data analysis of a community-based prospective cohort study

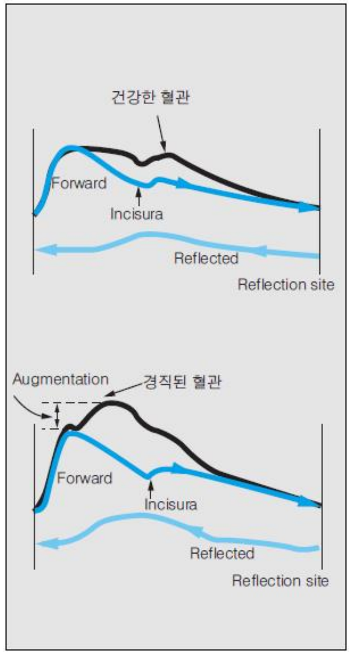
- **Data source**

  Cardiovascular and Metabolic Disease Etiology Research Center (CMERC) in 2013 and 2017

  1,420 men (mean age 50.2) and 2,601 women (mean age 52.1)

- **Measurements**
  - Bone mineral density
    - -Total bone, cortical bone and trabecular bone was measured
    - -BMD of femur neck was used
    - -By quantitative computed tomography
  - Augmentation index
    - - A change in the size of the pulse by reflected waves
    - - From radial arterial pulse waves
    - - Corrected for a 75 bpm rate





- **Statistical analysis**
  - Pearson correlation analysis, ANCOVA (Analysis of covariance), Multiple linear regression analysis

Results

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Table 1. Descriptive characteristics of study participants

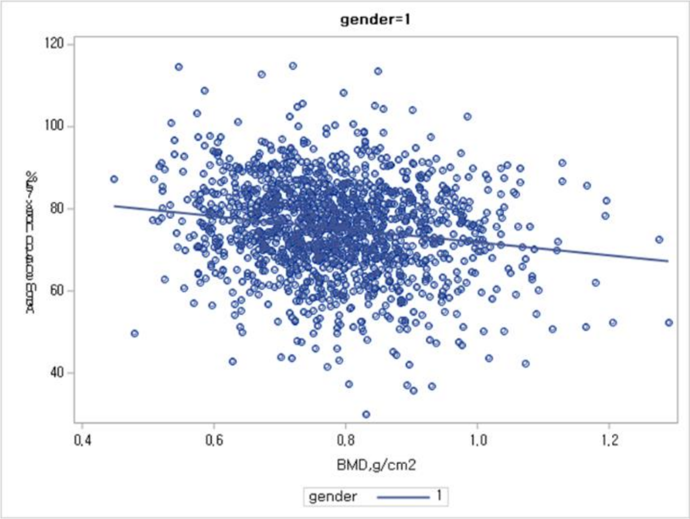
Variables	Men (n=1,420)		Women (n=2,601)		p-value
Age,years	50.2 ± 10.2		52.1 ± 8.7		<.0001
Weight,kg	72.7 ± 10.3		58.1 ± 7.8		<.0001
Height,cm	170.8 ± 6.1		157.6 ± 5.2		<.0001
Body mass index,kg/m²	24.9 ± 2.9		23.4 ± 3.0		<.0001
Obesity group					<.0001
BMI<23	390	(27.4)	1,293	(49.5)	
23≤BMI<25	376	(26.4)	642	(24.6)	
BMI≥25	660	(46.3)	679	(26.0)	
Waist circumstance,cm	86.7 ± 7.9		78.0 ± 8.2		<.0001
Hip circumstance,cm	95.4 ± 5.3		92.7 ± 5.3		<.0001
Thigh circumstance,cm	48.4 ± 4.4		46.8 ± 4.3		<.0001
25-hydroxy vitamin D,ng/mL	15.5 ± 7.0		16.2 ± 9.2		0.011
SBP,mmHg	125.0 ± 13.6		115.3 ± 14.5		<.0001
DBP,mmHg	80.6 ± 9.9		73.9 ± 9.1		<.0001
Augmentation index 75,%	75.3 ± -0.2		85.6 ± 10.6		<.0001
Bone minderal density					
BMD,g/cm³	0.8 ± 0.1		0.7 ± 0.1		<.0001
Hypertension	509	(35.7)	562	(21.5)	<.0001
T2DM	178	(12.5)	194	(7.4)	<.0001
Menopause	-		1,772	(67.8)	
Smoking					<.0001
Never	322	(22.6)	2,439	(93.0)	
Past	626	(43.9)	97	(3.7)	
Current	478	(33.5)	78	(3.0)	
Drinking					<.0001
Never	118	(8.3)	782	(29.9)	
Past	86	(6.0)	94	(3.6)	
Current	1,222	(85.7)	1,738	(66.5)	

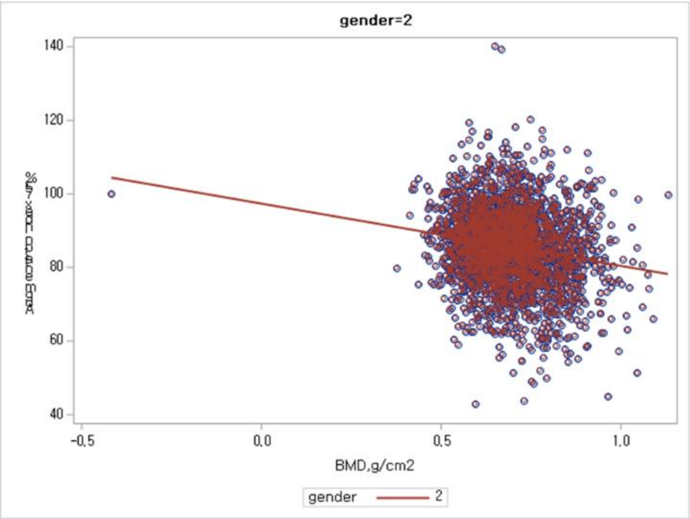
Data are presented as means±standard deviation, numbers (percent).
*p was derived from t-test, chi-square test.
SBP, systolic blood pressure; DBP, diastolic blood pressure; BMD, bone mineral density; T2DM, type 2 dia betes;

Results

Table 2. Correlations between bone mineral density and augmentation index (CMERC, 2013-2017)

	Unadjusted		Age, BMI adjusted	
	r	*p* value	r	*p* value
Men (n=1,420)	-0.165	<0.001	-0.045	0.088
Women (n=2,601)	-0.176	<0.001	-0.060	0.002
Premenopausal (n=838)	-0.120	<0.001	-0.103	0.003
Postmenopausal (n=1,763)	-0.048	0.046	-0.048	0.044





Results

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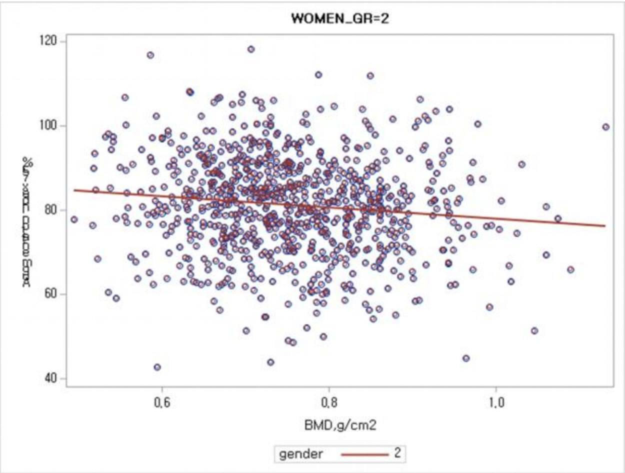

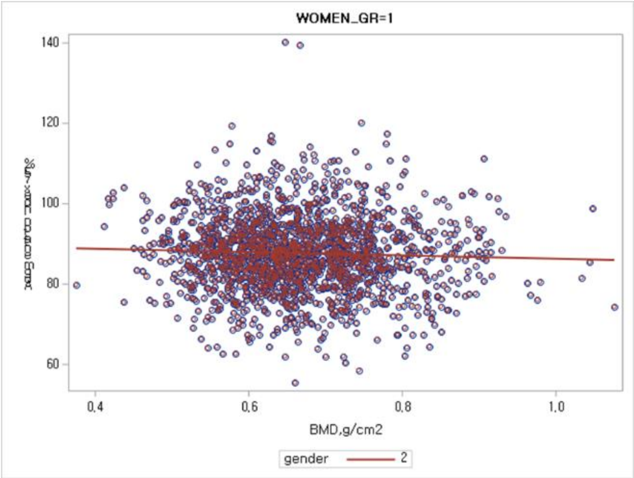

Results

Table 3. Association between bone mineral density of femur neck and augmentation index in men and women

	Unadjusted		Model1		Model 2	
	β	*p* value	β	*p* value	β	*p* value
Men (n=1,420)						
Bone mass	-15.936	<.0001	-4.101	0.098	-4.673	0.049
aBMD	-4.259	<.0001	-2.535	0.001	-2.604	0.000
vBMD	-0.834	<.0001	-0.468	0.001	-0.505	0.000
Women (n=2,601)						
Bone mass	-16.919	<.0001	-6.319	0.002	-5.970	0.002
aBMD	-1.095	0.064	-1.702	0.003	-1.667	0.002
vBMD	-0.600	<.0001	-0.680	<.0001	-0.645	<.0001

Model 1 is adjusted for age and BMI.
Model 2 is adjusted for age, BMI, smoking, drinking, physical activity, systolic blood pressure and menopause status(for women) diabet es status.

Results

Table 4. Association between bone mineral density and augmentation index 75% according to menopause status

	Unadjusted		Model1		Model 2	
	β	*p* value	β	*p* value	β	*p* value
Premenopausal (n=838)						
Bone mass	-13.325	0.001	-11.065	0.003	-11.016	0.002
aBMD	-0.535	0.660	-1.321	0.254	-1.594	0.150
vBMD	-0.268	0.384	-0.573	0.057	-0.667	0.021
Postmenopausal (n=1,763)						
Bone mass	-4.441	0.046	-5.029	0.031	-5.580	0.014
aBMD	-2.002	0.001	-1.928	0.002	-1.805	0.003
vBMD	-0.757	<.0001	-0.739	<.0001	-0.696	<.0001

Model 1 is adjusted for age and BMI.
Model 2 is adjusted for age, BMI, smoking, drinking, physical activity, systolic blood pressure, diabetes status.

Results

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Table 5 Association between bone mineral density and augmentation index

	Unadjusted		Model1		Model 2	
	β	p value	β	p value	β	p value
Normal						
Men (n=1,099)	-10.887	0.000	-3.233	0.267	-4.117	0.141
Women (n=1,624)	-14.035	<.0001	-6.943	0.011	-6.524	0.037
Premenopausal (n=812)	-11.211	0.005	-10.205	0.008	-7.412	0.010
Postmenopausal (n=811)	-7.402	0.049	-6.340	0.101	-5.545	0.141
Osteopenia+Osteoporosis						
Men (n=321)	-9.861	0.107	-5.746	0.351	-4.826	0.417
Women (n=977)	-7.312	0.048	-6.272	0.100	-7.285	0.006
Premenopausal (n=26)	-4.196	0.859	-7.781	0.737	-10.522	0.005
Postmenopausal (n=951)	-7.402	0.049	-6.340	0.101	-4.526	0.034

Model 1 is adjusted for age and BMI.
Model 2 is adjusted for age, BMI, smoking, drinking, physical activity, systolic blood pressure and menopause status(for women) diabetes.

Discussions

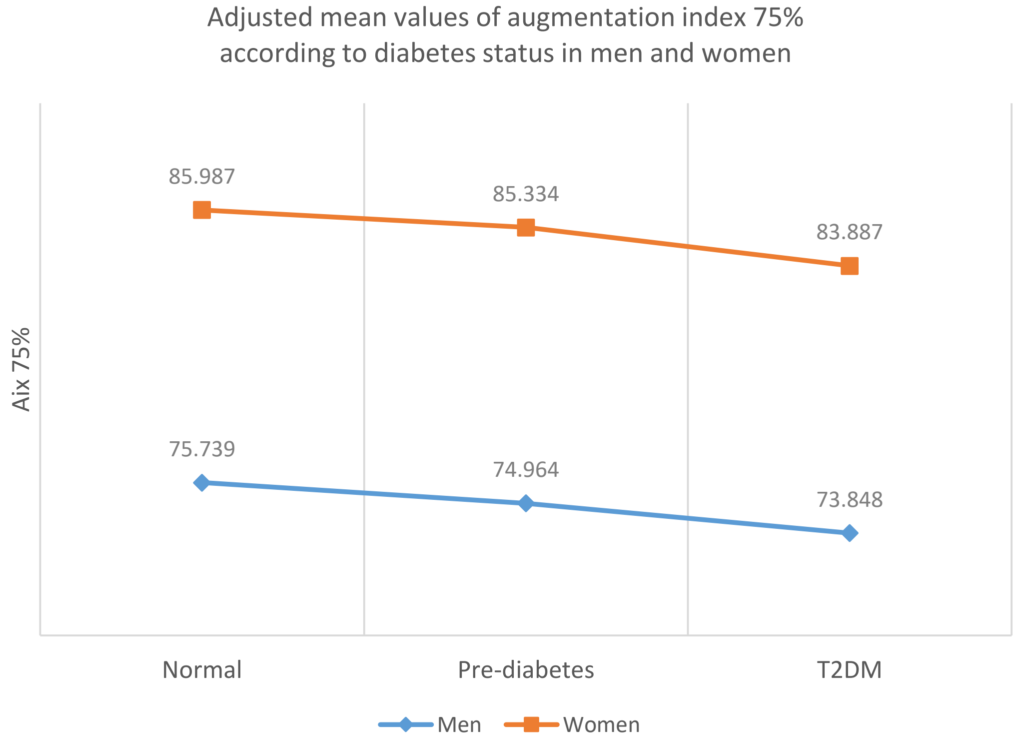
- There was a significantly negative association between BMD of femur neck and AIx after adjusting for all covariates women (standardized ß-7.285, p=0.002).

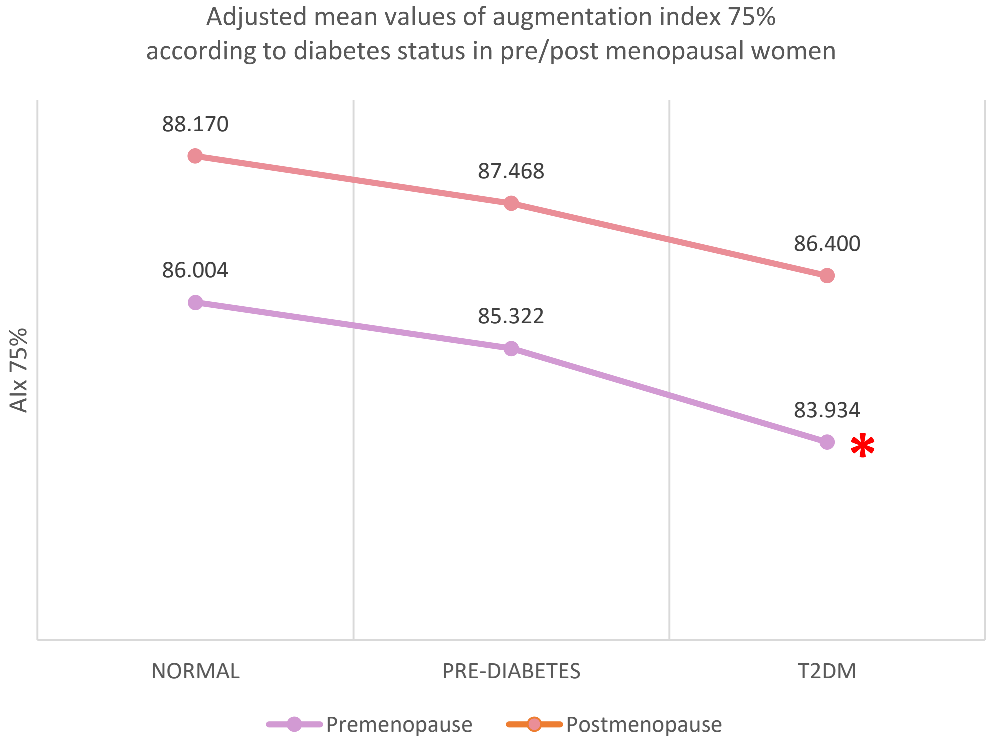
- Even women were divided into subgroups before and after menopause, inverse association remained in premenopausal (standardized ß=-10.522, p=0.002) and postmenopausal women (standardized ß-4.526, p=0.017).

- Previous studies showed negative association in postmenopausal women
  - BMD reaches a peak in early adulthood and generally remains constant until the menopausal transition, after which it declines.
  - Arterial stiffness increases linearly with age

- Stronger negative association was obtained in premenopausal women
  - Bone and vascular development share several common processes
  - collagen degradation in bone and arteries
  - Obesity
  - Diabetes status
  - Components of vascular development

Discussions





Conclusion

- Lower BMD was significantly associated with higher AIx in women only, and in particular, stronger negative association was obtained in premenopausal women than postmenopausal women.

- It is estimated that conditions such as obesity and diabetes may have acted as mediators.

- Further studies are needed with considering effects of parameters which could be mediators between BMD and arterial stiffness.

Thank you for your attention