

PREVALENCE OF HYPERTENSION AND OBESITY IN CIVIL AVIATION PILOTS IN INDIA AND THEIR CORRELATION: IS IT TIME TO CHANGE FITNESS CERTIFICATION GUIDELINES?

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Disclosure Information

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- This presentation is made for Non Profit Research and is solely for educational purpose only
- The Article has been published recently in 'Aerospace Medicine and Human Performance' Journal Vol.90, No.8 August 2019 (Pg 703-708). Details of the article can be obtained from AsMA's website

Background

- Hypertension (HT) – Common Cardiovascular disease
- Prevalence 20-25% in general population
- Currently JNC VIII Criteria for blood pressure used in fitness evaluation and certification (BP cut off 140/90)
- New ACC/AHA Criteria of 2017 (BP cut off 130/80) – not used
- Prevalence as per new criteria not known
- Prevalence of overweight and obesity in pilots is also not studied

Material & Methods

- Cross Sectional Observational Study
- Civil Aviation Pilots – 1185 consecutive pilots
- Routine Medical examination
- Informed Consent, Privacy
- Ethical clearance, Permission from DGCA, India
- Height, Weight measurement
- $BMI = Wt (Kg)/(Height \text{ in meter}^2)$
- Blood Pressure recording as per Standard method
- 24 h ABPM, where indicated

Methods

- Data captured in a systematic format
- Diagnosis of HT – as per standard JNC VIII criteria (140/90)
- Established cases of HT also included
- New Criteria for HT (Cut off 130/80) used to study the prevalence; not for disposal
- Overweight and obesity were studied as per WHO Criteria for advice and disposal
- Asia Pacific criteria used to assess only prevalence of Overweight/Obesity as per this criteria

JNC VIII

Table 3. Classification of Blood Pressure in Adults (age ≥18 years)			
Classification	Systolic Blood Pressure (mmHg)		Diastolic Blood Pressure (mmHg)
Normal	<120	AND	<80
Prehypertension	120-139	OR	80-89
Stage I HTN	140-159	OR	90-99
Stage 2 HTN	≥160	OR	≥100

ACC/AHA 2017 Classification of BP

Category	BP
Normal	<120/80 mm Hg
Elevated	120-129/<80 mm Hg
Stage 1 hypertension	130-139/80-89 mm Hg
Stage 2 hypertension	≥140/90 mm Hg

BP = blood pressure.

* Based on accurate measurements and average of ≥2 readings on ≥2 occasions.

New ACC/AHA Hypertension Guidelines

Make 130 the New 140

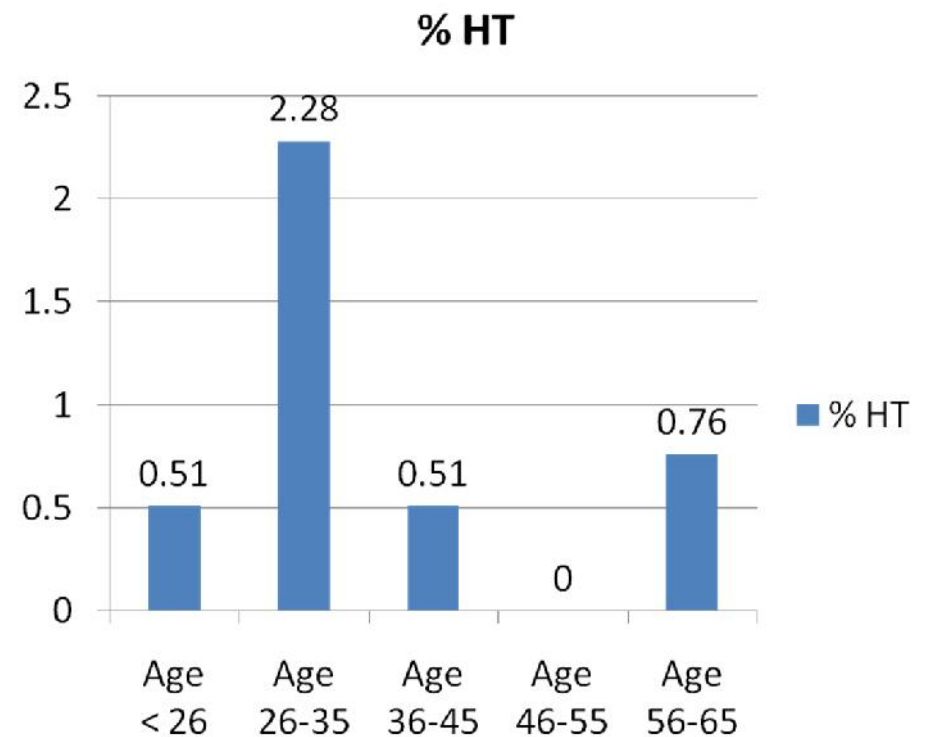
Systolic, Diastolic Blood Pressure (mm Hg)	JNC VIII	2017 ACC/AHA
<120 and <80	Normal BP	Normal BP
120–129 and <80	Prehypertension	Elevated BP
130–139 or 80–89	Prehypertension	Stage 1 hypertension
140–159 or 90–99	Stage 1 hypertension	Stage 2 hypertension
≥ 160 or ≥100	Stage 2 hypertension	Stage 2 hypertension

Criteria for Diagnosing Hypertension using 24 Hrs Ambulatory BP Monitoring

Ambulatory BP Monitoring (ABPM)	Systolic BP in mmHg	Diastolic BP in mmHg
Day time average (Awake)	≥135	≥85
Night time average (Sleep)	≥120	≥70
24 or 48 hour average	≥130	≥80

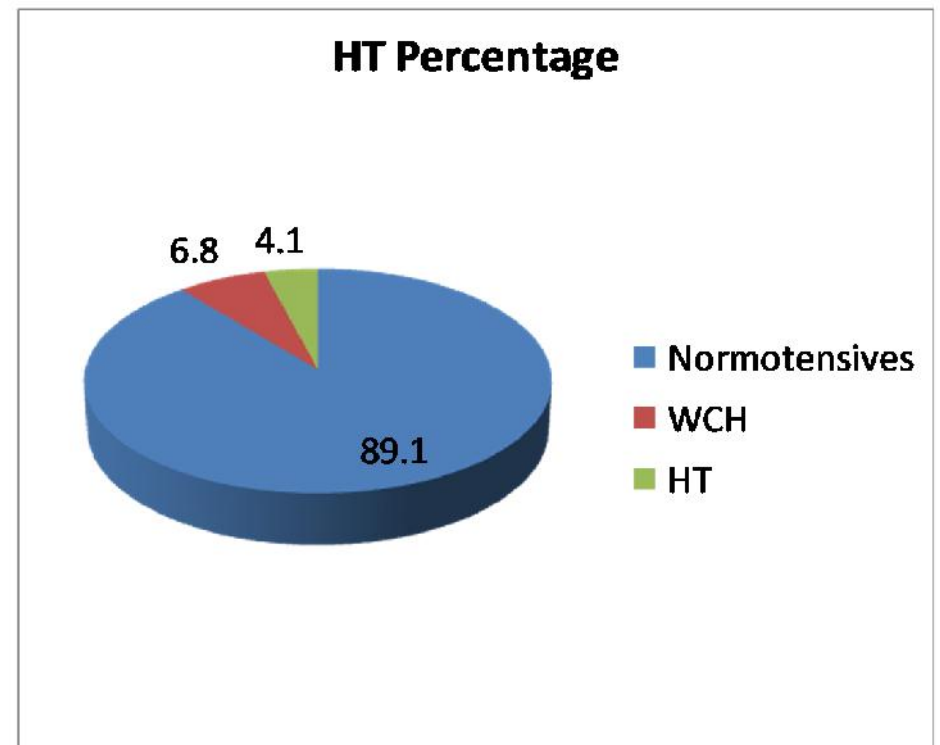
Results

- 1185 Pilots studied
- Mean age 34.8 ± 13.7 years (Range 18-65)
- Males 91.4%, Females 9.6%
- Prevalence increased above age 30 years
- Maximum noted in 26- 35 years age group



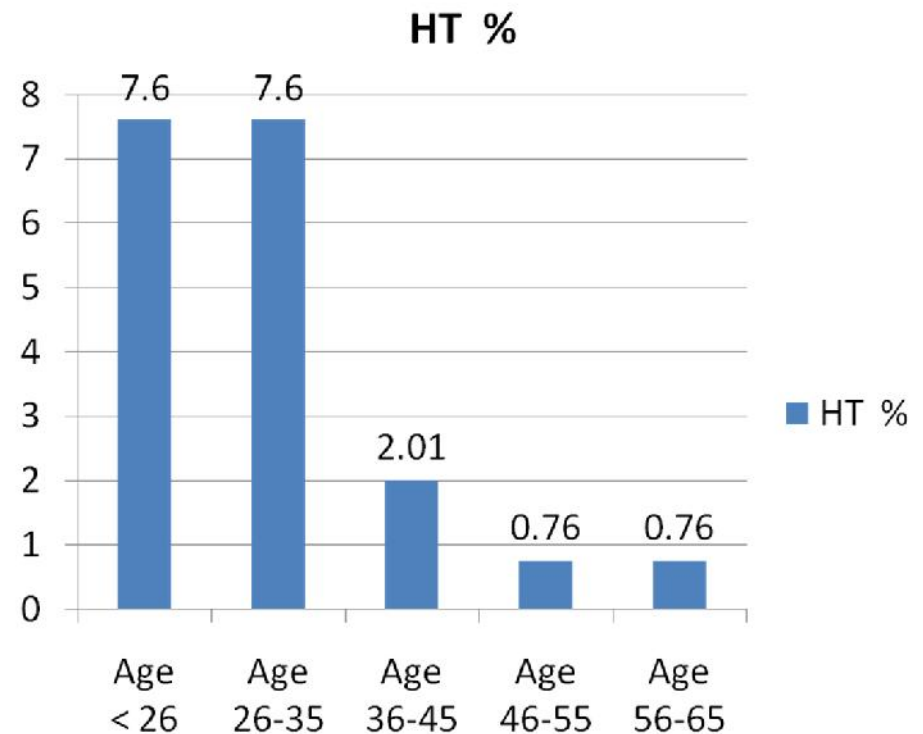
Results

- Normotensives 89.1%
- 10.9 % had BP \geq 140/90 mmHg
- 24 h ABPM done in 10.9%
- 4.1% HT
- 6.8 % – White Coat HT (WCH)
- WCH > HT



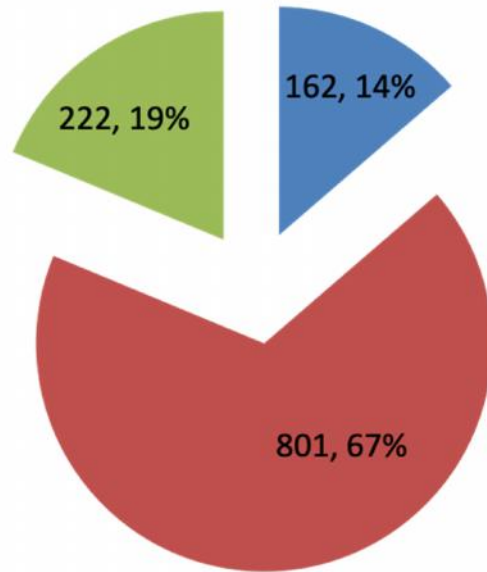
Results

- HT as per new ACC/AHA Criteria
- Total 18.7% HT
- Prevalence more in age ≤ 35 yr
- Paradoxical Association
- Cause? Explanation?



**Normotensives and Hypertensives as per new ACC/
AHA Criteria of 2017**

■ Normotensive ■ Elevated ■ Hypertensive



Body Mass Index (BMI) Classification

WHO CRITERIA

ASIA PACIFIC CRITERIA

CLASSIFICATION	BMI (kg/m²)	BMI (kg/m²)
Underweight	<18.5	<18.5
Normal	18.5 – 24.9	18.5 – 22.9
Overweight	23	24.9
Obese	30	25

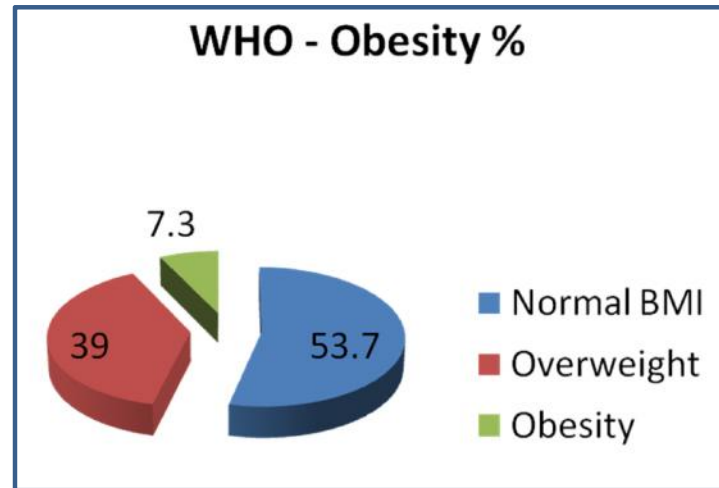
Results – Overweight/Obesity

As per WHO Criteria

Normal BMI 53.7 %

Overweight 39 %

Obesity 7.3%

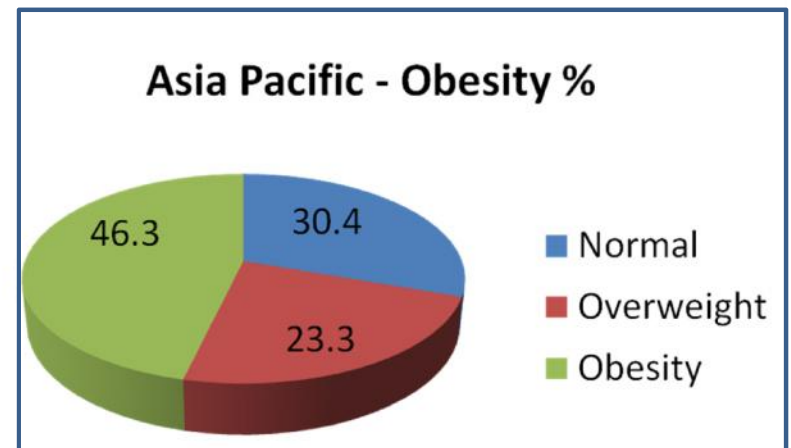


As per Asia Pacific Criteria

Normal 30.4%

Overweight 23.3 %

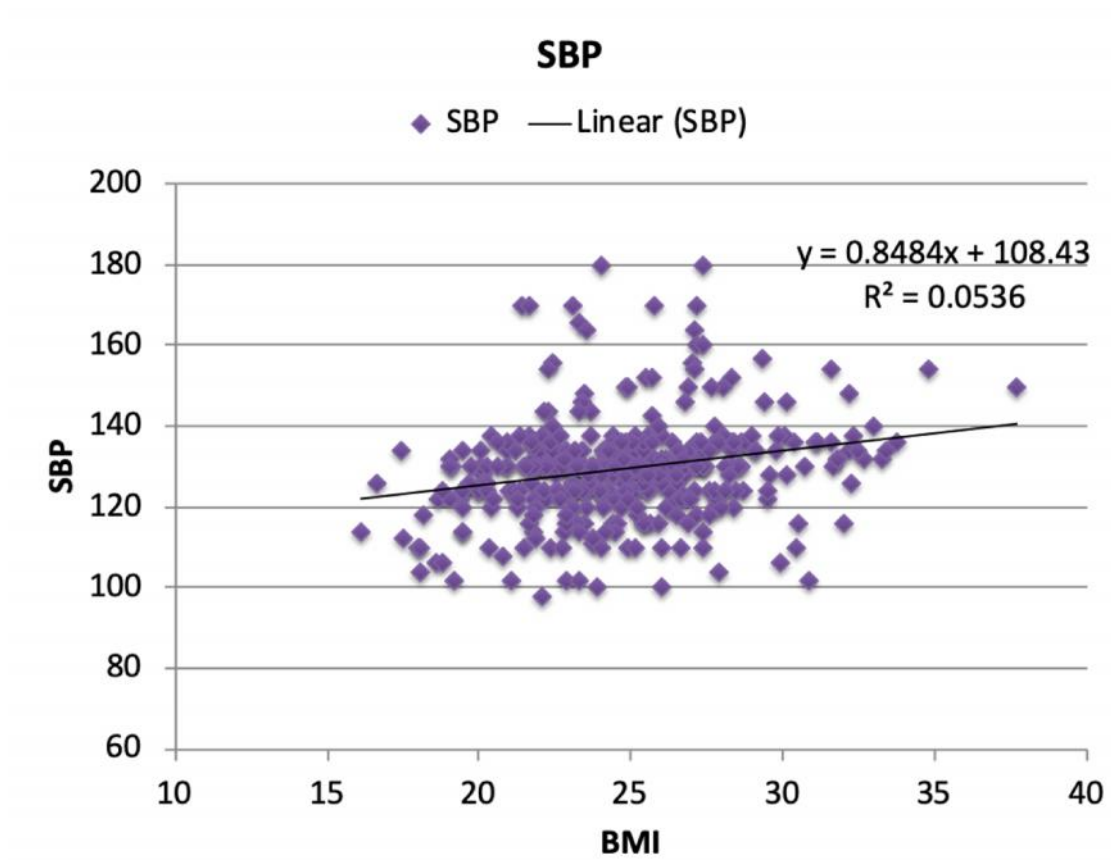
Obesity 46.3 %



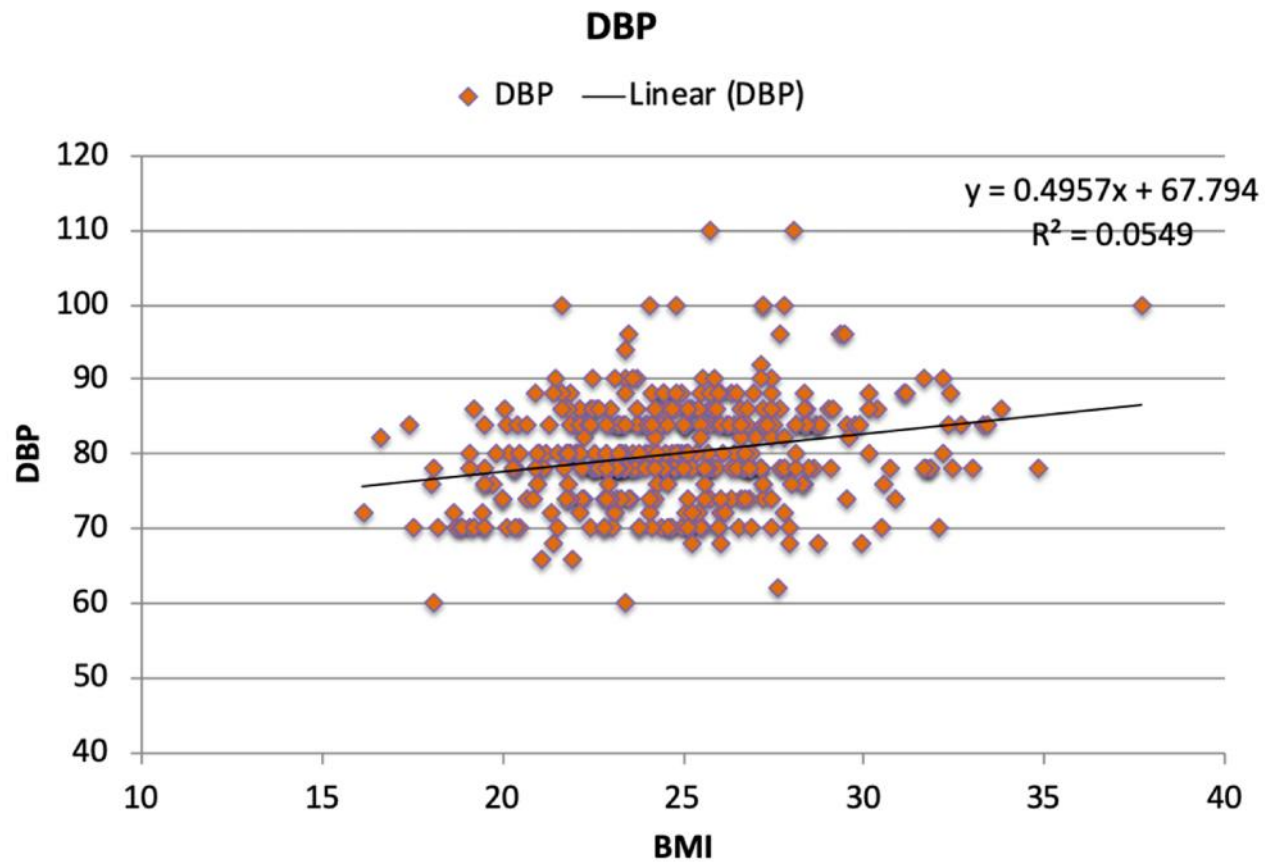
Obesity & HT Correlation

- BMI > 25 → 2.65 times higher risk of having HT (OR 2.65, 95% CI 0.9 – 7.77)
- BMI > 23 → 6.86 times higher risk of having HT (OR 6.86, 95% CI 0.9-52.58)

Scatter diagram showing rise in Systolic BP (SBP) as BMI increases above 23



Scatter diagram showing rise in Diastolic BP (DBP) as BMI increases above 23



Discussion

- Prevalence of HT in our civil aviation pilots 4.1%
- Less versus general population; but consistent with Chinese study in pilots where it was 4.96%
- If new criteria applied, prevalence would be 18.7%; No similar studies in civil pilots could be found on internet search
- Additional 6.2% require medication (10 yr ASCVD risk > 10%)
- Which guideline to adopt ?
- Flight safety vs Loss of trained and skilled manpower
- New Criteria if adopted will affect operational readiness

Discussion

- Prevalence of Overweight 39%, Obesity 7.3%; high compared to general population
- If Asia Pacific criteria used, Obesity 46.3%, Overweight 23.3%
- Risk of HT increased as BMI > 23; OR 6.86
- Therapeutic life style measures should be instituted in pilots if BMI > 23 kg /sq. m
- 10 yr ASCVD risk calculation if BP > 130/80 and drug therapy to be instituted in the interest of flight safety

Need: Change in Practice

- BMI Cut off for South Asian pilots should be 23 kg/sq.m
- BP Cut off to be 130/80 mmHg for initiation of life style measures
- 10 yr ASCVD risk calculation to be included
- ICAO Guidelines need to be changed/Larger studies
- Additional (6.2%) percentage of pilots who require medication may affect immediate operational readiness but in the long term will improve flight safety

Thank You