

Prevalence of Metabolic Syndrome in Healthy Middle-Aged Adults: Insight from the Primary cARe AuDIt of Global risk Management (PARADIGM) Study

Mahesh Kajil¹, Michelle Tsigoulis¹, Subodh Verma^{1, 3, 4}, Milan Gupta^{1, 2, 3, 4}

¹Canadian Cardiovascular Research Network, Brampton, ON; ²McMaster University, Hamilton, ON;

³Keenan Research Centre in the Li Ka Shing Knowledge Institute of St. Michael's, Toronto, ON; ⁴University of Toronto, Toronto, ON

BACKGROUND

- The PARADIGM study is an observational registry, the primary objective of which is to evaluate primary care physician assessment of global cardiovascular (CV) risk in healthy individuals

- In 2009/2010, primary care physician investigators from 105 sites across Canada prospectively enrolled 3015 healthy middle-aged adults in PARADIGM to assess the prevalence of CV risk factors and trends in CV risk assessment using traditional biochemical and novel inflammatory and structural biomarkers of atherosclerosis

- The metabolic syndrome (MS) is associated with increased risk for cardiovascular disease and all-cause mortality

- We assessed the prevalence of MS and associated clinical characteristics in healthy, middle-aged subjects in the PARADIGM study

METHODS

- The PARADIGM study enrolled 3015 generally healthy, middle-aged patients in an observational registry

- Subjects with diabetes or vascular disease were excluded, as were subjects receiving lipid-lowering therapy

- PARADIGM represents a pure primary prevention cohort

- The present analysis reports on those subjects who were found to have MS (as per the NCEP ATP III criteria) within this cohort

Inclusion Criteria

- Men ≥40y, women ≥50y
- Absence of known high Framingham Risk Score
- Absence of type 1 or type 2 diabetes
- Absence of lipid lowering treatment (current or past)
- No previous history of atherosclerosis (angina, TIA, myocardial infarction, stroke, peripheral arterial disease)
- Willingness to give informed consent

PARADIGM STUDY OBJECTIVES

- To evaluate primary care physician assessment of global cardiovascular risk in healthy individuals
- To determine the prevalence of MS and associated clinical characteristics in healthy, middle-aged Canadians
- To evaluate the risk category of subjects with MS based on the Total CV Framingham Risk Score

RESULTS

Figure 1. Prevalence of metabolic syndrome in the PARADIGM cohort

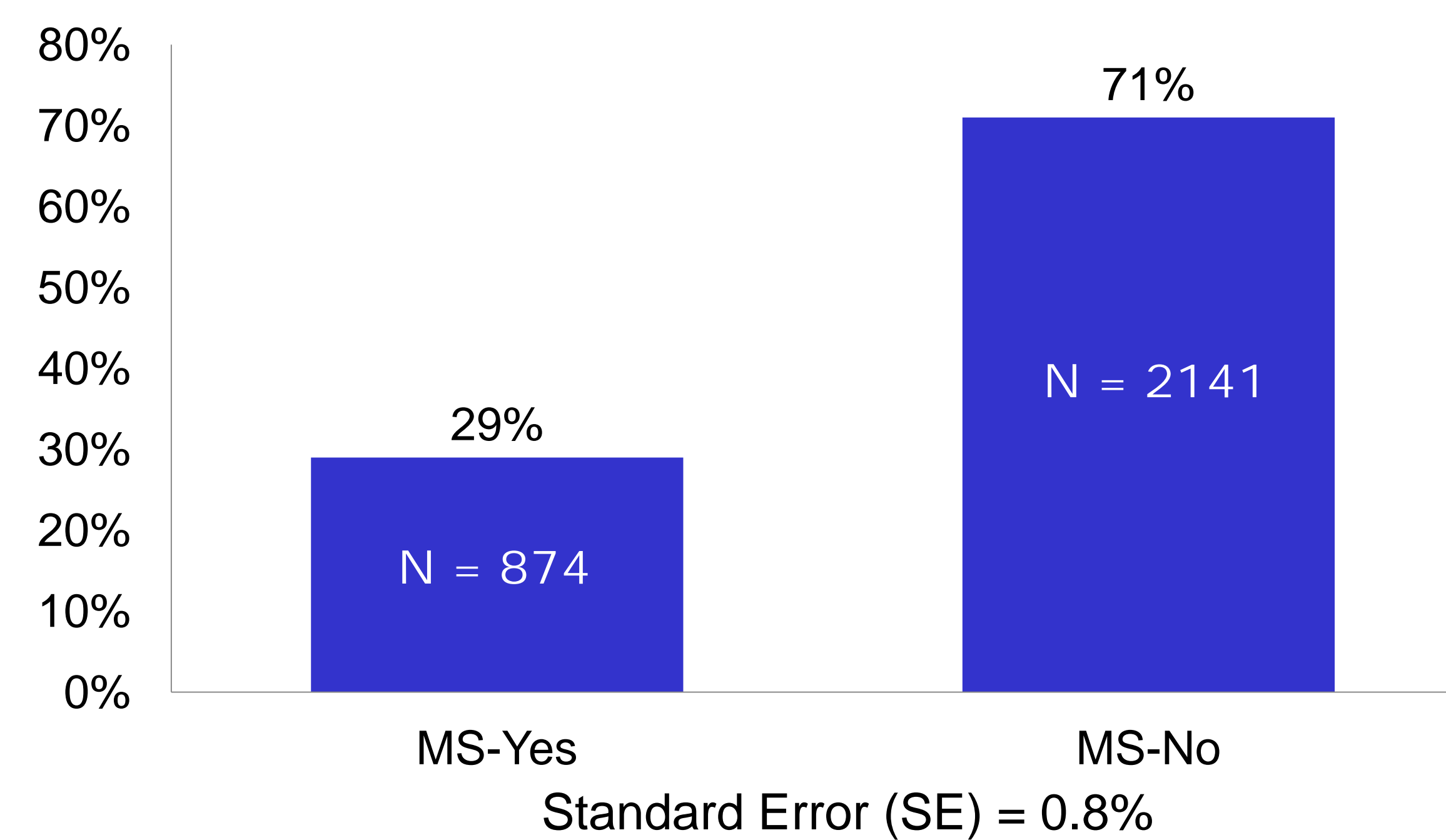
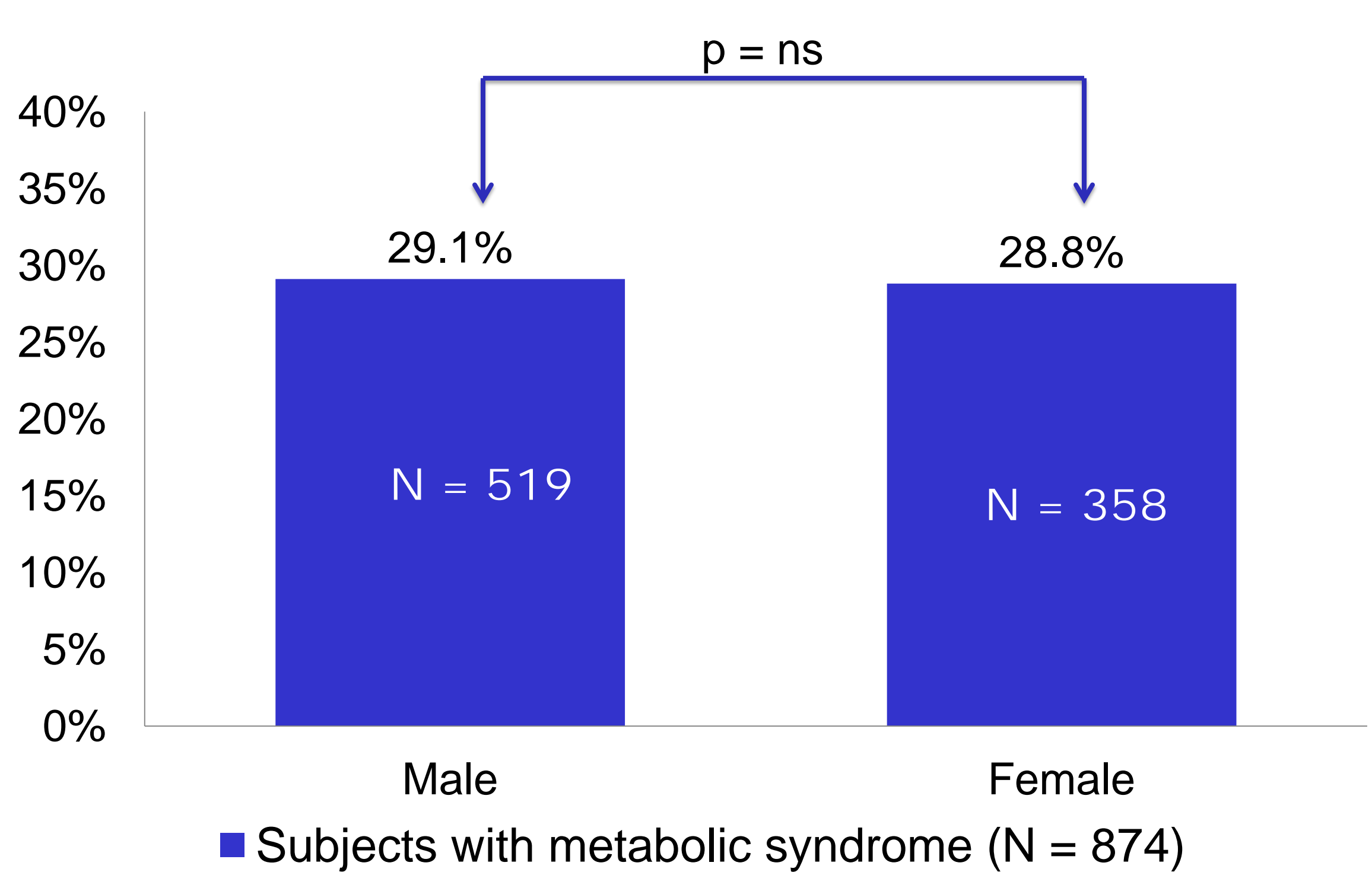


Figure 2. MS prevalence by gender in the PARADIGM cohort



RESULTS

Table 1. Clinical variables

Variable (% (n) or mean ± SD)	MS - Yes (n=874)	MS - No (n=2141)	p-value
Age ± SD†	56.9y ± 8.2	56y ± 8.5	p = ns
Hypertension	54.3% (475)	20.6% (442)	p<0.00001
Smoking Hx* (P/C)**	39.8% (348)	32.6% (698)	p<0.001
Family Hx CVD***	28.5% (248)	22.6% (484)	p<0.01
BMI****(kg/m ²)	30.8 ± 5.6	26.5 ± 4.5	p<0.00001
WC [†] (Inches)	40.8 ± 5.1	35.9 ± 4.8	p<0.00001
IFG [‡]	60.1% (498)	23.8% (505)	p<0.00001

†Standard deviation
*Hx (history)
**P/C (past or current smoker)
***CVD (cardiovascular disease)
****BMI (body mass index)
†WC (waist circumference)
‡IFG (impaired fasting glucose)

Table 2. Lab results

Variable (% (n) or mean ± SD)	MS - Yes (n=874)	MS - No (n=2141)	p-value
TC (mg/dl)*	222.3 ± 39.4	216.5 ± 37.3	p<0.001
LDL (mg/dl)**	139.3 ± 31.9	137.3 ± 32.6	p = ns
HDL (mg/dl)***	45.2 ± 11.9	56.8 ± 15.1	p<0.00001
TG (mg/dl)****	197.8 ± 116.2	114.5 ± 67.1	p<0.00001
HbA1c	5.9%	5.7%	p<0.00001
Fasting Glucose (mg/dl)	103.4 ± 16.6	94 ± 10.2	p<0.00001
hsCRP (mg/L)	4.2 ± 5	2.4 ± 3.8	p<0.00001

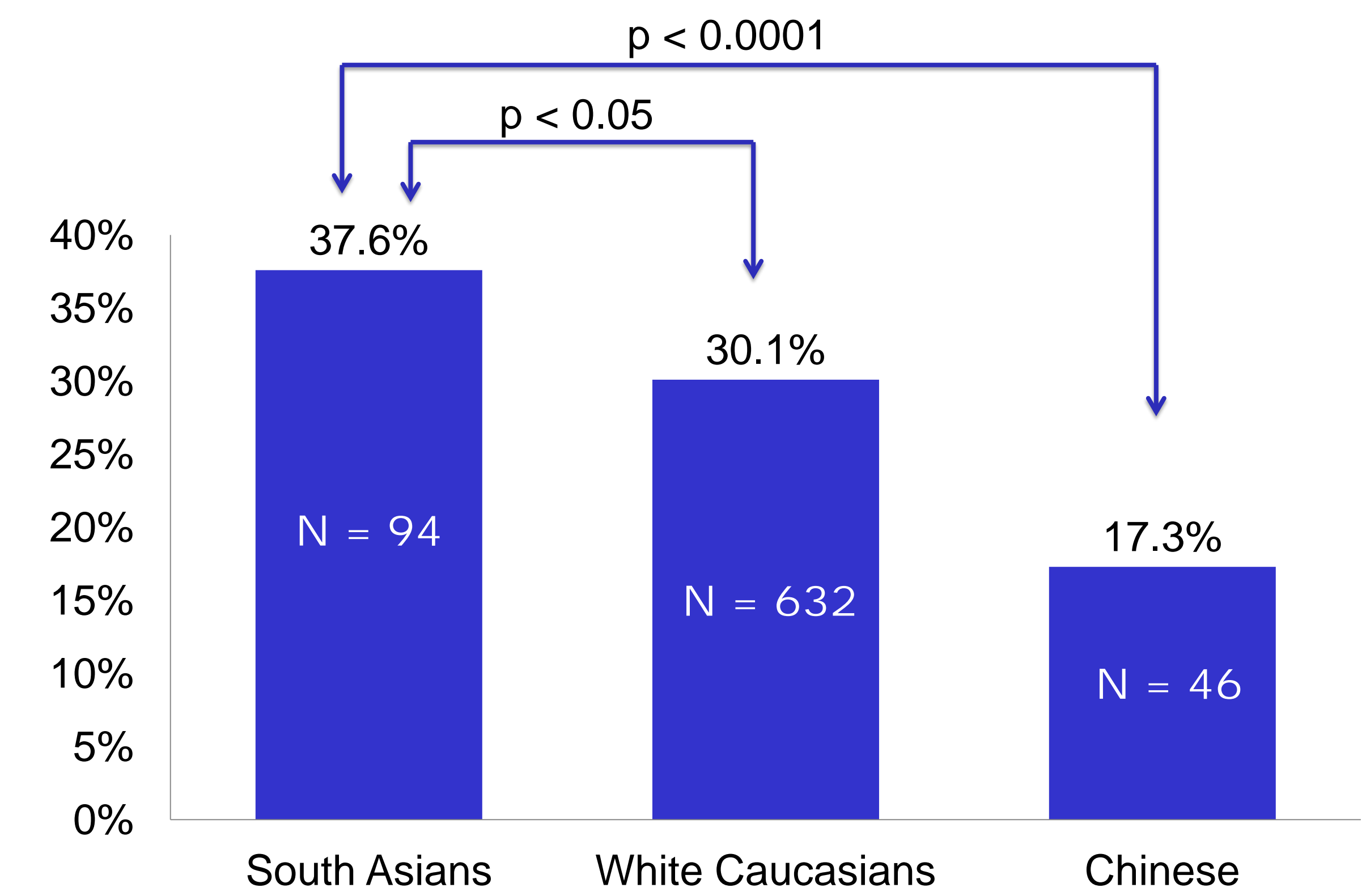
*TC (total cholesterol)
**LDL (low density lipoprotein)
***HDL (high density lipoprotein)
****TG (triglycerides)

Table 3. Categories of risk by total cardiovascular Framingham Risk Score

Variable % (n)	MS - Yes (n=874)	MS - No (n=2141)	p-value
Mean total CV FRS	19.7%	12.7%	p<0.00001
Low FRS	22.1% (193)	52.4% (1121)	p<0.00001
Intermediate FRS	40.9% (357)	31% (664)	p<0.00001
High FRS	37% (323)	16.6% (356)	p<0.00001

RESULTS

Figure 3. Prevalence of metabolic syndrome in various ethnic groups



SUMMARY AND CLINICAL IMPLICATIONS

- In a contemporary large primary prevention cohort, free of diabetes or known vascular disease, approximately one-third of individuals had metabolic syndrome
- The highest prevalence of MS was amongst South Asians followed by white Caucasians and lowest amongst the Chinese
- LDL-cholesterol levels were similar in subjects with and without MS
- The mean FRS (20%) in non-diabetic subjects with MS was consistent with high CV risk
- Identification of MS, even in the absence of diabetes, is associated with substantial CV risk, and represents an opportunity for the application of preventive strategies

ACKNOWLEDGEMENTS

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